Transit Station Proximity and Development Outcomes → Lessons for Post-Pandemic Transit and Land Use Planning

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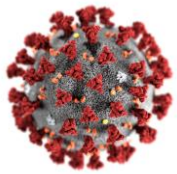
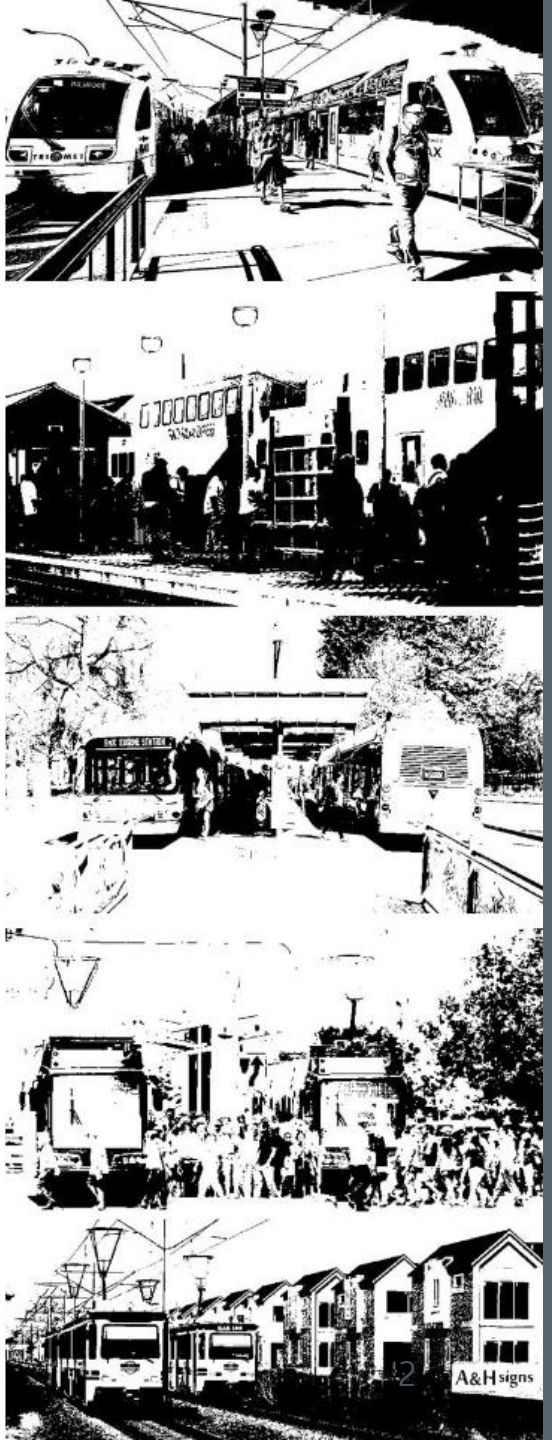
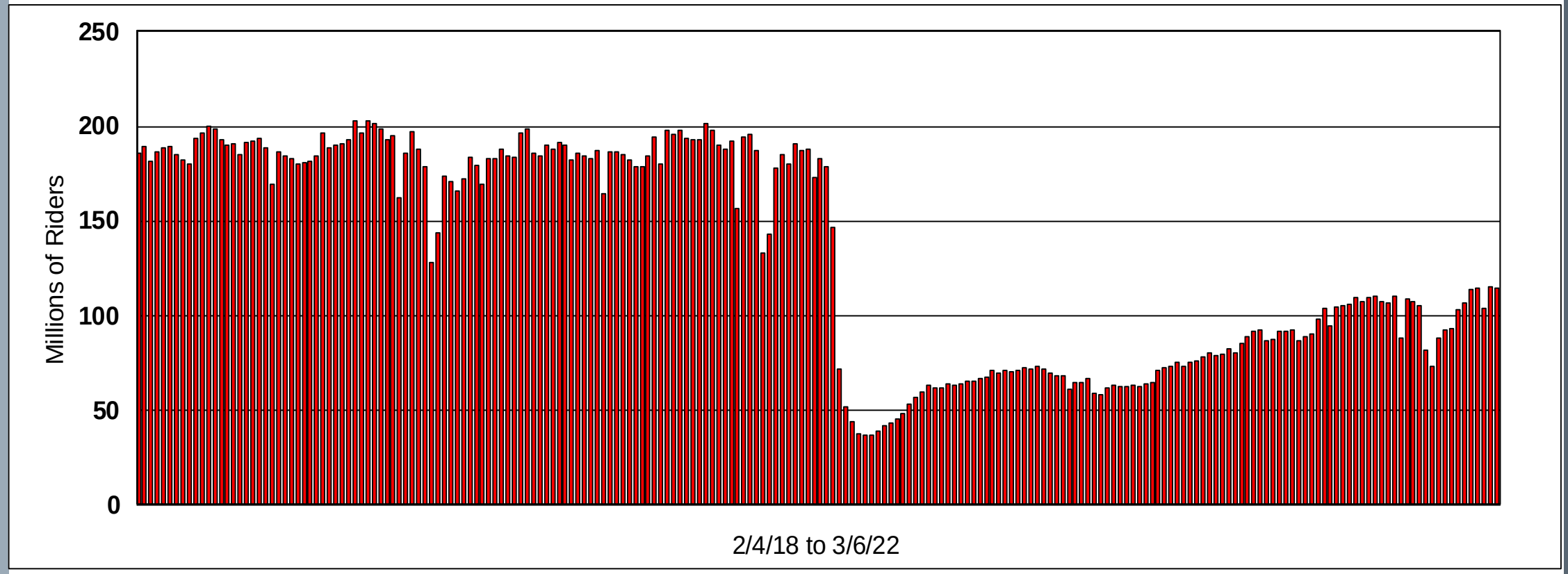
Outline

- Effect of the pandemic on transit
- Analytic framework
- Real estate market theory of transit
- Transit station rental premiums
- People and transit station proximity
- Jobs and transit station proximity
- Upping planning after 

