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Local Transportation Policy and Economic Opportunity

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Local Transportation Policy and Economic Opportunity

There is broad agreement about the economic importance of transportation infrastructure, but there is disagreement about the goals of transportation policy and the appropriate means to achieve these goals. A careful examination of relevant trends in recent decades offers valuable perspective and background on these important economic policy choices.

Although highways and urban rail systems serve nearly twice as many users compared with the 1990s, bus usage has remained stagnant. Moreover, congestion remains a serious problem limiting the efficiency of multiple modes of transportation. These patterns point to opportunities for policymakers to help improve the reliability, effectiveness, and accessibility of different modes of transportation.

In a new Hamilton Project policy memo, Matthew Turner of Brown University lays out what is known about the state of the nation's infrastructure, the effects that changes in infrastructure capacity or condition have on usage, and how investments in highways and public transportation affect the organization, location, and level of economic activity in the nation's urban and rural areas. Insights from this analysis suggest that policies for bus transit, highway funding, and congestion pricing hold promise to improve access to economic opportunity and reduce transportation costs.

Background

Highways, Buses, and Rail

Since the late 20th century, there was a modest increase in the total miles of interstate highways as well as the size of the bus and urban rail fleet. However, the growth rates of interstate lane-miles, buses, and urban rail cars have not kept up with the growth rate of the U.S. population.

Even so, Turner contends that there is not a new or growing crisis of maintenance for the interstate highways or for the national fleet of buses and urban rail cars. The condition of the Interstate Highway System improved (in the sense of having fewer potholes) from 1980 to 2008, and it appears to have improved further still since 2008. Additionally, the average age of the bus and urban rail fleets stayed about the same from 1992 to 2017. However, there are areas of relative concern; urban sections of the interstate highways tend to be poorly maintained compared with rural sections, there are certainly sections of road or bridges that are in urgent need of attention, and the average age of an urban rail car is 22 years, suggesting that at least some subway systems suffer from deferred maintenance.

Utilization Rates

Neither the nation's interstate highways nor its buses and rail systems come close to using all of their available capacity, except at certain peak hours. Rates of interstate highway use, for example, are less than 40 percent of a plausible maximum for a typical urban section of road, and 18 percent for an average rural section. Buses have remained at about 20 percent utilized capacity since 1992. For urban rail cars, utilized capacity is now roughly at the same rate of 15 to 20 percent seen for buses.

However, the Interstate Highway System has carried more traffic each year, and an average lane-mile of highway now serves almost twice as many vehicles per day as it did in 1980. Rural interstate highways have carried about half as much traffic per lane-mile in recent decades as have urban interstate highways. In addition, the urban rail fleet has increased in utilization, serving nearly twice as many passengers in 2017 as it did in 1992. By contrast, buses have carried about the same number of passengers per day since the 1990s.

The Challenge

Transportation infrastructure reduces the cost of moving people and goods, shaping where people choose to live, work, and trade. Low- and high-income workers make different uses of this infrastructure. In order to improve the economic opportunities that are available to low-income workers, it is necessary to understand how the quantity and quality of the transit system matter for those workers in particular.

Transportation Infrastructure and Congestion

Turner explains that increases in a city's stock of highways have been shown to have little effect on travel times. This is related to a consistent research finding that vehicle miles traveled in a city tend to increase in direct proportion to increases in interstate capacity, with one study estimating that a 1 percent increase in lane-miles causes a 1 percent increase in interstate highway driving over a time horizon of less than five years. Expansions of the road network seem to add to capacity but not to reduce congestion.

This finding has an important implication for transportation policy. The author explains that we should not expect anything more than short-run relief from traffic congestion when adding capacity to the road network. However, additional capacity can lead to enhanced economic activity in an area, which may or may not be beneficial to society depending on where this activity is diverted from.

