REIMAGINING TRANSPORTATION POLICY DURING AND AFTER COVID-19

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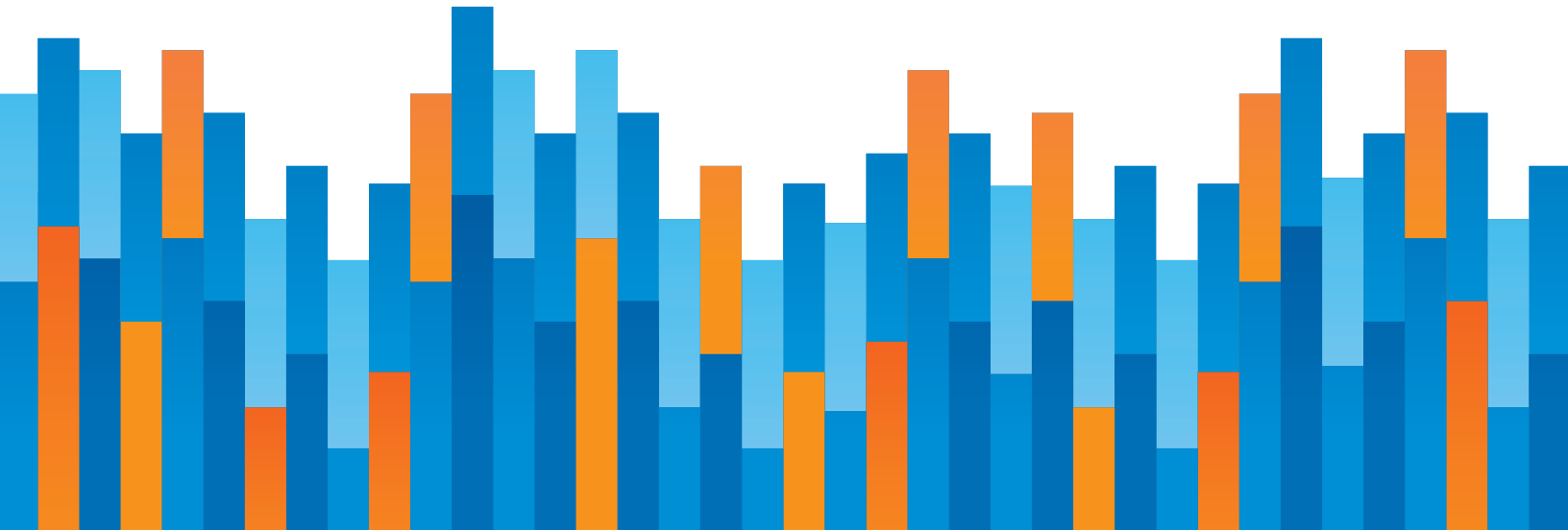

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EXECUTIVE SUMMARY

The COVID-19 pandemic has resulted in large changes in transportation usage in the United States, including a 40% decline in driving and an 84% decline in transit ridership. It is likely that transportation habits will significantly change after the pandemic as well. While these changes are uncertain, some are less uncertain than others and demand changes in transportation policy. Even where uncertainties remain, those very uncertainties call into question transportation programs and projects that were predicated on assumptions about the future that are now highly questionable.

There is widespread agreement that one of the changes produced by the pandemic is that far more people are going to work at home after the pandemic than did so before. Before the pandemic, about 5% of workers worked at home and 5% took transit to work. This paper will show that, mathematically, a one percentage point increase in the number of people working at home will result in a 2% decline in transit ridership. In other words, if the share of people working at home increases by five percentage points from 5% to 10%, then the share of people taking transit will decline by 10%, from 5% to 4.5%.

People who work at home tend to be high-income white-collar workers—a demographic who are more likely to ride rail transit than bus transit, so most of the impact on transit will be on rail transit. This means that plans to build new rail transit lines, which were already questionable before the pandemic, are now more questionable than ever. Other forms of heavily subsidized mass transportation, such as Amtrak and high-speed rail, are also likely

to be even less viable in the post-pandemic world. Legislators and policymakers need to understand these and other implications and uncertainties of transportation after the pandemic before committing taxpayers to major new programs and projects.

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PART 1

INTRODUCTION

> *As the nation recovers from the current pandemic, we will see major changes in urban areas and in urban and intercity transportation.*

As the nation recovers from the current pandemic, we will see major changes in urban areas and in urban and intercity transportation. These changes may not always fit into the previous plans of transportation agencies.

Historian Stephen Davies observes that a major pandemic does not "introduce something novel." Instead, "it accelerates and magnifies trends and processes that were already under way." It can also bring "a final stop to processes that were already exhausted."[1]

To understand what will happen after the pandemic, then, it is helpful if not essential to know what was happening before it. The 20th century witnessed major changes in urban

[1] Davies, Stephen. "Going Viral: The History and Economics of Pandemics." Institute for Economic Affairs, *iea.org*. 2020. Web. iea.org.uk/wp-content/uploads/2020/04/Going-Viral.pdf. 19 August 2020.

and intercity transportation that continued up through 2019. Government efforts to slow or reverse those trends have largely proven ineffective. There are good reasons to think that many of these trends will accelerate after the pandemic.

Some of these accelerated trends appear fairly certain and will require immediate changes in government policies. Other trends are more uncertain, but their very uncertainty demands changes in some current policies and programs that are predicated on outcomes that no longer appear likely.

PART 2

RECENT TRENDS

2.1 LAND USE

> *Due to improved transportation, the most important urban trend in the last century has been the decentralization of cities.*

Land use both influences and is influenced by transportation technologies. Due to improved transportation, the most important urban trend in the last century has been the decentralization of cities. In 1910, most city jobs were in factories and most factories were in downtowns. Most factory workers couldn't afford to ride streetcars every day, so they lived in dense neighborhoods within walking distance of the downtowns.[2] Middle-class workers could afford streetcars and lived in moderately dense "streetcar suburbs" located within a few miles of downtowns.[3]

[2] Simon, Roger D. *The City-Building Process: Housing and Services in New Milwaukee Neighborhoods, 1880–1910.* Philadelphia: American Philosophical Society, 1978. 15. Print.

[3] Warner, Sam Bass, *Streetcar Suburbs: The Process of Growth in Boston, 1870–1900.* Cambridge: Harvard, 1978. 10. Print.

Henry Ford's moving assembly line changed all of that. The assembly lines greatly increased worker productivity but were also land-intensive, so factories moved out of downtowns. Moving assembly lines also made cars affordable to factory workers, so they also moved away from downtowns and substituted auto driving for walking and transit. The result was a depopulation of city centers and growth of suburbs that were often politically independent of the cities.

Manhattan's population peaked in 1910 and fell by almost 40% by 1980. The decentralization process was slowed by the Depression and World War II, but after 1950 the populations of the core city areas of Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Milwaukee, Minneapolis, Philadelphia, St. Louis, and Washington, D.C. all shrank, in some cases by more than 50%, even though the populations of their greater urban areas all grew.[4]

In 1950, the Census Bureau estimated that the average density of urbanized land—that is, communities of more than 2,500 people—was 5,438 people per square mile.[5] By 2010, this had fallen to 2,343 people per square mile.[6] In that year, only 8% of urban jobs remained in traditional downtowns.[7]

Early in the past decade some claimed that cities were growing again at the expense of the suburbs.[8] However, that appears to have been a temporary artifact of the 2008 financial crisis and the housing bubble that led to that crisis. While most, though not all, central

4 Gibson, Campbell. *Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990*. Washington: Census Bureau, 1998. Table 18; "Annual Estimates of the Resident Population for Incorporated Places of 50,000 or More, Ranked by July 1, 2019 Population: April 1, 2010 to July 1, 2019." Census Bureau. *Census.gov*. 2020. Web. www2.census.gov/programs-surveys/popest/tables/2010-2019/cities/totals/SUB-IP-EST2019-ANNRNK.xlsx 19 August 2020.

