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FEDERAL TRANSIT ADMINISTRATION

Trends in Transit-Oriented Development 2000–2010

MAY 2014

FTA Report No. 0050
Federal Transit Administration

PREPARED BY

Center for Transit Oriented Development

U.S. Department of Transportation
Federal Transit Administration

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Federal Transit Administration
Office of Planning and Environment
U.S. Department of Transportation
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Washington, DC 20590

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Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liter	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or “metric ton”)	Mg (or “t”)
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

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After decades of decline, public transportation ridership grew 36 percent from 1995 through 2008, almost three times the growth rate of the U.S. population (14%) and substantially more than the growth for vehicle miles of travel on our nation's streets and highways (21%). This report analyzes the trends in transit regions and transit-oriented developments (TOD) from 2000 to 2010, illuminating changes in how and where we live, travel, and work. This analysis focuses on the regions and the ½-mile radius around station areas that existed in 2000 and 2010 and provides a snapshot of station areas in systems that came on line after 2000. Three case studies provide a closer look at how TOD impacts local communities. Investment in new fixed-guideway transit systems surged, and the number of regions with systems increased 43 percent, from 28 to 40. More households chose to live near transit in compact, mixed-use TOD communities closer to jobs and daily destinations, with easy access to transit, less reliance on automobiles, and more cost-of-living protection from volatile gas price spikes.

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ABSTRACT

After decades of decline, public transportation ridership grew 36 percent from 1995 through 2008, almost three times the growth rate of the U.S. population (14%) and substantially more than the growth for vehicle miles of travel on our nation's streets and highways (21%). This report analyzes the trends in transit regions and transit-oriented developments (TOD) from 2000 to 2010, illuminating changes in how and where we live, travel, and work. This analysis focuses on the regions and ½-mile radius around station areas that existed in 2000 and 2010 and provides a snapshot of station areas in systems that came on line after 2000. Three case studies provide a closer look at how TOD impacts local communities. Investment in new fixed-guideway transit systems surged, and the number of regions with systems increased 48 percent, from 27 to 40. More households chose to live near transit in compact, mixed-use TOD communities closer to jobs and daily destinations, with easy access to transit, less reliance on automobiles, and more cost-of-living protection from volatile gas price spikes.

EXECUTIVE SUMMARY

In the decade since the new millennium, the U.S. has seen unprecedented shifts in our economy, housing market, and transportation costs. We have experienced the greatest economic decline since the Great Depression, witnessed a foreclosure crisis that radically altered the housing market, and experienced gas price spikes that have dominated the headlines. At the same time, commitment to environmental issues was rekindled, with sustainability strategies permeating multiple sectors of our society and economy, including housing, transportation, education, consumer goods, and personal lifestyles.

One major trend that did not receive the headlines it deserved is the resurgence in transit ridership across America. After decades of decline, public transportation ridership grew 36 percent from 1995 through 2008, almost three times the growth rate of the U.S. population (14%) and substantially more than the growth for vehicle miles of travel (VMT) on our nation's streets and highways (21%) over the same period.[1]

Investment in new fixed-guideway transit systems surged, with the number of regions with systems increasing 48 percent, growing from 27 to 40. As this report demonstrates, more households chose to live near transit in compact, mixed-use TOD communities closer to jobs and daily destinations. These communities allow residents to rely less on costly and polluting automobiles and to benefit from cost-of-living protection from volatile gas price spikes.

This report analyzes the trends observed in fixed guideway transit regions and TOD from 2000 to 2010 to illuminate the changes in how and where we live, travel, and work. This analysis focuses on the regions and ½-mile radius around station areas that existed in 2000 and 2010 and provides a snapshot of station areas in systems that came on line after 2000. Three case studies provide a closer look at how transit-oriented development impacts local communities.

Here's what we found:

- **Transit is expanding.**
  - The number of regions with fixed-guideway transit systems increased 48 percent, growing from 27 regions to 40. This included heavy rail, light rail, commuter rail, streetcars, and bus rapid transit (BRT) with dedicated right-of-way.
  - Since 2000, 881 new transit stations were built, an increase of 25 percent, bringing the total number of U.S. stations to 4,416. Philadelphia and Portland added the most, with 83 stations each.
- **More Americans are living near transit.**
  - The number of people living within ½-mile of a transit station increased 6 percent. The total number of households in the same area increased 8 percent.

[1] American Public Transportation Association, *2010 Public Transportation Fact Book*, 61st Edition, April 2010.

   - Large, medium, and small system transit sheds captured a signification portion of their transit region's population growth, ranging from 4.5 to 6 percent. Extensive systems also experienced growth, but as a smaller percentage of the regions' total, likely due to being fairly built out by 2000.

- **Households near transit are smaller and denser.**
   - Transit sheds are capturing an increasing share of small households, with 1- and 2-person households increasing 3 to 6 percent and 3-person households decreasing 8 percent.
   - The average number of housing units per acre near transit has increased, ranging from an 8 percent increase in extensive systems to a 23 percent increase in small systems.

- **Household transportation patterns reflect advantages of proximity to transit.**
   - Auto ownership is consistently lower in all transit sheds in comparison to their regions, with households in extensive system station areas owning, on average, 0.5 fewer autos. In large, medium, and small systems station areas, the rate of ownership ranged from 0.25 to 0.5 fewer autos.
   - In all transit sheds, a significantly larger percent of commuters take public transit, bike, or walk to work than in the transit regions. This is true regardless of the size of the transit system or whether the system is new or existing. However, since 2000, only the extensive system transit sheds showed growth in usage of public transportation, bicycle, or walking to work.
   - Since 2000, auto ownership rates have increased everywhere, with the exception of the station areas in San Francisco. They have increased at lower rates in the station areas of the extensive systems and higher rates in the large, medium, and small system regions, with the exception of Washington DC and Pittsburgh.
   - Housing and transportation costs as a percent of income rose in most transit sheds and regions, but the rate of growth was less in the transit shed compared to the region.
- **The number of jobs near transit is increasing, particular in the fast-growing educational and medical services sectors, although job decentralization continues.**
   - The number of jobs located within ½ mile of transit rose 24 percent, primarily driven by transit system expansion.
   - The new transit systems that were built in the 2000s provided access to 1.3 million jobs by the end of the decade.

– Transit sheds established prior to 2000 held their overall share of regional employment of approximately 22 percent, with some large regions experiencing growth (New York and Los Angeles) and others experiencing declines consistent with a national trend of job decentralization.
– Transit shed employment is concentrated in the educational and medical services sectors, which are expected to experience growth in the coming decades.

Approach to Analysis

This analysis focuses on the ½-mile radius around station areas using the National Transit-Oriented Development Database (http://toddata.cnt.org). The ½-mile radius is generally accepted as the distance people are willing to walk to use rail. Two sets of transit sheds were analyzed: a 2000 transit shed that includes stations that existed in 2000, and a 2010 transit shed that includes all stations that came on after 2000.

Transit systems in the analysis include heavy and light rail, commuter rail, streetcar, ferry, and bus rapid transit (BRT) with dedicated right-of-way. Transit systems were grouped for analysis based on size, primarily by number of stations, into extensive, large, medium, and small systems. The report methodology is detailed in Appendix B.

Data Sources, Aggregation, and Comparisons

The National Transit-Oriented Development Database includes data from several sources, including the U.S. Census 2000, the U.S. Census 2010, the American Community Survey (ACS) 2005–2009 Five-Year Estimates, and Local Employment Dynamics (LED) 2002–2009, and proportionally sums these data to geographies of interest (see the TOD Database User Guide for a complete description at http://toddata.cnt.org/user-guide.php).

The analysis in this report uses appropriate comparisons when identifying trends. Census 2000 Summary File 1 data (aggregated from Census Blocks) are used in comparison to Census 2010 Summary File 1 data, and Census 2000 Summary File 3 data (aggregated from Census Block Groups and Tracts) are used in comparison to ACS 2005–2009 data. Data from the 2002 and 2009 Local Employment Dynamics (LED) are used for the employment analysis.

Definitions

Definitions used in this report include the following:

- Transit Zone – the ½-mile radius around station areas.
- Transit Shed – the aggregate of transit zones for a transit region. An important feature of the transit shed statistics is that when two transit zones overlap, the transit shed does not double count the data.
- Transit Region – the aggregate from one or more Census County boundaries that contain the majority of the region's economic activity and transit system. The counties that make up each Transit Region can be found at http://toddata.cnt.org/transit_region_counties.php.
- Established Transit Systems – 27 transit systems that were operating in both 2000 and 2010.
- New Transit Systems – 13 transit systems came on line after 2000 and are not included in trends analysis.
- Transit System Size: the fixed-guideway transit systems in the U.S. fall into the following four categories and are listed in Section 2.
  - Extensive: 325–951 stations
  - Large: 72–151 stations
  - Medium: 25–67 stations
  - Small: fewer than 25 stations[2]

Figure E-1

Description of Transit Zone, Transit Shed, and Transit Region

[2]Gaps in station counts between system size types are due to measured station counts.

SECTION 1

National Trends

System Size

The decade beginning in 2000 saw considerable growth in fixed-guideway transit systems serving the United States and Puerto Rico. New transit corridors were brought online in 13 regions that previously lacked fixed-guideway transit, bringing the total number of regions with fixed-guideway transit systems to 40, a 48 percent increase.

Given this growth in the nation's transit infrastructure over the past decade and the release of the 2010 Census, it is an opportune time to examine whether these investments are related to corresponding changes in population living near transit, household characteristics, and travel behavior. This report examines the trends in household demographics, transportation choice, and employment that occurred in these regions and their transit sheds.

In 2010, there were 4,416 fixed-guideway transit stations, 881 of which were new since 2000, a 25 percent increase. Along with the 292 stations built in the 13 new regions with transit systems, 589 stations were added to regions with existing systems. The median station growth rate for existing transit systems was 16 percent. The Norfolk, Virginia, transit region had the highest growth rate, at 367 percent. Philadelphia, Pennsylvania, and Portland, Oregon, added the most stations since 2000, each adding 83 over the period.

Regions with fixed-guideway transit vary considerably in terms of system size and types of agencies providing service. The number of stations in a transit region ranges from five in the Harrisburg, Pennsylvania, region to 951 in the New York area. System size plays a significant role in the demographic and mobility characteristics of workers and residents near transit, because more stations in a system will connect more people and places. Therefore, in this report, regions have been grouped by size into four categories based on total number of stations:

- Small: less than or equal to 23 stations (14 regions)
- Medium: 25–72 stations (13 regions)
- Large: 81–151 stations (8 regions)
- Extensive: 325–951 stations (5 regions)

Access to Transit

From 2000 to 2010, as might be expected considering the overall growth of the national transit system, there was a corresponding increase in access to transit for U.S. and Puerto Rican citizens (Table 1-1).

- Total population living in the national transit shed increased from 15,691,807 in 2000 to 16,597,041in 2010, an increase of almost 6 percent.
- Total number of households living in the national transit shed increased from 6,131,299 in 2000 to 6,649,300 in 2010, an increase of more than 8 percent.

The average household size of a typical household within the national transit shed decreased 5.9 percent, from 2.15 in 2000 to 2.02 in 2010.

Table 1-1

Household Characteristics 2000 and 2010

	U.S. 2000	U.S. 2010	Percent Change	National Transit Shed 2000	National Transit Shed 2010	Percent Change
Total population	281 million	308 million	9.70%	15,691,807	16,597,041	5.80%
Total households	105 million	118 million	11.40%	6,131,299	6,649,300	8.40%
Average household size	2.62	2.59	-1.10%	2.13	2.02	-5.00%

SECTION 2

Regional Trends

Systems Overview

The 27 regions with transit systems existing in 2000 were examined together, grouped by system size.

Table 2-1

27 Existing Transit Regions

Extensive	Large	Medium	Small
Boston	Cleveland	Atlanta	Buffalo
Chicago	Dallas	Baltimore	Detroit
New York	Los Angeles	Denver	Harrisburg
Philadelphia	New Orleans	Miami	Jacksonville
San Francisco	Pittsburgh	Sacramento	Memphis
	Portland	Salt Lake City	Norfolk
	San Diego	Seattle	
	Washington DC	St. Louis	

The 13 regions with new transit systems since 2000 were examined as a group, differentiated by system size

Table 2-2

13 New Transit Regions

Medium	Small
Eugene	Albuquerque
Las Vegas	Austin
Minneapolis-St. Paul	Charlotte
Phoenix	Houston
	Kansas City
	Little Rock
	Nashville
	San Juan
	Tampa

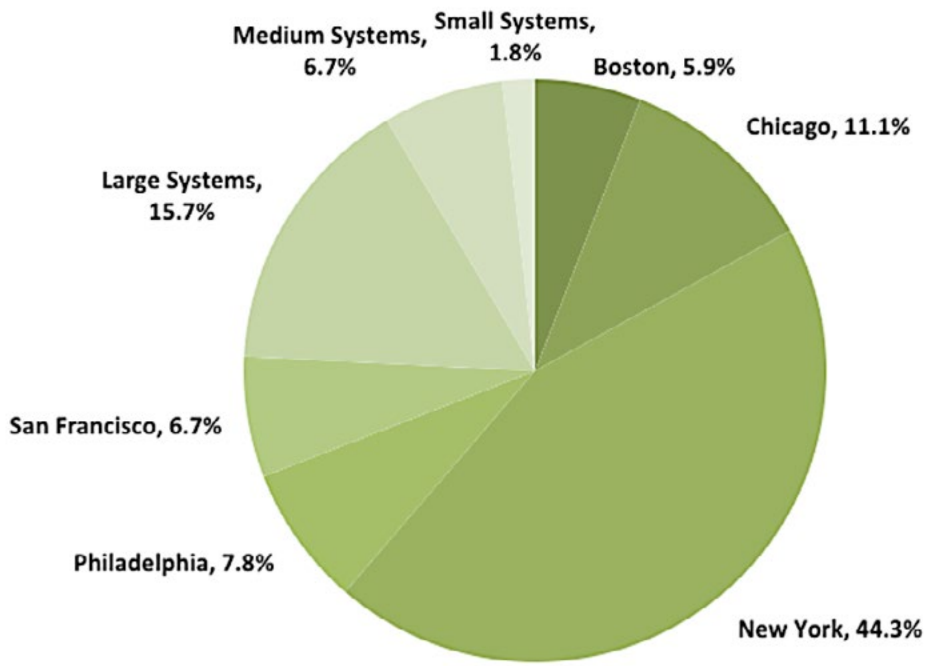
Who Lives near Transit in 2010?

Population

A substantial majority of the nation's transit shed population reside in regions with extensive transit systems. A total of 16.6 million people or 6.6 million households lived within a ½-mile radius of fixed-guideway transit stations in 2010. This equates to 11 percent of both the total population and number of households within the 40 metro regions covered in this study. These transit zones represent less than 1 percent of the total land area in the regions, clearly demonstrating that transit zones tend to be more densely-populated than these regions as a whole. Approximately 75 percent of the total transit zone population in the U.S. lives in the five regions that have extensive transit systems—New York, Chicago, Philadelphia, San Francisco, and Boston. Although this still represents 75 percent of the transit population, it decreased from 80 percent in 2000, reflecting significant population and system size growth among the smaller systems. Despite the fact that only 25 percent of all transit zone residents live in the regions with small, medium and large systems, this, nonetheless, represents more than 3 million people nationwide (Figure 2-1).

Figure 2-1

Distribution of Transit Community Population, 2010

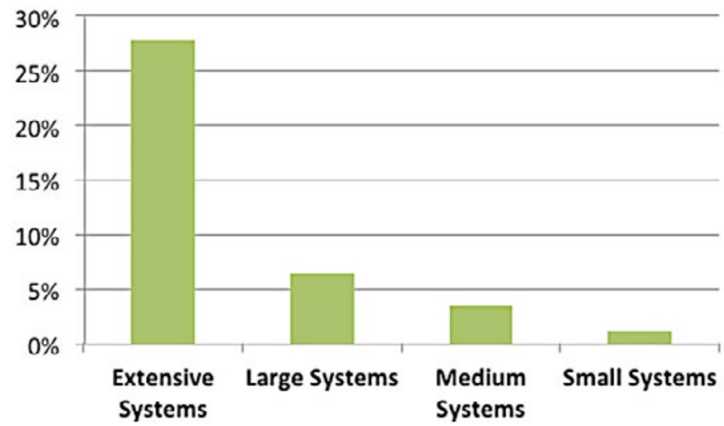


Share of Regional Populations Living in Transit Communities

Regions with large and medium-size systems with fixed-guideway systems located in densely-populated areas, or where TOD was aggressively promoted, appear to have had some success in accommodating a higher proportion of residents in transit zones. While areas with extensive transit systems predictably exhibit higher proportions of the regional population, some smaller system transit sheds also captured modest shares of the regional population. In the Portland, Oregon, and Washington DC transit regions, for example, more than 10 percent of all residents live in transit communities. Ten percent of Eugene, Oregon's, population is within the bus rapid transit (BRT) shed, which is nearly three times the average capture rate for other medium-size transit systems. Figure 2-2 depicts the percentage of regional population living in transit zones by system size for stations existing in 2010.

Figure 2-2

Percent of Population Residing in Selected Transit Sheds, 2010

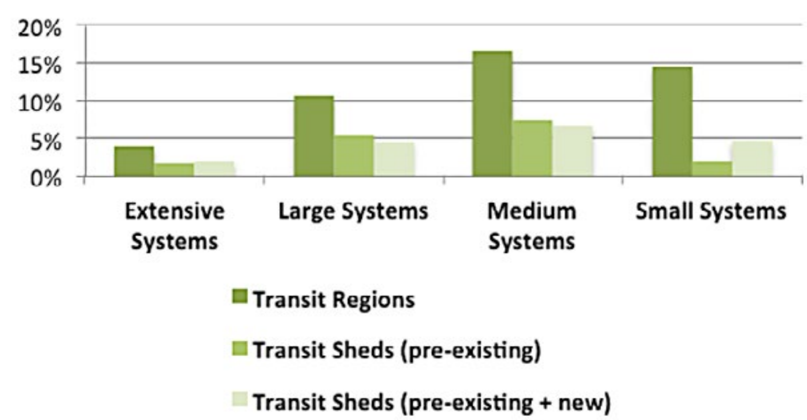


Population Increases in Transit Regions and Sheds

Between 2000 and 2010, population increased both within transit sheds and in their larger regions. In transit sheds, the rate of growth over the last 10 years has been more modest and has not kept pace with the transit regions. This is to be expected, given that many transit sheds are within built-out urban areas, whereas other parts of the regions possess more opportunities for greenfield development. The rate of growth, however, varies considerably, depending on the size and growth of the transit systems themselves. As depicted in Figure 2-3, regions with extensive transit systems (located primarily in the Northeast) exhibited more modest population growth than did regions with smaller expanding systems. Given that many of the latter are located in the South, West, and Sunbelt, this is consistent with national growth trends. As transit systems continue to expand, there is an opportunity to provide access to more parts of these growing regions. For small to large transit systems, the population of these regions expanded between 4 and 16 percent, whereas the transit sheds grew from 2 to 6 percent.

