

Does Luxury Housing Construction Increase Rents in Gentrifying Areas?

Brian Asquith, Evan Mast, and Davin Reed

Motivation

- Housing costs are rapidly rising in many large cities and central neighborhoods
- Potential solution: build more housing
 - But story may be more complicated than standard supply/demand models
- Induced demand hypothesis:
 - If new housing supply improves neighborhood amenities, this could further increase demand for the area, causing housing costs to **increase**
 - Particularly relevant in gentrifying areas, barrier to new housing construction
- Little to no empirical evidence on whether induced demand exists

Concerns of induced demand influence housing policy

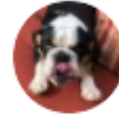
News

Activists protest controversial proposed upscale Pilsen apartment development

April 2, 2016

Brooklyn activists protest plans to build luxury apartments

ASHOKA JEGROO | MARCH 7, 2016



David Campos
@DavidCamposSF



Status quo not working for Mission. Pause on LUXURY housing will allow time for City to develop plan for building affordable housing needed!

1:44 AM · May 5, 2015

REAL ESTATE

SF activists protest 'Monster in the Mission' luxury apartments

Induced demand is plausible

- Economists have generally not taken induced demand seriously
- However, recent research suggests neighborhood amenities are highly valued and endogenously determined
 - Guerrieri, Hartley, and Hurst (2013), Albouy and Stuart (2018), Diamond (2016)
- Implies that changes in neighborhood composition can change amenities, and these amenities are important enough to change demand
- Whether induced demand exists is an **empirical** question

Data and methods

Data

- Newly constructed apartments: hand-collected new apartment construction data
- Rents: listing-level rental prices from HotPads (rental arm of Zillow Group)
- Migration: household address histories from Infutor

- Span at least 2012-2018, contain exact locations, cover 11 major cities

Methods

- Spatial difference-in-difference:
 - Before vs. after completion of new building
 - Within 200 meters vs. 200 to 800 meters from new building (city blocks)

- Triple difference with placebo neighborhoods:
 - Placebo = location of *future* apartment construction

Preview of findings

1. New construction decreases listed rents within 200m of new building relative to listings 200-800 meters away
 - a. About \$200 per month on average
 - b. This pattern does not appear in placebo neighborhoods

2. New construction increases in-migration from rich areas, but by less than the increase in supply
 - a. Number of rich in-migrants to other buildings near new construction *decreases* by about 15% relative to placebo neighborhoods
 - b. Likely mechanism for observed rent decreases

3. Overall, evidence that new apartment construction does not increase nearby prices
 - a. Caveats: short-run estimates, average effect

Our contributions

1. Estimate the effect of new construction on nearby housing costs
 - a. To our knowledge, no existing well-identified reduced form estimates of this elasticity
 - b. Caveat: we study only luxury multifamily buildings in gentrifying areas
2. Show how changes in migration drive the effect on housing costs
3. Find evidence suggesting that induced demand from new housing construction does not raise rents in gentrifying areas
 - a. Caveat: this effect is local to the types of neighborhoods where developers currently have built new buildings.

Overview

1. Rental Analysis

- a. Data
- b. Empirical Strategy
- c. Results

2. Migration Analysis

- a. Data
- b. Empirical Strategy
- c. Results

Rental Analysis

Rental Data and Summary Statistics

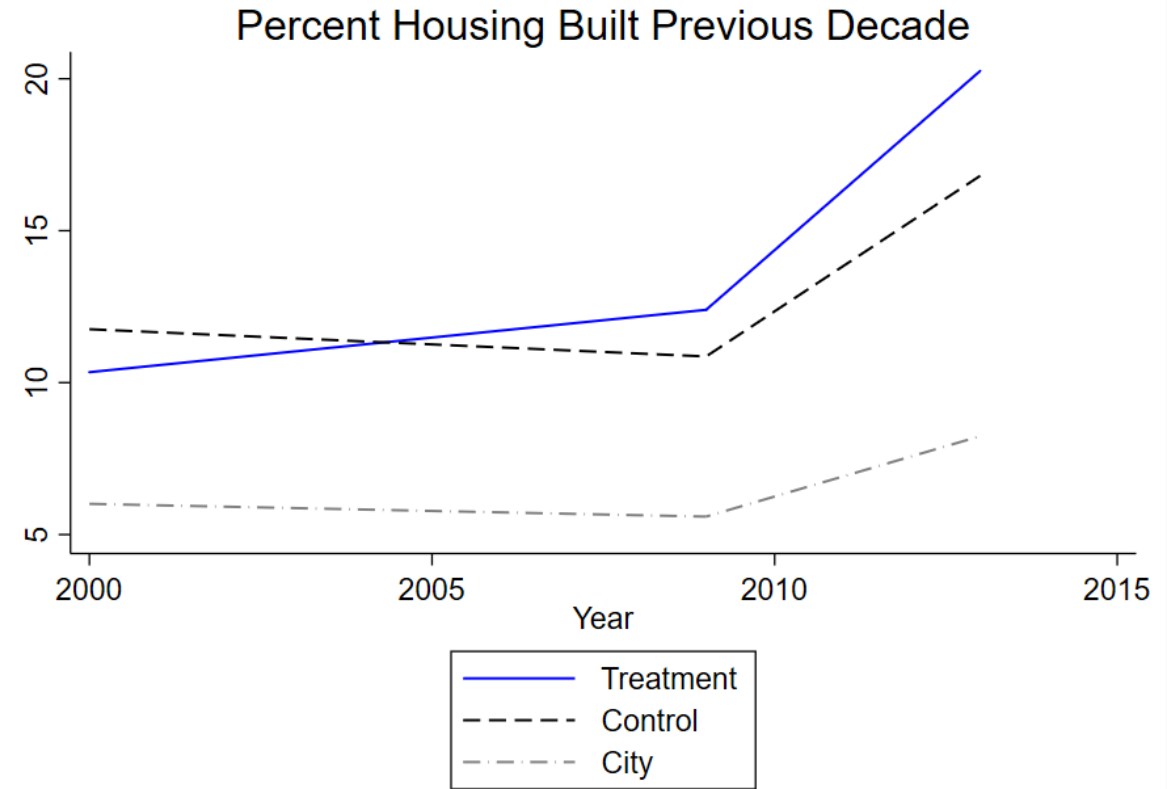
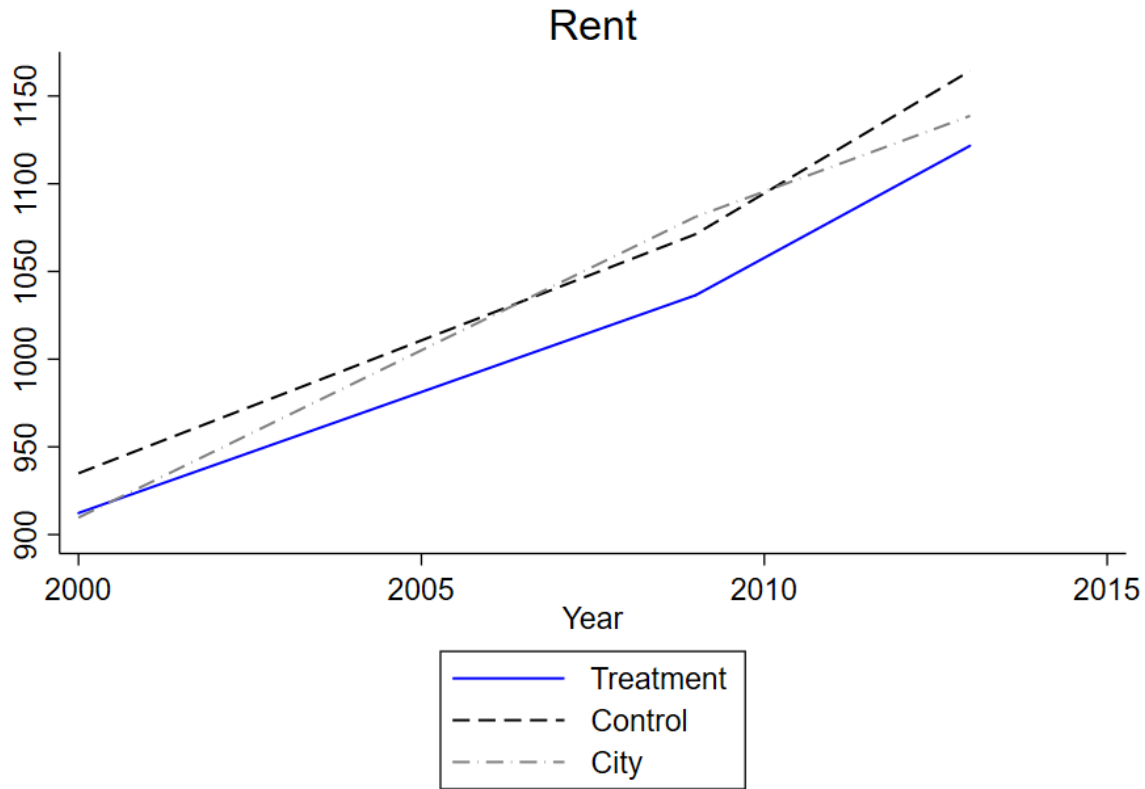
Data on new apartment construction

1. Hand-collected data on luxury apartments from 11 major, strong market cities
 - a. 100 buildings per city
 - b. Exact address, date constructed, number of units
2. Focus our analysis on isolated buildings: no other luxury building within 500 meters
 - a. Proxy for gentrifying areas
3. Treatment buildings: 52 isolated buildings constructed 2014-2016
4. Control buildings: 49 isolated buildings constructed 2017-2018
 - a. Study the pre-construction period where buildings have not yet affected market

