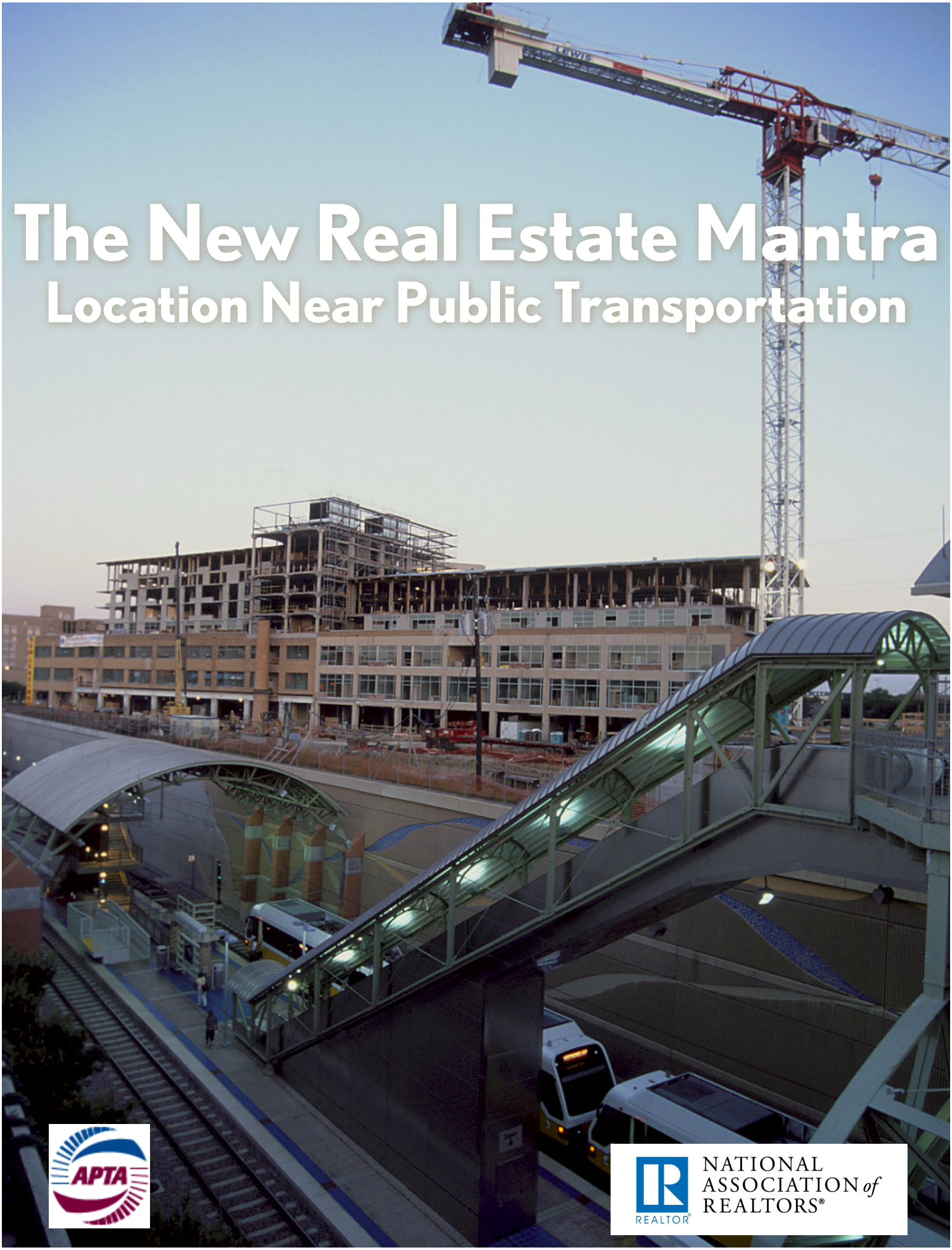

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Executive Summary

Fueled by demographic change and concerns over quality of life, there has been a growing interest in communities with active transportation modes. The recession added another dimension to these discussions by emphasizing the economic implications of transportation choices. Housing and transportation, the two economic sectors mostly closely tied to the built environment, were both severely impacted by the economic downturn. There has been a growing effort among planners, real estate professionals, and economists to identify not only the economic benefits of alternative transportation modes in and of themselves, but also the impact that they have on housing prices and value retention. The real estate mantra of "location, location, location" is more important than ever. Moving beyond the traditional arguments that good schools and neighborhood amenities impact housing prices, emerging research has indicated that urban form and transportation options have played a key role in the ability of residential properties to maintain their value since the onset of the recession.

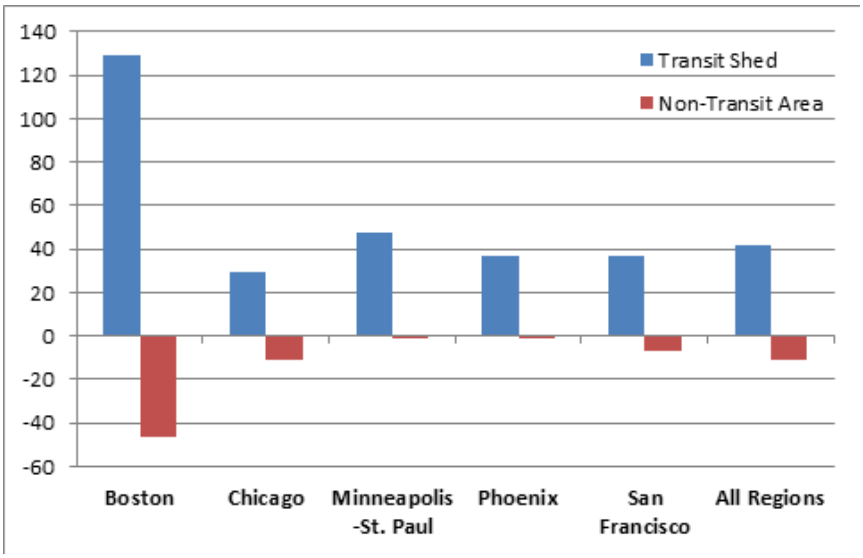
Studies have shown that consumers are willing to pay more for housing located in areas that exemplify new urbanist principles or are "traditional neighborhood developments." These neighborhoods are walkable, higher density, and have a mix of uses as well as access to jobs and amenities such as transit.

This analysis investigates how well residential properties located in proximity to fixed-guideway transit have maintained their value as compared to residential properties without transit access between 2006 and 2011 in five regions: Boston, Chicago, Minneapolis-St. Paul, Phoenix, and San Francisco. The selection of these places for the study regions provides not only a geographic distribution, but also an illustrative sample of the types of fixed-guideway transit systems in the US. Minneapolis-St. Paul and Phoenix have newer light rail systems, while Boston, Chicago, and San Francisco are mature systems dominated by heavy and commuter rail. Additionally, Boston is also home to one of the earlier BRT lines.

Here's what we found:

Across the study regions, the transit shed outperformed the region as a whole by 41.6 percent. In all of the regions the drop in average residential sales prices within the transit shed was smaller than in the region as a whole or the non-transit area. Boston station areas outperformed the region the most (129%), followed by Minneapolis-St. Paul (48%), San Francisco and Phoenix (37%), and Chicago (30%).

FIGURE SUMMARY 1
Percent change in average residential sales prices relative to the region, 2006-11



Transit type had an effect on the resilience of property values, which benefited more from transit that was well connected and had a higher frequency of service. Stations with higher levels of transit access saw the most price resilience within and across regions.

No consistent trends have emerged with regards to residential property type. For most property types, the transit shed outperformed the region, and in Boston and Chicago this holds true for all property types.

In addition to more resilient residential property values, households living in transit sheds had better access to jobs and lower average transportation costs than the region as a whole.

The relative stability of property values in areas with transit access has a number of policy implications. It helps to provide consumers and planners with better information, and encourages greater investment in transit and more sustainable development patterns.

Previous Research

Studies have shown that consumers are willing to pay more for housing located in areas that exemplify new urbanist principles or are "traditional neighborhood developments." These neighborhoods are walkable, higher density, and have a mix of uses as well as access to jobs and amenities such as transit. Tu and Eppli used a hedonic regression model to compare the price differential between what consumers will pay for a single-family home in a new urbanist development relative to comparable housing in conventional suburban developments. They found that buyers paid 4.1 to 14.9 percent more for housing in new urbanist developments after controlling for other housing characteristics. In another study, several measures of urban form were developed and then used to characterize neighborhoods in the suburbs of Portland, Oregon. The authors found that households were willing to pay more for homes in neighborhoods with a more connective street network, smaller blocks, pedestrian accessibility to commercial uses, a mix of land uses, and proximity light rail stations.

Proximity to high-capacity transit stops has been shown to increase property values, a phenomenon known as the "transit premium." The Center for Transit Oriented Development (CTOD) examined a range of studies to determine the impact of transit investments on real estate values and found that transit premiums ranged from a few percent to over a 150 percent increase. The increases in property values near transit were most dramatic for office and retail spaces. For residential properties, single family dwellings had a property value premium range of 2 percent to 32 percent; condominiums from 2 to 18 percent; and apartments from 0-4 percent to 45 percent.

A study of select stations in San Francisco, New York, and Portland using a hedonic regression also found that single family homes derive a premium from transit access. Within one mile of the Pleasant Hill BART station (in the San Francisco region) the average value of a single family home was 9 percent greater than comparable homes outside the station area. In Queens, New York there was a 13 percent increase in value within the three station areas in the neighborhoods of Forest Hills and Rego Park. The findings were not replicated in Portland, where

1. Tu, Charles C. and Mark J. Eppli. 2001. "An Empirical Examination of Traditional Neighborhood Developments," Real Estate Economics. 29(3): 485-501.
2. Song, Yan and Gerrit-Jan Knaap. 2003. "New Urbanism and Housing Values: A Disaggregate Assessment." National Center for Smart Growth Research and Education, University of Maryland.
3. Center for Transit Oriented Development. 2008. "Capturing the Value of Transit." Federal Transportation Authority.
4. Within 200 ft of at San Diego Trolley station. VNI Rainbow Appraisal Service. 1992. "Analysis of the Impact of Light Rail Transit on Real Estate Values." San Diego Metropolitan Transit Development Board.
5. Within 100 ft of the St. Louis LRT. Garrett, Thomas. 2004. "Light Rail Transit in America: Policy Issues and Prospects for Economic Development." Federal Reserve Bank of St. Louis.
6. Within 2,640 ft of a San Diego Trolley station. Cervero, Robert et al. 2002. "Land Value Impacts of Rail Transit Services in San Diego County." Urban Land Institute.
7. Within 2,640 ft of a San Diego Trolley station. Cervero, Robert et al. 2002. "Land Value Impacts of Rail Transit Services in San Diego County." Urban Land Institute.
8. Within 1,320 ft of a Santa Clara Valley LRT. Cervero, Robert. 2002. "Benefits of Proximity to Rail on Housing Markets: Experiences in Santa Clara County." Journal of Public Transportation. 5(1): 1-18.

three stations along the East Burnside corridor were studied, and the authors postulate that this is a result of proximity to heavy traffic since Portland's light rail runs down a major arterial. However, there was a slight increase in property values when homes were within the one mile radius but more than 2,000 ft from the roadway and transit line. Additionally, they speculate that the near absence of a transit premium could be due to differences in the service characteristics of light rail as compared to the heavy rail studied in San Francisco and New York. Ranges in premiums are impacted by numerous factors, including the local regulatory environment, transit service characteristics and connections, and national and regional economies.

Research on other active transportation modes, namely walking, has shown that walkable neighborhoods also result in higher property values. Using WalkscoreTM data as a measure of walkability, a positive correlation between walkability and housing prices was found in 13 out of 15 metropolitan areas (with Las Vegas and Bakersfield being the exceptions). Walkscore is measured on a scale of 1 to 100 and the study found that one additional point of improvement in the average Walkscore adds between $700 and $3,000 to the value of a typical home, all other mitigating factors being constant. A study of neighborhoods in the Washington D.C. region also found that there was a premium associated with walkability in the form of an increase in office, residential and retail rents, retail revenues, and for-sale residential values. The recession increased the premium for retail and office space in walkable urban neighborhoods; pre-recession (defined as 2000-07) there was a 23 percent premium per square foot valuation, during the recession (2008-10) it jumped to 44.3 percent.

