

Traffic calming and neighborhood livability: Evidence from property prices in Portland

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Motivation

- ▶ Dual role of street network in residential urban areas:
 - ① Transportation of people and goods.
 - ② Public amenity: leisure/social space.
- ▶ Large emphasis on ① since mass-production of automobile, but recent re-emergence of ② in urban policy debate:
 - ▶ Rising interest for car-bans in CBDs
 - ▶ 10 major U.S. cities in 2012-2015 launched a "Vision-Zero" program to reduce automobile speeds and volumes and make streets safer for pedestrians and cyclists.
 - ▶ Many advocacy groups supporting greener and more livable ("complete") streets.

Motivation

High and/or fast car traffic is a sizable urban disamenity which typically gets capitalized into home prices (Ossokina & Verweij, 2015). More specifically:

- ▶ Increased level of noise
 - Theebe (2004), Cohen & Coughlin (2008)
- ▶ Air pollution
 - Currie & Walker (2011), Chay & Greenstone (2005)
- ▶ Increased risk of collision and injury

Traffic calming is meant to mitigate the above when neighborhood streets are out of character with their intended residential and recreational use.

Research Question

How effective are traffic calming and bicycle-oriented development at increasing neighborhood livability?

Following Rosen (1974), the economic value of "street livability" can be recovered by examining behavior in the housing market. If traffic calming and bicycle greenways improve the urban environment of nearby residents, home prices should reflect this improvement.

Portland, Oregon

In the U.S., Portland is arguably the poster child for urban policies geared towards neighborhood livability and "bicycle-friendliness".

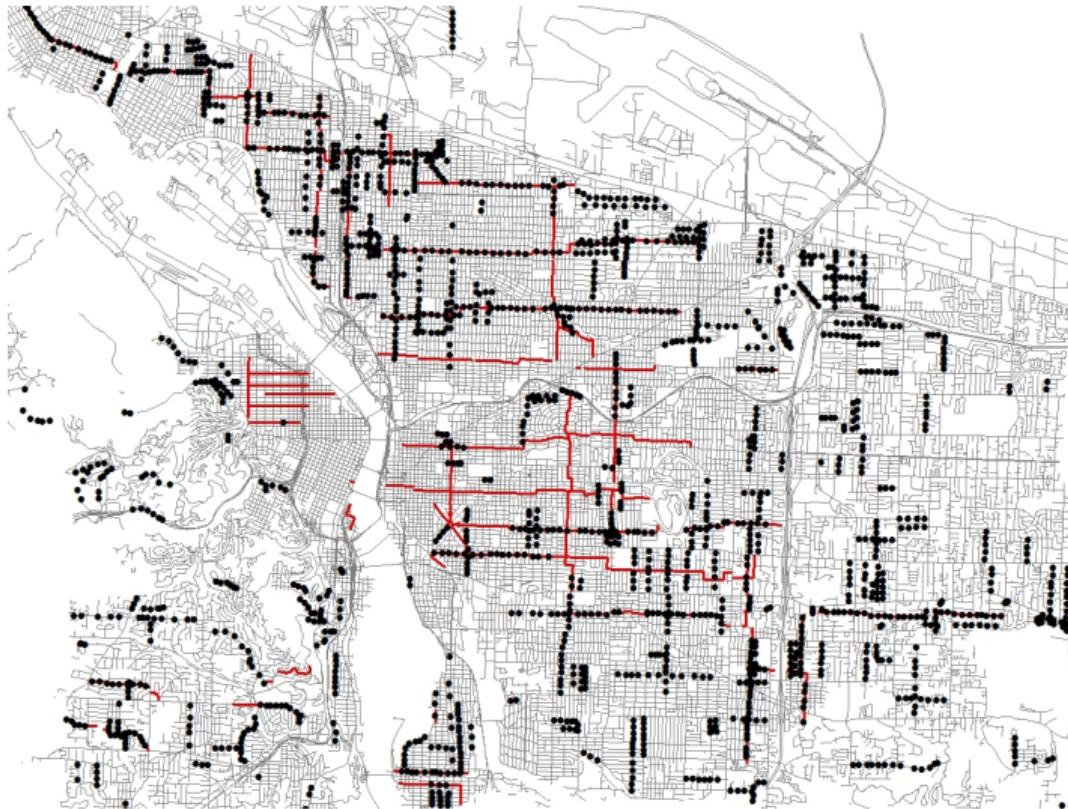
Portland's Traffic calming program:

- ▶ Aims at reducing vehicle speeds and encouraging the use of more appropriate streets for through trips.
- ▶ 2-3 M\$ yearly annual budget in the 1990's (for capital expenses)
- ▶ More than 1500 calming devices installed since 1988. This includes speed bumps, medians, diverters, traffic circles, etc.

