Light Rail Effect on Neighborhood Incomes

A Case Study of Houston's METRO Rail

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Introduction

Transit-oriented development is often used as a tool to promote employment and income mobility for low-income, transit dependent neighborhoods in urban areas. In recent years, the introduction of light rail transit (LRT) has been cited as a progressive tool for alleviating restricted job choice and improving income mobility. Yet, the empirical consensus regarding the effects of LRT on neighborhood outcomes remains unclear. While some economist's estimate modest wealth increases, others remain concerned about transit induced spatial segregation effects. We investigate the causal relationship between the development of LRT and movements in economic variables, such as household income and rents for the Houston metropolitan area.

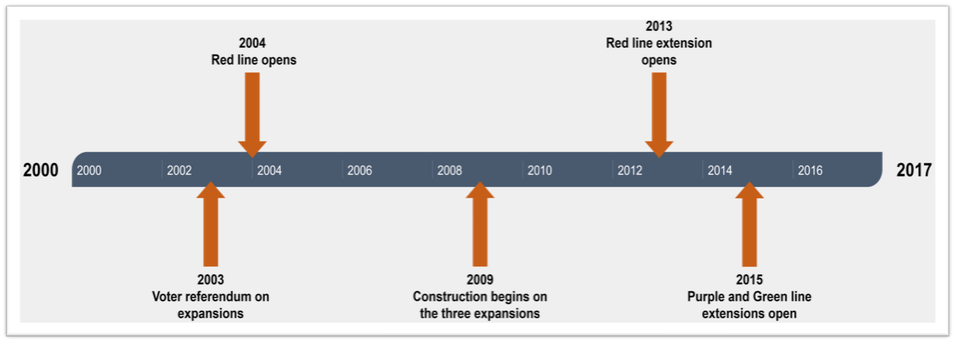
Methodology

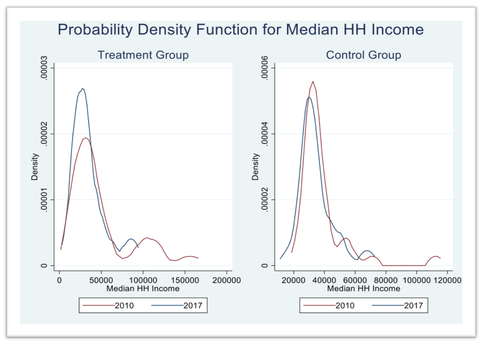
- We investigate census tract outcomes between 2010 and 2017 for Harris County neighborhoods using a difference-in-differences technique.
- We estimate the difference-in-differences to be:

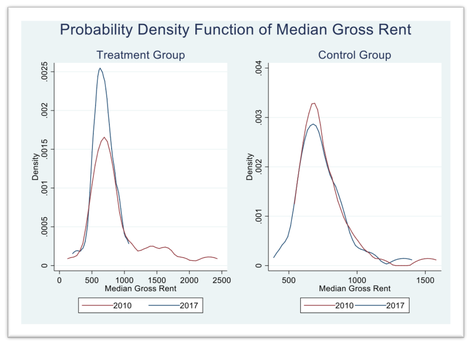
$$Y_{it} = \alpha + \beta_1\gamma_i + \beta_2\lambda_t + \beta_3(\gamma_i \cdot \lambda_t) + X'_{it} + \epsilon_{it},$$