Additional evidence that properties in location efficient areas have performed better during the recession comes from a study on mortgage default. Using a sample of over 40,000 mortgages in Chicago, Jacksonville, and San Francisco, researchers modeled the probability of mortgage default based on differences in location efficiency. Two proxy variables were used to measure location efficiency, vehicles per household scaled by income and Walkscore. In all three cities, the probability of mortgage default increased as the auto ownership rates rose. In high income areas the likelihood of default decreased with increases in Walkscore (associated with higher walkability); the results did not hold true in low income areas however.

This paper investigates how well residential properties located in proximity to

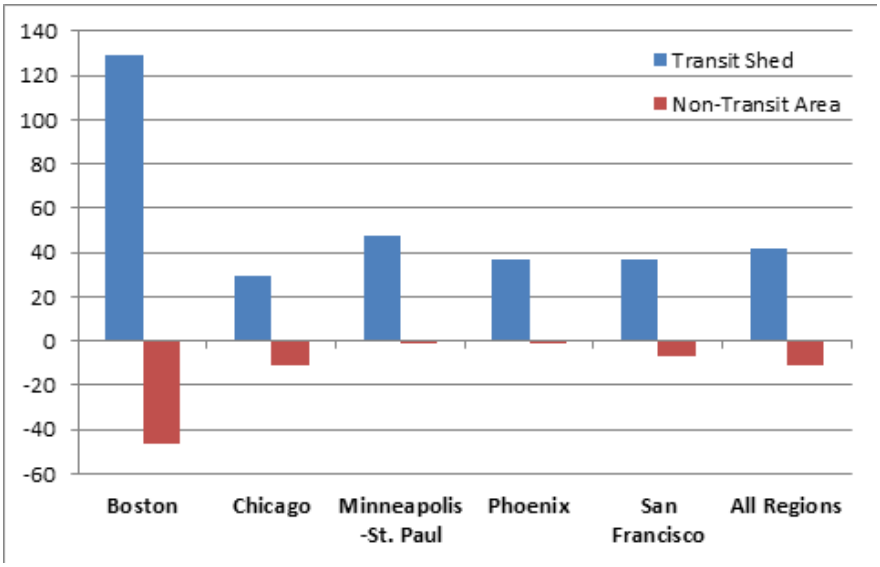
9. Lewis-Workman, Steven and Daniel Brod. 1997. "Measuring the Neighborhood Benefits of Rail Transit Accessibility." Transportation Research Record. 1576(1):147-153.
10. Cortright, Joe. 2009. "Walking the Walk." CEOs for Cities.
11. Leinberger, Christopher B. and Mariela Alfonzo. 2012. "Walk this Way: The Economic Promise of Walkable Places in Metropolitan Washington, D.C." Brookings Institute.
12. Rauterkus, Stephanie Y., Grant I. Thrall, and Eric Hangen. 2010. "Location Efficiency and Mortgage Default." Journal of Sustainable Real Estate. 2(1).

fixed-guideway transit have maintained their value as compared to residential properties without transit access in five regions: Boston, Chicago, Minneapolis-St. Paul, Phoenix, and San Francisco. The relative stability of property values in areas with transit access has a number of policy implications. It helps to provide consumers and planners with better information, and encourages greater investment in transit and more sustainable development patterns.

Findings

Overall there was a substantial decline in average residential sales prices in the study regions between 2006 and 2011. However, in all of the regions, the decline in average residential sales prices within the transit shed was lower than in the region as a whole or the non-transit area. Across the study regions, the transit shed outperformed the region as a whole by 41.6 percent. Figure 1 shows the percent change in average residential sales prices in the transit shed and non-transit area relative to the regional percent change in price.

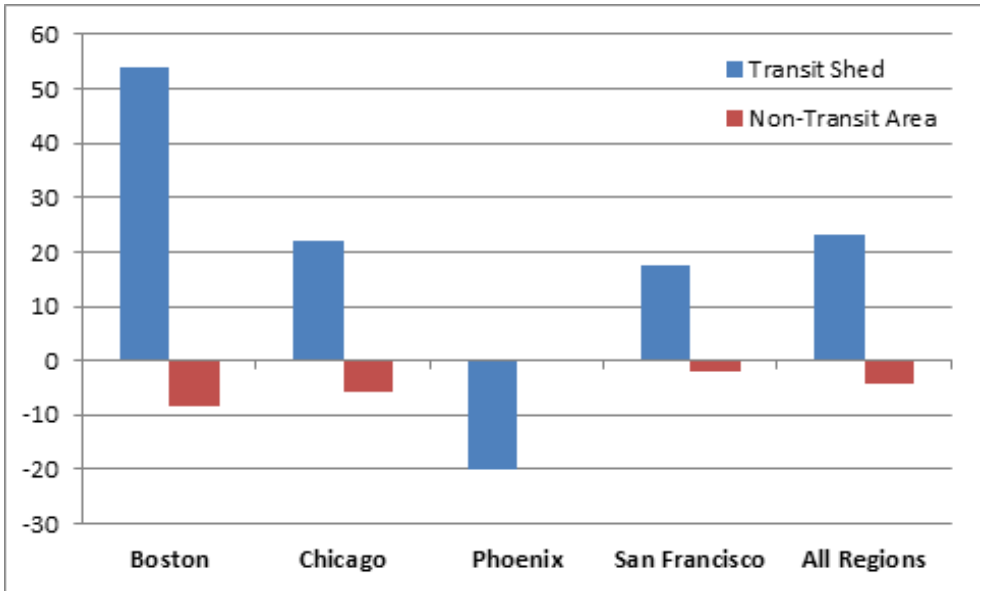
FIGURE 1
Percent change in average residential sales prices relative to the region, 2006-11



Within a given region, heavy rail, light rail, and BRT transit sheds held their value best. In addition to having higher frequency service and better transit connectivity, these types of fixed-guideway transit stations also tend to be located in areas that are more walkable, have higher residential density, and better access to jobs. Commuter rail sheds also saw a smaller decline in average residential sales prices than the region as a whole.

No consistent trends have emerged with regards to residential property type. For most property types, the transit shed outperformed the region, and in Boston and Chicago this holds true for all property types. Data was not available to perform a breakout by property type in the Minneapolis-St. Paul region.

FIGURE 2
Percent change in average residential sales prices relative to the region of single family homes, 2006-11

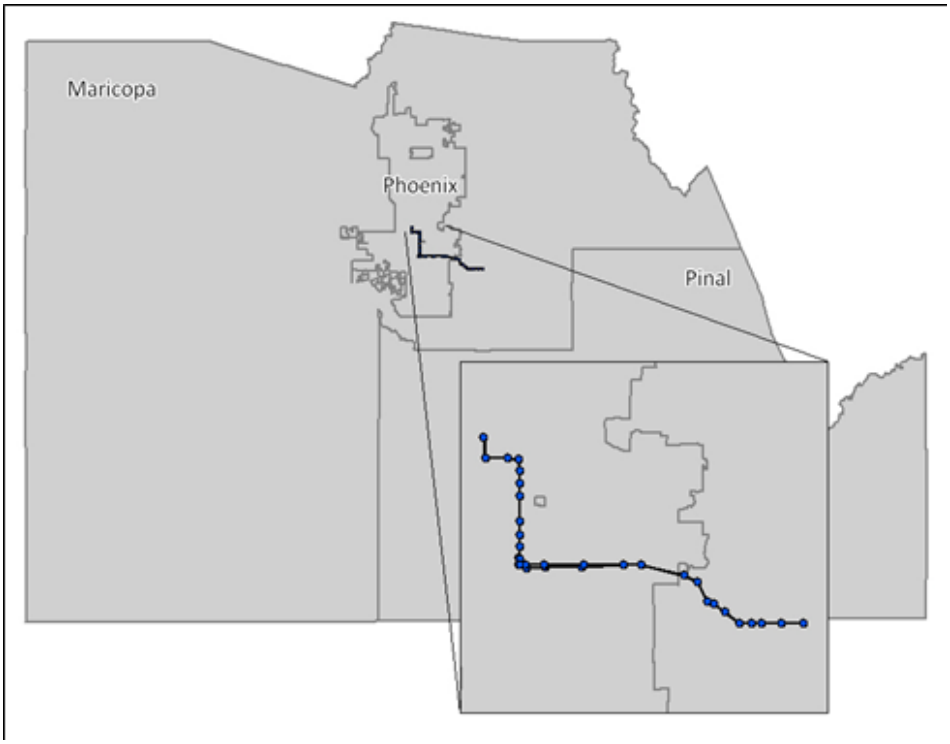


13. Boston's rapid transit stations which consist of both heavy and light rail transit are included in the heavy rail category here.

Phoenix

The Phoenix study region includes Maricopa and Pinal counties and is analogous to the Phoenix Core Based Statistical Area (CBSA). Valley Metro is the region's transit agency and it provides bus, light rail, paratransit, and rideshare services. The Metro Light Rail (Metro) opened December 27, 2008. It includes one line with 32 stations serving the cities of Phoenix, Tempe, and Mesa. Average weekday ridership for Metro was 44,000 in the first quarter of 2012; combined average weekday ridership for all of Valley Metro services was 213,600.[14]

FIGURE 3
Map of Phoenix study region and Valley Metro light rail

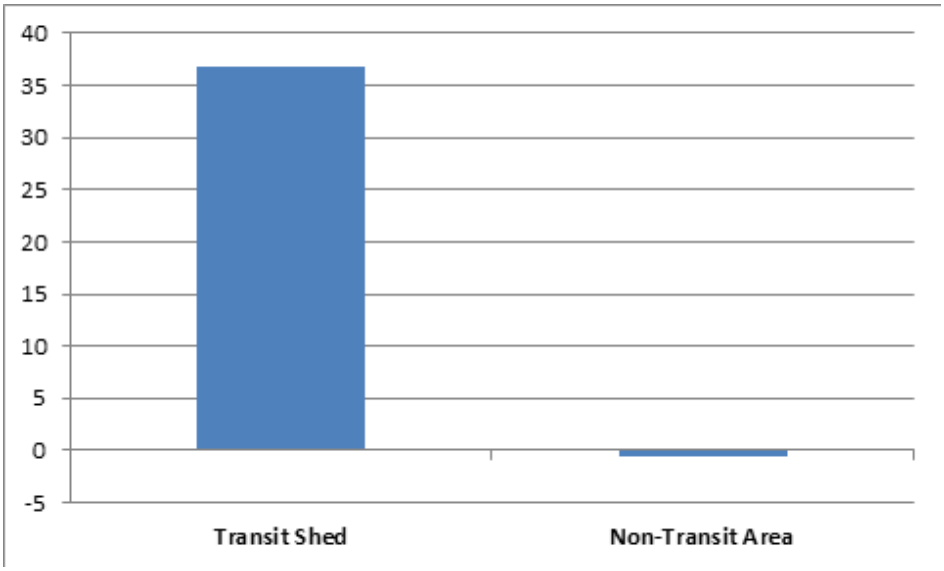


In 2010, 76,012 people and 30,615 households lived within a half mile of Metro, representing 1.8 percent and 2 percent respectively of the region's population and households.[15] Within the transit shed, 9.1 percent of workers commuted via transit, compared to 2.4 percent in the region as a whole in 2009. The percentage of workers taking transit, walking, or biking was 21.4 percent in the shed and 4.9 percent in the region.[16]

The average sales price for residential properties in Phoenix declined substantially between 2006 and 2011. However, the transit shed outperformed the region by 36.8 percent (Figure 5). See Appendix A for charts depicting the percent change in average residential sales prices not relative to the region.