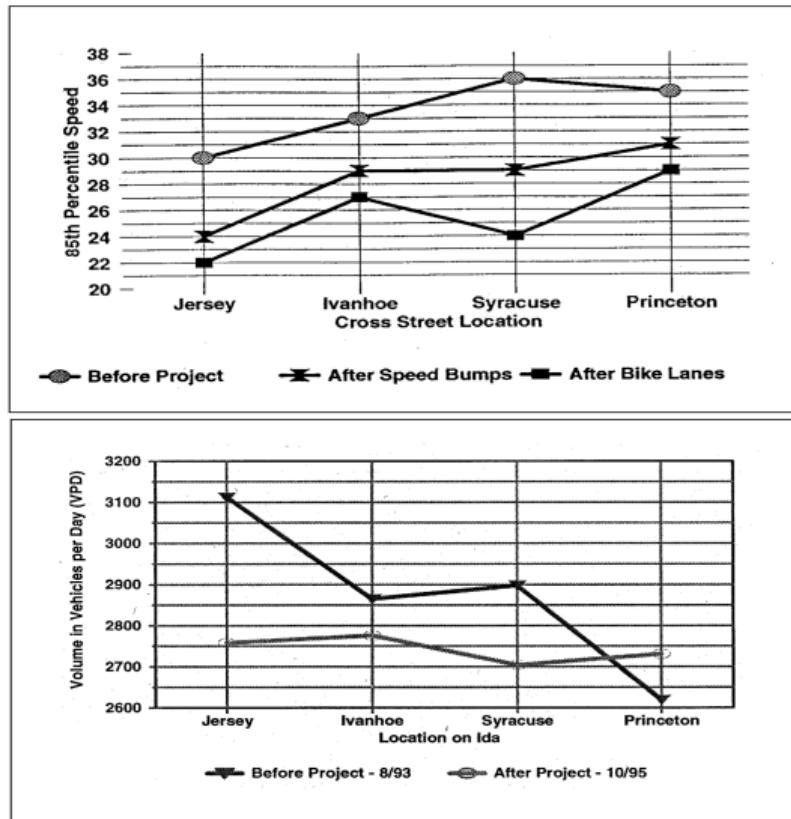
Neighborhood Greenway program:

- ▶ 70 miles of residential streets accommodated to prioritize cyclists and pedestrians. Low speeds and volumes are enforced using traffic signals, curb extensions, and calming devices.
- ▶ 60M\$ spent so far, 600M\$ planned as part of the "2030 Bike Plan".

Portland, Oregon



Portland, Oregon



Data

Real-Estate Transactions:

- ▶ Data on 169,905 residential properties obtained from the Multnomah County division of Assessment and Taxation, through government sponsored public web-tool *portlandmaps.com*.
- ▶ For each property, full sales history for 1988-2015 period is observed.
- ▶ Limited set of physical characteristics: land area, floor space, year built, #floors, # bathrooms, # fireplaces, roof style, and presence of garage or patio. **No temporal variation.**

Traffic Calming & Greenways:

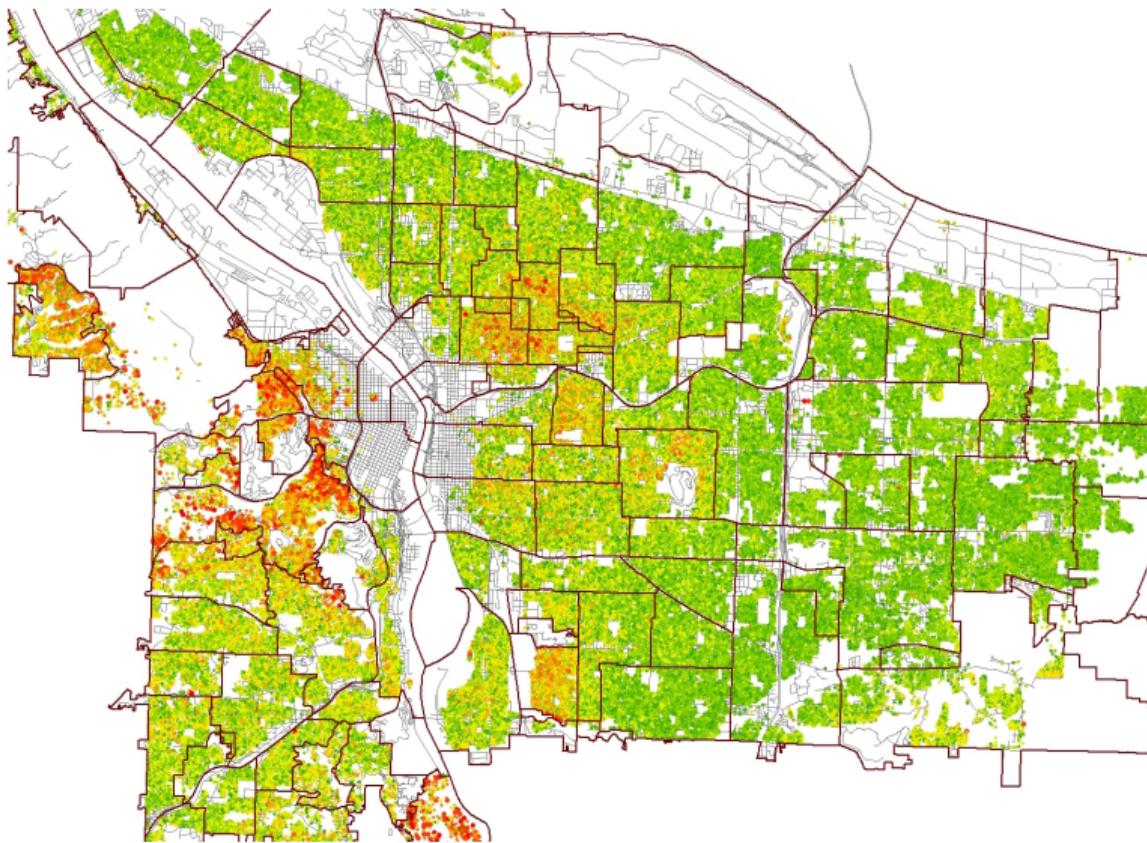
- ▶ PBOT provided various inventory lists of traffic calming devices.
- ▶ Assembled shapefile containing precise location and installation date for 1532 devices (>95% speed bumps) during the 1991-2012 period.
- ▶ Complete map of active Neighborhood greenways with inauguration year.

Data

Other Data Sources:

- ▶ Automobile speeds and daily volumes at various location-years around Portland.
- ▶ Geographical Boundaries of 128 Neighborhoods containing houses in dataset.
- ▶ Street grid with detailed hierarchical classification (Highway, Arterial, Collector, Local)
- ▶ Location of reported car crashes (with limited detail) for 2007-2014.
- ▶ Performance Report for 92 calming projects during 1994-2002 period, totalizing 41.5 miles of streets and 436 of 1532 devices in master shapefile.

Data

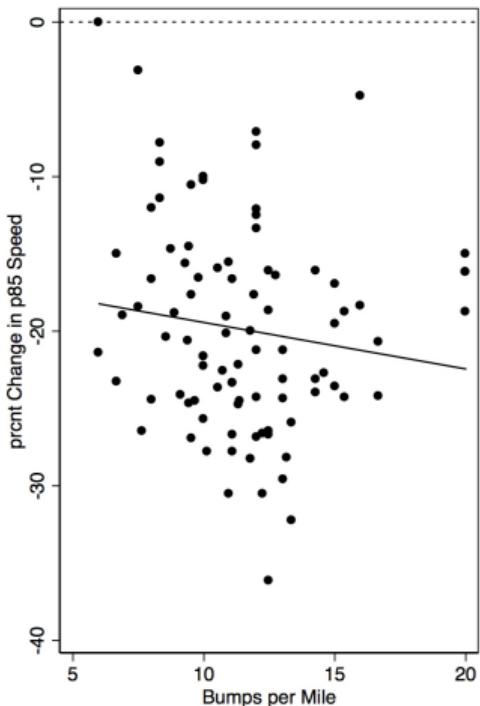
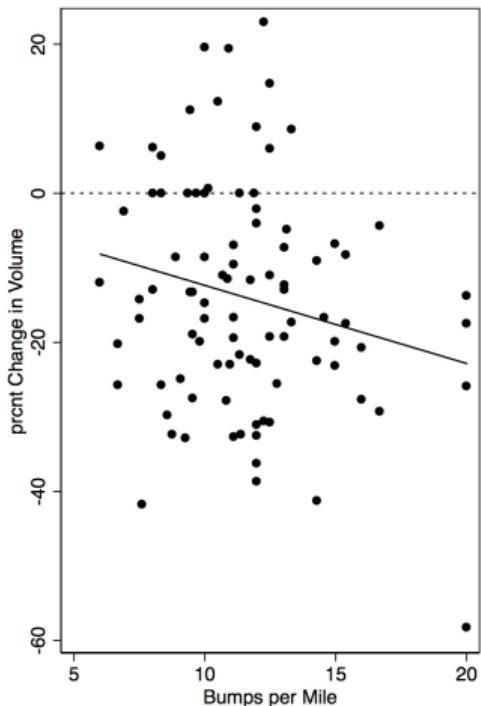