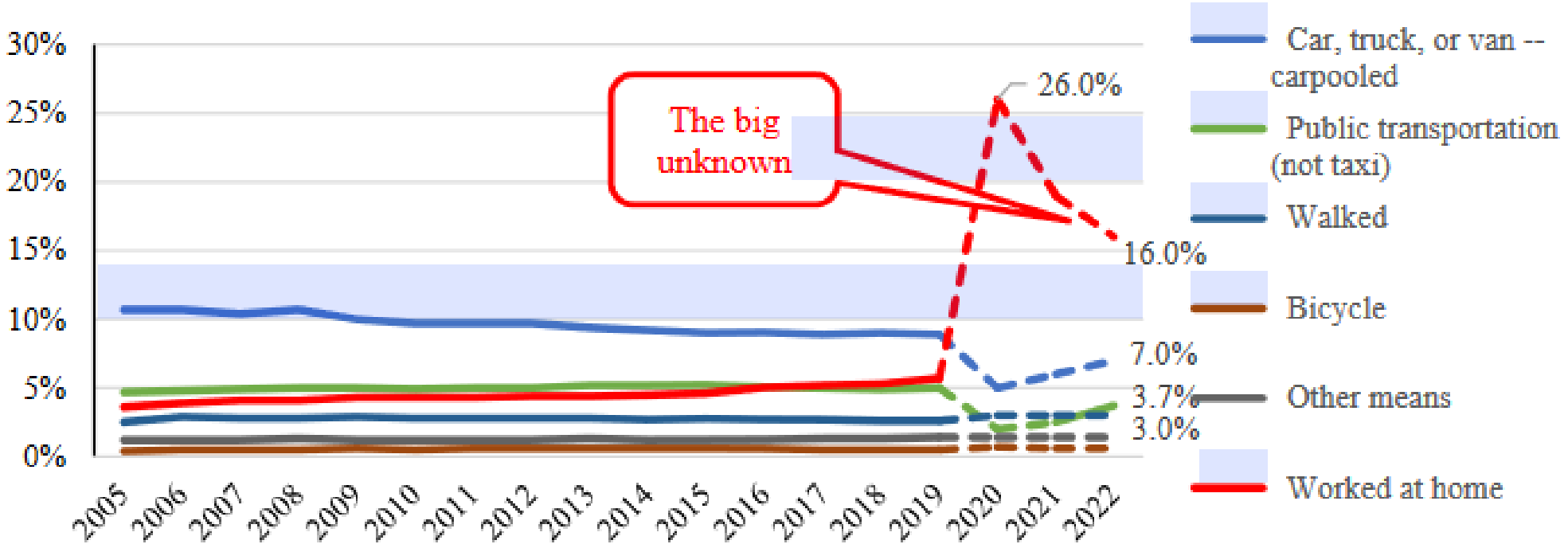


Effect of the Pandemic on Transit Ridership



Data for image from https://transitapp.com/APTA

Pandemic's Effects on Transit → Trending to Pre-Pandemic Levels by Mid-2020s



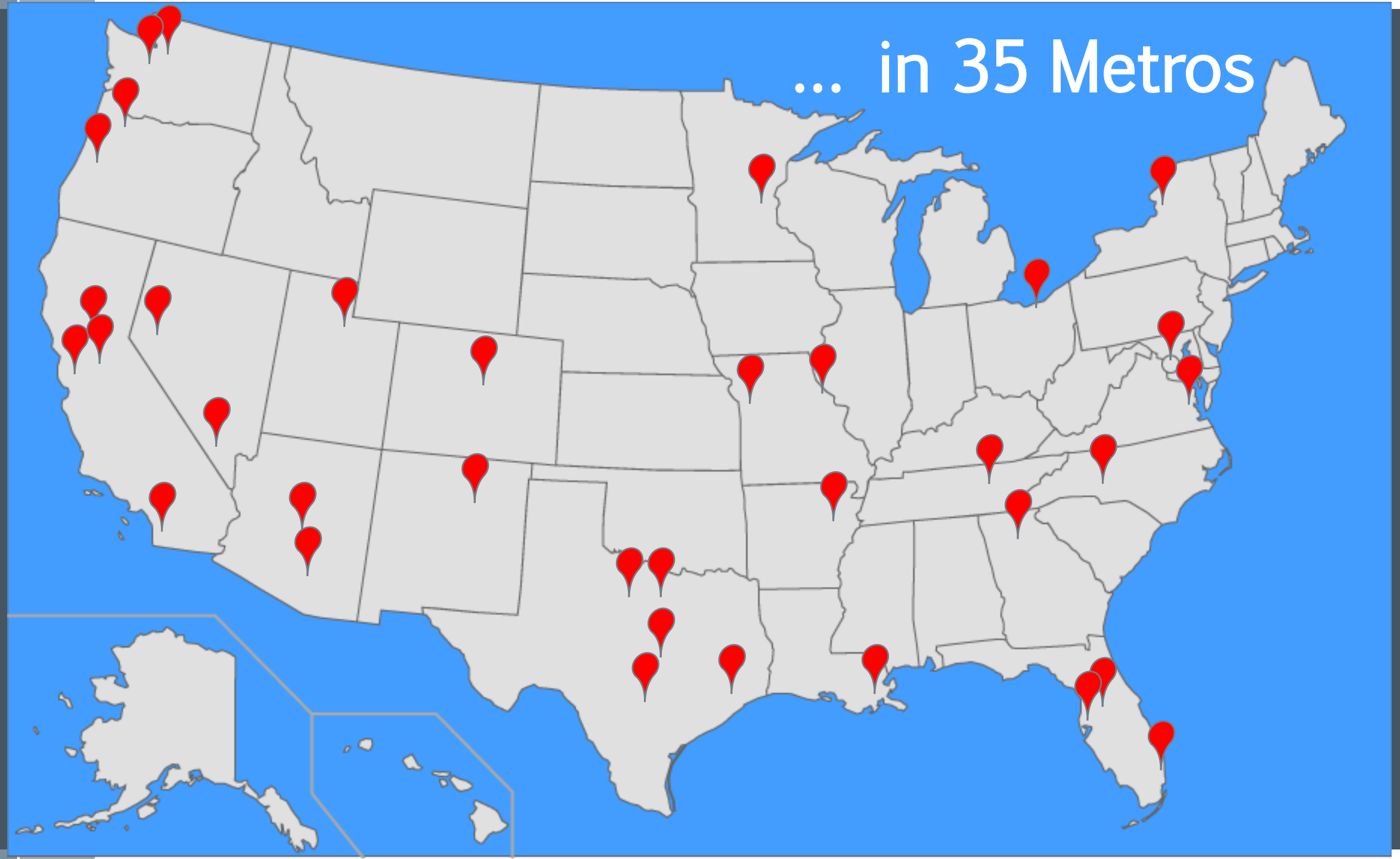
Source: ACS Commute data with post-Covid future scenario

