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 \( \rightarrow \) Light Rail
  • Even more surprising office market responsiveness \( \rightarrow \) 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
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 ¼-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 ¼-mile walk based only on the 10-minute “walk-in-the-park”

Then there was the ½-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 \( i \).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std Error</th>
<th>t-score</th>
<th>p</th>
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<tr>
<td>Constant</td>
<td>-56.137</td>
<td>18.623</td>
<td>-3.014</td>
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<td>Class A</td>
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<td>Floor Area Ratio</td>
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<td>-4.237</td>
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<td>Stories</td>
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<td>Effective Year Built</td>
<td>0.035</td>
<td>0.009</td>
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<td><strong>Distance Nearest LRT Station</strong></td>
<td><strong>-0.722</strong></td>
<td><strong>0.400</strong></td>
<td><strong>-1.803</strong></td>
<td><strong>0.05</strong></td>
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<td><strong>Squared Distance Nearest LRT Station</strong></td>
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<td>Observations</td>
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<td>Degrees of Freedom</td>
<td>796</td>
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Dallas Office Rent Premiums: 
Percent Change based on Distance from Light Rail

- 25% premium loss @ 0.25 mile
- 50% premium loss @ 0.56 mile
- 75% premium loss @ 0.93 mile
- Minima @ 1.85 mile
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 \( \rightarrow \) Identifies economic sectors attracted to and repelled by transit.
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
A Street Car with Desires
## Downtown Portland Streetcar Job Change

### <1/8 Mile

<table>
<thead>
<tr>
<th>Year</th>
<th>Jobs</th>
<th>SCT only</th>
<th>SCT+ LRT</th>
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<tr>
<td>2002</td>
<td>31,070</td>
<td>5,674</td>
<td>25,396</td>
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<tr>
<td>2011</td>
<td>38,562</td>
<td>6,744</td>
<td>31,818</td>
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<tr>
<td><strong>Change</strong></td>
<td><strong>7,492</strong></td>
<td><strong>1,070</strong></td>
<td><strong>6,422</strong></td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Jobs</th>
<th>SCT only</th>
<th>SCT+ LRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>39,676</td>
<td>2,251</td>
<td>37,425</td>
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<tr>
<td>2011</td>
<td>33,800</td>
<td>2,082</td>
<td>31,718</td>
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<tr>
<td><strong>Change</strong></td>
<td><strong>(5,876)</strong></td>
<td><strong>(169)</strong></td>
<td><strong>(5,707)</strong></td>
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</table>
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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