Characteristics of treatment and placebo neighborhoods

1. Similar upwards trends in rent, age of housing stock, and education in tracts around treatment and control buildings leading up to study period
 - a. Upward trajectory and lack of other luxury buildings suggest gentrifying areas
2. However, both treatment and placebo areas already wealthier than city average
 - a. Suggests that new complexes tend to be built in later stages of gentrification
 - b. Future work will study buildings in different neighborhood types separately, explore different definitions of gentrification

Rent and housing stock in treatment and placebo

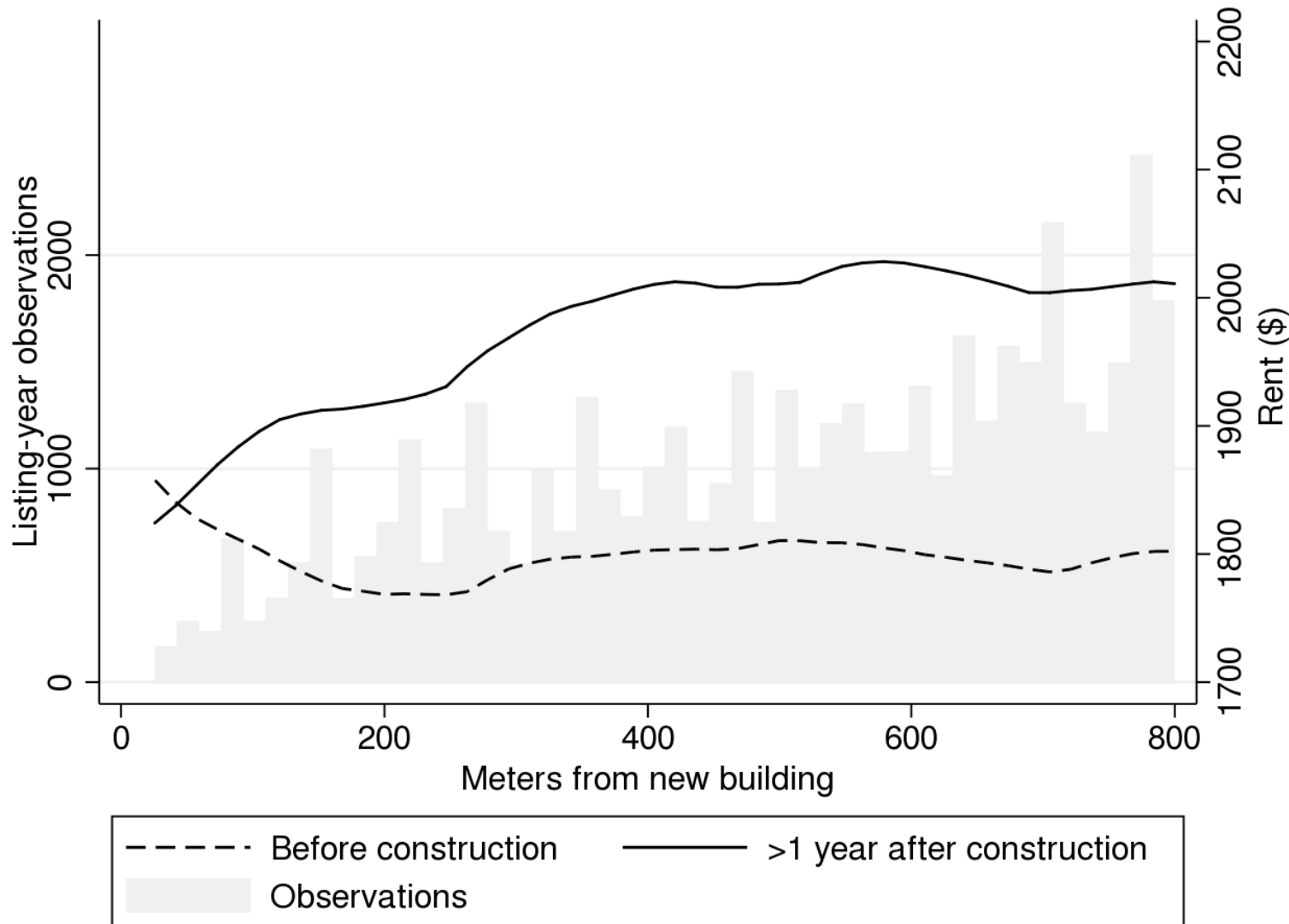


1. Data from Census 2000 long form, ACS 2005-2009, and ACS 2009-2013
2. Characteristics of tract containing new building
3. Note this time series ends before our buildings are completed

Data on rental prices

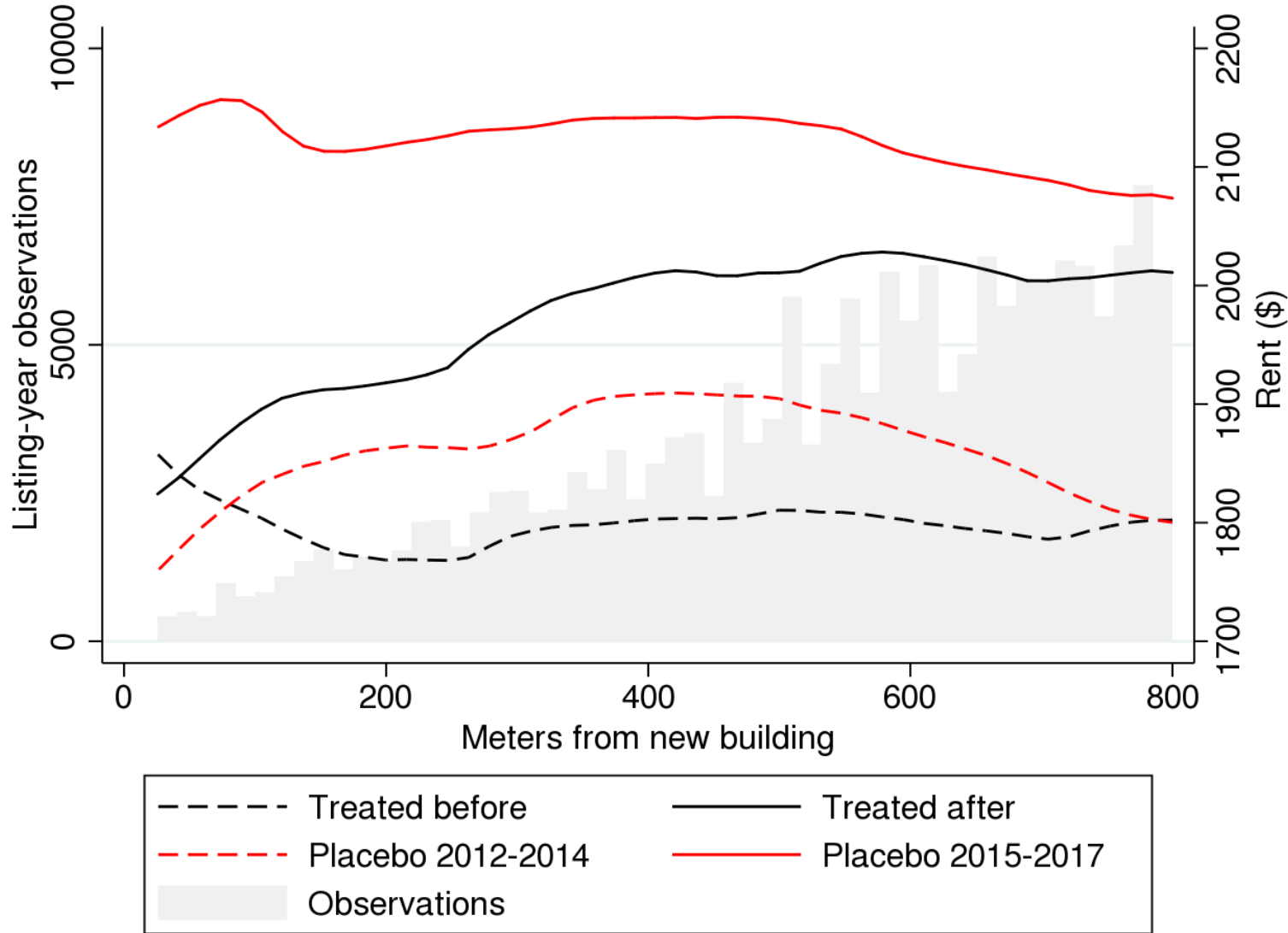
1. Provided by HotPads (rental arm of Zillow Group)
 - a. Includes listings from Zillow, Trulia, StreetEasy, and HotPads
 - b. Includes 11 major metropolitan areas covering 2012-2018
 - Atlanta, Austin, Chicago, Denver, Los Angeles, New York City, Philadelphia, Portland, San Francisco, Seattle, and Washington, D.C.
2. Data is at the listing level
 - a. Observe price, address, date of posting, and bedroom count
 - b. About 700,000 units within one kilometer of luxury building
3. Subset of total listings
 - a. Buildings with less than 50 units
 - b. Unpaid (includes almost all buildings with less than 50 units)

Rent versus distance to new building, before/after completion



- Rent increases less in units near the new construction
 - [Demeaned version](#)
- Consistent with new apartments reducing demand for surrounding area
- Notes:
 - Includes listings near 52 isolated new buildings
 - Completed 2014-2016
 - No other luxury apartment complex within 500 meters
 - Excludes listings in new building

Rent versus distance to new building, comparison to placebo group



- This pattern is not true in a placebo group—the areas around future construction
 - [Demeaned version](#)
- These placebo areas appear to be otherwise similar to treated areas, suggesting that the lower price growth near the new buildings is not driven by other factors
- Notes:
 - Treated=isolated buildings completed 2014-2016 (52)
 - Placebo=isolated buildings completed 2017-2018 (49)
 - Excludes listings in new building

Rentals value data provided by HotPads. The results and opinions are those of the authors and do not reflect the position of HotPads.