Figure 2-3

Percentage Increase in Population, 2000–2010



Population growth in individual transit systems varied even more significantly (Figure 2-4). In terms of percentage increases, newer, small systems in the Southeast—for instance, Tampa and Charlotte—saw their transit shed populations increase by more than 30 percent in their new station areas. Among the large systems, the transit sheds of Portland and Denver each grew approximately 20 percent. Extensive systems experienced more modest percentage gains but, in absolute numbers, recorded much larger growth. While New York transit shed added nearly 200,000 residents, both Washington DC and San Francisco grew between 75,000 and 81,000.

Some systems actually lost population over the course of the decade. The places which have experienced loss in their transit zones also lost population in the region as well. The case of New Orleans is different because of Hurricane Katrina, but regions like Cleveland, Baltimore, Detroit, and Buffalo have seen declines in regional population for decades and are known for being weak market cities. Cook County in Chicago, where many of CTA's stations are located, experienced a population decline as well. Dallas County in Texas experienced slower growth than in the past, with only a 7 percent growth rate compared to at least 17 percent gains every decade since 1970. Finally, the population of Sacramento, California, in transit zones declined by about 1,000 people, while the region grew tremendously, at almost 20 percent. Most of this growth appears to be in suburban areas and not near transit stations.

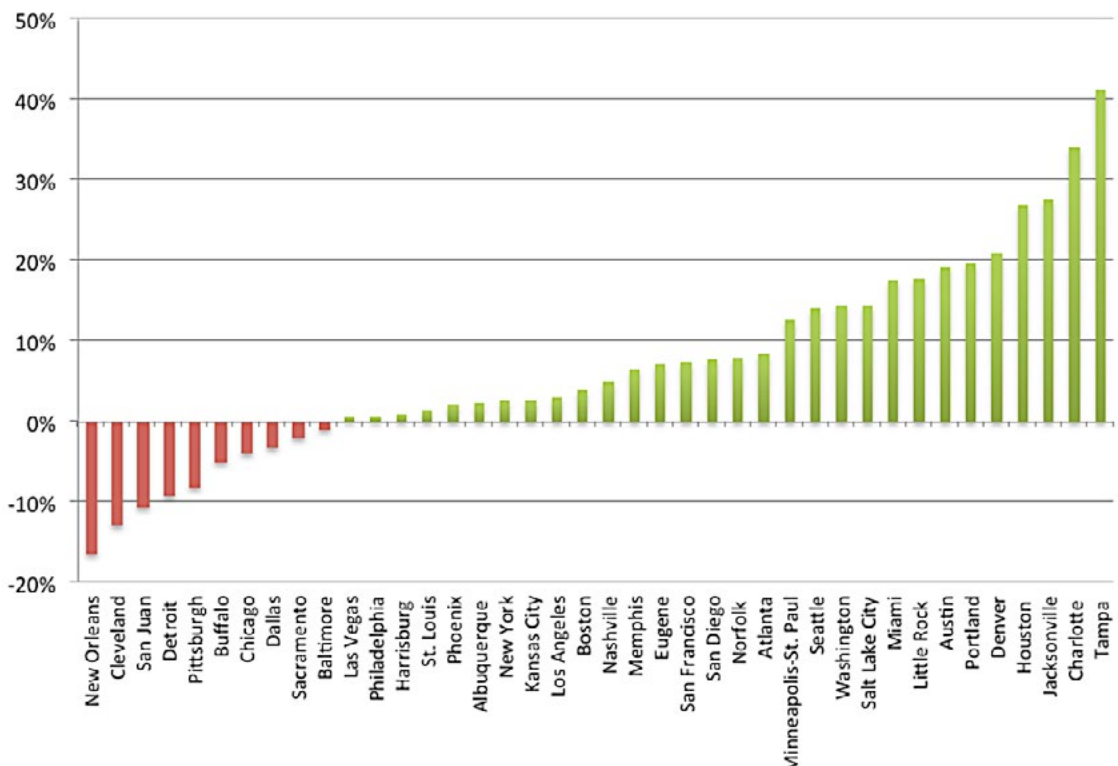


Figure 2-4

Percentage Change in Population by Transit Sheds, 2000–2010

Transit Shed Capture of Regional Population and Household Growth

Even with transit system expansions across the country, transit sheds still represent less than 1 percent of the total land area in all transit regions. In regions with extensive systems, the sheds account for only 3.7 percent of the land area. Given their small share of buildable land, transit sheds are capturing an inordinate amount of regional population and household growth. As demonstrated in Figure 2-5, transit sheds predating 2000 captured more than 5 percent of regional population growth in small to large transit regions. Although extensive systems represented less than 2 percent of their regions' population growth, they captured more than 20 percent of regional household growth (Figure 2-6). Extensive urban infill in these major metropolitan areas and smaller household sizes likely contributed to this significant difference between population and household capture rates. In other words, extensive systems appear to be attracting a large share of their regions' small (e.g., 1–2 person) households, causing faster household growth than population growth in these transit sheds.

Figure 2-5

Transit Shed Capture Rates of Regional Population Growth, 2000–2010

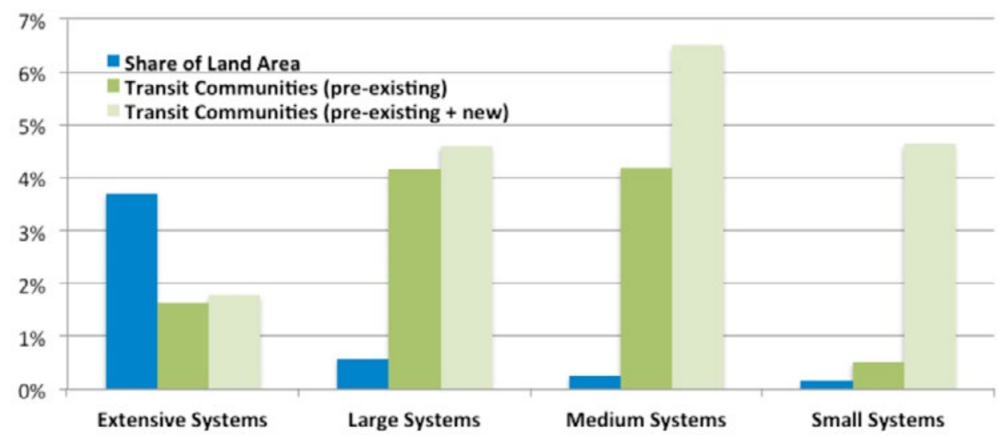
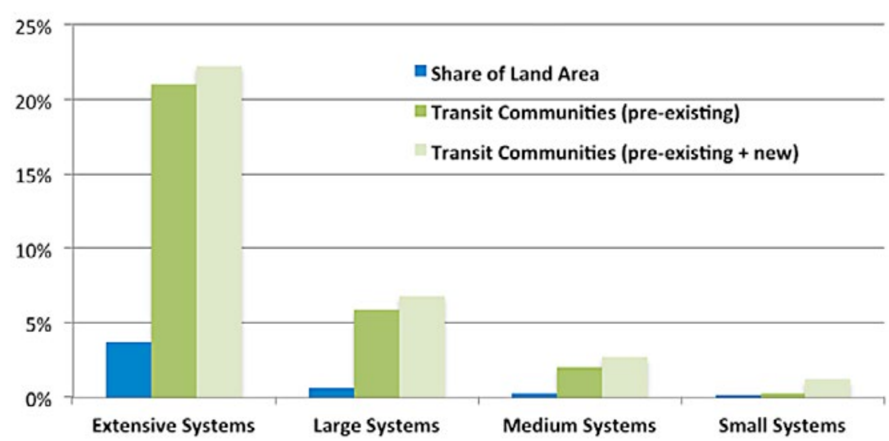


Figure 2-6

Transit Shed Capture Rates of Regional Household Growth, 2000–2010



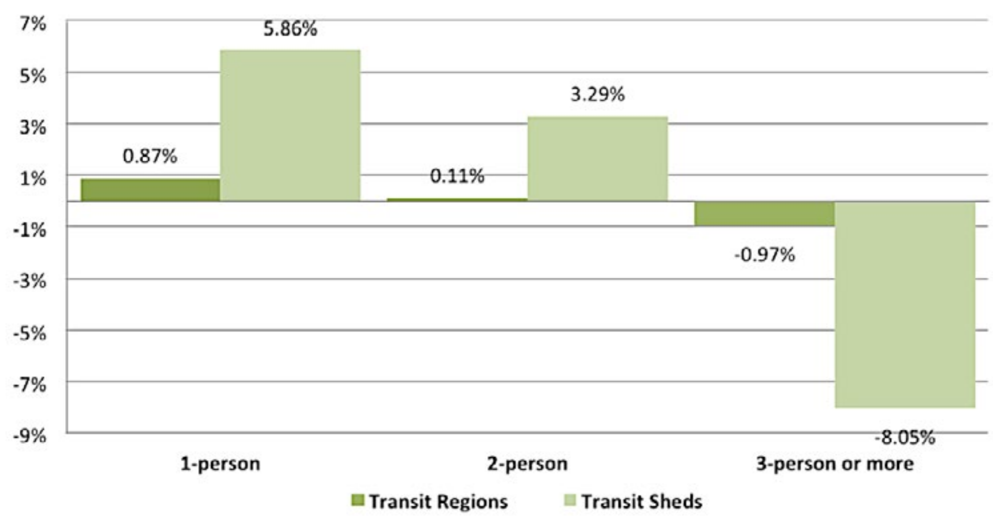
Households

Transit sheds are attracting an increasing share of small households. Across transit sheds and regions, the size of households has changed. The share of smaller 1- and 2-person households increased from 2000 to 2010 in both transit regions and sheds, while larger 3-person or more households decreased (Figure 2-7). This shift, however, was more pronounced within transit sheds. Shares of 1- and 2-person households witnessed increases of approximately 6 and 3 percent, respectively, during the time period, while households with 3 or more people decreased by 8 percent. This trend may reflect the renewed attraction of urban living for singles and couples near transit.

Previous research by CTOD, "Hidden in Plain Sight: Capturing the Demand for Housing Near Transit" (2004), found that nearly two-thirds of the demand for housing near transit would be generated by single households and couples without children, a disproportionate share given the size of these household types relative to the total US population. Demand for transit served housing by singles and couples without children is due to both the increase in the number of these households and to their preference for housing in location efficient neighborhoods.

Figure 2-7

Percentage Change in Household Size Distribution, 2000–2009



Income

Transit sheds had a higher percentage of low- and moderate-income households than transit regions in both 2000 and 2010 (Figures 2-8 and 2-9). Within transit sheds, the highest proportion of households, approximately 28 percent, made less than $25,000 per year in 2010. This is down from nearly 35 percent in 2000, but does not account for inflation over the period. The largest household income cohort (31%) in the transit regions continues to be those earning between $50,000 and $100,000.

Figure 2-8

Household Income Distribution, 2010

Figure 2-9

Household Income Distribution, 2000

Residential Density

Over the past decade, the average number of housing units per acre near transit increased (Figure 2-10). In 2000, average densities in small to large transit system sheds were between 3 and 4 units per gross acre, and nearly double that in extensive transit systems. Since then, densities have intensified across all system sizes. The increase for each category was close to 0.5 units per acre. In terms of percentage increases, however, small to larger systems experienced more significant gains. The average density in small system transit sheds, for instance, grew from 3.0 to 3.6 units per acre, an increase of more than 22 percent. It should be noted, however, that residential population per acre has not increased at the same rates (Figure 2-11). Again, this can be explained by the smaller household sizes that characterize transit sheds.

Figure 2-10

Average Housing Units per Acre + Percentage Change by System Size, 2000–2010

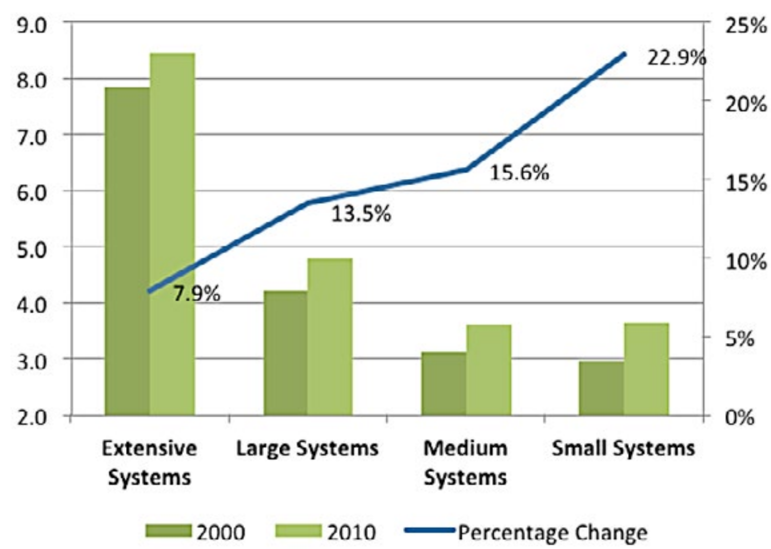
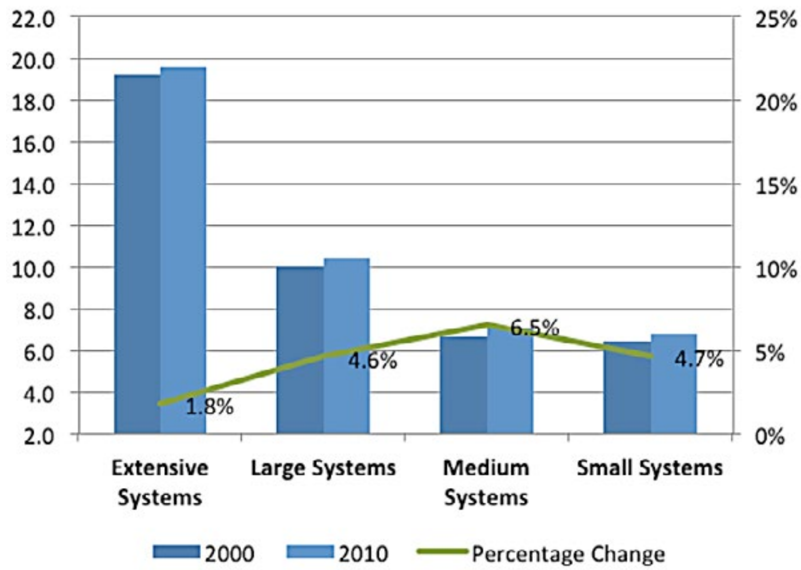


Figure 2-11

Population per Acre + Percentage Change by System Size, 2000–2010



Changes in Travel Behavior Resulting from U.S. Investment in Transit

A comparison of household travel patterns in station areas to their larger transit regions illustrates the effect of transit access on household transportation choices and spending.

Vehicle Ownership

Auto ownership is consistently lower in all transit sheds in comparison to their larger regions (Figure 2-12). In the extensive transit system regions, on average, the rate of ownership is roughly 0.5 cars less in the transit shed compared to the larger region. In the large, medium, and small system station areas, auto owner rates range from 0.25 to 0.5 autos less than in the larger region.

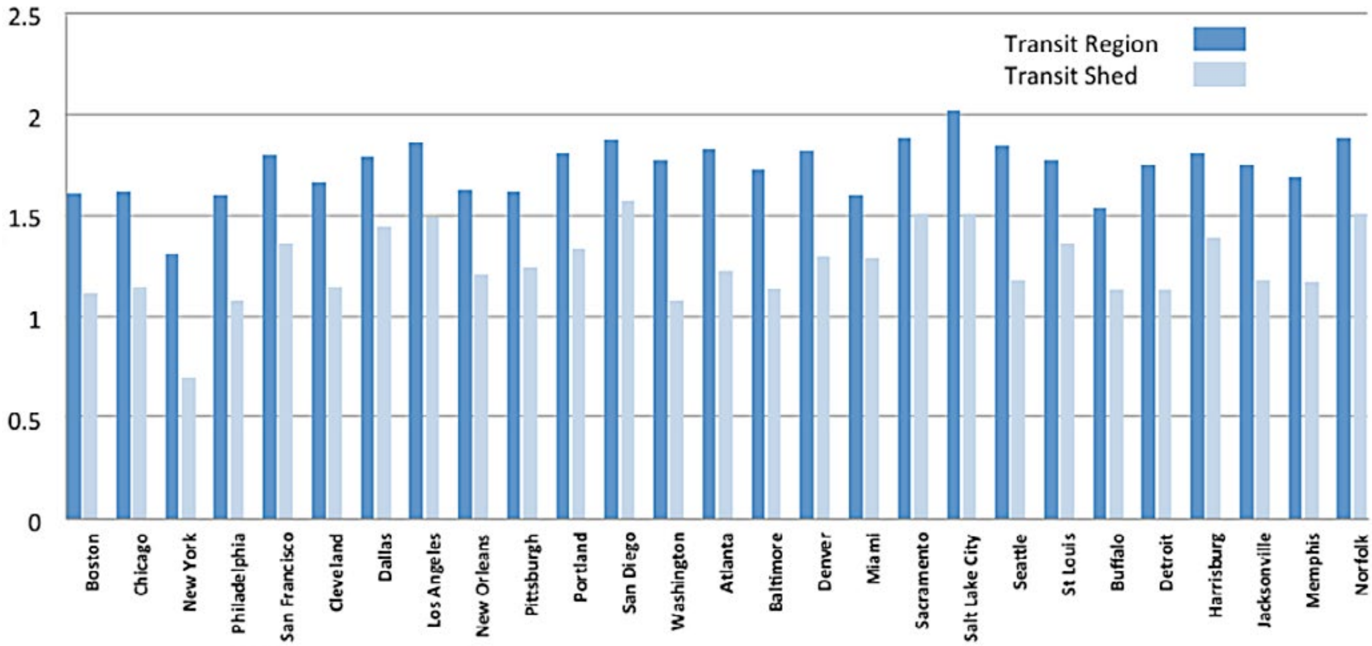


Figure 2-12

Average Number of Vehicles per Household, 2009

Since 2000, auto ownership rates have increased everywhere. However, with the exception of the station areas in San Francisco, auto ownership rates have increased at a much lower rate in the station areas of the extensive systems as compared to their larger regions. Additionally, it may be useful to put this information into the context of national trends. Auto ownership rates, in fact, have been rising nationally since the 1960s, with the increase from 2000–2010 approximately the same as in the decades from 1960–1970, 1970–1980, and 1980–1990. Further, transit ridership figures for fixed-guideway systems from the National Transportation Database for 2000 and 2010 show increased ridership in 72% of regions examined in this study (Figure 2-13). In regions with lower ridership, decreases were generally slight. Decreases may be due to service changes, population declines, loss of employment during the recession, or combinations of these factors.