Performance of Calming projects

	Δp85 Spd.	%Δp85 Spd.	% ΔVol.	bump/mi.
mean	-6.793919	-19.92%	-14.34%	11.54
std dev	(2.494133)	(6.77%)	(15.55%)	3.04
min	-12.5	-36.13%	-58.33%	6
max	0	0%	22.97%	20

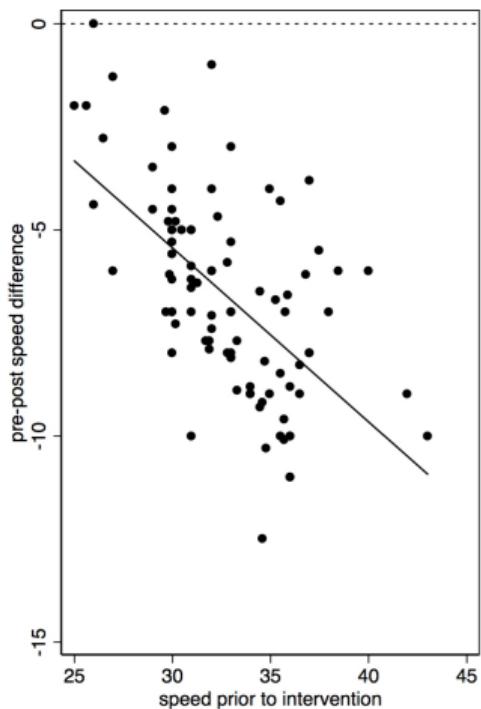
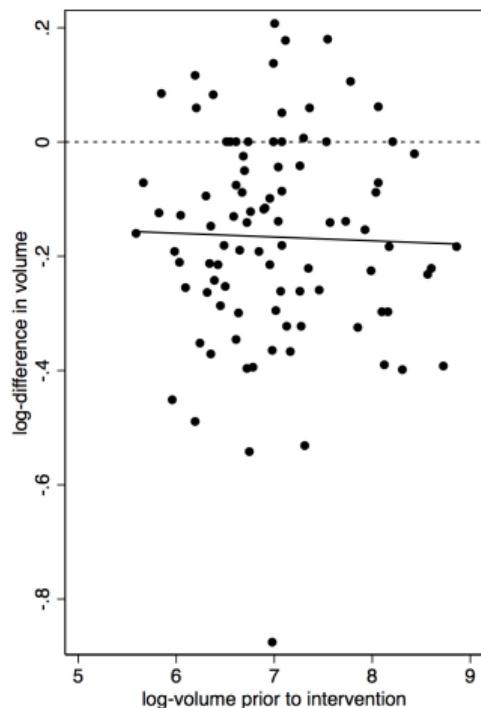
Performance of Calming projects

Speed and Volume reductions as a function of spacing.

