The Effect of School Redistricting on Housing Markets

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Motivation: Public Schools and Local Control

- US public school system is characterized by local control by school districts
- Much attention in economics on school choice systems
  - But most districts use **school attendance boundaries (SABs)**
  - These link residential location to public school access
- Substantial heterogeneity in quality of public schooling implies that SABs ...
  - ... **capitalize** into housing markets
  - ... affect **equitable provision of and access to** public education
- Schools are frequently redistricted (as we show today)
  1. Presents excellent opportunity to revisit extent of school quality valuation
  2. But can also evaluate how households **respond to boundary changes**

Previous Literature and Policy Relevance

- Large literature documents that school quality capitalizes in housing markets
  - Evidence across boundaries e.g. Black 1999, Bayer et al 2007, Schönholzer 2021
  - Some panel evidence e.g. Cellini et al 2010, Neilson and Zimmerman 2014
  - Redistricting allows to combine cross-sectional and panel evidence

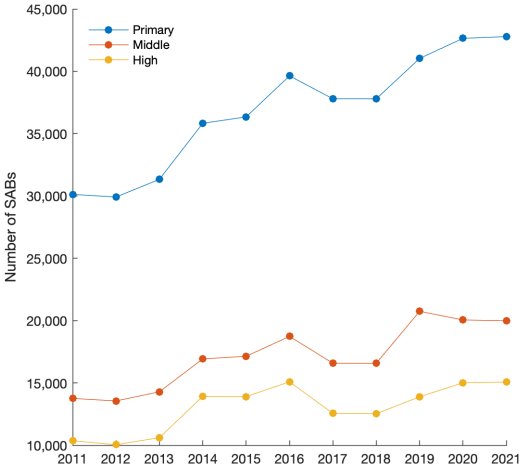
- Redistricting is also of independent interest:
  - Opportunity for districts to address residential segregation Monarrez 2021
  - Case studies on redistricting find impacts on students e.g. Billings et al 2014
  - Belief that moving costs in response to quality changes are low e.g. Boustan 2010

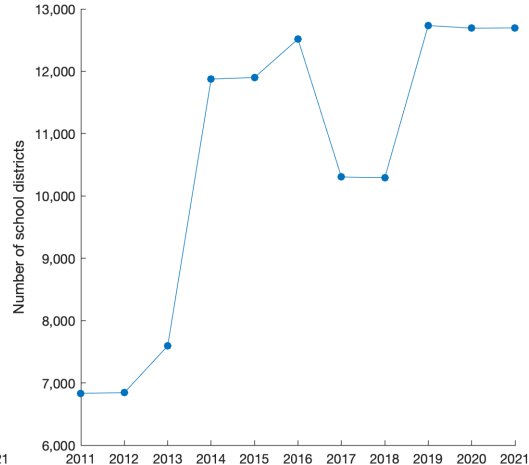
- Key **policy** importance of redistricting:
  1. How strongly do households respond (e.g. re-sort) to redistricting across the US?
  2. How should districts draw SABs, balancing efficiency and equity?