5 "Census of Population: 1950 Volume II part 1." Census Bureau, 1953. 22. Print.

6 "Percent Urban and Rural in 2010 by State and County." Census Bureau. *Census.gov* 26 Mar. 2012. Web. www2.census.gov/geo/docs/reference/ua/PctUrbanRural_County.xls Accessed 19 August 2020.

7 Cox, Wendell. *United States Central Business Districts. Downtowns With Data for Selected Additional Employment Areas*. Belleville, IL: Demographia, 2014. 5. Print.

8 Dougherty, Conor and Robbie Whelan. "Cities Outpace Suburbs in Growth." *The Wall Street Journal*. 28 June. 2012. Print.

cities are growing, the suburbs of all the nation's 50 largest urban areas are growing by an average of 4.5 times faster than their central cities.[9]

This dispersion is taking place despite various government policies aimed to curb it. Collectively known as growth management, these policies use a variety of tools.

- The Hawaii Legislature passed a land-use law in 1961 that put almost 94% of the state off-limits to urban development.
- Urban areas in California, Oregon, and Washington use urban-growth boundaries to prevent low-density development. Only 1.3% of Oregon and just 17.9% of the San Francisco Bay Area, for example, are available for development (nearly all of which has already been developed).[10]
- Boulder, Colorado has a greenbelt equal to nearly ten times the size of the city itself.[11]
- Montgomery County, Maryland has placed two-thirds of the county in agricultural reserves or conservation easements.[12]
- Counties such as Loudoun County, Virginia, use inflexible large-lot zoning to prevent rural development.[13]

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9 "2010 and 2018 American Community Surveys. Table B01003 for places and urbanized areas." Census Bureau. *Census.gov* 7 June 2019. Web. data.census.gov/cedsci/table?q=b01003&g=0100000US.160000,.400000&tid=ACSDT1Y2018.B01003&hidePreview=true and data.census.gov/cedsci/table?q=b01003&g=0100000US.160000,.400000&tid=ACSDT1Y2010.B01003&hidePreview=true Accessed 19 August 2020.

10 "Oregon Zoning Acres by County." Oregon Department of Land Conservation and Development. 1986; *Draft Plan Bay Area Environmental Impact Report.* Oakland: Association of Bay Area Governments. 2013. 2.10-17. Print.

11 Boulder is about 15,800 acres in size. "Boulder City, Colorado." Census Bureau. *Census.gov* 2020. Web. data.census.gov/cedsci/profile?g=1600000US0807850&q=Boulder%20city,%20Colorado Accessed 19 August 2020. The city of Boulder has acquired more than 45,000 acres of open space. "Land Acquisition Program." City of Boulder. *Bouldercolorado.gov.* 2020. Web. bouldercolorado.gov/osmp/land-acquisition-program Accessed 19 August 2020. Boulder County has acquired about 105,000 acres of open space. "Acres of Boulder County Parks and Open Space." Boulder County. *Bouldercounty.org.* 2020. Web. assets.bouldercounty.org/wp-content/uploads/2017/07/acres-of-open-space.pdf. Accessed 19 August 2020.

12 "Agricultural Reserve." Montgomery County Planning. *Montgomeryplanning.org* 2018. Web. montgomeryplanning.org/planning/agricultural-reserve/ 19 August 2020.

13 "Revised 1993 Zoning Ordinance as Amended Through January 1, 2020." Loudoun County. Virginia. *Loudoun.gov.* 2020. Web. www.loudoun.gov/DocumentCenter/View/99645/Revised-1993-Zoning-Ordinance?bidId= Accessed 19 August 2020.

These anti-sprawl policies sometimes increased urban densities, but they also led people to go beyond urban jurisdictions to escape the restrictions. People who work in Portland moved to Vancouver, Washington, whose growth rapidly accelerated after Portland's growth boundary made housing expensive on the Oregon side of the Columbia River.[14] People who work in San José moved to Stockton.[15] This dispersion, combined with the fact that only a minority of urban areas have adopted these policies, means that overall urban area densities continue to fall.

> *…contrary to planners' hopes, densification doesn't reverse the trend away from transit and toward driving.*

More pertinently, contrary to planners' hopes, densification doesn't reverse the trend away from transit and toward driving. Between 1990 and 2018, the population density of the San Francisco-Oakland urban area grew by 36%. Yet per capita transit ridership fell by 12% and per capita driving increased by 1%. In the same time period, the density of the Los Angeles urban area increased by 13%, per capita transit ridership fell by 4%, and per capita driving increased by 4%.[16]

14 1990 and 2000 census data show that, between 1990 and 2000, Vancouver, Washington tripled in population while Portland grew by only 21%.

15 Kendall, Marissa. "Nightmare 90-Minute 'Super Commutes' More Common as Bay Area Housing Shortage Intensifies." *San Jose Mercury-News*. April 25, 2018. *Mercurynews.com* Web. www.mercurynews.com/2018/04/25/nightmare-90-minute-super-commutes-more-common-housing-shortage-intensifies/ 19 August 2020.

16 Calculated using the 1990 and 2018 National Transit Database; 1990 and 2018 Highway Statistics table HM72; and 1990 and 2018 census data for populations and land areas for urbanized areas. Between the 1990 and 2000 censes, the Census Bureau split the Los Angeles urban area into three, creating the Mission Viejo and Santa Clarita urban areas, and it split the San Francisco-Oakland urban area into four, creating the Concord, Livermore, and Vallejo urban areas. These were merged back together to calculate 2018 population densities that are comparable to the 1990 densities.

Defenders of anti-sprawl policies often claim there is a large, pent-up demand for living in dense cities that cannot be met due to anti-density land-use regulations.[17] This claim isn't supported by surveys of public preferences. For example, a 2018 Gallup poll found that 40% of Americans who lived in cities aspired to move to lower-density areas while more Americans aspired to live in suburbs and rural areas than actually lived there.[18]

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We can further test the claim that there is a pent-up demand for dense housing by looking at where people are actually moving. From 2010 to 2018, Census Bureau estimates show that the suburban populations of 37 out of the top 50 urban areas grew faster than the central cities of those urban areas.[19] Many of the cities that grew faster than their suburbs did so through annexation, not by growing denser. Even in the Houston urban area, which has the fewest land-use restrictions against dense development of any major American city, suburbs grew more than twice as fast as the city. Some central cities including Baltimore, Kansas City, Cleveland, Pittsburgh, and St. Louis are still losing population.[20]

17 Weissmueller, Zach. "Density or Sprawl? How To Solve the Urban Housing Crisis." *Reason.com Video*. Reason Foundation. 28 February 2020. Web. reason.com/video/density-or-sprawl-how-to-solve-the-urban-housing-crisis/ 19 August 2020.

18 Newport, Frank. "Americans Big on Idea of Living in the Country." *Gallup.com*. Gallup Poll. December 7, 2018. Web. news.gallup.com/poll/245249/americans-big-idea-living-country.aspx. 19 August 2020.

19 *American Community Survey*. Table B01003, 2010 and 2018, for places and urbanized areas.

20 Ibid.

2.2 AUTO TRAVEL

The decline in urban population densities was prompted by increased automobile ownership. In 1960, 78% of households owned at least one automobile.[21] By 2010, this had grown to 91%.[22] By 2018, just 4% of American workers lived in a household without a vehicle. "Non-ownership" isn't the same as non-access: in 2018, more than 20% of workers who lived in households without vehicles nonetheless drove alone to work, probably in employer-supplied vehicles.[23]

Automobiles have become the dominant form of travel in the United States, providing more than 80% of all motorized passenger transport and 98.5% of urban motorized passenger transport in 2018. The automobile's only serious challenger is the airlines, which carried 12% of travel in 2018. Private buses carried about 6%; urban transit and Amtrak together were less than 1%.[24]

Automobiles achieved this dominance here, as well as in other developed countries around the world, because they are faster, more convenient, and less expensive than the alternatives. Even with $54 billion in subsidies, transit agencies charged fares averaging 30 cents per passenger-mile in 2018.[25] That sounds inexpensive compared with the cost of driving, which according to the American Automobile Association (AAA) averages 62 cents per vehicle-mile.[26] That's more expensive than transit unless the vehicle holds more than two people.

