

# When and How Much Did the Green Line LRT Increase Housing Values in Saint Paul, Minnesota?

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# Outline

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**1. Background**

**2. Methodology**

**3. Results**

**4. Conclusion**

# 1. Background

- Rail transit: mitigates traffic congestion but requires substantial subsidies
- Studies on value-added of rail transit – justify the subsidies
- The effects of transit itself vs. the effects of the existing highly-accessible locations
- The timing of the value uplift



- Green Line LRT project facts:
  - 11-mile light rail transit connecting downtown Minneapolis and downtown Saint Paul;
  - Construction began in late 2010
  - Full Funding Grant Agreement (FFGA) was announced on **April 26, 2011**
  - Opened to the public on **June 14, 2014**

## 2. Methodology

### 2.1 Modeling Approach

- **Hedonic difference-in-difference (DID)**

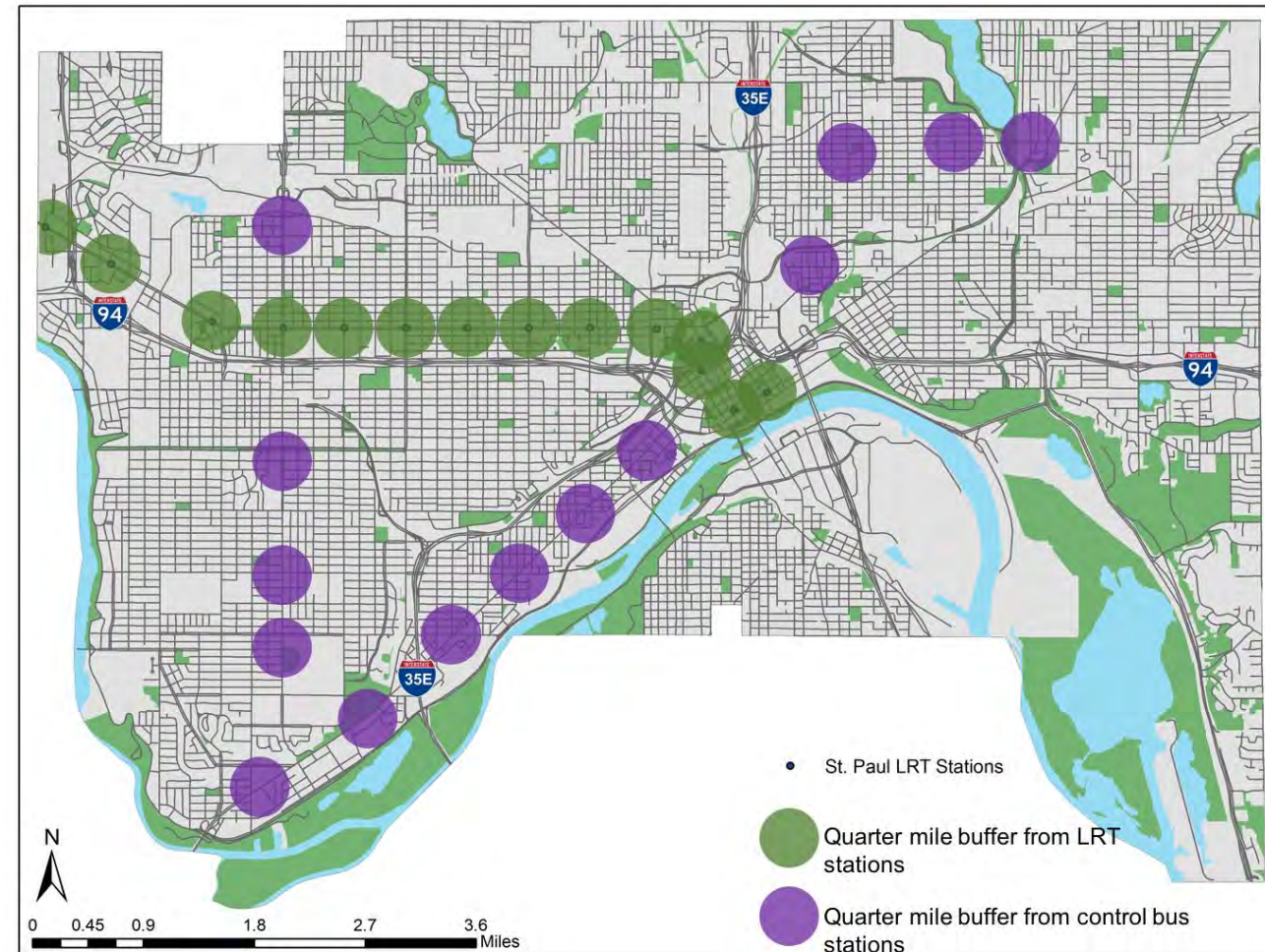
**model 1:**

$$Y = f(S, N, L, T, O, O \times T, FFGA, FFGA \times T),$$

**model 2:**

$$Y = f(S, N, L, T, Year_i, Year_i \times T).$$

- **Hedonic pricing model** controls other potential price determinants
- **Control areas** are used to control for external factors
- **DID model** differentiates transit effects from location effects





## 2. Methodology

### 2.2 Data and Variables

- Based on tax parcel data from Ramsey County
- Considers houses sold between 2008 and September 2016
- Location variables were computed using ArcGIS

Variable	Definition
Sales Price	Adjusted price using CPI
<b>Normalized Price</b>	Sales price(\$) per square foot