Rental Empirical Strategy

Approach 1: Spatial diff-in-diff/event study

- Compare rent in units near/far from new building before/after construction
 - Restrict to isolated buildings (no other construction within 500 meters)
 - Include buildings completed in 2014, 2015, 2016
 - Use years-to-treatment dummies to observe dynamics
 - Use indicator for new building as treatment, or indicator scaled by # new units
- Details
 - Time trend at (New building)*(bedrooms in unit)*quarter level
 - Cluster errors at building/bedroom/quarter level
 - Weight each new building equally

Specification for spatial event study

Rent in listing i in quarter t is given by:

$$\text{Rent}_{it} = \gamma_{rbt} + \sum_{k=-3 \text{ to } 3} [\beta_k * I_{it}(\text{years to treatment} = k)] + \varepsilon_{it}$$

Where:

1. Treated group is listings within 200 meters of new construction
2. Control group is 200-800 meters
3. γ_{rbt} is a bedroom-quarter-nearby building fixed effect.
4. Only listings near 2014-2016 buildings are included

Identification assumption: In the absence of construction, rent would have changed in parallel in near vs. far areas

Approach 2: Triple-difference

1. Add an additional difference to the previous setup:
 - a. Compare the gap between near/far units by *actual* 2014-2016 construction to the gap between near/far units by *future* 2017-2018 construction
 - b. This relaxes previous identification assumption:
 - a. Accounts for *time-varying* omitted variables that affect both areas near 2014-2016 and areas near 2017-2018 construction
 - c. Essentially embeds a placebo test to previous regression

Specification for triple difference

Rent in listing i in quarter t is given by:

$$\text{Rent}_{it} = \gamma_{rbt} + \alpha_{nt} + \sum_{k=-3 \text{ to } 3} [\beta_k * I_{it}(\text{years to treatment} = k)] + \varepsilon_{it}$$

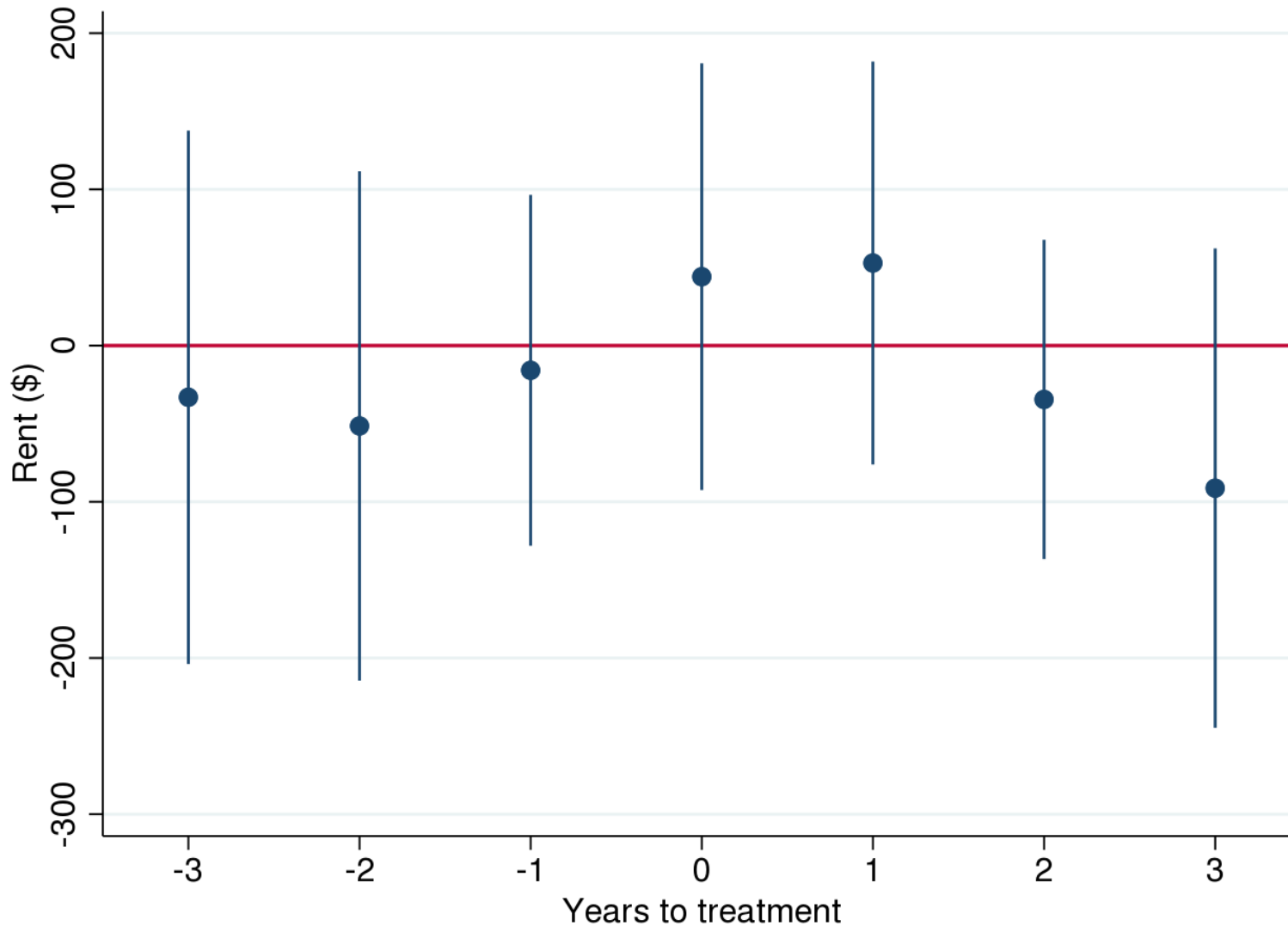
Where:

1. Treated group is listings within 200 meters of 2014-2016 construction
2. Listings near 2014-2018 construction are included
3. γ_{rbt} is a bedroom-quarter-nearby building fixed effect
4. α_{nt} is a within-200-meters-quarter fixed effect

Identification assumption: In the absence of construction, the rent differential in the inner vs. outer ring would have changed in parallel in areas near 2014-2016 and 2017-2018 construction.

Results on Rental Prices

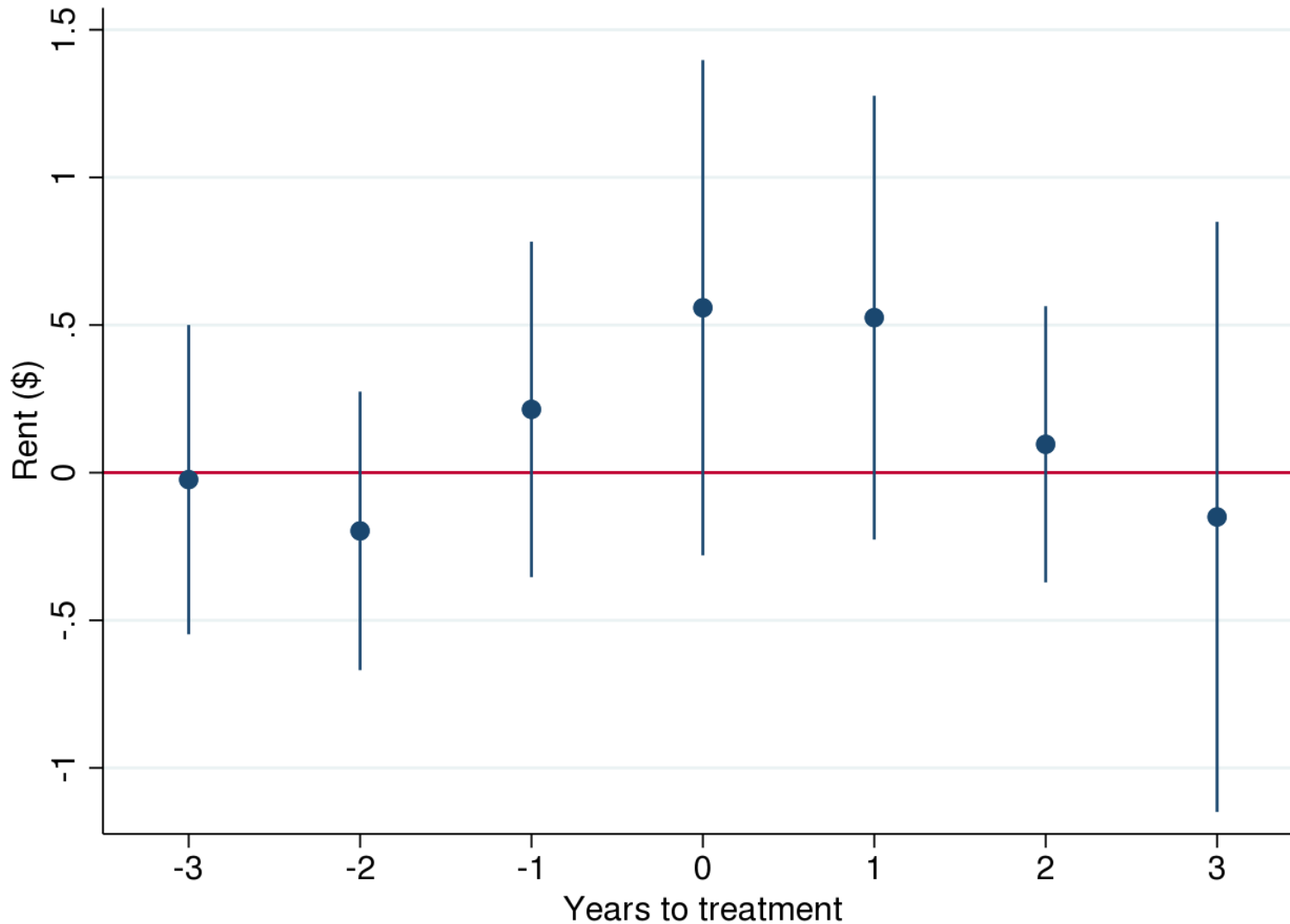
Within 200 m vs. 200-800 m from new construction