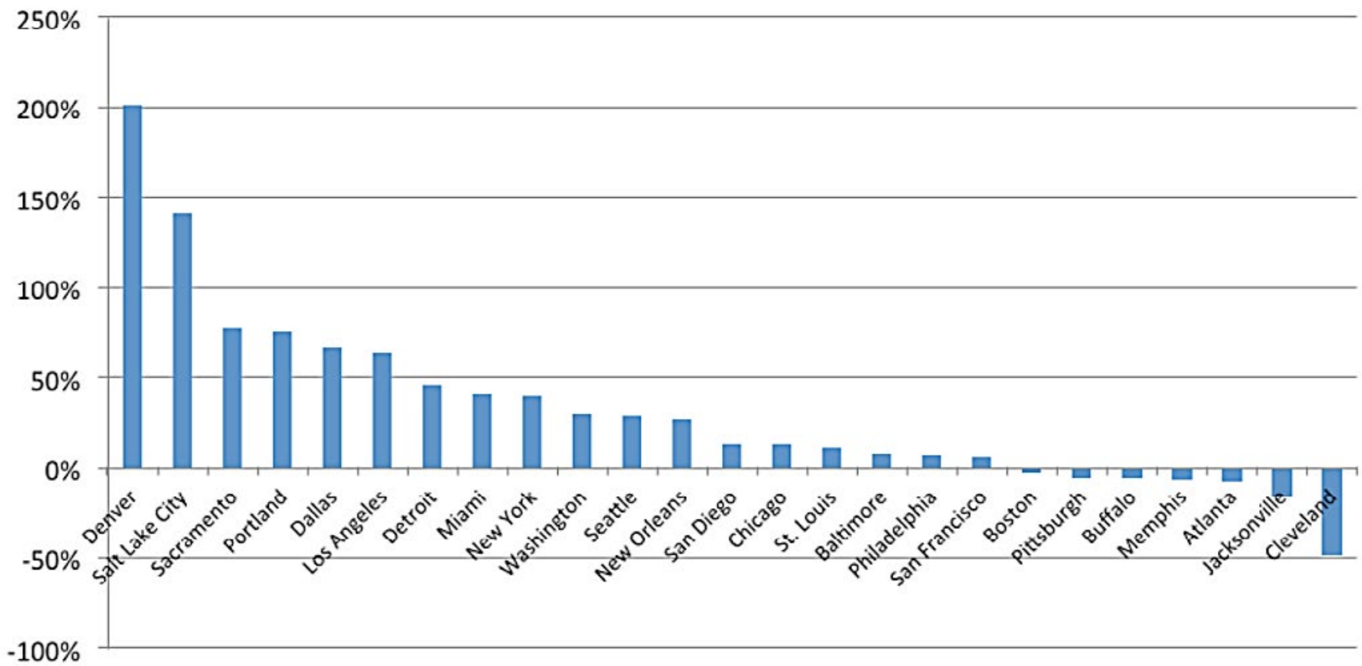


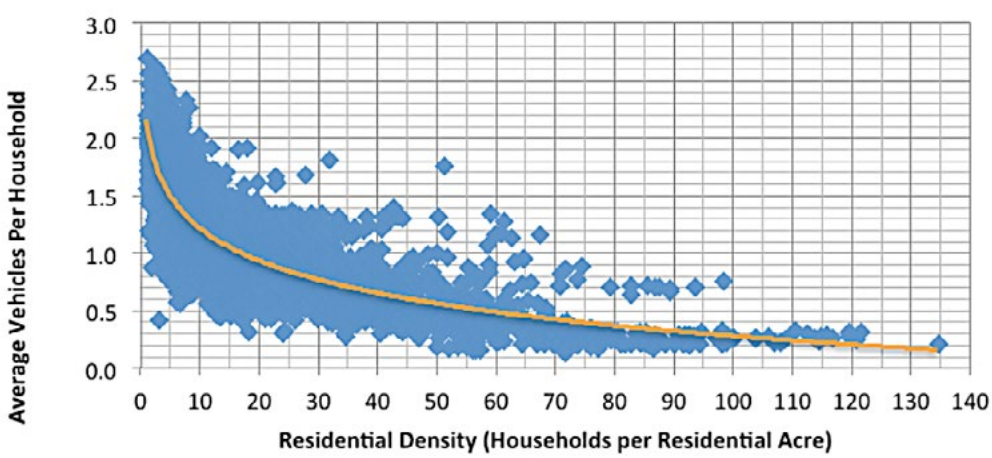
Figure 2-13

Change in Transit Ridership, 2000-2010

An examination of the auto ownership rates of all the station areas in the study indicates a clear relationship between residential density and auto ownership. As residential density increases, auto ownership declines. Since residential density is increasing in all systems sizes on average (see Figure 2-10), the rate of auto ownership may be expected to decrease in station areas that are maturing and continue to be more fully built out.

Figure 2-14

Autos per Household and Residential Density



Commuting Patterns

In all transit sheds, a significantly larger percent of commuters take public transit, bike, or walk to work than in their larger transit region. This is true regardless of the size of the transit system or whether the system is new or existing (Figure 2-15). However, changes in commuting patterns between 2000 and 2009 varied across regions. Public transit ridership accounts for the highest share of commuters within the transit, walk, or bike to work categories. Generally, cities with more extensive systems capture a greater share of transit commuters. In the New York region, which has the largest transit system in the nation, 63 percent of commuters living in the transit shed commute to work via public transit (51%), walking (11%) or biking (1%).

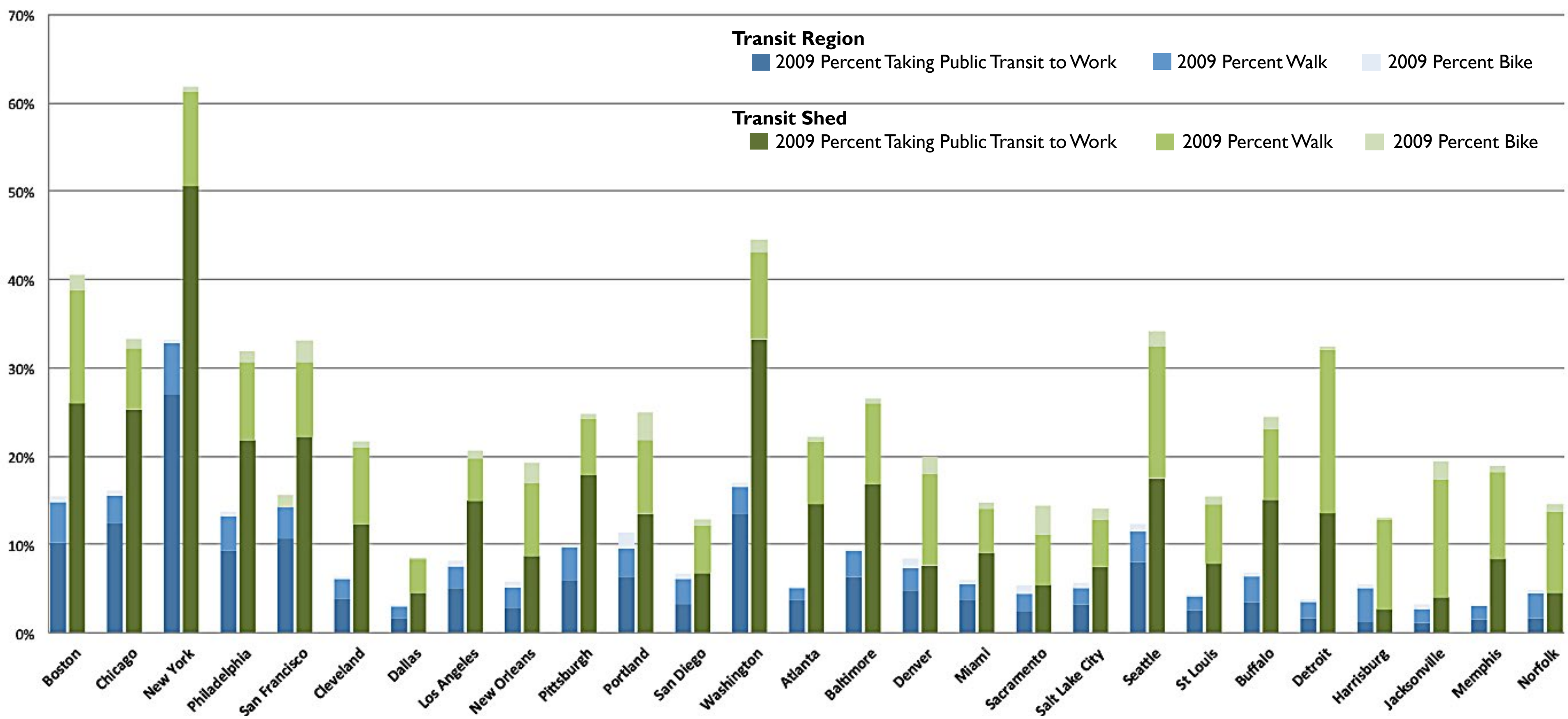


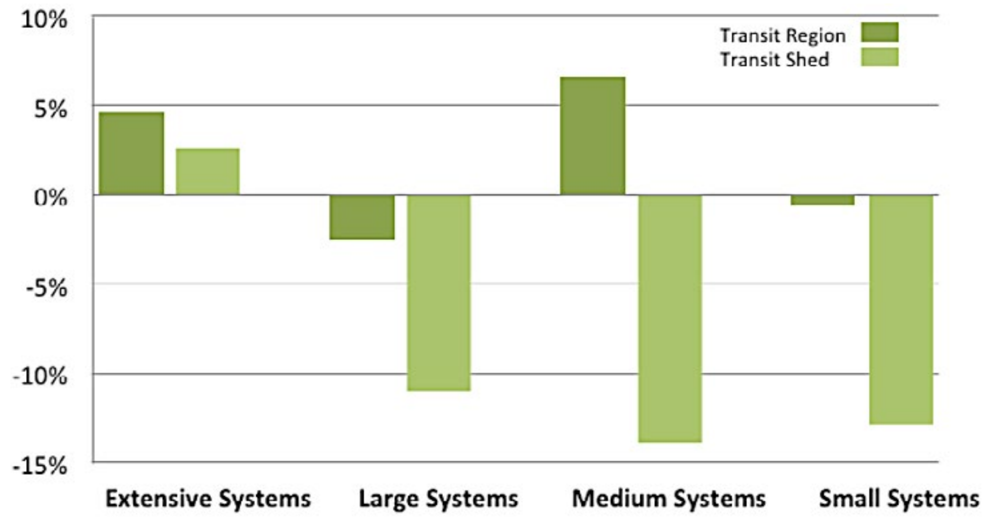
Figure 2-15

Percent Taking Transit, Walking, or Biking to Work, 2009

Between 2000 and 2009, only the extensive system transit sheds showed growth in usage of public transportation, bicycle, or walking to work (Figure 2-16). This growth rate was lower than the rate of the larger regions; however, it was based upon a very high non-auto commute rate in 2000. The percent of workers using non-auto modes to work decreased in the large, medium, and small system transit shed, whereas it changed little in the large and small system regions and went up in the medium-system regions.

Figure 2-16

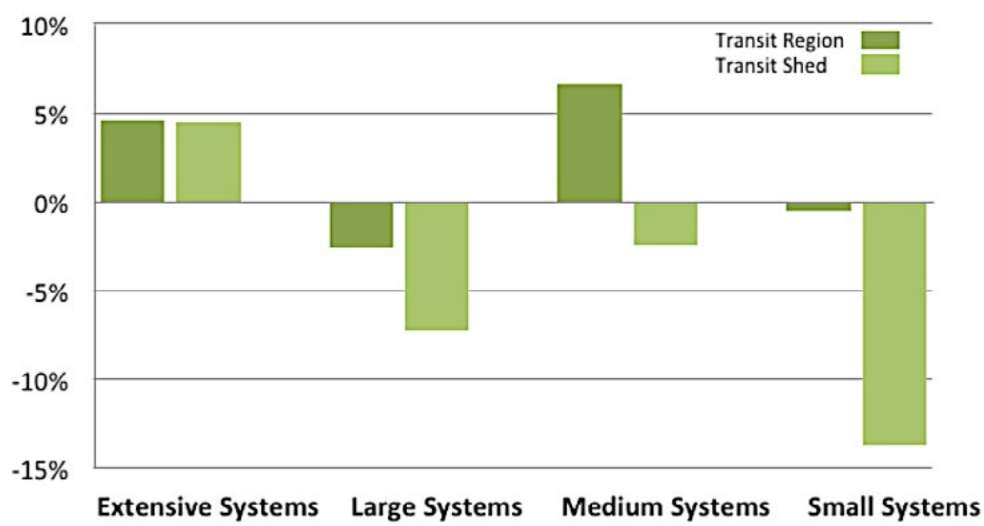
Percent Change in Percent Taking Public Transportation, Bicycling, or Walking, 2000–2009



Looking at a subset of stations, only those that existed in both 2000 and 2010 indicates that this trend is less pronounced in these more established station areas (Figure 2-17). It may be likely that some time is required for new stations to become established before rates of non-auto commutes increase. Small systems may be limited in their capacity to realize higher rates of non-auto commutes due to their limited connectivity to employment and other destinations.

Figure 2-17

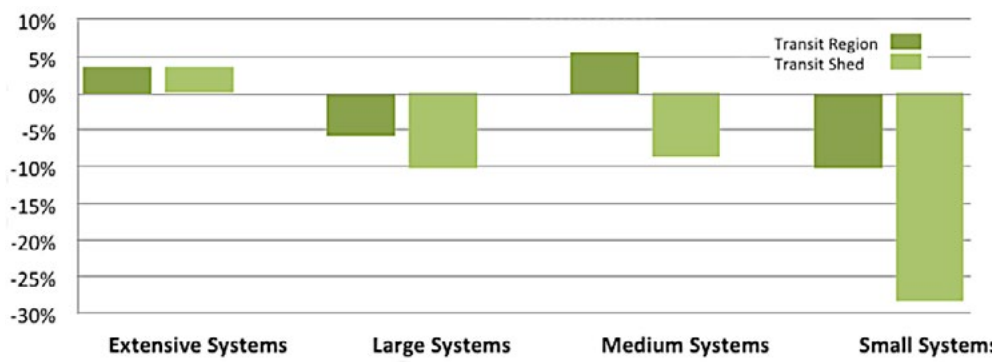
Subset of Stations: Percent Change in Percent Taking Public Transportation, Bicycling, or Walking, 2000–2009



In 2009 in all regions, there are a significantly higher percentage of people taking transit to work in the transit sheds compared to the region. In most regions, this percentage is twice as great and, in some cases, even more. However, since 2000, this higher rate of transit commuters in the transit shed has increased only in the extensive system regions and has decreased in the large, medium, and small system regions (Figure 2-18). More investigation is needed to understand if this is a short-lived trend or if it is related to population or employment changes in the station areas.

Figure 2-18

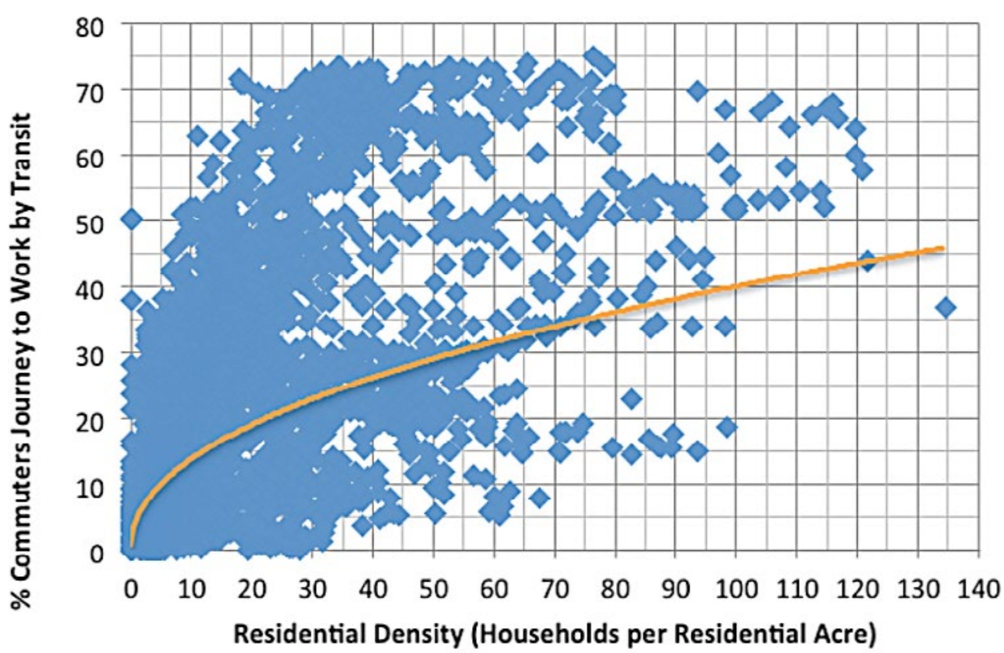
2000 Sheds, Percent Change in Percent Taking Transit to Work, 2000–2009



An examination of the transit share commute to work of all the station areas in the study indicates a clear relationship between residential density and transit commutes (Figure 2-19). As residential density near transit increases, the transit share of work commute increases. Since residential density is increasing in all systems sizes on average (see Figure 2-10), the share of transit commute to work may be expected to increase in station areas that are maturing and continue to be more fully built out.

Figure 2-19

Residential Density and Percent of Commuters Taking Transit



Since 2000, there has been a growth in biking in both regions and transit sheds (Figure 2-20). This growth has been higher in the transit shed in most of the extensive system regions and comparable to the growth large and medium system regions. There has not been a consistent trend in small system transit sheds, with Buffalo, Detroit, and Memphis experiencing the most growth.

