Can We Rebuild a City?
The Dynamics of Urban Redevelopment

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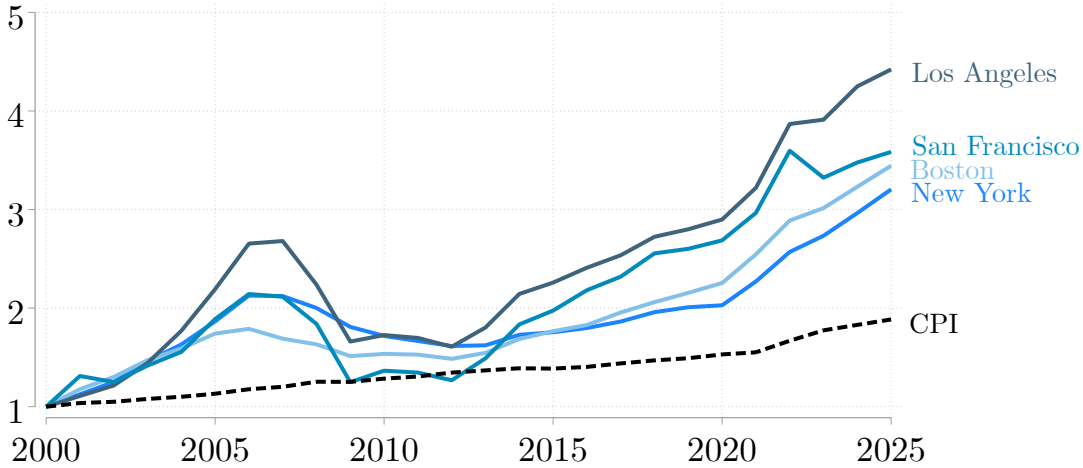
MIT

NBER Summer Institute
July 24, 2025

Home prices are growing much faster than income in large cities



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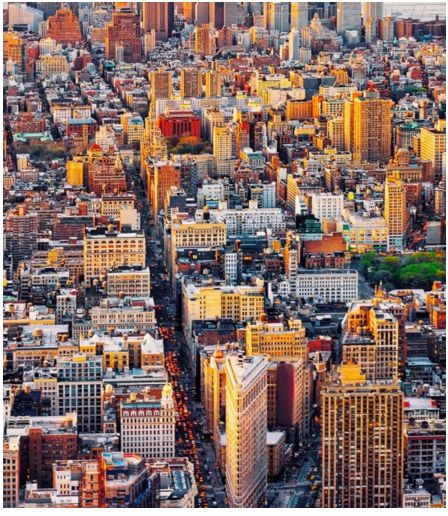
- Strict **zoning** is often denounced as a culprit.
  - → Some deregulation happening in many cities.



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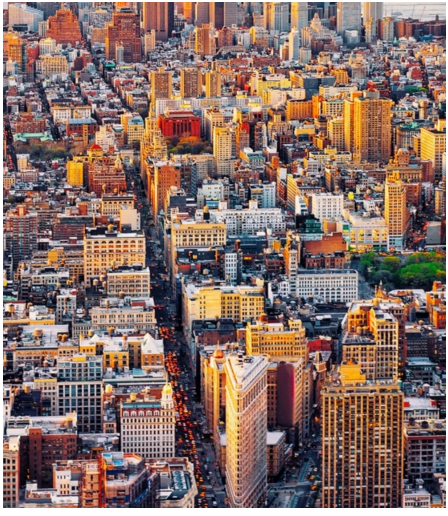
- In urban cores, vacant land is scarce, change comes from **redevelopment**.
  - → Demolishing and replacing old buildings.
  - → Increasingly how cities grow (Frolking et al., 2024).
  - → Requires to pay large **fixed costs**.



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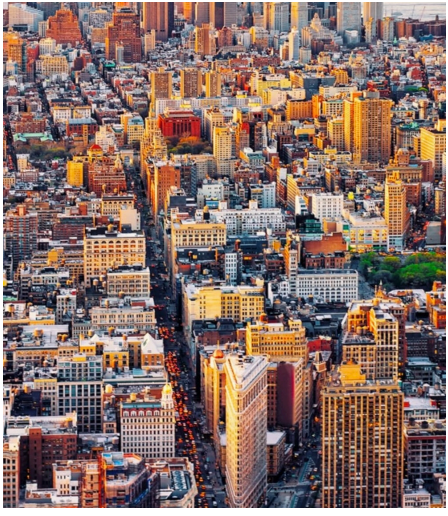
This paper:

1. Describe redevelopment.
2. Measure the extent to which regulation vs. adjustment costs hinder growth.



Challenges to studying redevelopment

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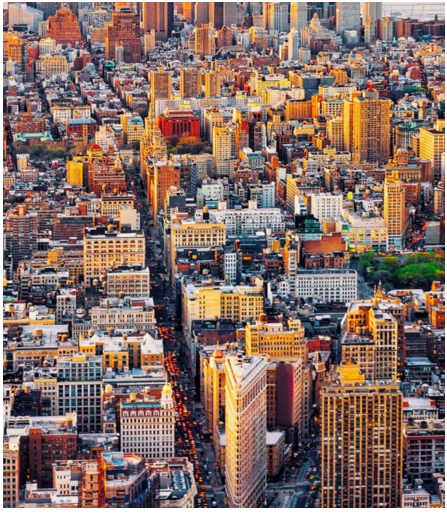
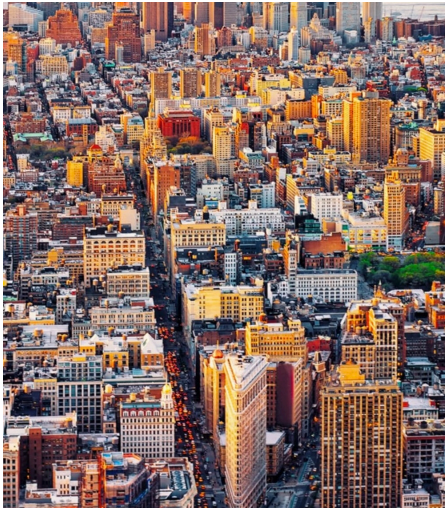


Challenges to studying redevelopment

- **Challenge 1**: Need **data** on developer behavior.
- **Challenge 2**: Modeling developers' choices.
  - → Developers make **forward-looking decisions**.
  - → These decisions are distorted by **zoning**.
  - → Construction in one area changes prices throughout the city → **GE effects**.



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- I evaluate the effects of recent zoning changes.
- I estimate a **dynamic general equilibrium** model of redevelopment.
  - → **Supply**: Behavior of forward-looking developers given prices and regulation.
  - → **Demand**: Quantitative spatial model predicts how development affects prices.
  - → **Validation** using quasi-experimental evidence.

Findings

1. **Zoning strongly hinders construction**.
   - → In NYC, zoning is the primary determinant of supply elasticities.
   - → Removing zoning would more than quadruple the city's supply elasticity and growth rate.