This paper

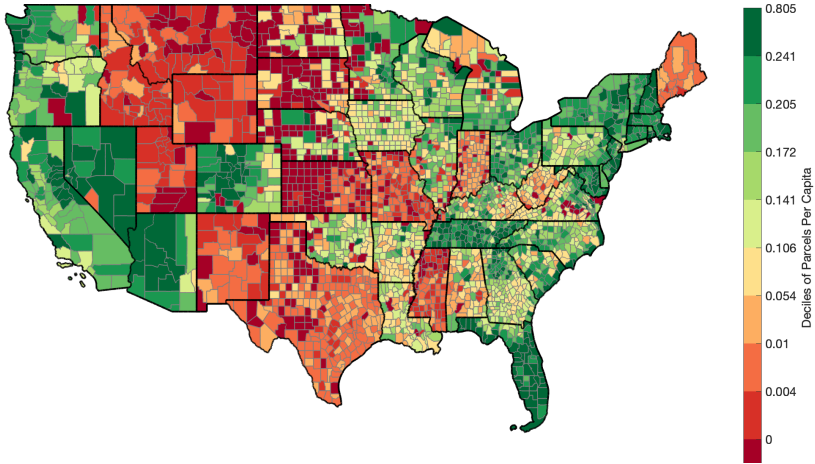
- We link SABs from thousands of districts to millions of real estate records
  - Proprietary SAB data for 2011-2021 from Maponics
  - Zillow microdata (*ZTRAX*) with prices, characteristics, buyer/seller names
- Empirical approach:
  - Event studies around timing of redistricting
  - Compare redistricted housing to similar housing nearby
  - Aggregate effects in a way that accounts for heterogeneous effects
- Contributions:
  - Summarize changes in SABs on a national scale
  - Estimate **causal impact** of school redistricting on:
    1. **House prices** – household valuation of school quality (examples today)
    2. **Sales volume** and **race of buyer/seller** – household sorting and segregation (future)

Number of school districts and SABs over time in our data

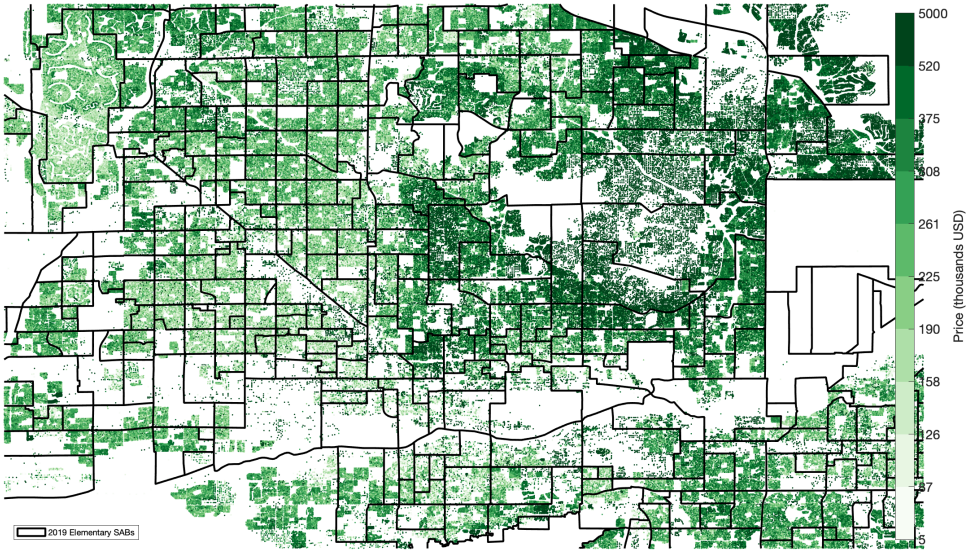




Real estate data coverage – parcels per capita



Example of combined SABs and real estate data: Phoenix, AZ



Identifying and classifying SAB change events

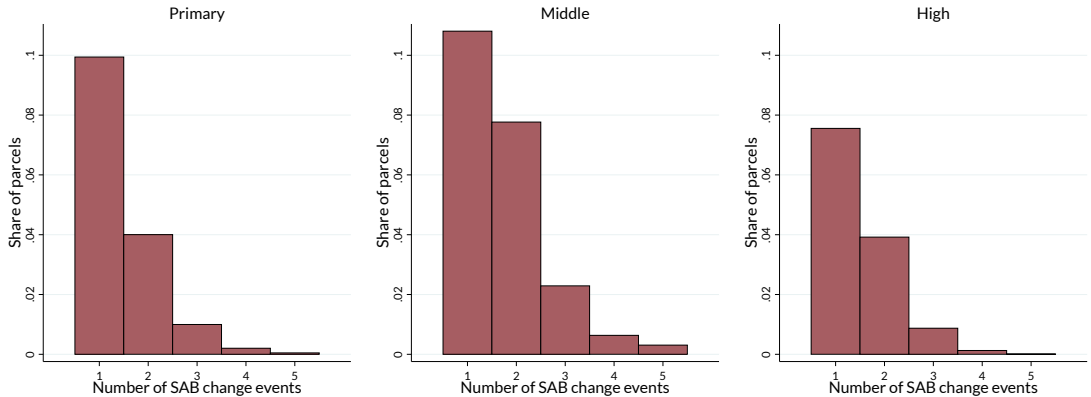
Why may school boundaries change? Primary reasons in the last ten years:

1. New school openings:
   - to relieve overcrowding of existing schools nearby
   - new housing developments may induce rearranged SABs
2. School closings due to:
   - low enrollment
   - low performance
3. Adjustments related to school capacity
   - Residential development
   - Changes in school program offerings

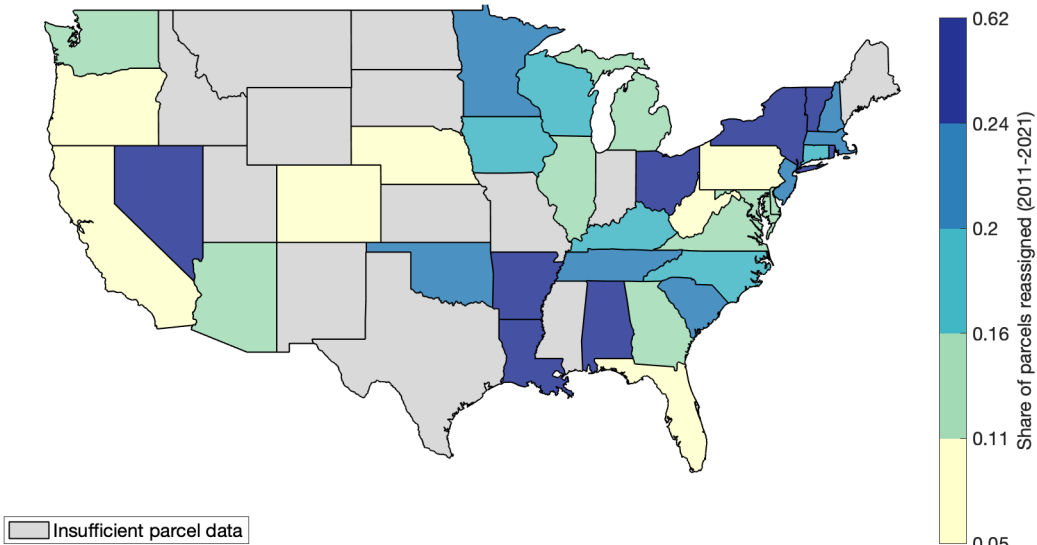
SAB changes are common, and they can be complex

- Need to distinguish between 1-to-1, 1-to-M, M-to-1, and M-to-M
- A single school may experience multiple events over 2011-2021

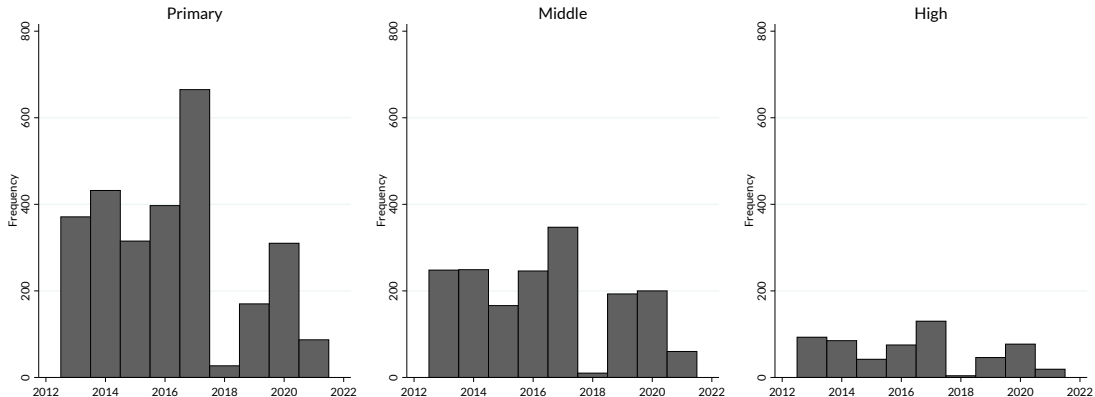
School redistricting probability over 2011-2021