- Trends in rents appear to change around the year a new building is completed
- Rents within 200m were previously increasing faster, but opposite is true after construction

- Notes:
 - Treatment is 0-1
 - Includes 52 isolated new buildings
 - Completed 2014-2016
 - No other luxury apartment complex within 500 meters
 - Excludes listings in new building

Event study with scaled treatment variable

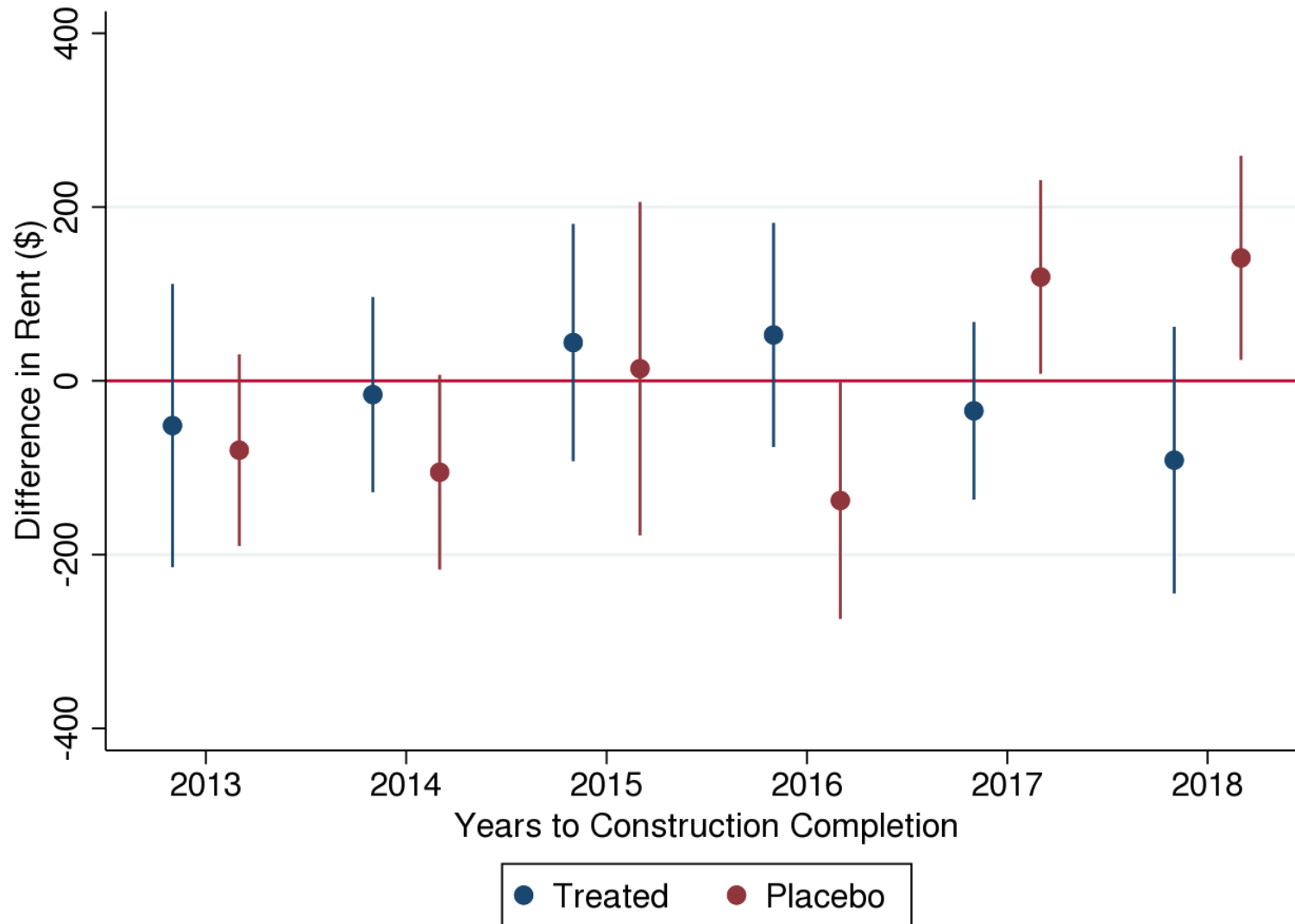


- The pattern is similar when treatment variable is scaled by number of units in new building

- Notes

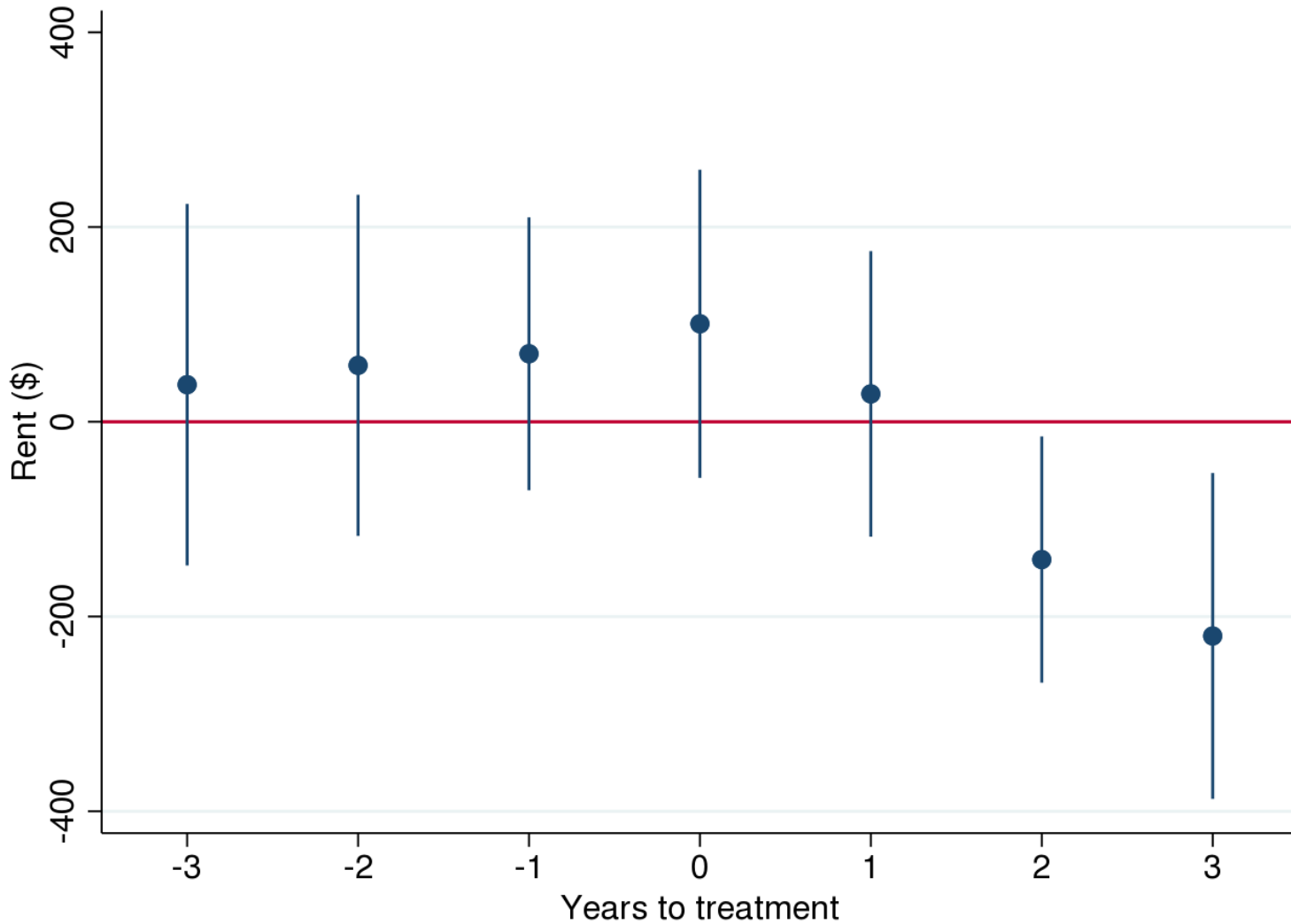
- Treatment scaled by # units in new building
- Includes 52 isolated new buildings
 - Completed 2014-2016
 - No other luxury apartment complex within 500 meters
- Excludes listings in new building

Near vs. far event study in treated versus placebo areas



- Rents in the inner ring continued to grow faster than the outer ring in placebo areas
 - Suggest the difference in treated areas was not driven by other factors
- Blue dots show DD with 2014-2016 construction
- Red dots show same DD with 2017-2018 construction

Coefficients from triple-difference event study



- Each coefficient shows the difference between the near-far gap in treated areas and the near-far gap in placebo areas (blue – red from previous figure)
- Areas near the new construction see prices decline after building is completed

- Notes:

- Treatment is 0-1
- Treated=isolated buildings completed 2014-2016 (52)
- Placebo=isolated buildings completed 2017-2018 (49)
- Excludes listings in new building

Are underlying trends different in areas around 2014-2016 vs. 2017-2018 construction?