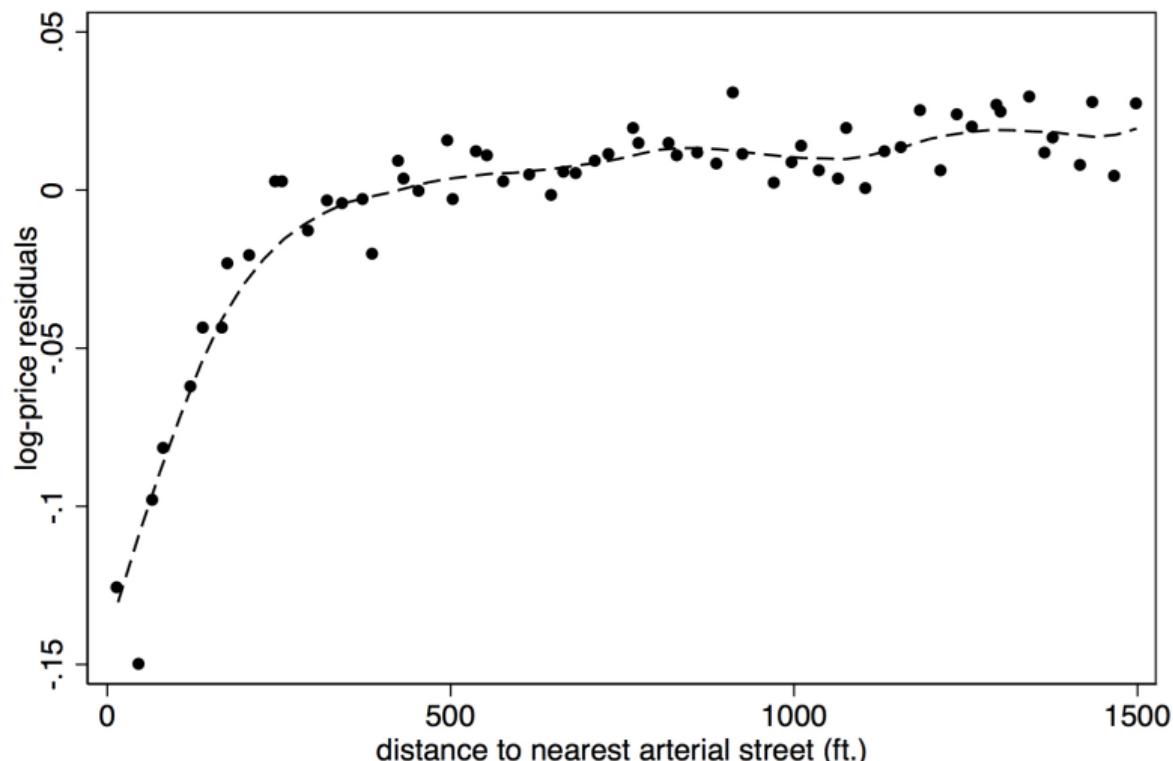


Performance of Calming projects

Speed and Volume reductions as a function of initial Speed and Volume.

