Declines in Transit Ridership

Analysis of Recent Trends

Photo: Cory Hancock, IMF

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Above: A rider takes a Metro train through L'Enfant Plaza in Washington, D.C. Before the COVID-19 pandemic, trains traveling through this busy hub were almost always full of riders. Two Transit Cooperative Research Program studies examine the decline in U.S. transit ridership that, though exacerbated by the pandemic, had begun some years prior.

Even before the COVID-19 pandemic, in 2019 transit ridership in the United States had declined for the fifth consecutive year. Buses were the most affected, with the lowest transit ridership levels since the 1970s. Even rail travel has declined over the past few years, after having experienced an upward trend since 2009 (see Figure 1). As transit ridership declines, agencies lose fare revenue and often reduce service to meet budget constraints—resulting in further transit ridership losses.

Even though these trends are remarkably consistent across U.S. cities, in many other countries transit ridership has increased in the past several years. Canadian transit agencies have seen a steady rise in transit ridership that has closely followed increases in service since the mid-1990s. Among 39 countries tracked by the International Association for Public Transport, 24 "experienced an increase or at least maintained a stable rate of public transport use (journeys per capita) over the past 15 years." The United States is not alone in its transit ridership losses, but most countries with similar losses have poor economic conditions or have experienced substantial demographics changes.

Photo: Seattle DOT

A crowded bus makes its way through Seattle, Washington. Bus ridership is less affected by changes in population and density than that of other modes like rail.

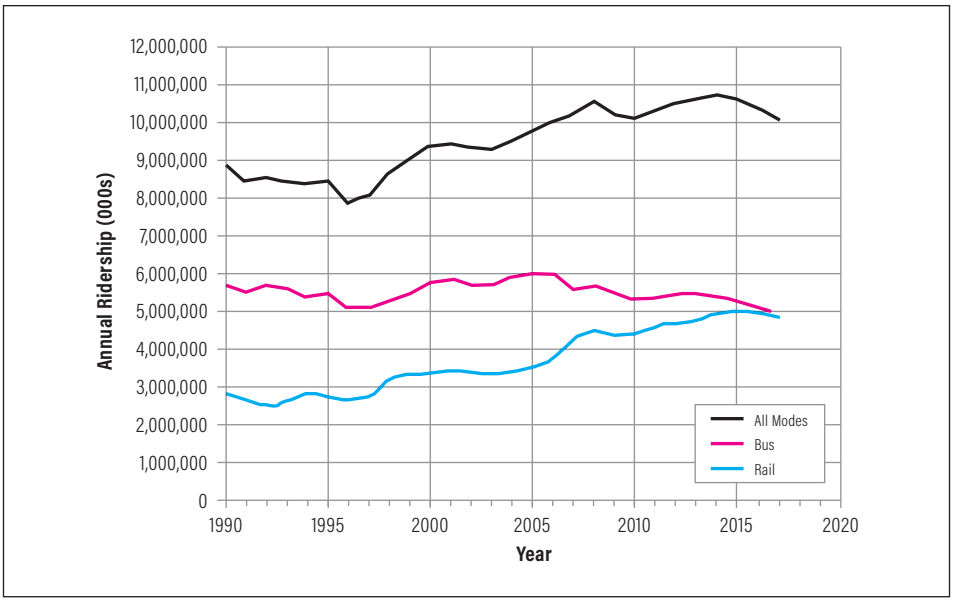

FIGURE 1 Transit ridership in the United States, 1990–2018.

The recent decline in transit ridership is particularly worrisome because traditional factors of transit ridership do not seem to be involved. Although U.S. transit agencies experienced drastic service cuts following the recession, overall vehicle revenue miles rebounded to their 2010 level by 2015 and have kept growing ever since. Meanwhile, urban population and employment rates, which are both typically associated with high transit ridership, have risen substantially in the same period.