21 "Statistical Abstract of the United States: 1999." Census Bureau. 1999. 878. Print.

22 *American Community Survey*. Table B25044 for 2010. Census Bureau. *Census.gov*. 4 Sept. 2012 Web. data.census.gov/cedsci/table?q=b25044&tid=ACSDT1Y2010.B25044&hidePreview=true. 19 August 2020.

23 *American Community Survey*. Table B08141." Census Bureau. *Census.gov*. 4 April 2019. Web. data.census.gov/cedsci/table?q=b08141&tid=ACSDT1Y2018.B08141. 19 August 2020.

24 "National Transportation Statistics table 1-40." Bureau of Transportation Statistics. *Bts.gov*. 1 Jan. 2020. Web. www.bts.gov/content/us-passenger-miles 19 August 2020.

Auto's share of urban transport calculated from "2018 Highway Statistics." Federal Highway Administration, 2019. Print.

"Table HM72 and 2018 National Transit Database Service Spreadsheet." Federal Transit Administration, 2019. Print.

25 Calculated from "2018 National Transit Database," Capital Expenses, Operating Expenses, Fare Revenues, and Service spreadsheets.

26 Edmonds, Ellen. "Your Driving Costs." *Aaa.com*. American Automobile Association. 2019. Web. https://newsroom.aaa.com/auto/your-driving-costs/. 19 Aug. 2020.

AAA, however, assumes that people buy a new car, pay full financing charges, and replace the car after it is fully paid off in five years. Yet the average car on the road is nearly 12 years old, which means cars that are two decades old can still provide several years of transportation.[27] Buying a used car can greatly reduce depreciation, insurance, and finance charges. One analyst reported on Reddit that the least-costly car ownership strategy is buying a 10-year-old used car and replacing it with another 10-year-old car every five years. This would, he estimated, reduce the cost of auto ownership to as little as 20 cents per vehicle-mile.[28] Auto owners can reduce the cost per passenger-mile further by carrying more than one person.

2.3 URBAN TRANSIT

Increased auto ownership, combined with the dispersion of jobs and population, reduces the importance of urban transit. In 1960, when transit systems were mostly private, they carried urban Americans an average of 75 trips per year. By 2018, this was down to 37 trips per year.[29]

Transit's decline is in spite of huge subsidies to the transit industry and large increases in traffic congestion that many cities have allowed to take place in order to discourage driving and encourage transit ridership. In 1964, Congress authorized federal subsidies to transit, and since then, after adjusting for inflation, federal, state, and local transit, subsidies have totaled more than $1.4 trillion.[30] Despite these subsidies, transit ridership has declined in

27 "National Transportation Statistics Table 1-26." Bureau of Transportation Statistics. *Bts.gov*. 2019. Web. www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states. 19 Aug. 2020.

28 NMTXINSC. "New vs. Used Vehicle, Cost of Ownership Comparison." *Reddit.com*. Reddit. 2017. Web. www.reddit.com/r/dataisbeautiful/comments/6jc09l/new_vs_used_vehicle_cost_of_ownership_comparison/?mod=article_inline 19 Aug. 2020.

29 "2019 Public Transportation Fact Book Appendix A, table 1." American Public Transportation Association. 2019. Print.

1960 urban population from "Census of Population: 1960 volume 1, part A, XII." Census Bureau. 1961. Print.

2018 urban population from "American Community Survey table B01003 urban population." Census Bureau. *Census.gov*. 7 April 2019. data.census.gov/cedsci/table?q=b01003&g=0100001US&tid=ACSDT1Y2018.B01003&hidePreview=true. 19 Aug. 2020.

30 "2019 Public Transportation Fact Book Appendix A, tables 68, 80, and 92." American Public Transportation Association, 2019. Print.

every year since 2014 and the number of people who commute to work by transit has declined in every year since 2015.[31]

> *Low-income commuters who were once transit's core market in many cities have increasingly bought cars. Transit systems have responded by building expensive rail transit lines in order to attract middle-class commuters out of their cars and onto transit.*

Buried in the data about transit's decline is a change in the make-up of transit riders. Low-income commuters who were once transit's core market in many cities have increasingly bought cars.[32] Transit systems have responded by building expensive rail transit lines in order to attract middle-class commuters out of their cars and onto transit. Commuters whose incomes were under $35,000 a year were less likely to ride transit in 2018 than they were in 2010, while commuters who incomes were above $50,000 a year were more likely to ride transit in 2018 than 2010.[33] As a result, the median income of transit commuters, which was once well below that of all workers, is now higher than that of commuters using any other mode of transportation, including driving alone, carpooling, walking, and cycling.[34]

Historic data adjusted for inflation to 2019 dollars using GDP deflators calculated from "Current-Dollar and 'Real' GDP." Bureau of Economic Analysis, *bea.gov*. 30 July 2020. Web. apps.bea.gov/national/xls/gdplev.xlsx 19 August 2020.

31 Annual transit ridership from "National Transit Database Monthly Module Adjusted Data Release." Federal Transit Administration, *Transit.dot.gov*. 2020. Web. www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release 19 Aug. 2020.

Number of people who commute by transit from "American Community Survey, table B08301." Census Bureau. *Census.gov*. 16 Oct. 2019. data.census.gov/cedsci/table?q=b08301&tid=ACSDT1Y2018. 19 Aug. 2020.

32 Manville, Michael, Brian D. Taylor, Evelyn Blumenberg. "Falling Transit Ridership: California and Southern California." Southern California Association of Governments. 2018. 4. Print.

33 *American Community Survey*. Table B08119. Census Bureau. *Census.gov*. 4 Apr 2019. Web. data.census.gov/cedsci/table?q=b08119&tid=ACSDT1Y2018.. 19 August 2020.

34 *American Community Survey*. Table B08121. Census Bureau. *Census.gov*. 4 Apr 2019. Web. data.census.gov/cedsci/table?q=b08121&tid=ACSDT1Y2018. 19 August 2020.

Expensive rail transit lines may have resulted in more harm than good to many transit systems. Because Los Angeles cut bus service and raised fares to pay for rail construction, it has lost almost seven bus riders for every rail rider gained.[35] Charlotte, Portland, and other cities have also opened new rail lines that generated no net new riders because they lost more bus riders than they gained on rail.[36]

2.4 TELECOMMUTING

> *The other change in commuting is the growth in the number of people who don't commute because they work exclusively at home.*

The other change in commuting is the growth in the number of people who don't commute because they work exclusively at home. In 2017, this group was larger than the number of transit commuters for the first time, and the difference grew even more in 2018, when 5.3% of workers worked exclusively at home and just 4.9% commuted by transit.[37] People who work at home also had higher median incomes than any of the commuting categories; telecommuters are the only category of workers whose median incomes are higher than transit commuters.[38]

2.5 INTERCITY TRANSPORT

In intercity transportation, the main trend is the growth of air travel since airline deregulation. Air travel first exceeded rail passenger travel in the mid-1950s. By 1970, the year before Amtrak took over from the private railroads, domestic airlines carried about 18

35 Rubin, Thomas and James Moore. "A Critical Review of LA Metro's 28 by 2028 Plan." Thoreau Institute. Feb. 2020. Web. ti.org/pdfs/APB41.pdf. 19 Aug. 2020.

36 "National Transit Database Monthly Module Adjusted Data Release."

37 *American Community Survey*. Table B08119.

38 *American Community Survey*. Table B08121.

times as many passenger-miles as the railroads. Today, they carry well over 100 times as many passenger-miles as Amtrak.[39]

Nationally, Amtrak carries only about 0.1% of passenger-miles.[40] Even in the Boston-Washington, D.C. corridor, Amtrak carries about 6% of intercity travel, while intercity buses carry about the same, airlines 5%, and the rest is by private automobile.[41] In other corridors Amtrak's share of travel is so small that it is effectively meaningless.