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   - → Removing zoning would more than quadruple the city's supply elasticity and growth rate.

2. **Fixed costs of redevelopment are an equally important barrier to growth**.
   - → They increase sharply with the height of buildings to be demolished.
   - → Deregulation is effective in areas with high prices and low density.
   - → The (large) welfare gains from deregulation only materialize slowly.
   - → When allowing 5 new units, only 1 will be built over the next 40 years.

Data and context

Parcel-level land use panel

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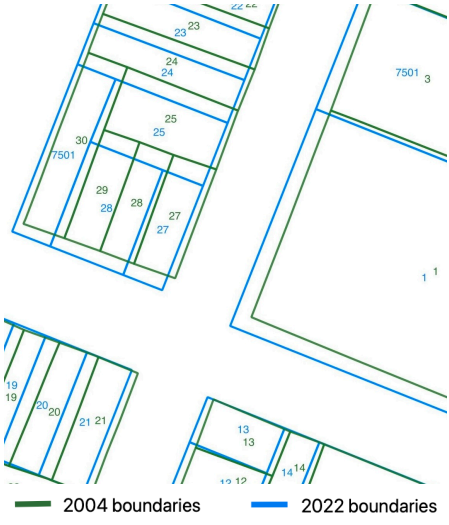

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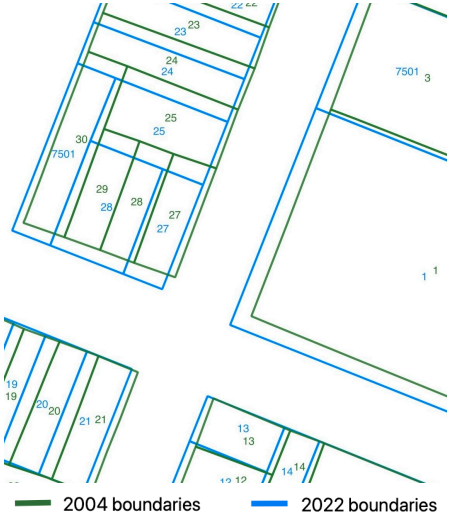

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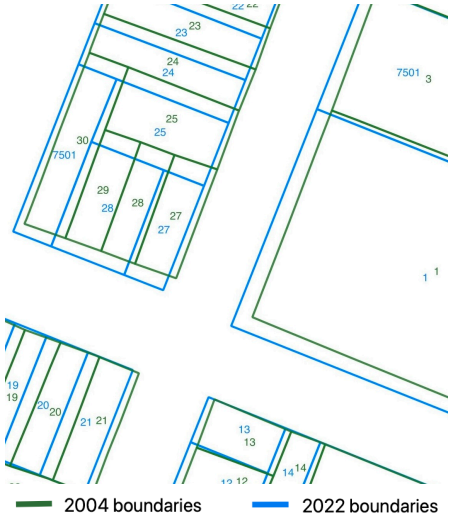
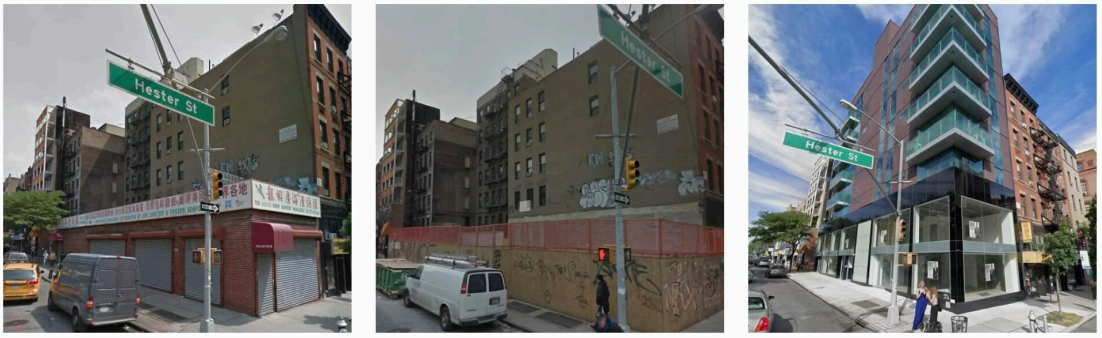
- **Prices** from real estate transactions over 2003-2022 (1.2 million observations).



Construction timelines for 22,000 redevelopment events

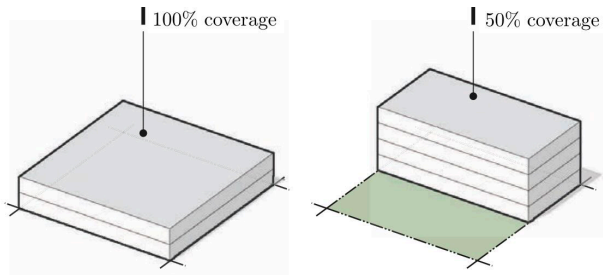


Certificates of occupancy OCR | Redevelopment duration | Quantity changes | Quantity changes, by use

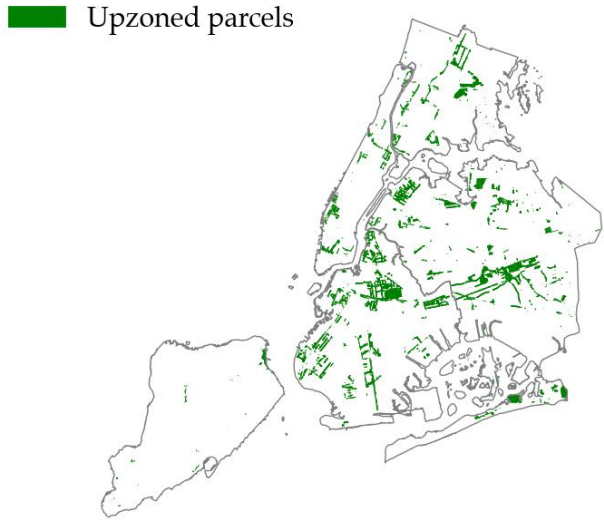
Zoning

- I match my land use panel with zoning regulations for each year.
- Main zoning instrument in NYC: limits on the **Floor Area Ratio** (FAR).
  → FAR = sq. ft of floorspace/sq. ft of land.

Buildings with a FAR of 2



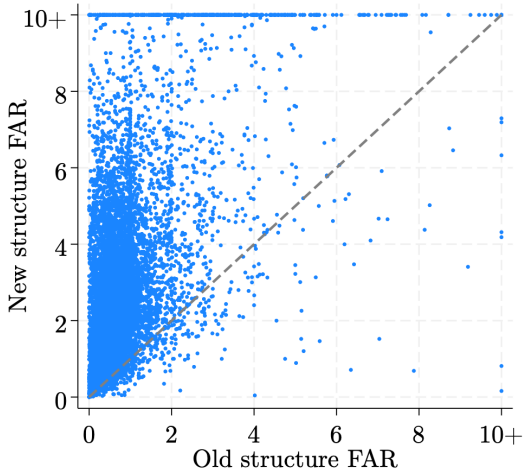
- Several neighborhoods of NYC have been upzoned in the past decades.
  - → Focus on large upzonings initiated by planners.
  - → Many veto players: exact zoning changes and timing unclear when upzoning discussions begin.



