

# Land Use & Property Value Impacts of BRT



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# Outline



# Land Use Impacts of BRT

- Can bus rapid transit (BRT) impact surrounding land uses and property values in a similar way as light rail transit (LRT)?
- Issue of permanence of services & facilities



# Previous Work

- Before 2009, no recent quantitative modeling studies on property value impacts of BRT in the U.S.
- Previous studies address impacts of rail modes on property values
  - Isolate effect of distance from transit (either right-of-way, stations, or both)
  - Typical results find positive impacts on property values from nearby rail transit, but magnitudes are relatively small

# Hypothesis & Method

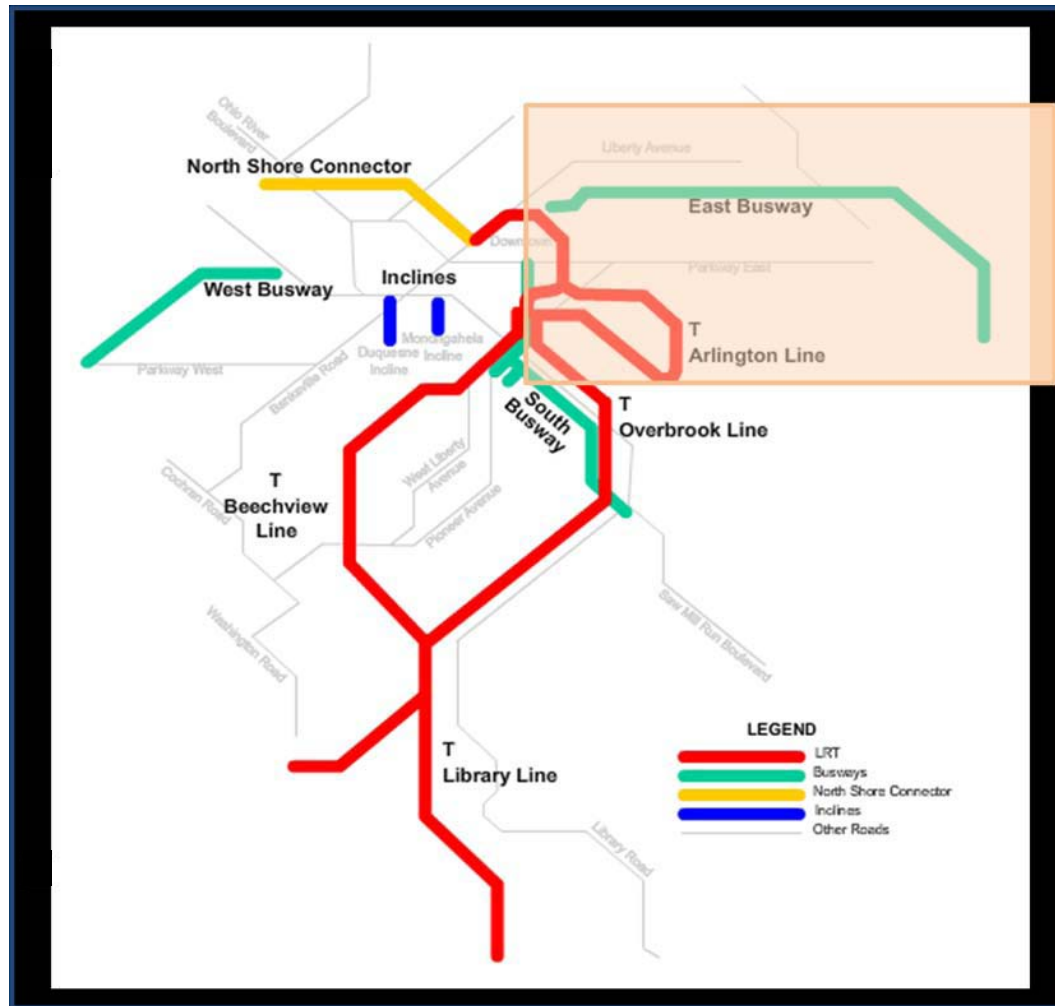
- Hoped to find statistically significant, positive impacts on surrounding property values from BRT, with magnitudes approaching those found for rail transit modes.
- Estimate impacts of BRT on surrounding property values using hedonic regression models
  - Estimate the variation in property values due to proximity to BRT stations
  - Isolate the effect of distance to nearest BRT station from all other (measurable) factors that determine property values