Two/three-family House	Dummy variable indicating the property is a two/three-family house
Townhouse	Dummy variable indicating the property is a townhouse
Single-family House	Dummy variable indicating the property is a single-family house
Stories	Number of stories
Total Rooms	Total number of rooms
Bedrooms	Number of bedrooms
Family Rooms	Number of family rooms
Basement	Dummy variable indicating the property has a basement
Garage	Dummy variable indicating the property has a garage
Year Built	Year when the residence was built
Distance to Downtown MPLS	Network Distance to Downtown Minneapolis (km)
Distance to Downtown StP	Network Distance to Downtown St. Paul (km)
<b>LRT</b>	Dummy variable indicating the property is within LRT station areas
<b>FFGA</b>	Dummy variable indicating the property is sold after full funding grant agreement
<b>Opening</b>	Dummy variable indicating the property is sold after the opening of the Green Line

### 3. Results

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#### Model 1:

$$Y = f(S, N, L, T, O, O \times T, FFGA, FFGA \times T)$$

Number of observations: 2740

R-Square: 0.384

- The FFGA announcement increased housing values in treatment areas by **\$9.2/sqft.**
- **\$13.7/sqft** uplift in housing values in treatment areas after the opening of the Green Line

	Model 1	
	Coeff.	P-value
Constant	-304.8	0.002
Two/three-family house	-13.5	0.000
Townhouse	-24.8	0.001
Total Rooms	-2.2	0.002
Number of stories	-6.5	0.002
Garage availability	11.4	0.000
Year Built	0.2	0.000
Distance to downtown St. Paul	15.5	0.004
FFGA	-8.3	0.019
<b>Treatment (T)*FFGA</b>	<b>9.2</b>	<b>0.029</b>
Opening	8.1	0.015
<b>T*opening</b>	<b>13.7</b>	<b>0.006</b>