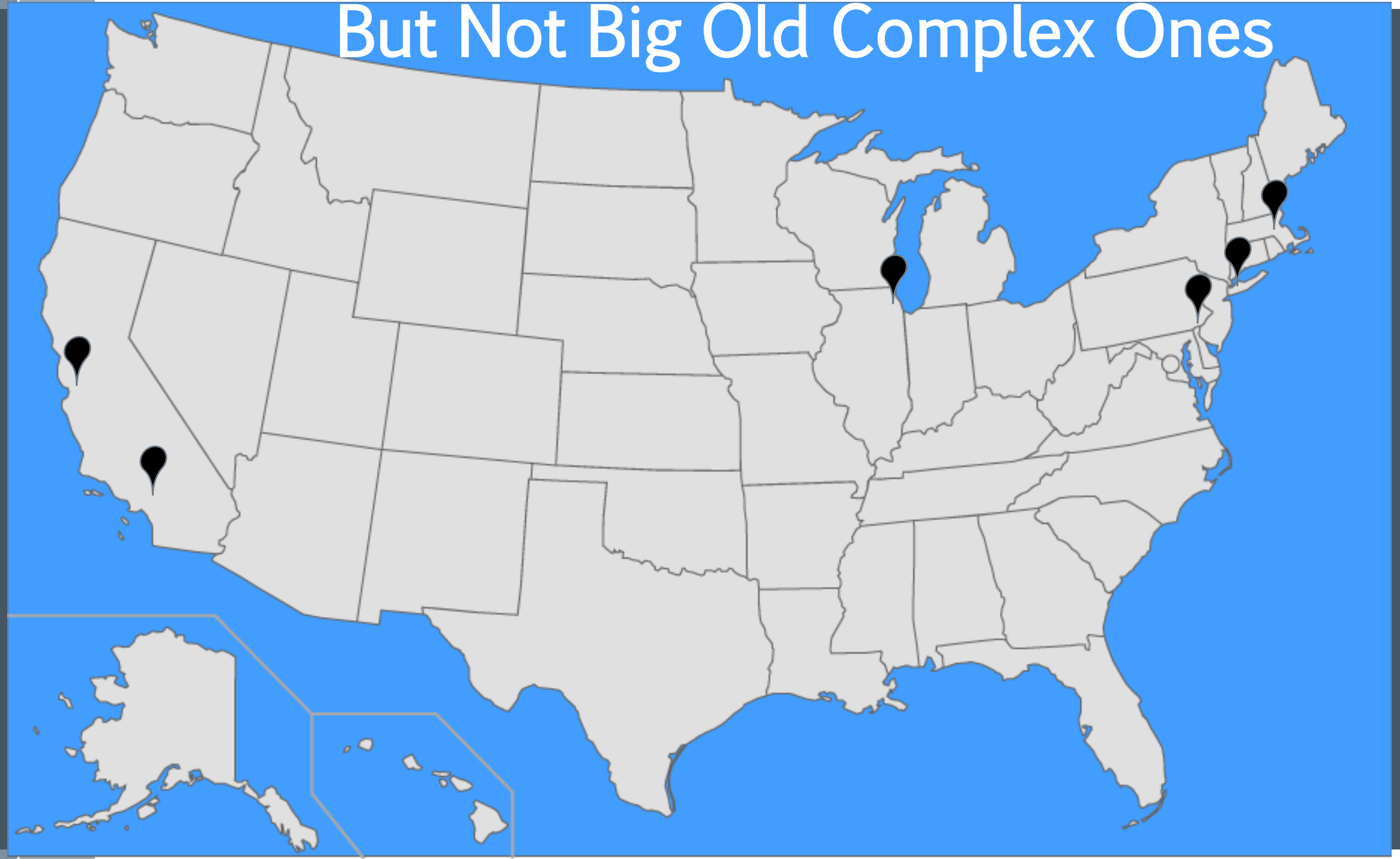
Pre-Pandemic Outcomes to Guide Post-Pandemic Transit and Land Use Planning

- Transit station proximity and real estate rental premiums.
- Attractiveness of transit station proximity to people.
- Attractiveness of transit station proximity to jobs

Research Results of More than 40 Transit Systems …

Light Rail Transit	Year	Bus Rapid Transit	Year	Streetcar Transit	Year
Buffalo	1984	Arlington-Alexandria	2014	Atlanta	2014
Charlotte	2007	Cleveland	2008	Dallas	2015
Cleveland	1980	Eugene-Springfield	2007	Little Rock	2004
Dallas	1996	Kansas City	2005	Portland	2001
Denver	1994	Las Vegas	2004	Salt Lake City	2013
Houston	2004	Nashville	2009	Seattle	2007
Minneapolis-St. Paul	2004	Phoenix	2009	Tacoma	2003
Norfolk	2011	Pittsburgh	1977	Tampa	2002
Phoenix	2008	Reno	2010	Tucson	2014
Pittsburgh	1984	Salt Lake City	2008		
Portland	1986	San Antonio	2012		
Sacramento	1987	San Diego	2014		
Salt Lake City	1999	Seattle	2010		
San Diego	1981	Stockton	2007		
San Jose	1987				
Seattle	2003				
St. Louis	1993				


... in 35 Metros


But Not Big Old Complex Ones

Theoretical Foundations

- Transportation improves access thereby **increasing** economic interaction
- **Agglomeration economies** arise because of synergistic economic outcomes
- Excessive agglomeration = **congestion & diseconomies**→
  New activity goes elsewhere or never happens
- **Transit increases** transportation capacity
- Transit thus **increases agglomeration** economies
- Transit creates **new development** opportunities

How the Real Estate Market Guides Transit Station Planning

The real estate market is the best indicator of the extent to which transit station planning, location, design and other factors are **effective** in influencing land use patterns in desirable ways.

If you don't want transit to influence the market →

put it where the market does not respond to it.