Intercity bus service declined from 1960 to 2006, but then started growing due to the introduction of the Megabus model, which reduced costs by dispensing with dedicated infrastructure. Tickets were sold via the internet and passengers boarded buses at curbsides, so there was no need for bus stations. Buses offered power outlets and free wifi, and these amenities combined with low ticket prices mean intercity buses carry at least as many passenger-miles as Amtrak in the Boston-Washington, D.C. corridor and several times more passenger-miles than Amtrak nationwide.[42]

2.6 FREIGHT

Since the railroad and trucking industries were deregulated in 1980, rail's share of freight ton-miles has grown from 22% to 33% and truck's share has grown from 30% to 40%. This growth has come at the expense of water-borne transportation, whose share declined from 22% to 10%, and pipelines, whose share declined from 25% to 17%. Air freight has grown, but from only 0.1% to 0.3%.[43]

39 "National Transportation Statistics table 1-40." Bureau of Transportation Statistics. *bts.gov*. 2019. Web. https://www.bts.dot.gov/archive/publications/national_transportation_statistics/table_01_40 19 Aug. 2020.

40 Ibid.

41 "A Vision for High-Speed Rail in the Northeast Corridor." Amtrak, 2010. 4. Print.

42 Schwieterman, Joseph P., Lauren Fischer, Sara Smith, and Christine Towles. *The Return of the Intercity Bus: The Decline and Recovery of Scheduled Service to American Cities, 1960 - 2007*. Chicago: Chaddick Institute, 2007. 1. Print.

43 "National Transportation Statistics table 1-50." Bureau of Transportation Statistics. *Bts.gov*. 2019. Web. https://www.bts.dot.gov/archive/publications/national_transportation_statistics/table_01_50 19 Aug. 2020.

PART 3

THE EFFECTS OF THE PANDEMIC

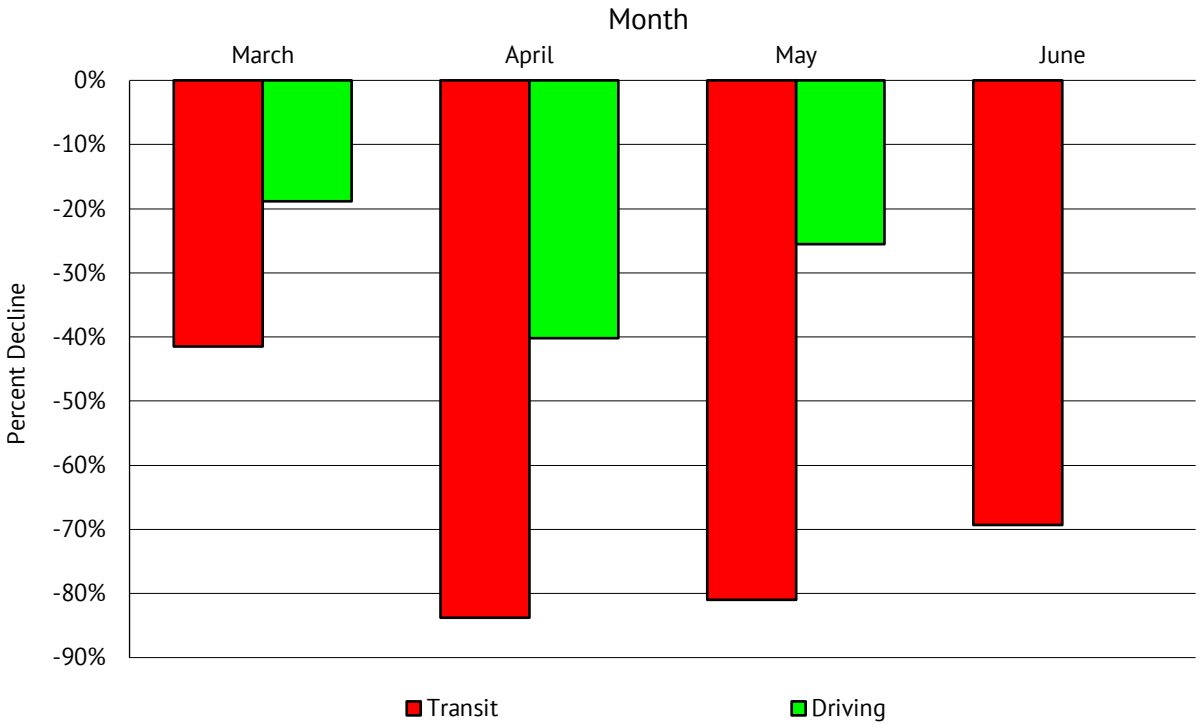
The pandemic and the economic shutdowns in response to it have dramatically reduced all forms of transportation. Compared with the year before, driving was down by 19% in March and 40% in April.[44] Transit ridership declined by more than 40% in March and 84% in April.[45] Rail freight declined by 24% in April.[46] Airlines, Amtrak, and other travel were similarly decimated. Figure 1 displays the one-year decrease in driving and transit usage related almost entirely to COVID.

44 "Traffic Volume Trends April 2020." Federal Highway Administration. 2020. 1. Print.

45 "National Transit Database Monthly Module Adjusted Data Release." Federal Transit Administration. 2020. Print.

46 Corselli, Andrew. "Rail Traffic Nosedives, But AAR Remains Optimistic." *Railwayage.com*. 15 Apr. 2020. Web. www.railwayage.com/freight/class-i/rail-traffic-down-but-aar-remains-optimistic/ 19 Aug. 2020.

FIGURE 1: U.S. 2019 AND 2020 AUTOMOBILE AND TRANSIT USE



Sources: National Transit Database Adjusted Data Release for June, 2020, Federal Transit Administration, 2020, www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release; Traffic Volume Trends, June, 2020, Federal Highway Administration, www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm.

In response to COVID-19 and the associated economic shut down, driving declined less and rebounded faster than transit, suggesting it is more important to the economy.

Moreover, surveys show that many Americans expect to change their transportation habits after the pandemic is over. Nearly half of New York City residents say they plan to stop riding transit even after the pandemic.[47] A Harris Poll found that 39% of urban residents are considering moving to lower-density communities.[48]

[47] Barone, Vincent and David Meyer. "Nearly Half of New Yorkers Plan to Avoid Mass Transit Post-Lockdown: Poll." *New York Post*. 14 May 2020. *Nypost.com*. Web. nypost.com/2020/05/14/nearly-half-of-nyc-plans-to-avoid-transit-post-lockdown-poll/ 19 Aug. 2020.

[48] Cohen, Arianne. "Should You Flee Your City? Almost 40% Have Considered It During the Pandemic." *The Harris Poll*, 4 May 2020. *Fastcompany.com*, Web. www.fastcompany.com/90500696/should-you-flee-your-city-almost-40-have-considered-it-during-the-pandemic 19 Aug. 2020.

The New York Times reports that 5% of New York City and at least 13% of Manhattan residents have fled the city during the pandemic.[49] That completely wipes out the population gains Manhattan has made since 1980. While some residents are expected to return once the COVID pandemic ends, others may never return.

What people say they will do often turns out to be far different from what people actually do. While the pandemic seems likely to reinforce the long-term trends toward decentralization and auto driving over mass transportation, considerable uncertainty remains over how big those shifts will be.

Some things, however, are less uncertain than others. Moreover, some changes are likely to have a cascading effect, predictably leading to other changes that in turn will lead to other predictable changes.

