

# **Get Over, and Beyond, the Half-Mile Circle (for Some Transit Options)**

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# Themes

Lessons from Catchment Area Analysis

Get Over, and Beyond, the Half-Mile Circle

- Surprising residential market responsiveness → **Light Rail**
- Even more surprising office market responsiveness → **Light Rail**

Bus Rapid Transit and Economic Development

The Forgotten Mode: Commuter Rail Transit

A Streetcar with Desires

Implications: **Choice of Transit Matters**

The Dream Team

# Catchment Area Analysis

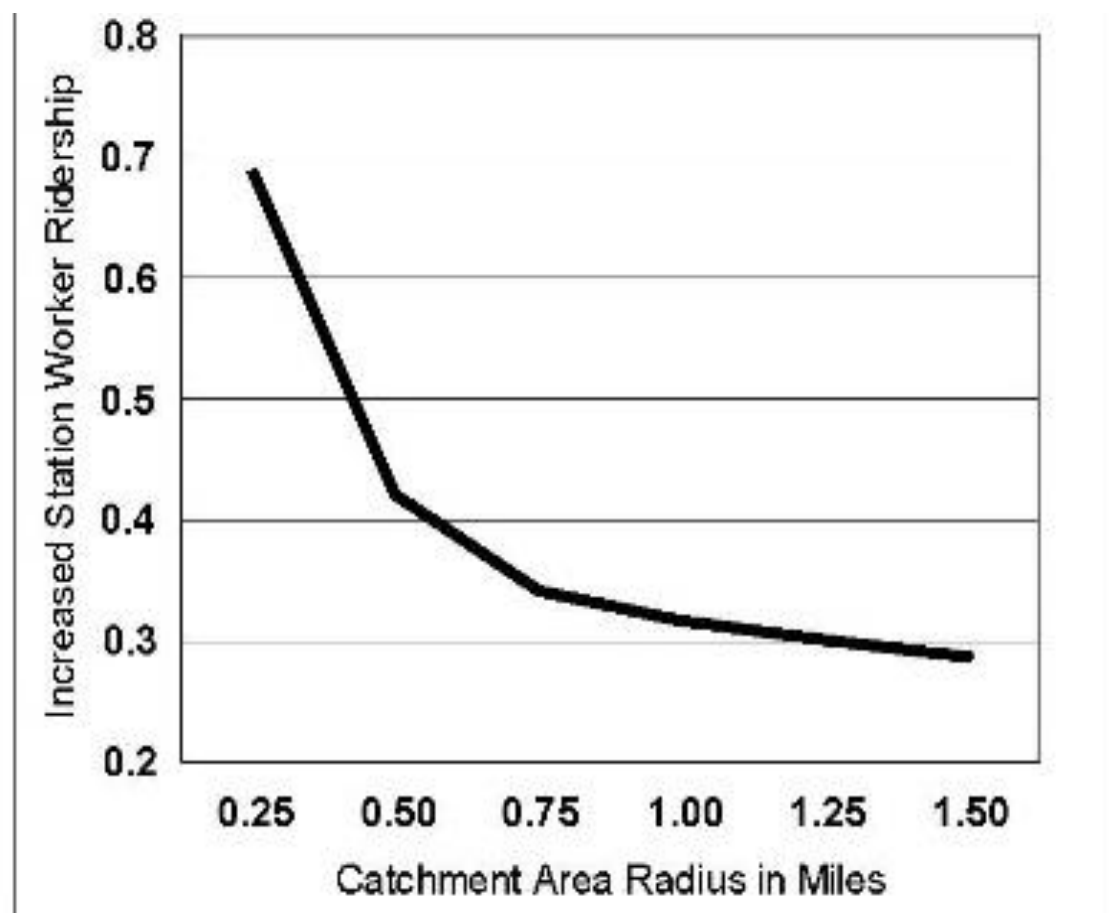
Guerra, Cervero and Tischler (2012) explored the variation in catchment areas for residents and workers. Considering only workers, they find probably of using transit increases with each successive  $\frac{1}{4}$ -mile increase to the station →

First 0.25 mile an increase of 69%

Next 0.25 mile an increase of 42%

Next 0.25 mile an increase of 19%

The job-related catchment areas for transit ridership may extend from about 1.0 to as much as 2.0 miles from stations for commercial land uses. Does the market reflect this in terms of values and rents?



**Figure 1**

Expected marginal increase to station ridership resulting from 1-unit increase in workers or population in bands of 0.25-to-1.5-mile catchment areas

Source: Adapted from Guerra, Cervero and Tischler

# Theory

**Transportation improvements improve economic exchange**

**Efficiency gains in economic exchange are capitalized by the land market**

**To the extent transit rail improves economic exchange, efficiencies will be capitalized**



# Get Over, and Beyond, the Half-Mile Circle

*First* there was the **1/4-mile walk** based only on the 10-minute “walk-in-the-park”

*Then* there was the **1/2-mile circle** based on the 10-minute “business walk” with scant empirical evidence

*Now*, based on NITC research, we need to **rewrite the TOD planning book** based on the evidence *for some transit options*

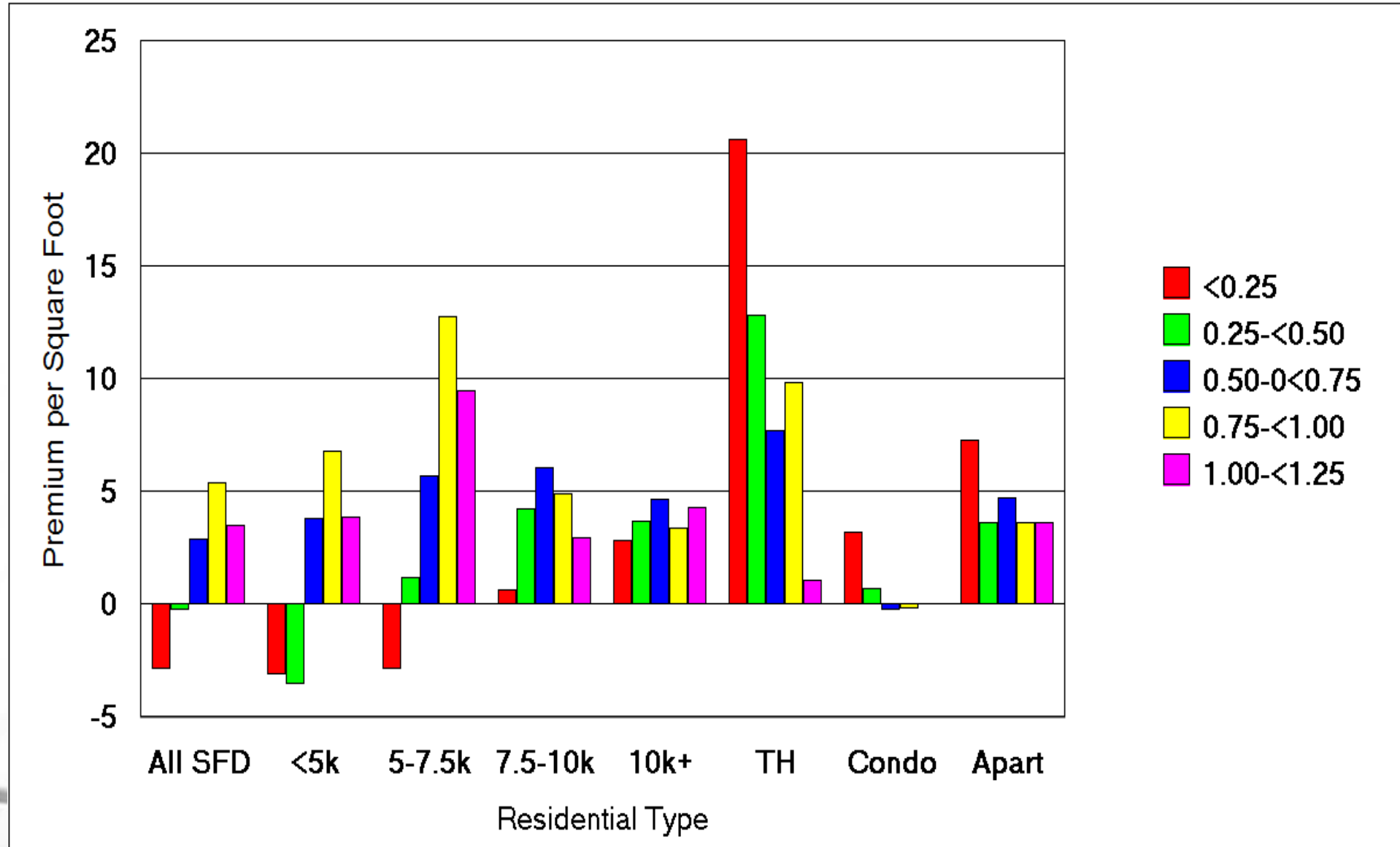
# Hedonic Studies of Market Responsiveness to Light Rail Transit Station Location