Stylized facts

Redevelopment leads to densification

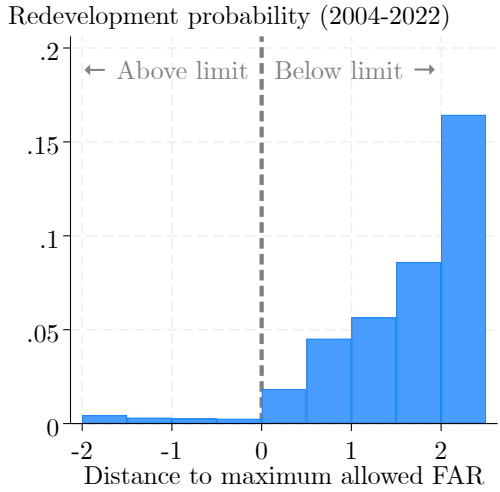
- New buildings 3.4 times larger than the ones they replace (on average).
- Allows to cover large fixed costs of redevelopment.



Change in number of units

Redevelopment mostly happens when upward growth is allowed

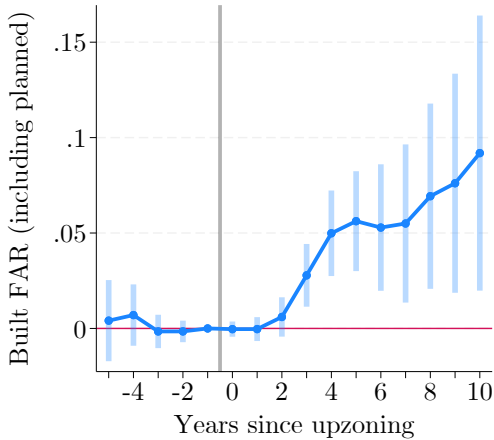
- Buildings at or over the zoning limit are seldom redeveloped.



Upzoning prompts construction

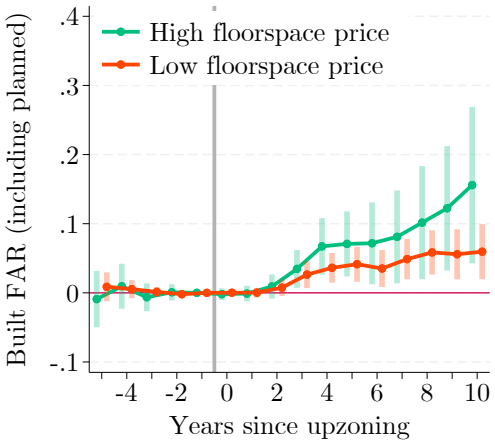
- Compare parcels upzoned earlier vs. later.
- 10 years after upzoning, developers have used **1/10** of newly allowed floorspace.

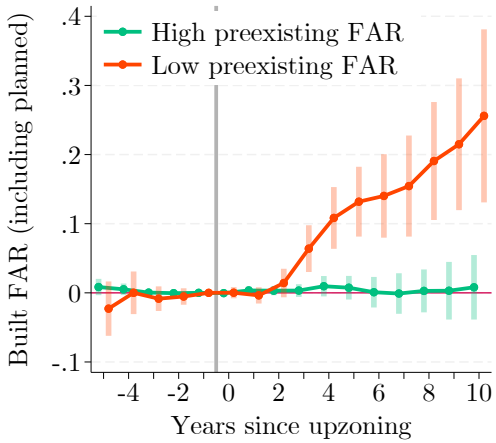
Relaxing use constraints



Upzoning prompts construction

When prices are high, on parcels that are initially less built-up





A dynamic model of redevelopment

Supply of floorspace

Developer choices

Each year, developers make redevelopment decisions independently for each parcel.

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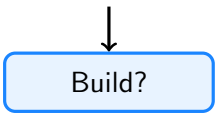

Extensive margin

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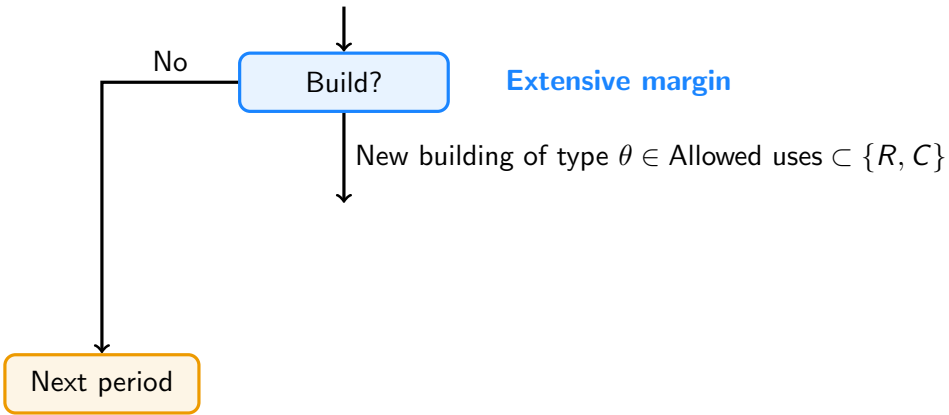

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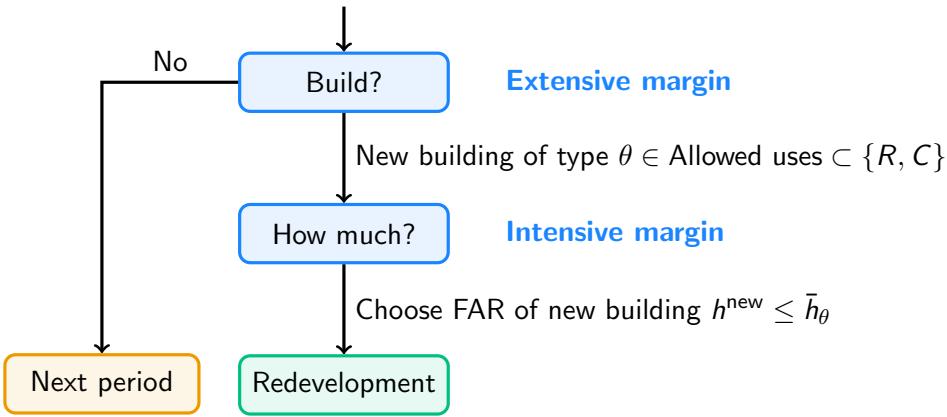