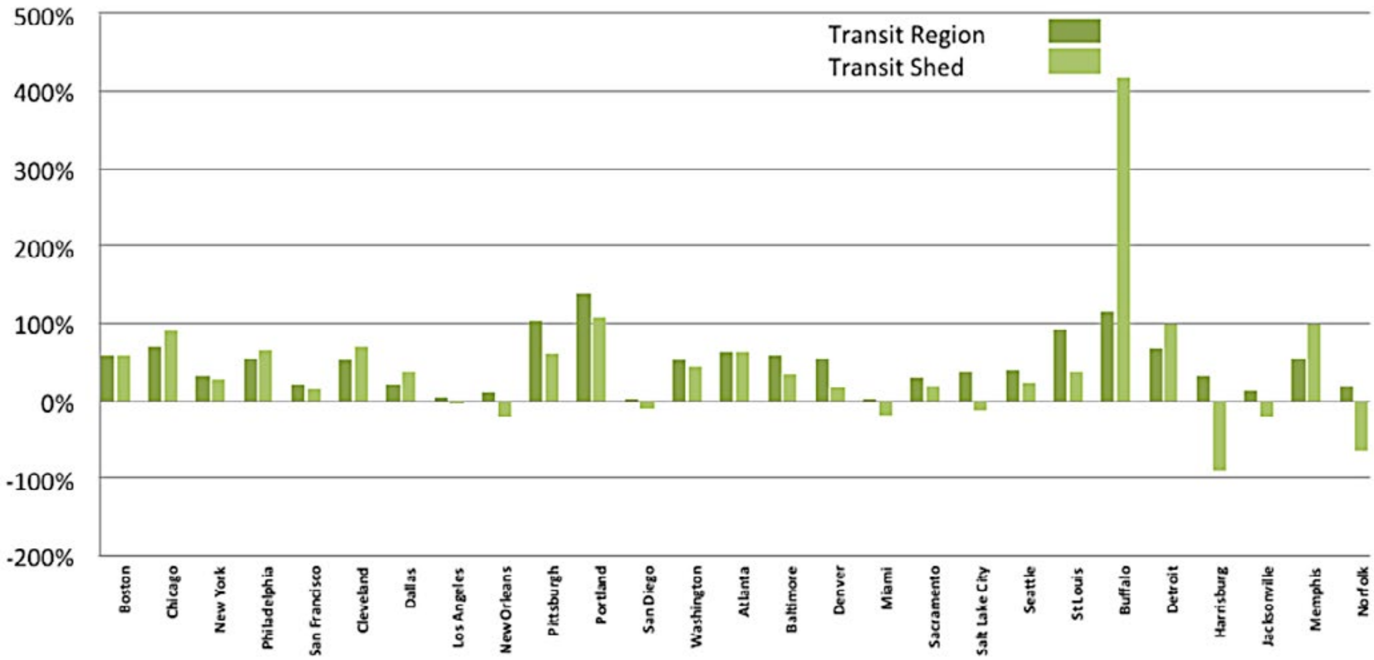


Figure 2-20

Percent Change in Percent Biking to Work, 2000–2009

Housing and Transportation Costs

In 2009, average combined housing and transportation costs reported by the Housing and Transportation (H+T®) Index[3] for the national typical household were lower in the transit sheds than the transit regions for all 27 regions with existing transit systems (Figure 2-21). Transportation costs were universally lower in the transit shed. Neighborhoods served by transit typically exhibit higher location efficiency; they are walkable, denser, and have better access to jobs and services, and residents can rely less on costly autos for commuting and everyday trips.

[3]https://htaindex.cnt.org. Additional information on the H + T Index can be found in the appendices.

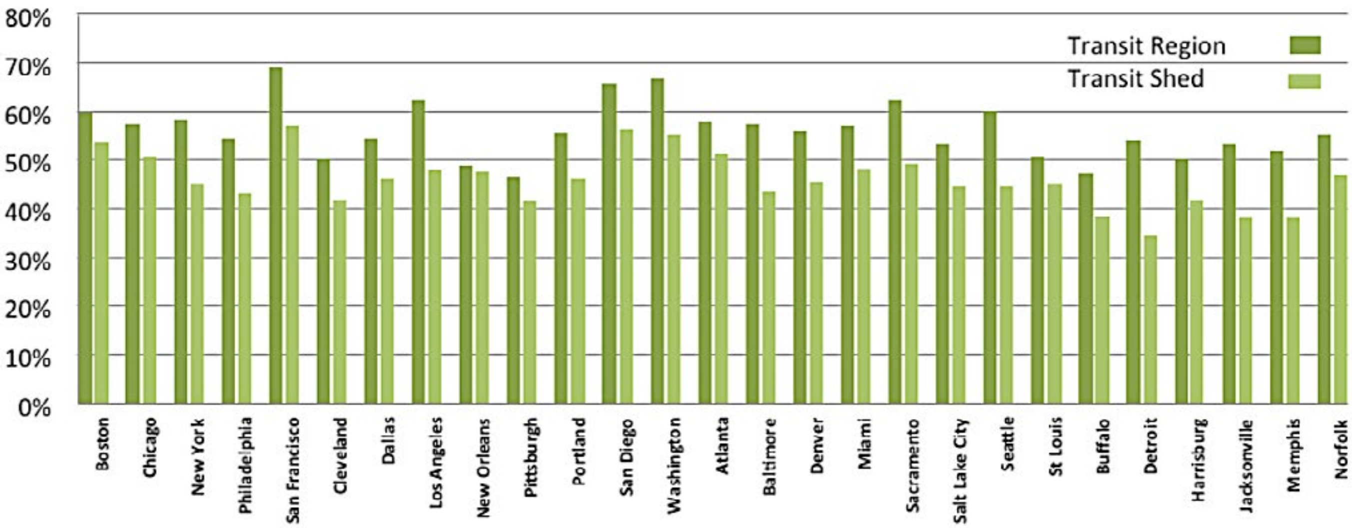


Figure 2-21

Average Housing + Transportation Costs for National Typical Household as a Percentage of National Median Income, 2009

Between 2000 and 2009, housing and transportation costs as a percent of income rose in most transit sheds and regions (Figure 2-22). In 59 percent of regions, transportation costs grew at a slower rate in the transit shed than the region as a whole. Housing costs, however, typically grew at a faster rate in the shed (Figure 2-23). This may be attributable to a growing market demand to live near transit, higher land values in central cities, and newer construction housing.

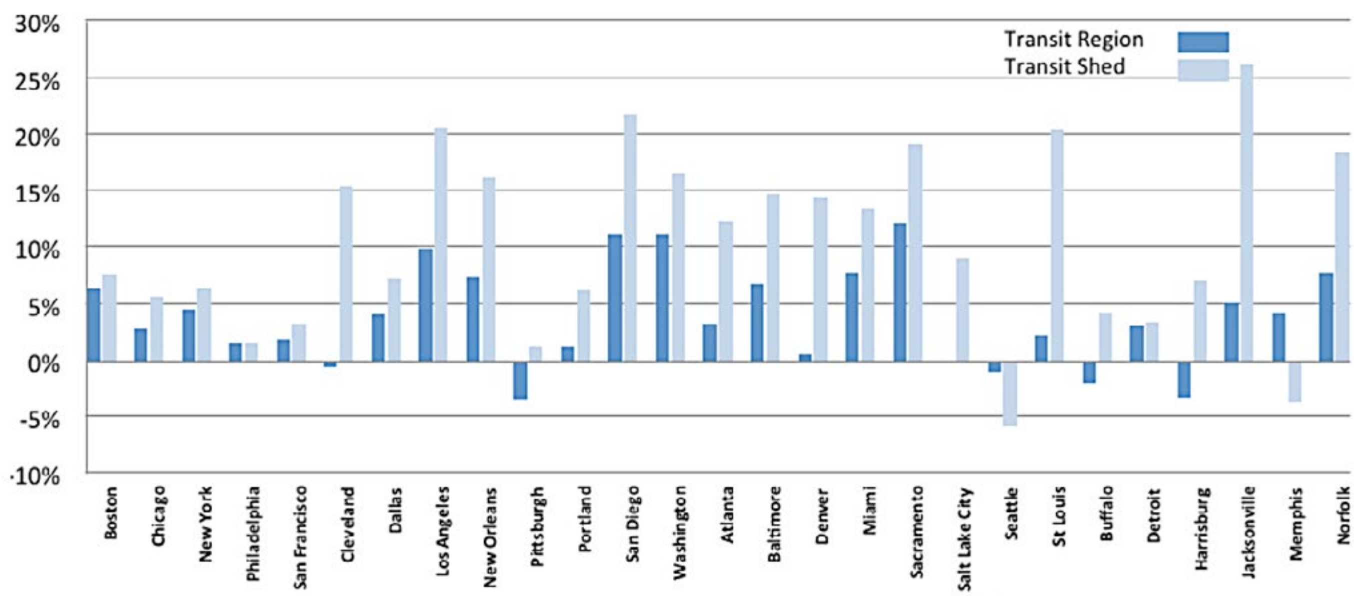


Figure 2-22

Percent Change in National Typical Household Housing + Transportation Costs Percent Income, 2000–2009

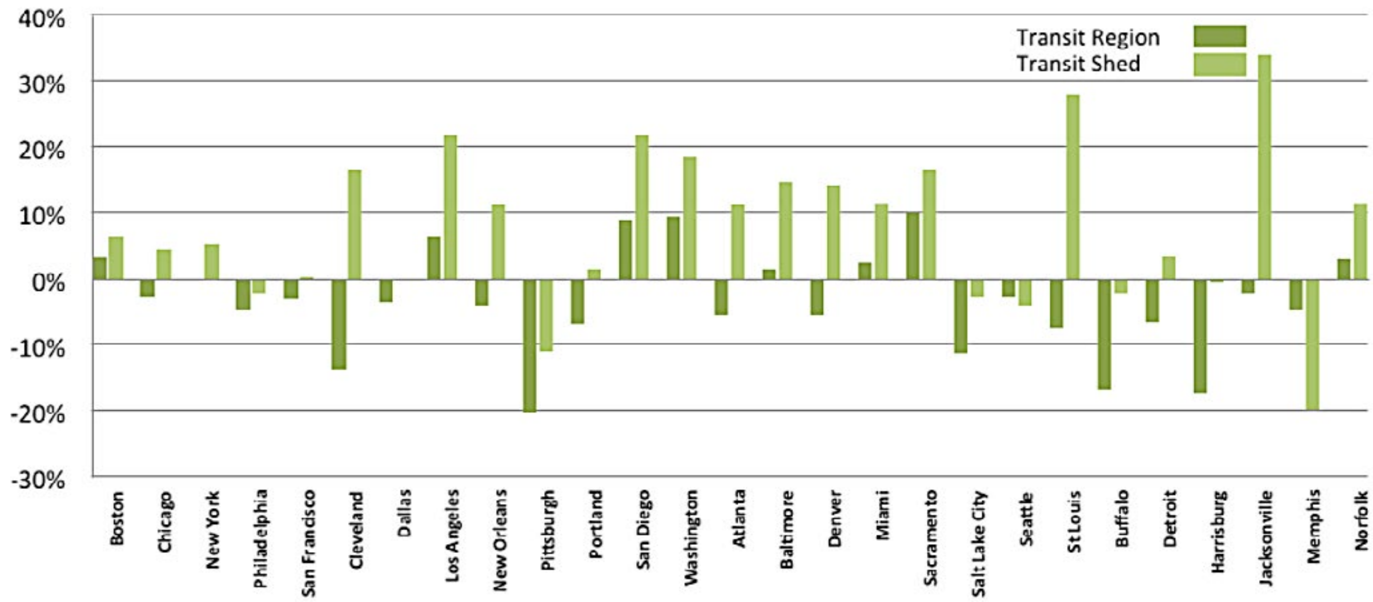


Figure 2-23

Percent Change in Housing Costs as a Percentage of Income, 2000–2009

Jobs and Transit

Employment uses are a key component of successful transit planning and TOD, and findings from studies on this topic can contribute to an improved approach to economic development. Research has shown that places with higher concentrations of employment near transit tend to have higher transit ridership rates; indeed, the density of employment uses near transit more closely corresponds to transit ridership than the concentration of residential uses.[4] Proximity to transit can also provide benefits to employers and workers, allowing employers to draw from a larger labor pool and reduce workers dependency on the private automobile. Moreover, transit can facilitate the "agglomeration" benefits that occur when firms cluster together, such as the ability to share inputs, rely on common transportation infrastructure and suppliers, and transfer knowledge across firms and industries, while mitigating traffic congestion and other impacts associated with high densities.[5]

In most regions throughout the country, however, employment has been decentralizing over the past 40 years. The share of regional employment located in central business districts (CBDs) has declined, while the share of employment located at the periphery—either in the form of low-density

[4]See, for example: Barnes, Gary, "The Importance of Trip Destination in Determining Transit Share," *Journal of Public Transportation* 8, 2005; Zupan, Jeffrey, and Boris Pushkarev, "Public Transportation and Land Use Policy," *Regional Planning Association*, 1977.

[5]Agglomeration benefits and transit are discussed in greater depth in CTOD's white paper "Transit and Regional Economic Development," May 2011.

clusters along major highways or higher-density suburban employment centers such as Tysons Corner outside of Washington DC—has increased.[6] This decentralization has made it more difficult to design transit systems that effectively serve a high share of the region's commuters; transit agencies must increasingly serve multiple, dispersed destinations rather than rely on the traditional "hub and spoke" model of connecting outlying suburban neighborhoods to the CBD.[7]

This analysis provides a broad overview of how the nation's continued investment in transit between 2000 and 2010 contributed to making more jobs accessible to transit and an assessment of how places that were already served by transit in 2000 performed during the volatile economic times that characterized the decade.

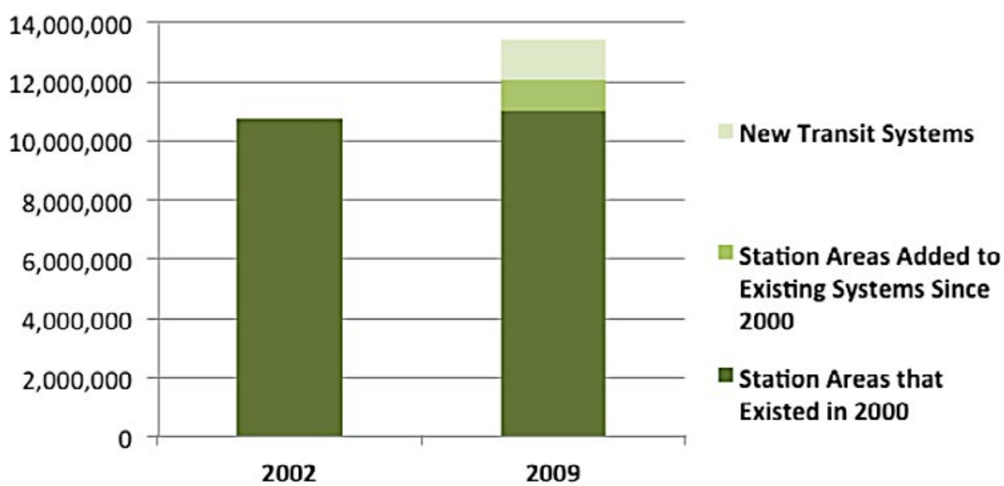
Total transit shed employment increased by 2.6 million (24%) between 2002 and 2009. Most of this increase was driven by transit system expansion rather than by job growth within existing station areas. However, transit shed employment is highly concentrated in knowledge-based and educational and medical services employment, two sectors that are expected to experience significant employment growth over the coming decades. Transit sheds are, therefore, in a strong position to capture future job growth, particularly if planners and policymakers make a concerted effort to encourage employment uses near transit stations and continue locating transit stations near employment centers.

TOD Employment Trends

The number of jobs located within ½-mile of a transit station rose from 10.7 million in 2002 to 13.4 million 2009, driven primarily by transit system expansion (Figure 2-24).

Figure 2-24

Total Transit Shed Employment, 2002–2009



Includes 37 new and established transit systems and their respective regions.

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[6]Kneebone, Elizabeth, "Job Sprawl Revisited: The Changing Geography of Metropolitan Employment," Brookings Institute, April 2009.

[7]Brown, Jeffrey, and Gregory Thompson, "The Relationship Between Ridership and Decentralization," *Urban Studies*, June 2007. For a more detailed discussion of the relationship between transit ridership and employment decentralization, see CTOD, "Transit-Oriented Development and Employment," May 2011.

The 12 new transit systems built in the 2000s (and for which employment data are available) provided access to 1.3 million jobs by the end of the decade. New stations added to the 25 already-established systems connected another 1.1 million jobs to transit. The remaining 240,000 new transit-accessible jobs resulted from employment growth within station areas established prior to 2000.

Figure 2-25 shows the percent of each transit region's jobs located within a transit shed in 2009. In general, this employment capture rate corresponds to system size: overall, 40 percent of employees worked within a transit shed in regions with extensive systems, 17 percent in regions with large systems, 16 percent in regions with medium systems, and 9 percent in regions with small systems (Figure 2-26).