### 3. Results

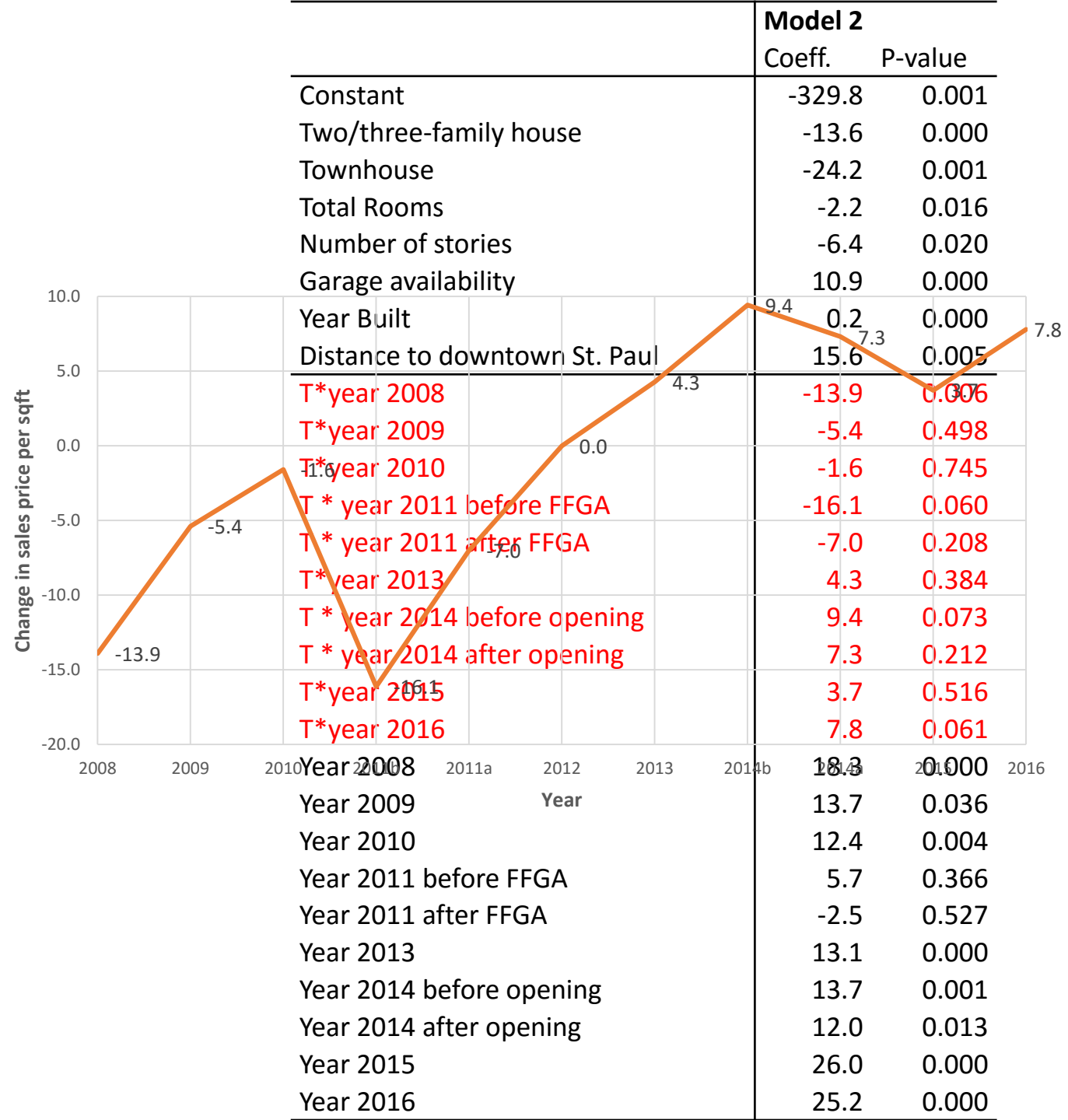
#### Model 2:

$$Y = f(S, N, L, T, Year_i, Year_i \times T)$$

Number of observations: 2740

R-Square: 0.423

- Reference period: 2012
- The year-to-year changes of housing values are not statistically significant
- Housing values in treatment areas recovered after FFGA and reached the peak before the operation of LRT in 2014



## 4. Conclusions

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- **Impacts**

Relative to control corridors in St. Paul

- FFGA: \$9.2/sqft
- Opening: \$13.7/sqft
- Housing value increased since the FFGA announcement and peaked before LRT opening
- Streetscape improvements and zoning amendments

- **Implications**

- Tax revenues-governments; property values-owners
- Gentrification? displacement? transport benefits?

- **Limitations:**

- Time-varying attributes such as unemployment rates
- Foreclosure crisis could be a confounding factor because it was worse in the Green Line corridor