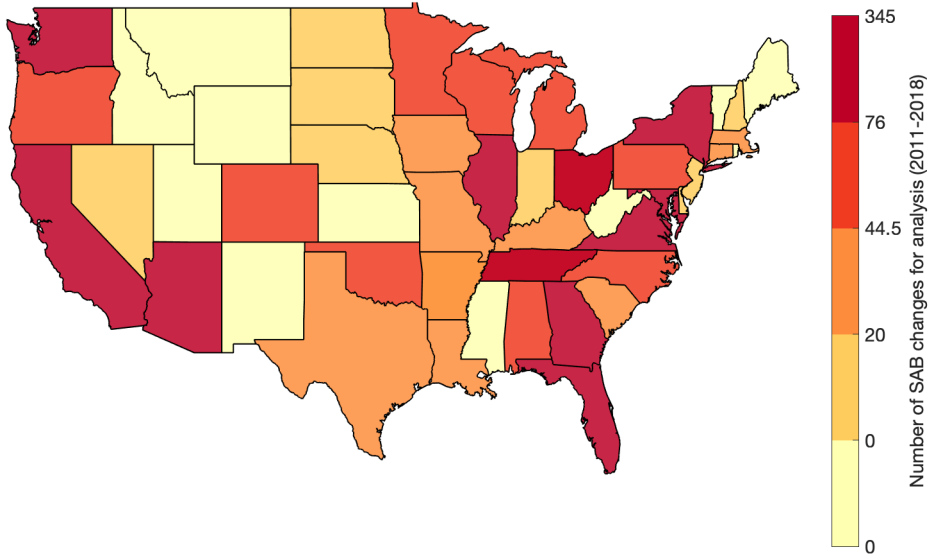
School redistricting probability over 2011-2021 – Primary Schools



Number of **singular** SAB change events for analysis



Number of **singular** SAB change events for analysis – Level 1



Estimating the effect of an individual SAB change event

We first restrict data to housing affected by a single event at time E_i (e.g. 2014):

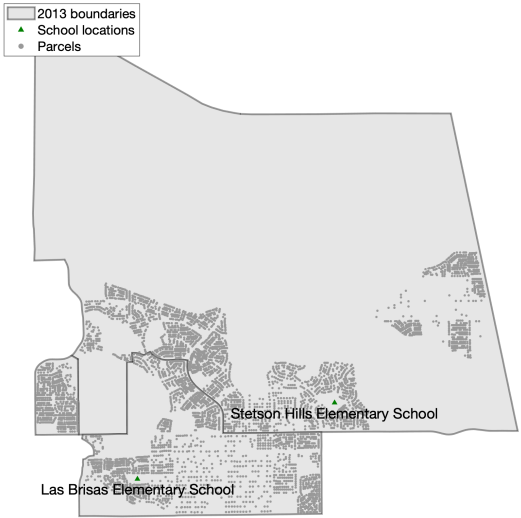
- Treated: parcels redistricted to different school
- Control: parcels "left behind", whenever possible

We then estimate: $Y_{it} = \alpha_{c(i)} + \gamma_t + \sum_{s=\ell_L}^{\ell_U} 1[E_i = t + s]\beta_s + \mathbf{X}_{it} + \varepsilon_{it}$