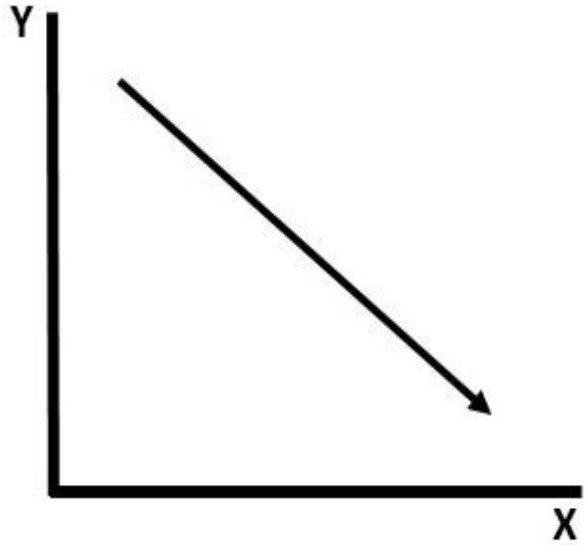
Existing station performance may be **informed** by analysis of real estate rent outcomes and used to improve those stations.

Future station planning can use our research results to **improve** station planning and design to improve future outcomes.

Value-added from transit-induced real estate value can be used to finance initial investments, leverage new systems, and mitigate impacts.

The effect of transit station proximity on real estate rents—*Theory*

Downward Sloping Rent with respect to transit station proximity



This is GOOD because the market values station proximity as an amenity.

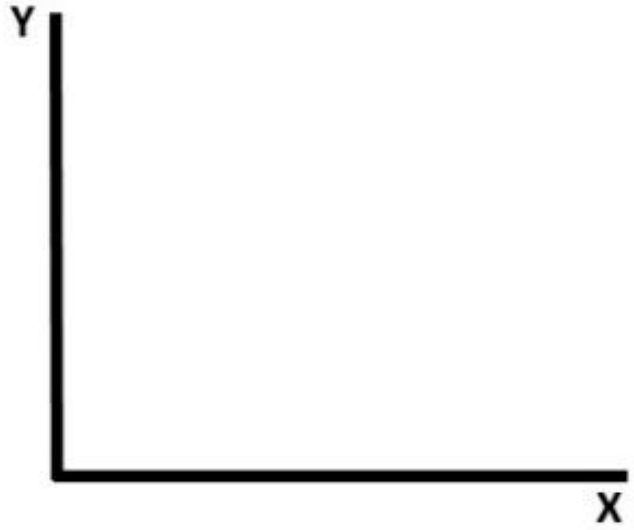
The effect of transit station proximity on real estate rents—*Theory*

Convex Sloping Rent with respect to transit station proximity

This is GOOD because the market values station proximity close to stations as an amenity before station externality effects are revealed.

The effect of transit station proximity on real estate rents—*Theory*

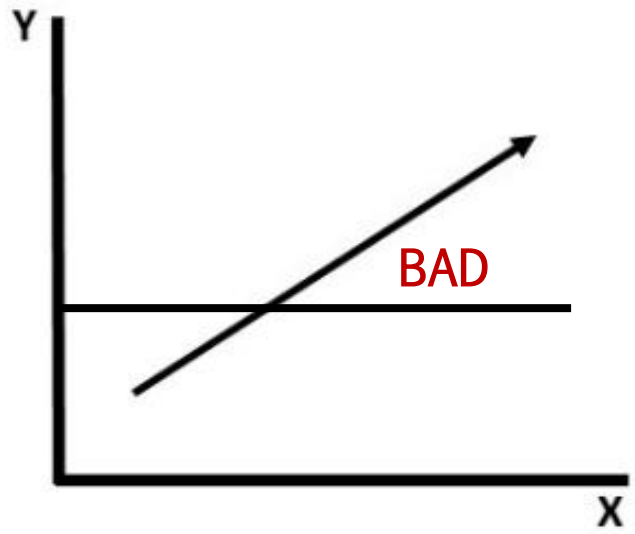
Ambiguous (no) Sloping Rent with respect to transit station proximity

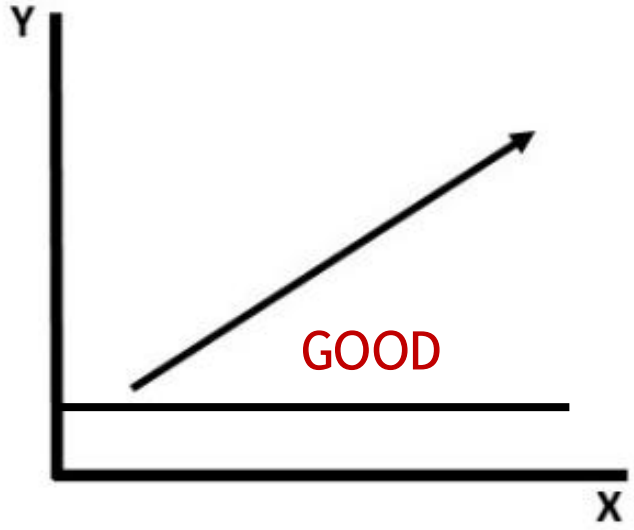


This is BAD because the market does not value station proximity.

The effect of transit station proximity on real estate rents—*Theory*

Upward Sloping Rent with respect to transit station proximity

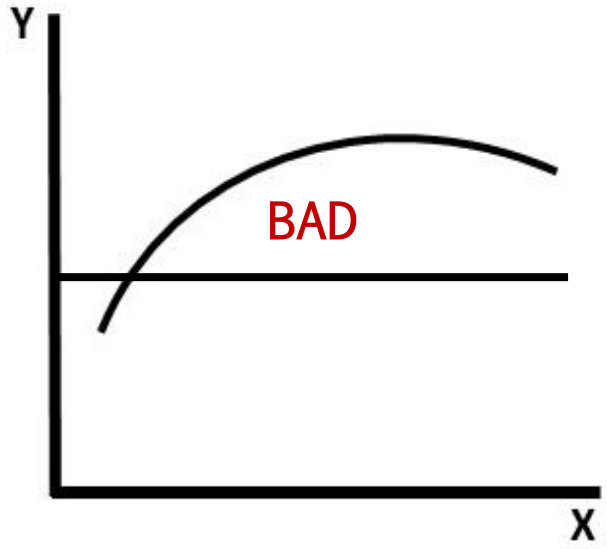


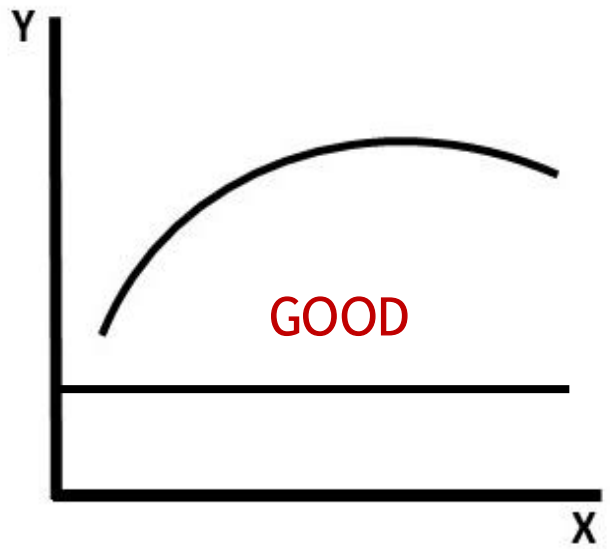


This is BAD if externalities exceed accessibility value near the station but GOOD if accessibility value exceeds externalities.