3.1 WORKING AT HOME

The keystone change in this regard is that the post-pandemic era will see a massive increase in the number of people working at home. According to the Census Bureau, more than 8.2 million Americans, or about 5.3% of the nation's workforce, worked exclusively at home in 2018. But there is room for many more to do so: 8.6% of Colorado workers and 15.4% of Marin County, California workers worked at home.[50]

This is only a small fraction of the number of people who could work at home. Before the pandemic, the Bureau of Labor Statistics estimated that 29% of American employees could work at home.[51] A study produced in the midst of the pandemic concludes as many as 37% could work at home.[52]

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49 Quealy, Kevin. "The Richest Neighborhoods Emptied Out Most as Coronavirus Hit New York City." *New York Times*. 15 May 2020. *nytimes.com*, Web. www.nytimes.com/interactive/2020/05/15/upshot/who-left-new-york-coronavirus.html. 19 Aug. 2020.

50 *2018 American Community Survey*. Table B08301." Census Bureau, *census.gov* 2019. Web. data.census.gov/cedsci/table?q=b08301&tid=ACSDT1Y2018.B08301. 19 Aug. 2020.

51 "29 Percent of Wage and Salary Workers Could Work at Home in Their Primary Job in 2017–18." Bureau of Labor Statistics. *Bls.gov*. 30 Sep. 2019. www.bls.gov/opub/ted/2019/29-percent-of-wage-and-salary-workers-could-work-at-home-in-their-primary-job-in-2017-18.htm 19 August 2020.

52 Dingel, Jonathan I. and Brent Neiman. "How Many Jobs Can Be Done at Home?" Becker Friedman Institute. 2020. Web. 1. bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf 19 August 2020.

Employers may have been reluctant to allow people to work at home because they are more difficult to monitor and they worry that employees may be distracted by home activities. But the pandemic has been a giant experiment in working at home. One survey found that 88% of organizations big enough to have human resource departments are letting some or all of their employees work at home.[53]

But the pandemic has been a giant experiment in working at home. One survey found that 88% of organizations big enough to have human resource departments are letting some or all of their employees work at home.

The experiment appears to have been successful.[54] Even before the pandemic, a study by Stanford University researchers found that people working at home were 13% more productive than when they worked in an office.[55] More than half of employees who are working at home during the pandemic report that their productivity has increased, while only 25% say their productivity has declined. The main reason given by those who report a decline is the reduction in access to co-workers, but ironically one of the main reasons given by those who report an increase is fewer distractions from co-workers.[56] While another study found that people working at home during the pandemic were, on average, 1% less productive than when they worked in an office, employers might be willing to

53 "Most Employees Working from Home During Coronavirus Pandemic." *businessfactilities.com*. 19 Mar. 2020. Web. businessfacilities.com/2020/03/most-employees-working-from-home-due-to-coronavirus-pandemic/. 19 Aug. 2020.

54 Loh, Tracy Hadden and Lara Fishbane. "COVID-19 Makes the Benefits of Telework Obvious." Brookings Institution, March 2020. Web. www.brookings.edu/blog/the-avenue/2020/03/17/covid-19-makes-the-benefits-of-telework-obvious/ 19 Aug. 2020.

55 Bloom, Nicholas, James Liang, John Roberts, and Zhichun Jenny Ying. "Dow Working from Home Work? Evidence from a Chinese Experiment." *The Quarterly Journal of Economics* (2015) 165–218. Web. nbloom.people.stanford.edu/sites/g/files/sbiybj4746/f/wfh.pdf 19 August 2020.

56 Schrotenboer, Brent. "Working at Home Had a Positive Effect on Productivity During Pandemic, Survey Says." *USA Today*. May 4, 2020. *Usatoday.com*, Web. www.usatoday.com/story/money/2020/05/04/coronavirus-pandemic-might-game-changer-working-home/3061862001/ 19 August 2020.

accept such a loss in exchange for saving thousands of dollars per employee by reducing their office space requirements.[57]

Businesses that allow people to work at home can also save lots of money. Global Workplace Analytics, an organization that helps employers transitioning to telecommuting, estimates that employers save $11,000 per year for each employee they allow to work at home half time, and the employees themselves save $2,500 to $4,000 on commuting costs.[58]

Twitter has announced that many of its employees who have been working at home during the pandemic will be allowed to continue working at home after stay-at-home orders are lifted.[59] Walmart has made a similar announcement.[60] So have three of the nation's largest banks: Barclays, JPMorgan Chase, and Morgan Stanley.[61] So has Nationwide Insurance, which says it is permanently closing offices all over the country.[62] Global Workplace Analytics estimates that "25-30% of the workforce will be working-from-home on a multiple-days-a-week basis by the end of 2021."[63]

While the Census Bureau only counts the number of people who work exclusively from home, from a transportation standpoint two people who work at home half time have the

57 Afshar, Vala. "Working from Home: Average Productivity Loss of Remote Work Is 1%." *ZDNet.com*, ZDNet. 11 May 2020. Web. www.zdnet.com/article/the-average-productivity-loss-of-remote-work-is-1/ 19 Aug. 2020.

58 "Work-at-Home After COVID-19: Our Forecast." *Globalworkforceanalytics.com*, Global Workplace Analytics. 2020. Web. globalworkplaceanalytics.com/work-at-home-after-covid-19-our-forecast 19 Aug. 2020.

59 Kantrowitz, Alex. "Twitter Will Allow Employees to Work at Home Forever." *Buzzfeednews.com,* BuzzFeedNews. 12 May 2020. Web. www.buzzfeednews.com/article/alexkantrowitz/twitter-will-allow-employees-to-work-at-home-forever. 19 Aug. 2020.

60 Repko, Melissa. "Walmart Say Its Thousands of Tech Employees Will Continue Remote Working After Pandemic Subsides." *CNBC.com*. Consumer News and Business Channel. 28 May 2020. Web. www.cnbc.com/2020/05/28/walmart-says-its-thousands-of-tech-employees-will-continue-remote-work.html 19 Aug. 2020.

61 Haag, Matthew. "Manhattan Faces a Reckoning If Working from Home Becomes the Norm." *New York Times*. 12 May 2020. *Nytimes.com*. Web. www.nytimes.com/2020/05/12/nyregion/coronavirus-work-from-home.html 19 Aug. 2020.

62 Gorman, Sean. "Future of the American Office: Will the Shift to Remote Work Become a Long-Term Trend Post Pandemic?" *Richmond Times-Dispatch*. 17 May 2020. Richmond.com. Web. www.richmond.com/business/watch-now-future-of-the-american-office-will-the-shift-to-remote-work-become-a/article_326a660e-80f7-52dc-a217-047cf52493ed.html. 19 Aug. 2020.

63 "Work-at-Home After COVID-19: Our Forecast," Global Workplace Analytics.

same impact on transportation facilities as one person who works at home full time. This means a 30% increase in people working at home half time is effectively equal to a 15% increase in people working at home full time.

This paper will assume that, after the end of the pandemic, the share of people effectively working at home will increase by 10 percentage points. Other estimates in this paper are derived from this assumption. If the share of work-at-homes increases by only five points, the other estimates should be reduced by 50%. If the share of work-at-homes increases by 15 points (which is closer to Global Workplace Analytics' prediction), then the other estimates should be increased by 50%.

3.2 LAND USE

> *The transition to more people working at home will accelerate the decentralization of urban areas.*

The transition to more people working at home will accelerate the decentralization of urban areas. American commuters seem to have a travel time budget: the amount of time they spend traveling to work has remained roughly constant at 25 minutes for many years.[64] Someone who takes 25 minutes to travel one-way five days a week spends 250 minutes traveling to and from work. In 1994, an Italian physicist named Cesare Marchetti observed that daily commute times averaged about 30 minutes each way all over the world, an amount that has become known as *Marchetti's Constant*.[65]

While Marchetti's Constant is more of a hypothesis than a proven fact, one piece of evidence for it is that studies of people who work at home have found that they drive at

[64] Travel time to work is calculated by dividing the "Aggregate Travel Time to Work" from table B08136 by the number of workers by means of transportation to work in "American Community Survey Table B08301." Census Bureau. *acs.org* 2019. Web. data.census.gov/cedsci/table?q=b08136&tid=ACSDT1Y2018.B08136 and https://data.census.gov/cedsci/table?q=b08301&tid=ACSDT1Y2018.B08301 19 Aug. 2020.