- Y_{it}: house prices, sales event, or probability (non-)white
- $\alpha_{c(i)}$ and γ_t are census block and time fixed effects
- β_s effect after s years from lower (ℓ_L) through upper (ℓ_U) end points
- $\mathbf{X}_{it}$ observable parcel characteristics

Note: no staggered rollout, so TWFE is robust to heterogeneity

Example 1: School redistricting due to parcel transfer



Las Brisas SAB extended

- Some parcels from Stetson Hills transfer
- From very high-achieving (0.49 SD) ...
- ... to moderately high (0.28 SD)

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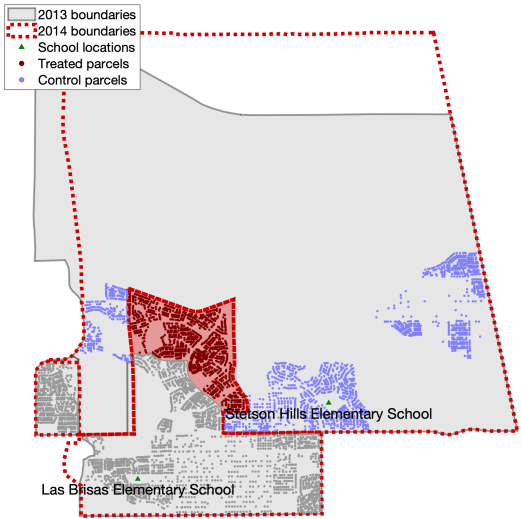


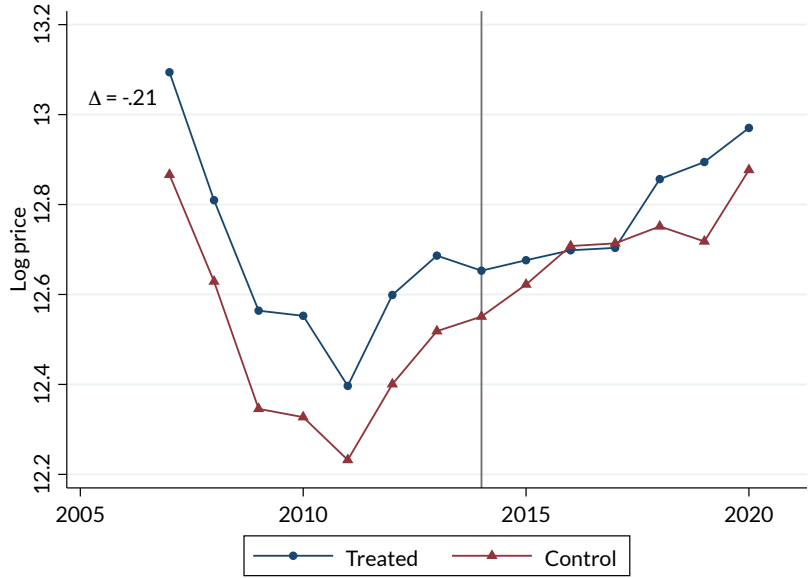
Las Brisas SAB extended

- Some parcels from Stetson Hills transfer
- From very high-achieving (0.49 SD) ...
- ... to moderately high (0.28 SD)
- So drop of 0.21 SD!

