

# 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

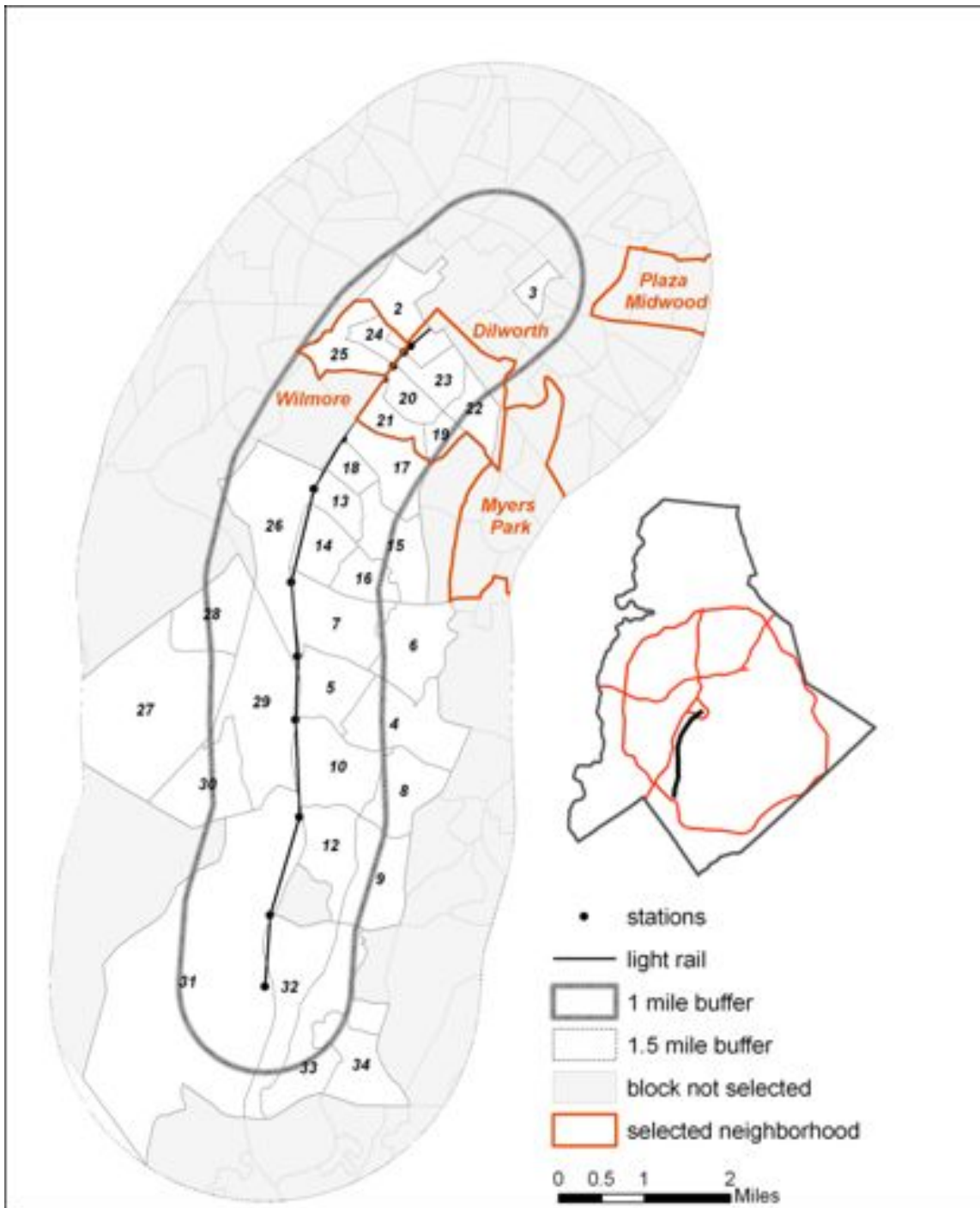
built in freight corridor

rail system of limited scope (15 km, 15 stations)





# Study Corridor



# Hedonic Price Models

$$P = f(D, H, N, L)$$

**P = price of single family home (2005 \$)**

**D = distance to LRT station**

**H = housing characteristics**

**N = neighborhood characteristics**

**L = 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 = 1308**

**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

|           | <b>T1</b>               | <b>T2</b>               | <b>T3</b>               |
|-----------|-------------------------|-------------------------|-------------------------|
| <b>T2</b> | 0.046<br><i>(0.20)</i>  |                         |                         |
| <b>T3</b> | 0.025<br><i>(0.52)</i>  | -0.021<br><i>(0.55)</i> |                         |
| <b>T4</b> | -0.071<br><i>(0.10)</i> | -0.117<br><i>(0.00)</i> | -0.096<br><i>(0.02)</i> |



# 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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UNC CHARLOTTE

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



# 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

