Getting More Out of State Transportation Infrastructure Spending

Tracy C. Miller and Megan E. Hansen

August 2016

MERCATUS WORKING PAPER

MERCATUS CENTER
George Mason University

3434 Washington Blvd., 4th Floor, Arlington, Virginia 22201
www.mercatus.org

Tracy C. Miller and Megan E. Hansen. "Getting More Out of State Transportation Infrastructure Spending." Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, August 2016.

Abstract

Recent trends suggest that the federal role in funding highways is likely to decline in the future. As a result, state and local governments will likely shoulder a larger portion of the costs of building and maintaining roads and highways. Like the federal government, however, many states do not employ their transportation revenues as efficiently as they could. In this study, we explore changes states could make to allow surface transportation dollars to go further, thereby better serving taxpayers and road users alike. Specifically, we examine how states can reduce costs created by regulations, can better allocate transportation funds to their most highly valued use, and can strengthen the link between drivers' willingness to pay and the amount spent on transportation infrastructure. We also explore the role that changes in incentives could play in reducing congestion; improving development patterns; and contributing to a more efficient mix of streets, roads, and public transportation infrastructure.

JEL codes: R42, R48, H4, H7

Keywords: transportation, highways, mass transit, roads, tolls, toll road, subsidies, public goods, taxation, public finance, public investment

Author Affiliation and Contact Information

Tracy C. Miller
Senior Policy Research Editor
Mercatus Center at George Mason University
tcmiller@mercatus.gmu.edu

Megan E. Hansen
Master's student
Utah State University

Getting More Out of State Transportation Infrastructure Spending

Tracy C. Miller and Megan E. Hansen

Recent debates about federal highway funding suggest that the federal role in funding highways is likely to decline in the future because of declining fuel tax revenue and the reluctance of Congress to raise taxes on gasoline and diesel fuel (see figure 1, page 44).[1] One representative introduced legislation that would give states the option of taking their share of highway funding directly rather than having to rely on the Federal Highway Administration (FHWA) to decide how much funding goes to each spending category.[2] Whether or not the federal government continues to have a role in highway funding, state and local governments will likely have to pay a bigger share of the costs of building and maintaining surface transportation infrastructure. Like the federal government, many states do not use the funds they receive in gas taxes as efficiently as they could. In this article, we will explore changes states could make so that their surface transportation dollars go further, thus better serving state taxpayers and road users alike.

States are not getting as many benefits as they could from their highway spending for a number of reasons. Regulations raise the cost of highway construction at the state level. In addition to regulations that accompany federal money, states have their own regulations that often raise costs. Another problem is that state governments do not effectively maximize the

[1] A six-year highway bill passed in December keeps federal highway funding at about the same level as in the recent past, but it relies on additional revenue sources, including $53 billion of Federal Reserve capital, to supplement revenue from fuel taxes. For details, see Bart Jansen, "Congress Approves $305B Highway Bill," *USA Today*, December 3, 2015.

[2] US Sen. Rob Portman (R-OH), "Portman Introduces Bill Giving States Control of Their Own Federal Highway Funds," news release, May 2, 2015.

long-run value of the highway assets they own and manage.[3] The investment priorities of state highway departments are often based more on political considerations than on economic ones. Legislatures approve projects that funnel spending to the districts of politically powerful legislators instead of approving those where the spending would yield the largest net benefits. This spending results in bridges to nowhere and the misallocation of public resources.

Growing congestion in almost all metropolitan areas reveals the failure of conventional approaches—such as expanding highway capacity or encouraging more commuters to use mass transit—to reduce congestion. Congestion problems do not necessarily mean that more should be invested in highways or transit. Whether new highways are a worthwhile investment depends on drivers' willingness to pay compared to the cost of marginal additions to capacity. Because drivers do not pay directly for their use of a particular highway, it is difficult to estimate (a) their willingness to pay and (b) how marginal benefits compare to marginal costs.

Many of those problems are common to most or all states. Thus, much of this paper will discuss general principles that could be used to make highway funding more efficient in any state. State highway departments, however, do vary in their performance, with outcomes depending partly on the state legislation that governs highway funding and management. Some states have fewer costly regulations. Others have better procedures for asset management or for prioritizing projects. Some states have implemented innovative methods of relieving congestion, such as high occupancy toll (HOT) lanes, with varying degrees of success. Others have used public-private partnerships to reduce costs, to improve management, or to hasten the construction of new highway capacity.

[3] The state of Pennsylvania acknowledged this problem, noting the potential for saving money by more disciplined asset management that would emphasize preventive maintenance and preservation treatments. See Pennsylvania Highway Information Association (PHIA), *Pennsylvania Transportation Funding and Reform Commission Final Report* (Harrisburg, PA: PHIA, 2016).

States also differ in how much they invest in highways and public transportation. Thus, states can learn from each other, but reforms will vary between states because of differences in political culture, existing institutions, geography, population, and the current condition of transportation infrastructure.

As noted in a recent article, a promising way to improve highway funding is by replacing fuel taxes with comprehensive mileage-based user fees (MBUF).[4] Implementing such a drastic change would likely require a very long transition. This article focuses on changes that could be implemented in the short and medium run before a system of MBUFs could be fully operational.

The first section of this paper discusses problems that states face in funding and managing highways and mass transit. The following section discusses ways to reform state policy, the middle section summarizes the most important proposed reforms and how they could solve the problems that states face, and the final section identifies conclusions.

The Problem Explained

States face a number of problems involving funding and management of surface transportation. Those problems include (a) working with costly federal and state regulations, (b) choosing priorities, (c) allocating money to highways versus other spending priorities, (d) managing assets, and (e) balancing competing goals in urban areas. Decisions about highway and transit funding are affected by the interaction between federal, state, and local funding. The way funding flows from higher to lower levels of government and the share collected and spent by each level is shown in figure 2 (page 45).

[4] See Tracy C. Miller, "Improving the Efficiency and Equity of Highway Funding and Management: The Role of VMT Charges" (Working Paper No. 14-04, Mercatus Center at George Mason University, Arlington, VA, February 2014).

Eliminating Regulations That Increase Project Costs

Each state's highway spending is affected by federal regulations and rules about how federal highway trust fund money can be allocated. When states accept federal funding for highways—as all states do—that funding often comes with regulatory strings attached. States must comply with federal regulations if they want to be able to take advantage of federal money that can be used to build new highways or to repair existing ones. Those regulations, however, drive up the cost of completing infrastructure projects across the states.[5] Federal regulations not only raise the cost of highways, but also substantially raise the cost of public transit, which competes with highways for funds.[6]

Long before the federal government assumed control of highway projects across the United States, infrastructure projects were financed and managed by states, local governments, and private entities.[7] One option for reducing costs is for money from federal fuel taxes to be given to state highway departments in the form of block grants, with those departments then choosing how to spend the money. Turning fuel taxes over to the states would allow for greater flexibility, thereby reducing the regulatory burden of a federal one-size-fits-all approach.

Federal regulations aside, states also spend more than needed to build and maintain transportation infrastructure. Like the federal government, many state governments have imposed regulations that raise the cost of building and maintaining roads and highways. One of those is prevailing wage laws, which, in addition to being applied to all federally funded

---

[5] For a discussion of all the ways that federal funding raises the costs of highway projects, see Clifford Winston, *Last Exit: Privatization and Deregulation of the US Transportation System* (Washington, DC: Brookings, 2010), 41–45.
[6] William Lind, "Lean Urbanism Needs Lean Transit," American Conservative Center for Public Transportation, July 30, 2014.
[7] Gabriel Roth, "Federal Highway Funding," *DownsizingGovernment.org*, CATO Institute, June 2010.

construction projects, has also been enacted in 32 states.[8] The Davis-Bacon Act, enacted in 1931, requires all workers on a federally funded construction project to be paid at least the "prevailing wages" of the area.[9] States have enacted so-called "Little Davis-Bacon" Acts, setting their own wage floors for workers employed on transportation or other construction projects.[10]

Those state-level requirements further distort the labor market, thus adding to the cost of infrastructure projects. While such policies may benefit the workers involved, they add to the taxpayer burden and reduce the efficiency of state highway spending. In addition to raising costs, they reduce employment opportunities by preventing mutually beneficial exchanges at lower wages between workers and contractors. Prevailing wage laws are a classic case of concentrated benefits and dispersed costs, where a few workers benefit at the expense of all taxpayers. One way that states could stretch their transportation dollars further would be to eliminate state-level wage floors for workers on infrastructure projects.

Other state policies that often raise the cost of infrastructure projects are in-state preference policies. Those policies give preference for infrastructure project contracts to construction firms in the state, even if an out-of-state firm could complete the project at a lower cost. Such policies are politically popular because they appear to keep jobs, revenues, and spending associated with infrastructure projects in a state's economy. However, a study by Hoffer and Sobel found that broad-based preference policies are associated with an additional $664 million in capital expenditures and an additional $622 million in construction costs for the median state. Those additional costs eventually get passed on to state taxpayers, thereby

[8] US Department of Labor, *Wage and Hour Division: Dollar Threshold Amount for Contract Coverage*, January 1, 2015.
[9] Congressional Budget Office, "Repeal the Davis-Bacon Act," in *Options for Reducing the Deficit: 2014 to 2023*, November 2013.
[10] National Conference of State Legislatures (NCSL), "Prevailing Wage Resources" (Washington, DC: NCSL January 1, 2015).

increasing the burden of state infrastructure projects and reducing efficiency.[11] One way for states to spend their infrastructure dollars more wisely would be to get rid of broad-based in-state preference policies.

Choosing between Competing Transport Modes

Besides reducing or eliminating costly regulations, efficient management of state highway spending requires spending on projects that yield the greatest benefits relative to costs. A key challenge for states is to decide how to allocate funding among competing highway projects and between highways and public transportation. Ideally, funding should be allocated on the basis of marginal benefits and marginal costs. But because there is no market price for one mile of highway, there is no good way to calculate marginal benefits or marginal costs. It may be possible to estimate marginal costs if inputs are purchased in the market, but most transportation projects involve some inputs supplied by government agencies. The problem is in determining how much of the costs incurred by an agency should be allocated to each project.