The most comprehensive effort to understand transit ridership change within the industry has been the Transit Cooperative Research Program (TCRP) Project A-43, "Recent Decline in Public Transportation Ridership—Analysis, Causes, Responses," and the preceding TCRP Project J-11, Task 28, "Analysis of Recent Public Transit Ridership Trends," whose final report was published as *TCRP Research Report 209: Analysis of Recent Public Transit Ridership Trends*. A few of the most important findings in *TCRP Research Report 209* include the following:

- Although not uniformly true, in most regions, population has increased; therefore, transit ridership per capita has been falling at an even faster rate than total transit ridership. Population is a strong predictor for bus ridership historically, but **mixed traffic (generally bus) ridership change seems unaffected by the recent increases in population**. Population is a more moderate predictor for dedicated right-of-way (mostly rail) ridership historically, and population change also explains some of the recent rail ridership changes.
- The amount of transit service provided is an important lever available for transit agencies to affect transit ridership. **The relationship between transit ridership and transit service levels is strong.** Especially in mid-sized regions, transit service levels explain much of the variation in transit ridership. However, in looking at recent changes in transit service, **in larger metro areas, more bus service does not equal more bus ridership.** The change in transit ridership is much more closely associated with recent change in transit service levels for dedicated right-of-way than for mixed traffic modes.
- **Small- to mid-sized regions that didn't increase transit service levels between 2012 and 2016 saw, on average, an 8–10 percent loss in transit ridership.** In *TCRP Research Report 209*, the authors created a series of graphics showing transit ridership as it related to such factors as service provided. On a simplified version of the graphic (Figure 2), the *y*-axis intercept of the trend lines in the transit service change versus transit ridership change figure is the amount of ridership change that should be expected if transit service levels had not changed ($x = 0$). Although there is a definite relationship between the change in transit ridership

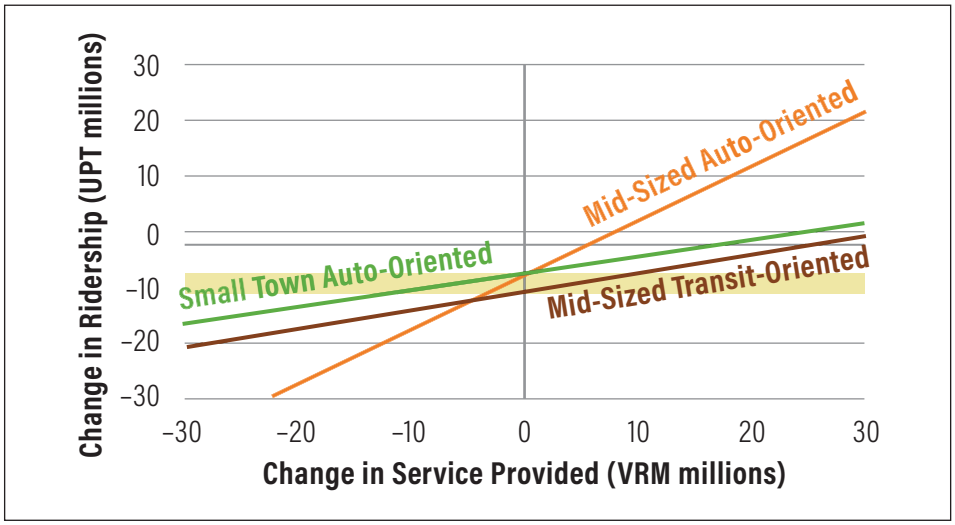

FIGURE 2 Change in service versus change in ridership, 2012–2016. (Note: UPT = unlinked passenger trips; VRM = vehicle revenue miles.)