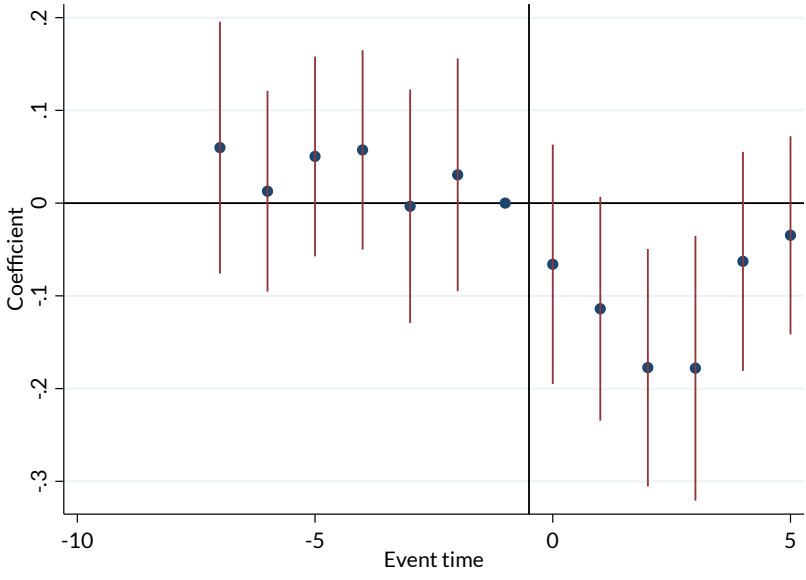
Does value of parcels in redistricted area fall?

- If yes, then redistricting capitalized
- Effect of 0.21 SD redistricting

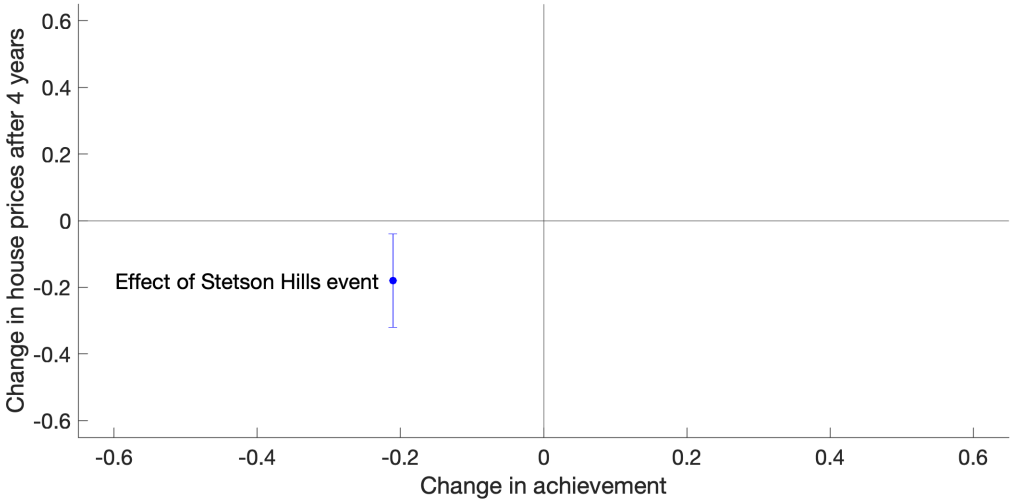
Example 1: Impact on house prices – price trends



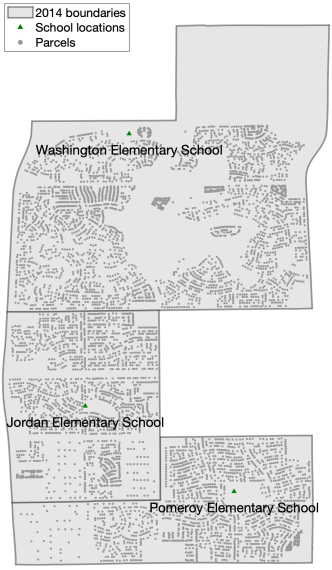
Example 1: Impact on house prices – event study



Example 1: Effect size versus treatment size



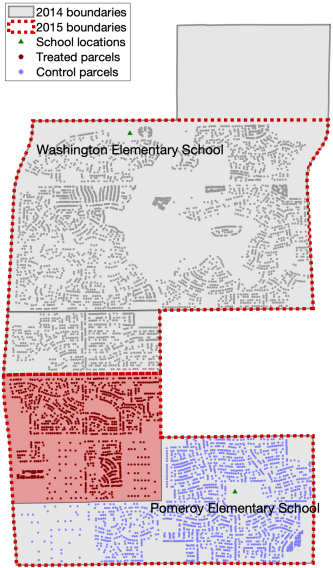
Example 2: School redistricting due to school closure