## Residential

- Apartments (published)
- Townhouses
- Condominiums
- Single Family detached
- Single Family detached by lot-size categories

## Office

# Residential Premium/Sq.Ft. with respect to 1/4-mile bands, Salt Lake County

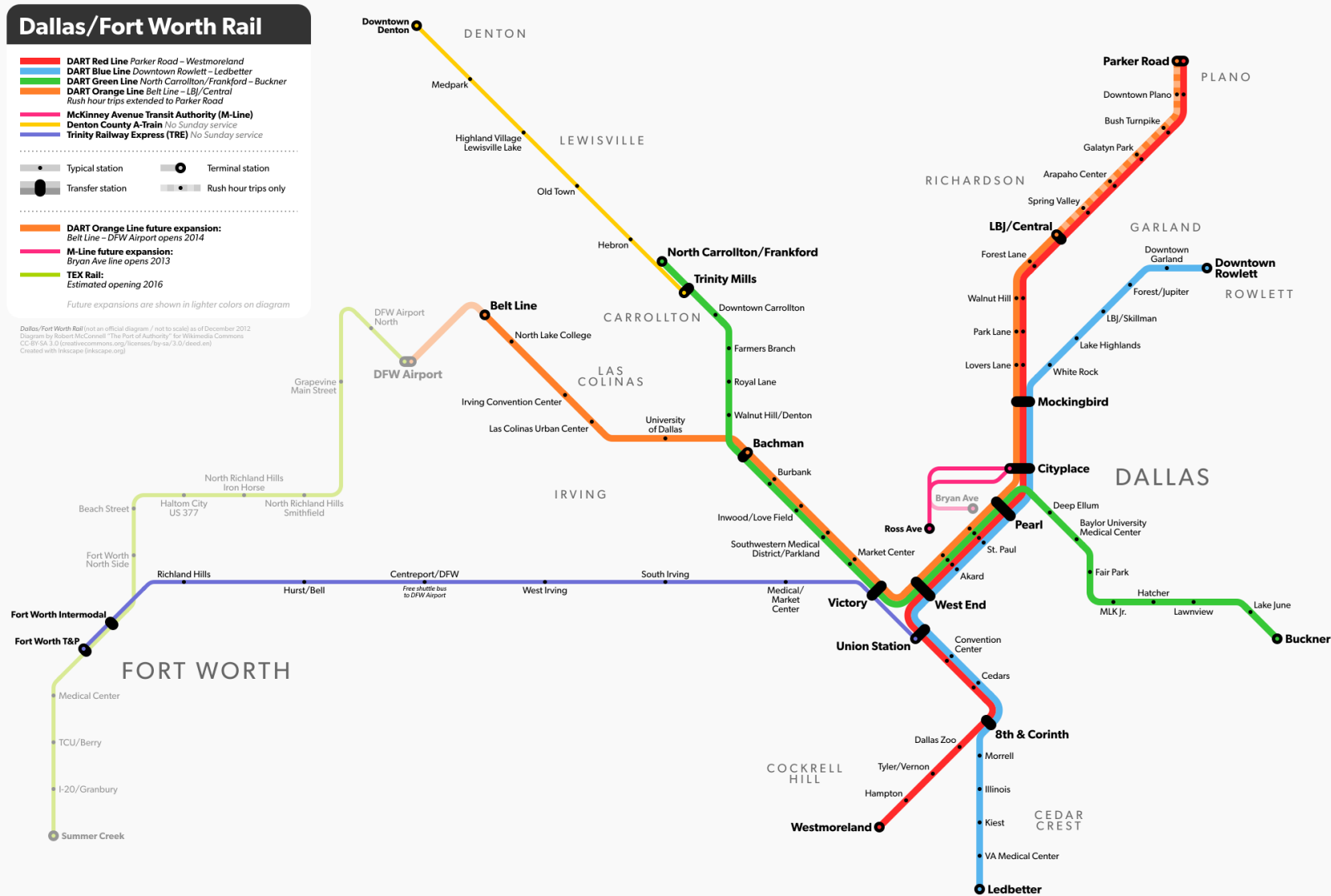




# Office Rents and Light Rail Station Distance

**Does light rail transit confer an office rent premium with respect to transit station proximity all other factors considered?**

# Study Area—Dallas Light Rail Transit



# Model

$$R_i = f(B_i + S_i + C_i + L_i)$$

where:

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

**B** is the set of building attributes of property  $i$ ;

**S** is the set of socioeconomic characteristics of the vicinity of property  $i$  in this case the host census block group of each observation;

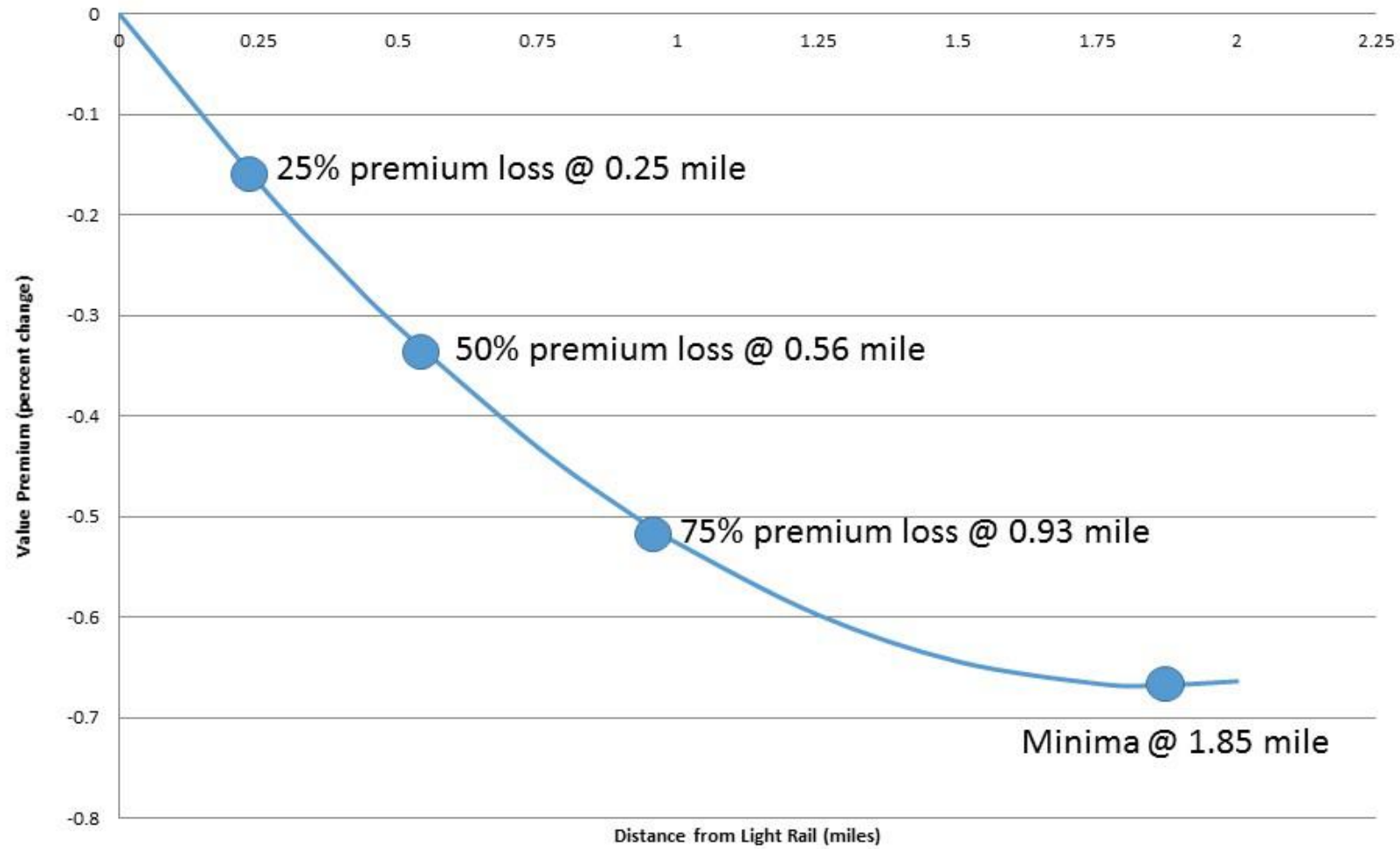
**C** is a composite measure of urban form of the vicinity of property  $i$  in this case the host census tract of each observation; and