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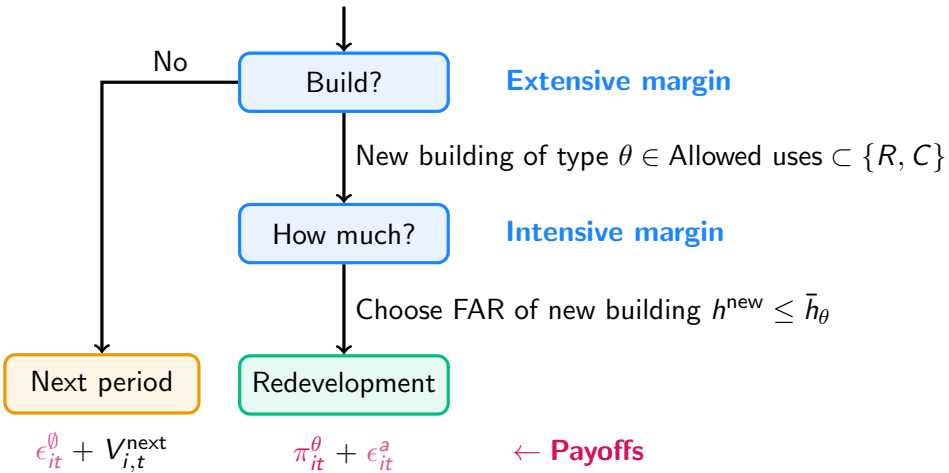

Developer profit function

$$\pi_{it}^{\theta} = \max_{h^{\text{new}} \leq \bar{h}_{\theta it}} \left[\underbrace{P_{it}(h^{\text{new}}, \mathbf{x}_{it}^{\text{new}}) - P_{it}(h_{it}^{\text{old}}, \mathbf{x}_{it}^{\text{old}})}_{\text{Change in property value}} - \underbrace{[VC_{it}(h_{it}^{\text{new}}) + FC_{it}]}_{\text{Cost of redevelopment}} \right]$$

- P is the discounted sum of future rents.
  → As buildings age, $P_{it}(h_{it}^{\text{old}}, \mathbf{x}_{it}^{\text{old}})$ decreases, redevelopment becomes more profitable.
- Variable costs: construction costs, increase with size of new building h.
- Fixed costs: eviction, demolition, permitting, etc.
  → Vary by building (e.g., larger for bigger buildings in dense neighborhoods).

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Estimation: Prices and variable costs

- Estimate prices $P_{it}(h_{it}, \mathbf{x}_{it})$ through a **hedonic regression** on the sales data.
  $\rightarrow$ Function of location, FAR h_{it}, and quality controls $\mathbf{x}_{it}$ (age, grade, type, etc.).

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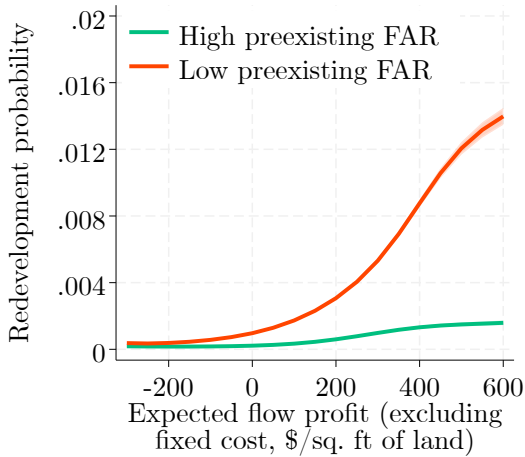
- Estimate variable costs $VC_{it}(h_{it})$ using a **revealed preferences** approach.
  - → Data on the FARs chosen by developers and prices/zoning they faced.
  - → Assume that developers maximize profits under the zoning constraint.
  - → Estimated construction costs consistent with engineering estimates.

Estimation: Fixed costs

- **Idea:**
  - → Compute expected profit from redevelopment, excluding fixed costs.
  - → Compare with redevelopment probability.



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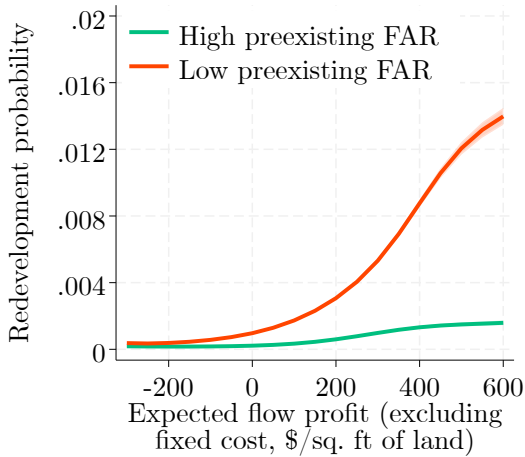

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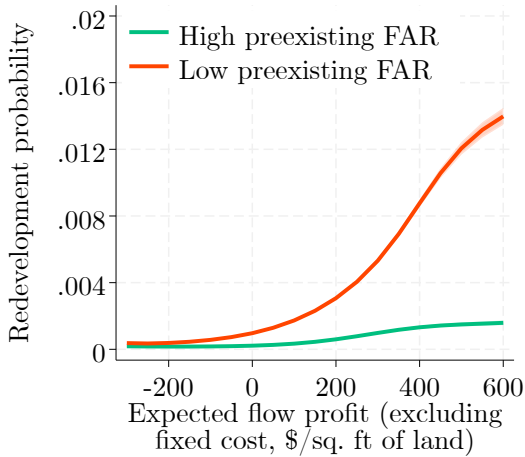
- Estimation using **full-solution approach** (extending Rust, 1987) Parameter estimates



Model validation: Predicted effect of upzonings

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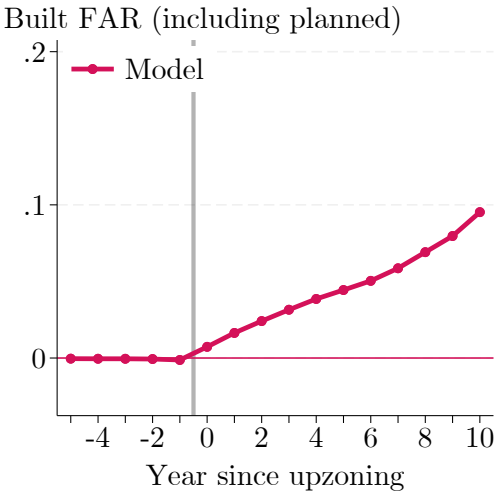
  - → Compute model-implied causal effect of upzoning.