1. It could be that earlier construction indicates stronger upward trends in the area.
 - a. Our results would then understate the true effect of new construction.
2. Alternatively, it could be that areas near earlier construction were in later stages of gentrification, and rent increases would have slowed down anyway.
 - a. Our results would then overstate the true effect of new construction.
 - b. Future work: study timing of developments in more detail to investigate story
 - i. Demographics surely matter, but many idiosyncratic frictions to development
3. Parallel trends in pre-period support our identification assumption.

Migration Analysis

Migration Data and Summary Statistics

Data on migration

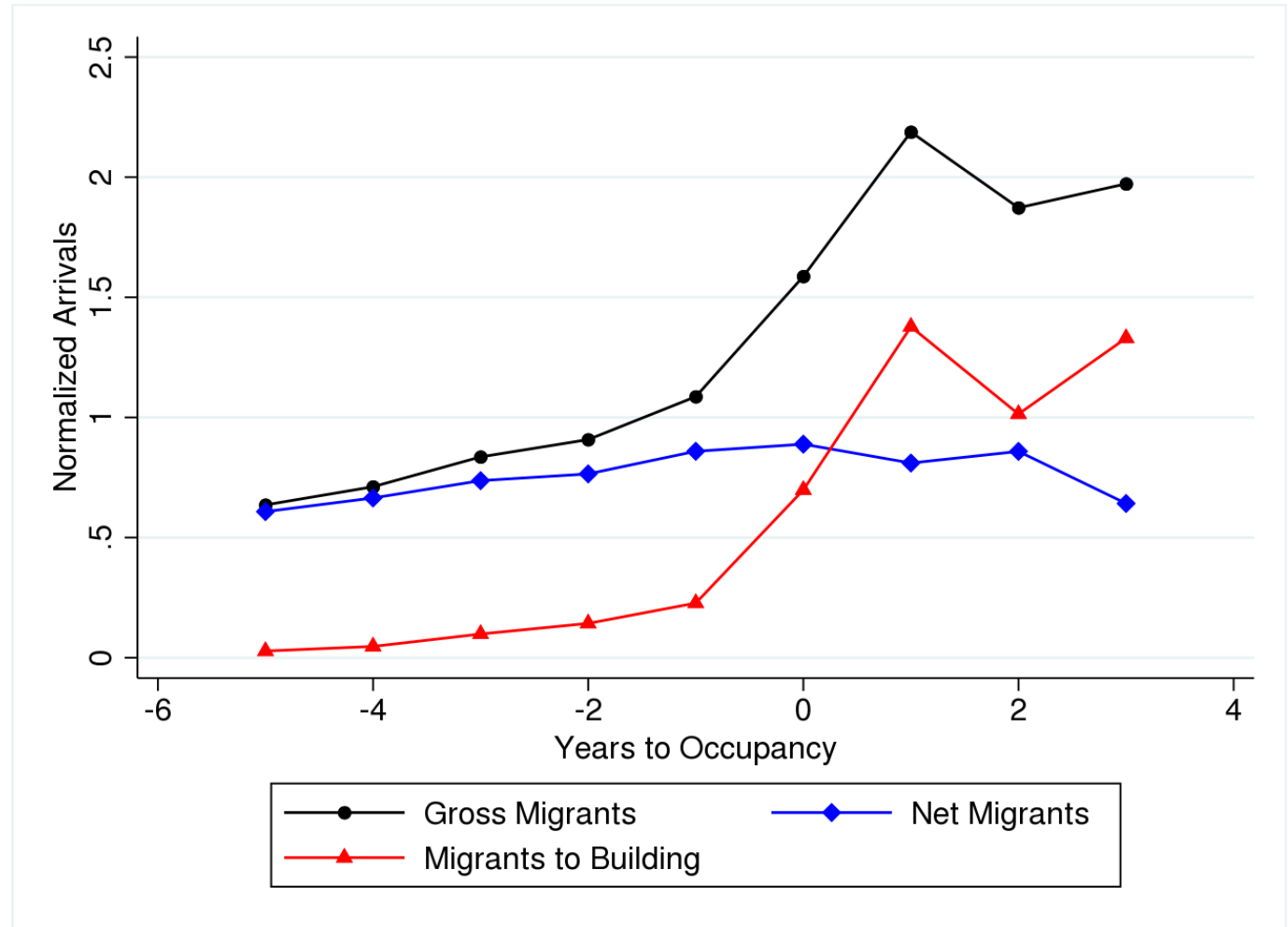
1. Migration data from Infutor Data Solutions
 - a. Household-level address histories
 - b. Constructed from various public and private sources, sold for targeted advertising
 - c. First used in Diamond, McQuade, and Qian (2018) paper on rent control

2. Construct measures of in- and out-migration
 1. Restrict to 102 isolated buildings completed since 2013
 2. Restrict to area within 800 meters of building
 3. Consider years since 2000

3. 1,078,000 total moves (about 515 per building per year)

Migration from rich tracts to areas within 200 meters of new buildings

- More people from rich tracts move to the area after construction, but the increase is absorbed by the new building.
- Net migration = net of new building
- Results are similar when we use earlier buildings and look at longer post-period
 - [Link to early building results](#)
- Notes:
 - Rich tracts = median income > \$75,000
 - Buildings = isolated, completed 2014-2016
 - Y-axis is normalized by the average number of arrivals to within 200m of building over 2010-2017 time period



Migration Empirical Strategy

We compare treated buildings to placebo group using a DD specification

Migration within 200 meters of building i in year t is given by:

$$\text{Migration}_{it} = \gamma_t + \alpha_i + \beta * I_{it}(\text{after treatment}) + \varepsilon_{it}$$

Where:

1. Treated group is buildings completed 2014-2016
2. Placebo group is buildings completed 2018
3. γ_t is a year fixed effect
4. α_i is a building fixed effect
5. Cluster errors at building level

β is coefficient of interest—differential change in migration near constructed buildings

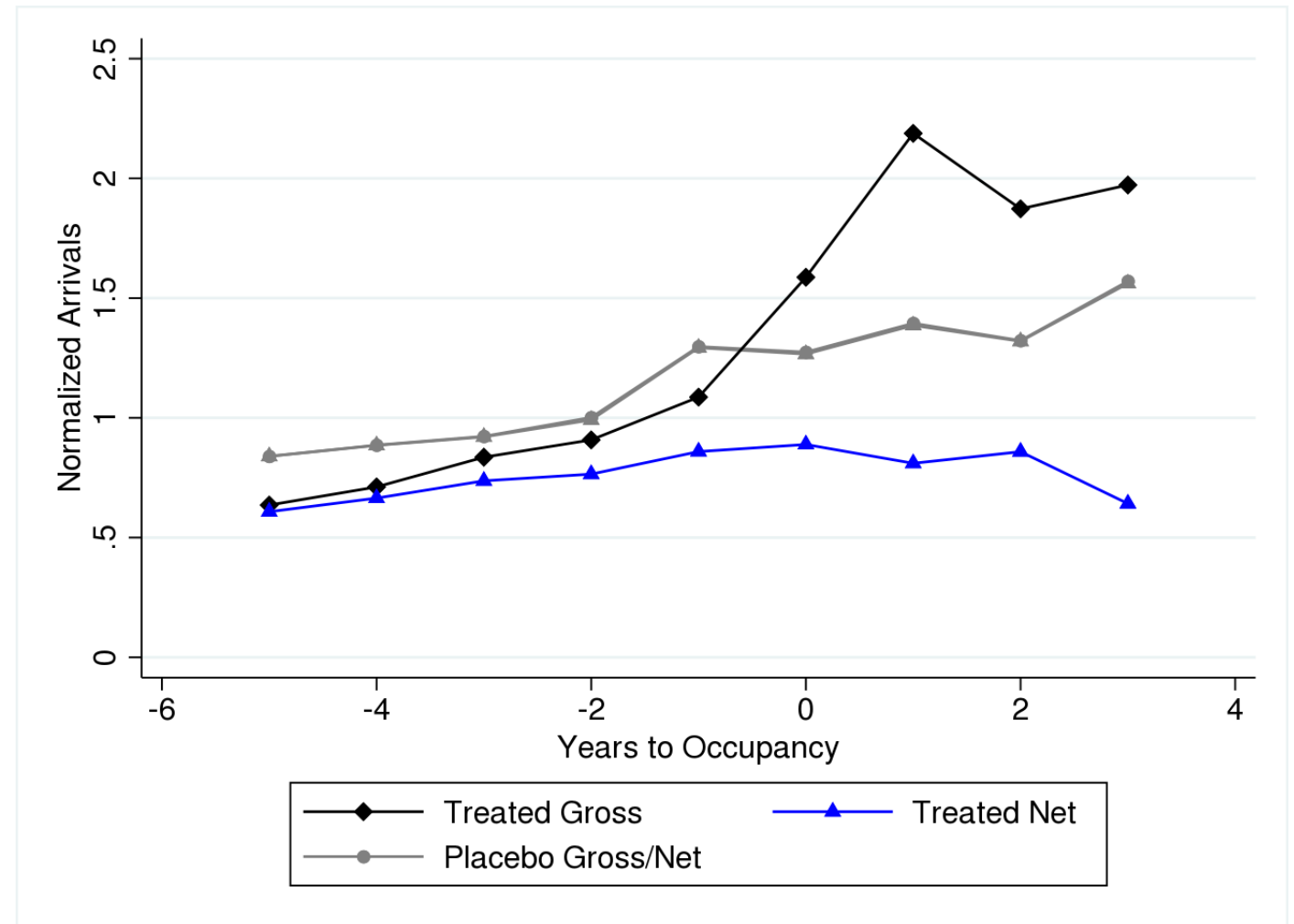
Identification assumption: In the absence of construction, migration would have changed in parallel in treated and placebo groups

Note: Here we start with treatment vs. placebo comparison, whereas rents started with near vs. far.