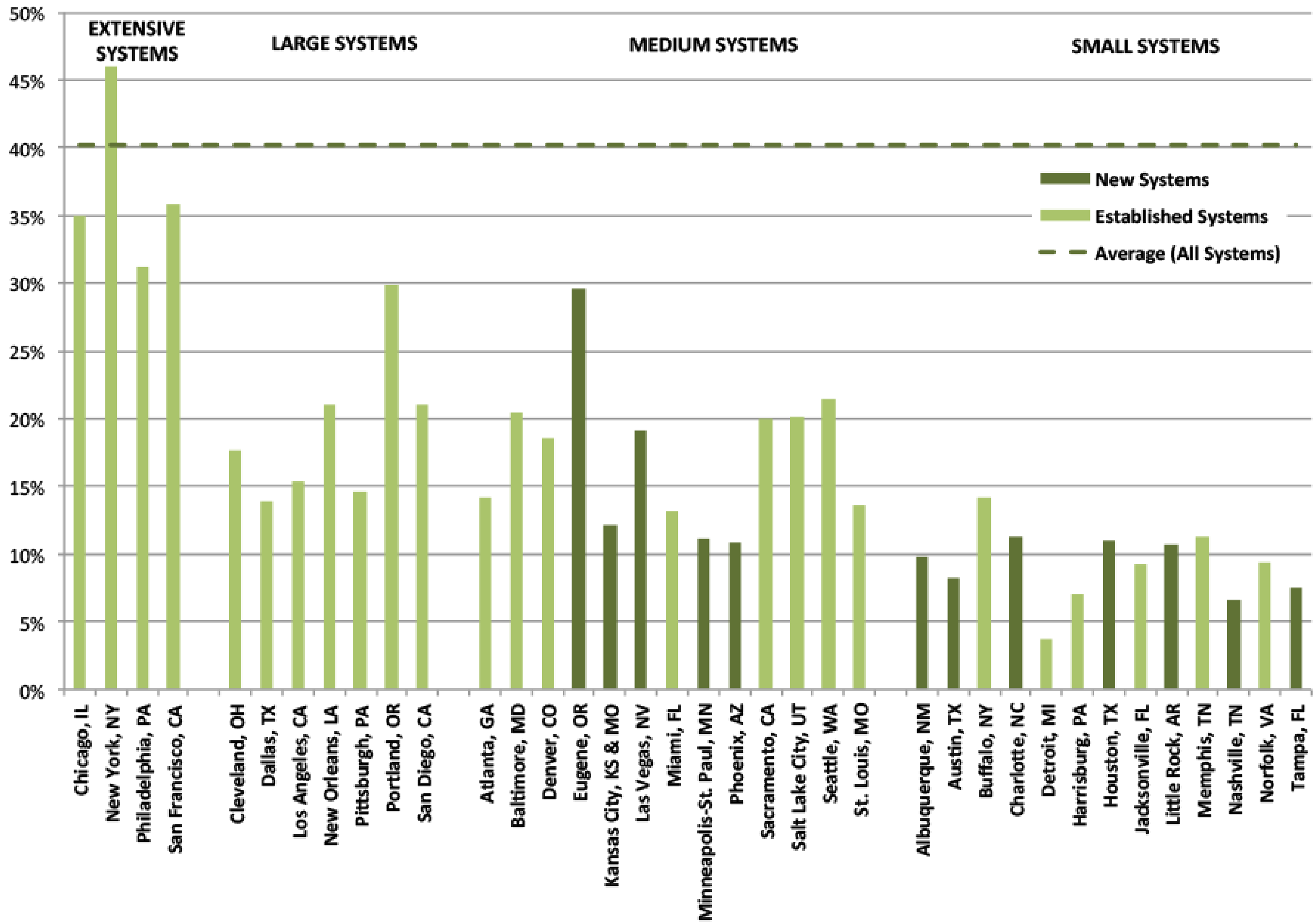
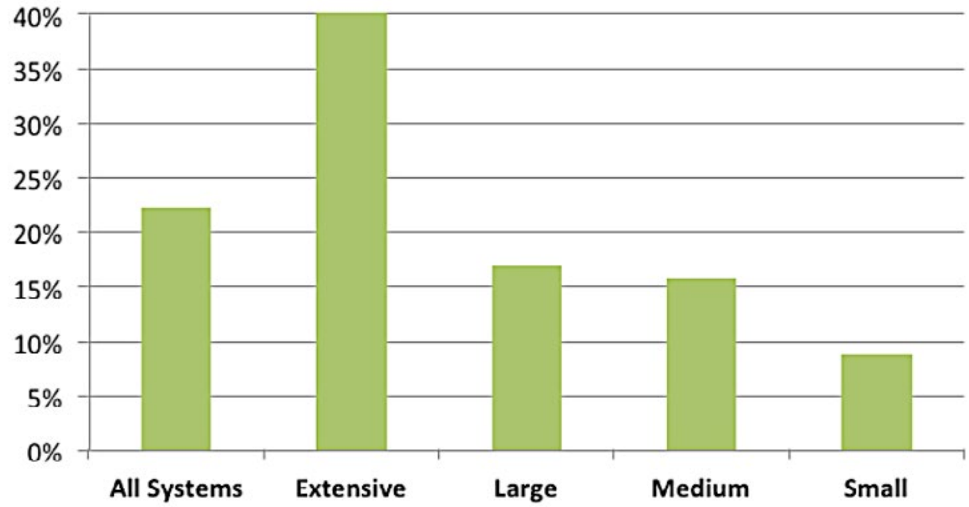


Figure 2-25

Percent of Regional Employment Captured in Transit Shed, 2009

Figure 2-26

Percent of Regional Employment Located in Transit Sheds by System Size, 2009



Includes 37 new and established transit systems and their respective regions.

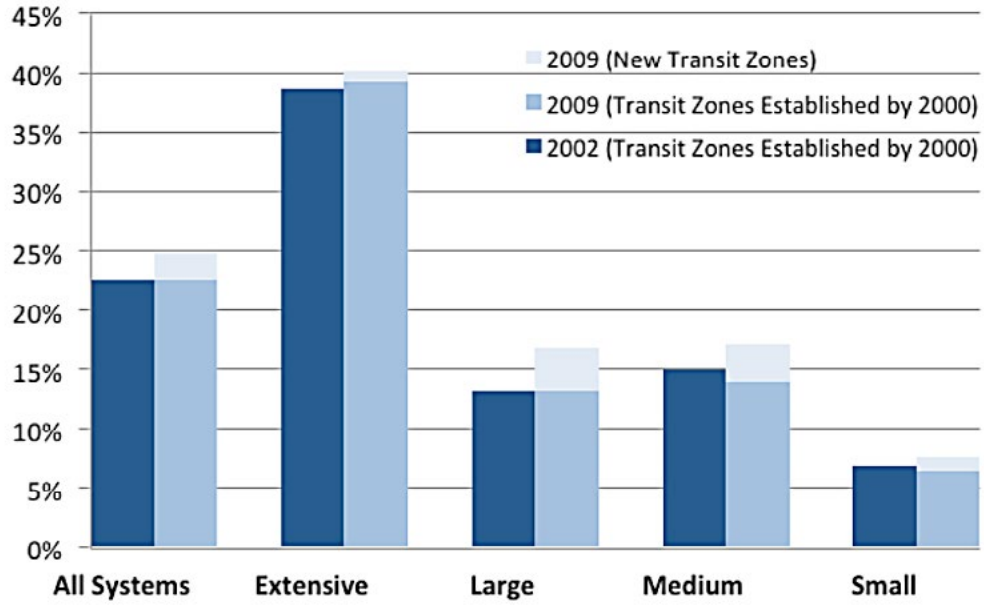
However, some systems stand out as providing access to a particularly high share of regional employment. In particular, the BRT system in Eugene, Oregon, which opened in 2007, is a medium system (28 stations) that connects almost 30 percent of Lane County's jobs, including employment centers such as downtown Eugene, the University of Oregon, and a major hospital. Buffalo and Memphis also have relatively high transit shed capture rates (14% and 11%, respectively) for small systems. Among the medium and large systems, Portland, Oregon (30%) and Seattle, Baltimore, Salt Lake City, Sacramento, New Orleans, and San Diego (20–21% each) also have relatively high shares of transit-accessible employment. New York has the highest capture rate in the nation, with 46 percent of the region's jobs located within ½-mile of transit.

While transit system expansion drove the increase in the number of transit-accessible jobs between 2002 and 2009, transit zones established prior to 2000 retained their overall share of regional employment, even after the economic downturn.

Within the 25 regions with transit systems established prior to 2000, the share of jobs located in a transit shed rose from 23 percent in 2002 to 25 percent in 2009 (Figure 2-27). The vast majority of this increase resulted from the addition of new stations to established systems.

Figure 2-27

Percent of Regional Employment Located in Transit Shed: Established Systems by System Size, 2002–2009



Includes the 26 transit systems established by 2000 and their respective regions.

Regions with large and medium systems saw the greatest increase in the share of jobs served by transit, a result of system expansion that connected significant concentrations of new employment in cities as diverse as Denver, Eugene, Sacramento, Salt Lake City, Seattle, St. Louis, Cleveland, Los Angeles, Portland, and San Diego (Figure 2-28). Among the small systems, the transit shed employment capture rates in Memphis and Norfolk also increased significantly due to system expansion. San Francisco saw the greatest increase in transit shed employment among the extensive systems, also due to system expansion.

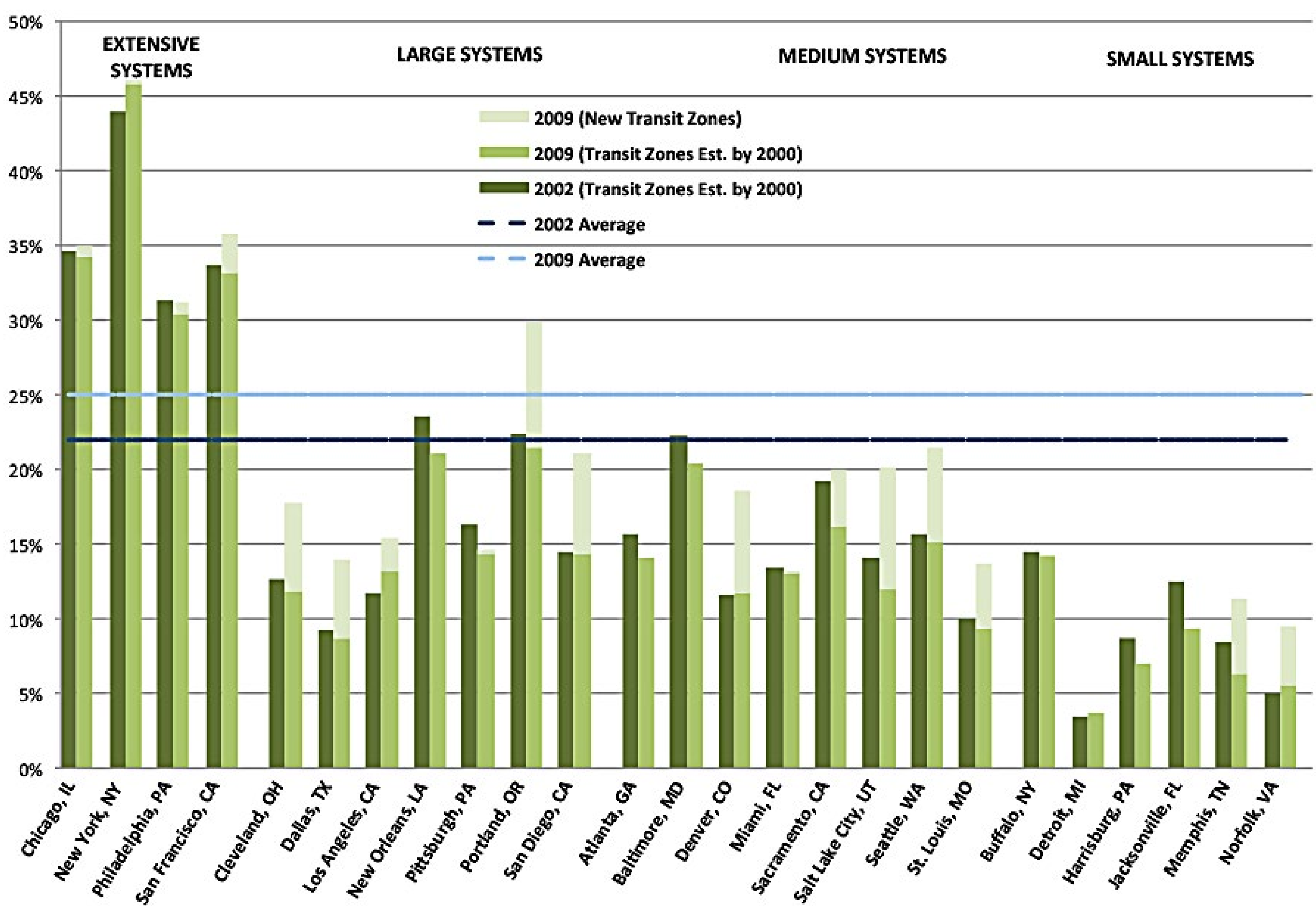


Figure 2-28

Percent of Regional Employment Captured in Transit Sheds: Established Systems, 2002–2009

Meanwhile, transit zones around stations established prior to 2000 held their overall share of regional employment, at about 22 percent. However, as Figure 2-28 shows, only New York and Los Angeles experienced significant increases in the share of regional employment captured in established (pre-2000) transit zones. Denver, Norfolk, and Detroit also saw very slight increases in the capture rate in established zones. (In the case of Detroit, the number of jobs located in the transit zones actually decreased, but more slowly than in the region as a whole.) In all other transit regions, established transit zones declined as a share of regional employment. This is consistent with a national trend towards job decentralization; one recent study found that 95 out of 98 metropolitan areas experienced a decline in the share of jobs located within 3 miles of the central business district between 1998 and 2006, while the share of jobs at the outer-most parts of the metro areas increased.[8]

In most regions, the decline in the share of regional jobs located in established transit zones was offset by system expansion that brought new jobs within a half-mile of transit service. A few regions, however, experienced net declines in the employment capture rate. These include aging industrial places such as Baltimore, Harrisburg, and Pittsburgh, as well as regions such as Atlanta and Jacksonville, Florida, that are among the most rapidly decentralizing metro areas in the nation.[9]

Many new transit systems provided access to a high share of regional employment compared to established systems of a similar size.

Figure 2-29 shows the employment capture rate for the 12 new systems, compared to the averages for all small and medium systems (including established as well as new systems). Many of the smaller systems captured a high share of regional employment compared to the national average for small systems (9%), including Charlotte, Houston, and Little Rock (about 11% each) and Albuquerque (10%). Among the medium-size systems, the Eugene transit shed captured 30 percent of employment, while the Las Vegas transit shed captured 19 percent of employment, several percentage points above the average for medium-sized systems (16%). These high capture rates reflect the fact that the new transit systems are serving downtowns and other employment concentrations.

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[8]Kneebone, Elizabeth, "Job Sprawl Revisited: The Changing Geography of Metropolitan Employment," Brookings Institute, April 2009.

[9]*Ibid.*

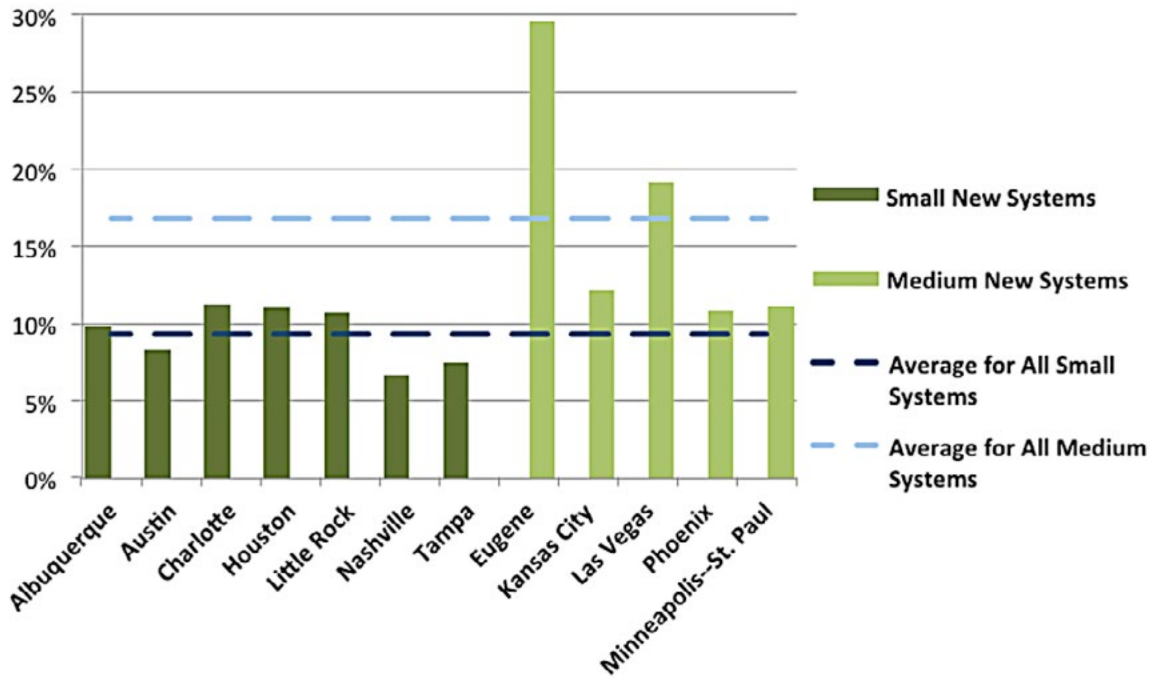


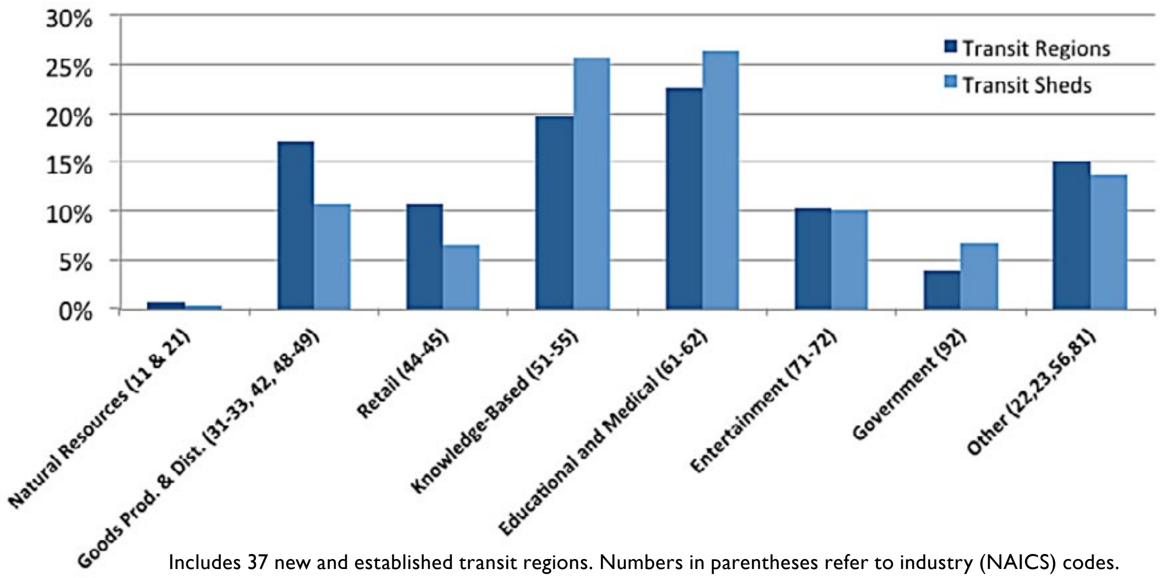
Figure 2-29

Percent of Regional Employment Captured in Transit Sheds: New Systems by System Size, 2009

Transit shed employment is concentrated in the educational and medical services and knowledge-based sectors, which are among the sectors expected to experience the fastest employment growth in the coming decades.