Mass transit projects compete with highways for scarce state government revenue. This competition is most evident in states where some fuel tax revenue or highway toll revenue is diverted to fund mass transit.[12] A few state governments spend very little on public transportation, leaving transit to be subsidized by some combination of federal and local government funding.

---

[11] Adam J. Hoffer and Russell Sobel, "Protectionism among the States: How Preference Policies Undermine Competition" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, October 2015).

[12] For details on revenue sources used for transit funding in each state, see American Association of State Highway Transportation Officials (AASHTO), *Survey of State Funding for Public Transportation*: *Final Report 2014, FY 2012 Data* (Washington, DC: AASHTO, 2014).

One justification for subsidizing transit use is that if more people used mass transit instead of driving, drivers would benefit from the reduced highway congestion and would save time on each trip that they took. If highway capacity is underpriced, thereby causing congestion delays, a more efficient allocation of commuters between autos and transit might result if mass transit were subsidized. This result would cause more drivers to be incentivized to substitute mass transit for driving. Transit subsidies are a second-best solution to congestion. Subsidies will result in better use of transit infrastructure if buses and trains have excess capacity.

A better solution may be for drivers to pay for the marginal costs they impose on other drivers during congested periods with tolls that vary with demand. Pricing roads would provide signals about whether the value of constructing additional highway capacity would be enough to cover costs and would likely increase demand for transit as a substitute for driving. Under such an arrangement, the unsubsidized demand for transit would also provide better information about whether the benefits of expanding transit systems would be high enough to cover the cost.

The costs drivers incur for each trip they take include fuel, vehicle maintenance, and time. But in most cases, drivers do not have to pay the cost they impose on other drivers who are using the same highway and who must drive more slowly because of congestion. The exceptions to this are on roads where tolls vary with congestion. If drivers do not pay congestion tolls, moderate transit subsidies lead to a more efficient outcome. The optimal size of the subsidy, however, depends on the seriousness of the congestion problem and on how many people switch from driving to transit in response to the subsidy.[13]

[13] If the subsidy costs less than the value of the time saved by drivers because of reduced congestion, then it improves welfare. Some research shows that large transit subsidies in some major metropolitan areas enhance welfare. See Ian Parry and Kenneth Small, "Should Urban Transit Subsidies Be Reduced?," *American Economic Review* 99, no. 3 (2009): 700–724.

Transit fares paid are considerably less than operating costs in every major US metropolitan area, with most of the difference covered by government subsidies (figure 3, page 46). Subsidies to cover operating costs may be cost-effective in some US cities but only if they are not too large.[14] The problem is that subsidies not only cover part of operating costs, but also cover all capital costs. When all operating and capital costs are accounted for, rail transit systems result in positive net benefits in only one US metropolitan area.[15] As a way to reduce congestion in most urban areas, expanding the highway capacity will cost considerably less than expanding rail transit.[16] Expanding bus service, which involves lower capital costs than does rail transit, is sometimes cost-effective for reducing highway congestion.

The allocation of government funds, however, is not necessarily decided based on benefits and costs, but rather by which interest groups have the most power. The costs of transportation infrastructure projects are usually underestimated and the benefits overestimated. This problem is more serious with rail transit than with highways.[17] Subsidies from the federal government that are part of the New Starts Program have reduced the cost to local transit agencies of expanding rail transit relative to the cost of expanding bus service. Cities are incentivized to spend this federal funding, because local costs, which are only a small share of

[14] In the largest Michigan cities, fare revenue covers between 13 percent and 18 percent of bus operating and maintenance costs. "Transit: So Popular It Needs to Be Subsidized," *Michigan Capitol Confidential*, March 21, 2015.

[15] Research has found that rail transit systems result in a positive net benefit only in the San Francisco Bay area, even when the benefits of congestion reduction are accounted for. Rail transit has not been able to attract enough riders to cover its high average cost. Given the growing decentralization of urban areas, this problem is likely to continue. See Clifford Winston and Vikram Maheshri, "On the Social Desirability of Urban Rail Transit Systems," *Journal of Urban Economics* 62 (2007): 362–82.

[16] A mile of rail transit line "typically costs more to build than a four- to eight-lane freeway and typically carries fewer than half as many people as a single freeway lane mile" according to Randal O'Toole in "Roadmap to Gridlock: The Failure of Long-Range Metropolitan Transportation Planning" (Policy Analysis No. 617, Cato Institute, Washington, DC, 2008), 21.

[17] See Bent Flyvbjerg, Nils Bruzelius, and Werner Rothengatter, *Megaprojects and Risk: An Anatomy of Ambition* (Cambridge, UK: Cambridge University Press, 2003).

total costs, are less than benefits.[18] The result has been that many cities have established or expanded rail transit infrastructure, in spite of the high costs and small increases in transit use that have resulted.[19] Rail transit is cost-effective only in densely populated cities with a clearly defined central business district.

In public debates between those who advocate expanding rail transit and those who support building more highways, each side presents compelling arguments. The case for expanding rail transit depends on claims that it will generate substantial external benefits, including that it will attract transit-oriented development, an assertion that is not well supported by evidence.[20] In spite of the small percentage of commuters who use mass transit, most metropolitan areas invest almost as much in transit infrastructure as they do in highways, and some invest even more in transit infrastructure than in highways.[21]

That such a large percentage of commuters drives rather than uses transit, in spite of severe highway congestion, suggests that in many metro areas, marginal returns are higher for

[18] As part of the New Starts Program, urban areas compete for mass transit capital grants from the federal government, on the basis of their willingness to provide matching funds and whether they can demonstrate an urgent need for an expansion of transit facilities. If a city does not apply to use New Starts funding for transit investment, then the money allocated to that program will go for transit programs in other cities that submit applications that are approved. For more information on this program, see US General Accounting Office, *Mass-Transit: FTA's New Starts Funding Criteria*, 1998.

[19] Nathaniel Baum-Snow and Matthew Kahn, "Effects of Urban Rail Transit Expansions: Evidence from Sixteen Cities, 1970–2000," in *Brookings-Wharton Papers on Urban Affairs* (Washington, DC: Brookings Institution Press, 2005), 147–206.

[20] As noted earlier, Winston and Maheshri, "On the Social Desirability of Urban Rail Transit Systems," have demonstrated that at existing levels of ridership, rail transit is not cost-effective in most US cities, so arguments for it must rest on potential future benefits, such as transit-oriented development improving neighborhoods and motivating less driving and more transit use in the future. Some evidence exists that high-density development has occurred near transit stations in older urban areas with well-established transit systems. However, in newer metro areas in the south and west, transit stations often do not attract high-density development without subsidies; that which occurs is often opposed by local residents. Such development, by increasing highway congestion, may reduce how far people can commute to jobs, thus resulting in worse job matches and lower incomes. See John Charles and Michael Barton, "The Mythical World of Transit-Oriented Development: Light Rail and the Orenco Neighborhood, Hillsboro, Oregon" (report, Cascade Policy Institute, Portland, OR, April 2003).

[21] Transit's share of metropolitan transportation plan funds exceeded 50 percent in 9 metropolitan areas and was more than 20 percent in 33 metro areas. New York is the only metropolitan area in the United States where more than 20 percent of commuters use mass transit. The data are reported in table 1 in O'Toole, "Roadmap to Gridlock."

highway than transit spending. Nevertheless, without prices being charged for using highways, it is not possible to calculate whether the marginal benefits are high enough to cover the marginal cost of expanding highways. Although it does not take long for urban expressways to become congested after capacity is expanded, this reality does not reveal how much drivers value the additional capacity. Congestion pricing could provide information on the marginal benefits of capacity expansion as well as giving drivers an incentive to reduce driving during periods when demand for highway capacity is greatest.

Besides adjusting the mix of spending between transit and highways to equalize marginal returns, state highway agencies should reallocate highway spending to better achieve their priorities. One way that states may be able to get more out of their limited budgets is to reduce the amount they spend on lightly traveled highways in rural areas, perhaps even reducing the mileage that is paved.[22] Approximately 80 percent of vehicle miles traveled occur on a small percentage of paved highways, which can be considered major highways.[23]

State decisions to reduce spending on lightly traveled roads would be more politically palatable if those decisions were based on objective criteria, such as traffic volumes, that could be explained to the public. The problem with decisions about how to allocate state highway funding is that, of necessity, those decisions are influenced by the political power of nearby residents and the users of each particular road or highway. Thus some states spend a substantial share of their budgets on replacing and upgrading bridges that serve small but wealthy rural communities while neglecting maintenance of bridges along Interstates and heavily traveled

[22] For example, Utah has an estimated $11 billion shortfall for priority projects included in state transportation plan through 2040. "The state has even stopped maintaining some rural highways for lack of money." See Lee Davidson, "Legislators: Utah Tax Hikes Coming for Gas, Roads, Transit," *Salt Lake Tribune*, January 6, 2015.
[23] US Department of Transportation, Federal Highway Administration (US DOT FHWA), "Missouri DOT Performance Management Case Study" in *Beyond the Short Term: Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*, 2015.

arterial roads and highways.[24] Whether they look at rural or urban areas, critics of highway policy can find numerous examples of states spending millions of dollars to build new highways or to redesign existing ones in spite of few benefits.[25]

Determining How Much Money to Spend on Surface Transportation

The political process will not necessarily result in an optimal level of highway or transit funding. In some states, politically powerful transportation supporters have succeeded in passing legislation to increase fuel taxes or other taxes earmarked for highways or transit or both. In other states, especially those in which fuel tax revenue can be used for purposes other than transportation, highways must compete directly for funding with other programs, such as education.

One major funding need, the reconstruction of Interstate highways, is not accounted for in state highway budgets, because states have traditionally relied on federal funding to cover most construction and maintenance costs for Interstate highways. The Interstate Highway System was built to last 50 years, and many Interstates are now reaching the end of their useful lives. Robert Poole estimates that it will cost approximately $589 billion in 2010 dollars to replace all 47,000 miles of Interstate without adding any new lanes or new routes.[26] Unless a much larger share of federal matching funds is used for Interstate highways and less is spent on other roads and highways, not enough will be available to pay for reconstructing and widening Interstate

[24] Marohn discusses the example of the Interstate bridge failure in Minnesota, which occurred at about the same time that the state was spending money to reconstruct bridges serving relatively small numbers of local residents in rural areas. See Charles Marohn, *A World Class Transportation System: Transportation Finance for a New Economy* (Kindle Locations 422–30, Kindle ed., 2014).
[25] For an example of a multimillion-dollar highway project with dubious benefits, see Charles Marohn, "Best of Blog: PennDot Fiddles," *Strong Towns*, December 17, 2012.
[26] Robert Poole, "Interstate 2.0: Modernizing the Interstate Highway System via Toll Finance" (Policy Study 423, Reason Foundation, Los Angeles, CA, September 2013).

highways to keep up with projected increases in traffic.[27] Thus, state and local governments will need to either raise more revenue or find ways to get more out of their highway spending than they have in the past.