[65] Marchetti, C. "Anthropological Invariants in Travel Behavior." *Technological Forecasting and Social Change*. 47 (1994) 75. Print.

least as much, if not more, than people who commute. If people have a daily or weekly travel budget in hours, then those who work at home and can avoid congestion are likely to drive more miles than people who commute by car. In fact, two studies found just that: working at home leads to an increase in total driving.[66] A third study found that telecommuting might decrease total driving, but it wasn't statistically significant and the decrease was only 2%.[67]

If someone starts working at home part time on a permanent basis, they'll soon realize they can live much farther away from work and still maintain a reasonable weekly travel budget. While no one has ever proven that Marchetti's Constant is valid on a weekly level, people who are used to spending 50 to 60 minutes a day commuting five days a week will be willing to live even farther away if they only have to commute two or three days a week. Of course, if they work at home full time, they can live even farther away from their former workplace. This will lead to a new burst of growth of suburbs and exurbs. The exurbs—defined as rural development for people with urban occupations—are especially likely to grow as the number of people who work exclusively at home increases.

Employment locations for people who aren't working at home are likely to disperse as well. Financial firms and similar businesses tend to locate in downtown areas because of the importance of face-to-face meetings. But if many of the people who work for those businesses are doing some or all of their work at home, those face-to-face meetings will be less important. Businesses won't bother paying the high rents charged for downtown spaces when their principal employees are working at home and so will be likely to move their offices to the suburbs.

66 Zhu, P. and S.G. Mason. "The Impact of Telecommuting on Personal Vehicle Usage and Environmental Sustainability." *Int. J. Environ. Sci. Technol.* 11 (2014) 2185-2200. Print. Sandip Chakrabarti. "Does Telecommuting Promote Sustainable Travel and Physical Activity?" *Journal of Transport and Health* 9. (2018). 19-33. Print.

67 Choo, Sangho, Patricia L. Mokhtarian, and Ilan Salomon. "Impacts of Home-Based Telecommuting on Vehicle-Miles Traveled: A Nationwide Time Series Analysis." California Energy Commission. 2002. 59–60. Print.

> *Businesses won't bother paying the high rents charged for downtown spaces when their principal employees are working at home and so will be likely to move their offices to the suburbs.*

Other pandemic-related factors are promoting decentralization. Some people are already leaving dense cities out of fear of infection. "People are saying, 'I'm not going back,'" says Alison Bernstein, the CEO of a company that helps people relocate. " 'This could happen again and we don't know when it is going to end.'"[68] With social distancing, the things that made cities attractive—lively streets, enticing restaurants, festivals and musical concerts—are discouraged or disappearing: one estimate suggests that 25% of restaurants will fail to reopen after the pandemic.[69] Even if the restaurants open up again, if people view restaurants and bars as possible sources of infection for other diseases, the attraction of living in cities with lots of such businesses will decline. These factors will increase the impacts on transportation.

Decentralization may not increase total travel for commuting, but it is likely to increase travel for other purposes as people live farther away from stores, schools, and other people they may want to socialize with. Commuting makes up less than 20% of personal travel, so decentralization is likely to result in a significant increase in per capita driving.[70]

68 Kelly, Heather and Rachel Lerman. "The Pandemic Is Making People Reconsider City Living, Trading Traffic for Chickens." *Washington Post*. 1 June 2020. *Washingtonpost.com*. Web www.washingtonpost.com/technology/2020/06/01/city-relocate-pandemic/ 19 Aug. 2020.

69 Terenzio, Olivia. "In It Together: Calling All Leaders with Kevin Boehm & Naomi Pomeroy." *OpenTable.com*. Open Table. 22 May 2020. Web. restaurant.opentable.com/news/qas/in-it-together-calling-all-leaders-with-kevin-boehm-naomi-pomeroy/ 19 Aug. 2020.

70 "Summary of Travel Trends: 2017 National Household Travel Survey table 9a." Federal Highway Administration. 2018. Web. 19 Aug. 2020.

3.3 URBAN TRANSIT

> *Transit is going to be doubly hit by the increase in the number of people working at home.*

Transit is going to be doubly hit by the increase in the number of people working at home. The people who work at home tend to be higher-income white-collar workers. As noted above, that group has made up transit's major growth market for the last decade or more. Thus, an increase in working at home is likely to draw a disproportionate share of commuters away from transit.

In 2018, the American Community Survey estimated that, of 154.6 million workers in the United States, about 7.6 million—5.2% of commuters but 4.9% of all workers—usually took transit to work while about 8.3 million—slightly more than 5%—worked at home. Since 5.2% of commuters took transit, that means that, for every hundred people who start working at home, at least five and possibly more of them will have previously been transit commuters.

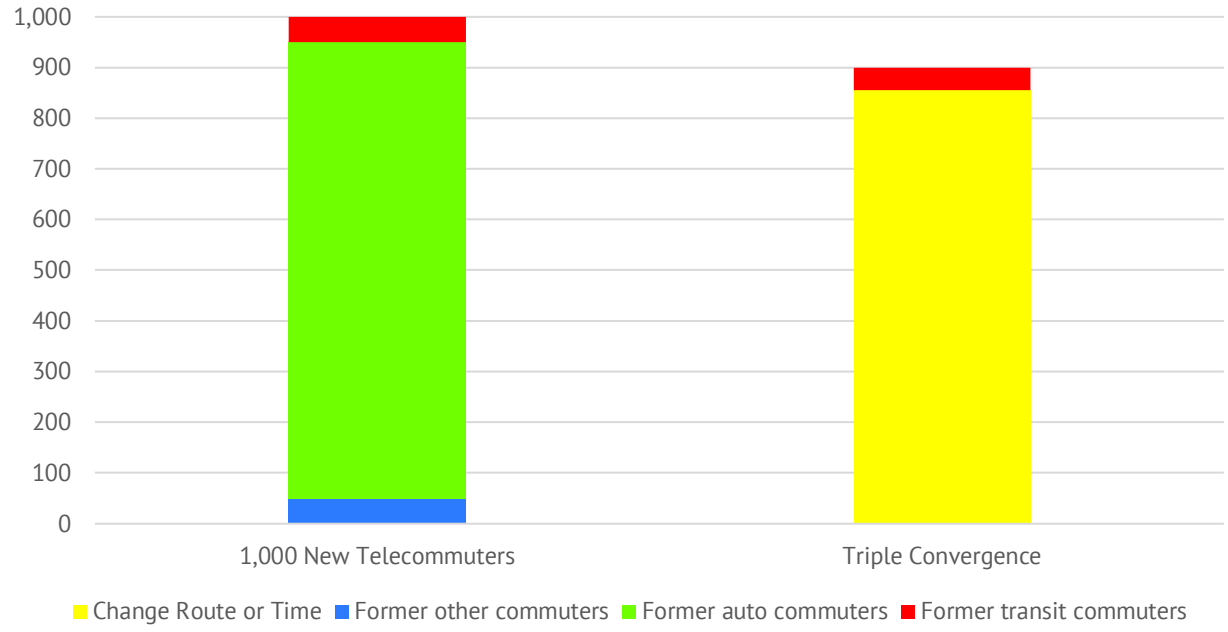
A doubling of working at home from 5% to 10%—that is, from 8.3 to 16.6 million people—would take at least 430,000 commuters off of transit, reducing transit's share from 5% to 4.75%. Similarly, if working at home tripled to 15%, transit's share would decline by at least 10% to 4.5%. In short, *a one-percentage point increase in working at home leads to a 1% decline in transit commuting*.

That's just the direct effect of an increase in working at home. There will also be an indirect effect resulting from the fact that most of the other 95% of commuters who start working at home would previously have been auto drivers. If working at home increases from 5% to 10%, it will effectively take 5% of cars off the road. If it increases to 15%, it will roughly take 10% of cars off the road. This reduction in congestion will lead other people, including transit riders, to change their behavior.