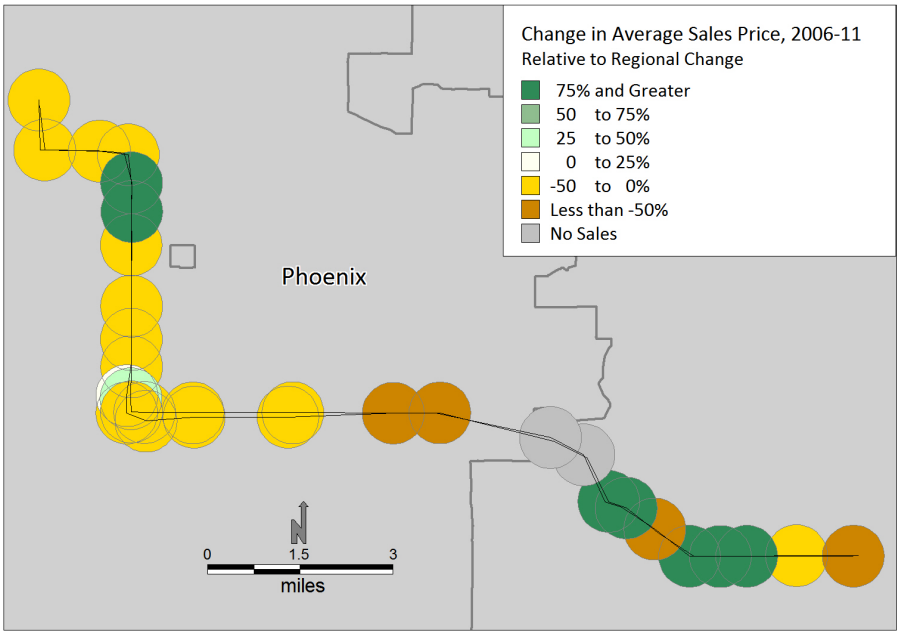
14. American Public Transportation Association. 2012. "Public Transportation Ridership Report: First Quarter 2012."
15. 2010 Census
16. 2005-09 American Community Survey

FIGURE 4
Percent change in average residential sales prices relative to the region in Phoenix, 2006-11



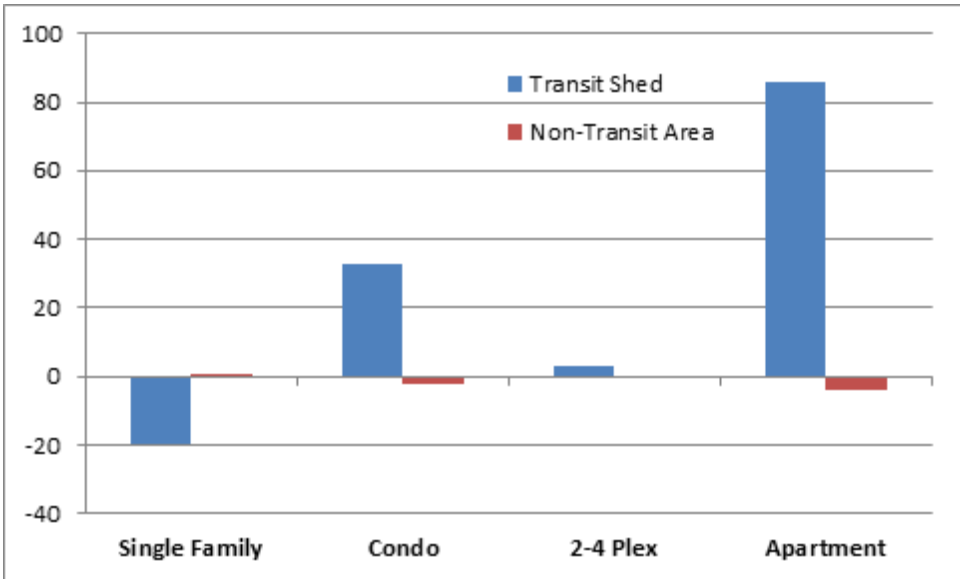
Among individual transit zones, the Smith-Martin/Apache station had the highest percent change in average sales price relative to the regional percent change (528.9%). Appendix B includes a complete list of the change in average sales price for all transit zones.

FIGURE 5
Percent change in average residential sales prices relative to the region by transit zone in Phoenix, 2006-11



Examining the change in average sales price by property type shows that all property types did not benefit equally from access to transit. Apartment buildings within the transit shed experienced the smallest decline in average sales price (see Appendix A), and per Figure 7, differed the most from the region.[17] Average sales prices for condominiums and 2-4 plexes also experienced smaller declines in the transit shed than in the region or non-transit area. Single family homes, however, performed better outside of the transit shed.

FIGURE 6
Percent change in average residential sales price relative to the region by property type in Phoenix, 2006-11



Residential properties in the transit shed not only have access to fixed-guideway transit, overall they have substantially better transit connectivity and higher levels of service than the region as a whole. CNT developed two measures of transit access, the Transit Connectivity Index (TCI) and Transit Access Shed. TCI is based on the number of bus stops and train stations that are accessible in a given neighborhood; it is scaled by frequency and weighted by distance from the transit stop. Within the transit shed the average TCI is 23,096 rides per week, more than five times greater than the regional average of 4,438. The Transit Access Shed is the area accessible from any neighborhood within 30 minutes by public transportation (allowing for one transfer), scaled by frequency of service. In the transit shed, the average area accessible by transit within a half an hour is 318.5 km2; in the region as a whole the average transit access shed is 96.0 km2.

17. Apartment buildings defined as five or more units

Along with better transit service, the transit shed is also more walkable, denser, and has better access to jobs. As a result, average transportation costs for the typical regional household are $175 less per month in the transit shed than the region as a whole.[18] These neighborhood amenities, along with access to the Metro Light Rail, help account for the smaller decline in average sales prices.

FIGURE 7
Neighborhood characteristics in Phoenix

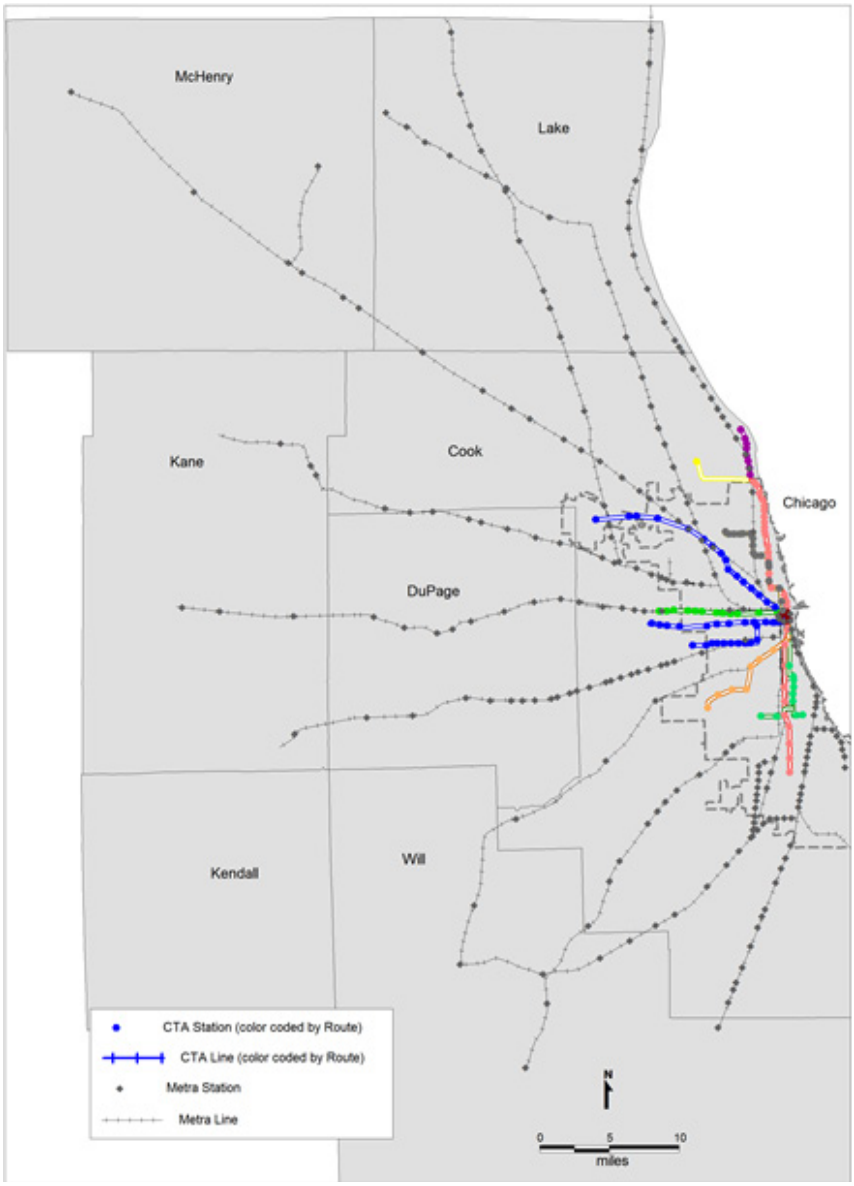
	Transit Shed	Region
Transit Connectivity Index (Rides per Week)	23,096	4,438
Transit Access Shed (Square Kilometers)	319	96
Residential Density (Households/Residential Acre)	5.51	3.33
Average Block Size (Acres)	14.42	35.63
Intersection Density (Intersections/Square Mile)	218	187
Employment Access Index (Jobs/Square Mile)	88,241	32,290
Average Monthly Transportation Costs for the Typical Regional Household	$1,006	$1,181

18. Center for Neighborhood Technology. 2012. Housing + Transportation Affordability Index. http://htaindex.cnt.org/

Chicago

The Chicago study region includes Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will counties in Illinois and is not directly comparable to the Chicago CBSA. Three transit agencies serve the Chicago study region: Metra, the Chicago Transit Authority (CTA), and PACE, with Metra and the CTA providing fixed-guideway transit service. Metra is a commuter rail system with 240 stations on 11 lines. In addition to bus service, the CTA has eight heavy rail lines with a total of 144 stations. Average weekday ridership for Metra in the first quarter of 2012 was 304,300. For the CTA subway, ridership was 709,700 and the combined bus and rail total for the CTA was 1,711,900.[19]

FIGURE 8
Map of Chicago study region, CTA rail, and Metra rail



19. APTA, 2012.

In 2010, 1,944,836 people and 801,900 households lived within a half a mile of a CTA or Metra station, representing 23.1 percent and 26 percent, respectively, of the study region's population and households. Both population and households were fairly evenly distributed between the CTA and Metra sheds.[20, 21] Within the CTA transit shed 31.7 percent of workers commuted via transit in 2009, compared to 18.5 percent in the Metra transit shed, and 12.6 percent in the region as a whole. In the same year, the percentage of workers taking transit, walking, or biking was 41.8 percent in the CTA shed, 25.3 percent in the Metra shed, and 16.3 percent in the region.[22]

The average sales price for residential properties in the Chicago region declined by nearly a third between 2006 and 2011 (see Appendix A). Prices in the transit shed outperformed the region by 29.7 percent (Figure 10). The CTA shed was the most resilient and did 47.3 percent better than the region; the Metra shed was 22.7 percent better.

FIGURE 9
Percent change in average residential sales prices relative to the region in Chicago, 2006-11

