Land Use Impacts of BRT: Effects of BRT Station Proximity on Property Values

Bus Rapid Transit and Transit Oriented Development Seminar
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Previous Work

- 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

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Hypothesis & Method

- We hoped to find statistically significant, positive impacts on surrounding property values from BRT, with magnitudes approaching those found for rail transit modes.
- Estimate the impacts of BRT on surrounding property values using hedonic regression model
  - 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

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First Application

- Pittsburgh East Busway
  - Operating since 1983
  - Serves Downtown Pittsburgh, eastern communities of Pittsburgh, and eastern suburbs of Allegheny County
  - Average weekday ridership: 25,000
  - Annual ridership: 7 million
  - 9.1 miles in length
  - 9 stations

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Data

- 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
- Used only parcels located in between the Allegheny and Monongahela Rivers, and within one half-mile of East Busway corridor

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Variables

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

Property Characteristics

- 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 nonlinearity)
- 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

- Population density
- Median income
- Percent of minority residents
- Crime per capita (dropped due to data problems)
- Municipality fixed-effects (dummy variables)

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Results

- Signs and magnitudes of most coefficients as expected
- **Moving from 101 to 100 feet from a station increases market value of single-family home by $19.00**
- **Moving from 1,001 to 1,000 feet from a station increases market value of a single-family home by $2.73**
- Magnitudes somewhat larger than expected
- Results statistically significant at the 5% level using heteroskedastic-robust standard errors

Caveats

- Results only valid for Pittsburgh's East Busway corridor using these data
- Magnitude of key coefficient (distance to BRT station) is larger than expected
- Spatial autocorrelation may be introducing bias to the key coefficient
  - Not able to correct for spatial autocorrelation in this effort
- Multi-family residences and commercial properties not examined
- Due to data limitations, a cross-section (one point in time) analysis was employed
  - Ideally, a before-and-after scenario would be used

Coming Work

- Address caveats discussed previously
- Refine method and apply to other cities
  - Boston
  - Cleveland
  - Los Angeles
  - Eugene…

Policies and Potential Impacts on BRT and Development

Understanding the relationship between land use & BRT

Question of incentives offered in cities where BRT and LRT operate

Report on land use policies that may impact development around BRT and/or other transit modes

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Cleveland – Euclid Corridor

- Over $4 billion in investment
- Retail, residential, office

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Ottawa

- $700 million in development around stations
- Retail, office, residential

Boston – Washington Street

- Over $650 million
- Retail, residential, office, health

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Boston Seaport

- Fan Pier, Courthouse, World Trade Center
- Retail, residential, office, health

Pittsburgh

- Over $500 million
- Commercial, residential, office, medical, recreational

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MLK, Jr. East Busway (Pittsburgh)

Community	Type of Development	Type of use	New Construction or Redevelopment	Value of Investment
Wilkinsburg				
	Apartments*	Residential	New	$1,340,000
	Bank*	Bank	New	$76,000
	Convenience Store*	Retail	New	$210,000
	Drug Store*	Retail	New	
	Fast food restaurants (4)*	Retail	New	$832,000
	Hospital*	Medical	New	$5,526,000
Homewood				
	Community College*	Institutional	New	$275,000
	Farmers Market*	Retail	Redevelopment	$900,000
	Single family residence*	Residential	New	$1,871,000
	Single family residences*	Residential	New	$1,484,000
Point Breeze				
	Research and Engineering offices	Office	New	$32,800,000
	University offices	Office	Redevelopment	$1,350,000
East Liberty				
	Fast Food restaurant	Retail	New	$213,000
	Shopping center	Shopping center	New	$4,300,000
	Association offices*	Office	Redevelopment	$524,000
	Bank*	Bank	New	$53,000
	Condominiums*	Residential	New	$548,000
	Health Club*	Recreation	New	N/A
	Medical offices*	Medical	Redevelopment	$397,000
	Medical offices*	Medical	New	$58,000
	Organization Headquarters*	Office	Redevelopment	$14,000,000
	Painters Store*	Retail	New	$310,000
	Restaurant*	Retail	Redevelopment	$960,000
	Shopping center (8 tenants)*	Retail	New	$2,816,000
	Theatre and shops*	Theatre/retail	Redevelopment	$1,360,000
	Townhouses*	Residential	New	$25,000,000
Shadyside				
	Apartments	Residential	Redevelopment	$20,000,000
	Apartments	Residential	New	$2,600,000
	Hospital, Medical offices, parking garage	Medical/parking	New	$43,798,000
	Offices	Office	Redevelopment	$4,500,000
	Offices	Office	Redevelopment	$200,000

