The Impact of a New Light Rail System on Single Family Property Values in Charlotte, NC

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Transport and Property Values

Property with Good Access

Cost/Time Savings

Increased Demand/Competition

Premium ($)
Empirical Evidence

Dozens of Transit Capitalization Studies

Modest Station Area Premiums

Magnitude of Impacts are Highly Contextual

Recent Literature Reviews:
Bartholomew/Ewing 2011
Giuliano/Argawal 2010
Expanding on Existing Research

New context: LRT in Charlotte, NC

- Rail system was built in last decade
- Mid-sized but fast growing metro
- Very auto-oriented region
- Built in freight corridor
- Rail system of limited scope (15 km, 15 stations)
Study Corridor
Hedonic Price Models

\[ P = f(D, H, N, L) \]

\[ P = \text{price of single family home (2005 $)} \]
\[ D = \text{distance to LRT station} \]
\[ H = \text{housing characteristics} \]
\[ N = \text{neighborhood characteristics} \]
\[ L = \text{locational attributes} \]
Temporally Segmented Models

T1: 1997-1998, pre-planning stage, N = 1,592

T2: 1999-2004, planning stage, N = 2,568

T3: 2005-2007, construction stage, N = 1,308

T4: 2008, operation stage, N = 913
Station Distance Coefficients
(price elasticities)

T1: 0.123 (sig. = 0.00)

T2: 0.169 (sig. = 0.00)

T3: 0.148 (sig. = 0.00)

T4: 0.052 (sig. = 0.12)
## Difference of Station Distance Coefficients by Time Period

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>0.046</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>0.025</td>
<td>-0.021</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.52)</td>
<td>(0.55)</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>-0.071</td>
<td>-0.117</td>
<td>-0.096</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.00)</td>
<td>(0.02)</td>
</tr>
</tbody>
</table>
Explanation of Temporal Pattern

Accessibility benefits need to be seen/felt

Running trains create a positive image

Redevelopment of Industrial Land Uses
developers ahead of home buyers?

Rezoning
influence should show up in T3
Conclusions

Merits of before/after studies

Abandoned freight corridors may require patience

Despite many limitations, Charlotte LRT investment appears to have some influence

Will station area values continue to increase?

How are other property types affected?

Variation within the corridor?
Thank You

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<table>
<thead>
<tr>
<th>Variable</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constant)</td>
<td>8.196*</td>
<td>7.406*</td>
<td>8.123*</td>
<td>8.249*</td>
</tr>
<tr>
<td>Property characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>-0.004*</td>
<td>-0.001</td>
<td>-0.003</td>
<td>-0.006*</td>
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<tr>
<td>squared age</td>
<td>4.37E-05*</td>
<td>2.59E-05</td>
<td>4.16E-05*</td>
<td>8.21E-05*</td>
</tr>
<tr>
<td>height</td>
<td>0.125*</td>
<td>0.062*</td>
<td>0.076*</td>
<td>0.053</td>
</tr>
<tr>
<td>no fuel</td>
<td>-0.796*</td>
<td>0.302</td>
<td>0.032</td>
<td>-0.794*</td>
</tr>
<tr>
<td>central air conditioning</td>
<td>0.045*</td>
<td>0.080*</td>
<td>0.090*</td>
<td>0.101*</td>
</tr>
<tr>
<td>building grade</td>
<td>0.034*</td>
<td>0.027*</td>
<td>0.032*</td>
<td>0.059*</td>
</tr>
<tr>
<td># fire places</td>
<td>0.089*</td>
<td>0.064*</td>
<td>0.057*</td>
<td>0.004</td>
</tr>
<tr>
<td>ln (heated area)</td>
<td>0.337*</td>
<td>0.392*</td>
<td>0.338*</td>
<td>0.455*</td>
</tr>
<tr>
<td>Rail Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln (network distance)</td>
<td>0.123(.028)*</td>
<td>0.169(.022)*</td>
<td>0.148(.027)*</td>
<td>0.052(.033)</td>
</tr>
<tr>
<td>(std. error)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.779*</td>
<td>0.786*</td>
<td>0.811*</td>
<td>0.837*</td>
</tr>
<tr>
<td>Moran’s I (residuals)</td>
<td>0.097*</td>
<td>0.110*</td>
<td>0.167*</td>
<td>0.021*</td>
</tr>
</tbody>
</table>
Rail Impacts in Modern Cities

Reason for Skepticism

- well connected existing networks
- polycentrism
- preference for auto travel

 Depends on Supply/Demand

- limited supply of station proximate properties
- limited demand can drive premiums
Sensitivity Analysis

![Sensitivity Analysis Graph]

- **.25 mile (409 meters)**
- **1 mile (1609 meters)**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>House Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>280000</td>
</tr>
<tr>
<td>t2</td>
<td>310000</td>
</tr>
<tr>
<td>t3</td>
<td>490000</td>
</tr>
<tr>
<td>t4</td>
<td>410000</td>
</tr>
</tbody>
</table>