Developing an Asset Management

Some evidence suggests that the marginal benefit per dollar spent on maintenance exceeds the marginal benefit per dollar of new construction.[28] Highways are an asset. How well they are maintained will determine how much a state must spend to achieve a given level of mobility. One way that states could get more out of their current levels of spending is to develop an asset management plan that is proactive rather than reactive.[29] If states were to focus more on preventive maintenance, this approach would extend the life of pavements and bridges so that states would spend less on expensive reconstruction and replacement projects.

Many state highway maintenance divisions focus on solving existing problems, such as patching potholes or improving the condition of pavement that falls below some specified quality standard.[30] Given limited resources, it is easy to skimp on preventive maintenance treatments, because those treatments do not directly increase the number of miles of pavement that meet ride quality targets. But by investing in preventive maintenance such as sealing cracks and chips and strengthening shoulders, highway departments can reduce the number of potholes and pavement-

[27] If reconstruction occurs over 35 years, the cost per year will be $16.8 billion. The FHWA estimates that the total spent on Interstate rehabilitation in 2010 was less than $11 billion. See FHWA, *2010 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*. Poole, "Interstate 2.0," estimates that adding lanes to keep up with projected increases in traffic would increase the annual cost to more than $27 billion, which is considerably more than the $15 billion to $20 billion now being spent annually on Interstate rehabilitation, enhancement, and expansion.
[28] Sarantis Kalyvitis and Eugenia Vella, "Public Capital Maintenance, Decentralization, and US Productivity Growth," *Public Finance Review* 39 (2011): 784–809.
[29] US DOT FHWA, "Key Agency Roles in Asset Management," *Beyond the Short Term*.
[30] US DOT FHWA, "Asset Management as a Quality Framework."

edge failures and can prolong the life of a road. While less politically popular in the short run, this type of management would save taxpayer money in the long run.

Critics of US highway policy have noted that many US highways were constructed with pavement that is not thick enough, thereby saving money in the short run but increasing the present value of total spending in the long run.[31] Such an approach has enabled highway agencies to build more highways with a given amount of resources, but it has also necessitated more frequent maintenance and reconstruction. By making pavement less durable in the past, states have increased the cost of maintaining quality highways in the present. States can save money if they reallocate their limited resources to do a better job of constructing highways with pavement durable enough to minimize costs for the long run.

One of the challenges facing highway agencies is to convince the public that long-term asset management is a good strategy. To succeed at this, highway departments must demonstrate a customer-service attitude toward the voting public. Members of the public are more likely to support increased transportation spending if they are convinced that the state highway department is responsive to them, as evidenced by how quickly the department fixes urgent problems, such as filling potholes.[32] In states that have overemphasized fixing short-run problems in the past, money will be hard to find for (a) solving the urgent problems that upset voters and (b) increasing spending on long-term asset management.

[31] Clifford Winston, "Efficient Transportation Infrastructure Policy," *Journal of Economic Perspectives* 5, no. 1 (Winter 1991): 113–27.
[32] US DOT FHWA, "Asset Management as a Quality Framework."

Balancing Goals to Encourage Better Urban Development

One challenge in discussing the management of streets, roads, and highways is to recognize that they serve multiple goals. Roads not only provide mobility, they also influence development patterns, aesthetics, and the kind of lifestyle people lead. One way that governments attempt to balance competing goals is through metropolitan transportation planning. The 1962 Federal-Aid Highway Act required metropolitan planning organizations (MPOs) to be established in all urban areas with a population of at least 50,000. The purpose of MPOs was to direct and organize the transportation planning process for urban areas.[33] The federal government requires MPOs to write long-range (20 to 30 years) metropolitan transportation plans.[34]

Long-range plans assume a government agency can predict and influence development patterns 20 to 30 years in the future. Development patterns, however, are the result of complex interactions among where firms locate, household preferences, land values, infrastructure costs, zoning laws, and transportation alternatives. Although planners may be able to do a reasonably good job of expanding highways and public transportation in light of current trends in residential and commercial development, the further they go into the future, the less accurate their forecasts are. Many long-range plans emphasize altering behavior to achieve development patterns that turn out to be inconsistent with the kinds of communities where people choose to live and work. Thus, the longer range the plan, the more the outcome will likely differ from the predictions of planners.

Many metropolitan transportation plans place too much emphasis on altering people's behavior. Such plans are meant to achieve patterns of development envisioned by planners rather

[33] US DOT FHWA, *Metropolitan Planning: Legislation and Regulations* (USDOT FHWA, Washington, DC, July 17, 2015).
[34] O'Toole, "Roadmap to Gridlock."

than to foster the kind of development that people would choose for themselves. O'Toole argues that rather than planning to expand highways to reduce congestion, some MPOs view growing congestion as a way to discourage people from driving. But such attempts to alter behavior do not work very well. Urban areas with plans that have emphasized expanding or promoting transit use and land use regulation have not seen much reduction in driving.[35]

It is often in the interest of local governments to plan for and promote high-density development. Governments must maintain the streets and the sewer and water lines under the streets, and they need tax revenue to do so. High-density development will increase the tax revenue associated with a given amount of infrastructure, thereby increasing the likelihood that local government can maintain it without going into debt.

Whether dense development occurs also depends on incentives facing landowners. If property tax rates depend on how much is built on the land, landowners have an incentive to build less. This tax rate is one reason people may choose to build less densely than otherwise. One argument for taxing land rather than improvements to the land is that it gives landowners an incentive to build more housing, apartment units, or office space in those areas that residents or businesses value most highly.

O'Toole argues that MPO transportation plans often focus on land use goals that reflect the preferences of the planners and are not consistent with most people's preferences about where to live and work.[36] Where people choose to live is also affected by the incentives they face. Transportation plans that seek to promote relatively dense development are usually

[35] According to O'Toole, "Roadmap to Gridlock," not a single urban area "can claim to have reduced per capita driving by even 1 percent." People who choose to live in more dense neighborhoods drive less, but if higher density is the result of policy and does not reflect residential choices in response to market incentives, it will have a relatively small effect on driving per capita.
[36] Ibid.

consistent with the financial interests of local governments. The lower cost of homes in less dense neighborhoods makes those areas more attractive for some residents.

Residents and businesses, however, do not always bear the full costs of low-density development. Local governments often do not require developers of new residential areas and commercial facilities or the subsequent owners to pay the full marginal cost of building and maintaining infrastructure. This problem is exacerbated when businesses receive tax breaks for opening in a new location.[37] Also, existing residents often oppose new development in existing neighborhoods. This opposition plays an important role in limiting residential density and raising the cost of houses in those neighborhoods, which are often more densely populated than suburbs.[38]

Auto-oriented development, often the result of a combination of zoning laws, highway design standards, tax policy, and market forces, can lead to the decline of urban neighborhoods and businesses. Thus, the tax base is reduced as low-density developments in outlying areas replace traditional neighborhoods.[39] Many city planners aim to reverse this process. Nevertheless, many planners acknowledge that per capita driving will rise in the future despite new rail transit lines and increased population densities that their plans advocate.[40] Many plans emphasize getting more people to use transit instead of expanding highways. Adhering to such plans often results in increased congestion, which gives people a greater incentive to live and work in outlying suburbs.

Because of incentives created by government policy, people's choices of where to live or locate their businesses are different than they would be if they had to pay the full costs

[37] For an example of this, see Charles Marohn, "The Allure of Shiny and New," *Strong Towns*, September 18, 2015.
[38] Matthias Cinyabuguma and Virginia McConnell, "Urban Growth Externalities and Neighborhood Incentives: Another Cause of Urban Sprawl," *Journal of Regional Science* 53, no. 2. (2013): 332–48.
[39] Charles Marohn, "Adding Insult to Injury," *Strong Towns*, January 11, 2012.
[40] O'Toole, "Roadmap to Gridlock."

associated with the neighborhood where they live or work. As a result, businesses produce goods and services less efficiently, and fewer people live where they would choose to if regulation did not raise the relative cost of living or operating a business in the most desirable neighborhoods. Tax policy and zoning laws sometimes increase the cost of living in more dense urban neighborhoods, thus discouraging people and businesses from buying or renting in such areas. In metropolitan areas where infrastructure is funded by local taxes, residents of more dense neighborhoods may end up subsidizing those who live in less dense neighborhoods. That subsidy occurs because the per capita cost of maintaining infrastructure is higher when density is lower.

Although transportation plans may seek to offset the distortions caused by tax policy and zoning laws, they often fail to adequately account for residents' preferences. Many people value mobility highly and prefer paying less per square foot of housing than what it would cost to live in compact urban neighborhoods. By not adequately accounting for the demand for mobility and for big houses on large lots, the long-term planning required of MPOs sometimes does more harm than good. It locks "more and more urban areas into dubious programs of increased congestion, . . . unaffordable housing and costly rail projects."[41]

Too often, plans have the effect of restricting development in some parts of metropolitan areas but have limited success in promoting dense development in urban centers and inner ring suburbs. If plans restrict development in some suburbs, as a result people move to more distant suburbs with fewer restrictions, thereby reducing density. State transportation policy, which often focuses on getting drivers to their destinations as quickly as possible, often is not consistent with planners' goals of encouraging more dense development. In particular, state highway design

[41] Ibid. 24.

standards play an important role in discouraging the kind of dense urban development that was common in the past.