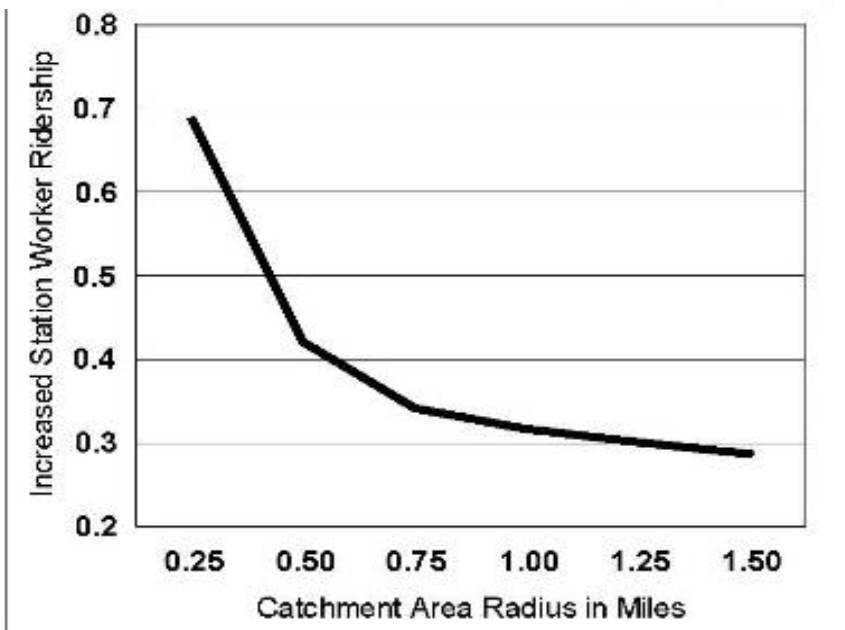
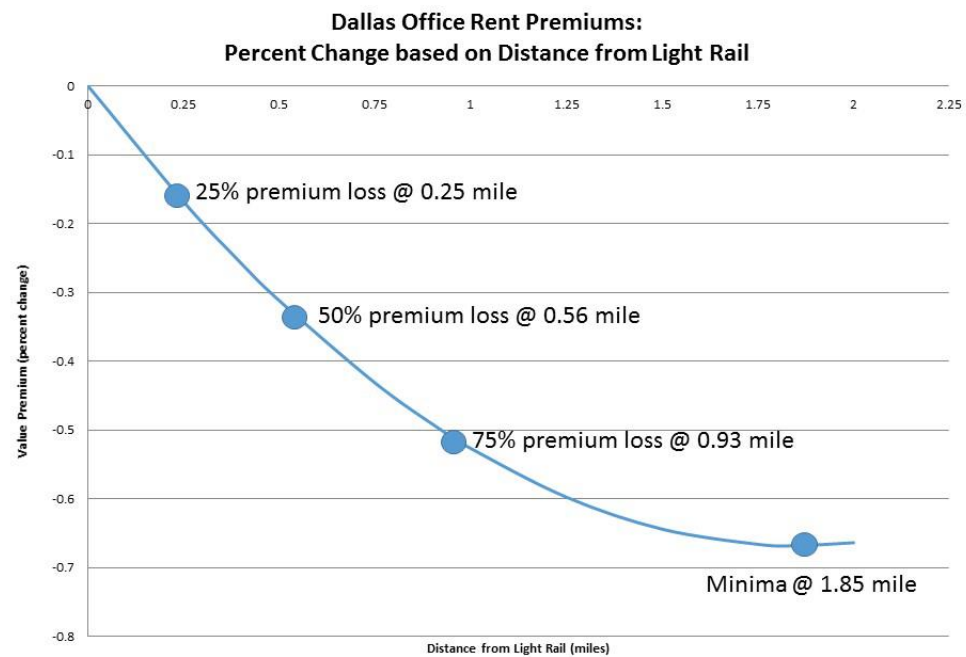
**L** is a set of location attributes of property  $i$ .

Variable	Coefficient	Std Error	t-score	p
Constant	-56.137	18.623	-3.014	0.01
Class A	7.329	0.528	13.869	0.01
Class B	2.418	0.405	5.969	0.01
Gross Leasable Square Feet	0.000	0.000	1.420	0.10
Floor Area Ratio	-0.333	0.079	-4.237	0.01
Stories	-0.018	0.041	-0.431	
Vacancy Rate	-0.024	0.005	-4.674	0.01
Effective Year Built	0.035	0.009	3.689	0.01
Median Household Tract Income	0.046	0.005	9.767	0.01
Percent Not White Non-Hispanic	0.000	0.010	-0.025	
Compactness Index	1.095	0.366	2.995	0.01
Distance from CBD, miles	-0.291	0.043	-6.777	0.01
Distance from Interchange, miles	-0.133	0.633	-0.211	
Square Distance from Interchange, miles	0.322	0.264	1.221	
<b>Distance Nearest LRT Station</b>	<b>-0.722</b>	<b>0.400</b>	<b>-1.803</b>	<b>0.05</b>
<b>Squared Distance Nearest LRT Station</b>	<b>0.195</b>	<b>0.084</b>	<b>2.324</b>	<b>0.01</b>
R Square	0.542			
Adjusted R Square	0.533			
Std. Error of the Estimate	3.526			
F	62.779			
Sig. F	0.000			
Observations	811			
Degrees of Freedom	796			