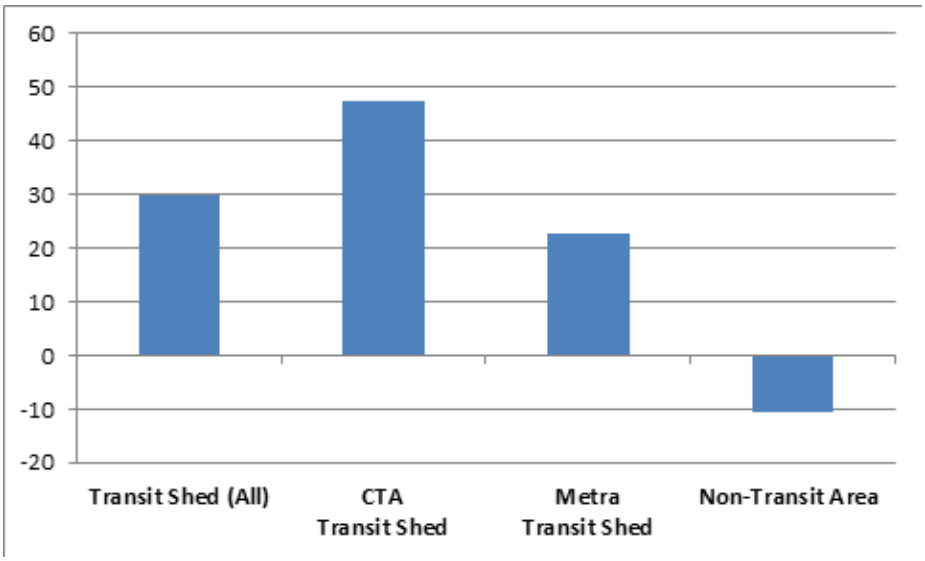
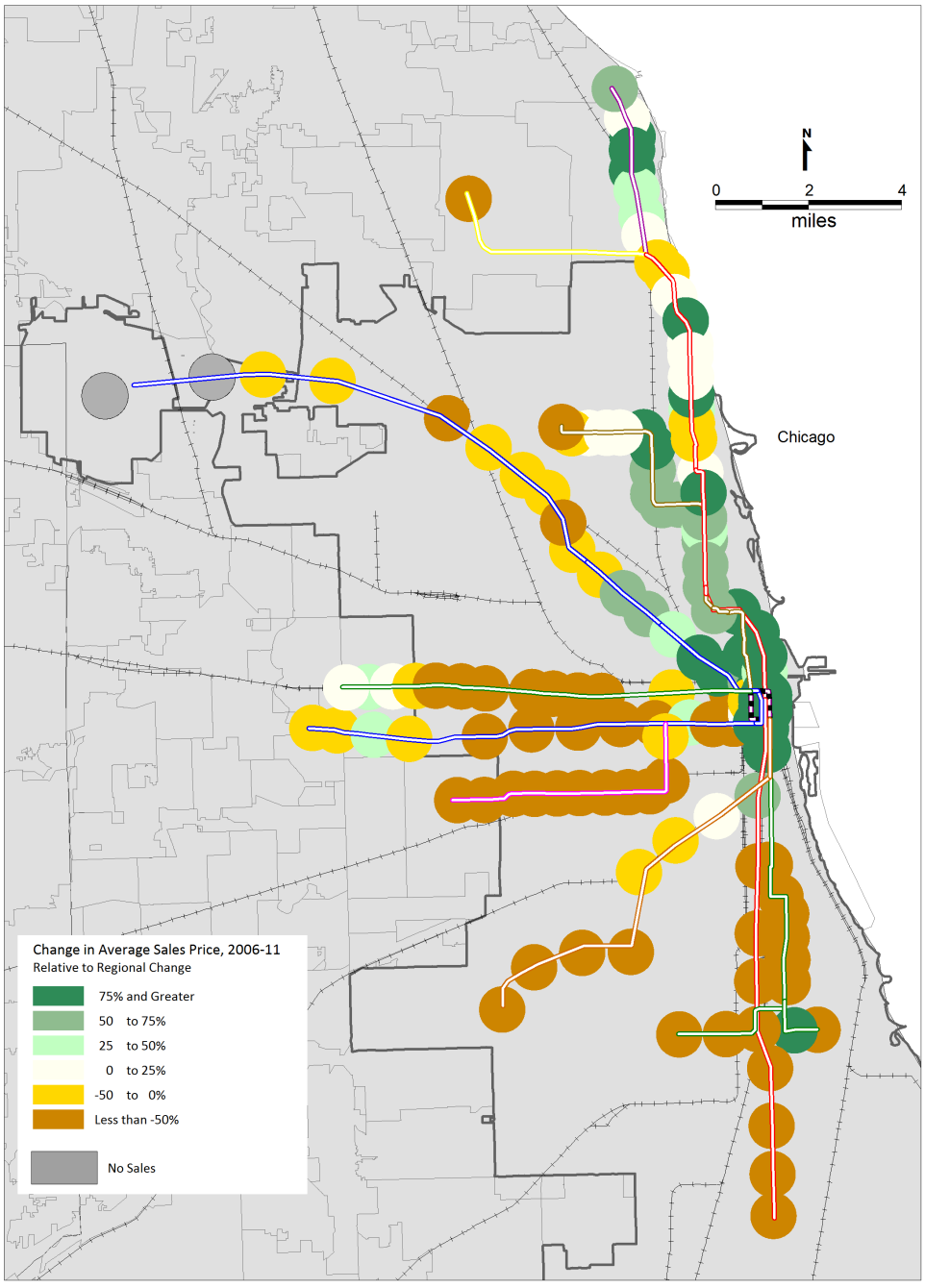


Figure 11 shows the percent change in average sales prices relative to the region within individual CTA transit zones; the Noyes Purple Line station has the largest change at 549.5 percent. Appendix B includes a complete list of the change in average sales price for all transit zones.

20. 1,070,837 people and 471,365 households lived in the CTA shed; for Metra the numbers were 1,043,796 and 412,337.
21. 2010 Census
22. 2005-09 American Community Survey

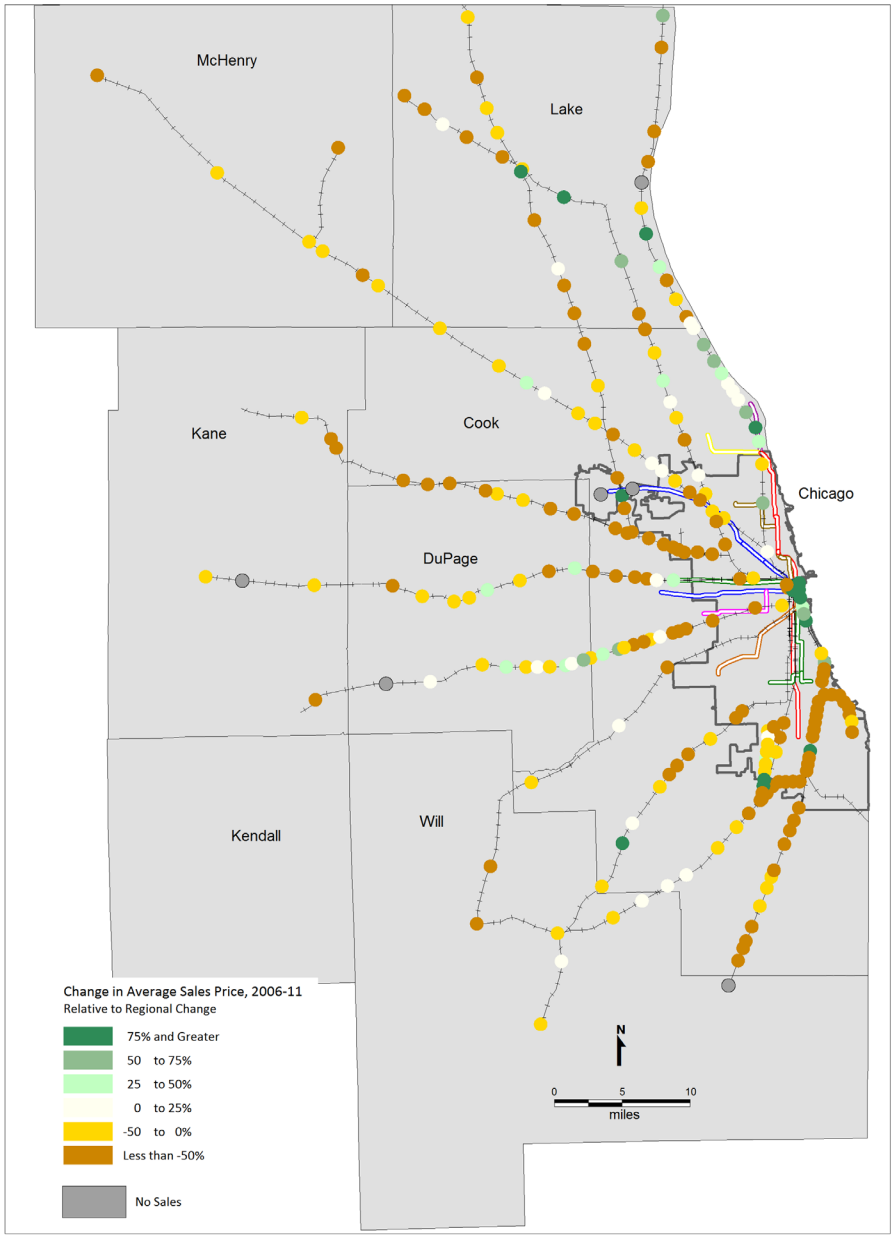
FIGURE 10

Percent change in average residential sales prices relative to the region by CTA transit zone in Chicago, 2006-11



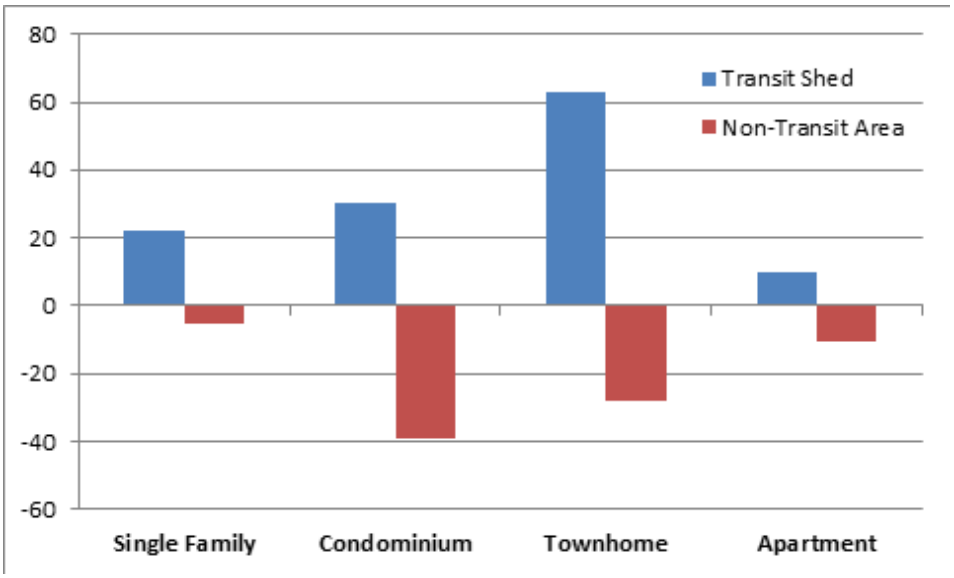
For Metra transit zones, the change in average sales prices relative to the region was the greatest at the 103rd St (Rosemoor) station on the Metra Electric Line in Chicago (461.4%).

FIGURE 11
Percent change in average residential sales prices relative to the region by Metra transit zone in Chicago, 2006-11



The CTA and Metra transit shed performed better than the region and the non-transit area for all property types. Townhomes in the transit shed experienced the smallest decline in average sales price (see Appendix A). Additionally, the transit shed for townhomes outperformed the region more than any of the other property types, by 63 percent (Figure 13).

FIGURE 12
Percent change in average residential sales price relative to the region by property type in Chicago, 2006-11



In addition to having more stable average residential sales prices, the CTA transit shed also has lower household transportation costs. As a result of better access to jobs and transit, higher residential density, and more walkable streets, the typical regional household spends significantly less on transportation –nearly $300 a month– within the CTA transit shed as compared to the regional average. The Metra transit shed is also more location efficient than the region, but not as efficient as the CTA shed.