Part of good urban transportation planning is to clearly distinguish roads and highways from streets. Roads and highways are intended to move people quickly toward their destination. The purpose of streets is to attract high-quality development. Most cities have too many of what Marohn refers to as "stroads," streets where commercial development is encouraged, but which are designed to move traffic rapidly to its destination. Such commercial development increases congestion and slows traffic. The less-dense, auto-oriented commercial development along stroads may result in lower land rents than in commercial corridors along streets in denser urban neighborhoods. As suburbs have grown, many urban streets have been widened to become stroads filled with fast-moving commuter traffic, while roads and highways into town have become surrounded by commercial development and access roads that have slowed traffic. Thus both congestion and low density are not entirely the result of market forces but are partly the result of unintended consequences of state control and design of highways.

Options for Reforming State Highway Funding and Management

State Political Culture and Institutions

This section seeks to explore how institutions affecting highway funding and management can be reformed to help solve some of the problems described previously. Because the goal is a more cost-effective transportation system, we also consider private alternatives to state funding and management that would benefit state residents.

Most highway funding comes from fuel taxes. The amount of revenue raised through the fuel tax is connected to the number of vehicle miles traveled, which should be roughly

proportional to the cost of building and maintaining highways. In many states, fuel tax revenue is earmarked for highways only, but other states permit it to be used for mass transit as well. Some states even use fuel taxes for purposes other than transportation, such as education. Not all states rely solely on fuel taxes to pay for highways. Virginia, for example, recently raised its state sales tax by 0.3 percent and used the proceeds for funding highways and mass transit.[42]

Because of their relationship to miles driven, fuel taxes have some advantages over other methods of paying for transportation. Nevertheless, it is not realistic to argue for a one-size-fits-all method of funding surface transportation across states. Whatever method of tax funding is used, decisions about priorities will reflect political considerations rather than benefits and costs.

Whether taxes result in a level of spending for surface transportation that is close to optimal may depend on the kind of taxes that are used, including the role of dedicated user fees and general fund revenue sources. When general fund revenue is used for transportation or when fuel tax revenue is used for purposes other than transportation, political pressure could lead to too much or too little spending on highways. Politics also affect whether dedicated fuel taxes generate enough revenue for highway funding. If fuel tax rates are not indexed to the cost of maintaining and constructing highways, real highway spending will tend to decline during inflationary periods.

One way to overcome underfunding of highways is to combine state funding with another source. In the case of expressways, tolls are a promising alternative funding source that can also help address problems with congestion.[43]

---

[42] National Conference of State Legislators, "Transportation Funding and Finance Legislation Database," Virginia House Bill 2313, 2015.

[43] In many states, enacting local option transportation taxes is another way that cities, counties, and transit districts supplement revenue from state or federal fuel taxes. See Todd Goldman and Martin Wachs, "A Quiet Revolution in Transportation Finance: The Rise of Local Option Transportation Taxes," *Transportation Quarterly* 57, no. 1 (2003): 19–32.

Advantages and Disadvantages of Tolling

Using tolls instead of fuel taxes to fund highways can address congestion problems and supplement inadequate government funding for highways. Toll funding, especially when combined with public-private partnerships (PPPs), may allow funding decisions to be based on comparing marginal costs and benefits, rather than on political considerations alone.

Few states have been very successful in reducing highway congestion. Between 1984 and 2005, the percentage of congested highways increased in 35 states and fell in only 15 states (figure 4, page 47).[44] Highway departments have used two primary approaches to reduce congestion—expanding highways or promoting greater use of public transit. Neither approach has been successful. As a result, urban Interstate capacity has not kept up with traffic in most cities. Good public transit systems help reduce congestion, but recent transit expansions have not resulted in enough substitution away from driving to have much effect on congestion.[45]

Congestion results when demand for highways exceeds capacity. As with other goods, excess demand for highways results when prices are too low. Thus, a high enough price for highway use could eliminate excess demand and reduce congestion. One simple way to set a price would be to charge tolls so that drivers pay directly for their use of highways.

The one approach that has proven effective in reducing congestion is the use of tolls on express lanes, particularly if the level of tolls varies throughout the day and is higher during peak traffic periods. In the past few years, a growing number of toll highways have implemented open road tolling with all-electronic toll collection so that drivers do not stop to pay at toll booths.

---

[44] "Congestion" is reported by the states, and it is measured as a volume-to-capacity ratio according to the Transportation Research Board's Highway Capacity Manual. The percentage of urban Interstate miles congested increased by 15 percent between 1984 and 2005. For details, see David Hartgen and Ravi Karanam, *16th Annual Report on the Performance of State Highway Systems* (Policy Study 460, Reason Foundation, Los Angeles, CA, 2007).

[45] O'Toole, "Roadmap to Gridlock."

When tolls are used to fund the construction of new express lanes or to allow additional vehicles on lanes that were previously limited to high occupancy vehicles (HOV), then tolls result in lower congestion.[46]

On urban expressways, tolls that vary with congestion would incentivize some peak-period commuters to change the timing of their trips. As noted earlier, congestion tolls would work better than transit subsidies do at reducing congestion in a cost-effective way. Congestion tolls could be set high enough to eliminate rush-hour congestion without expanding highway capacity. If congestion tolls are high enough and if drivers are still willing to pay them, then tolls could provide a signal that drivers are willing to pay the cost of expanding highways.

Very few highways have tolls that vary with congestion. Popular opposition to the use of congestion tolls is widespread, with the tolls viewed as just another tax. Drivers' views may become more favorable, however, if they experience congestion pricing and observe the effectiveness of the higher prices at reducing congestion.[47]

If state or local governments are not spending enough on highways, tolls on limited-access highways can also be used to offset inadequate tax revenue. Tolls make it possible for some highways to be self-funded. If a private firm or a PPP must rely on only toll revenue to fund a given highway, then the firm will have an incentive to extend the highway and add lanes only to the point where expected marginal revenue exceeds expected marginal costs. By limiting spending on additional lanes or new highways to what can be covered by tolls or financed by

[46] Tolling existing express lanes rather than new ones might increase congestion on adjacent free lanes. Converting express lanes to HOT lanes could increase welfare by about 70 percent as much as full tolling, according to simulation model results. See Kenneth Small, Clifford Winston, and Jia Yan, "Differentiated Road Pricing, Express Lanes, and Carpools: Exploiting Heterogeneous Preferences in Policy Design," in *Brookings-Wharton Paper on Urban Affairs* (Washington, DC: Brookings Institution Press, 2006), 53–96.

[47] For an example of this, see Jonas Eliasson et al., "The Stockholm Congestion—Charging Trial of 2006: Overview of Effects," *Transportation Research Part A: Policy and Practice* 43, no. 3 (2009): 240–50.

revenue from anticipated future tolls, enough funding will be available to fund those projects that satisfy drivers' demand for mobility in a cost-effective way.[48]

Using tolls to offset shortfalls in tax revenue raises one objection—tolls are regressive, because the burden to income ratio is higher for low-income households.[49] Fuel taxes are also regressive if the income elasticity of mileage driven is less than one. Unless tolling becomes widespread, any increase in regressivity is likely to be small. If widespread tolling were implemented, states could reduce fuel taxes, which would offset most of the increase in regressivity from tolls.

Despite the benefits of toll roads, their competition with adjacent roads and highways without tolls makes it hard for toll highways to cover their costs. Most toll highways in the United States are not far from a freeway or an arterial highway that could be used to reach many of the same destinations. For this reason, tolls must be kept low or too few drivers will use the toll highway. This lower use is particularly true of newly constructed, toll-funded highways that are managed by PPPs. Private firms managing highways are competing with governments that practice the equivalent of predatory pricing—charging a zero price and then covering costs by taxes on all drivers. This practice is why private highway managers often negotiate agreements that restrict government options for expanding competing highways or require them to compensate the private partner if they do.

Where toll highways face more limited competition, tolls are sometimes higher than necessary because toll agencies administer them like taxes, using some of the revenue for purposes other than for managing the toll highway itself. For example, some states, such as

[48] This self-funding mechanism would work better if toll highways were not competing with nearby free roads and highways.
[49] Equity issues involving congestion tolls are discussed in Ian Parry, "Pricing Urban Congestion," *Annual Review of Resource Economics* 1 (2009): 461–84.

Pennsylvania, use toll revenue to subsidize public transit.[50] Even if toll revenue were used exclusively for toll highways, new toll highways would face political opposition, particularly from the trucking industry. Truckers and other users of toll highways are paying twice for the miles they drive—once through fuel taxes and again through tolls.

Robert Poole , director of transportation policy at the Reason Foundation, argues that to make tolls more politically acceptable to the trucking industry, state governments should implement rules that require that toll revenue be spent to maximize the net benefits of using the toll highway.[51] He proposes that federal and state governments pass enabling legislation that would do the following:

- "Limit the use of toll revenues to the newly tolled facilities."
- "Charge only enough to cover the full capital and operating costs of the tolled facilities."
- "Begin tolling only after" a highway has been upgraded to 21st-century design standards.
- "Use tolls *instead of*, rather than in addition to, current state fuel taxes."[52]

If implemented, Poole's proposal could sometimes result in tolls below the level consistent with reducing or eliminating congestion. Instead of restricting the level of tolls on all lanes, charging higher tolls on express lanes but limiting tolls on regular lanes might be a politically acceptable way to distinguish between drivers willing to pay for a congestion-free trip and those who prefer a more affordable alternative. Such an approach would also be less regressive than tolling all lanes.

[50] In Pennsylvania, after the legislature approved Act 44 in 2007, the state department of transportation started receiving revenues from the turnpike to subsidize mass transit.
[51] Robert Poole, "Truck-Friendly Tolls for 21st Century Interstates" (Policy Study No. 466, Reason Foundation, Los Angeles, CA, 2015).
[52] Ibid., 5–6.

When some highways have tolls and others do not, higher tolls result in more traffic and higher maintenance costs for competing roads that do not have tolls. Thus, it may be more efficient for government to subsidize toll roads rather than requiring that all costs be covered by tolls. Rebating fuel taxes for users of toll highways would be another way to account for the external benefit from reduced congestion on other highways if more drivers use toll roads. Fuel tax rebates could also make tolls more politically acceptable.

Tolls would make it easier to finance additional lanes and to reconstruct existing lanes of Interstate Highways. Tolls could also be used to finance truck-only lanes on some busy corridors. If tolls were used to upgrade the quality of Interstates, thereby enabling trucks to get to their destinations more quickly with less auto congestion, truckers might be more inclined to politically support them, particularly if all toll revenue was used for the highway on which it was paid.