# Pittsburgh Busways

- **South Busway opened in 1977**
  - Oldest busway in the U.S.
  - 4.3 miles, shares dual-use tunnel with subway
- **East Busway opened in 1983**
  - 6.8 miles, built on active rail ROW
  - Extended in 2003, incorporating a bike trail and park
- **West Busway opened in 2000**
  - Built on abandoned rail ROW
  - Allows crosstown travel w/o transfers



# Pittsburgh Fixed-Guideway System



# Pittsburgh East Busway

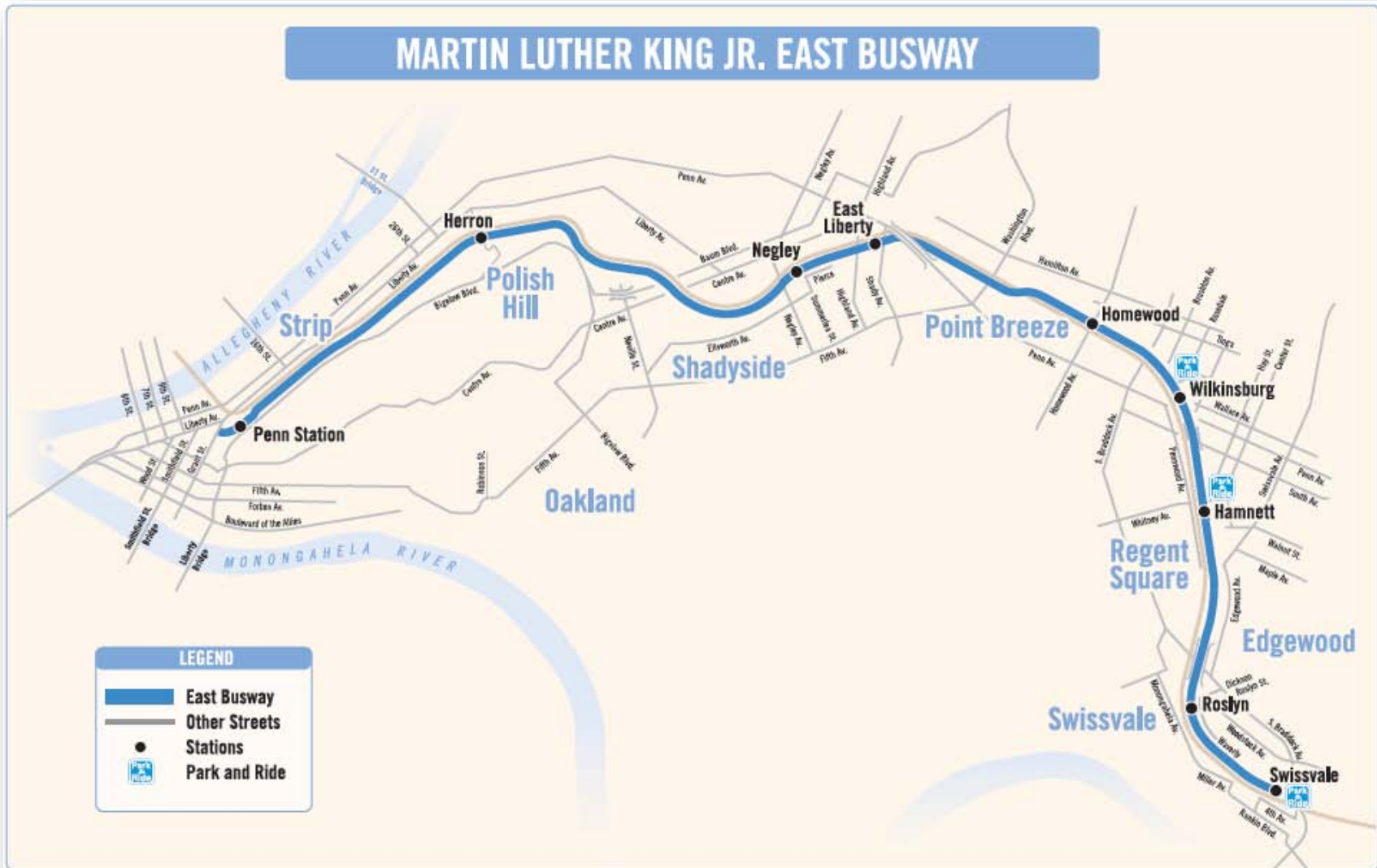


- Operating since 1983
- Serves Downtown Pittsburgh, eastern communities of Pittsburgh, and eastern suburbs of Allegheny County
- Average weekday ridership: 25,000
- 9.1 miles, 9 stations
- Over \$500M in development: retail, residential, office, medical, recreational





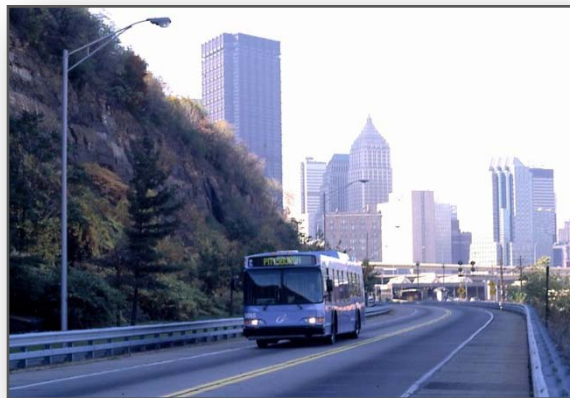
# Pittsburgh East Busway



# Pittsburgh Data

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- Parcel data from Allegheny County Property Assessor's Office, 2007
- 2000 U.S. Census data, Allegheny County
- Crime data from the Pennsylvania Uniform Crime Reporting System
- Data set constructed using GIS



# Variables

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- Dependent variable: property value (assessed value)
- Key independent variable: distance of parcel to nearest BRT station
- Other variables
  - Property characteristics
  - Neighborhood characteristics

# Property Characteristics

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- Lot size (sq. ft.)
- Living area (sq. ft.)
- Number of bedrooms (including interaction term with living area)
- Number of full bathrooms, number of half-baths
- Condition of property
- Age of property
- Distance to nearest BRT station (including squared term to test for increasing or decreasing marginal effects)
- Distance to nearest LRT station
- Distance to nearest freeway entrance & distance to CBD (highly collinear with distance to LRT station; removed from model)
- Distance to freeway & BRT right-of-way

# Neighborhood Characteristics

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- Population density
- Median income
- Crime per capita (dropped due to data problems)
- City ward/neighborhood fixed-effects (dummy variables)