FIGURE 13
Neighborhood characteristics in Chicago

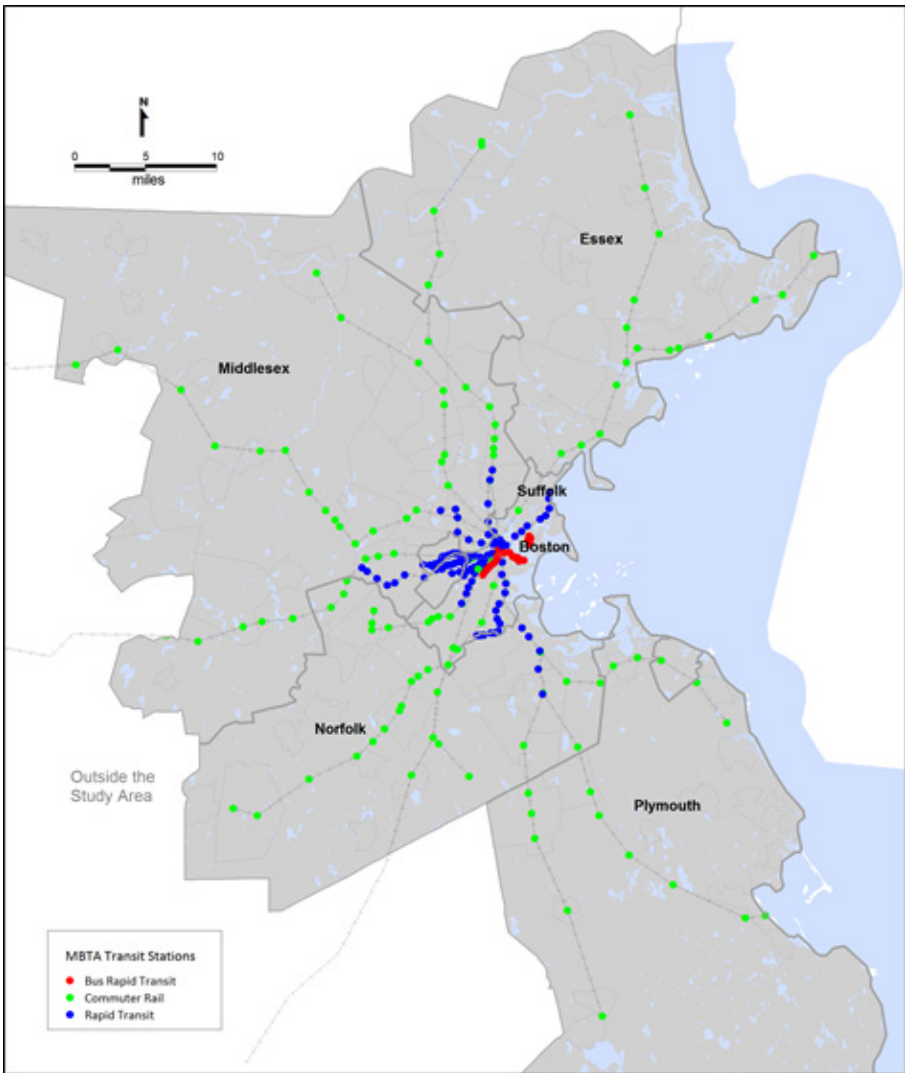
	CTA Transit Shed	Metra Transit Shed	Region
Transit Connectivity Index (Rides per Week)	95,712	46,876	29,997
Transit Access Shed (Square Kilometers)	714	468	258
Residential Density (Households/Residential Acre)	16.65	6.41	4.51
Average Block Size (Acres)	5.04	6.91	14.91
Intersection Density (Intersections/Square Mile)	586	391	303
Employment Access Index (Jobs/Square Mile)	139,908	77,513	56,300
Average Monthly Transportation Costs for the Typical Regional Household	$775	$990	$1,074

23.CNT, 2012.

Boston

Boston's study region covers Essex, Middlesex, Norfolk, Plymouth, and Suffolk counties and does not correspond to the CBSA. One transit agency serves the Boston region, the Massachusetts Bay Transportation Authority (MBTA). In addition to bus service, MBTA provides five types of fixed-guideway transit service: commuter rail, heavy rail, light rail, bus rapid transit, and ferry boat. For this analysis the heavy rail and light rail are grouped together under "rapid transit" and the ferry boats are excluded. There are other ferry providers in the Boston region that are also not examined here. There are 12 commuter rail lines with a total of 134 stations (123 of which fall within the area of analysis), four rapid transit lines with 121 stations, and one BRT line with 35 stations. Average weekday ridership for MBTA in the first quarter of 2012 was 1,317,800.[24] For commuter rail, average weekday ridership was 130,700 and for rapid transit it was 758,900.

FIGURE 14
Map of Boston study region and MBTA fixed-guideway transit

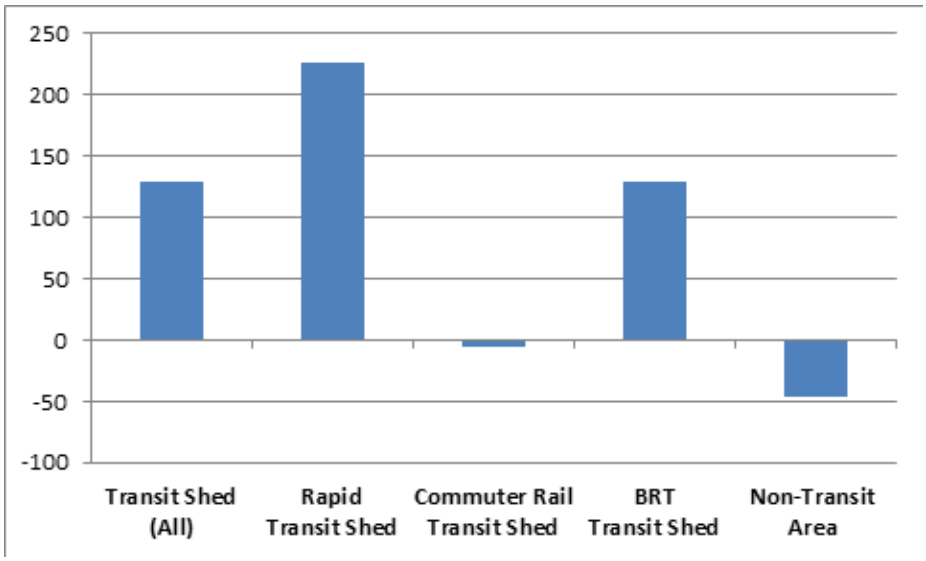


24. APTA, 2012.

In 2010, 934,403 people in 382,911 households lived within a half mile of the MBTA stations included in this analysis, representing 22.9 percent of the study region's population and 24.3 percent of the households.[25] Within the transit shed 33.8 percent of workers commuted via transit, compared to 13.1 percent in the region in 2009. Over half (52.9%) of workers in the shed used transit, walked, or biked; in the region the figure was 19.1 percent.[26]

Between 2006 and 2011 the transit shed outperformed the region by 128.7 percent (Figure 16).The rapid transit shed did 226.7 percent better than the region as whole (Figure 16) and was primarily responsible for the increase in prices in the overall transit shed (see Appendix A). Although prices declined in the commuter rail shed slightly more than the regional average, the shed still fared better than the non-transit area.

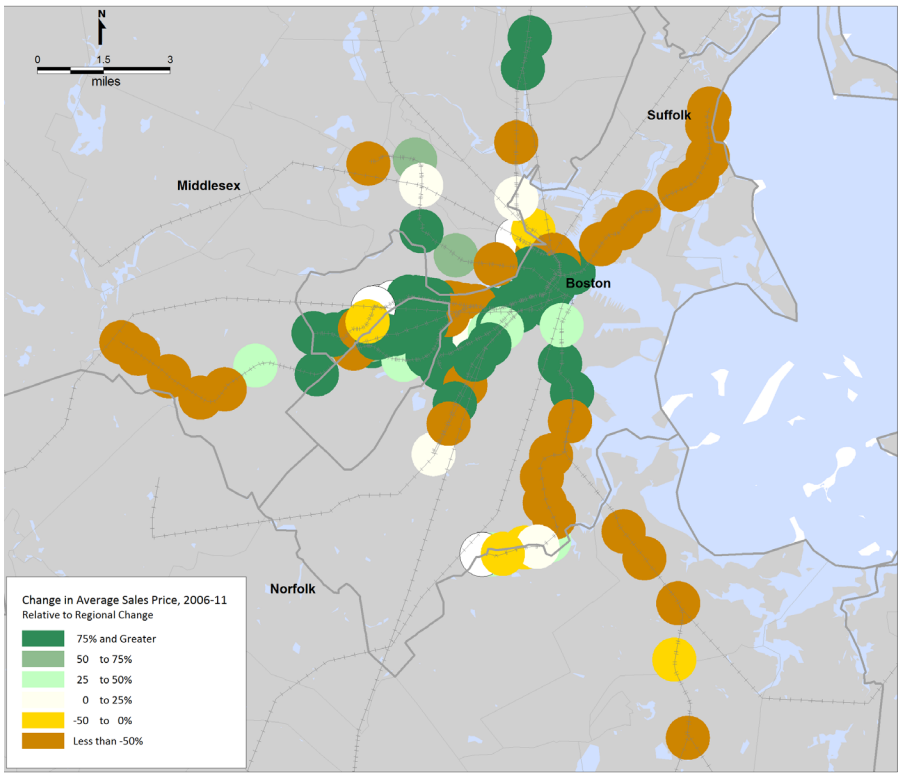
FIGURE 15
Percent change in average residential sales prices relative to the region in Boston, 2006-11



25. 2010 Census
26. 2005-09 American Community Survey
27. Prices fell in the non-transit areas for rapid transit (-12.5%), commuter rail (-8.4%), and BRT (-9.3%) as well.

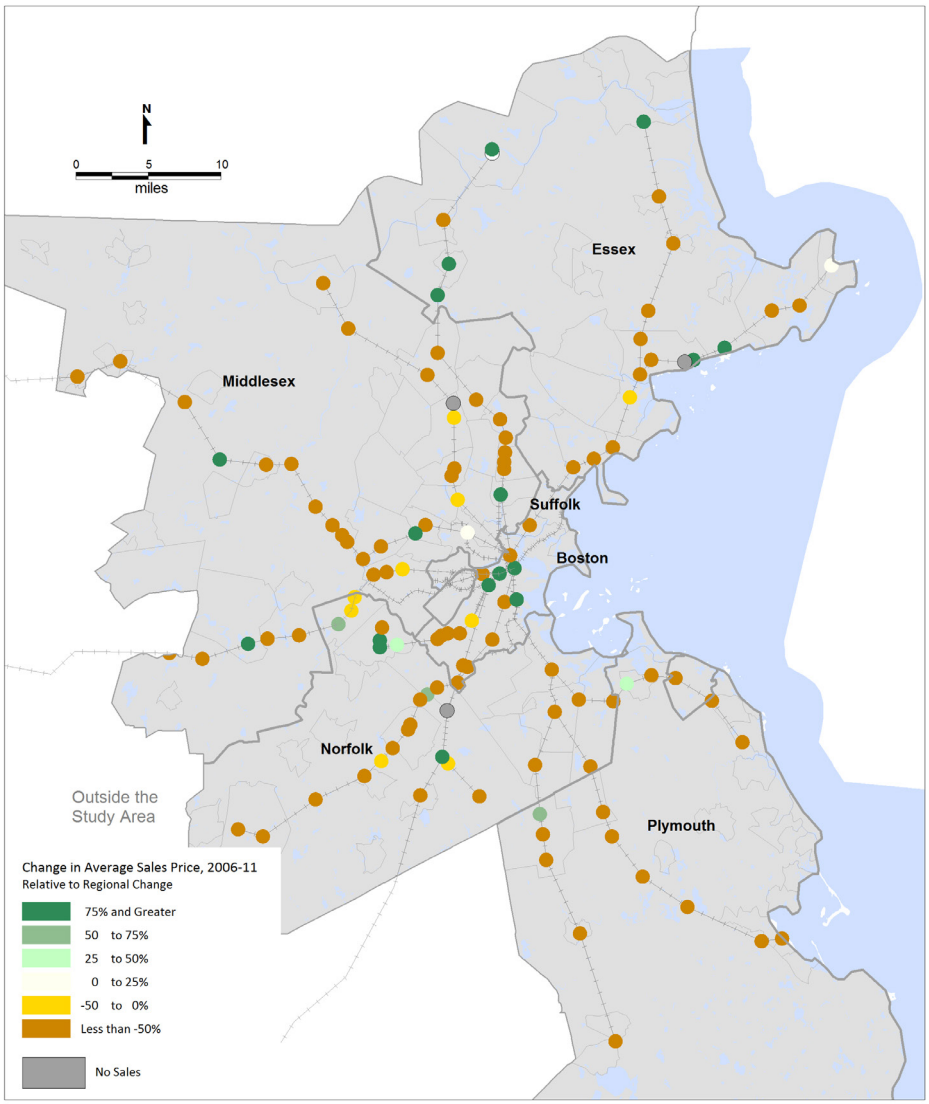
Within individual rapid transit zones, the station area with the highest percent change in average sales prices relative to the region was the Mattapan station on the Red Line (Mattapan High-Speed Line portion) at 3,437 percent. Appendix B includes a complete list of the change in average sales price for all transit zones.