Economist Anthony Downs has pointed out that people respond to traffic congestion by changing routes, changing the time of travel, or changing modes such as from driving to

transit. When congestion is relieved, which is what would happen if 5% or 10% of people who were driving to work started working at home, then other people would change routes, times of travel, or modes to take advantage of the reduced congestion. Downs called this the "triple convergence" and it explains why new roads and other congestion relief measures don't appear to relieve peak-hour congestion (although they may decrease the number of hours of congestion per day).[71] Figure 2 illustrates how mode changes factor into the triple convergence theory.

FIGURE 2: INCREASED TELECOMMUTING'S ANTICIPATED EFFECT ON 1,000 WORK-AT-HOME COMMUTERS



Source: 2018 American Community Survey table B08301, Census Bureau

Out of every 1,000 new telecommuters, about 50 will have been former transit commuters, 900 former auto commuters, and 50 former commuters by other modes. The 900 former auto commuters means about 850 fewer cars on the road. Fewer cars on the road will lead to a triple convergence of people changing their routes, times of travel, or modes of commuting to take advantage of reduced congestion, including about 43 people shifting from transit to driving. In short, 1,000 new telecommuters equals 93 fewer transit commuters; 1,000,000 new telecommuters means 93,000 fewer transit commuters; etc.

[71] Downs, Anthony. *Stuck in Traffic*. Washington: Brookings Institution, 1992. 27–29. Print.

According to the American Community Survey, about 118 million people drove alone to work in 2018 and another 14 million carpooled with an average of about 2.25 people per carpool. That means about 124 million vehicles were used by commuters. A doubling of working at home would take about seven million of those cars off the road (which coincidentally is about the same as the number of transit commuters). The triple convergence would lead other people to change their routes, travel times, or modes to take advantage of the reduced congestion. Since about 5% of commuters take transit, roughly 5% of the people who change their behavior will be former transit riders who elect to drive instead.

Thus, if working at home increases from 5% to 10%, transit is likely to lose another 5% of its commuters. If working at home increases from 5% to 15%, transit will lose another 10% of its commuters. When added to the loss due to former transit commuters working at home, transit will lose 20% of its commuters if working at home increases from 5% to 15%.

Thus, a 10-percentage point increase in people working at home will translate into a 20% decline in transit commuting. If telecommuting increases by just five percentage points, transit will lose 10% of its commuters, while if telecommuting increases by 15 percentage points, transit will lose 30% of its commuters.

This doesn't count any of the people who decide to stop riding transit because of fear of infection, nor the people who respond to the pandemic by moving to lower-density areas out of the range of transit, nor the jobs that move to lower-density areas out of the range of transit. When these are added, it seems likely that an increase in working at home from 5% to 15% will contribute to transit losing at least 25% of the commuters it was carrying before the pandemic. This will happen no matter how much money is spent on building new rail transit, boosting transit frequencies, or sterilizing transit vehicles.

> *About 40% of transit ridership consists of commuting and work-related travel. But people who give up transit for commuting are also likely to give it up for shopping, social, recreational, and other purposes.*

About 40% of transit ridership consists of commuting and work-related travel.[72] But people who give up transit for commuting are also likely to give it up for shopping, social, recreational, and other purposes. Thus, it seems likely that transit will lose at least 25% of its total riders. If the estimate that working at home increases by 10 percentage points is off one way or the other, then the 25% will be roughly that much higher or lower. But transit is clearly going to lose a substantial portion of its riders no matter what. It is worth noting that, two months after China lifted quarantine restrictions, transit ridership there is down 35% from what it was before the pandemic.[73]

3.4 INTERCITY TRAVEL

The pandemic has reduced long-distance travel significantly as businesses substitute in-person trips with video conferencing, and leisure travelers forego international trips. Short-distance travel (fewer than 400 miles) has been affected in a different way as travelers switch from airline and rail travel to a mode that is convenient, inexpensive, and less likely to transmit infections: the private automobile. This will have an outsized negative impact on Amtrak.

In 2019, the average Amtrak trip was under 200 miles, 86% of those trips took place on short-distance trains, and most of those riders did not transfer to longer-distance trains.[74] Even on the long-distance trains, some of whose route lengths are well over 2,000 miles, the average trip length was just 550 miles, meaning many passengers used the trains for just short-distance travel. Thus, it is likely that at least 90% of Amtrak riders are short-haul passengers, so a 50% drop in short-distance rail travel would mean a 45% drop in Amtrak ridership.

Amtrak claims that its trains in the Northeast Corridor make money, but it can make this claim only by ignoring depreciation, one of the largest costs on its ledger.[75] The Northeast Corridor has an $11.6 billion "basic infrastructure backlog," the result of deferring

[72] McGuckin, N. and A. Fucci. "Summary of Travel Trends: 2017 National Household Travel Survey Table 9a." Federal Highway Administration, 2018. Print. 19 Aug. 2020.

[73] Bellon, Tina. "Empty Trains, Clogged Roads: Americans Get Behind the Wheel to Avoid Transit." Reuters. May 20, 2020, www.reuters.com/article/us-health-coronavirus-usa-transit/empty-trains-clogged-roads-americans-get-behind-the-wheel-to-avoid-transit-idUSKBN22W29X Accessed 19 August 2020.

[74] "Monthly Performance Report: FY 2019." Amtrak. 2019. 8. Print

[75] Ibid. 3, 8. Print.

maintenance due to funding shortfalls that would not exist if the corridor actually did make money. This only scratches the surface of the corridor's real problems, which include worn-out bridges and tunnels that will cost at least another $33.6 billion to replace.[76] Rather than replace this infrastructure, it might be better to shut down Amtrak and devote resources to making the form of travel used by 89% of intercity travelers in the corridor—namely motor vehicles on highways—safer and more efficient.

[76] "Northeast Corridor Capital Investment Plan: Fiscal Years 2020-2024." Northeast Corridor Commission. 2019. 16. Print.

PART 4

SHORT-TERM TRANSPORTATION POLICY IMPLICATIONS

The pandemic will greatly increase telecommuting, which will contribute to accelerated decentralization and a decline in urban and short-range intercity mass transportation. These changes have important implications for land-use and transportation policymakers.

4.1 STATES AND CITIES SHOULD STOP FIGHTING DECENTRALIZATION

The decentralization trend that began before the pandemic is likely to gain vigor afterward. Even if urban-growth boundaries and other growth-management tools have increased densities of some urban areas, many people have relocated outside the city centers, and the increase in telecommuting will allow many more to do so.

4.2 RECOGNIZE THE VALUE OF THE AUTOMOBILE

> *Clearly, the solution to automotive transportation problems is to make automobiles and highways cleaner, safer, and more fuel-efficient, not to try to force people out of those automobiles, which they clearly prefer.*

Clearly, the solution to automotive transportation problems is to make automobiles and highways cleaner, safer, and more fuel-efficient, not to try to force people out of those automobiles, which they clearly prefer. Taking steps to reduce congestion, including variable tolls on specific lanes or entire highways, will also help. Unfortunately, too many policymakers believe that "we can't build our way out of congestion," so they do nothing, fearing that if they actually relieve congestion it will attract more drivers, as if enabling more mobility is somehow a bad thing.

While auto critics focus on the costs of automobiles, they refuse to acknowledge the huge benefits of the automobile. They imply that mass transportation can provide equal mobility, but that has been thoroughly disproven by the University of Minnesota's Accessibility Observatory. Among other things, this research group publishes annual reports estimating the number of jobs that are accessible to people by transit and by automobile in all 49 of the nation's largest urban areas.[77]

The Observatory's 2018 reports found that the average resident of these areas could reach 46 times as many jobs in a 20-minute auto drive than a 20-minute transit trip, and 12 times as many in a 60-minute auto drive than a 60-minute transit trip. In fact, they could reach twice as many jobs in a 20-minute auto trip as in a 60-minute transit trip. Even in the New York urban area, residents could reach twice as many jobs in a 30-minute auto trip as a 60-

[77] Owen, Andrew and Brendon Murphy, *Access Across America: Auto 2018*. Minneapolis: University of Minnesota Accessibility Observatory, 2020. Print; Andrew Owen and Brendon Murphy, *Access Across America: Transit 2018*. Minneapolis: University of Minnesota Accessibility Observatory, 2020. Print; Data are included in the auto report for the nation's 50 largest urban areas, but the researchers were unable to develop transit data for Memphis so that report includes only 49 of the nation's 50 largest.

minute transit trip.[78] Autos also provide better access to housing, low-cost consumer goods, and various social and recreational activities.