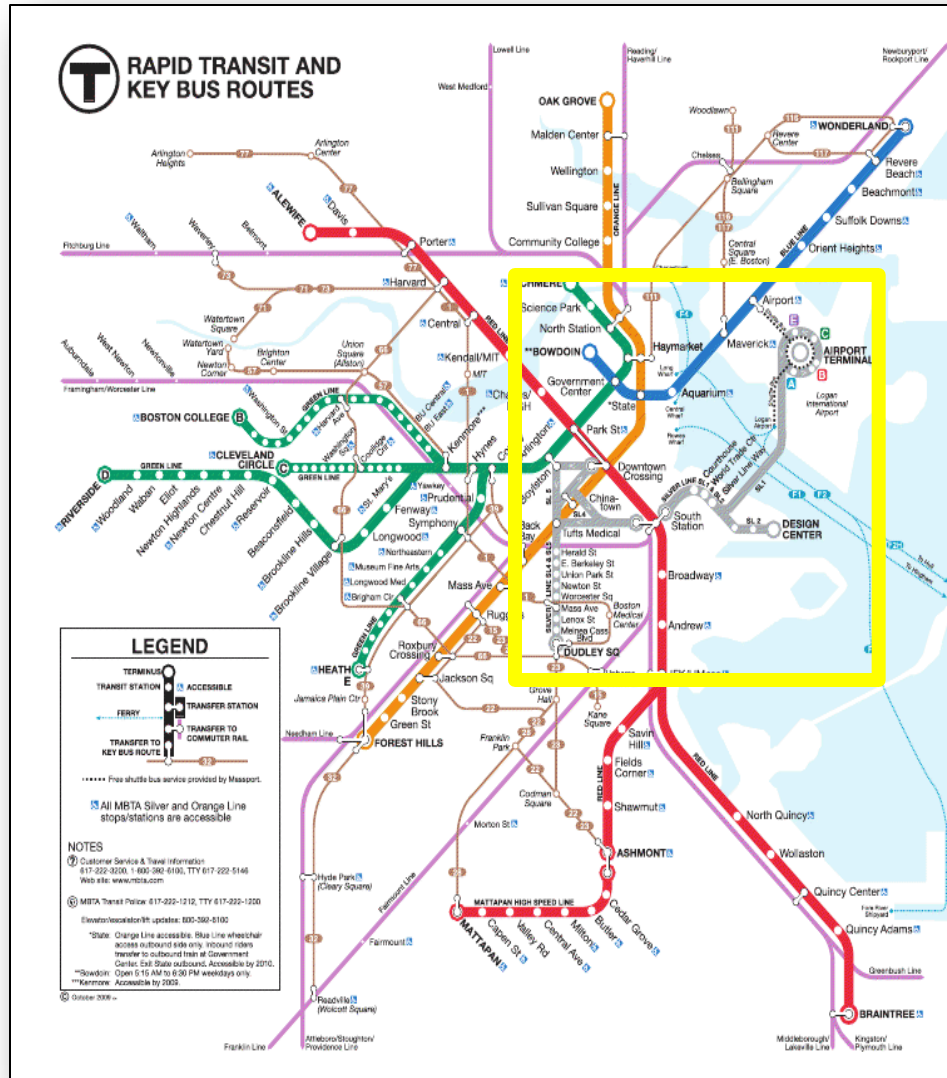
# Pittsburgh East Busway Results

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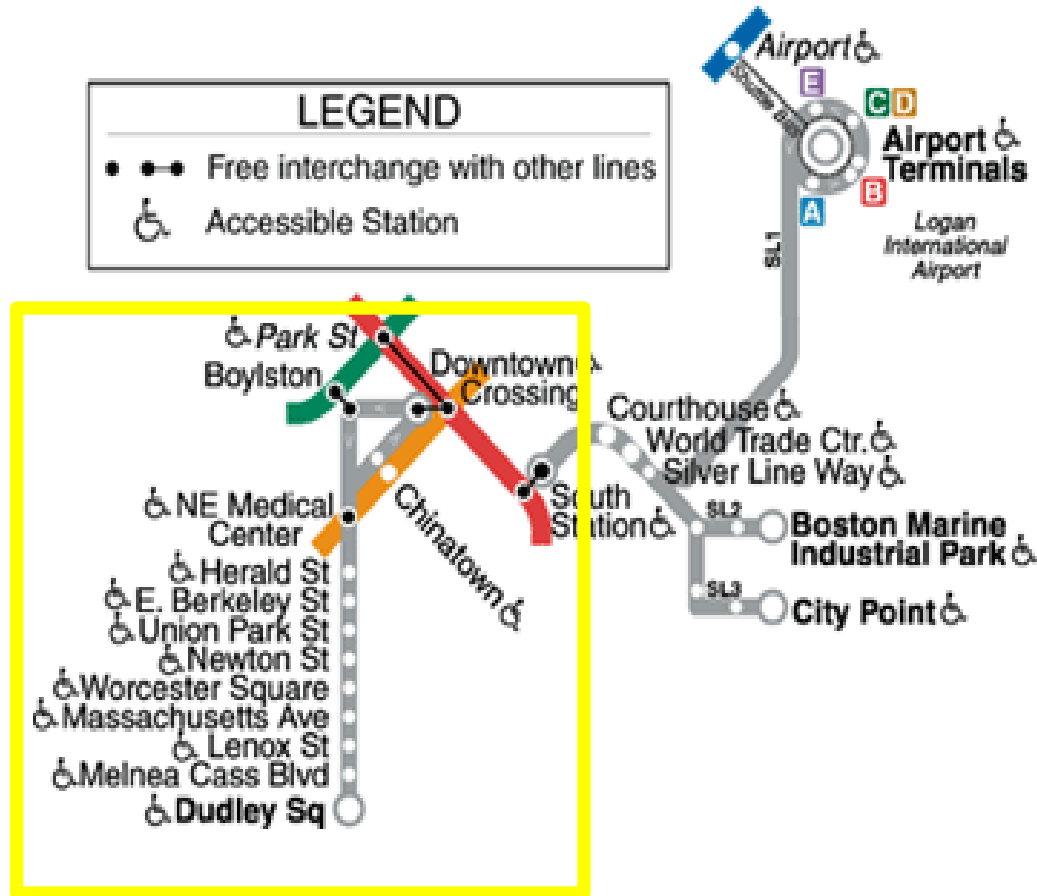
- A single-family home 1,000 feet away from a station is valued approximately \$9,745 *less* than a property 100 feet away, all else constant