FIGURE 16
Percent change in average residential sales prices relative to the region by rapid transit zone in Boston, 2006-11



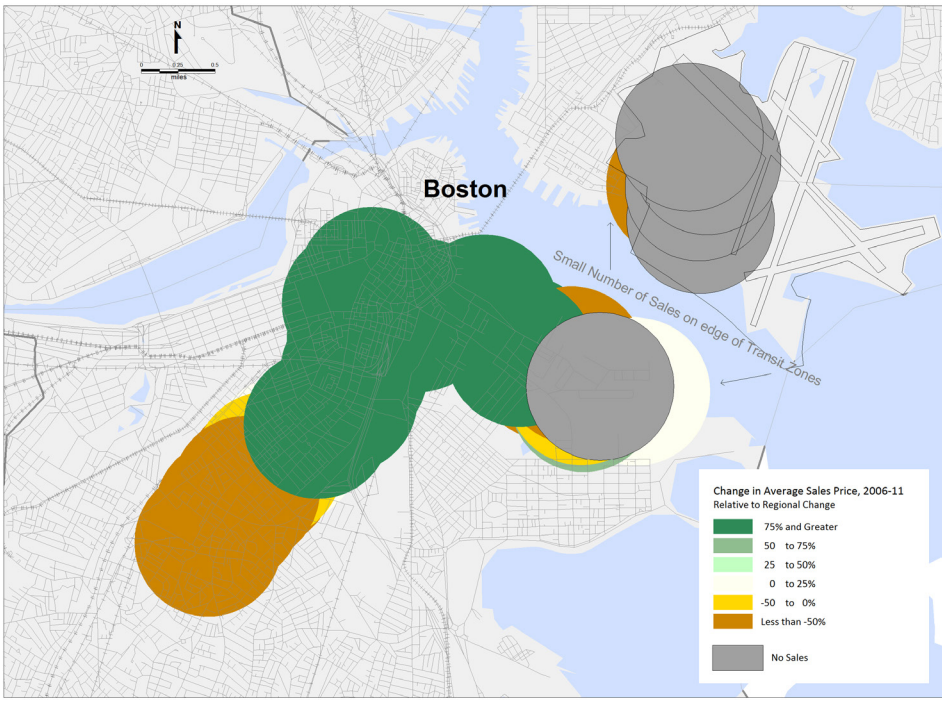
The Bradford commuter rail transit zone on the Haverhill Line performed 1,090.8 percent better than the region.

FIGURE 17
Percent change in average residential sales prices relative to the region by commuter rail transit zone in Boston, 2006-11



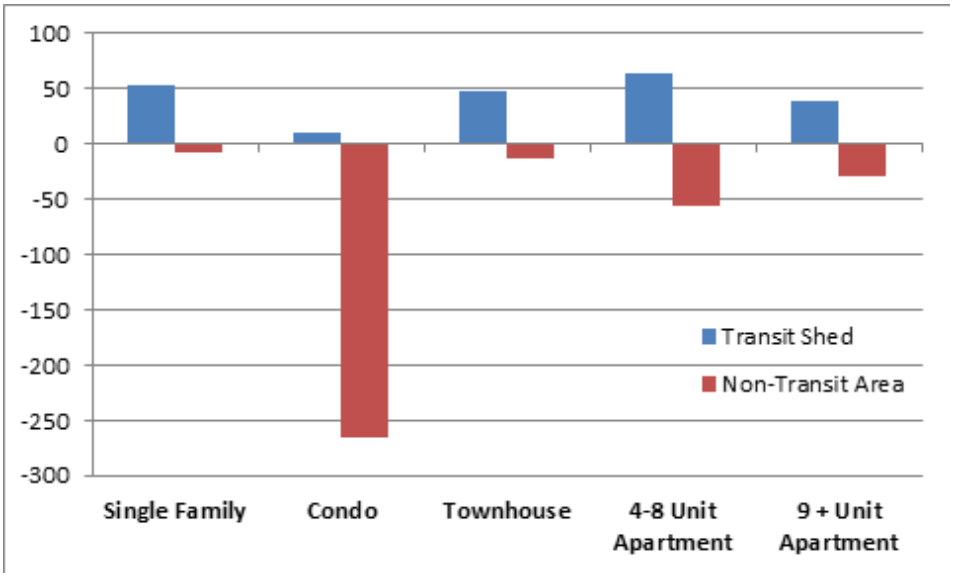
For BRT transit zones, the largest percent change in average residential sales prices relative to the region was at the Washington St at E Berkeley St station (316.6%).

FIGURE 18
Percent change in average residential sales prices relative to the region by BRT transit zone in Boston, 2006-11



Large apartment buildings (with nine or more units) showed the most dramatic increase in value across geographies. Condos were the only other property type that saw an increase in average price in the transit shed and region (see Appendix A). However, the other property types –single family, townhouse, and 4-8 unit apartments- still held their value better in the transit shed than the region or non-transit area (Figure 20).

FIGURE 19
Percent change in average residential sales price relative to the region by property type in Boston, 2006-11



Transportation costs for the typical regional household are significantly lower within the BRT transit shed than the region overall. Households located in the BRT shed have the best access to transit and jobs, and live in the most walkable neighborhoods. The rapid transit shed is also very location efficient. Although the commuter rail shed had higher household transportation costs than the other sheds, it is still more efficient and affordable in terms of household transportation costs than the region overall.

FIGURE 20
Neighborhood characteristics in Boston[28]

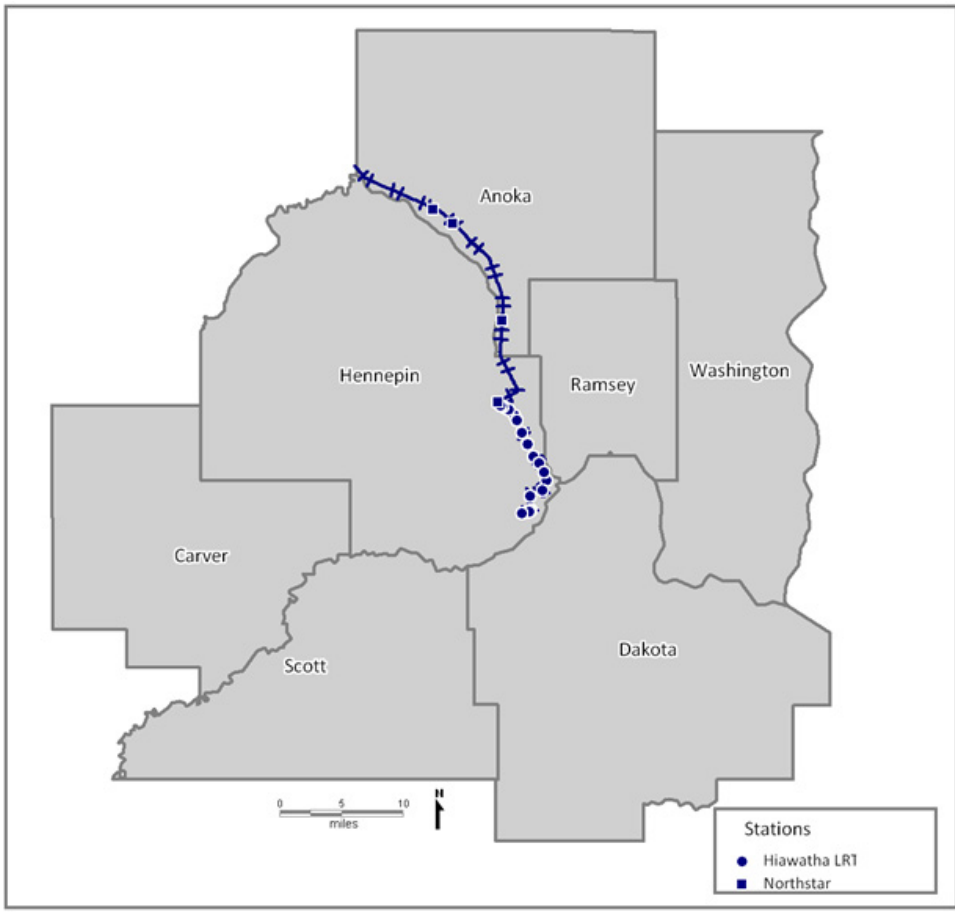
	Commuter Rail Transit Shed	Rapid Transit Shed	BRT Transit Shed	Region
Transit Connectivity Index (Rides per Week)	130,776	258,652	444,556	64,582
Transit Access Shed (Square Kilometers)	843	1,336	2,160	389
Residential Density (Households/Residential Acre)	6.64	13.93	29.01	4.14
Average Block Size (Acres)	8.34	5.13	3.61	24.62
Intersection Density (Intersections/Square Mile)	478	634	859	293
Employment Access Index (Jobs/Square Mile)	101,880	170,334	305,279	57,363
Average Monthly Transportation Costs for the Typical Regional Household	$955	$746	$636	$1,097

28.CNT, 2012.

Minneapolis-St. Paul

Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington are the counties in Minnesota covered by this analysis; the study region is smaller than the Minneapolis-St. Paul-Bloomington MN-WI CBSA. The primary transit provider for the Minneapolis region is Metro Transit, which has two types of fixed-guideway service, the Hiawatha light rail line and the Northstar commuter rail line. The Hiawatha Line opened in June of 2004 and has 19 stations; the Northstar commuter rail opened November 16, 2009 and has 6 stations (4 of which are included in this analysis). In the first quarter of 2012, average weekday ridership on the Hiawatha line was 27,100 and was 2,100 on the Northstar line. Metro Transit's total average weekday ridership was 260,500.[29]

FIGURE 21
Map of Minneapolis-St. Paul study region, Hiawatha LRT, and Northstar commuter rail

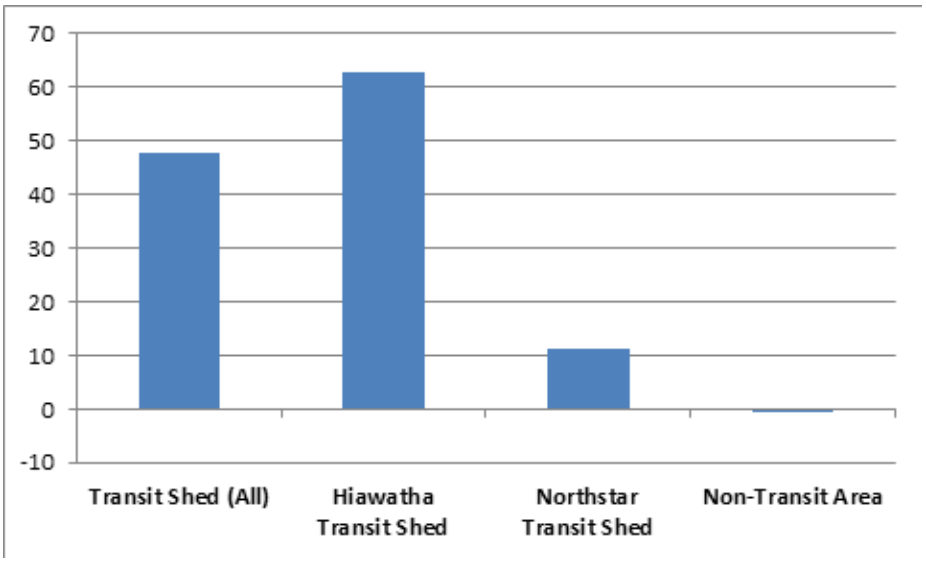


29. APTA, 2012.

Two percent (56,631 people) of the study region's population and 2.2 percent of households (24,887) lived within the transit shed in 2010.[30] While only five percent of the region's population used transit to get to work, 14.5 percent of commuters in the shed used transit, and 28.5 percent used transit, walked, or biked; 8.3 percent of the region's population used active commuter modes. For the Hiawatha transit shed alone, 15.9 percent of workers use transit and 31.3 percent walk, bike, or take transit.[31]

Although average residential sales prices declined across geographies, they fell 47.8 percent less in the transit shed compared to the region (Figure 23). The Hiawatha shed preformed 62.7 percent better than the region, while the Northstar transit shed did 11.2 percent better.