Turner also explores the effects that additional public transit capacity has on highway congestion, finding that the evidence is mixed. Although some studies found that changes in a city's stock of urban rail cars do not affect vehicle miles traveled on highways, others found large—albeit very short-run—effects. With regards to ridership, however, there is some evidence that increasing urban rail infrastructure results in increased ridership.

Transportation Infrastructure and Economic Growth

Turner explains that transportation infrastructure generally leads to less dense cities, although the metropolitan areas of which they are a part can become larger. One of the most fundamental predictions of economic models of cities is that reductions in transportation costs spread people out across space. Consistent with this prediction, one study finds that the construction of the Interstate Highway System explains nearly the entire decline in the population of an average metropolitan area's original center from 1950 to 1990. These findings highlight the role of interstate highways in moving population and economic activity from some areas to others. The effects of subways on the spatial organization of cities is qualitatively similar, though somewhat smaller.

For a given U.S. city, how large are the effects of transportation infrastructure on employment? The author describes his own research finding that a 10 percent increase in lane-miles of interstate highways leads to a 1.5 percent increase in employment. Using separate estimates of the benefits of agglomeration, he calculates only small benefits for wages and productivity through this channel. Similarly, though economic activity does shift toward the routes of subways and light rail lines, the overall effect on population growth and productivity is small. Transportation infrastructure primarily moves rather than causes new economic activity.

One interesting possibility is that transportation infrastructure can facilitate greater economic specialization. Indeed, one study found that—after connecting to the interstate highway—counties with high initial shares of high-skilled labor saw increases in the demand for high-skilled labor (and likewise for counties with high initial shares of low-skilled labor). Given that specialization is often regarded as one of the mechanisms driving economic growth, transportation infrastructure could indirectly facilitate growth through this channel. Other studies also found that highways lead to a concentration of people and economic activity in a few regional centers at the expense of smaller satellite cities.

The author characterizes the overall evidence base as implying that policymakers should be skeptical of strong claims about the potential job-creating and growth-producing effects of particular infrastructure projects. Highways and other types of transportation infrastructure can certainly create economic activity in one place at the expense of others. It is less clear that this infrastructure increases overall economic growth.

Transportation Infrastructure and Economic Opportunities for Low-Income People

Automobiles are expensive, and they require a large share of income, particularly for low-income people. Perhaps unsurprisingly, these people are more likely to use public transit than those with higher incomes, other things held constant. Turner discusses research findings that low-income people tend to move toward bus lines.

Improving the availability and reliability of public transit might significantly improve labor market outcomes for people whose incomes are so low that operating an automobile is prohibitively expensive. Indeed, evidence from the developing world shows that small subsidies for travel can result in large changes in labor market outcomes. Understanding how public transit expansions affect low-wage workers is therefore key to understanding whether such investments are merited.

Turner discusses research that examines the relationship between subway access and employment outcomes for low-skilled U.S. men. This research finds that a 10 percent increase in subways (relative to the working-age population) is associated with about a 0.5 percent increase in labor force participation among low-skilled men. This analysis suggests—in conjunction with information about the typical costs of construction—that subway expenditures cause low-skilled people to find jobs at a cost of between $20,700 and $207,000 per person. This is higher than the average annual earnings of a low-skilled worker.

Based on this limited evidence, the magnitude of low-skilled employment increases is a relatively small contributor to the employment of the low-skilled population, and when measured against costs would likely not be a decisive consideration in the decision to build or extend a subway network.

Indeed, this is consistent with the author's own research showing that subways do not affect the growth rate of cities' populations. While focusing on only one type of benefit—employment changes—may miss the benefits of improved access or reduced travel times for those who would use the subway, one cannot necessarily assume that the new jobs or economic activity associated with low-skilled workers will justify the investments on their own.

A New Approach

Turner explains that large-scale investments in transportation infrastructure have important implications for where Americans live and work. However, they may also be an expensive way to increase labor force participation among low-skilled workers. The author focuses instead on changes in bus transit policy, highway funding, and congestion pricing, all of which he believes are worthy of policymakers' attention.