Results on Migration

Graphical comparison to migration from rich tracts to placebo group

- Suggestive evidence that net migration to area is lower than it would be without the building
- Net migration = net of new building
- Includes migrants within 200m of new building
- Notes:
 - Treated=2014-2016 buildings
 - Placebo is 2018 buildings
 - X-axis is mislabeled for placebo— values are for years 2010-2018
 - Rich tracts = median income > \$75,000



Diff-in-diff suggests that building increased gross arrivals, decreased net

	Level	Log
<i>Gross change in rich arrivals within 200m</i>	11.36** [2.13]	0.43*** [3.72]
<i>Net change in rich arrivals within 200m</i>	-10.62** [2.21]	-0.15* [1.78]

- Each cell shows β from a separate regression with a different dependent variable
 - t-stat in brackets
- As suggested by graphs, gross migration from rich tracts increases after construction, but net-of-new-building migration decreases
- [Years-to-treatment](#) graphs suggest parallel pre-trends

How local is the effect?

Area	Net Rich Arrivals, Level	Net Rich Arrivals, Log
<i>200-800 meters from building</i>	-22.23 [0.77]	-0.04 [0.98]
<i>0-200 meters from building</i>	-10.62** [2.21]	-0.15* [1.78]

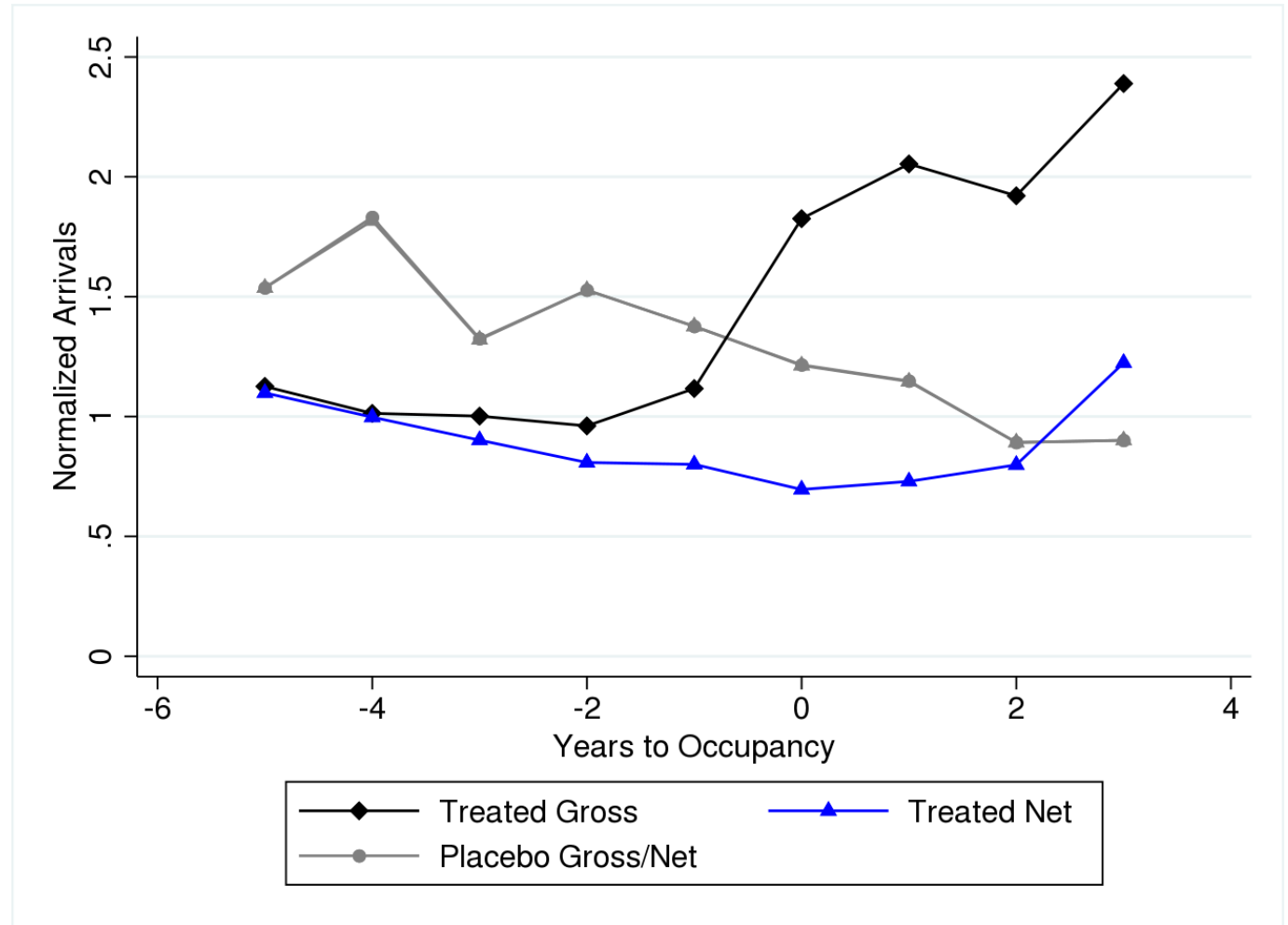
- The first row repeats specification from previous slide using arrivals to *outer* ring. Second row shows inner ring results from previous slide.
- There's a much bigger proportional change for the immediate area than the outer ring
 - Consistent with rent results where rents decreased more in the immediate area
- [Years-to-treatment](#) graphs suggest parallel trends

Migration from poor tracts to areas within 200 meters of new buildings

- Suggestive evidence that new building increases in-migration from low-income tracts

- Notes:

- Treated=2014-2016 buildings
- Placebo is 2018 buildings
- X-axis is mislabeled for placebo—values are for years 2010-2018
- Poor tracts = median income < \$50,000
- Net migration = net of new building



Repeat treatment vs. placebo DD with arrivals from poor tracts

	Level	Log
<i>Gross change in poor arrivals within 200m</i>	4.15*** [2.9]	0.58*** [4.5]
<i>Net change in poor arrivals within 200m</i>	-0.11 [0.1]	-0.012 [0.1]

- Each cell shows β from a separate regression with a different dependent variable
 - t-stat in brackets
- Gross migration from poor tracts increases, net migration is unaffected
- Migrants may not actually be low-income. But even if not, they may be vacating affordable units in low-income areas (see Mast 2018)

Robustness

1. Migration results are extremely similar for radii from 200-400 meters
2. Total migration follows same pattern as migration from rich tracts
3. Results also similar when relaxing criteria for “isolated” buildings
4. Our rent results fade out as radius approaches to 400 meters

Conclusion

1. We find strong evidence that induced demand does not increase rent
 - a. New construction decreases nearby rents *relative* to what would occur absent new construction
 - b. Migration from rich areas to area around building increases by less than increase in supply

2. Policies that limit new construction in an attempt to prevent gentrification may be counterproductive
 - a. Caveat: Our sample of new buildings is on average in late stages of gentrification

Future additions

1. Effects on original resident out-migration and net in/out migration
2. Heterogeneity by neighborhood characteristics
 - a. Different definitions of gentrification
 - b. Different stages of gentrification
3. Heterogeneity by characteristics of new building
 - a. Do results depend on how similar new building is to existing housing stock?
(segmented housing search)
4. Effects on nearby home prices

Thank you!