Toll roads provide a promising method for states to overcome funding issues for highway management, construction, and maintenance. Nevertheless, to the extent that almost everyone pays fuel taxes, gaining political support for new toll highways will continue to be difficult unless those highways clearly offer superior value to alternative free highways. Toll highways are most likely to be politically feasible in rapidly growing urban areas where highway budgets cannot keep up with demand. Tolls are also more politically acceptable if they apply only to selected lanes so that drivers can choose whether they are willing to pay extra for a congestion-free trip. More widespread use of tolls may contribute to better highways in some states, but other changes can also play an important role in improving highway funding and management.

Changes of Who Is in Charge: Public-Private Partnerships

If a highway can be financed by tolls instead of tax revenue, then it can be managed by a private firm rather than by the government. Although no highways in the United States are privately owned, several states use PPPs.[53] PPPs involve private firms that lease highways from the government and that agree to manage them to achieve specified performance standards. PPPs are typically funded by direct user fees, such as tolls, but some are funded by state payments in lieu of direct user fees, known as availability payments.

Billions have been invested in PPPs to build and maintain highways since the 1990s. Typically, PPPs involve state investment of from 20 percent to 25 percent, which works like a down payment.[54] A private infrastructure investment firm finances the rest.

When government funds and manages highways, there is a principal-agent problem. The state highway agency is supposed to manage highways to satisfy the interests of the voting public. Other interest groups, however, including contractors, are likely to try to influence decisions made about highways in their favor. One large construction contractor stands to gain or lose much more than an individual voter from decisions about highways. Thus, individual voters do not have much incentive to be well informed about how efficiently the state highway department is managed. As a result, the projects that get funded are not necessarily the ones that yield the greatest net benefits. A recent Congressional Budge Office (CBO) study reports the result of benefit-cost analysis done by the Federal Highway Administration, which reveals that too much is spent expanding and repairing rural Interstate

[53] US DOT FHWA, "Public-Private Partnerships: P3 Defined," accessed September 24, 2015, www.fhwa.dot.gov /ipd/p3/defined.
[54] Bernard Feigenbaum, "Innovative Financing Tools Stretch Transportation Resources" (Testimony before the Senate Finance Committee, Reason Foundation, Los Angeles, CA, July 13, 2015).

Highways, whereas not enough is spent expanding and repairing urban Interstates or other major urban highways.[55]

If highways were privately owned, their owners would be incentivized to manage them to maximize their market value. Assigning private property rights would incentivize highway owners to provide the quality and quantity of highway capacity that drivers are willing to pay for and to spend more on highways that are most heavily traveled. All highways managed through PPPs in the United States remain public property. PPPs, however, provide some of the same benefits that full private ownership would yield. Even though they do not own the highways, private firms that lease highways will manage them to attract more paying users as cost-effectively as possible, because this usage will maximize their profits.

PPPs have many critics who can find examples of how some PPPs have been mismanaged. Although flaws can be identified in the way PPPs are managed, they should be compared with the alternative, which is management by a state-owned enterprise (SOE).[56] Private firms managing highways have owners who are residual claimants, thereby earning profits that depend on how many people use the highway; how much they pay to use it; and how much money the firm incurred to build, maintain, and manage it. Ownership rights to private firms can also be traded, thus giving owners an incentive to maximize the present value of the firm's assets, which will be reflected in the market price of the firm. This market price serves as an objective indicator of firm value and of managerial performance.[57]

---

[55] Although the data are about federal highway spending, state highway departments make the decisions about which highways or bridges to expand, repair, or replace in each state. See Congressional Budget Office, *Approaches to Make Federal Highway Spending More Productive*, February 2016.
[56] R. Richard Geddes, *The Road to Renewal: Private Investment in US Transportation Infrastructure* (Washington, DC: AIE Press, 2011), 41.
[57] Geddes, *Road to Renewal.*

SOEs, however, do not face the same incentives as private firms. Richard Geddes points out several problems with SOEs, including the following:

- SOEs, lacking residual claims that can be traded, have no comparable objective indicator of managerial performance.
- SOEs are effectively owned by the voters collectively, so that no one voter has concentrated ownership or much incentive to incur the cost of monitoring the performance of an SOE.
- Unlike owners of private firms, who self-select and likely share common interests, owners of an SOE are diverse and may have conflicting objectives.[58]

When highways are managed by private firms that earn toll revenue for doing so, those private partners have a greater incentive to keep roads well maintained, to limit congestion, to provide safety improvements, and to keep costs down than do government tolling agencies. Private firms also have an advantage in raising capital. Large private firms with a good track record can raise massive amounts of capital relatively quickly and can finance new projects with equity as well as debt.[59]

Besides being able to raise capital more quickly, private partners are motivated to get construction finished sooner because delays can raise project costs substantially, thus reducing profits. According to the CBO, when compared with traditional funding methods, PPPs have slightly reduced the time required to complete road projects and lowered construction costs.[60]

---

[58] Ibid., 44.
[59] In 2005, SAFETEA-LU authorized the use of private activity bonds, which are tax exempt, for qualified transportation projects. This leveled the playing feeling between private and public borrowing to finance highways. Ibid., 88–89.
[60] Joseph Kile, "Public-Private Partnerships for Highway Projects" (Testimony before the Panel on Public-Private Partnerships, Committee on Transportation and Infrastructure, US House of Representatives, March 5, 2014).

PPPs may also have the advantage of incentivizing management strategies that consider long-run maintenance costs rather than focusing solely on minimizing up-front construction costs. If a privately managed project has a long-term lease, private firms have better incentives than do government agencies to manage their assets efficiently. When government agencies pay for highways, they usually award construction contracts to whatever contractor agrees to meet their specifications for the lowest price. A contractor who agrees to complete the project for the lowest price may cut corners on constructions costs, which may lead to higher maintenance costs in the future. If instead, a private firm is given a contract to design, build, and maintain the highway for a specified period of time, then it will have an incentive to consider something else. The firm will regard expected maintenance costs in deciding how much to spend on construction and will have an incentive to use preventive maintenance to enhance profits and the value of the highway in the long run.

When negotiating transportation PPPs, governments often do not spell out all the details of the agreement in the original contract, thus leaving some parts of the arrangement to be negotiated later. Most contracts give considerable discretion to the government partner, thereby increasing downside risks to the private partner. Furthermore, legislatures can abrogate contracts in a way that private firms cannot.[61] Nevertheless, to continue to attract private firms willing to offer high bids for PPPs, governments have an incentive to treat private partners fairly and to keep commitments.

One challenge for governments working with private partners is to find a way to get firms managing private highways to charge a price that covers average cost rather than a higher price that would enable them to maximize profits. This pricing could be accomplished by treating the private

[61] Geddes, *Road to Renewal*, 134–35.

partner as a public utility and regulating the tolls that may be charged. As noted earlier, offsetting the external effects of high tolls on nearby public highways may justify setting tolls below average cost with government providing a subsidy to the private partner to make up the difference.

Competition with publicly funded highways often makes it hard for private firms to earn enough revenue from tolls to cover costs on highways they manage. Thus, firms with a toll concession often seek contractual terms that either limit expansion of competing public highways or compensate the firms for the resulting lost revenue. In the case of privately managed California State Route 91, the contract included a noncompetition agreement, which limited the ability of highway agencies to expand nearby free lanes. As the need for additional lanes on competing highways became more urgent, public opposition to the PPP agreement grew. Eventually the local government purchased the road from the private partner so that nearby highways could be expanded to meet demand.[62] The conflict that resulted from the way this agreement was structured hurt the reputation of PPPs. As a result, subsequent PPP agreements have included compensation clauses rather than noncompetition agreements to make it easier to expand competing public roads.

A number of PPP agreements for highways have been successfully implemented in the United States.[63] Two well-known PPPs involved the purchase of existing toll highways are the Indiana Toll Road and the Chicago Skyway. PPPs have been used to fund new highways, among them the Dulles Greenway in Virginia and Texas State Highway 130. Without private funding, those highways might not have been built.

More recently, a PPP was used to fund construction of HOT lanes on the Capital Beltway around Washington, DC. The sale of the Chicago Skyway enabled the city to improve its bond

[62] Phineas Baxandall, Kari Wohlschlegel, and Toy Dutzik, *Private Roads, Public Costs: The Facts about Toll Road Privatization and How to Protect the Public* (Boston: US PIRG [Public Interest Research Group] Education Fund, 2009).
[63] See Geddes, *Road to Renewal*, 34–40.

rating and to get a higher rate of return from a valuable asset. The state of Indiana also improved its bond rating and was able to use the proceeds from selling the toll road to fully fund a state transportation plan from 2006 to 2015.

A good way to encourage more PPP agreements in a state is to pass enabling legislation that specifies transparent general rules that apply to all agreements. Such rules should deal with potential conflicts between the interests of the private partners and the state, such as conditions under which the state can make improvements to competing public roads.

One promising approach would be to specify clear performance standards involving safety and congestion that would serve as a trigger determining when those roads could be expanded or improved. This approach should help overcome objections that PPPs are too often negotiated behind closed doors in a way that is contrary to the interests of highway users. In states with enabling legislation, firms that incur the upfront costs to bid on a project will have more confidence that they have a chance to win the bid as long as they satisfy the rules rather than being subject to whether a majority of legislators decides to vote in favor of specific PPP proposals.

The consequences of not having enabling legislation are illustrated by what happened when firms placed bids to lease the Pennsylvania Turnpike in 2008. After the governor solicited bids and accepted the winning bid, the bidders and the state were left in limbo for months as the legislature debated whether to approve the agreement. The legislature never voted on the agreement.[64] States such as Pennsylvania that require each PPP agreement to get legislative approval have few if any highways managed by PPPs.[65] Firms instead concentrate their efforts to

[64] Pew Center on the States, *Driven by Dollars: What States Should Know When Considering Public-Private Partnerships to Fund Transportation*, (Washington, DC: Pew Center on the States, 2009).
[65] Richard Geddes and Benjamin Wagner, "Do State Public-Private Partnership Enabling Laws Increase Investment in Transportation Infrastructure?" (Department of Policy Analysis and Management, Cornell University, Ithaca, NY, August 2012).

secure PPP agreements in states where they do not have to wait for legislative approval to lease the asset after submitting their bids.