The effect of transit station proximity on real estate rents—*Theory*

Concave Sloping Rent with respect to transit station proximity



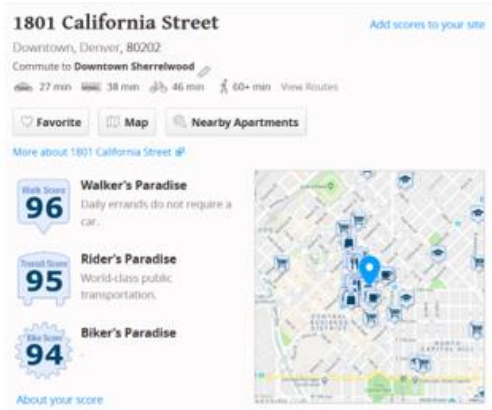


This is BAD if externalities exceed accessibility value near the station but GOOD if accessibility value exceeds externalities.

GOOD Transit Stations

18th & California Station

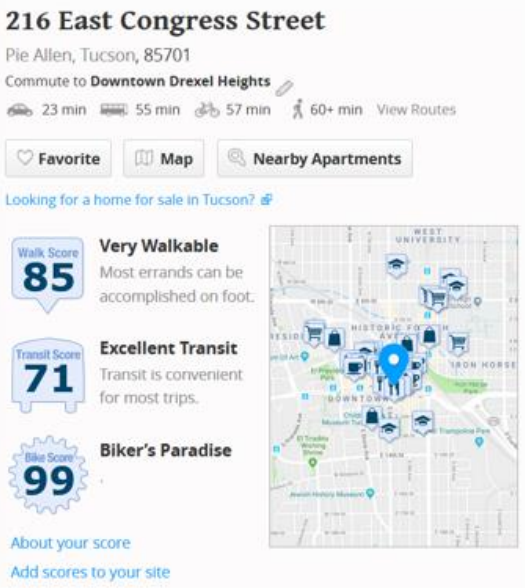
Source: http://subwaynut.com/denver/18_california/index.php



Source: https://www.walkscore.com/score/1801-california-st-denver-co-80202

Serving Denver's Light Rail System, the sister stations along 18th St. at Stout and California are single-tracked running north- and southbound, respectively. These stations are located in the downtown central business district within walking distance.[2]

Source: https://www.google.com/maps/@32.2220167,-110.968457,3a,75y,98.53h,86.99t/data=!3m6!1e1!3m4!1sMIpa230PIqeRJ5DnV6Wohg!2e0!7i13312!8i6656

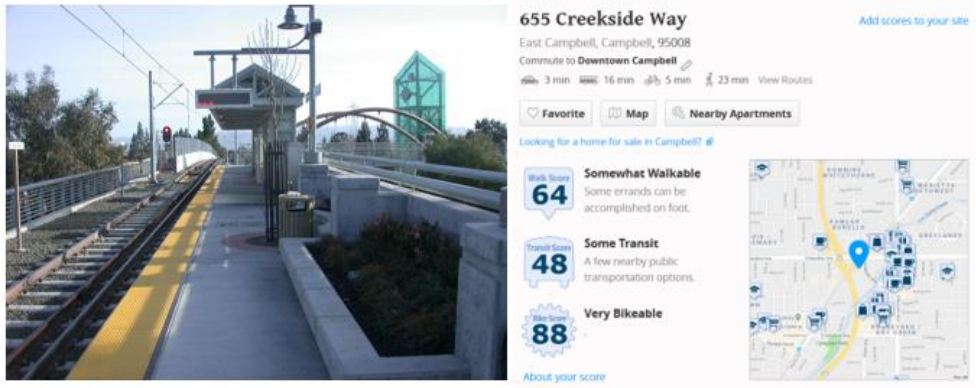


Source: https://www.walkscore.com/score/216-e-congress-st-tucson-az-85701

Located along popular Congress Street in downtown Tucson, the SunLink streetcar brings people from all over Tucson to the downtown area.

BAD Transit Stations

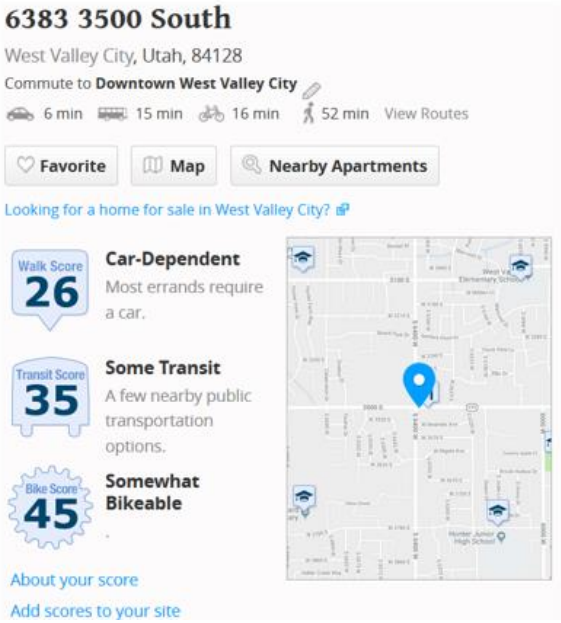
Source: https://en.wikipedia.org/wiki/Hamilton_station_(VTA)#/media/File:HamiltonVTAPlatformLevel030406.JPG



Source: https://www.walkscore.com/score/655-creekside-way-campbell-ca-95008

The Hamilton Station is not only cumbersomely elevated, but it is located at likely the least accessible intersection of all of Silicon Valley

https://www.google.com/maps/@40.6965684,-112.0431371,3a,73.8y,151.68h,85.69t/data=!3m6!1e1!3m4!1spJETljcWQtAZcAUOfGX8vg!2e0!7i13312!8i6656



Source: https://www.walkscore.com/score/6383-3500-s-w-valley-city-ut-84128

The stop at 3500S @ 6261W is not in a retail area and will likely not become a retail destination due to high volumes of single-family homes.