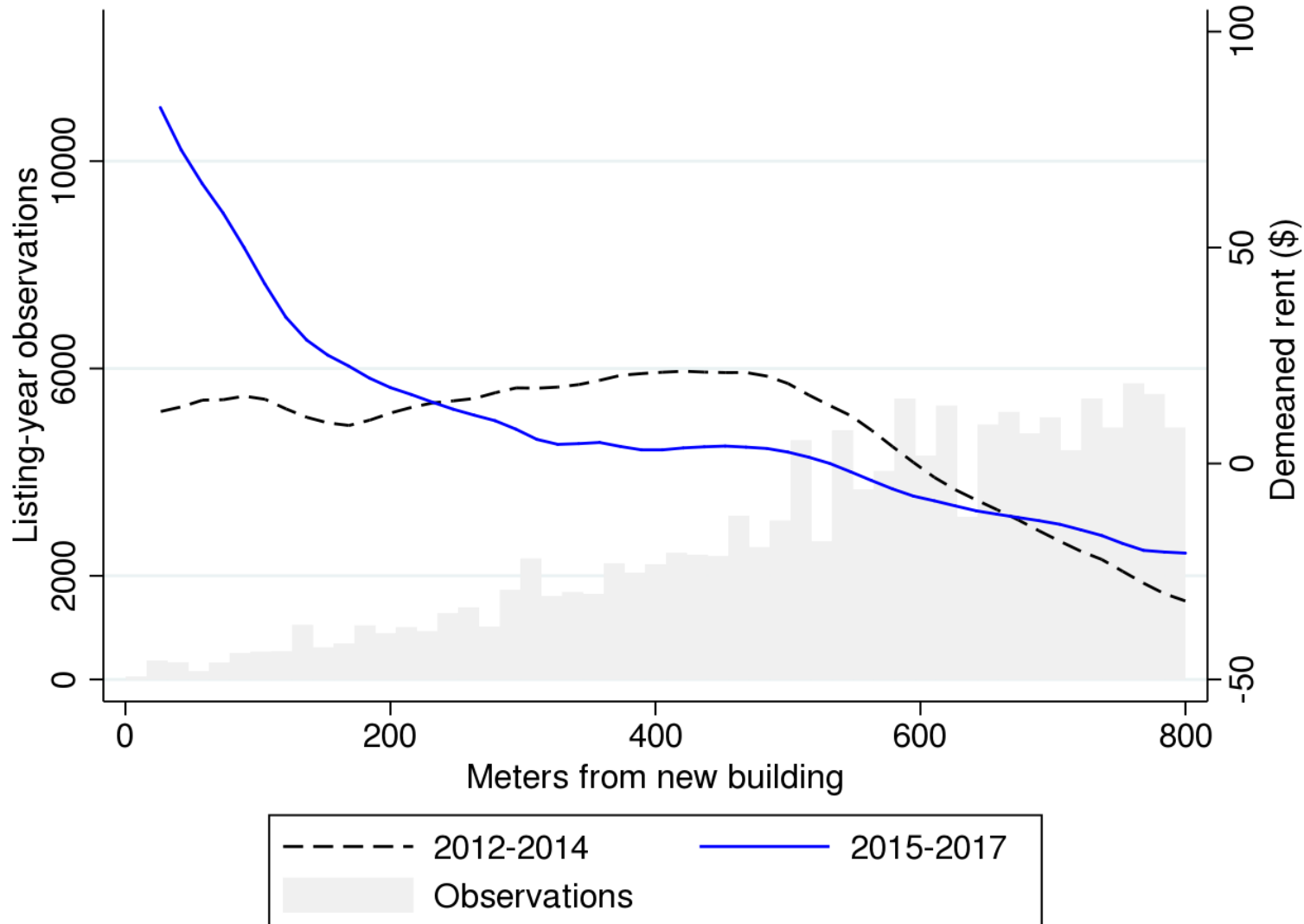
Appendix Slides

Demeaned price versus distance to new complex, before/after completion



- Includes 52 isolated new buildings
 - Completed 2014-2016
 - No other luxury apartment complex within 500 meters
- Rents demeaned at the building/year/bedroom level
- Excludes new building
- [Back to main slides](#)

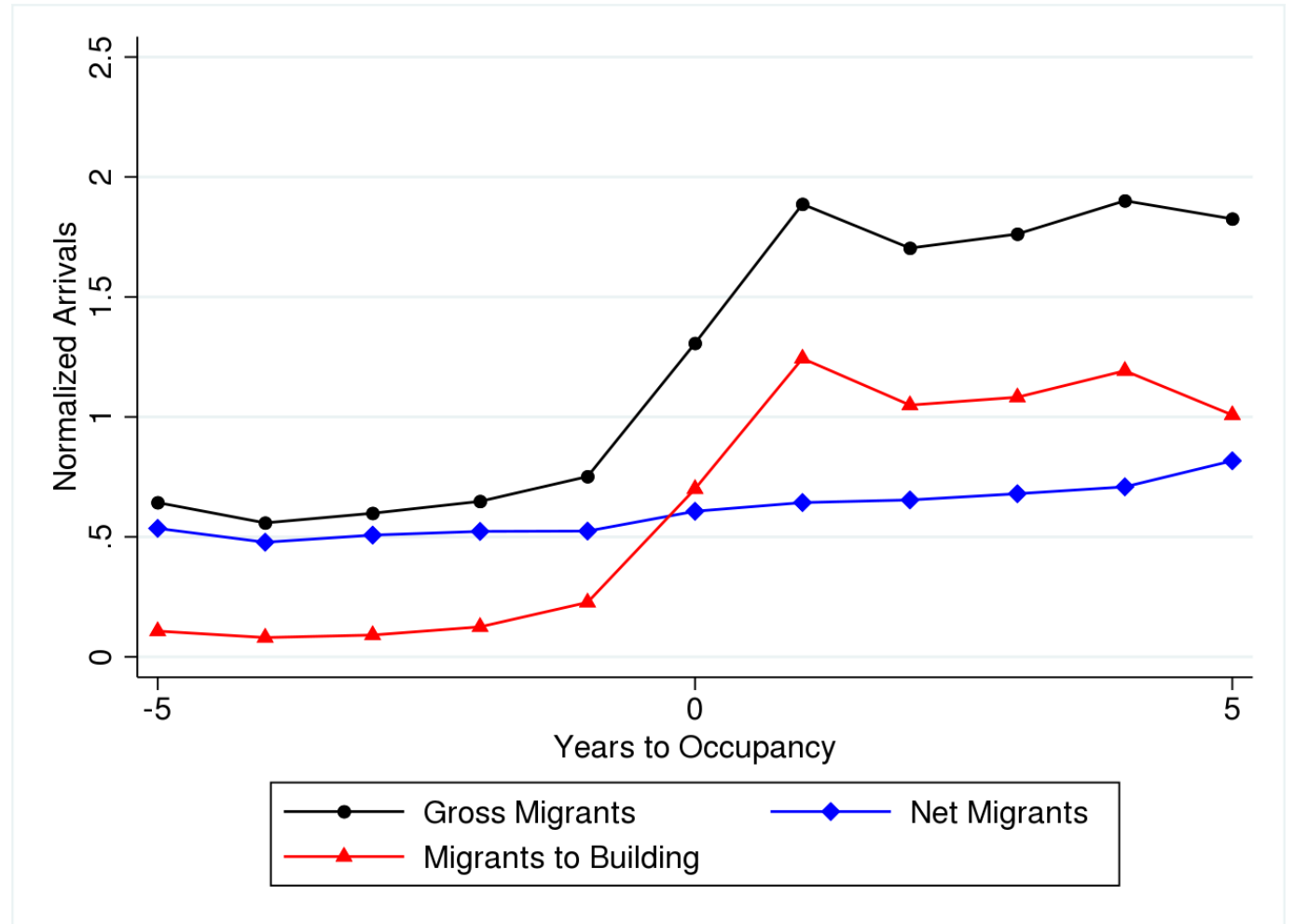
Comparison to placebo group



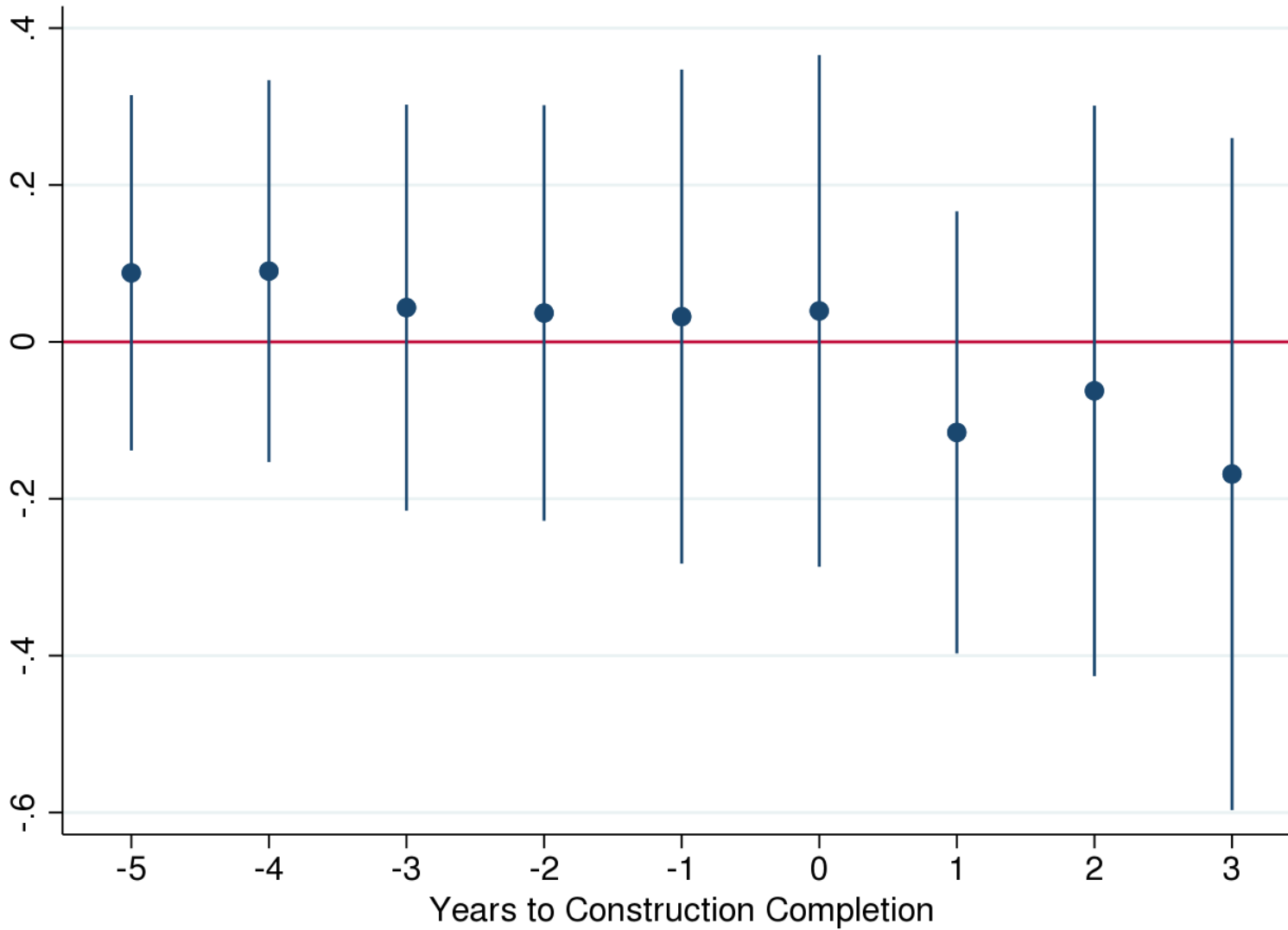
- Includes 49 isolated new buildings
 - Completed 2017-2018
 - No other luxury apartment complex within 500 meters
- Rents demeaned at the building/year/bedroom level
- Excludes new building
- [Back to main slides](#)