State vs. Local Funding and Management

PPPs funded by tolls are feasible only on limited-access highways.[66] Hence, streets and roads on which it is not feasible to collect tolls will likely continue to be funded by taxes. Rather than being funded by state taxes, however, streets that serve primarily local residents might be more efficiently managed if funded by local governments.

In many states, rural roads and streets that serve primarily local residents are managed by local governments.[67] A few state governments, such as Virginia and North Carolina, manage major portions of the rural road system.[68] Even in states where local governments manage rural roads and streets, a considerable share of funding comes from the federal or state government.[69]

Local funding could be used to replace state and federal funding, and it could also lead to better decisions about projects that benefit primarily local residents.[70] A general principle for efficient management of public programs is to have each program funded and managed by the

[66] In the long run, states could transition to funding roads and highways by VMT (vehicle-miles traveled) charges. Because those charges could be assessed on all miles driven, they could be collected for all kinds of highways, not just limited-access highways.

[67] In some states where most rural roads are managed by counties or townships, such as Michigan, funding comes from state fuel taxes. See, for example, County Road Association of Michigan, "A Quick Guide to Roads and Road Funding In Michigan," 2009. In other states, such as Tennessee, a considerable share of local funding is from taxes collected by county governments. See Tennessee Advisory Commission on Intergovernmental Relations (TAICR), *State Highway Aid to Local Governments in Tennessee* (Staff information report, TAICR, Nashville, February 2005).

[68] David Hartgen, M. Gregory Fields, and Baruch Feigenbaum, "21st Annual Report on the Performance of State Highway Systems (1984–2012)" (Policy Study No. 436, Reason Foundation, Los Angeles, CA, 2014).

[69] Aaron Renn, "Beyond Repair: America's Infrastructure Crisis is Local" (Policy Brief, Manhattan Institute for Policy Research, New York, October 22, 2015).

[70] In 1997, the state of California, recognizing the advantages of the level of government closest to the people making decisions, reformed its transportation program to give local regions greater authority in determining how capital construction dollars are spent. Several states have also passed legislation enabling local governments to raise funding to pay for transportation. See Joe McAndrew, "Twelve Innovations in Transportation Policy States Should Consider in 2016" (Report, Transportation for America, Washington, DC).

smallest unit of government that encompasses the problem to be addressed. This principle implies that, generally, cities and towns should fund local streets and that counties or townships should fund local roads. The advantage of this approach is that it would facilitate competition between a larger number of jurisdictions, thus helping create efficient management.

At the same time, the approach would be a close connection between what users pay and the benefits they receive. In metropolitan areas, a tradeoff exists between (a) economies of scale, which may result from a larger jurisdiction managing the network of local roads and streets, and (b) the benefits of more competition when adjacent towns separately manage parts of the network. If a county government managed local roads and streets that cross boundaries between cities, towns, and unincorporated areas, jurisdictional conflicts could be reduced and costs might be lower because of economies of scale.

Instead of state funding of transportation infrastructure that serves primarily local residents, local funding reduces political conflict between representatives of urban and rural districts. Residents of rural districts complain about state funding of public transit, which offers few benefits to them. Political activists in urban areas complain about how much highway funding goes to rural roads with very little traffic.[71]

Many urban residents claim to value the availability of rail transit, even those who rarely use it. As discussed previously, transit provides external benefits and might reduce congestion more in the long run than in the short run if it affects future development patterns. If residents are willing to pay for transit operating and capital subsidies through local taxes, as residents of some urban areas have been, they should be able to do so. When much of the funding comes from the state or federal government, however, local residents may vote for more expensive rail transit

[71] Frank Gamrat and Jake Haulk, "Rural and Urban Roads: Does One Subsidize the Other" (Policy Brief 13, no. 33, Allegheny Institute, 2013).

even when the local benefits are not sufficient to cover the costs. Such funding represents a case of concentrated benefits and dispersed costs, in which a few mass transit users reap the benefits while the costs are distributed among all state or federal taxpayers.

If people lived in denser neighborhoods, then transit might be more economically viable, and the per capita costs of streets and roads would be lower per mile of road. Compact high-quality commercial and residential development is more likely to occur on streets with low speed limits. Because local governments and residents of cities and towns stand to benefit the most from high-value development, they should be responsible for planning and maintaining streets. Marohn suggests that states give management responsibilities to city governments for some roads in urban areas that are suitable for commercial development. He also suggests that cities should lower speed limits on those streets to 25 miles per hour or less. Then the city can redesign the streets to make them more attractive for high-value commercial and residential development. The state government could retain control of those roads and highways that are intended to get vehicles coming from outside the city to their destinations quickly.[72] To control congestion, states could limit development adjacent to those roads by charging developers access fees proportional to the additional traffic anticipated.

The challenge with moving toward greater local funding of highways and public transit is that in metropolitan areas, some roads and highways are used by residents of a variety of different local political jurisdictions. Collaboration between local governments may improve management of local roads and highways that cross boundaries. Metropolitan planning organizations, which already exist and have a role in governance in many metropolitan areas, can facilitate coordination between towns, cities, and counties that jointly benefit from local road networks.

[72] See Marohn, *World Class Transportation System*.

The Brookings Institution published a series of proposals that advocate greater local funding of highways and transit, thereby arguing that the federal government should help devolve authority and funding from states to metropolitan governments by providing "incentives for states to transform MPOs . . . into regional infrastructure authorities, with taxation, programming, and spending power."[73] Regional infrastructure authorities may have some advantages over city or county governments in internalizing externalities between jurisdictions.

Superimposing a regional government on the complex mix of state and local political jurisdictions that already exists in many states, however, may do more harm than good. Transit lines are more likely to earn enough revenue to cover costs and to enhance property values in dense urban neighborhoods. Therefore, investment in transit infrastructure such as exclusive busways and rail lines could be better managed by city governments rather than by regional or metropolitan governments.

Along with efforts to promote increased authority and responsibility for local governments, federal government rules that affect planning should be changed or eliminated. In particular, the requirement that MPOs make detailed plans for land use and transportation from 20 to 30 years in the future should be eliminated. MPOs could still play an advisory role, facilitating cooperation between local governments in transportation and land use planning. For planning efforts to succeed, local governments should devote more effort to changing the rules and incentives that influence land use decisions so that impediments to building new homes in existing neighborhoods are eliminated. At the same time, those changes to rules and incentives should make landowners in new housing developments liable to pay the full marginal cost of

[73] The Transportation Research Board summarizes those proposals in *The Fuel Tax and Alternatives for Transportation Funding* (Washington, DC: National Academy of Sciences, 2006), 176.

building and maintaining the new infrastructure connected to the property they own, including the cost of access to roads and highways.

For local governments to bear increased responsibility for local transportation infrastructure, they could fund it with some combination of taxes or fees charged to local residents and of direct user fees, such as tolls and transit fares. Local funding for streets and highways or mass transit could come from several different kinds of taxes—local fuel tax revenue, local sales taxes, or local property taxes. Rather than using dedicated user fees such as gas taxes, local governments often fund streets and roads from general fund revenue, much of which comes from local property taxes.

Local residents and businesses reap a large share of the benefits of local transportation infrastructure because it makes their homes and businesses more accessible. Thus, property taxes may be the best way to pay for the capital costs of local transportation infrastructure. Better access to highways and public transportation raises local property values.[74] How much transportation infrastructure raises property values depends on the mix of local and through traffic served. Rather than being subsidized by the state or federal government, better investment decisions could be made if infrastructure intended to benefit primarily local residents was funded by property taxes.[75] In a paper given at a conference on rail transit for developing countries, Meakin discusses how Hong Kong's mass transit railway was self-

[74] For evidence on the effect of highways on land values, see H. William Batt, "Value Capture as a Policy Tool in Transportation Economics: An Exploration in Public Finance in the Tradition of Henry George," *American Journal of Economics and Sociology* 60, no. 1 (2001): 195–228. Several studies have considered the effect of transit on land values; among them is Robert Cervero, "Growing Smart by Linking Transportation and Land Use: Perspectives from California," *Built Environment* 29, no. 1 (2003): 66–78.

[75] This does not preclude using gas taxes or transit fares to cover part of the cost, but it accounts for the benefits from access to transportation options that accrue to property owners regardless of how much they drive on local streets or public transportation.

supported by rents from land development.[76] This approach demonstrates that if rail transit leads to dense development that increases land rents, the resulting increase in revenue from property taxes could pay for transit subsidies.

The layout of streets and roads in urban areas has an important effect on the costs of other infrastructure, such as water and sewer lines.[77] Local governments should take account of those costs in their transportation plans. Local government plans are more likely to be consistent with new residents' choices if residents are required to pay the marginal costs of new infrastructure.[78] In this case, planning for compact development might work because many new residents might choose to live in higher density neighborhoods to reduce infrastructure costs.

Infrastructure costs are often paid through taxes. If the taxes paid are not connected to the marginal cost of infrastructure used by each property owner, then the property owner does not have enough incentive to consider those costs as part of the decision of where to live or locate a business. If instead property owners were either paid directly for maintaining their share of local infrastructure (streets, sidewalks, water lines, and sewer lines) or were assessed property taxes

[76] R. T. Meakin, "Hong Kong's Mass Transit Railway: Vital and Viable," in *Rail Mass Transit for Developing Countries. Proceedings of the Conference Held in London on 9–10 October 1989*, edited by Institution of Civil Engineers (London: Telford, 1990), 125–43, cited in Jeffery Smith and Thomas Gihring, "Financing Transit Systems Through Value Capture: An Annotated Bibliography," *American Journal of Economics and Sociology* 65, no. 3 (2006): 751–86.

[77] Marohn provides data showing how much more pipe is required to supply water to houses in modern neighborhoods with low density than was the case in the 1940s when cities were much more densely developed. The result is a backlog of infrastructure repairs that many local governments cannot keep up with. See Charles Marohn, "Lafayette Pipes and Hydrants," *Strong Towns*, September 14, 2015.