# Boston Rapid Transit



# Boston Silver Line





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- Branded as part of MBTA's rapid transit system
  - Low-floor 60 ft. CNG vehicles
  - Exclusive bus lanes
  - 10-minute peak frequency
  - 15-minute off-peak frequency
  - Real-time passenger information
  - Transit signal priority
  - Phase I Washington Street opened July 2002
  - Phase II Waterfront opened December 2004
  - Proposed Phase III to connect the two

# Silver Line Washington St. Corridor



- As the first phase of the Silver Line, this corridor was selected for research
- Replaced MBTA Route 49
- Two routes operate along the corridor: SL4 & SL5
  - Provide two options into Downtown Boston
- 14 stations
- 15,500 daily boardings
- Over \$650M in development: retail, residential, office, medical



# Boston Data

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- Parcel data from City of Boston Assessing Department, 2003-2009
- Sales transactions of condominium units from the City of Boston, 2000-2009
- U.S. Census data
- Data set constructed using GIS
- Used only parcels located within one quarter-mile of the Washington Street corridor
- Data set contains approximately 5100 sales transactions from 2000 to 2009

# Variables

- Dependent variable: sale price per square foot
- Key independent variable: network distance of parcel to nearest BRT station
- Other variables
  - Property characteristics
  - Neighborhood characteristics
  - Local condo price index



# Variables

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- **Property characteristics**
  - Living area (sq. ft.)
  - Number of bedrooms
  - Number of full bathrooms & number of half-baths
  - Age of unit/structure
  - Distance to nearest BRT station (including squared term to test for increasing/decreasing marginal effects)
  - Number of parking spaces available
- **Neighborhood characteristics**
  - Median income
  - City ward/neighborhood fixed-effects (dummy variables)

# Boston Silver Line Results

- A condo 1,000 feet away from a station sells for \$45 per square foot *less* than a condo 100 feet away, all else constant (mean sale price: \$600/sq. ft.)
- No sales premium for distance to the corridor prior to the Silver Line opening



# Cleveland HealthLine

- Hedonic price regressions on sale prices of condominiums, single-family homes, townhomes
- Have data for all of Cuyahoga County with sales transactions from 1990 to 2011
- Also have data on commercial properties



# Cleveland HealthLine





# Policies & Potential Impacts on Development

- Any of these may provide incentive or disincentive for new developments or concentration of ongoing development along transit corridors
  - Local land use plans, policies, zoning, and capital improvement programs
  - Financial and non-financial incentives (e.g., density bonuses, tax incentives, streamlined development application process, loan support etc.)
  - Structure of tax revenues for local jurisdictions
  - Experience of the transit agency and other local institutions



# Closing

- With recent research on BRT in Pittsburgh, Boston, and Cleveland, we are beginning to show that proximity to BRT stations can have a positive effect on residential property values and sale prices
- These effects are very similar to those shown in the literature for LRT
- Communities need all available information on alternative modes for transit investments



# Land Use & Property Value Impacts of BRT



Research reports available at:  
[www.nbrti.org/research.html](http://www.nbrti.org/research.html)

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