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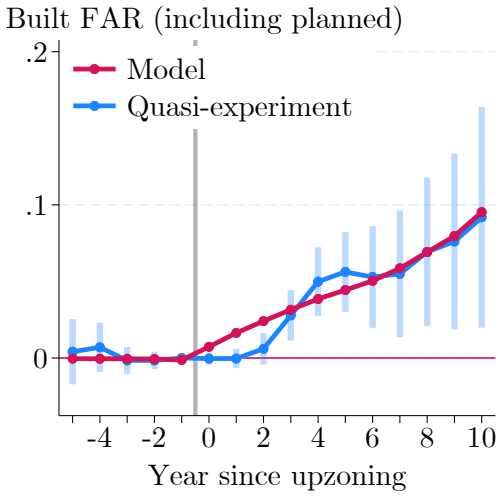

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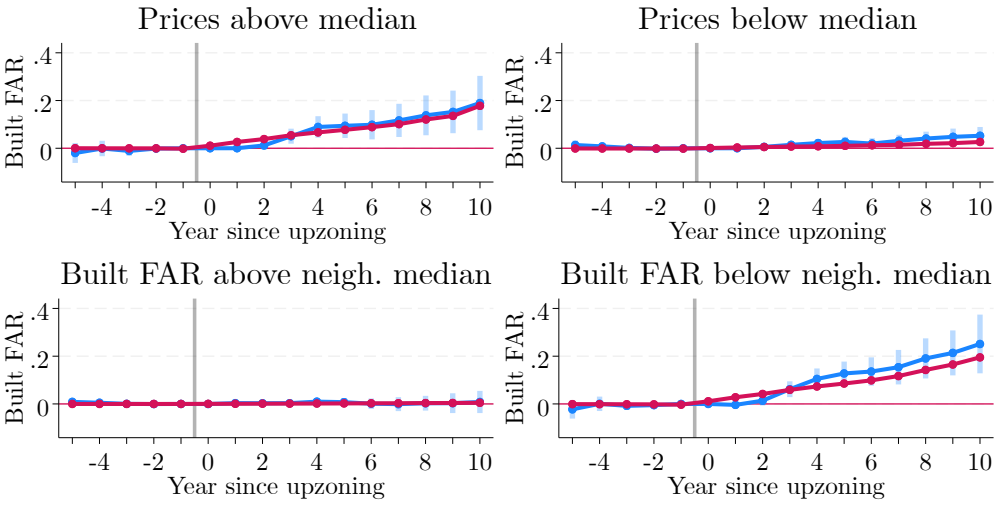
Excluding upzoned parcels



Demand for floorspace

Demand model: Overview More

- Workers consume residential floorspace, choose where to live/work.
- Firms produce using commercial floorspace and labor.

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- **Key extensions**: Heterogeneous types and non-homothetic preferences for housing.
- Additional ingredients:
  - → Migration
  - → Congestion
  - → Agglomeration externalities (internally estimated). More

Results

To what extent does zoning constrain NYC's growth?

Counterfactuals

Simulate the evolution of the city until 2060, keeping fundamentals at their 2019 level.

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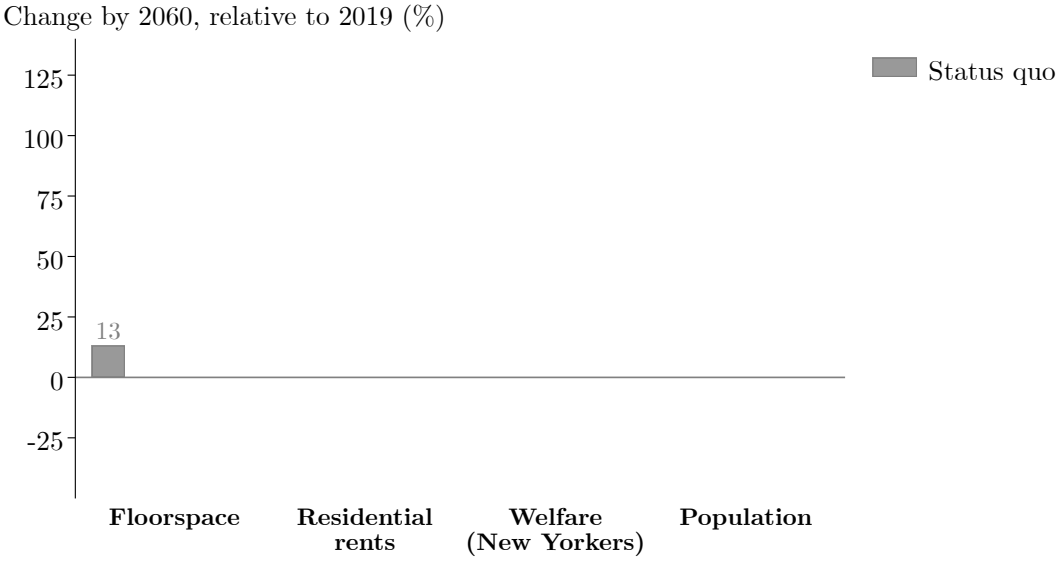
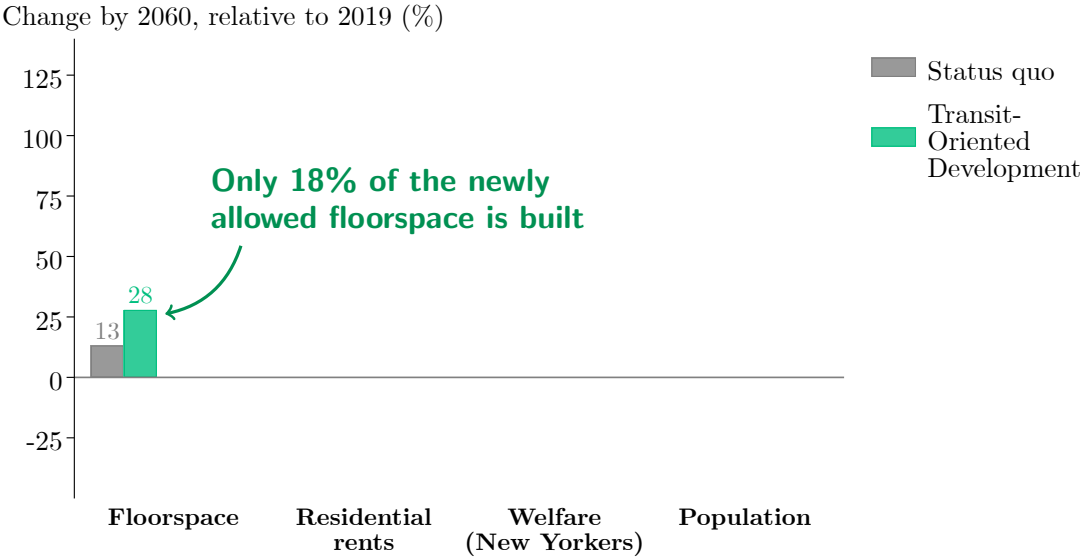
4. **Frictionless benchmark** (no zoning, no adjustment costs, price = marginal cost).