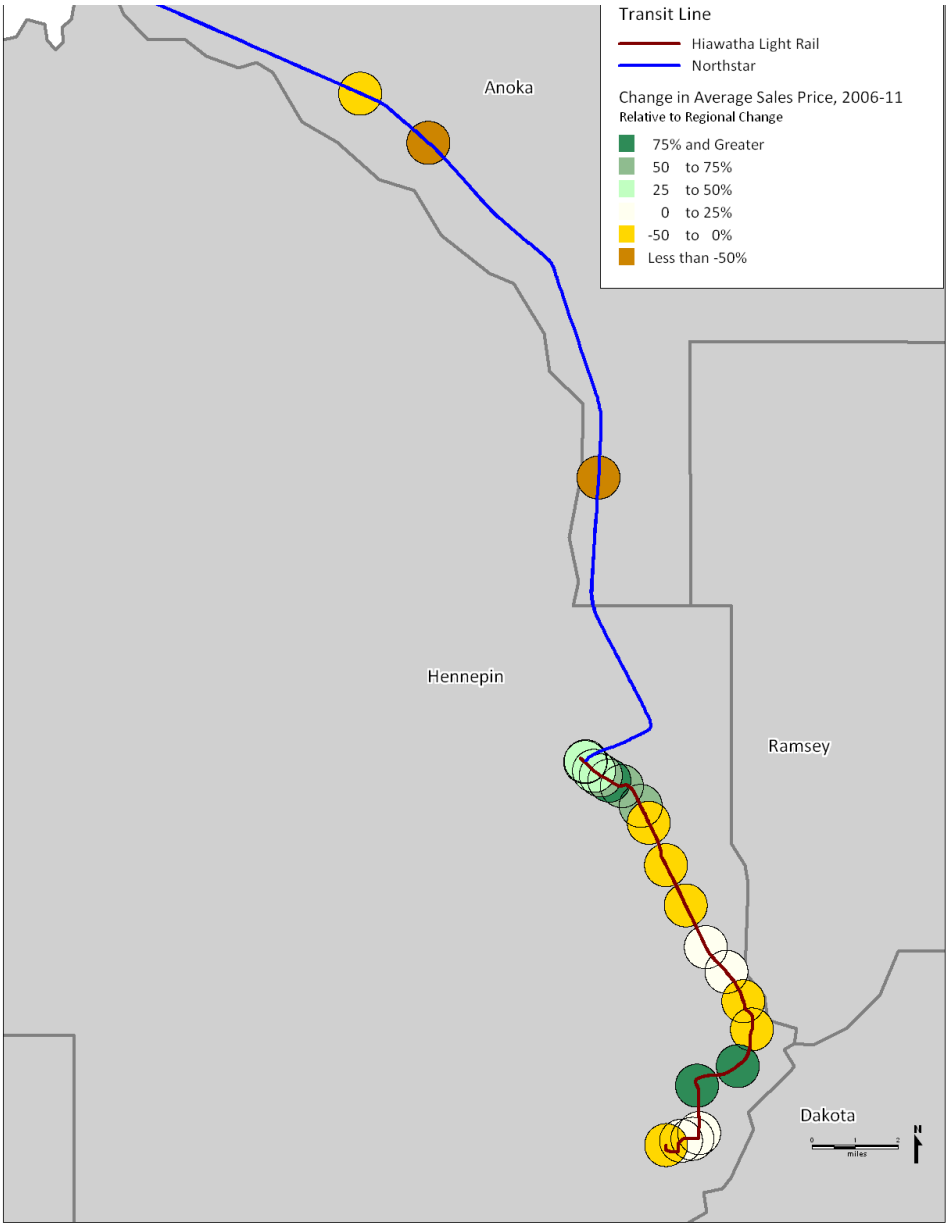
FIGURE 22
Percent change in average residential sales prices relative to the region in Minneapolis-St. Paul, 2006-11



30. 2010 Census
31. 2005-09 American Community Survey

On the Hiawath Line, the Government Plaza station transit zone (76.1%) had the highest percent change in average residential sales prices relative to the region, while on the Northstar Line it was the Target Field station (30.7%).

FIGURE 23
Percent change in average residential sales prices relative to the region by transit zone in Minneapolis-St. Paul, 2006-11



Data was not available to do a breakout by property type in the Minneapolis-St. Paul region.

Transit accessible neighborhoods in Minneapolis-St. Paul are more location efficient than the region as a whole. Neighborhoods with access to light rail were more efficient than those with access to commuter rail, but both types of fixed-guideway transit service helped to provide residents with substantially better transit connectivity and access.

FIGURE 24
Neighborhood characteristics in Minneapolis-St. Paul[32]

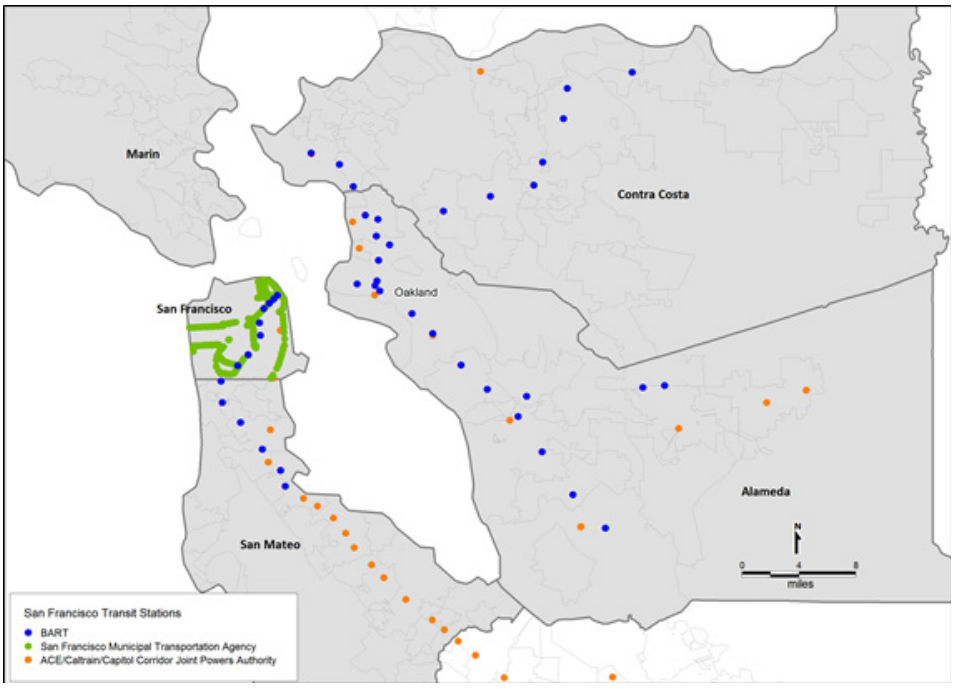
	Hiawatha Transit Shed	Northstar Transit Shed	Region
Transit Connectivity Index (Rides per Week)	128,011	97,204	20,101
Transit Access Shed (Square Kilometers)	1,314	1,104	253
Residential Density (Households/Residential Acre)	9.31	5.03	3.13
Average Block Size (Acres)	6.20	9.49	34.74
Intersection Density (Intersections/Square Mile)	268	211	151
Employment Access Index (Jobs/Square Mile)	132,132	108,354	37,484
Average Monthly Transportation Costs for the Typical Regional Household	$840	$977	$1,164

32. CNT, 2012.

San Francisco

The San Francisco study region covers Alameda, Contra Costa, Marin, San Francisco, and San Mateo counties, the same counties included in the San Francisco-Oakland-Fremont, CA CBSA. There are a number of transit providers in the region and the ones included in the study are: Altamont Commuter Express (ACE), Bay Area Rapid Transit (BART), Caltrain, Capital Corridor, and San Francisco Municipal Transportation Agency (SFMTA). As with the Boston analysis, ferry services are excluded. ACE, Caltrain, and Capital Corridor transit agencies all provide commuter rail service on a single line; respectively, they have 10 stations (4 of which are included in the analysis), 32 stations (16 within the study region), and 17 stations (8 stations included). BART has 44 stations on five heavy rail lines. SFMTA has 7 light rail lines, 3 cable car lines, and a streetcar line with a total of 255 stations. In the first quarter of 2010, ACE had an average weekday ridership of 3,100; Caltrain 42,400; Capital Corridor 5,700; and BART 383,700. SFMTA's total average weekday ridership was 690,100, on the cable cars it was 18,800, and on the light rail lines it was 164,900.[33]

FIGURE 25
Map of San Francisco study region and fixed-guideway transit systems

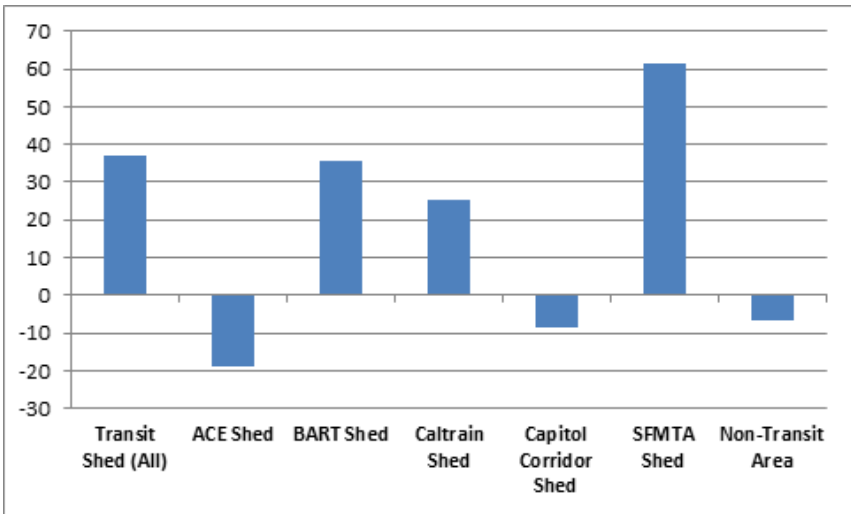


33. APTA, 2012.

Just over 20 percent of the region's population (869,110 people) and 22.8 percent of its households (369,845) lived within a half mile of a station in 2010.[34] The largest percent of people and households live within the SFMTA transit shed, 11.8 percent and 13.8 percent, respectively.[35] In 2009, 27.9 percent of workers residing in the transit shed commuted via transit, compared to 14.5 percent of workers in the region as a whole. Over 40 percent of workers in the shed took transit, walked, or biked; 20.2 percent of the region's commuters used active modes.[36] Within the SFMTA transit shed 33 percent of workers use transit, in the BART shed 29 percent do.[37]

Of the regions in the study, the San Francisco region saw the second largest decline in average residential sales prices between 2006 and 2011 (see Appendix A). However, the transit shed outperformed the region by 37.2 percent (Figure 27). The SFMTA shed performed considerably better than the region (61.6%).

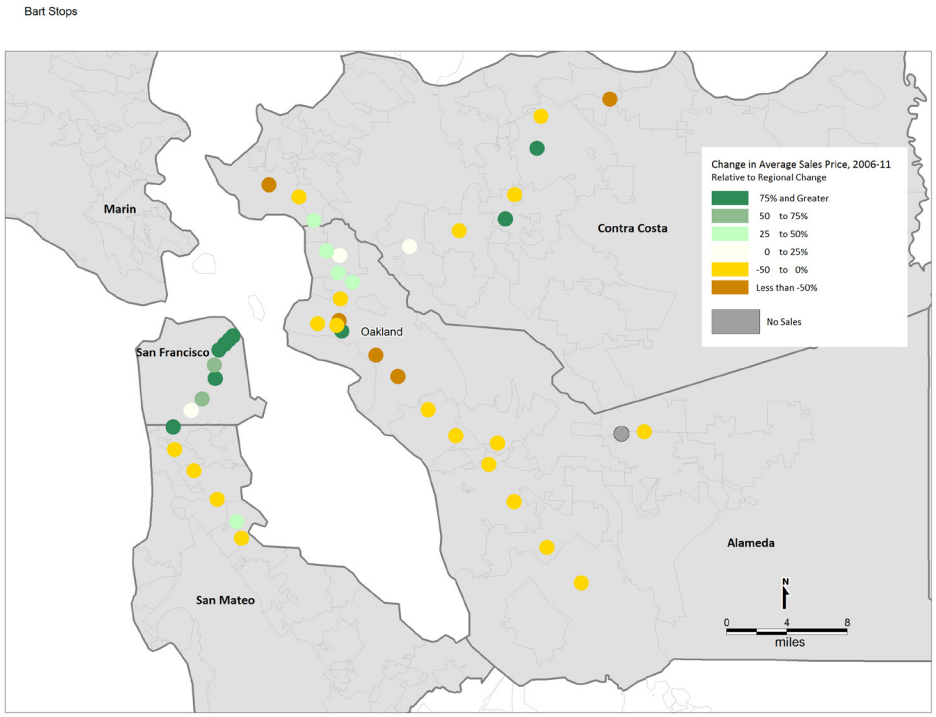
FIGURE 26
Percent change in average residential sales prices relative to the region in San Francisco, 2006-11



Among the BART transit zones, the percent change in average residential sales prices relative to the region was the highest at the Civic Center/UN Plaza Station (217%, Figure 28). Appendix B includes a complete list of the measured change in average sales price for all transit zones.