[78] Whether new development will occur in existing urban neighborhoods is affected not only by where new residents prefer to live but also by whether existing residents attempt to block new development as they often do. If new residents and businesses had to pay impact fees to account for infrastructure costs and external costs imposed on existing residents, those residents might be less inclined to oppose new development that increases urban density. See Cinyabuguma and McConnell, "Urban Growth Externalities," for a discussion about how incentives, such as subsidies and impact fees, could reduce the willingness of existing residents to block new development.

that varied with lot size and location, they would be more likely to consider the higher costs associated with low-density development in deciding which property to buy.[79]

If government is placed in charge of managing highways, regardless of the unit involved, it may not have the same incentive as private firms might have to manage highways efficiently. Although smaller units of government may be more responsive to voters, they don't have the same incentives that a private firm would have. Thus, private funding and management of highways may be a better long-run solution than local funding would be. Making users pay for highways in urban areas would also give people an incentive to live in more compact neighborhoods closer to where they work.

Private arrangements could work not just for limited access highways, but also for local roads and streets. In the case of local roads and streets, a private firm or nonprofit association, such as a homeowners' association, could own the infrastructure and charge a maintenance fee to residents whose homes are on a particular road or street.[80] Many private housing and commercial developments already use a similar approach. Such an approach would work best for roads whose main purpose is access to homes and local businesses rather than roads and highways used mostly by through traffic. A private association supported by local residents might be willing to pay for better maintenance of rural roads with too little traffic to justify state or county governments bearing the costs of maintaining pavement.

---

[79] One argument in favor of MPOs developing long-run plans that promote low-density development is that residents might not pay much attention to long-run infrastructure costs because of high time preference. The costs of maintaining infrastructure associated with new low-density development may not be incurred until several decades after the development occurs. Whereas government cannot change people's time preference, public debates about development patterns might help motivate people to attach more weight to long-run costs in deciding where to live and locate their businesses.

[80] For examples of infrastructure managed by private associations, see Fred Foldvary, "Proprietary Communities and Community Associations," in *The Voluntary City: Choice, Community, and Civil Society*, edited by David Beito, Peter Gordon, and Alexander Tabarrok (Oakland, CA: Independent Institute, 2002), 258–88.

Conclusions: Big Picture Suggestions for Reform

Some states have more serious problems with highway funding and management than do others. States with relatively small populations that are largely rural have fewer problems with their highway systems.[81] States without serious congestion or maintenance problems are more likely to continue to rely on fuel taxes as they have in the past. Other states could significantly improve their highway systems by using alternative ways to fund some roads and highways.[82]

If they have not already done so, states can save money by changing the way they manage their assets. Those assets should focus more on preventive maintenance so that pavement lasts longer and on other problems such as potholes that occur less frequently. State highway departments could also accomplish their transportation goals with less money if revenue from federal fuel taxes were paid to them as grants with fewer strings attached. Some states could also save a considerable amount by eliminating Davis-Bacon laws that raise labor costs.

In most states, a vital part of improving transportation funding and management involves finding the most cost-effective ways to reduce congestion in urban areas. The emphasis of metropolitan planning organizations on long-term planning, transit-oriented development, and behavior change to promote transit use instead of driving has not been successful at reducing costs. Billions have been spent on transit systems that serve a very small percentage of trips in urban areas. In a number of cities, expanding highways rather than expanding transit would have been a more cost-effective way of reducing congestion.

---

[81] Hartgen, Fields, and Feigenbaum, *21st Annual Report*.

[82] All states could benefit in the long run by replacing fuel taxes with vehicle mile charges, but the transition might take many years. For a discussion of the benefits of vehicle mile charges, see Miller "Improving the Efficiency and of Highway Funding and Management." Because our focus is on the short run, continued tax funding of major rural roads and highways that are not limited access may be the best alternative.

Compared to current sprawling suburban development patterns, dense urban development with people driving less and relying on transit is appealing to many urban planners. In reality, however, that is not how most people choose to live. Aside from subjective personal preferences, some people choose to live in less dense neighborhoods because they may not have been required to pay the costs of infrastructure associated with large lots and sprawling shopping centers.

Rather than allowing MPOs to try to regulate urban development patterns, local governments should explore ways to make people bear the full costs of infrastructure required to service their homes and businesses. In their planning, MPOs, or the local governments they represent, could focus on ways to improve incentives through means such as tax reform, privatization of streets, or assessments to homeowners for their share of the costs of maintaining the infrastructure they use. Reforming or eliminating zoning laws that prohibit high-density development could also play an important role.

Part of the reason transportation plans are not more effective is that MPOs face pressure from state governments, that, in turn, must adhere to certain federal criteria in their planning. If the federal government's role in funding surface transportation infrastructure were limited to funding Interstate highways, local governments would be less dependent on the federal government and thus more likely to plan according to the preferences of the local population.

In the long run, states would likely make better use of their fuel tax revenue if they did not receive massive federal subsidies for transit. Without federal subsidies for transit systems, each urban area would bear a larger share of the opportunity costs of its decision to pursue transit-oriented development at the expense of highways. As a result, local government could better meet the preferences of residents by spending more on highways and less on rail transit.

Similarly, state subsidies that are earmarked for transit do not give MPOs and local governments enough incentive to consider whether they could get more benefits by expanding highways rather than transit. If state subsidies for transit capital expenditures were eliminated, it would also strengthen the connection between local policy and the preferences of residents. Without federal subsidies that incentivize expanding rail transit systems, urban voters might choose to redirect transit funding to increase service for those who live in relatively dense neighborhoods or work in compact business districts while reducing or eliminating transit service to less dense areas where demand is insufficient to generate fare revenue that will cover most operating costs.

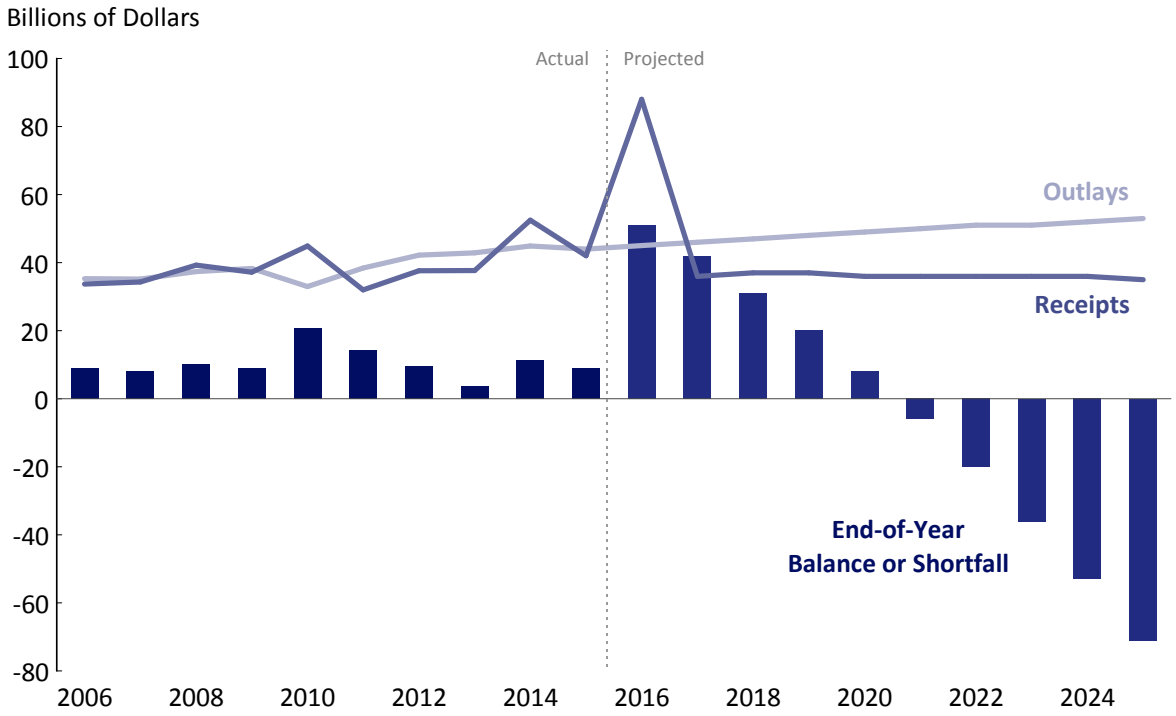
Reducing federal and state subsidies for other infrastructure, such as water and sewer lines, might also make a difference in development patterns. A reduction in subsidies could raise the marginal cost to local residents of streets and roads serving new neighborhoods. In the absence of subsidies from the federal or state government, competition with other metropolitan areas would open the door for alternative approaches to transportation and land use planning that might be more efficient. This competition might even lead to more pedestrian-friendly neighborhoods and less sprawl, but in a way that is consistent with residents' preferences and is cost-effective rather than the result of unsustainable transit subsidies that often disproportionately benefit suburban residents.

In states where congestion is a serious problem and in states where poorly maintained highways are a problem, tolls and PPPs could be used to increase highway funding and allocate scarce highway capacity more efficiently. Private firms would also have better incentives than do governments or state-owned toll authorities to manage highway assets efficiently. The greatest benefit from tolls comes when they are applied to congested urban freeways and when they are higher during the most congested periods.

Tolls would be more politically acceptable to motorists and thus more widespread if (a) they were treated as a payment for using a particular road and (b) the revenue was dedicated to that road. Policymakers might be able to persuade voters to accept more widespread tolls if they were part of a transition away from fuel taxes and toward mileage-based user fees on all roads. Although fuel tax rebates for users of toll roads could enhance their political viability, imposing comprehensive mileage-based user fees and eliminating gas taxes would be more effective ways of (a) tying payment to the use of each particular road and (b) eliminating voter concerns about paying twice for some roads.