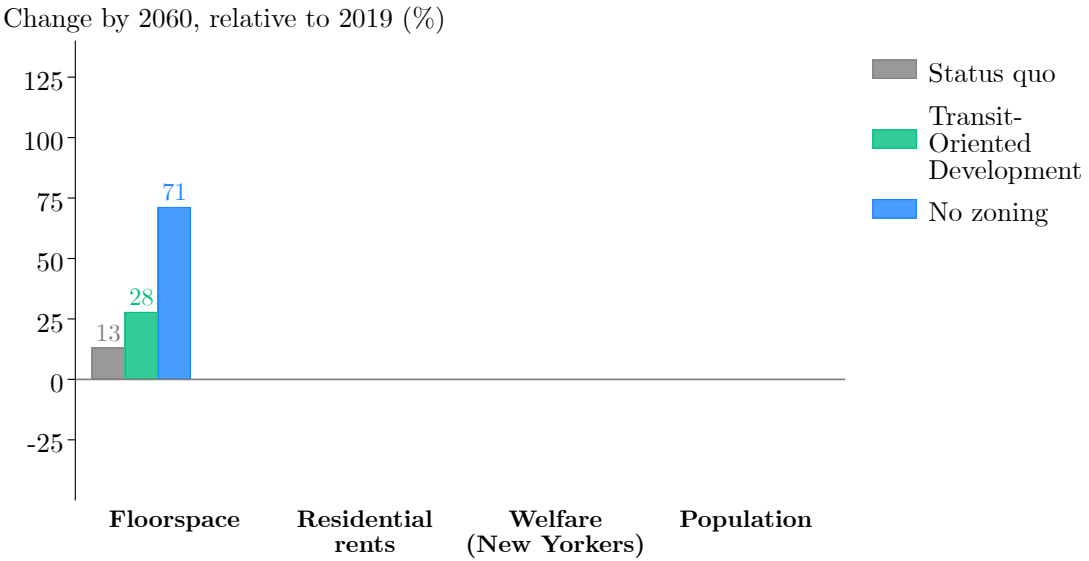
Under current zoning, NYC continues to grow slowly



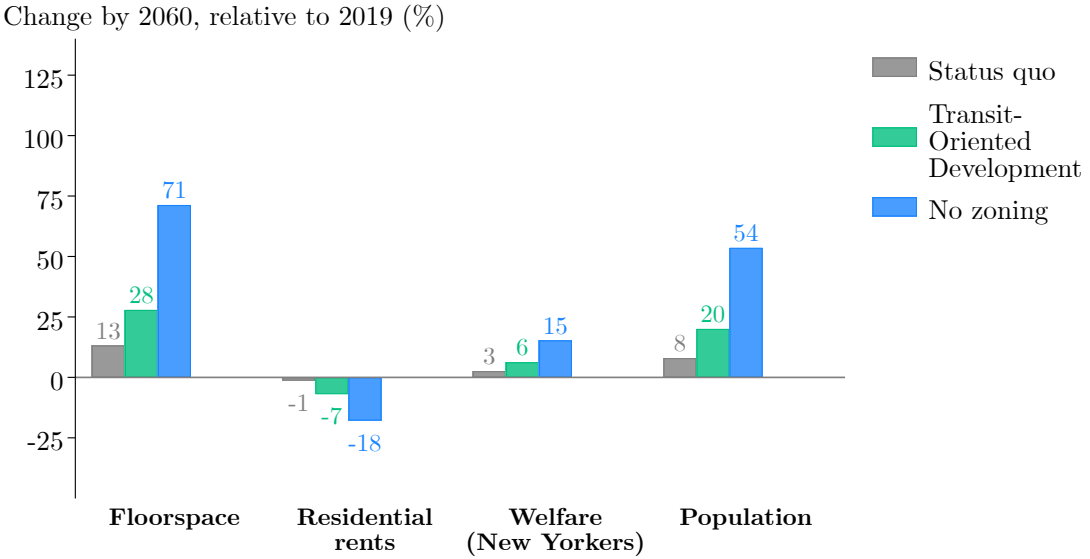
TOD doubles NYC's growth rate



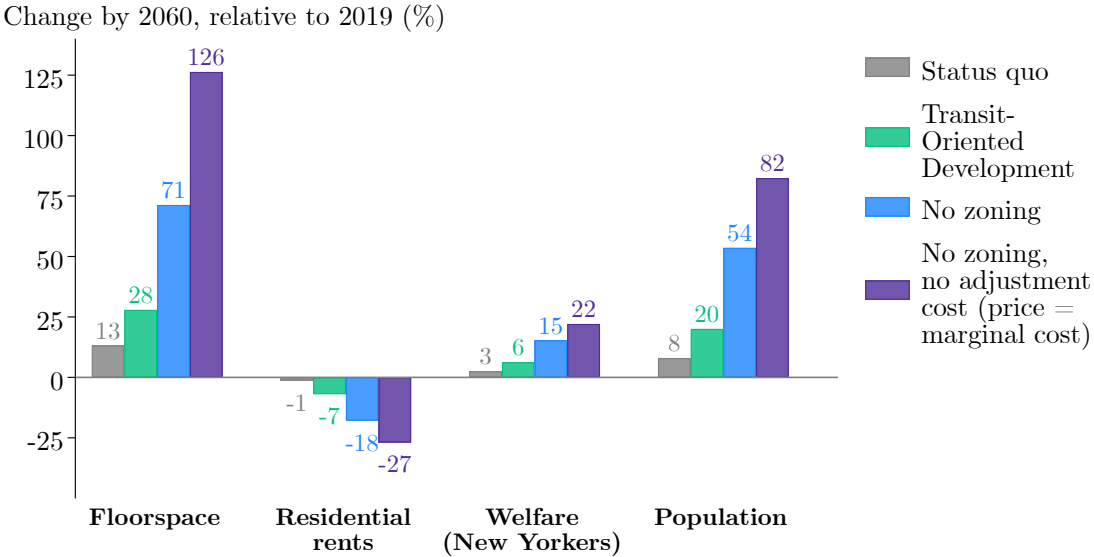
Completely removing zoning quadruples NYC's growth rate



Rent decreases are moderated by migration

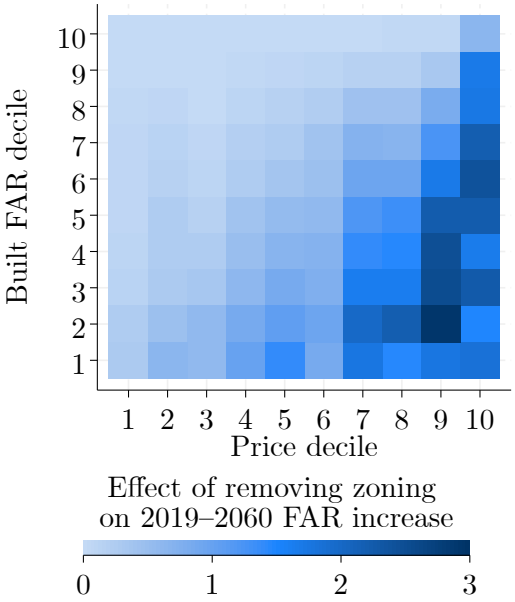


A simpler model greatly overstates effects of removing zoning



Where is zoning a constraint?

Where does relaxing zoning lead to increased supply?