A core goal of these reforms is to improve the reliability and effectiveness of the bus transit system, which disproportionately serves low-income workers. In addition, proper management of traffic congestion is complementary to this effort when it allows for a better-funded and more-reliable bus system.

Bus Transit Policy Reform

Turner notes that since the early 1990s, bus transit has lost ground as a transportation option relative to others. Moreover, buses in the U.S. are on average filling only about 20 percent of their capacity, as discussed above. Although an objective of bus-based public transit is to provide coverage in particular areas whether or not large numbers of riders are actually using the service, transit authorities should try to fulfill such a coverage mandate in the most cost-effective way.

There are a number of bus transit reform options. One is to require that all routes be reauthorized periodically (i.e., a route-by-route sunset condition) after a simple cost-benefit analysis. More generally, service levels could be subject to periodic cost-benefit auditing in order to trim lightly used routes and increase service where demand is higher. A range of transportation options for people in underserved communities (e.g., rides on demand or smaller buses) could provide coverage at lower costs. Another option is to restructure federal subsidies to increase incentives for transit districts to attract riders.

In recent years, bus authorities have experimented with a variety of operational reforms, ranging from dedicated bus lanes to traffic signals that adjust to accommodate buses to less-frequent stops. Carefully evaluating these changes would allow transit authorities to learn from each other and select improvements that can make buses more effective. This would disproportionately benefit the low-income workers who are more inclined to rely on them.

Highway Funding

Turner explains that the primary source of federal funding for the Federal-Aid Highway Program, which includes the interstate highways, is the Highway Trust Fund. Historically, this fund has been supported entirely by the federal gas tax and other user fees, but today the share of Highway Trust Fund revenues coming from general revenues is well above one-third.

Given that road capacity is often insufficient to meet peak-time demand, providing implicit subsidies for driving is particularly undesirable. The author therefore proposes two reforms.

The first reform would be to increase the gas tax. The federal gas tax has been constant, at about 18 cents per gallon since 1997, and therefore has not kept up with inflation. Increasing it would provide a sufficient dedicated source of funding for the Highway Trust Fund. The second reform would be to reduce the federal subsidy for highway construction and maintenance, leaving more for the states to cover. Because states also charge taxes on gasoline, it seems likely that much of the increased share would be reflected in state gas taxes.

Congestion Pricing

Congestion pricing entails charging drivers for access to roads at high-traffic times, when one individual's choice to take an additional trip imposes costs on other drivers. The rationale for congestion pricing is that highway capacity at peak hours is scarce but at other times is underused. By pricing access at peak times, policymakers provide drivers with an incentive to exploit unused off-peak capacity.

Congestion prices have been implemented in many places, most famously in London, Singapore, and Stockholm. Evaluations of these programs suggest that they are able to improve travel times, sometimes dramatically, often in response to modest time-of-day charges.

Congestion pricing and improvements to buses are complementary, particularly if the public transit system receives some or all of the revenue from congestion pricing. By speeding travel at peak hours, congestion pricing also speeds bus-based travel. And by improving bus-based transit relative to automobiles, congestion pricing should lead to the greater use of buses. Greater bus ridership, in turn, can allow for a reduction in fares or in federal subsidies.

Learn More about This Proposal

This policy brief is based on the Hamilton Project policy memo, "Local Transportation Policy and Economic Opportunity," which was authored by

MATTHEW TURNER
Brown University

Conclusion

Turner shows that changes in highways and public transit infrastructure cause dramatic changes in the geography of economic activity, but they do not likely produce large increases in the overall level of economic activity. Moreover, the state of repair of some transportation infrastructure appears to be improving; interstate road surfaces are in better shape than they were a generation ago. However, urban highways and the urban rail fleet are in relatively worse condition. Shifting expenditures from lightly used rural interstate highways to more heavily used urban infrastructure should improve the infrastructure that is most in demand.