## RESULTS

### Dallas Office Rent Premiums: Percent Change based on Distance from Light Rail



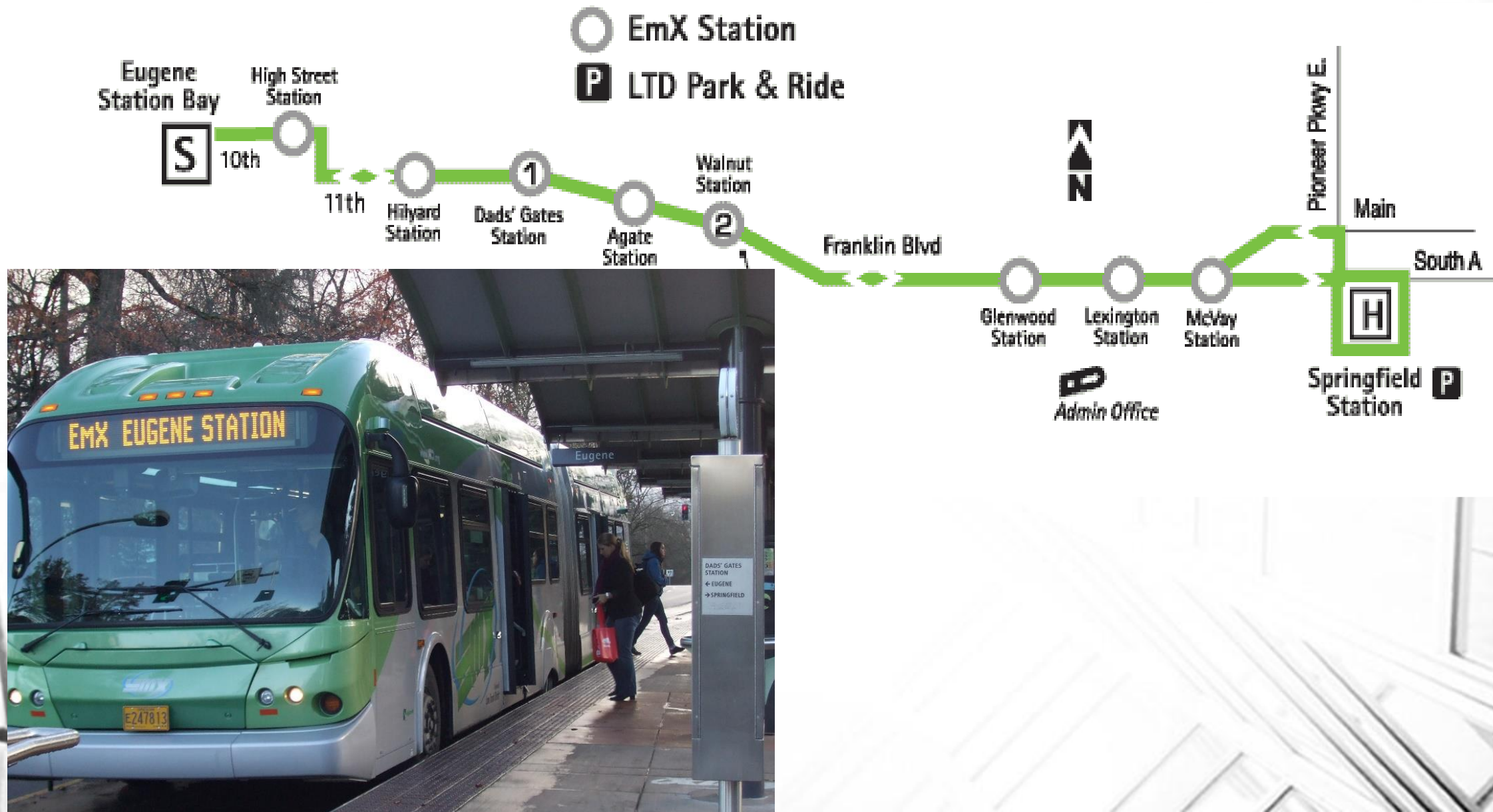


**Figure 1**

**Expected marginal increase to station ridership resulting from 1-unit increase in workers or population in bands of 0.25-to-1.5-mile catchment areas**



# Bus Rapid Transit & Economic Development



# Method: Shift-Share Analysis

Decomposes regional employment growth:

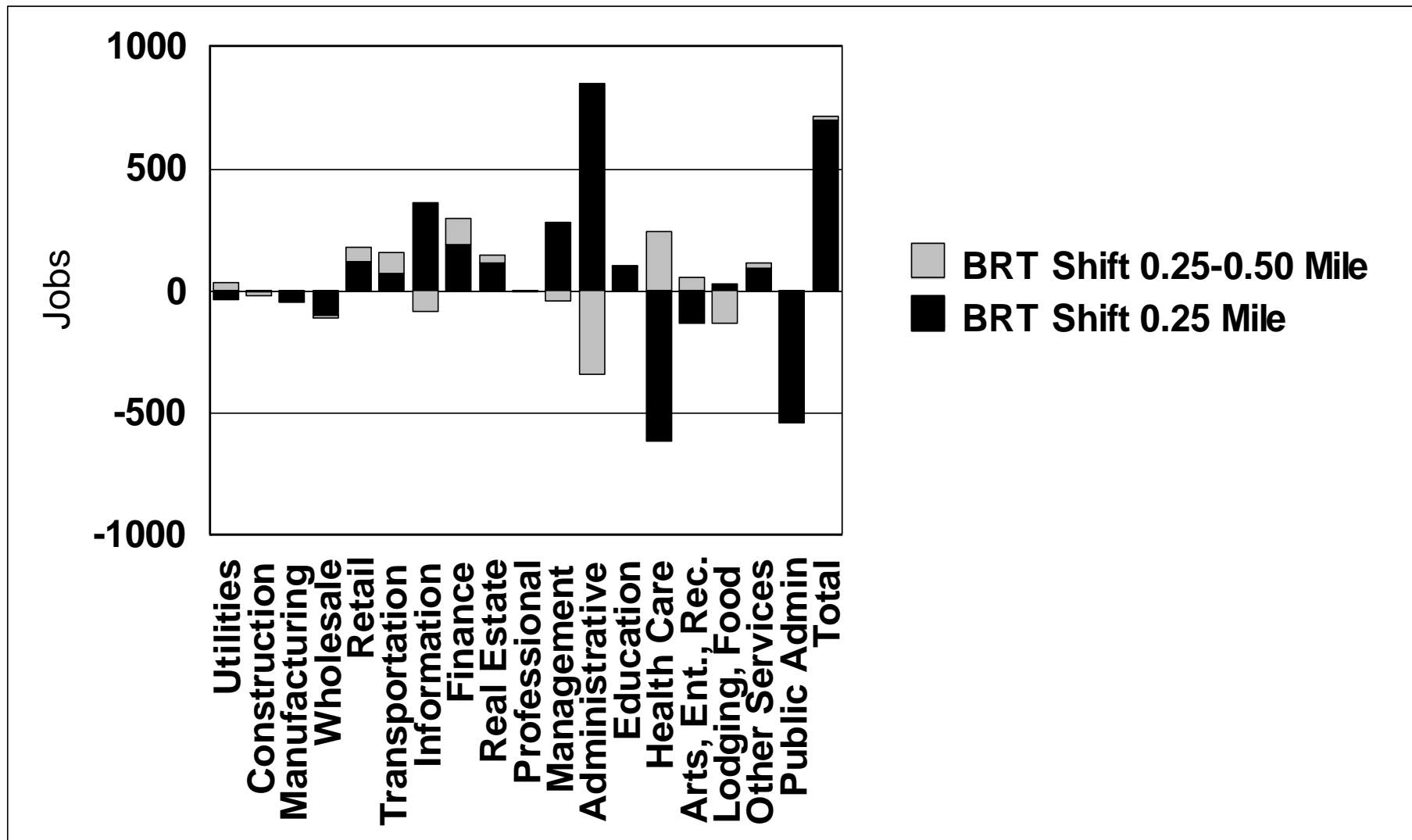
$$SS = MA + SM + TSA$$

Where

Metropolitan Area (MA): Measure of transit station area growth in relation to metropolitan growth

Sector mix (SM): Growth that is attributed to the metropolitan area's mix of industries.

Transit Station Advantage (TSA): Job shift associated with introduction of transit → Identifies economic sectors attracted to and repelled by transit.