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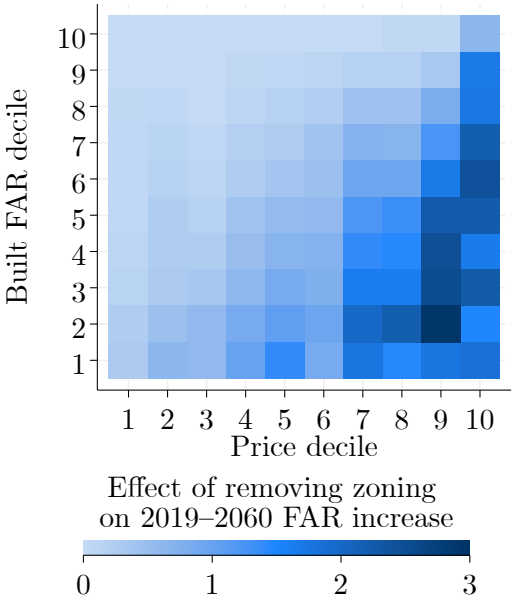

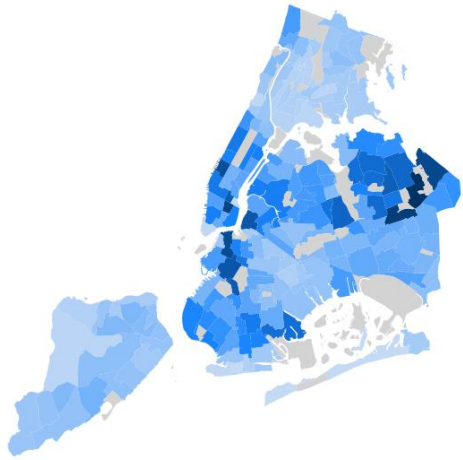

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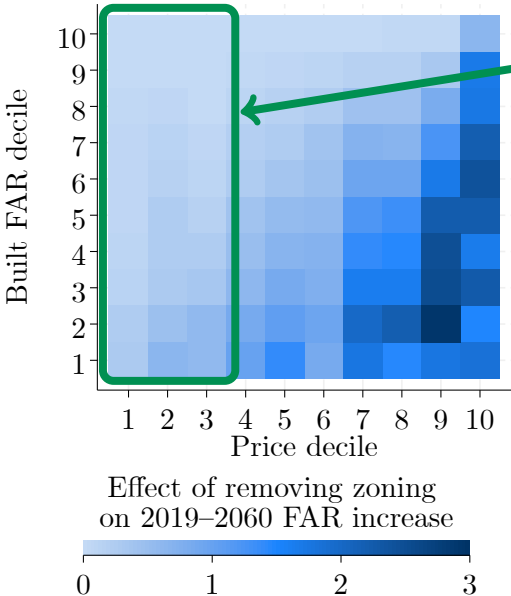
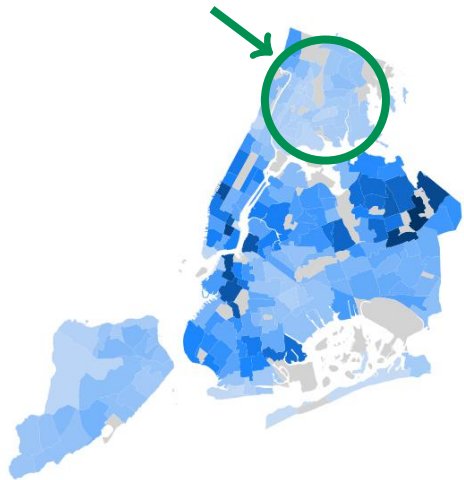
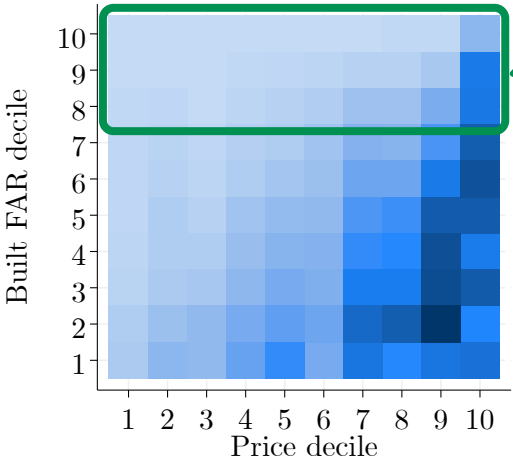
Other cities



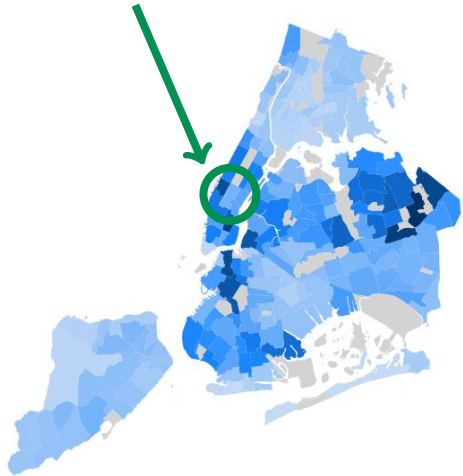
Zoning tends not be be binding when floorspace prices are low.



Where does relaxing zoning lead to increased supply?

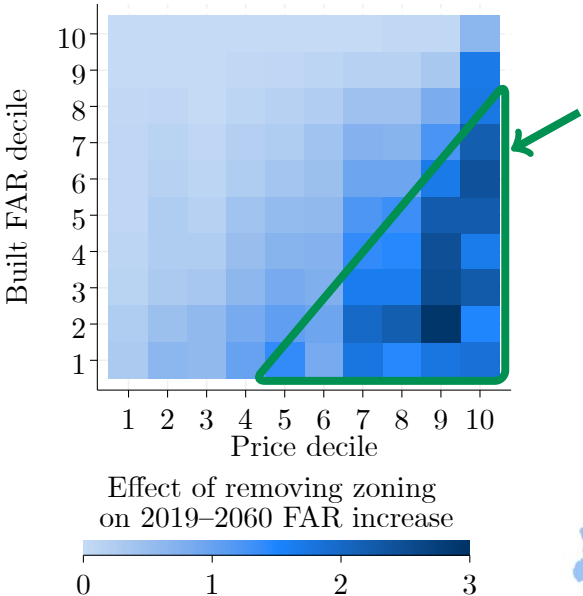


Removing zoning has little effects on parcels with tall buildings.

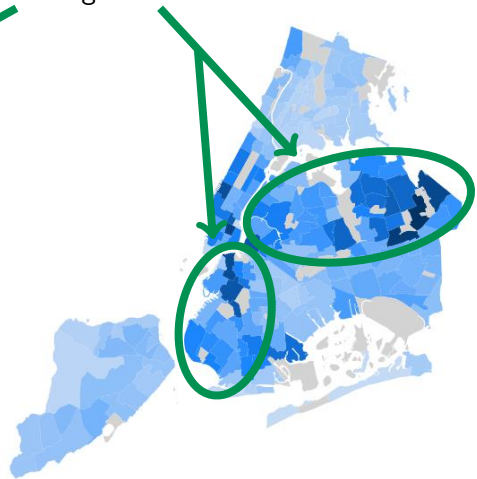


Where does relaxing zoning lead to increased supply?