The author sees two major policy areas that merit particular attention from policymakers. The first area is bus-based mass transit; in a period when travel on highways and urban rail systems both more than doubled, buses continued to serve about the same number of riders while maintaining a great deal of unused capacity. The author proposes that policymakers experiment with ways to improve the bus system, with possibilities including the requirement that all routes be reauthorized periodically (i.e., a route-by-route sunset condition), that federal subsidies be restructured to increase the incentives for transit districts to attract riders, or that bus routes and service levels be subject to periodic cost-benefit auditing in order to trim lightly used routes and increase service where demand is higher.

The second major policy area is congestion pricing. Although highways are often congested at peak hours, they usually have unused capacity off peak, and congestion pricing offers a way to shift demand from congested peak hours to slack off-peak hours. And though such programs remain relatively rare, they have been tried in a number of places with good results. That is, modest charges for peak-hour travel redistribute demand sufficiently to cause big improvements in peak-hour mobility without the enormous expense of capacity expansions.

Questions and Concerns

1. How do we reconcile the recent revitalization of central cities with the decentralizing effects of highways and subways?

Evidence from the period after 2000 suggests that U.S. central cities are attracting college-educated young people away from the suburbs. There is less evidence for the role of interstate highways on the population of central cities after 2000. This does not preclude the possibility that central cities are continuing to decline in total population and employment. It also does not contradict the finding that the Interstate Highway System was an important decentralizing force, at least up to 2000.

2. Does congestion pricing disproportionately burden low-income transit users?

Congestion pricing is probably, but not certainly, regressive in the sense of disproportionately burdening low-income people. Research shows that when household income increases by 10 percent, total miles driven increase by about 2.5 percent. High-income people drive more than low-income ones, but the rate of increase in driving is about one-fourth the rate of increase in income. Given this, one would expect that drivers will pay more in congestion tolls, but that the burden of congestion tolls will be a decreasing fraction of income. On this basis, a first guess should be that the burden of congestion pricing will fall relatively heavily on low-income people.

One might expect two factors to work against this regressivity. First, one would expect that at least some of the burden of the congestion pricing scheme will be passed on to employers. If employers insist that their low-income workers arrive at central locations at peak hours, then one would expect these employers ultimately will need to pay their workers more than employers that do not require their workers to incur congestion tolls. Second, low-income workers often have less control over their schedules than high-income ones, and so have less ability to adjust their schedules in response to congestion. Though congestion tolls may fall most heavily on these workers, so will the benefits of uncongested travel. Thus, the welfare implications of congestion pricing are more complicated than are questions about the incidence of the tax.

With this said, congestion pricing still offers a way to reduce the amount of time Americans spend sitting in traffic as well as to reduce the need for costly peak-hour highway capacity. These are important gains, and using toll revenue to subsidize transit service should help to offset the likely regressive nature of the congestion tolls.

Highlights

In this paper, Matthew Turner of Brown University examines the current state of U.S. infrastructure and explores the implications of infrastructure investment for the organization, location, and level of economic activity in urban and rural areas. He proposes different reforms that focus on improving mobility and reducing transportation costs for the highway and bus transit systems.

The Proposal

Explore policy options to improve the functioning and efficiency of buses. Evaluating bus routes and shifting service toward those with high demand could make the public transit system function more effectively while relying on other measures to insure coverage.

Increase the federal and state gas tax to make it a sufficient source of funding for the Highway Trust Fund. This would reduce the share of Highway Trust Fund revenues that come from general revenue, thereby diminishing the implicit subsidy to driving.

Implement congestion pricing. Pricing transportation access at peak times provides drivers with an incentive to exploit unused off-peak capacity, thereby improving travel times for both public transit users and drivers. Such plans also generate revenue that can be used to upgrade transit.

Benefits

The available evidence suggests that large-scale investments in transportation infrastructure may be an expensive way to increase economic opportunity. However, policy changes that focus particularly on improving the reliability and effectiveness of the bus transit system would disproportionately serve low-income workers at a modest expense. Proper management of congestion would also help to connect workers with economic opportunity.

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