Method

Using these theoretical and research design foundations as a guide and CoStar real estate rent data for 2019 before the pandemic, we develop the following general model for empirical application developed by Nelson:

R*i* = f (S*i*, SES*i*, C*i*,, M*i*, PT*i* ,DB*i*,)

Where:

R is the asking rent per square foot for property *i*;

S is the set of structural attributes of property *i*;

SES is the set of socioeconomic characteristics of the vicinity of property *i*;

C is a set of centrality attributes of property *i* in this case being distance to the nearest freeway/expressway ramps because distance to downtown is included as a dimension leading to the Place Type (**PT**) variable described below;

M is the metropolitan area within which property *i* is located—as metropolitan area conditions and markets vary between them, identifying the location of property *i* within its respective market helps control for metropolitan-specific influences;

PT is the Place Typology based on cluster analysis presented earlier in the report itself based on such factors as measures of urban form of the vicinity of property *i* and distance to +downtown; and

DB is the distance band of property *i* to a transit station

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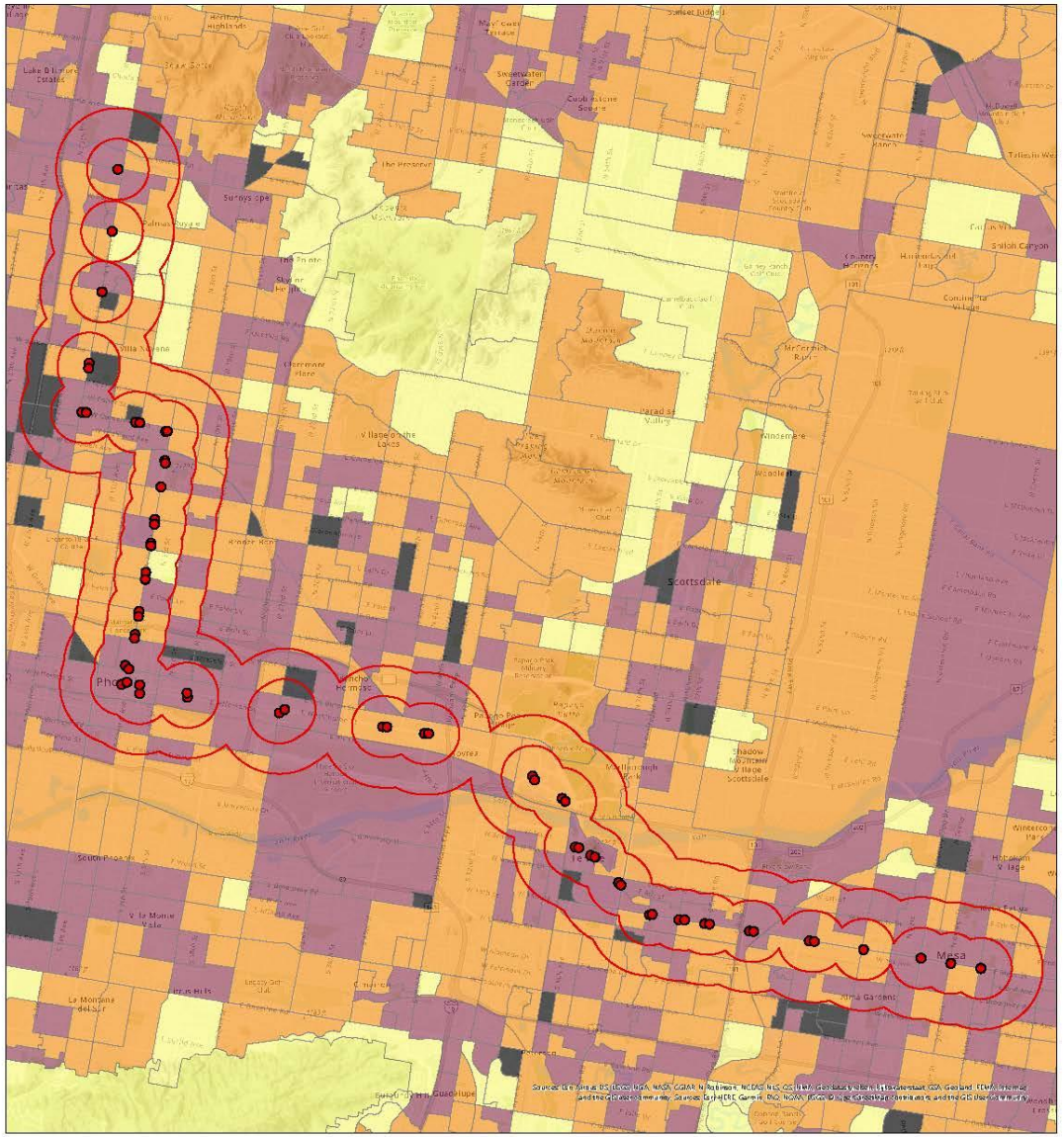
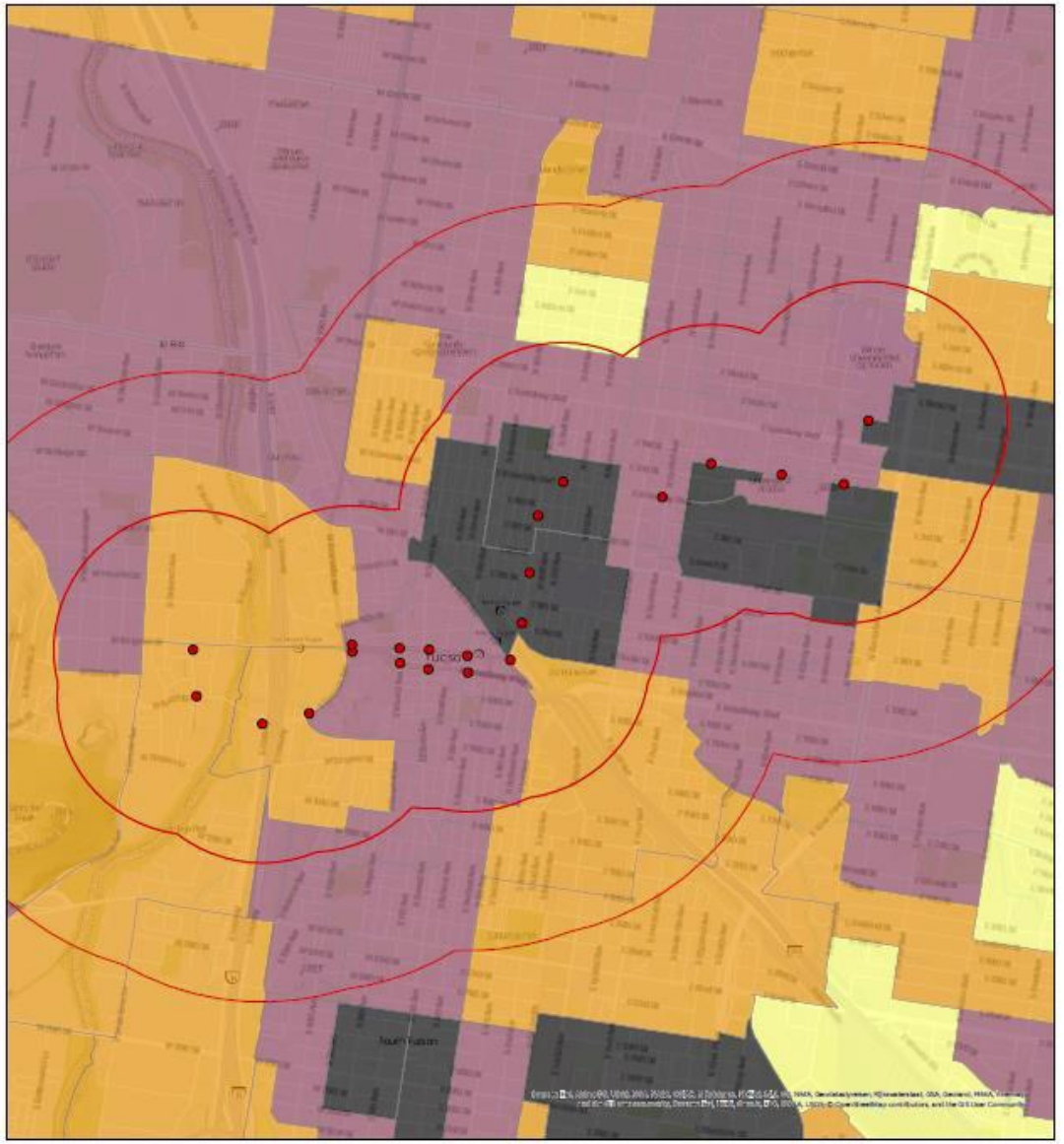