* Development clustered at the stations

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Plans, policies, and institutions

- 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

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Policies

- Ottawa, ON
- Boston, MA
- Los Angeles, CA
- Baltimore, MD
- New York, NY
- Pittsburgh, PA

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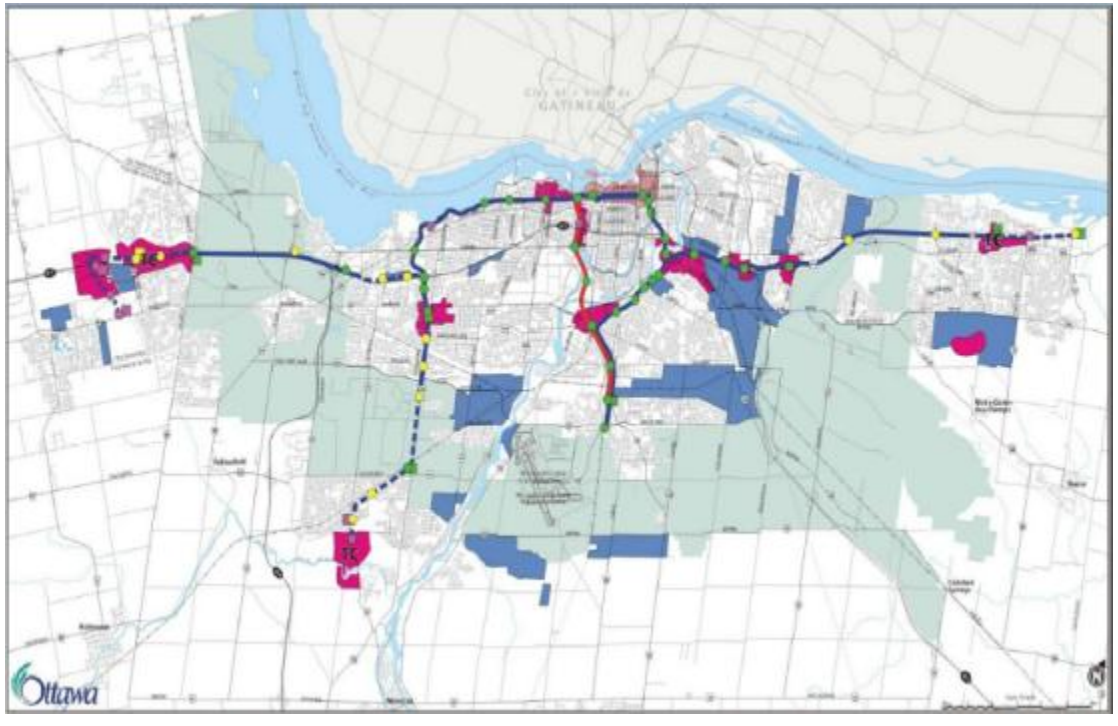
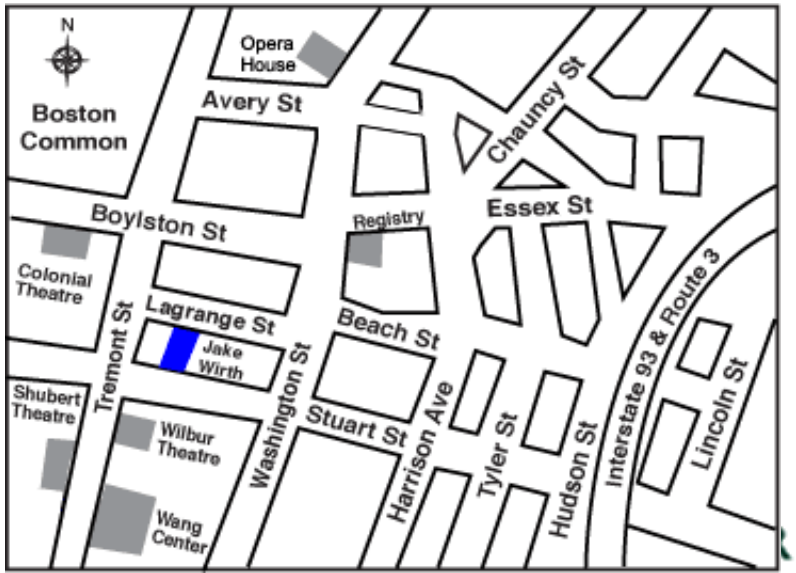
Ottawa Policies