We find similar results over a longer time horizon with earlier buildings

- Pattern appears to be stable over a long post-period
- Use isolated buildings completed in 2009-2013
- [Back to main slides](#)
- Notes:
 - Rich tracts = median income > \$75,000
 - Net migration = net of new building
 - Y-axis is normalized by the average number of arrivals to within 200m of building over 2010-2017 time period



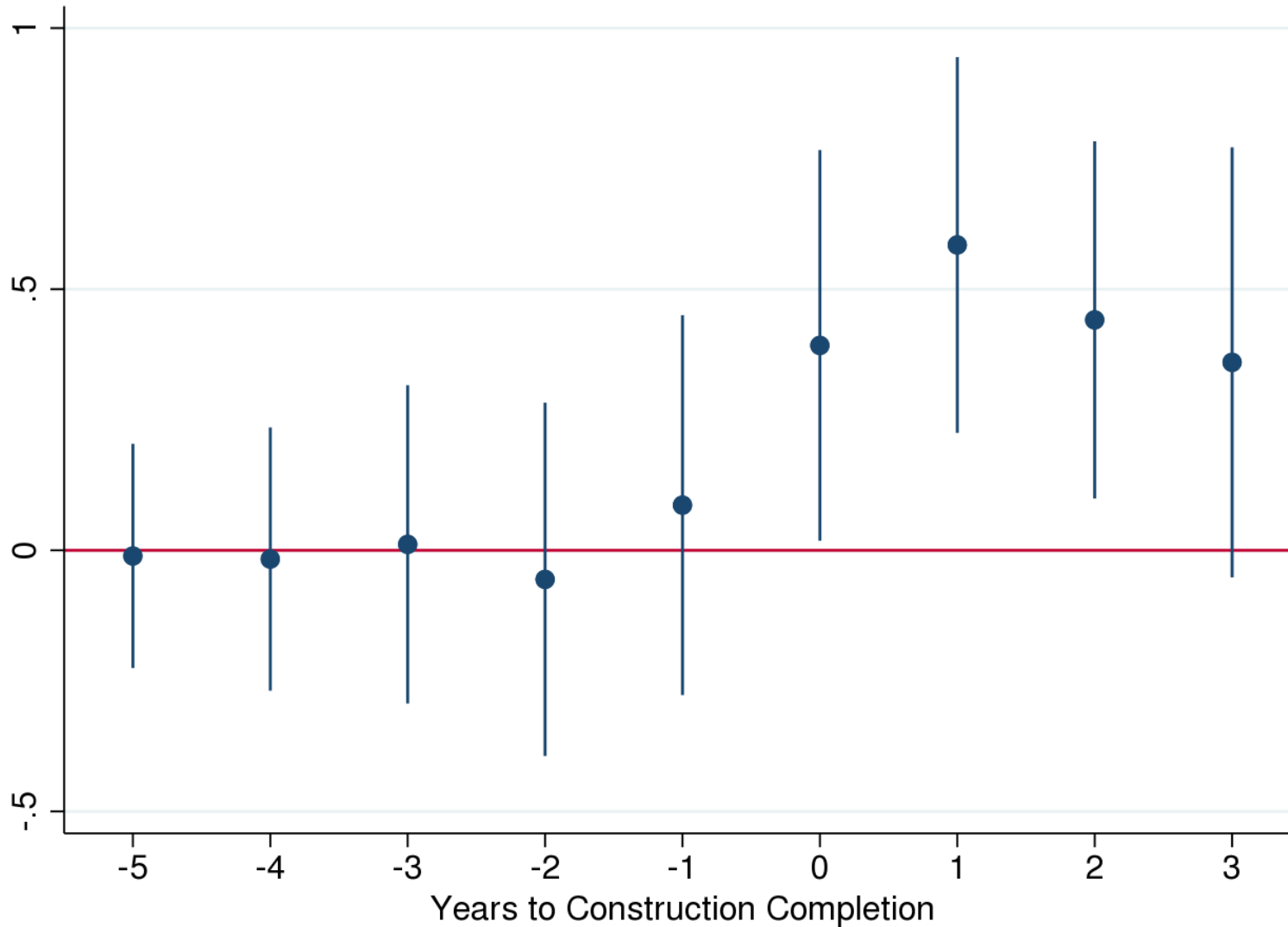
Years-to-treatment dummies for log(net rich arrivals) within 200m



- Coefficients compare net rich arrivals within 200 meters of 2014-2016 construction to within 200 meters of 2018 construction.

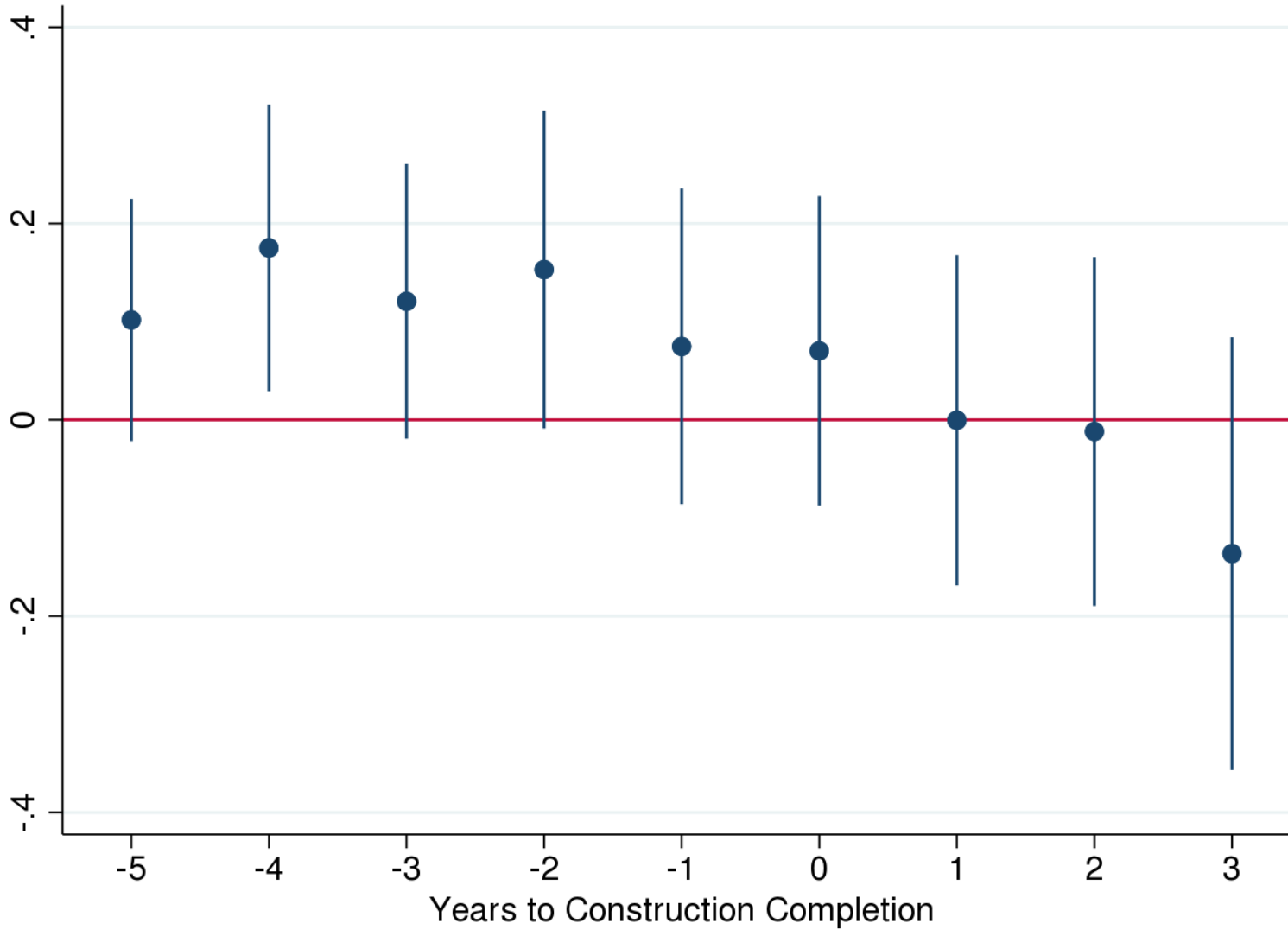
- [Back to main slides](#)

Years-to-treatment dummies for log(gross rich arrivals) within 200m



- Coefficients compare gross rich arrivals within 200 meters of 2014-2016 construction to within 200 meters of 2018 construction.
- [Back to main slides](#)

Years-to-treatment dummies for net rich arrivals 200m-800m



- Coefficient compares rich arrivals 200-800 meters of 2014-2016 construction to 200-800 meters of 2018 construction.

• [Back to main slides](#)