Station Typology for Light Rail Transit:
Phoenix-Mesa-Scottsdale, AZ

Buffers: Half & 1 Mile
LRT Buffers
Station Types
High MA
Mod MA
Low MA
Poor MA

0 0.5 1 2 3 4 Miles



Station Typology for Streetcar Transit:
Tucson, AZ

Buffers: Half & 1 Mile
SCT Buffers
Station Types
High MA
Mod MA
Low MA
Poor MA

0 0.13 0.25 0.5 0.75 1 Miles

Good and Bad Light Rail Transit Outcomes

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Office Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**-1.30%**		**Bad**
Buffalo	11.40%		Good
Charlotte	9.90%	16.20%	Good
Cleveland	9.10%	15.70%	Good
DFW	-5.30%	-9.00%	Bad
Denver	**2.70%**	**2.10%**	**Good**
Houston	12.40%		Good
MSP			Bad
Norfolk	4.40%		Good
Phoenix		**-9.60%**	**Bad**
Pittsburgh	-3.30%	5.00%	Bad
Portland	3.60%	8.30%	Good
Sacramento	2.10%	2.80%	Good
SLC			**Bad**
San Diego	-8.40%	-6.10%	Bad
San Jose	-27.00%	-21.00%	Bad
Seattle	1.90%		Good
St. Louis	-2.70%	8.30%	Bad
Metros		Good	**9**
Metros		Bad	**8**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

Multi-Family Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**7.50%**	**5.00%**	**Good**
Buffalo			Bad
Charlotte	31.40%	39.80%	Good
Cleveland		9.70%	Good
DFW		13.00%	Good
Denver	**-20.60%**		**Bad**
Houston			Bad
MSP		12.40%	Good
Norfolk	36.30%	16.10%	Good
Phoenix			**Bad**
Pittsburgh		-45.60%	Bad
Portland	8.20%		Good
Sacramento			Bad
SLC	**28.10%**	**26.10%**	**Good**
San Diego	18.00%	10.00%	Good
San Jose			Bad
Seattle	11.40%		Good
St. Louis			Bad
Metros		Good	**9**
Metros		Bad	**8**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

Good and Bad Streetcar Transit Outcomes

Office Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**-2.50%**		**Bad**
Atlanta			Bad
Cincinnati	3.30%	11.90%	Good
Dallas	21.50%	22.60%	Good
Kansas City	9.00%		Good
New Orleans	9.90%		Good
Portland	11.00%		Good
SLC	**-8.60%**		**Bad**
Seattle	11.70%	8.10%	Good
Tacoma	-5.40%	7.90%	Bad
Tucson	**10.40%**	**11.60%**	**Good**
Washington	-4.60%		Bad
Metros		Good	**7**
Metros		Bad	**4**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

Multi-Family Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**6.50%**	**18.60%**	**Good**
Atlanta	30.80%		Good
Cincinnati			Bad
Dallas	35.50%	17.80%	Good
Kansas City		14.30%	Good
New Orleans			Bad
Portland	10.50%	16.80%	Good
SLC	**32.20%**	**25.80%**	**Good**
Seattle		23.20%	Good
Tacoma	-57.50%		Bad
Tucson	**25.00%**	**45.10%**	**Good**
Washington			Bad
Metros		Good	**7**
Metros		Bad	**4**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

Good and Bad Bus Rapid Transit Outcomes

Office Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**3.00%**	**16.70%**	**Good**
Albuquerque	**3.00%**		**Good**
Cleveland	2.50%	7.30%	Good
Eugene-Spring.		-19.40%	Bad
Kansas City	12.70%	-7.40%	Good
MSP	-13.20%	-18.20%	Bad
Nashville	-3.10%	-10.50%	Bad
Pittsburgh	4.10%		Good
Reno		7.40%	Good
Salt Lake City	**-7.60%**		**Bad**
San Antonio	5.30%	9.30%	Good
San Diego	-6.20%		Bad
San Jose	19.60%	78.90%	Good
Seattle		3.70%	Good
Arlington-Alex.			Bad
Metros		Good	**8**
Metros		Bad	**6**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