- Greenbelt
  - Development occurring within certain areas
- Restrictions on future developments
  - Regional Official Plan
  - Parking limits



Boston Policies

- Boston (Boston Redevelopment Authority)
  - site acquisition, low-interest loans, joint development opportunities, multi-agency coordination, neighborhood visioning, grants, and streetscape improvements
  - Encourages developers to make projects pedestrian-friendly, mixed-use, and use minimal parking
  - Does not require these or other design standards to be met in order to receive the assistance that it offers
- Boston Agreements with EPA
  - Boston was allowed to freeze its parking requirements at the 1973 level plus 10 percent, which includes all general parking in Boston proper



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Los Angeles, CA

- Metro Rail, Metro Orange Line, Metro Rapid
  - Specifically focused on Orange Line
- Local jurisdictions and Metro helped create supportive land use policies and joint development agreements
  - City of Los Angeles (incentive measures), County of Los Angeles (combine incentives with development standards)
- 1993 City of Los Angeles Land Use and Transportation Policy was adopted
  - Created a series of incentives to projects within ¼ mile of transit stations

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Los Angeles, CA

- City also asks for local contribution toward construction cost of any fixed guideway transit
    - Target is three percent of total cost
- Metro provided supplementary zoning regulations for transit stations along the Blue Line
- 1992 Pacific Court Project – Redevelopment Agency program to reintroduce housing to Long Beach
  - Unintentional effort by Metro and city to encourage TOD
  - Financing incentives (wrote down cost of land and tax-exempting financing)

Pittsburgh, PA

- Light Rail, BRT
- Port Authority of Allegheny County (PAT) has not established any local, county, regional policies for TOD
  - Development occurring informal basis based on interest and public involvement

Pittsburgh, PA

- 2004 Pennsylvania Legislature
  - Allow local governments to create Transit Revitalization Investment Districts (TRID)
  - Lay the groundwork for TODs
  - No difference between rail and BRT

Baltimore, MD

- Light rail, Metro Subway, Commuter Bus, and MARC Train
- Had proposed 10.5 mile BRT route
- MDOT aggressively promotes TOD
  - Promote efficient and sustainable growth
- Maryland Base Realignment Zones (BRAC)
  - Local governments to provide state financing support for public infrastructure to these zones – for rail

New York, NY

- Extensive transit system
  - Five designated BRT corridors
- Incentives for development not specific toward mode
  - Limited ROW
- Blue Ribbon Commission on Sustainability of MTA ("green" focus)
  - Controlling growth by utilizing TODs
    - Two thirds of new development within ¼ to ½ mile of bus and subway stops
- Parking limits
- Ongoing efforts to update zoning by considering travel behaviors/patterns within areas

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