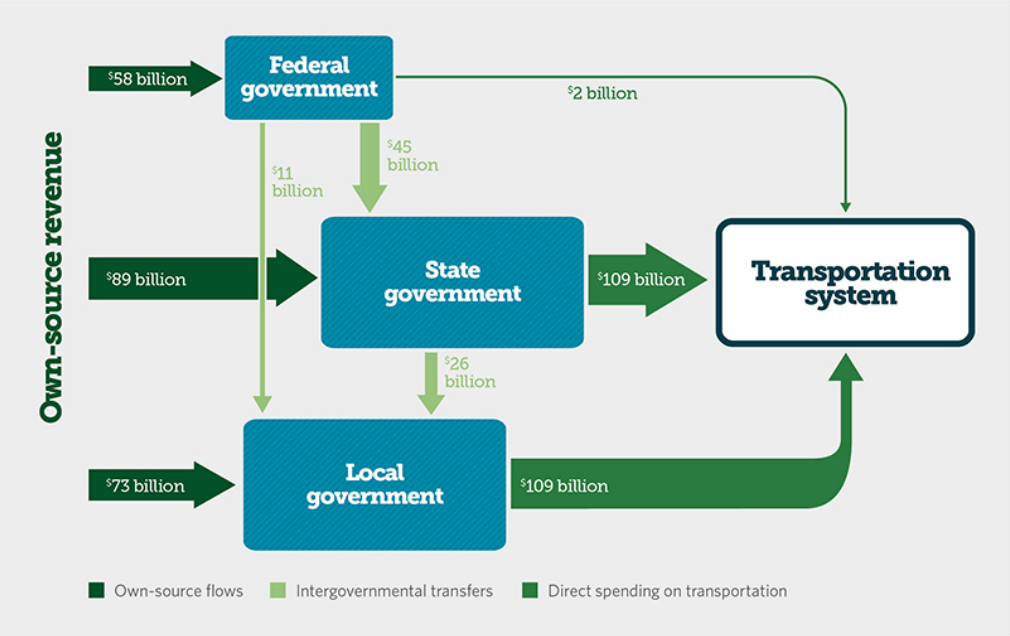
In the long run, private solutions are the key to more efficient funding and management of surface transportation. For local roads and streets that continue to be funded by government, the smaller and more local the government responsible for funding and management, the better. Policies that move toward privatization or toward more local control will benefit taxpayers and the users of highways by (a) reducing congestion, (b) reducing spending on roads with low traffic volumes, and (c) lowering costs. Some combination of privatization and local funding of subsidies could also enhance management of transit infrastructure and lead to a mix of highways, rail transit, and dedicated bus lanes that more cost-effectively satisfies the preferences of urban residents.

Figure 1. Status of the Highway Account of the Highway Trust Fund



Source: Congressional Budget Office, "The FAST Act and the Status of the Highway Trust Fund," presentation at the Transportation Research Board Annual Conference, January 10, 2016, slide 5.

Figure 2. Surface Transportation Funding Flows among Levels of Government: Spending on Highways and Transit, 2012

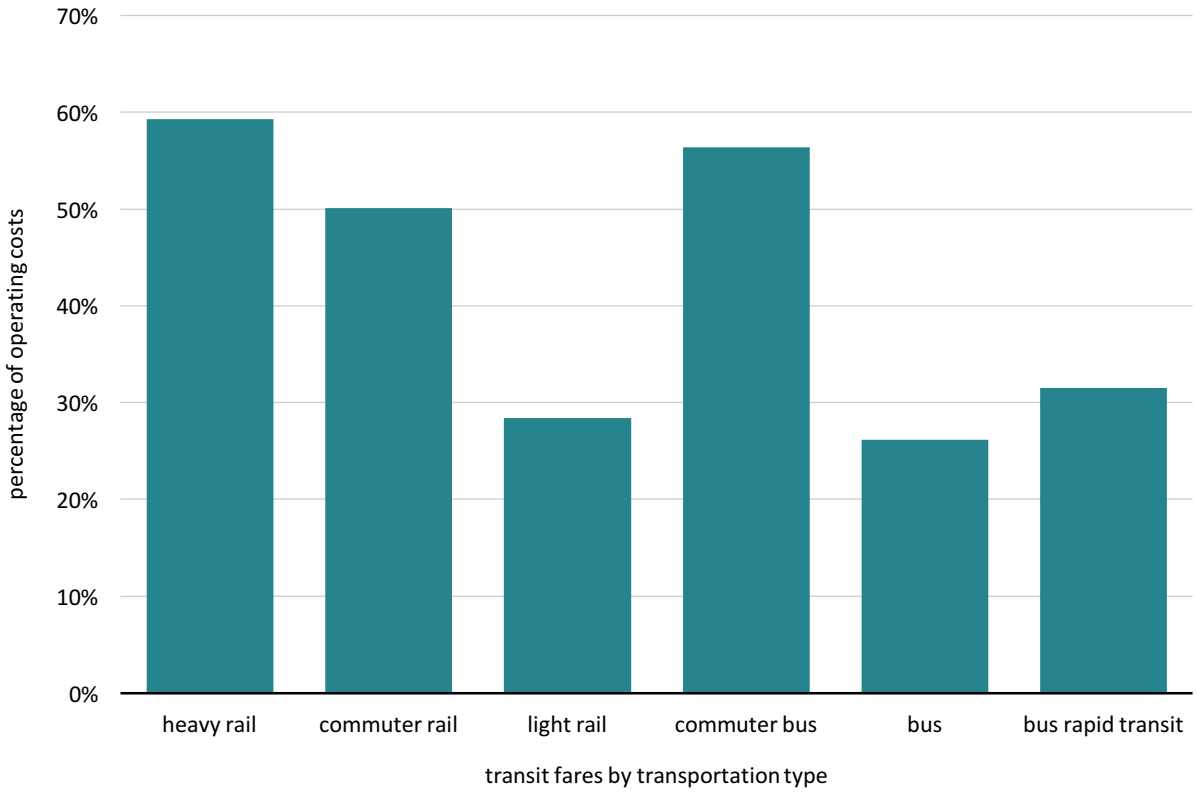


Note: Numbers may not add up exactly due to rounding.

Sources: Pew's analysis of U.S. Census Bureau's Annual Survey of State and Local Government Finances, 2012; U.S. Office of Management and Budget, Public Budget Database

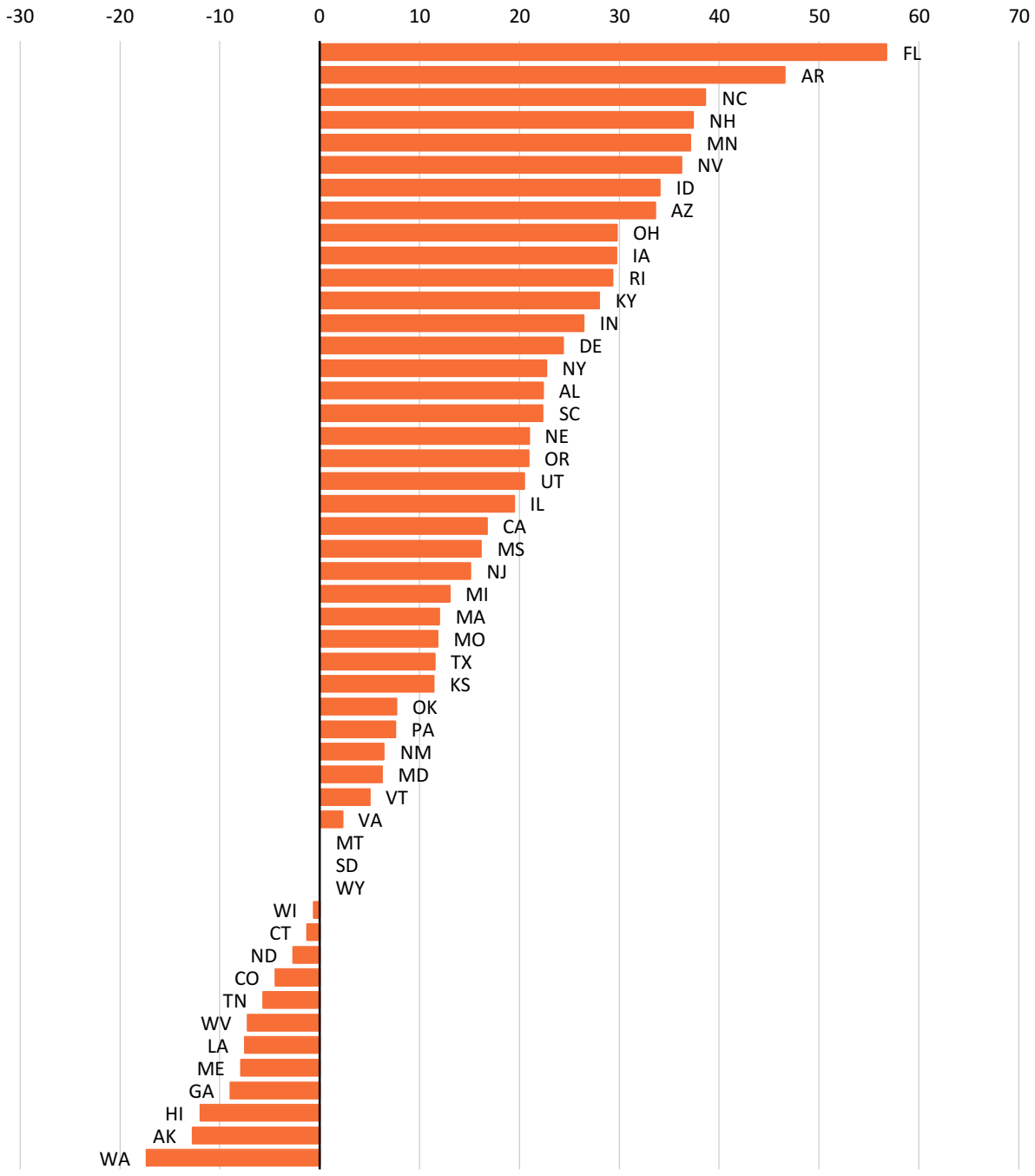
Source: Pew Charitable Trusts, "Funding Challenges in Highway and Transit: A Federal-State-Local Analysis," February 24, 2015.

Figure 3. Transit Fares as a Percentage of Operating Costs, 2014



Source: Federal Transit Administration, US Department of Transportation, "National Transit Summaries and Trends," February 2015.

Figure 4. Changes in the Percentage of Congested Urban Interstates by State, 1984–2005



Source: David Hartgen and Ravi Karanam, *16th Annual Report on the Performance of State Highway Systems* (Policy Study 460, Reason Foundation, Los Angeles, CA, 2007), table 12, Urban Interstate Congestion.