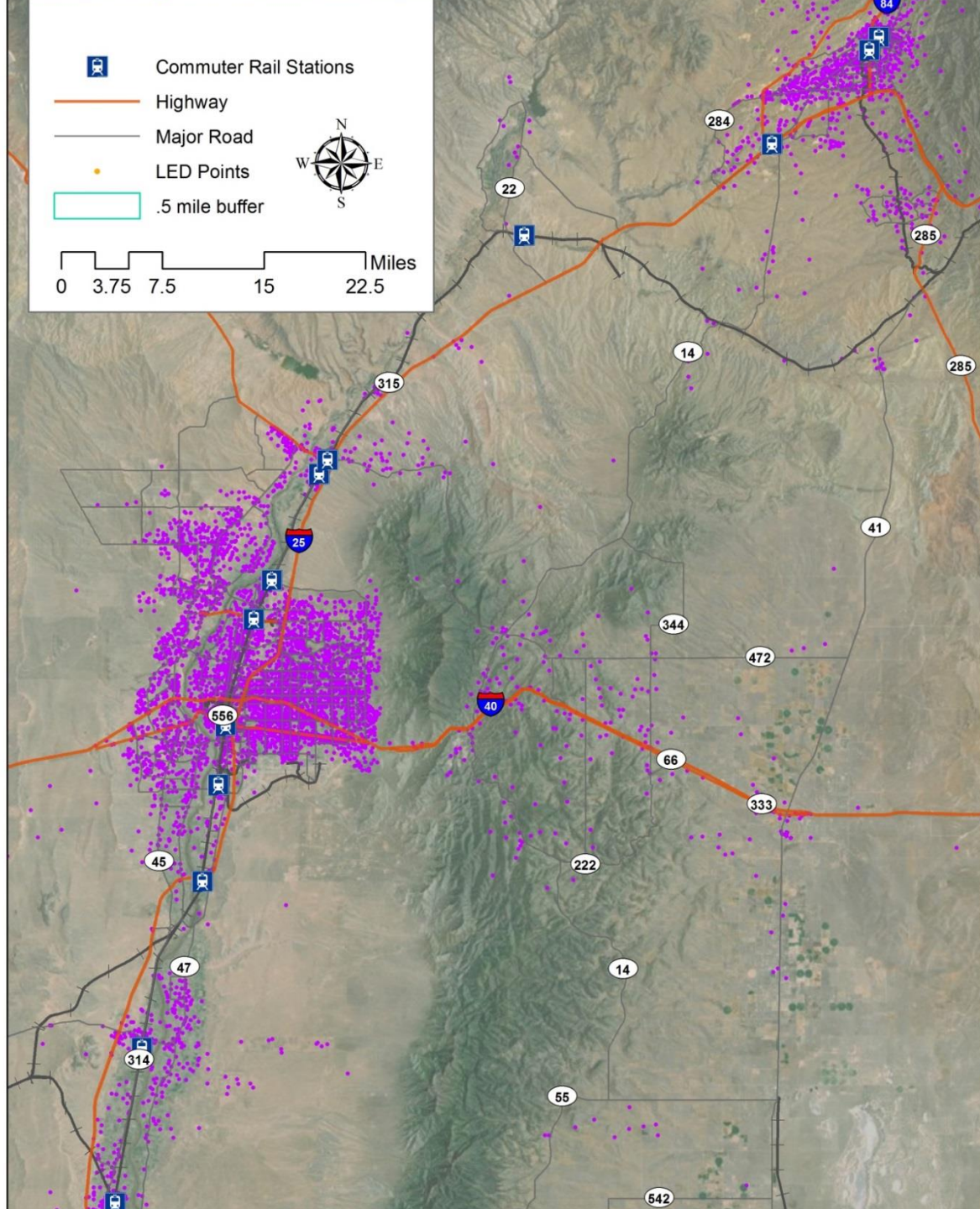


Arthur C. Nelson, Reid Ewing, Matt Miller, Shyam Kannan, Bruce Appleyard. 2013. Bus Rapid Transit and Economic Development. *Journal of Public Transportation*. 16(3): 41-57.

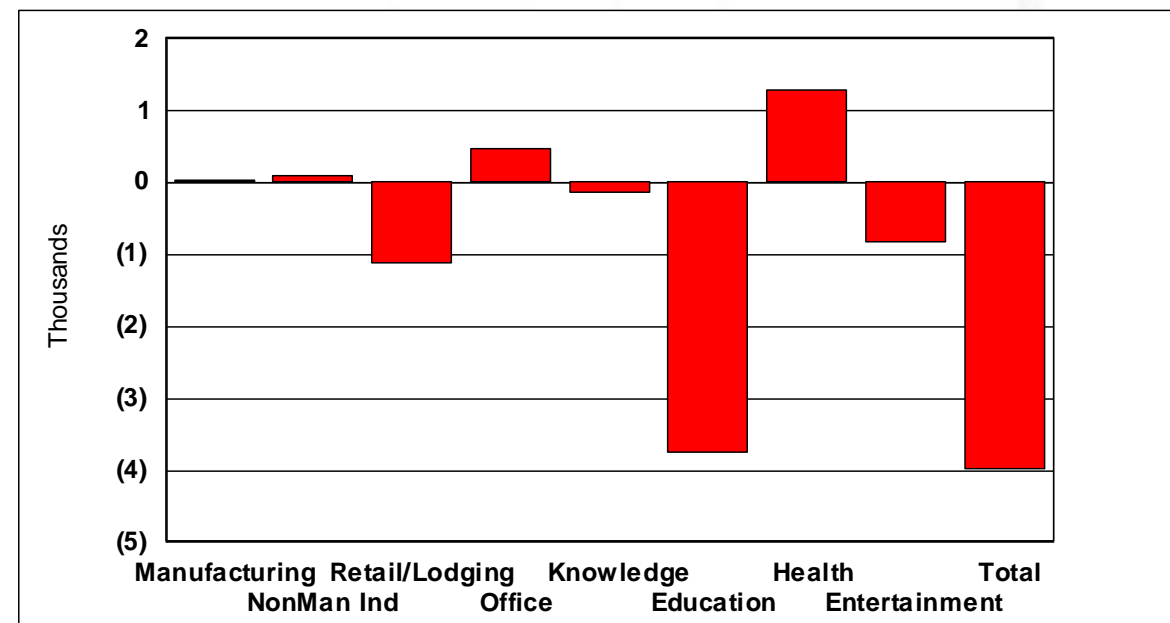
# The forgotten mode: Commuter Rail Transit

Application of Shift-Share Analysis to:  
Albuquerque Rail Runner  
Miami Tri Rail  
San Diego Coaster  
Seattle Sounder  
Salt Lake FrontRunner