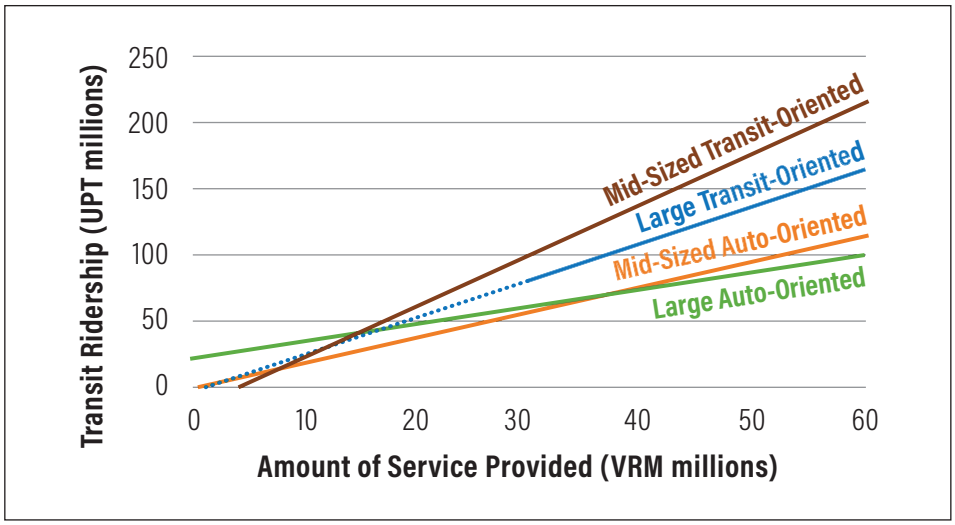

FIGURE 3 Transit ridership versus service provided.

and the change in transit service levels, there is some other effect at play that is driving transit ridership down. Only if transit service was substantially increased would transit ridership go up. If service levels remained the same, in most regions, transit ridership would have decreased.

- In mid-sized, transit-oriented regions, such as those in the "Rust Belt" (Baltimore, Pittsburgh, and Cleveland), each marginal vehicle revenue mile is associated with twice the transit ridership as in similar mid-sized, car-oriented regions in the "Sun Belt" (Kansas City, Charlotte, and Nashville). Similarly, the relationship between transit ridership and transit service levels is three times greater for transit-oriented metro areas (Boston, Philadelphia, Chicago, and Seattle) than for car-oriented metro areas (Atlanta, Houston, and Phoenix). In other words, **increasing transit service in denser transit-oriented regions, both in mid-sized and large metro areas, will increase transit ridership much more than in car-oriented regions**. This is demonstrated in the simplified graphic shown in Figure 3.

Explaining Transit Ridership Declines

The follow-on to *TCRP Research Report 209* is TCRP Project A-43, an ongoing project that employs a two-phase research approach to consider changes at the system, route, and stop levels, as shown in Figure 4.

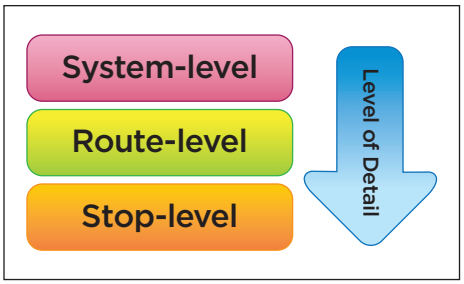

FIGURE 4 TCRP Project A-43 research approach.

TCRP PROJECT A-43

Phase 1 of TCRP Project A-43 included an extensive literature review and hypothesis development, as well as a system-level analysis. Researchers identified four categories of factors and strategies for transit ridership change. These were broken into traditional and emerging factors and internal and external factors, and their intersection is summarized in Table 1.

Traditional factors are those that have affected transit ridership for many decades, while emerging factors are newer to the transportation system and require more research. Internal factors are those that the transit agency can control (sometimes with

TABLE 1 Four Categories of Factors and Strategies Affecting Transit Ridership

	Internal	External
Traditional	• Service quantity • Fares • Speed and reliability • Service concentration • Access to transit • Security • Service quality	• Density • Population • Employment • Income • Gas prices • Commuting policies • Car ownership • Demographics
Emerging	• Restructuring transit networks • Demand response, flex route services, and microtransit pilots and partnerships • New fare media and fare integration • Real-time information • Maintenance issues • Dedicated transit right-of-way • School and employer partnerships • Fare discounts or elimination	• Gentrification • Aging population • Millennials • Telecommuters • Delivery services • Congestion and parking pricing • Shared mobility (ride-hailing, bikesharing, car-sharing, scooters)

help from local or regional governments), while external factors are those that affect transit agencies but over which they have little control.