4.3 AVOID MEGAPROJECTS

Representative Peter DeFazio (D-OR), chair of the House Transportation and Infrastructure Committee, recently released a plan to increase federal subsidies to urban transit by more than 70%. The plan would also increase the federal government's share from 50% to 80% of the cost of new rail transit projects.[79]

At around the same time, Representative Seth Moulton (D-MA) proposed that the federal government spend $205 billion on new high-speed rail lines.[80] Megaprojects such as high-speed rail and urban rail transit were questionable enough before the pandemic and are even more questionable now.

Around the country, states, cities, and transit agencies are planning or building numerous transportation projects that are predicated on the ability of government actions to influence people's travel habits. That assumption was already questionable, and the pandemic has made it even more unlikely.

78 Ibid.

79 "The Invest in America Act." House Transportation and Infrastructure Committee, *transporation.house.gov*. 4 June 2020. Web. transportation.house.gov/imo/media/doc/2020%20INVEST%20in%20America%20Bill%20Summary.pdf Accessed 19 Aug. 2020.

80 "Moulton Rolls Out National High-Speed Rail Plan." Office of Representative Seth Moulton. *Moulton.house.gov*. 19 May 2020. Web. moulton.house.gov/press-releases/moulton-rolls-out-national-high-speed-rail-plan 19 Aug. 2020.

> *Around the country, states, cities, and transit agencies are planning or building numerous transportation projects that are predicated on the ability of government actions to influence people's travel habits. That assumption was already questionable, and the pandemic has made it even more unlikely.*

In the face of the certainty that transit ridership is going to be dramatically lower after the pandemic than it was before, and uncertainties about the ability of any transit agency to attract new riders by building expensive rail lines, planning for such lines should be halted.

The pandemic underscores that rail transit is an obsolete business model that only works when large numbers of jobs are concentrated in the downtown hubs of hub-and-spoke systems. Since most jobs have dispersed to the suburbs, and some of those that are left downtown may also move in the near future with the move to incorporate more technology and less face-to-face interaction, it doesn't make sense to spend billions of dollars on rail projects that will never serve more than a tiny fraction of the populace.

High-speed rail is also made even more questionable by the pandemic. Its supporters admit that it is specifically aimed at short-distance intercity travelers, trips too short to be practical by air and too long to be comfortable by automobile.[81] But if the pandemic increases people's preferences for private autos over any mass transportation for short intercity trips, it kills the business model for high-speed trains.

[81] "Vision for High-Speed Rail in America." Federal Railroad Administration, 2009. 2. Print.

PART 5

LONG-TERM TRANSPORTATION POLICY IMPLICATIONS

As self-contained vehicles, private automobiles are the safest way to travel during a pandemic. A 2018 study found that mass transportation systems "offer an effective way of accelerating the spread of infectious diseases."[82] In April, 2020, an economist from MIT published data showing that New York City's subway system "was a major disseminator—if not the principal transmission vehicle—of coronavirus infection . . . during March 2020."[83] So it is not surprising that in late May the Centers for Disease Control issued guidelines

82 Ilpo Kulmala, Ian Hall, Jonathan Van-Tam, Pertti Pasanen, Nicolas Poirot, and Stéphane Bastier. Prevention and Management of High Threat Pathogen Incidents in Transport Hubs. *Proceedings of the 10th Symposium on CBNRE Threats*. 2018. Conference Proceedings. Cris.vott.fi. Web. cris.vtt.fi/en/publications/pandhub-prevention-and-management-of-of-high-threat-pathogen-inci 19 Aug. 2020.

83 Harris, Jeffrey E. "The Subways Seeded the Massive Coronavirus Epidemic in New York City." Working paper. 13 Apr. 2020. Web. www.dropbox.com/s/h9i8obshl6qdnde/4-13-20%20MIT%20Study,The%20Subways%20Seeded%20the%20Massive%20Coronavirus%20Epidemic%20in%20New%20York%20City,%20DOE,%20HarrisJE_WP2_COVID19_NYC_13-Apr-202.pdf?dl=0 19 Aug. 2020.

urging employers to pay for employee parking and otherwise give them incentives to drive to work rather than take mass transit.[84]

> *Instead, to reinforce the resilience of the nation's transportation network, the best thing the government can do is get out of the way.*

Instead, to reinforce the resilience of the nation's transportation network, the best thing the government can do is get out of the way. Stop reducing roadway capacities through "road diets" and similar programs. Stop diverting billions of dollars a year of highway user fees to transit and other non-highway programs. Stop subsidies to Amtrak and urban transit systems aimed at enticing people to become dependent on less resilient transportation modes.

84 "COVID-19 Employer Information for Office Buildings." Centers for Disease Control. *Cdc.gov*. 27 May 2020. Web. www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html 19 Aug. 2020.

PART 6

CONCLUSIONS

The pandemic is going to leave behind major changes in America's transportation system, and those changes in turn call for changes in transportation policies today. While nothing is absolutely certain, one of the most likely changes will be a large increase in the number of people who work at home. That increase will, in turn, provide enough congestion relief that it will change the commute habits of people who continue to work away from home.

The pandemic is going to leave behind major changes in America's transportation system, and those changes in turn call for changes in transportation policies today.

That in turn will have significant cascading effects. In particular, the number of transit commuters is likely to drop at twice the percentage of the percentage point increase in people who work at home. In other words, if 5% of people work at home today and this increases 10 percentage points to 15%, then the number of transit commuters is likely to decline by 20%. This is true even if some of the increase in telecommuters is people who work at home part time: two people who work at home half time will have the same effect on transportation as one who works at home full time.

The increase in working at home will also accelerate the decentralization of urban areas. Given that people have a time budget for commuting, someone who works at home half time will be willing to live twice as many minutes away from their workplace as when they worked away from home full time.

The other likely, but less quantifiable, impact will be to short-distance (under 400 miles) intercity travel. Only a small portion of airline travel carries short-distance travelers, but most Amtrak and intercity bus travel is over short distances, and these are likely to suffer severe declines in ridership.

In addition to increased telecommuting, other pandemic-related factors are promoting decentralization. Some unknown number of people who previously lived in dense multifamily housing will move to low-density suburbs or exurbs. Jobs are likely to further disperse as employers decide that the costs of being located in dense cities exceed the benefits. These changes result in even greater reductions in ridership on transit, Amtrak, and other short-distance intercity carriers.

While the exact numbers are uncertain, the direction of trends is fairly certain, and these trends demand changes in existing transportation policies. Even where changes are uncertain, that very uncertainty requires that some programs and projects that depended on now-questionable assumptions should be altered.

First, states and cities should stop trying to discourage decentralization and auto driving.

Second, states and cities that are planning mega-transportation projects should at least pause and most likely cancel those projects, especially if they depend on assumptions that people will continue to live in dense cities and ride mass transportation instead of driving. Even projects that are in early construction stages should be reconsidered, as it isn't worth throwing good money after bad if the project is going to fail to accomplish its goals.

ABOUT THE AUTHOR

Randal O'Toole is a land-use and transportation policy analyst and the author of several books on transportation issues, including *Gridlock: Why We're Stuck in Traffic and What to Do About It* and *Romance of the Rails: Why the Passenger Trains We Love Are Not the Transportation We Need*. A resident of central Oregon, O'Toole has previously taught environmental economics at Yale, University of California Berkeley, and Utah State University.