In total, 29 percent of workers in the 37 transit sheds are employed in the knowledge-based sector—which includes the information, professional, and business service sector and the financial and real estate services sector—and 26 percent are employed in the educational and health services sectors (Figure 2-30). In comparison, the knowledge-based and educational/health services sectors account for 20 and 23 percent of total transit region employment, respectively. These two sectors are expected to drive national employment growth over the coming decades; the U.S. Bureau of Labor Statistics projects that knowledge-based employment will increase16 percent between 2010 and 2020 and educational and medical services employment will increase 33 percent, while total employment is expected to increase by 14 percent.[10] Transit sheds also have a relatively high concentration of public-sector jobs, and fewer jobs in retail and goods production and distribution (a category that includes manufacturing, transportation and warehousing, and wholesale trade).

[10]Includes 37 new and established transit regions. Numbers in parentheses refer to industry (NAICS) codes.



Includes 37 new and established transit regions. Numbers in parentheses refer to industry (NAICS) codes.

Figure 2-30

Employment by Sector: Transit Regions Compared to Transit Sheds, 2009

SECTION 3

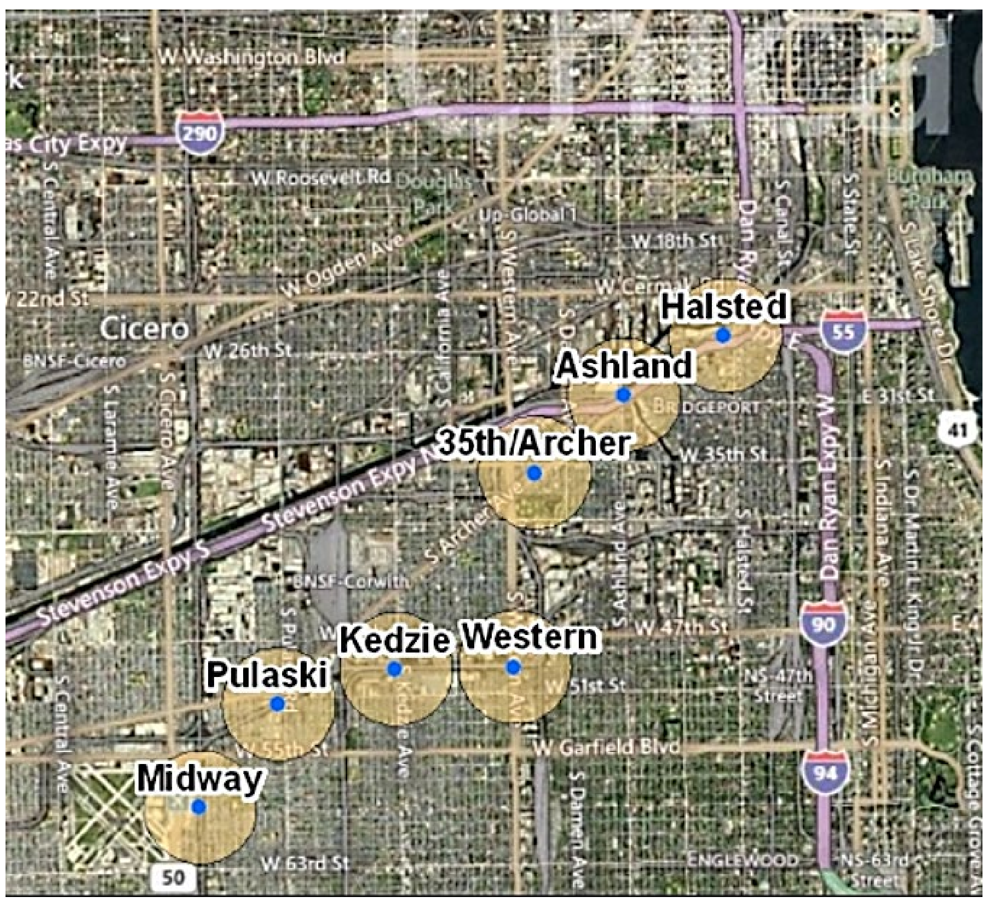
Corridor Trends

Chicago: Orange Line

The Orange Line segment of the Chicago Transit Authority's (CTA) rapid transit network runs from downtown Chicago to Chicago Midway International Airport. The line opened October 31, 1993, and is the newest CTA line (the Pink Line opened in 2008 but did not include new stations or track). This study focuses on the non-CBD stations from the Halsted station to the Midway Airport station; the stations excluded from the study are located in the downtown Loop and South Loop (Figure 3-1). The Orange Line study shed is home to diverse, working class neighborhoods that have remained affordable following the introduction of fixed-guideway transit. Over the course of the decade, the area bucked several trends and saw an increase in household size, commuters using transit, and renter-occupied housing units, countering trends occurring regionally and near other CTA transit stations.

Figure 3-1

CTA Orange Line Stations



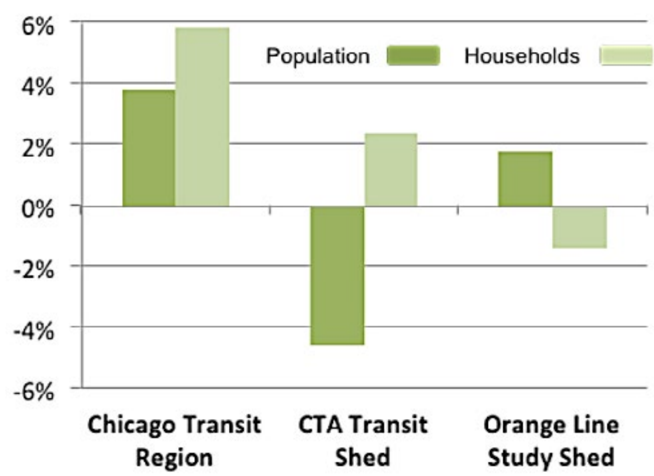
In February 2012, the Orange Line had 53,688 average weekday boardings. The study corridor had 27,619, a 12 percent increase over February 2000.

Demographics

In 2010, the Orange Line study corridor had a population of 61,161 and contained 18,237 households. Between 2000 and 2010, the Chicago region as a whole saw an increase in both population and households. In the CTA transit shed, population declined, but the number of households increased, while the Orange Line study shed saw the opposite trend occur (Figure 3-2). This is a result of increasing household sizes over the course of the decade. In 2010, the Orange Line study shed had an average household size of 3.34, a 3 percent increase over 2000. Average household size in the transit region was 2.68, and in the CTA transit shed it was 2.19; these figures represent a 2 percent and 7 percent decline compared to 2000 figures, respectively.

Figure 3-2

Percent Change, Population and Households, 2000–2010



Median income in the Orange Line study shed was $43,844 in 2009, lower than the median income in the region ($61,502) and the CTA transit shed ($57,070). Only the CTA shed saw an increase (7%) in median income from 2000 to 2009 when adjusted for inflation. The median income in the Orange Line study shed fell 8 percent, and the region's dropped 5 percent.

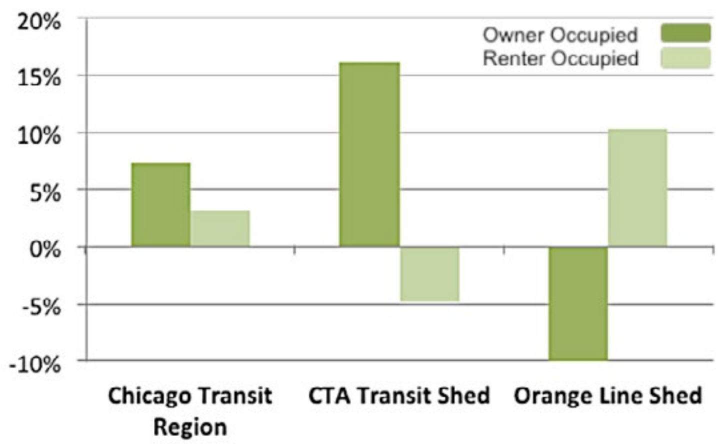
The Orange Line study corridor contains a large Hispanic and Latino population. In 2010, 67 percent of the population in the study shed was identified as Hispanic or Latino, a much higher percentage than the 21 percent in both the region and the CTA shed. Although the Orange Line study shed contains a larger percentage of Hispanics and Latinos than the region, the study shed experienced a slightly lower growth rate in these populations between 2000 and 2010. The region had a 25 percent growth rate; the Orange Line study shed had 22 percent. Although the region and the CTA transit shed had a comparable percentage of Hispanics and Latinos in 2010, there was a 7 percent decrease in these populations since 2000 in the CTA transit shed.

Travel Behavior

In the Chicago region and the CTA transit shed, the percent of workers taking transit to work stayed relatively flat between 2000 and 2009 (0.5% and 0.7% decrease, respectively). However, the Orange Line study shed experienced a 7 percent increase in the percent of workers commuting via transit. In 2009, 20 percent of workers in the study shed used transit, lower than the CTA shed (31%) but significantly higher than the regional figure (12%). Average household auto ownership in 2009 was 1.33 in the study shed, higher than the CTA shed (0.95), but lower than the region (1.62). From 2000 to 2009, auto ownership increased 2.3 percent in the Orange Line study shed compared to a 5.2 percent increase in the region; auto ownership rates remained flat in the CTA shed. Contributing to higher auto ownership rates is the fact that households in the Orange Line study shed had a greater number of workers per household than either the CTA transit shed or the region in 2009.

Figure 3-3

Percent Change, Owner and Renter Occupied Housing Units, 2000–2010



Housing Units

In 2010, there were 20,322 housing units in the Orange Line study corridor and 18,237 occupied housing units. The number of housing units declined 0.2 percent between 2000 and 2010, and the number of occupied housing units fell 1.4 percent. Owner-occupied housing units decreased, while the number of renter-occupied housing units increased, the reverse of trends in the whole CTA transit shed (Figure 3-3). For the national typical household,[11] housing and transportation costs were affordable in the Orange Line study shed in 2009, totaling 46 percent of household income. Although housing and transportation costs grew faster between 2000 and 2009 in the study shed (8%) than the region (3%) and CTA shed (8%), they still remained lower and more affordable; in 2009, housing and transportation costs in the region were equivalent to 57 percent of household income and 48.3 percent in the CTA transit shed.

[11]The National Typical Household assumes a household income of $51,425 (the national median household income), a national average household size of 2.6, and a national average number of commuters per household of 1.15.

Portland: Interstate MAX & Eastside MAX

A Tale of Two Corridors

Transit corridors and station areas can often reflect larger demographic trends and shifts occurring in transit regions. Two light rail transit (LRT) lines in Portland, Oregon, provide a representative example of two very different corridors in the same region. Socioeconomic trends along the Eastside MAX (Blue) and Interstate MAX (Yellow) suggest that the suburbs are becoming more racially and economically diverse, while close-in neighborhoods are attracting educated higher-income households. Transit usage for commuting is increasing comparably in both corridors, suggesting that a connection to larger regional growth trends is not tied to differing commuting patterns in these corridors. Additionally, increases in income are not necessarily a determinant of lower numbers of future riders.

One of the nation's first modern LRT lines, the 15-mile Eastside MAX Line connecting downtown Portland to Gresham opened in the fall of 1986. As part of unincorporated Multnomah County until the early 1980s, the five-mile segment of the Eastside MAX Line from just east of I-205 in East Portland to the western edge of downtown Gresham was largely suburban in nature with large residential lots and limited street connectivity and sidewalks.

The 5.8-mile Interstate (Yellow) Line connecting downtown Portland to the Expo Center near the city's northern edge at the Columbia River opened for service in the spring of 2004. Unlike the suburban Eastside MAX segment, the line passes through neighborhoods largely platted and developed in the early 20th century. With the exception of the I-5 right-of-way at the eastern edge of the corridor, the station areas include a fine grain of streets and a mix of neighborhood-serving retail and services. Since World War II, the neighborhoods have been home to a large portion of Portland's African-American population and business community.

The two corridors have experienced divergent demographic shifts over the past 10 years. As shown in Figure 3-4, the median household income in each of the close-in Interstate MAX station areas increased, but decreased in all of the Eastside MAX station areas.

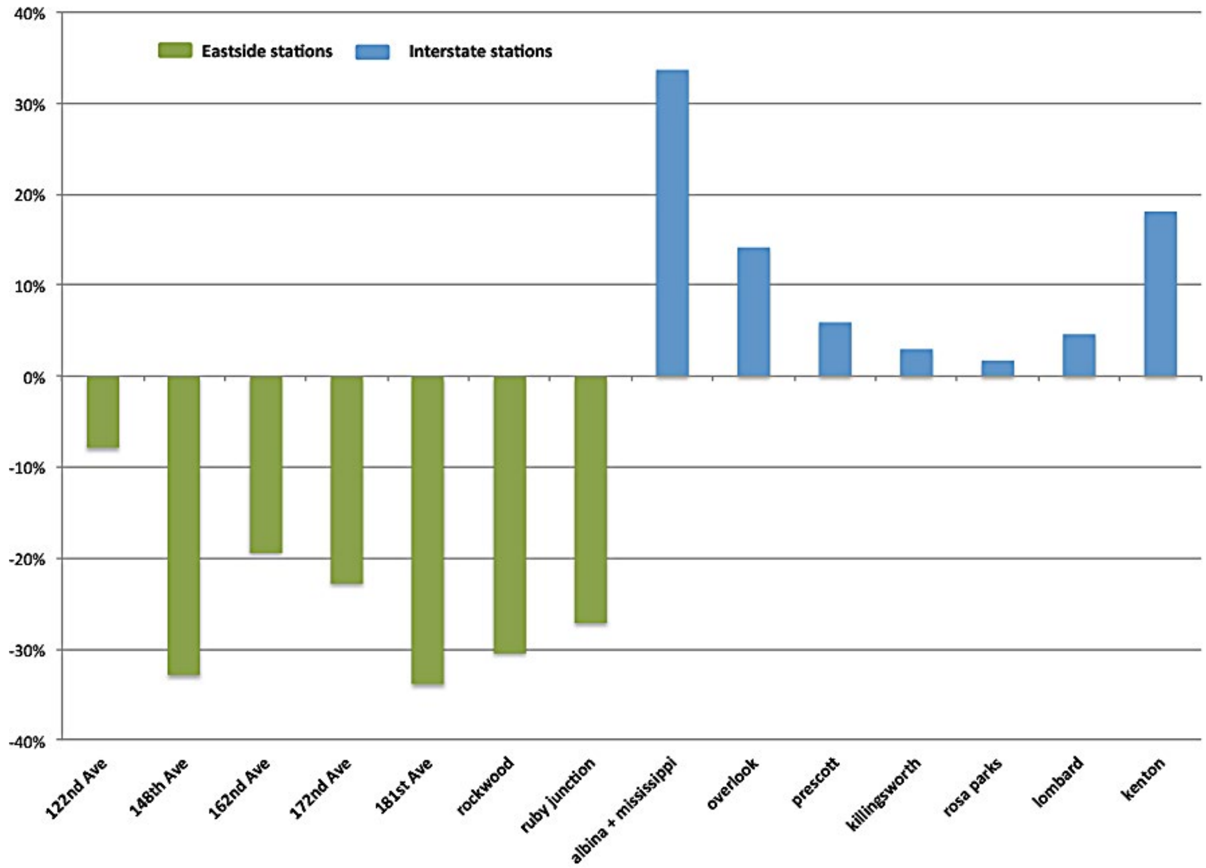


Figure 3-4

Percent Change, Median Household Income, 2000–2010 (Eastside + Interstate MAX Station Communities)

Resident educational attainment levels have also changed (Figure 3-5). Whereas the percentage of adults with less than a high school education has decreased in the Portland region, it stayed the same in the suburban Eastside MAX station areas while decreasing along the Interstate Max.

Figure 3-5

Percentage of Less than High School Educational Attainment, 2000–2009

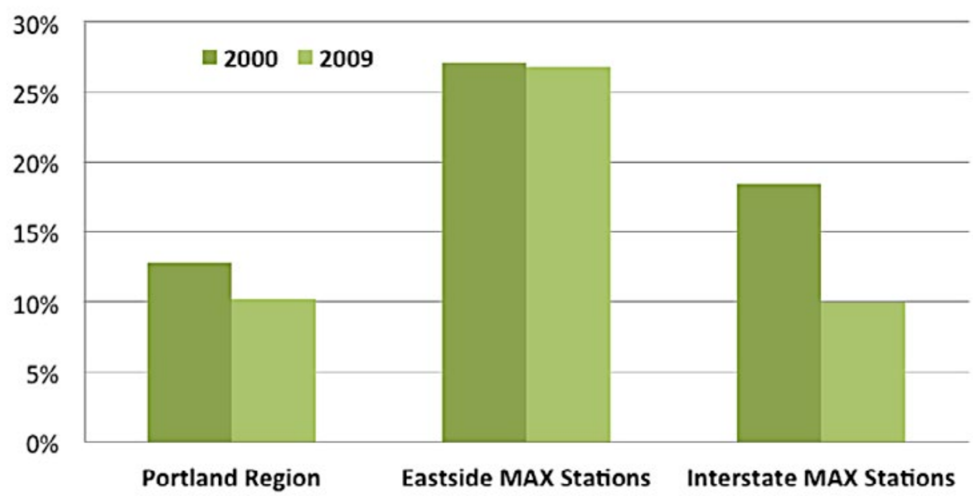


Figure 3-6 demonstrates that the racial composition of the two corridors is moving in different directions. Overall, the minority share of population increased by more than 20 percent within the Eastside MAX areas and decreased by more than 6 percent along the Interstate MAX.