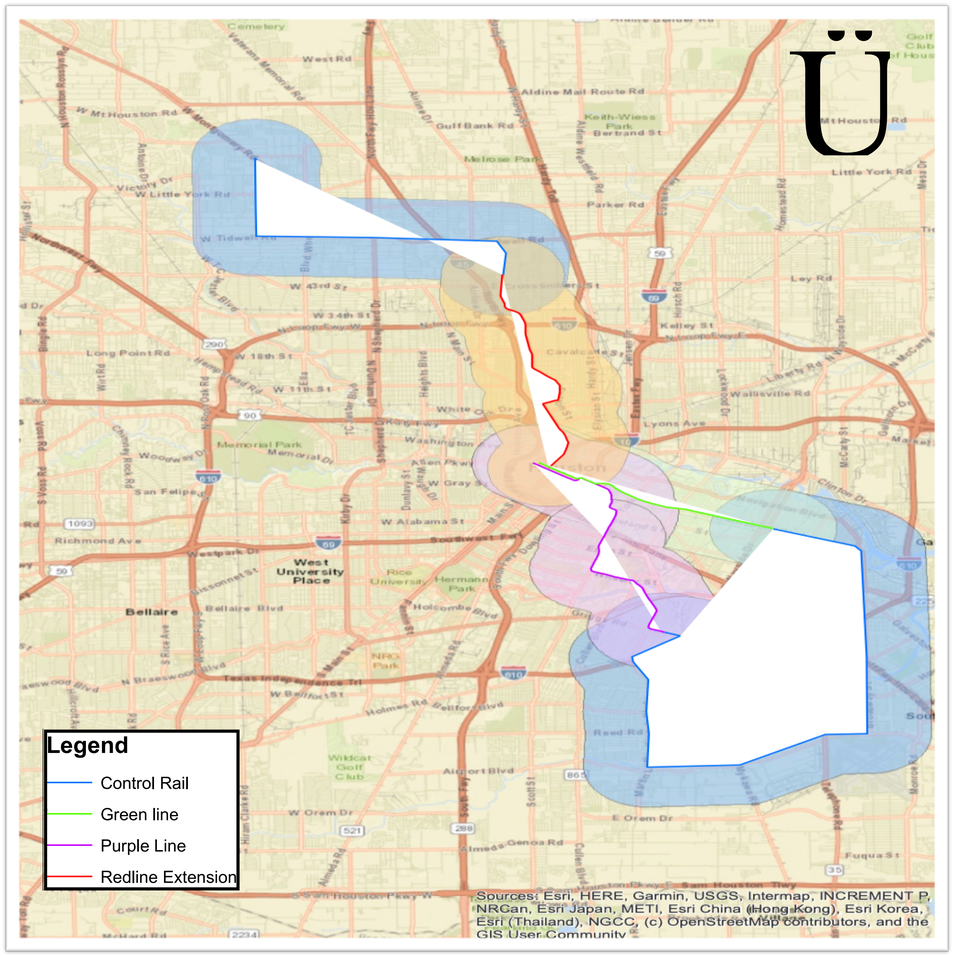
where i includes all observations between 2010 and 2017, β_1 represents time-invariant neighborhood effects, β_2 represents neighborhood-invariant time effects, and β_3 is the estimated change in expected outcome for neighborhoods receiving light rail transit.

- The treatment group is all neighborhoods within a one-mile radius of the rail for the rail extensions of the North Red, Purple, and Green lines.
- As the METRO does not choose neighborhoods randomly, the control group is all neighborhoods within a one-mile radius of the proposed rail expansions scheduled to be voted on in November of 2019.
- To ensure the quality of the control group, we test for mean differences and parallel trends in the decades before 2010.
- To check the robustness of our estimates, we redefine the control group using a propensity score matching approach.









Empirical Results

- We find an increase of $11,420 in median household income on average between 2010 and 2017 for neighborhoods that were targeted by one of the three most recent light rail expansions in Houston.
- While the level of median household income increases across the treatment group, we find an unequal distribution of the income benefits from the constructed rails. Tracts in the highest income quartile see the largest gains in median household income, whereas our poorest tracts see a decrease in median household income on average. The literature suggests that the observed income polarization occurs as a result of "poverty magnet" effects by which low-income households are incentivized to move nearer new rail developments.
- Among other economic variables, we estimate that poverty decreases on average by 5.2 percentage points, and median monthly rents increase by $196 on average as a result of the treatment effect.

Table 2.1

Dependent variable: Median family income.

	(1)	(2)	(3)	(4)
Post (β_1)	3,218 (3,421)	2,981 (2,421)	3,047 (3,095)	3,333 (2,935)
Treat (β_2)	-3,957 (3,943)			
Post X Treat (β_3)	11,183** (5,563)	11,420 (3,923)	14,346*** (5,133)	12,372*** (3,394)
Share Black 2010	-767*** (76)			
Share Hispanic 2010	-811*** (80)			
Population Density 2010	1.59*** (0.35)			
Fixed Effects	No	Yes	Yes	Yes
Buffer Size	One Mile	One Mile	Half Mile	Two Mile
Census Unit	Census Tracts	Census Tracts	Census Tracts	Census Tracts
Observations	126	126	66	93
R Squared	0.54	0.88	0.90	0.91

Acknowledgements

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