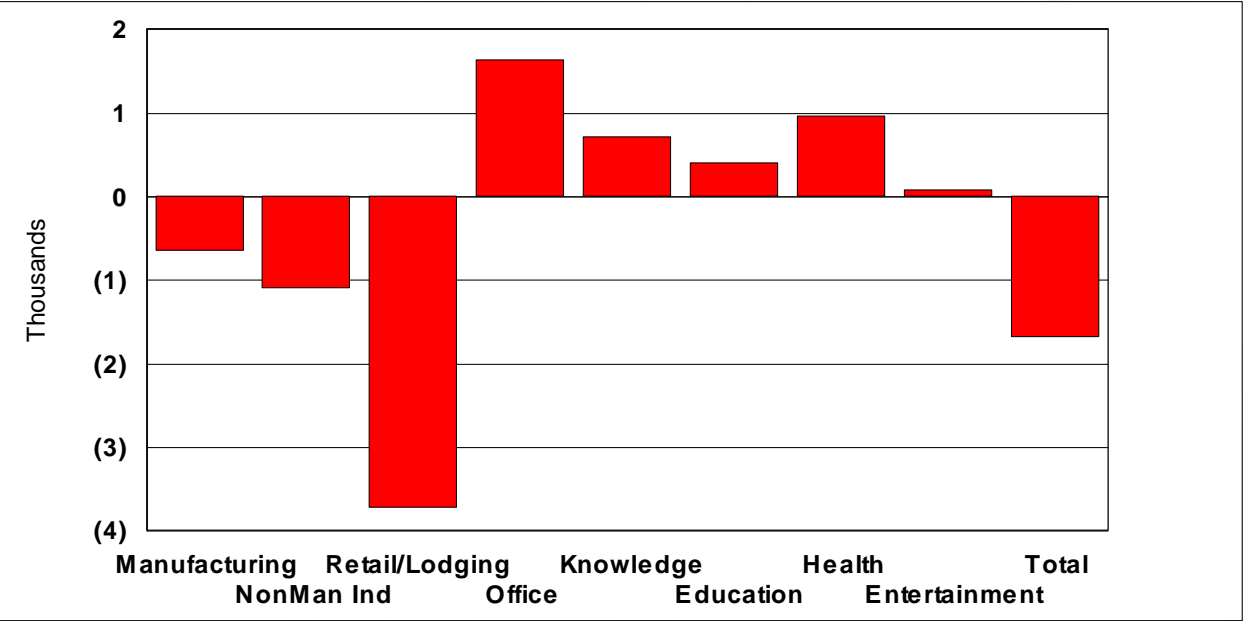
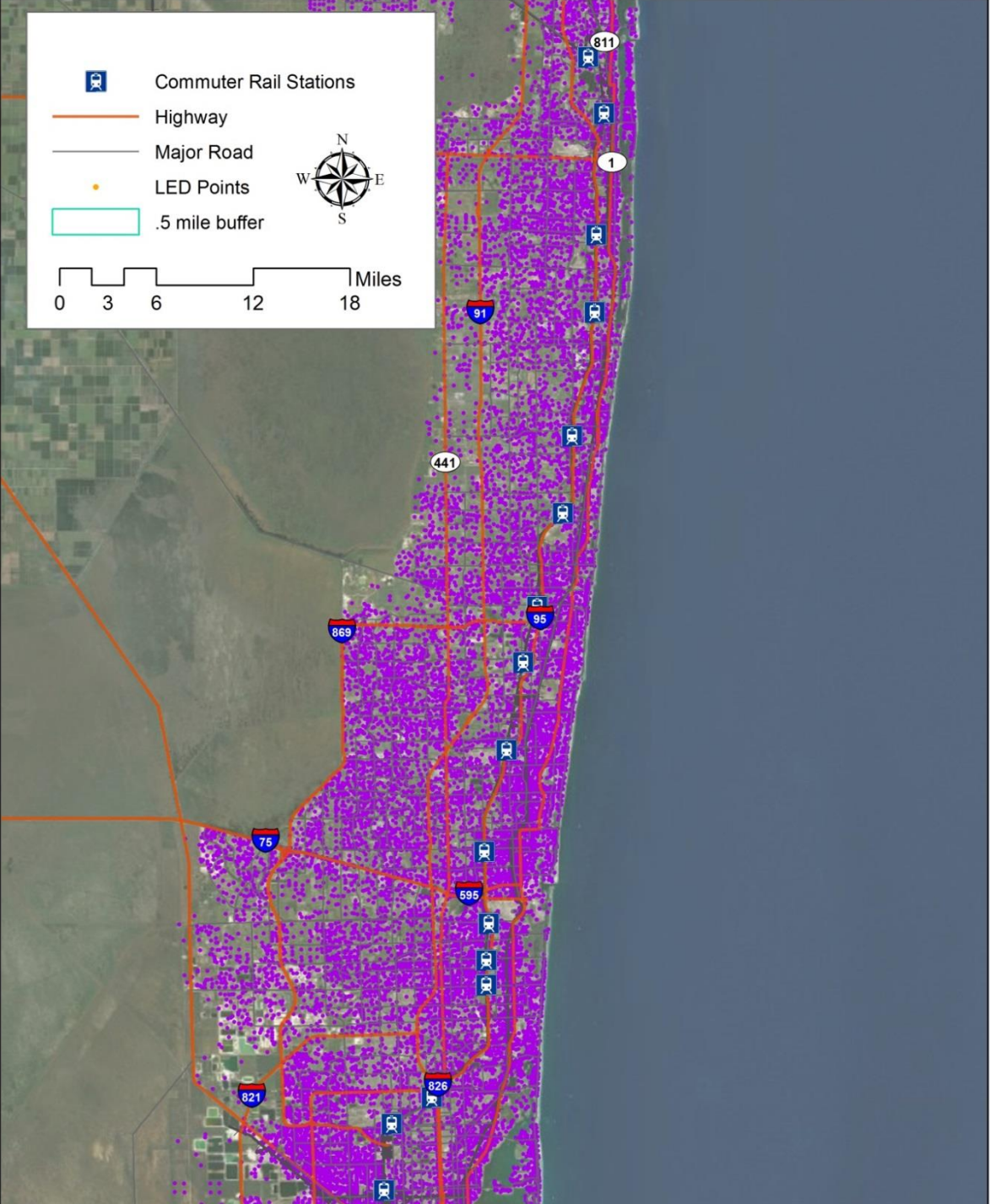