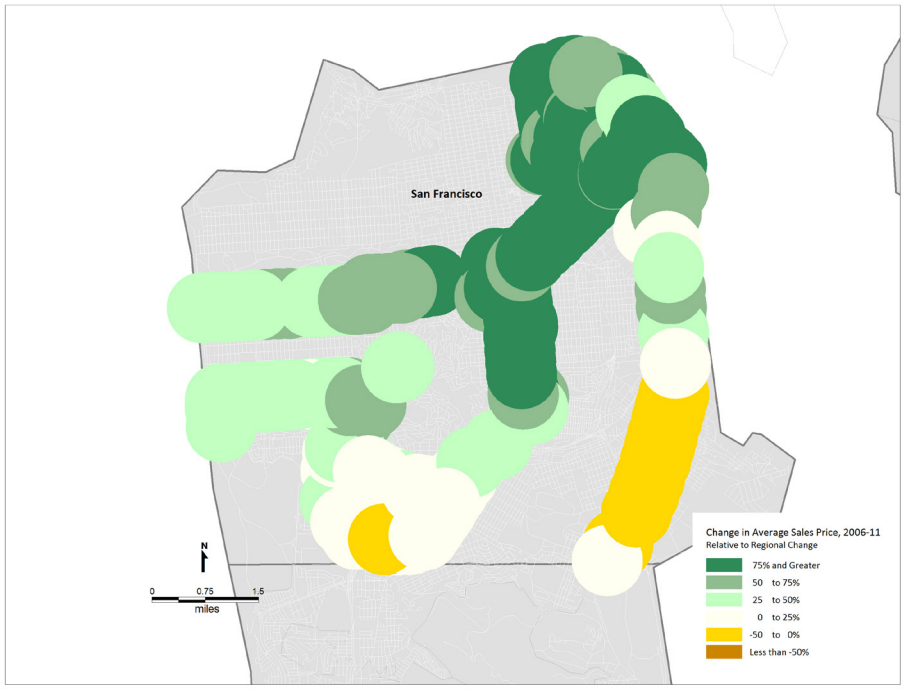
34. Census, 2010.
35. Percent of the region's population and households residing in each of the transit agency sheds: ACE (0.4%, 0.4%), BART (8.6%, 9.8%), Caltrain (2.5%, 2.8%), and Capital Corridor (1.1%, 1.1%).
36. American Community Survey, 2005-09.
37. In the ACE shed 5% of workers is transit, in the Caltrain shed 16%, and in the Capital Corridor shed 18%.

FIGURE 27
Percent change in average residential sales prices relative to the region by BART transit zone in San Francisco, 2006-11



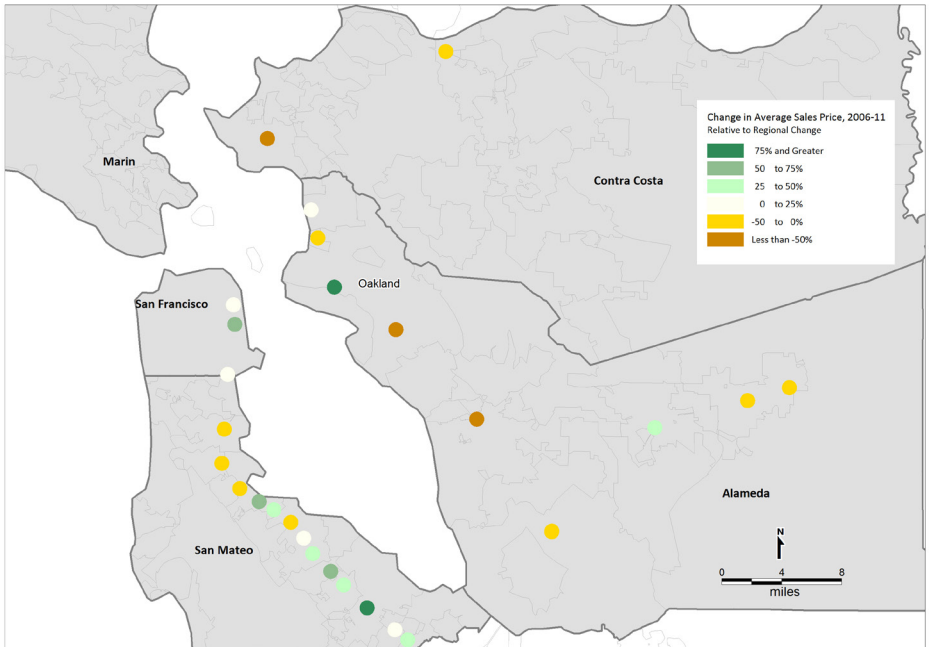
The transit zone surrounding the Market St & Gough St stop on SFMTA's Market & Wharves Line did 287.1 percent better than the region.

FIGURE 28
Percent change in average residential sales prices relative to the region by SFMTA transit zone in San Francisco, 2006-11



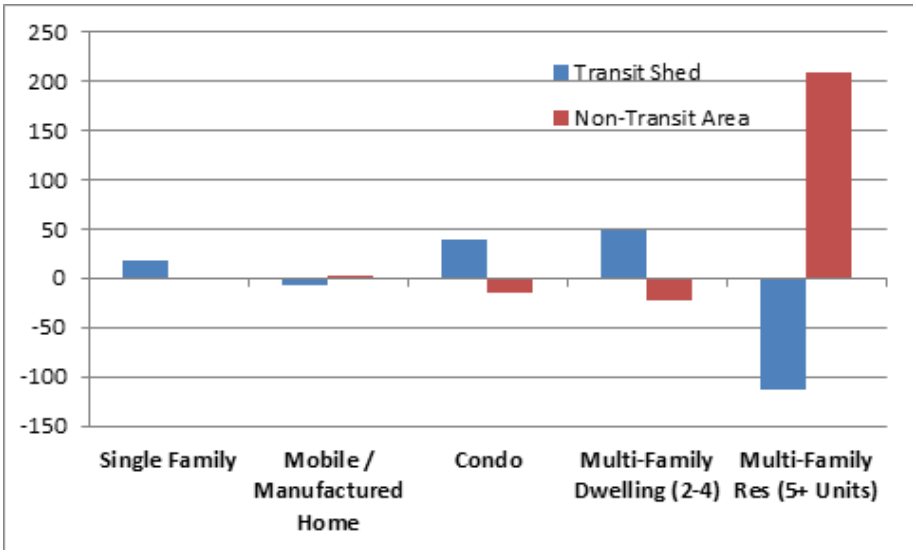
Of the commuter transit zones (ACE, Caltrain, and Capital Corridor), the Jack London Station on the Capital Corridor Line saw the largest increase in average residential sales prices relative to the region at 156 percent.

FIGURE 29
Percent change in average residential sales prices relative to the region by commuter rail transit zone in San Francisco, 2006-11



Not all property types in the San Francisco region performed better in the transit shed. Multi-family residences with five or more units saw a very slight decline in average residential sales prices in the transit shed, but increased in the non-transit area (see Appendix A). Sales prices for single family homes, condos, and smaller multi-family dwellings fell less in the transit shed than in the region; Figure 31 shows the percent change by property type in the transit shed and non-transit area relative to the regional percent change for each property type.

FIGURE 30
Percent change in average residential sales price relative to the region by property type in San Francisco, 2006-11



The SFMTA and BART transit sheds are more location efficient than the commuter rail transit sheds, which likely contributed to the smaller declines in average residential sales prices in these sheds.

FIGURE 31
Neighborhood characteristics in San Francisco

	ACE	BART	Caltrain	Capital Corridor	SFMTA	Region
Transit Connectivity Index (Rides per Week)	4,447	145,989	39,488	24,270	242,233	52,012
Transit Access Shed (Square Kilometers)	112	587	148	363	603	202
Residential Density (Households/Residential Acre)	5.25	11.54	8.25	8.27	18.09	5.36
Average Block Size (Acres)	12.47	5.94	6.64	7.14	4.40	20.42
Intersection Density (Intersections/Square Mile)	312	491	291	341	568	300
Employment Access Index (Jobs/Square Mile)	25,762	128,140	75,714	51,153	172,581	56,933
Average Monthly Transportation Costs for the Typical Regional Household	$1,207	$898	$1,084	$1,087	$746	$1,112

Conclusion

Data from all the regions studied shows that average sales prices for residences in close proximity to fixed-guideway transit were more stable during the recession, supporting the assertion that transit access helped mitigate the effects of the recession on property values. Compact neighborhoods in transit zones with walkable streets, access jobs, and a wide variety of services have high location efficiency, which also contributes positively to property value and reduces household transportation expenses.

Transit type also had an effect on the resilience of property values, which benefited more from transit that was well connected and had a higher frequency of service. Although most commuter rail transit sheds still saw a smaller decline in average residential sales prices than the region as a whole, heavy rail, BRT, and light rail transit sheds outperformed commuter rail transit sheds within and across regions. Heavy rail transit sheds had significantly higher levels of transit access, as measured by the Transit Connectivity Index and the Transit Access Shed, than the commuter rail sheds. Average monthly household transportation costs were also substantially lower in the heavy rail than the commuter rail sheds, indicating that the heavy rail sheds had not only higher levels of transit service, but were more location efficient overall. For most property types, the transit shed outperformed the region; however, unlike with transit type, there were no consistent trends across regions.

In addition to providing consumers and planners with information, the findings support investment in transit and encourage development in location efficient areas. The presence of fixed-guideway transit not only benefits individual property owners, it also supports a more resilient tax base.

Methodology

The study utilized recorder of deeds sales prices from 2006 and 2011 for residential properties in the Boston, Chicago, Minneapolis-St. Paul, Phoenix, and San Francisco regions. Data included sales of single family homes, apartments, condominiums, and townhomes. In Minneapolis-St. Paul, the data only included information on owner-occupied properties. Recorder of deeds data was used in the analysis because it shows actual sales prices, not a self-reported value. The locations of fixed-guideway transit stations, as well as station area characteristics, were pulled from the Center for Transit Oriented Development's (CTOD) National TOD Database.

Data was analyzed at four different geographies: the region, the transit zone, the transit shed, and the non-transit area. Some regions are limited by data availability, but where possible the regions matched the Census-defined Core Based Statistical Area (CBSA). A half mile buffer was created around each fixed-guideway transit station in the five study regions to create the transit zones. Transit sheds, an aggregation of transit zones that eliminates double counting, were constructed for all existing transit stations in the region, by agency, and by type of fixed-guideway transit. The non-transit area consists of the regional geography minus the land area covered by the existing transit half mile shed.

Recorder of deeds sales price data was geocoded for both years. For 2006 and 2011 data the average sales price of properties located within each of the four geographies was calculated. Averages were then determined for all the residential properties together and by property type. The property type classifications differed slightly between regions. Data from 2006 was converted into 2011 dollars to adjust for inflation. The percent change in sales prices from 2006 to 2011 was then evaluated for all the different geographies and property type. Averages across regions and agencies are weighted by the number of stations. Graphs in the body of the report show the percent change relative to the regional percent change as opposed the actual percent change in average residential sales prices; this information is available in Appendix A.

Some supplementary data is drawn from the Center for Neighborhood Technology's (CNT) Housing + Transportation Affordability Index (H+T® Index), including transportation costs modeled for the "typical regional household." The typical regional household is a household earning the area median income, with the average household size for the region, and the average number of commuters per household.

There are a number of areas for further research, including a study of commercial and mixed-use properties to see if transit has comparable effects on sales prices. The current study looked at average sales prices within a given geography, but did

not track repeat-sales to determine how individual properties performed. A study of repeat sales would control for some of the property characteristics that impact sales price. Rental properties were included in this study, but the impact of transit on rent in addition to sales prices could be investigated for both residential and commercial properties.

Data Sources

Boston: Recorder of deeds sales, point level data from The Warren Group

Chicago: Recorder of deeds sales, point level data from Record Information Services

Minneapolis-St. Paul: Recorder of deeds sales, block group level (owner-occupied properties only), from Metropolitan Council

Phoenix: Recorder of deeds sales, point level data from The Information Market

San Francisco: Recorder of deeds sales, point level data from DataQuick

For more information, contact the American Public Transportation Association
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