Jordan Elementary School in Mesa SD, AZ

- Low-achieving school (-0.42 SD)
- School also had low enrollment for years
- District finally decided to close in 2014
- Decided in school board meeting in 2013

Example 2: School redistricting due to school closure



Southern part reassigned to Pomeroy Elementary

- From low-achieving school (-0.42 SD) ...
- ... to high-achieving (0.16 SD)
- So this is a 0.58 SD improvement

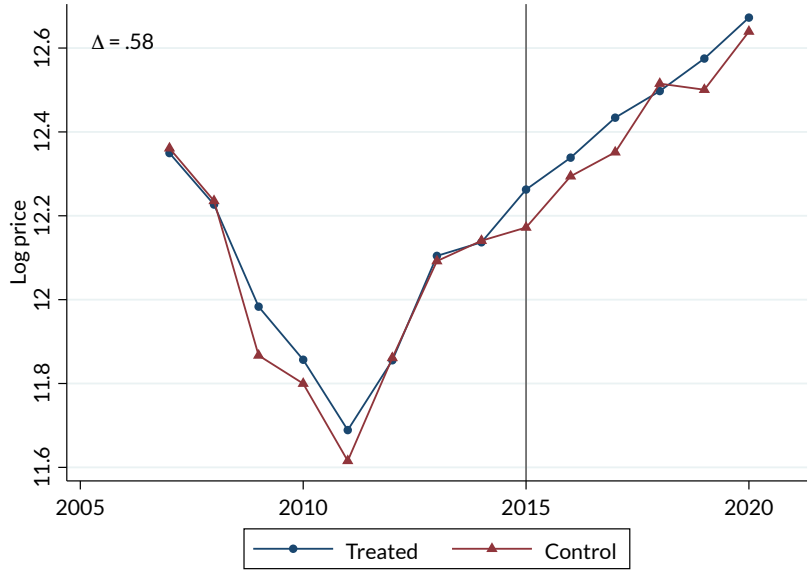
Control group:

- All Jordan parcels are reassigned
- We have no “left-behind” parcels!

Control group in this case:

- Original Pomeroy Elementary parcels
- Have to assume good counterfactual
- Pre-trends are informative
- But other control group options exist

Example 2: Impacts on house prices – trends



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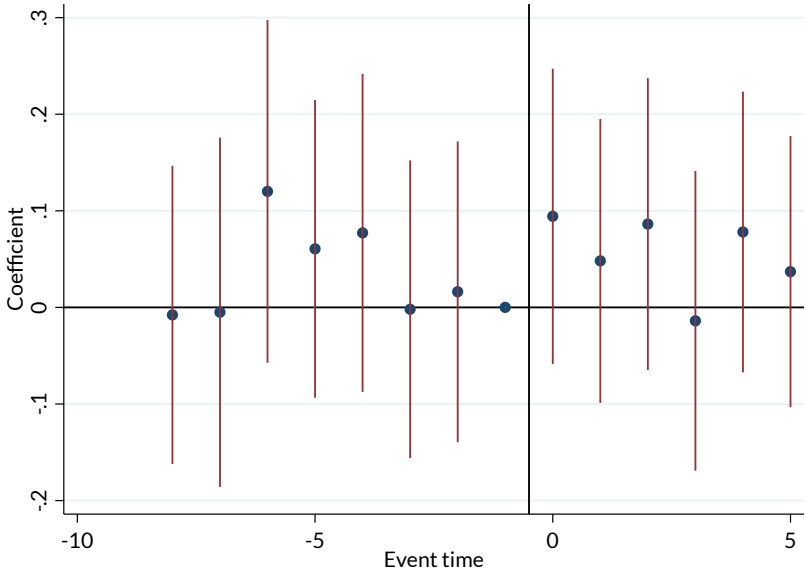