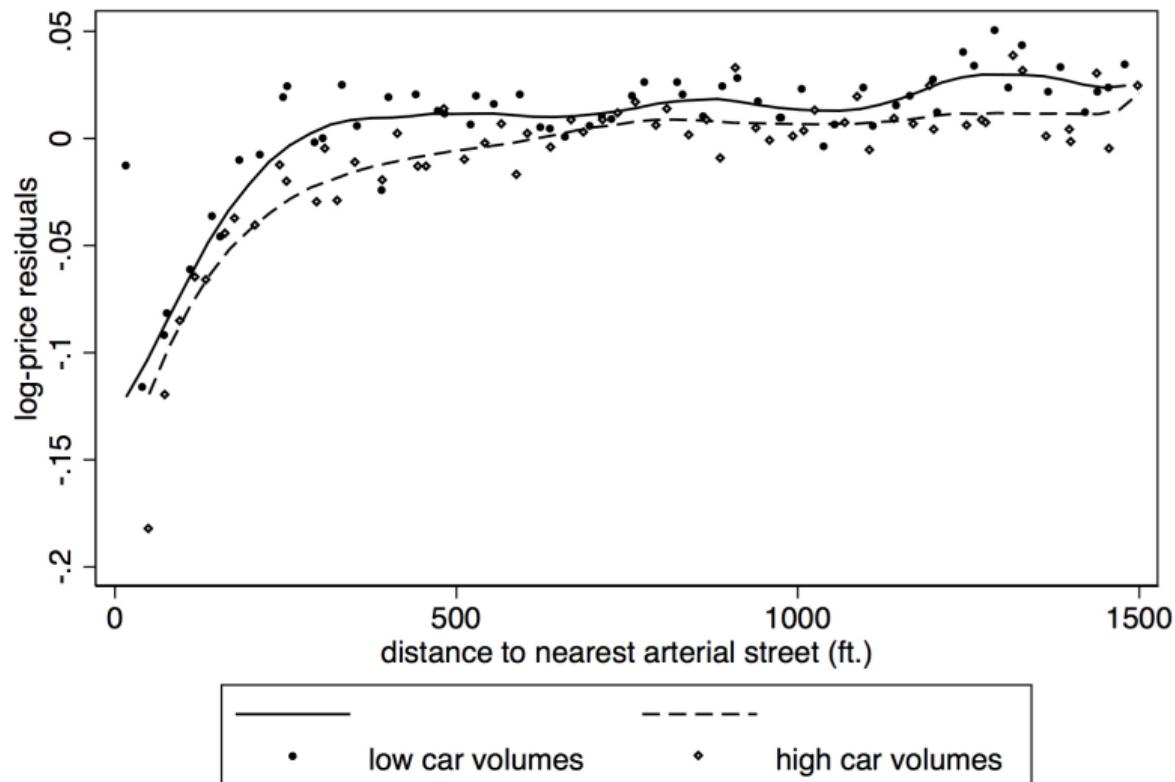


Preliminary look: House prices and Arterial Streets



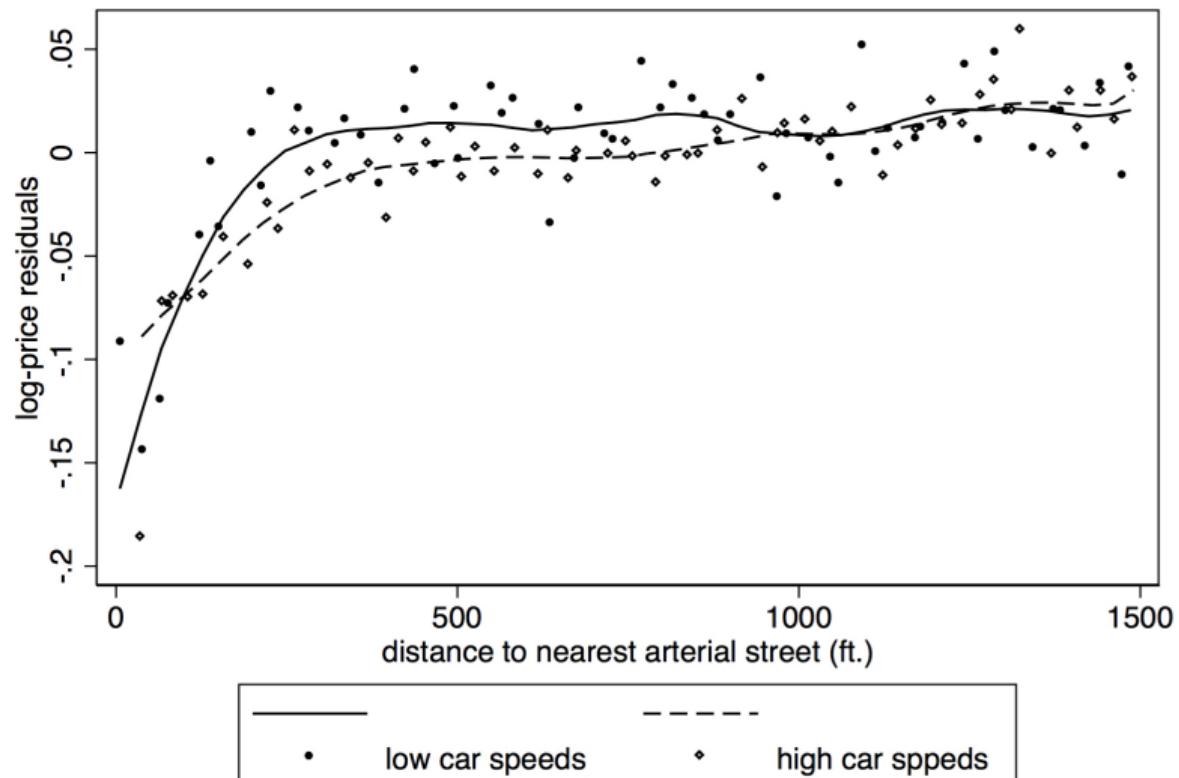
Regression includes entire set of house characteristics, month of transaction dummies, neighborhood FE and subquadrant*year FE. Sample limited to houses within 1500 feet of arteries, N=178165

Preliminary look: House prices and Arterial Streets



same specification, sample further restricted to arteries with observed volume, N=153711

Preliminary look: House prices and Arterial Streets



same specification, sample further restricted to arteries with observed speeds, N=92414