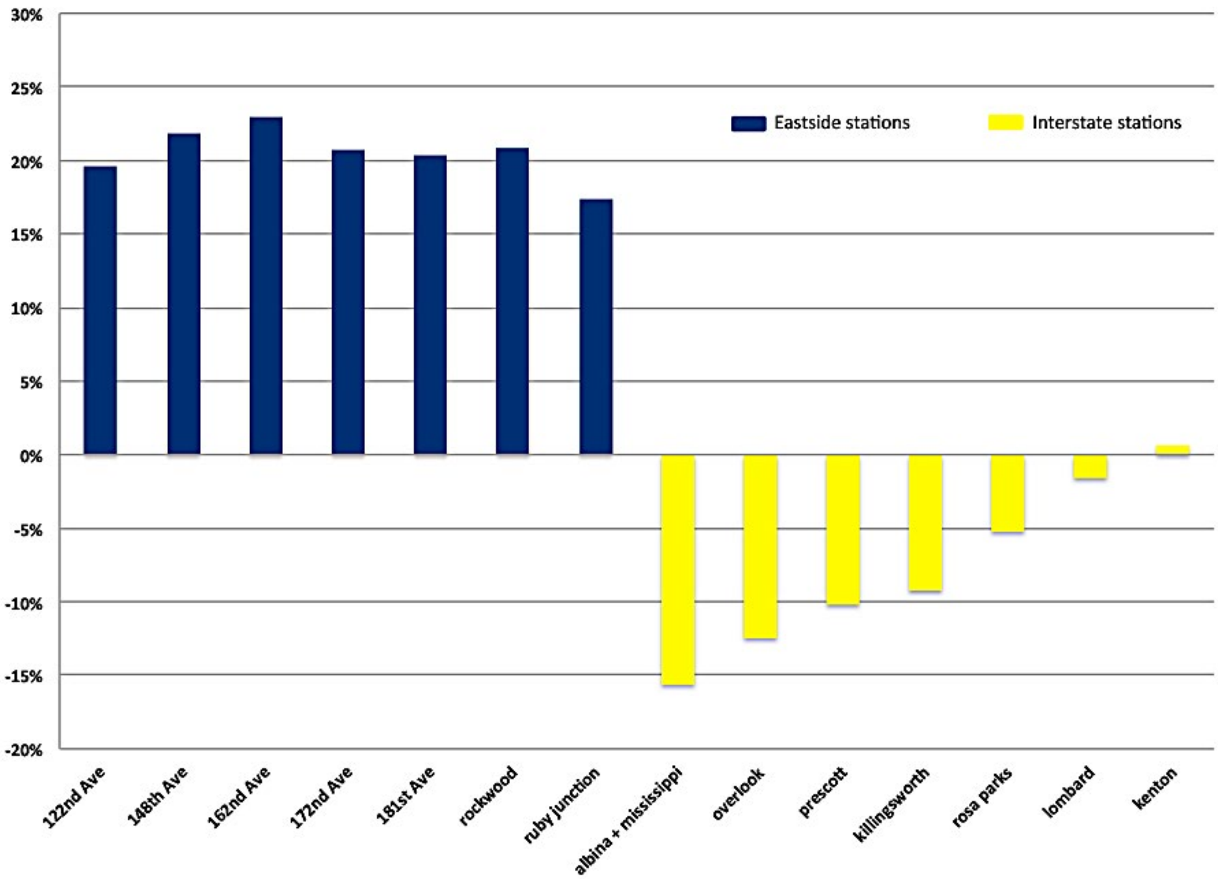


Figure 3-6

Change in Minority Share of Population, 2000–2010 (Eastside + Interstate MAX Station Communities)

Although these two corridors are experiencing opposing socioeconomic trends, they are witnessing comparable growth in terms of transit usage by commuters with proximate residences (Figure 3-7). Whereas the percentage of workers taking transit to work in the Portland region as a whole remained essentially the same at near 6 percent, commute shares increased for both the Eastside and Interstate MAX station areas. Transit ridership grew faster in the Interstate MAX areas than in the Eastside areas, suggesting that investment in high quality transit can attract new ridership despite increases in household incomes.

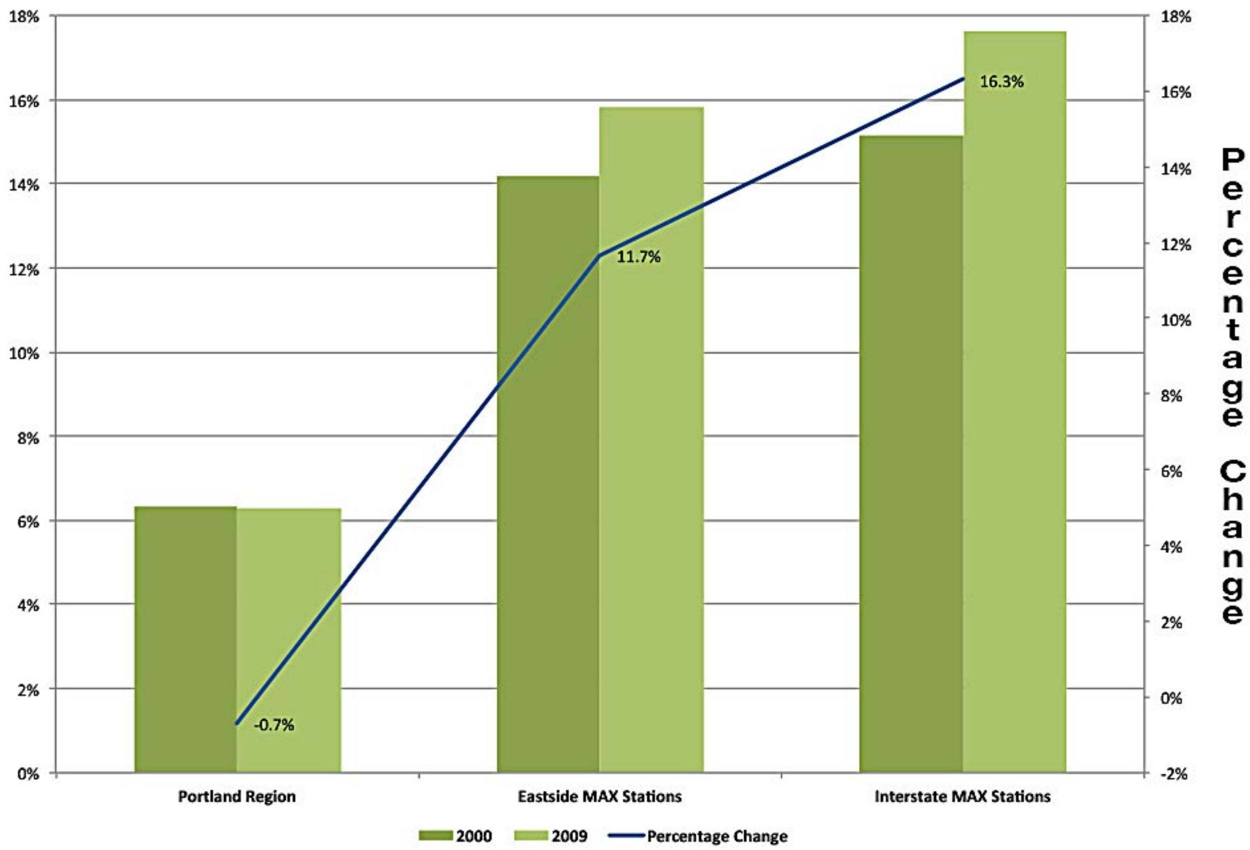


Figure 3-7

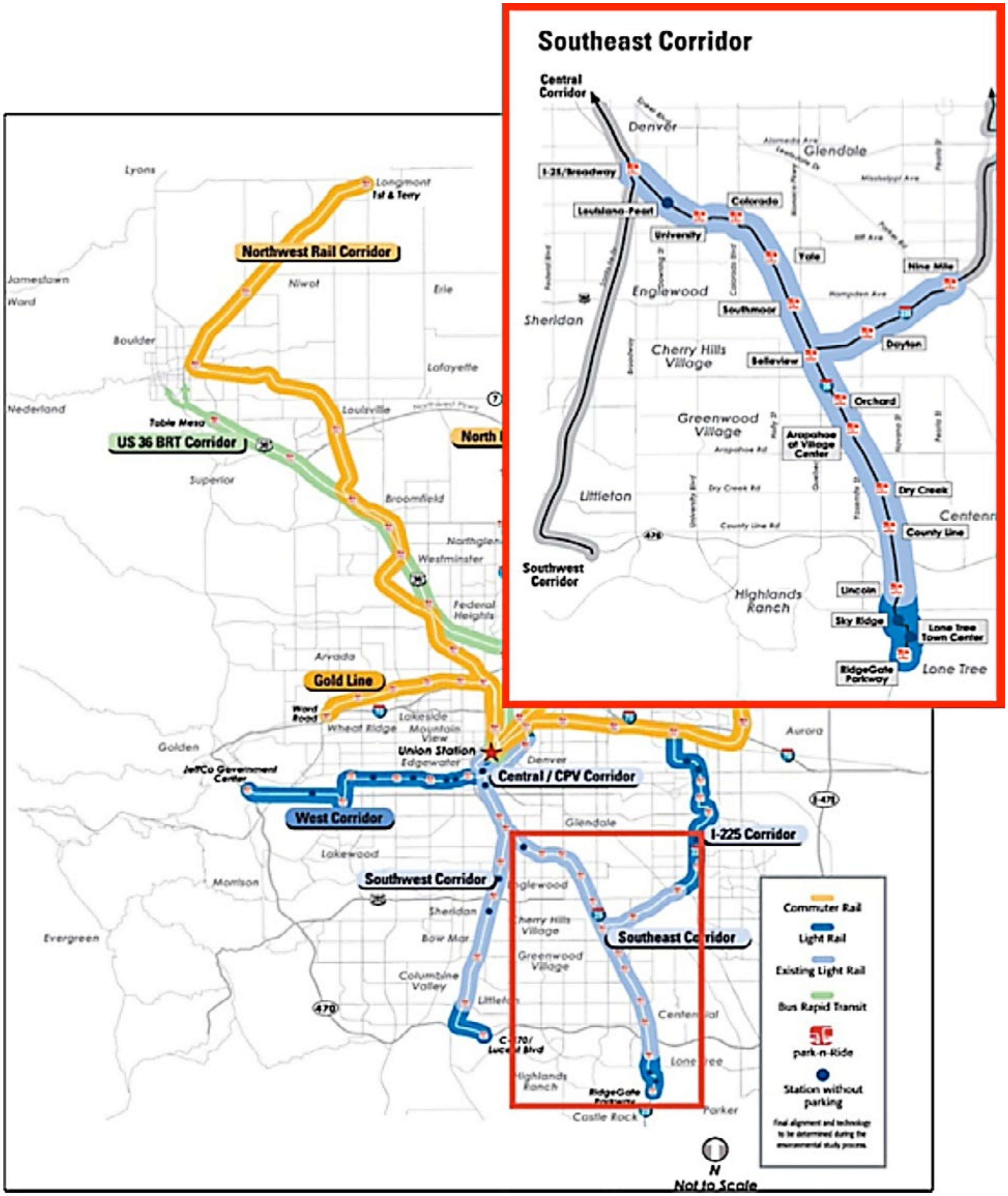
Transit Mode Shares for Journey to Work, 2000–2009

Denver Metro Area: Southeast Corridor

Connecting Employment Centers and Spurring Land-Use Diversification

The Southeast Corridor, which opened in 2006, is one of the three new lines added in the 2000s to Denver's rapidly expanding light rail system (Figure 3-8). The 19-mile long corridor runs within or adjacent to the Interstate 25 (I-25) right-of-way for most of the line, connecting downtown Denver to the Southeast Business District,[12] one of the region's most significant and fastest-growing employment centers. Approximately 90,000 jobs were located within the Southeast Corridor transit shed in 2009, accounting for about 7 percent of the region's total employment. The Southeast Business District and, by extension, the Southeast Corridor, fared relatively well in the recession of the late 2000s.

[11]While the Southeast Corridor does not technically include downtown Denver, riders can continue into downtown on the Central Corridor without transferring. A planned 2.3-mile extension will add 3 new stations to the southern end of the line, while the eastern spur (Dayton and Nine Mile stations) will eventually connect to the planned I-225 light rail line, providing a connection through the City of Aurora and into east Denver.



Adapted from Regional Transportation District (RTD), 2011 FasTracks System Map, and Southeast Rail Extension Map, http://www.rtd-fastracks.com.

Figure 3-8

Southeast Corridor and Denver's Existing and Planned Light Rail Lines

Between 2002 and 2009, the corridor accounted for two-thirds of all the new jobs created in the Denver transit region. Employment along the line is concentrated at the six southern-most stations, which serve the Denver Technology Center (a suburban-style office complex that is home to many large corporations) and the commercial development that extends south from the Tech Center along I-25. The Colorado station area also has a large amount of employment (Figure 3-9). Knowledge-based industries account for 40 percent of the corridor's employment, with particularly high concentrations of employment in information, finance, and insurance services and professional, scientific, and technical services (Figure 3-10). By linking the high tech, financial, and professional services concentrated in the Southeast Business District with the professional and business-support industries that tend to cluster downtown, the Southeast Corridor creates an alternative to the highway for workers traveling between the two employment centers and supports bi-directional commute flows.

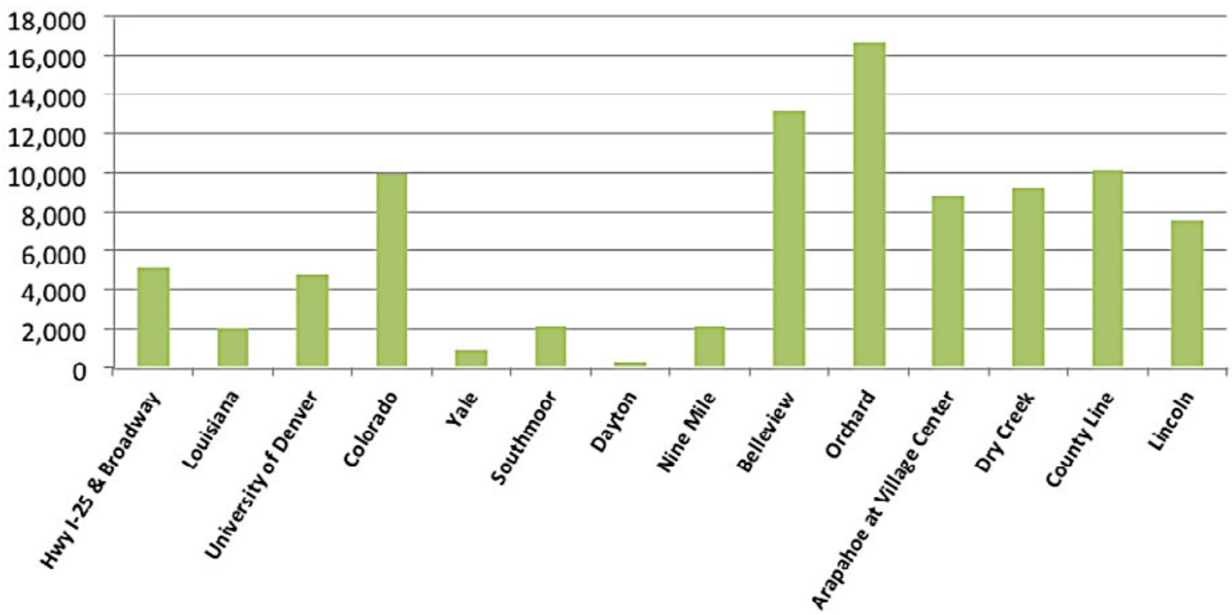
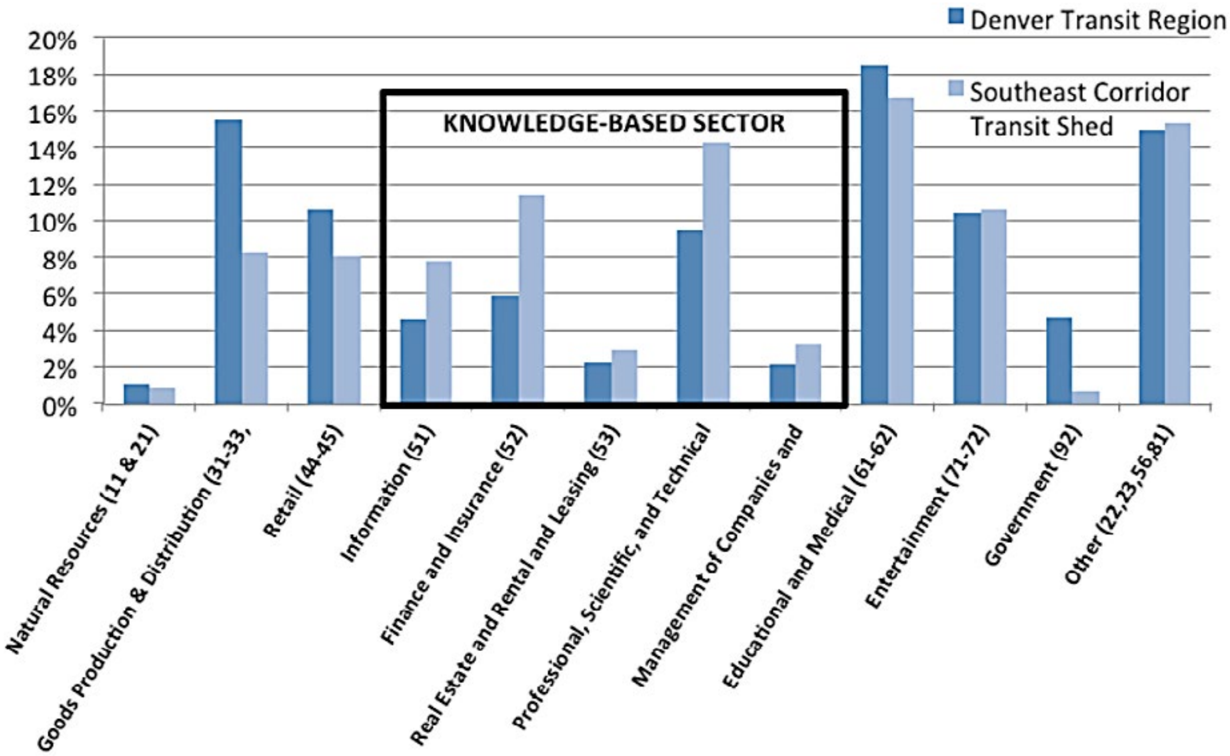


Figure 3-9

Total Jobs by Station Area in Southeast Corridor, 2009



Numbers in parentheses refer to industry (NAICS) codes.

Figure 3-10

Total Employment by Sector: Denver Transit Region and Southeast Corridor Transit Shed, 2009

CTOD's Rails to Real Estate report (2011) found that a large increment of new residential and commercial development occurred in the Southeast Corridor in the 2000s, with the pace of development increasing rapidly after the line opened in 2006. While it seems likely that significant development would have happened in the area even in the absence of transit, the

Rails to Real Estate analysis concluded that the introduction of light rail service helped change the perception of the station areas from predominantly highway-oriented job centers to places that could potentially attract residents as well. The Census data analyzed for this report supports the observation that the southern station areas, in particular, have become increasingly mixed-use over time. At the beginning of the decade, the Belleview, Orchard, Arapahoe at Village Center, Dry Creek, County Line, and Lincoln station areas were home to a total of about 2,300 residents, 1,180 households, and nearly 60,000 jobs (Figures 3-11 and 3-12). By the end of the decade, the population in the southern station areas had expanded more than threefold, to more than 8,300 residents. The 6,000 new residents in these 6 station areas accounted for 80 percent of the total population growth that occurred within the corridor. The number of households living in the 6 southern station areas—as along the rest of the corridor—increased faster than the total population because the corridor attracted small households. The average household size in the Southeast Corridor transit shed fell from 1.95 persons per household in 2000 to 1.73 in 2010, a decrease of 11 percent. Average household size in the region as a whole also declined over the course of the decade, but more slowly, falling from 2.5 in 2000 to 2.3 in 2010 (a decrease of 7%).