Multi-Family Transit Station Proximity Rent Premium*

Geography	<=100m	>100m to <=200m	Outcome
All Cases	**6.30%**	**5.50%**	**Good**
Albuquerque	**15.80%**	**23.20%**	**Good**
Cleveland	32.70%	15.60%	Good
Eugene-Spring.			Bad
Kansas City	24.80%	18.00%	Good
MSP			Bad
Nashville	14.80%		Good
Pittsburgh			Bad
Reno		-37.70%	Bad
Salt Lake City			**Bad**
San Antonio	13.10%		Good
San Diego		14.50%	Good
San Jose			Bad
Seattle			Bad
Arlington-Alex.			Bad
Metros		Good	**6**
Metros		Bad	**8**

*Only significant coefficients reported. Coefficients mean percent difference from the mean rent holding controls constant.

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Share of Transit Region Household & Job Change within 100- and 200-meters of Light Rail Transit Stations 2013-2019.

Geography	Distance	Households	Jobs
All Metros	**100 meters**	**10%**	**16%**
	200 meters	**2%**	**2%**
Buffalo	100 meters	0%	100%
	200 meters	0%	7%
Charlotte	100 meters	6%	17%
	200 meters	3%	6%
Cleveland	100 meters	25%	13%
	200 meters	4%	19%
DFW	100 meters	8%	15%
	200 meters	1%	0%
Denver	**100 meters**	**11%**	**20%**
	200 meters	**3%**	**6%**
Houston	100 meters	3%	2%
	200 meters	0%	0%
MSP	100 meters	16%	19%
	200 meters	2%	0%
Norfolk	100 meters	42%	0%
	200 meters	2%	0%
Phoenix	**100 meters**	**3%**	**9%**
	200 meters	**1%**	**0%**
Pittsburgh	100 meters	5%	11%
	200 meters	1%	0%
Portland	100 meters	20%	36%
	200 meters	5%	6%
Sacramento	100 meters	15%	18%
	200 meters	6%	0%
Salt Lake City	**100 meters**	**28%**	**30%**
	200 meters	**9%**	**0%**
San Diego	100 meters	15%	21%
	200 meters	2%	2%
San Jose	100 meters	52%	31%
	200 meters	0%	2%
Seattle	100 meters	4%	5%
	200 meters	4%	7%
St. Louis	100 meters	25%	0%
	200 meters	3%	7%

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Share of Transit Region Household & Job Change within 100- and 200-meters of Streetcar Stations. 2013-2019

Geography	Distance	Households	Jobs
All Streetcars	**100 meters**	**7%**	**12%**
	200 meters	**1%**	**1%**
Atlanta	100 meters	0%	2%
	200 meters	0%	0%
Cincinnati	100 meters	8%	28%
	200 meters	4%	-3%
Dallas	100 meters	8%	10%
	200 meters	0%	-0%
Kansas City	100 meters	14%	4%
	200 meters	0%	0%
New Orleans	100 meters	-47%	54%
	200 meters	3%	-4%
Portland	100 meters	28%	29%
	200 meters	0%	0%
Salt Lake City	**100 meters**	**2%**	**0%**
	200 meters	**0%**	**0%**
Seattle	100 meters	1%	2%
	200 meters	0%	2%
Tacoma	100 meters	1%	15%
	200 meters	0%	0%
Tampa	100 meters	2%	7%
	200 meters	0%	0%
Tucson	**100 meters**	**2%**	**0%**
	200 meters	**0%**	**-4%**
Washington	100 meters	125%	323%
	200 meters	15%	28%

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Share of Transit Region Household & Job Change within 100- and 200-meters of Bus Rapid Transit Stations 2013-2019.

Geography	Distance	Households	Jobs
All BRT Systems	**100 meters**	**14%**	**20%**
	200 meters	**2%**	**1%**
Albuquerque	**100 meters**	**18%**	**16%**
	200 meters	**3%**	**-2%**
Alex.-Arlington	100 meters	30%	54%
	200 meters	3%	-1%
Cleveland	100 meters	27%	-161%
	200 meters	-1%	-49%
Eugene-Spring.	100 meters	17%	8%
	200 meters	-0%	0%
Kansas City	100 meters	27%	25%
	200 meters	0%	-0%
Nashville	100 meters	29%	38%
	200 meters	4%	11%
Pittsburgh	100 meters	29%	-58%
	200 meters	3%	6%
Reno	**100 meters**	**7%**	**12%**
	200 meters	**-0%**	**1%**
Salt Lake City	**100 meters**	**3%**	**5%**
	200 meters	**0%**	**-0%**
San Antonio	100 meters	13%	36%
	200 meters	-1%	-0%
San Diego	100 meters	12%	29%
	200 meters	0%	0%
San Jose	100 meters	6%	22%
	200 meters	2%	8%
Seattle	100 meters	28%	8%
	200 meters	6%	-1%
Snohomish	100 meters	9%	-0%
	200 meters	2%	-0%
Stockton	100 meters	20%	18%
	200 meters	2%	2%

Gobsmacked

Mode	1st 100-meter Urban Land Area, km^2	1st 100-meter Share of Transit Region Urban Area	Share of Transit Region Household Growth	Share of Transit Region Job Growth
Light Rail Transit	58.0	0.2%	10%	16%
Bus Rapid Transit	116.0	1.0%	14%	20%
Streetcar Transit	22.0	0.2%	7%	12%

What About the Rest of the Half Mile Circle?

Jobs and people **locate very near transit stations**. With these redevelopment opportunities →

- Surface **parking lots**,
- Vast **vacant**, privately owned land, and
- Land on which there are **one- and two-floor structures being more than 30 years old** and occupying less than 25% of the land area.

What is needed to unlock them?

- Undo development regulations that are inconsistent with **market realities**;
- Fix **unpredictable or protracted** development approval processes;
- Remove **excessive** parking requirements;
- Development **exactions that exceed mitigation** needs;
- Engage **neighborhoods meaningfully**;
- Redesign **inefficient linkages** between development and transit stations (such as multi-lane highways, long blocks, and elevated station platforms among others); and
- Pursue **sensitive urban design** that makes transit station accessibility physically and even emotionally unpleasant.

Doing so within the half-mile circle could **meet all new development needs** to mid-century and beyond in most metros.

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THANK YOU!