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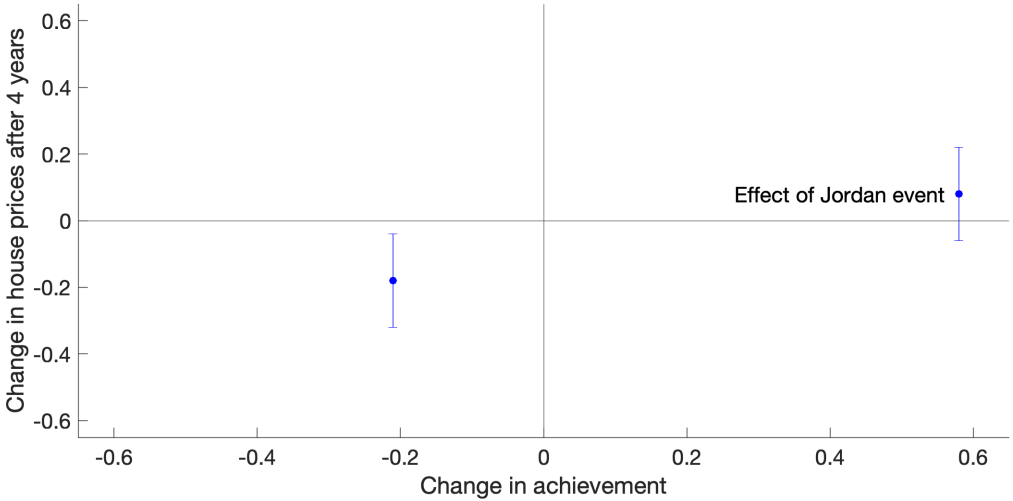
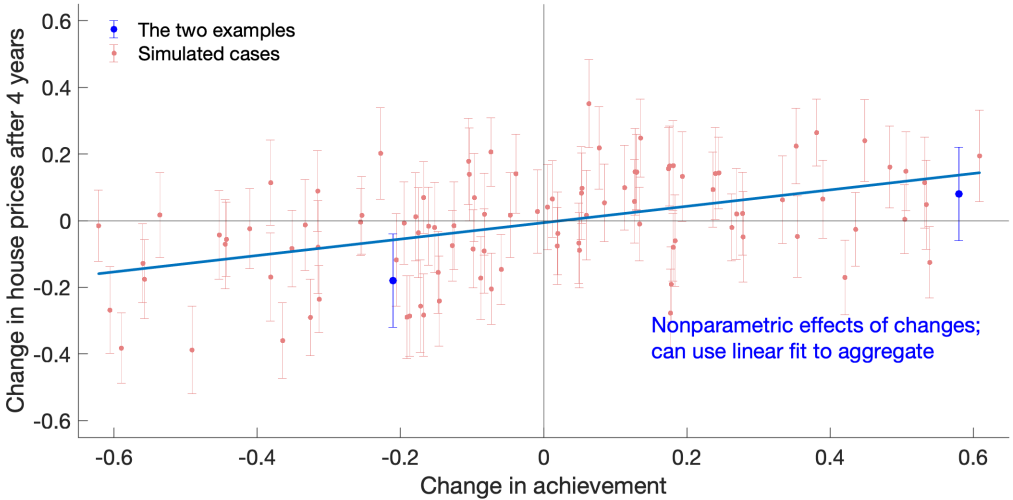


Aggregating many hypothetical effects



Next Steps

Finalize **event** and **comparison group** selection:

- Event selection:
  - Dealing with general many-to-many changes and multiple events over time
  - Tradeoff: sample size against “plausibly exogenous”, e.g. on school openings only
- Comparison group:
  - All left-behind, or only near old boundary?
  - What if there are no left-behind?

Household **sorting effects**:

- Assign race of buyer/seller to parcels:
  - Using buyer/seller first and last names (CFPB methodology)
  - Match with HMDA data
- Demographic effect against achievement change or demographic change?

Medium term: model for efficiency versus access tradeoff; spillovers