Current literature on the topic successfully identifies the important factors and the likely direction of each, but a mix of factors contribute to recent trends, pushing transit ridership in competing directions. To separate the effect of each of these factors, researchers conducted statistical analyses that correlate each of these with changes in transit ridership. In a system-level, multicity analysis, they estimated longitudinal models of total bus and rail ridership for 215 metropolitan statistical areas (MSAs) in the United States between 2012 and 2018. This allowed the research team to establish the sensitivity of transit ridership to changes in the descriptive variables (service miles, fares, population, and so on).

The resulting models show elasticity, or the percent change in ridership that would result from a 1 percent change in each descriptive variable. Researchers grouped the results into three clusters of MSAs based on transit operating expenses: high (greater than $300 million), medium (between $30 and $300 million), and low (less than $30 million). New York was excluded from this main analysis because it is such a substantial and distinct portion of U.S. transit ridership. Major data sources include the National Transit Database, the U.S. Census Bureau American Community Survey, the Bureau of Labor Statistics, the U.S. Energy Information Administration, the Bureau of Transportation Statistics, and Uber.

FACTORS AFFECTING TRANSIT RIDERSHIP

Overall, two sets of factors pushed an increase in transit ridership from 2012 to 2018:

- **More service.** Across all clusters, transit operators are providing more bus and rail service. These service additions resulted in a net bus ridership increase ranging from 2.5 percent in high-operating-expense cities to 4.7 percent in mid-operating-expense cities. Rail service increases were associated with ridership gains of 10 percent in high-operating-expense cities to 18 percent in mid-operating-expense cities.
- **Land use.** Land use affects transit ridership in terms of total population and employment growth, as well as how centralized that growth is. By cluster, metro areas grew between 5.8 and 7.9 percent in population and employment, pushing up ridership. However, in most clusters, that growth became less centralized, pushing ridership down, so that the combined effect of land use changes is a less than 2 percent increase in ridership.

Photo: J. C. Burns, Flickr

Falling gas prices in the late 2010s made driving less expensive, reducing bus and rail ridership.

The net transit ridership decline between 2012 and 2018 was due to a combination of four main sources. Together, these sources more than offset the factors cited above that pushed ridership up over this period. They include:

- **Income and household characteristics changed.** Higher incomes, higher car ownership, and an increase in the percentage of people working at home contributed a net ridership decline of about 2 percent for bus and rail. This remained relatively consistent across clusters.
- **Bus and rail travel became more expensive.** Average bus fares went up in two of the three clusters. Average rail fares in all clusters increased, with that increase ranging from 7 to 13 percent. The result was net ridership declines of zero to 4 percent.
- **Driving became less expensive.** Average gas prices decreased by about 30 percent over this period, contributing to an approximately 4 percent reduction in bus and rail ridership.
- **New modes competed with bus and rail.** The model results suggest that ride-hailing was the biggest contributor to lower bus ridership between 2012 and 2018, resulting in net decreases of between 10 and 12 percent. The effect of ride-hailing on rail ridership in larger metro areas (with high operating expenses) was much smaller, but the effect in the mid-operating-expense group was similar to that for buses. Bikeshare and e-scooters had a much smaller impact: less than or about 1 percent.

Transit Agency Strategies and Ridership Factors

In Phase 2 of TCRP A-43, researchers tested specific strategies and factors and related transit ridership effects that are difficult to discern at the system level, by analyzing

Photo: MetroTransit

As transit in the United States enters a post-pandemic future, researchers continue to investigate lasting effects on mobility and public transit in particular.

the change in route- and stop-level transit ridership data for a handful of cities. In each city, the team also assembled several additional data sets, such as level-of-service metrics, spatially detailed population data, employment and demographic data, and spatial and temporal data on micromobility trips. They uncovered several key points:

- **Transit should be given priority.** Case studies from Minneapolis–St. Paul, Minnesota, and Cleveland, Ohio, showed that high-quality light rail and bus rapid transit can increase ridership substantially, even with limited service increases.
- **Agencies should get creative with fare policies and prices.** A case study in Topeka showed that strategic fare discounts can substantially increase transit ridership. Fare-free promotions for kids in the summertime, as well as for seniors and veterans, can increase transit use.
- **Micromobility has limited impacts on transit ridership.** A case study in Louisville showed that e-scooters had limited, if any, impact on local bus ridership and may even have led to slightly higher express bus ridership. Agencies can consider micromobility partnerships to address first mile–last mile connectivity issues.
- **Transit ridership was peaking.** Morning and evening peak ridership declined the least and nighttime ridership declined the most. The most productive service (measured in ridership per vehicle hour) occurred on weekdays. Researchers found, however, that nighttime ridership was the most sensitive to changes in frequency. The final report from TCRP Project A-43 will be published this summer.