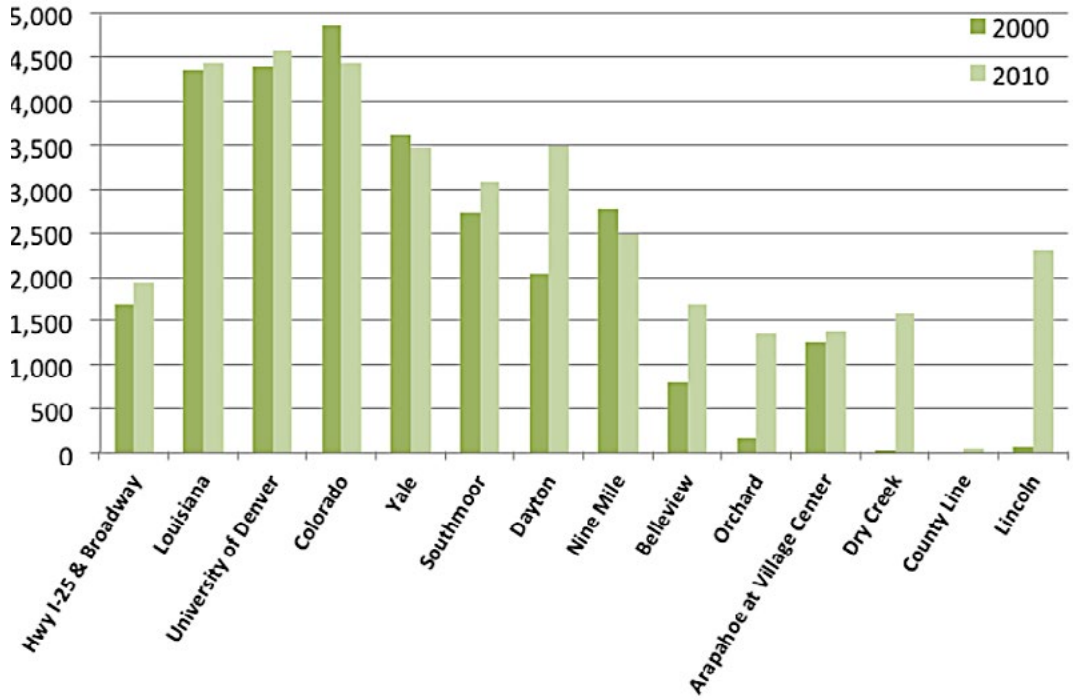


Figure 3-11

Population by Station Area, 2000–2010

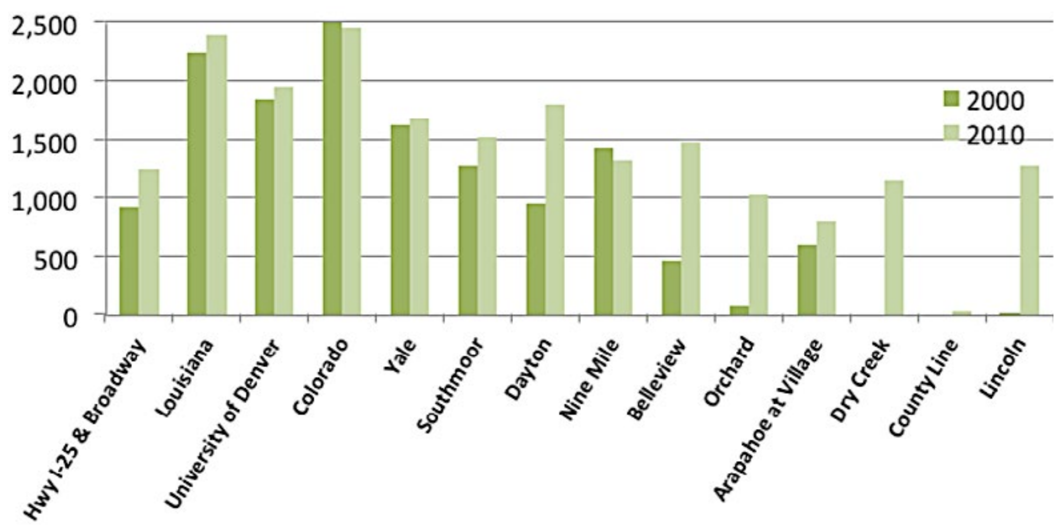


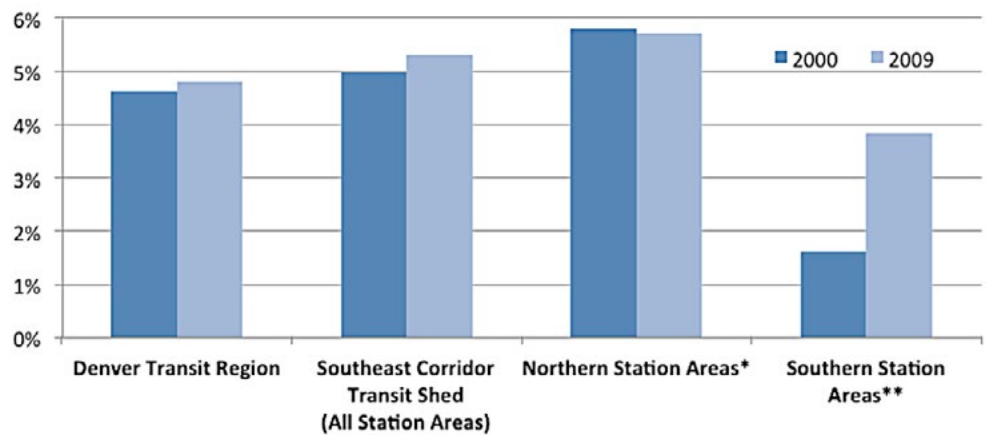
Figure 3-12

Households by Station Area, 2000–2010

The population growth along the line has corresponded with an increase in transit use, despite the fact that I-25 serves as a barrier to accessing the station from surrounding neighborhoods. By 2009, 5.8 percent of workers who lived within the corridor were taking public transportation to work, up slightly from 2000 and somewhat more than in the region as a whole. Transit ridership is highest in the northern station areas—which are generally characterized by older, more compact and pedestrian-oriented development patterns—but has increased quickly in the historically auto-oriented, commercial southern stations (Figure 3-13). Similarly, the average number of vehicles per household declined throughout the corridor over the course of the decade while staying constant in the region as a whole, with the fastest decreases occurring in the southern stations (Figure 3-14).

Figure 3-13

Percent of Workers Taking Transit to Work, 2000–2009

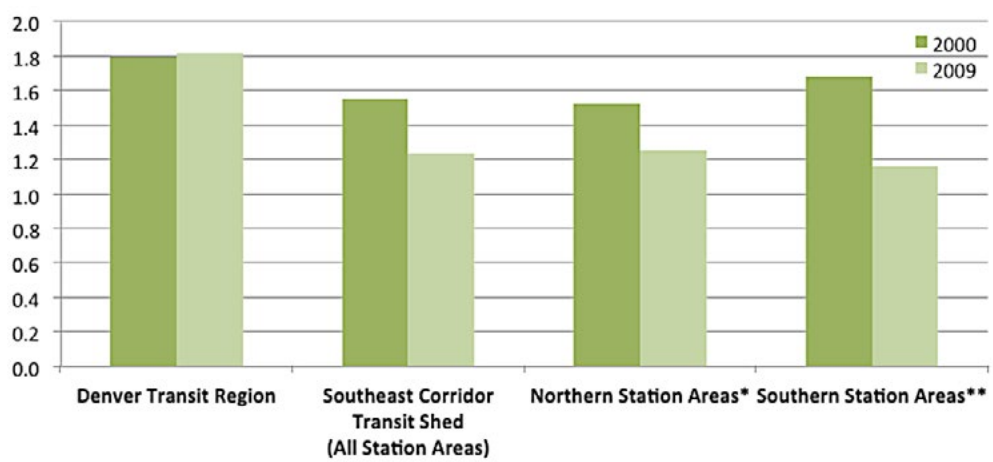


*Highway I-25 & Broadway through Southmoore, Dayton, and Nine Mile stations.

**Belleview through Lincoln stations.

Figure 3-14

Average Vehicles Available per Household, 2000–2009



*Highway I-25 & Broadway through Southmoore, Dayton, and Nine Mile stations.

**Belleview through Lincoln stations.

APPENDIX

A

Table A-1

Fixed Guideway Transit Systems in the U.S.

A National Transit System

Transit Region	System Type	System Size	Stations Existing in 2000	Stations Built since 2000	Total Stations 2010	Percent Growth
Albuquerque	New	Small	0	13	13	N/A
Atlanta	Existing	Medium	41	0	41	0 %
Austin	New	Small	0	9	9	N/A
Baltimore	Existing	Medium	67	0	67	0 %
Boston	Existing	Extensive	282	43	325	15.2 %
Buffalo	Existing	Small	16	0	16	0 %
Charlotte	New	Small	0	15	15	N/A
Chicago	Existing	Extensive	393	24	417	6.1 %
Cleveland	Existing	Large	21	69	90	328.6 %
Dallas	Existing	Large	55	39	94	70.9 %
Denver	Existing	Medium	37	17	54	45.9 %
Detroit	Existing	Small	12	0	12	0 %
Eugene	Existing	Medium	3	25	28	833.3 %
Harrisburg	Existing	Small	5	0	5	0 %
Houston	New	Small	0	16	16	N/A
Jacksonville	Existing	Small	8	0	8	0 %
Kansas City	New	Medium	0	55	55	N/A
Las Vegas	New	Medium	0	54	54	N/A
Little Rock	New	Small	0	13	13	N/A
Los Angeles	Existing	Large	114	37	151	32.5 %
Memphis	Existing	Small	17	6	23	35.3 %
Miami	Existing	Medium	66	1	67	1.5 %
Minneapolis-St. Paul	New	Medium	0	25	25	N/A
Nashville	New	Small	0	6	6	N/A
New Orleans	Existing	Large	97	0	97	0 %
New York	Existing	Extensive	936	15	951	1.6 %
Norfolk	Existing	Small	3	11	14	366.7 %
Philadelphia	Existing	Extensive	527	83	610	15.7 %
Phoenix	New	Medium	0	32	32	N/A
Pittsburgh	Existing	Large	84	2	86	2.4 %
Portland	Existing	Large	58	83	141	143.1 %
Sacramento	Existing	Medium	45	16	61	35.6 %
Salt Lake City	Existing	Medium	16	32	48	200.0 %
San Diego	Existing	Large	54	27	81	50.0 %
San Francisco	Existing	Extensive	384	40	424	10.4 %
San Juan	New	Small	0	16	16	N/A
Seattle	Existing	Medium	41	31	72	75.6 %
St. Louis	Existing	Medium	26	11	37	42.3 %
Tampa	New	Small	0	11	11	N/A
Washington	Existing	Large	129	2	131	1.6 %
National			3,537	879	4,416	

*AMTRAK station that integrates with newly-built transit system in Eugene.

Table A-2

Transit System by Percent Growth

Highest Growth	
Norfolk	367 %
Cleveland	329 %
Salt Lake City	200 %
Portland	143 %
Seattle	76 %
Dallas	71 %
Considerable Growth	
San Diego	50 %
Denver	46 %
St. Louis	42 %
Sacramento	36 %
Memphis	35 %
Los Angeles	32 %
Modest Growth	
Philadelphia	16 %
Boston	15 %
San Francisco	10 %
Little to No Growth	
Chicago	6 %
Pittsburgh	2 %
New York	2 %
Washington	2 %
Miami	2 %
Atlanta	0 %
Baltimore	0 %
Buffalo	0 %
Detroit	0 %
Harrisburg	0 %
Jacksonville	0 %
New Orleans	0 %

APPENDIX

B

Methodology

National Trends Access to Transit, Methodology

GIS was used to analyze changes in station area characteristics between 2000 and 2010. A ½-mile buffer was created around each station, referred to as a transit zone. The aggregation of these individual transit zones creates a national transit shed. In cases where transit zones overlap, the overlapped areas were merged to avoid double-counting the data. Two national transit sheds were created, one representing the 3,535 transit zones in 2000, and the other representing the 4,416 transit zones in 2010.

Regional Trends, Systems Overview, Methodology

Within each of the 40 regions served by transit systems in 2010, 40 regional transit sheds were created by aggregating the transit zones for stations existing in 2010. Additionally, for 27 of the 40 regions that had transit systems in 2000, transit sheds were created by aggregating the transit zones for stations existing in 2000. A regional geographic boundary was created for each of the 40 regions served by transit systems by aggregating county boundaries corresponding to the service area.

Employment Methodology

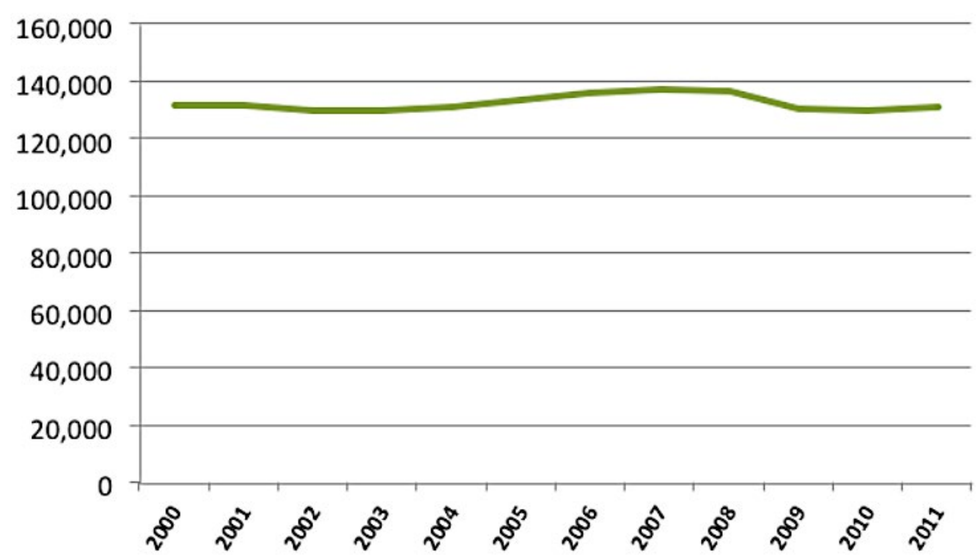
This section used employment data aggregated by the National TOD Database from the U.S. Census Bureau's Local Employment Dynamics (LED) dataset. LED is a voluntary partnership between the Census Bureau and state labor market information agencies that uses state unemployment insurance and other data to provide information on where workers work and live, what industries they work in, and other worker characteristics over time. As of early 2012, LED data was not yet available for Massachusetts, Washington DC, or Puerto Rico. Therefore, this section reports data for 37 transit systems and regions, excluding Boston, Washington DC, and San Juan.

LED is the only regularly-updated, publicly-available national data source that provides employment data sources at the Census Block level. As such, LED is uniquely suited for studying geographies such as transit sheds, which are constructed from Census Blocks. However, LED also has some limitations. First, when the dataset for this report was being constructed, LED data were available only for the years between 2002 and 2009.[13] However, the transit sheds used for this report (and available in the National TOD Database) were created by aggregating Census Blocks in the transit zones (½-mile radii) around all the stations that existed in 2000 and 2010. The 2000 and 2010 transit sheds are used in this section to approximate transit shed employment in 2002 and 2009, respectively.

Second, the methodology that the Census Bureau uses to assemble LED data has changed over time. In the early years of the time series, including 2002, LED was undercounting employment in some regions relative to other government data sources such as the U.S. Bureau of Labor Statistics and the Census Bureau's own Quarterly Workforce Indicators. In recent years, the LED methodology has improved and now more closely resembles that of other sources. As a result, the LED employment counts in 2009 more closely track those reported by other sources. However, LED data for earlier years have not been revised, so employment trends over time as reported by LED are inconsistent with other sources.[14] Independent of these changes in LED methodology, 2002 and 2009 are somewhat challenging years from which to draw conclusions, since they represent the troughs in the two recessions that the U.S. experienced during the decade (Figure B-1). For these reasons, although the report includes a brief discussion of the total number of jobs located near transit in 2002 and 2009, the focus is primarily on the changing relationship between transit sheds and transit regions over time, as indicated by changes in the employment capture rate—i.e., the share of regional employment located within a transit shed.

Figure B-1

Total U.S. Employment (in thousands), 2000–2011



[13]LED data for 2010 have since been released.
[14]Personal communication with U.S. Census Bureau staff, March 2012.

APPENDIX

C

Housing and Transportation Affordability Index

The Center for Neighborhood Technology's (CNT)Housing and Transportation (H+T®) Affordability Index provides a more comprehensive way of thinking about the cost of housing and true affordability. The Index (http://htaindex.cnt.org/) is the only tool of its kind that examines transportation costs at a neighborhood level. It allows users to view housing and transportation data as maps, charts, and statistics for nearly 900 metropolitan and micropolitan areas—covering 89 percent of the U.S. population.

Planners, lenders, and most consumers traditionally measure housing affordability as 30 percent or less of income. The H+T Index proposes expanding the definition of housing affordability to include transportation costs to better reflect the true cost of households' location choices. Based on research in metro areas ranging from large cities with extensive transit to small metro areas with extremely limited transit options, CNT has found 15 percent of income to be an attainable goal for transportation affordability. By combining this 15 percent level with the 30 percent housing affordability standard, the H+T Index recommends a new view off affordability, one defined as combined housing and transportation costs consuming no more than 45 percent of household income.

The H+T Index was constructed to estimate three dependent variables (auto ownership, auto use, and transit use) as functions of 11 independent variables (median income, per capita income, average household size, average commuters per household, residential density, gross density, average block size, intersection density, transit connectivity, transit access shed, and employment access). To hone in on the built environment's influence on transportation costs, independent household variables are fixed values. By fixing income, household size, and commuters, the model controls for the impact of these variables on transportation costs. Differences in transportation costs are, therefore, a result of neighborhood characteristics and variation in the built environment.

CNT has modeled data for three fixed households, each with a different income level: Regional Typical Household, Regional Moderate Household, and National Typical Household, which is the household type used in this report. The National Typical Household assumes a household income of $51,425 (the national median household income), a national average household size of 2.6, and a national average number of commuters per household of 1.15.

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