# Rail Runner



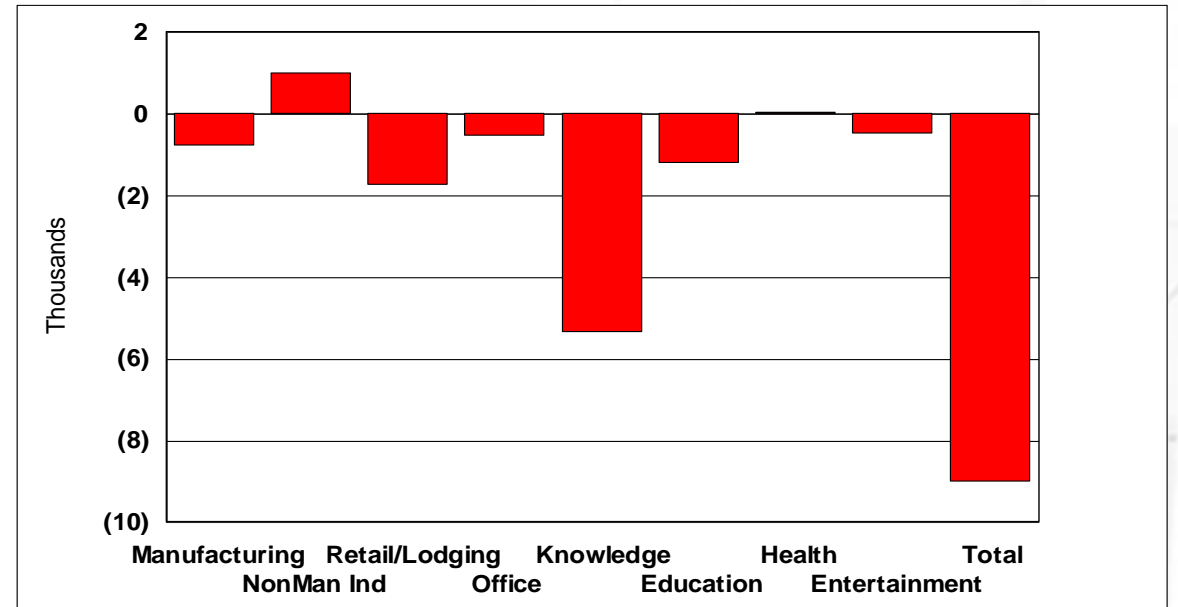
# Tri Rail



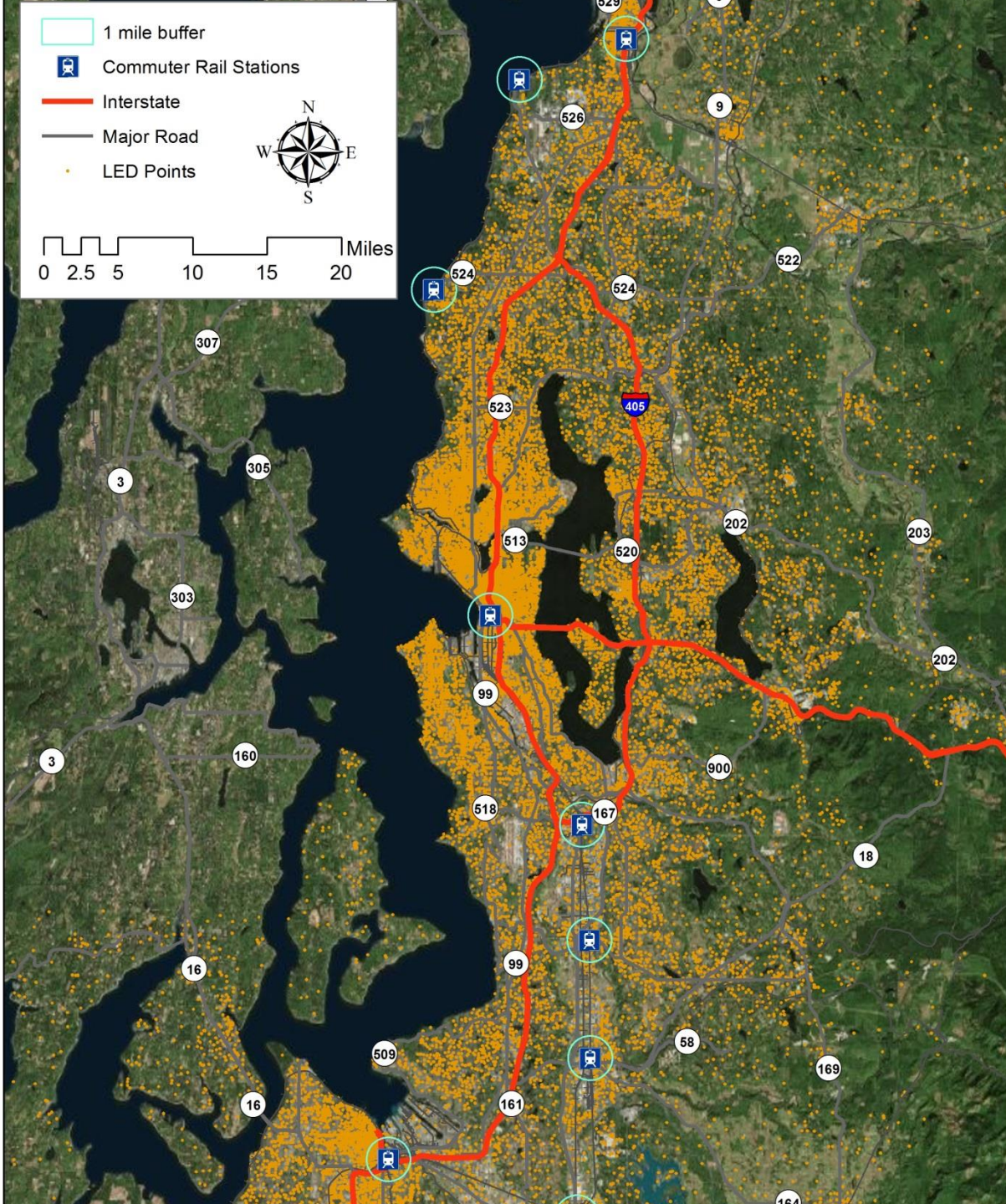




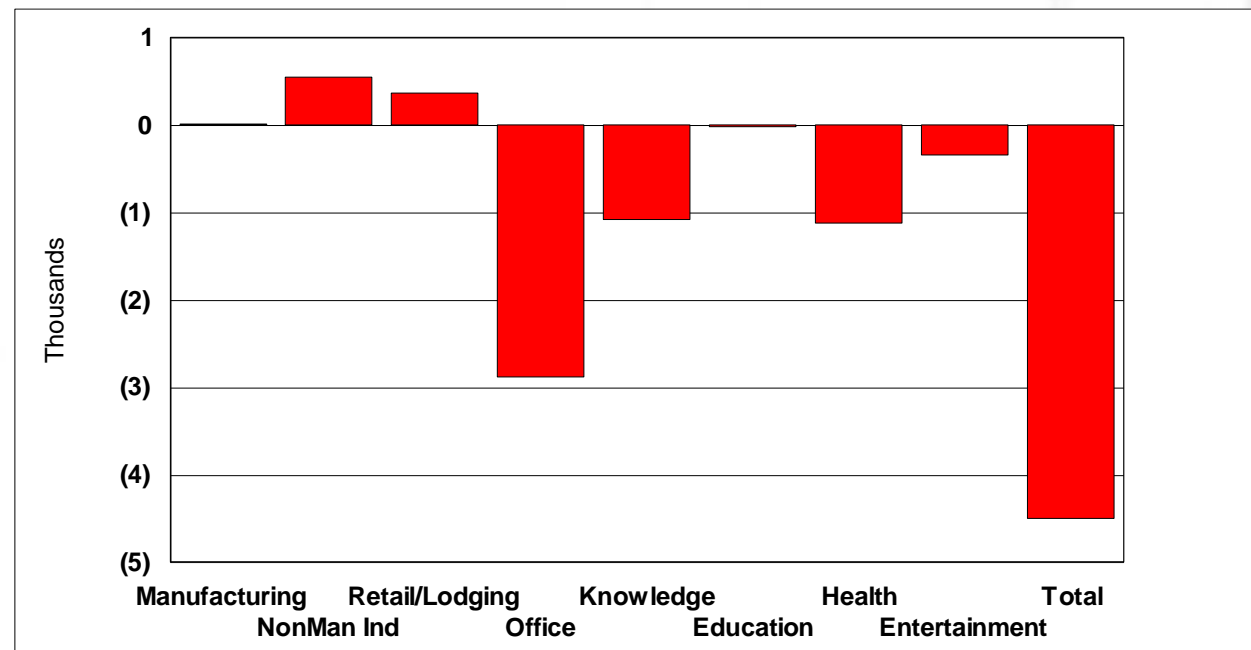
# Coaster



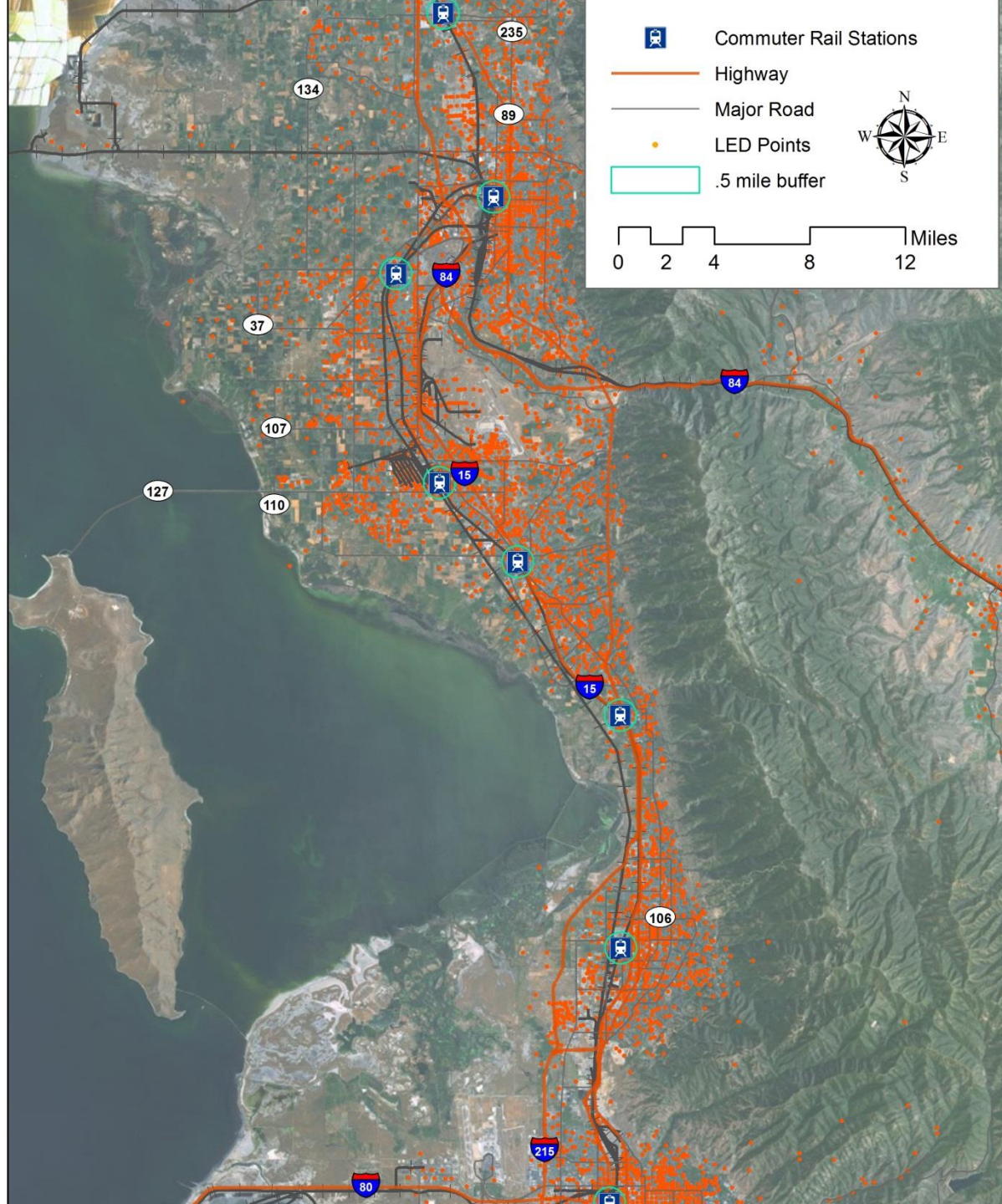




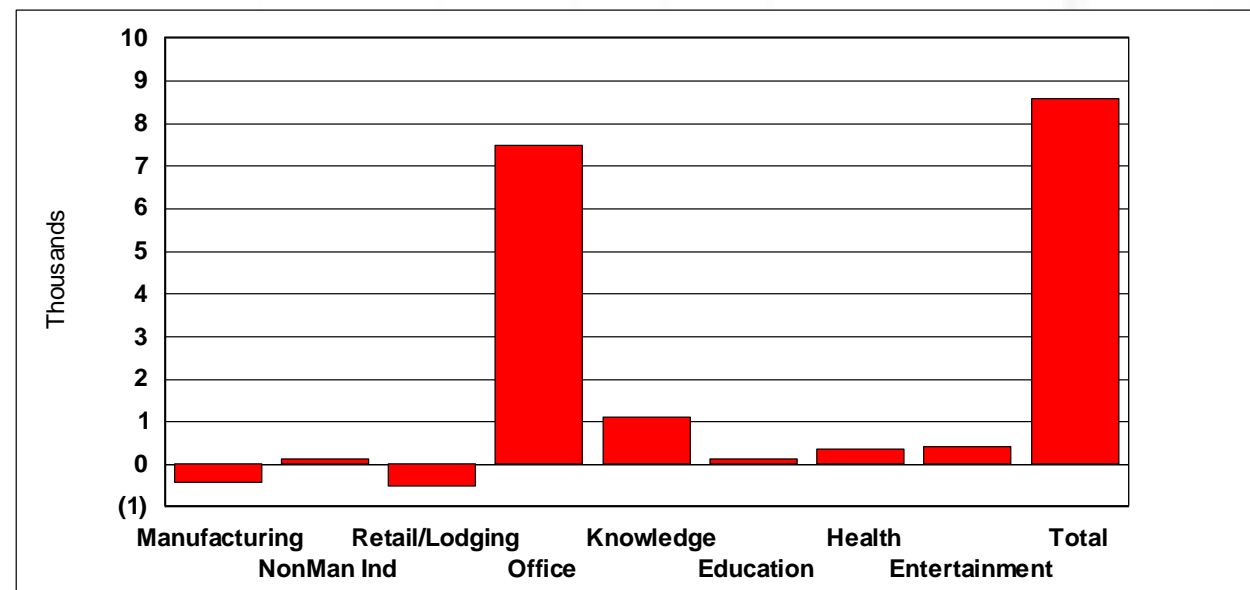
# Sounder





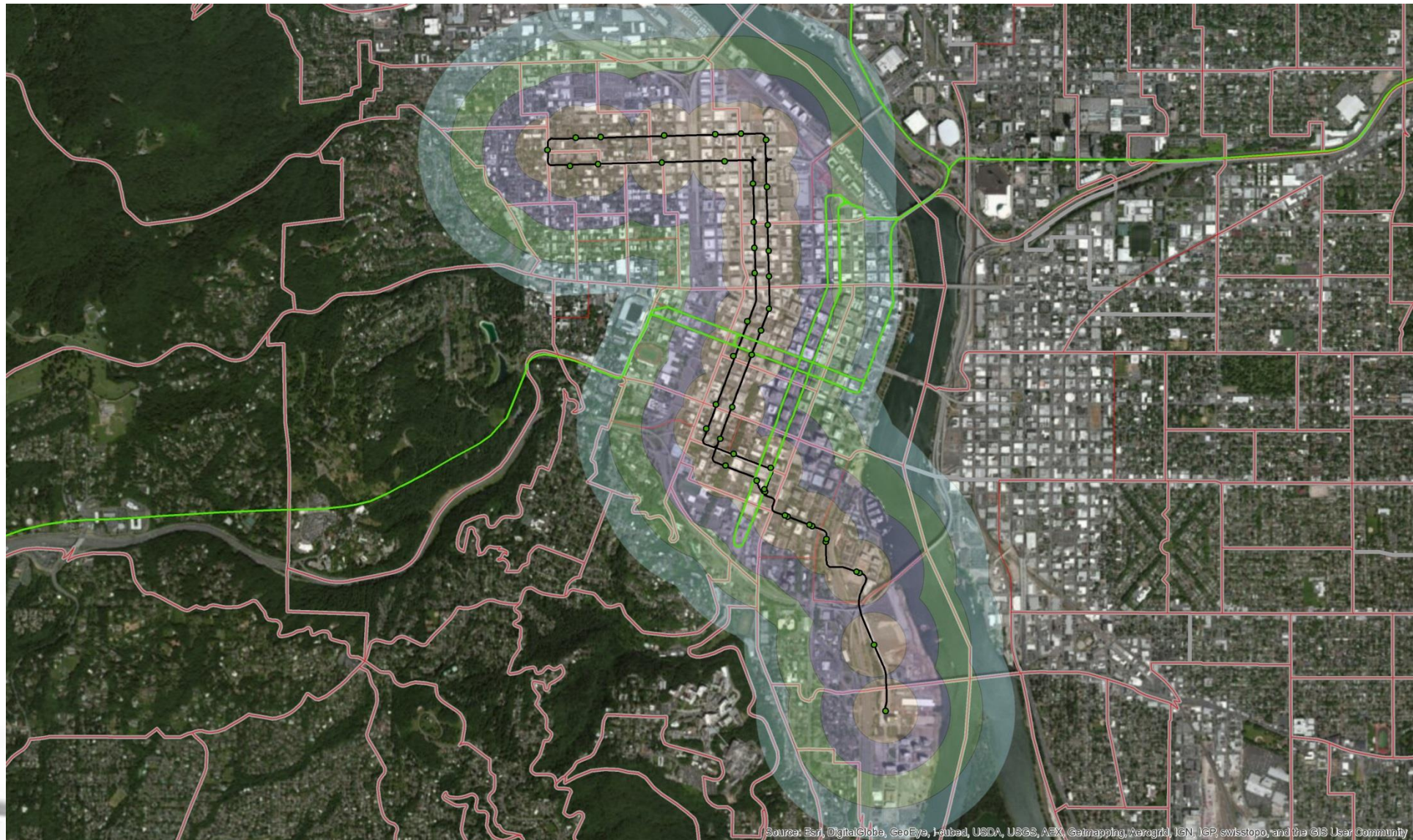


# FrontRunner





# A Street Car with Desires



# Downtown Portland Streetcar Job Change

## *<1/8 Mile*

Year	Jobs	SCT only	SCT+ LRT
2002	31,070	5,674	25,396
2011	38,562	6,744	31,818
<b>Change</b>	<b>7,492</b>	<b>1,070</b>	<b>6,422</b>

## *1/8 Mile - <1/4 Mile*

Year	Jobs	SCT only	SCT+ LRT
2002	39,676	2,251	37,425
2011	33,800	2,082	31,718
<b>Change</b>	<b>(5,876)</b>	<b>(169)</b>	<b>(5,707)</b>



# Implications: Choice of Transit Matters

Think outside the half-mile circle for **Light Rail** →

Attached residential & office rent premiums positive @ 1+ mile

The half-mile circle probably matters for **Commuter Rail**.

The quarter-mile circle probably matters for **Bus Rapid Transit**.

The eighth-mile circle probably matters for **Streetcar**.

In all cases, larger circles are possible. Canepa (2007) argues that combined with good urban design and multiple short-distance alternative modes (walking, biking, TOD-serving shuttles) there should be every reason to expect the market premium for land uses near rail transit stations to extend a mile and even well beyond.



# Thanks to the *DREAM* Team

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