Future Transit Ridership Impacts

Over the past year, the transit industry has been hit by what is likely its biggest challenge to date: a global pandemic that uniformly discouraged the close proximity between people on which transit depends to be the most spatially efficient mode. Across cities, rail ridership has significantly declined, as rail modes are most often used by workers who are more likely to have work-from-home options. Bus ridership has also declined, although much of the lower-income and critical workforce populations that buses often serve still ride transit out of necessity.

Moving forward, researchers are still trying to understand the longer-term impacts that the pandemic might have on mobility and public transit in particular. Using these findings as a basis, a few key ideas emerge:

- **Telecommuting impacts on transit will probably continue.** The impacts of telecommuting were already emerging before the pandemic. During the pandemic, these impacts were substantial and necessary. But as the pandemic subsides, many firms will retain some telecommuting practices, changing expectations for the "five days per week at the office" model and reducing the gap between peak hours and off-peak demand.

- **Population density may continue to decline.** Population densities were already starting to decrease before the pandemic, offsetting a rise in transit ridership that had resulted from previous population increases. It is hard to predict how the public will react in the longer term, but with more flexibility in job locations comes more flexibility in living locations and a need for greater space in the home.
- **Low gas prices hurt transit ridership.** During the pandemic, oil producers could not give their product away. As congestion has increased, so have gas prices, but are still generally very low. Sustained lower demand could continue to keep gas prices low, making driving a much cheaper option and adversely affecting transit ridership.
- **Potential for higher transit fares.** Similarly, driving can stay cheap compared with transit if agencies are forced to raise fares as they begin to recover their financial losses during the pandemic. The key to affordable transit is high ridership on a per vehicle hour basis. With low ridership per vehicle hour, transit must be subsidized to keep it affordable.
- **Impact on new modes is unknown.** Like transit, ride-hailing services also require that users share space. Although ride-hailing use grew rapidly before the pandemic, its future trajectory and resulting impact on transit remains to be seen.

These future impacts point even more toward the successful strategies that agencies have been pursuing before the pandemic. Prioritizing transit modes above lower-capacity modes, giving transit exclusive right-of-way, will make transit run faster and more reliably, thereby encouraging ridership. Integration with shared mobility and micromobility providers can help address some first mile–last mile issues via e-scooters and bicycles, but such partnerships should be approached carefully so that modes such as ride-hailing do not compete directly with transit in the most productive corridors, further reducing transit ridership. Regional agencies and municipalities should pursue densities and development that are supportive of transit to ensure that transit can stay competitive in the urban environment.

New strategies in response to the COVID-19 pandemic have emerged. Transit agencies must become more creative about fare media and pricing policies to ensure that commuters with many options are choosing transit as often as possible, even if it is not for every trip.

It is time for the transit industry as a whole to rethink its service standards, service delivery, and performance metrics to ensure that they are reflective of the twin missions of good public transit: to respectfully serve those who rely on transit on a day-to-day basis via greater emphasis on equity of accessibility and service, and to efficiently provide mobility in urban areas.

Acknowledgments

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VOLUNTEER VOICES

“My father was in the transportation industry, and he gave me a nudge in this direction. I stay because of the diverse culture, the diversity of the people involved, and the ever-changing reality that is asset carrier transportation. As a woman in business, I find it is an exciting and constantly evolving career path with a lot of opportunity for advancement and entrepreneurship.

—KELLY MORRIS
Director of Transportation, Midwest Region
Phoenix Cargo, LLC, Grove City, Ohio