Selection on gains



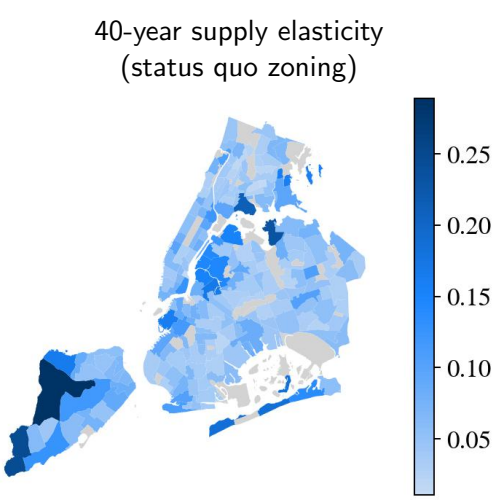
Upzoning is effective when prices are high enough and density is low enough.



How does zoning affect floorspace supply elasticities?

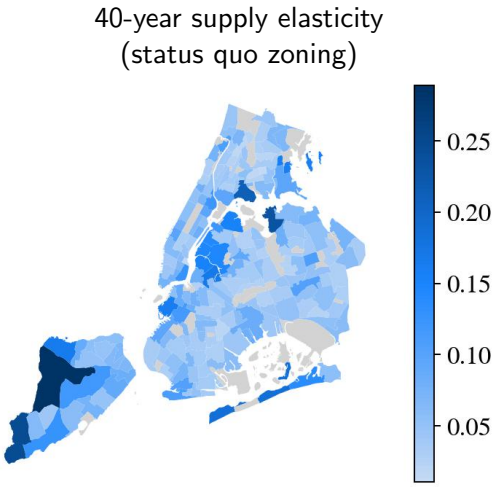
Supply elasticities

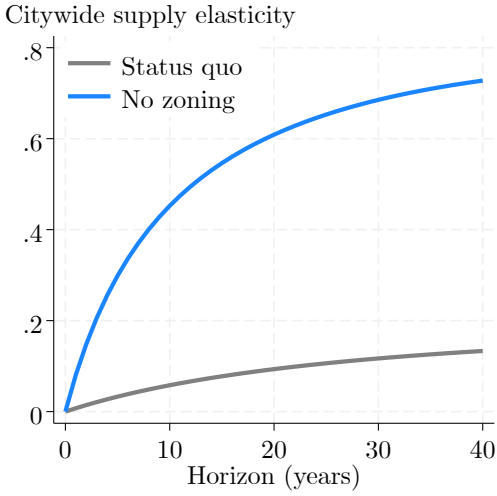
Determinants



Supply elasticities

Determinants





Additional results in the paper

- Distributional effects. More
- Effects on city structure. More
- Alternative policies (tax breaks, inclusionary zoning). More
- Historical analysis. More

Conclusion

Can we rebuild a city?

- Redevelopment is increasingly important for cities worldwide.
  → This paper provides a framework to analyze this process.

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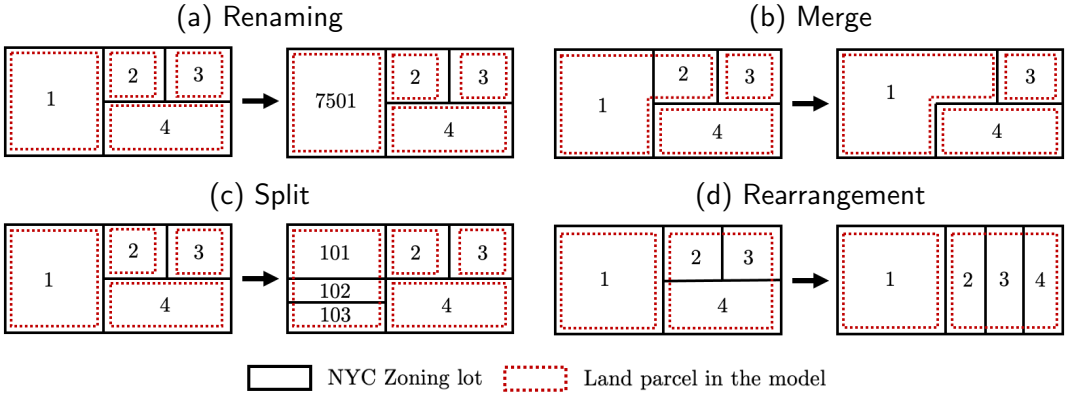
- In NYC, zoning severely constrains the growth of some neighborhoods.
  → Targeted upzoning can substantially boost floorspace supply.
- The gains from upzoning are diffuse and take time to materialize.
  → Effects of upzoning may look disappointing despite large welfare gains.

Appendix

Boundary changes (21,700 detected over 2004-2022)



Back

Examples of digitized Certificates of Occupancy

B Form 34 (Rev. 6/83)

THE CITY OF NEW YORK

TEMPORARY

DEPARTMENT OF BUILDINGS

CERTIFICATE OF OCCUPANCY

DATE OCT 22 1992 NO. 63439

BOROUGH BRONX

This certificate supersedes C.O. No. T. 62708/92 ZONING DISTRICT R7-1

THIS CERTIFIES that the new-altered-existing-building-premises located at

1229 BRYANT AVENUE Block 2993 Lot 15

CONFORMS SUBSTANTIALLY TO THE APPROVED PLANS AND SPECIFICATIONS AND TO THE REQUIREMENTS OF ALL APPLICABLE LAWS, RULES, AND REGULATIONS FOR THE USES AND OCCUPANCIES SPECIFIED HEREIN

Click Here to Delete Page | Click Here to Insert 1 Page | Click Here to Insert 3 Pages

NYC BUILDINGS

CERTIFICATE OF OCCUPANCY

Job Number NB 102820529

Borough: MANHATTAN Date: DECEMBER 10, 2004 No: 102820529-T-13

This certificate superceded C.O. No. 102820529-T-12 ZONING DISTRICT C6-3A

This certifies that the new-altered-existing-building-premises located at

120 WEST 21ST STREET

Block: 796 Lot: 50

CONFORMS SUBSTANTIALLY TO THE APPROVED PLANS AND SPECIFICATIONS AND TO THE REQUIREMENTS OF ALL APPLICABLE LAWS, RULES, AND REGULATIONS FOR THE USES AND OCCUPANCIES SPECIFIED HEREIN.

NEW YORK CITY DEPARTMENT OF BUILDINGS

CERTIFICATE OF OCCUPANCY

DATE: JUL 24 2002 NO. 102574091

BOROUGH MANHATTAN

This certificate supersedes C.O. NO ZONING DISTRICT R7-2

THIS CERTIFIES that the new-altered-existing-building-premises located at

87 ATTORNEY STREET Block 348 Lot 6

CONFORMS SUBSTANTIALLY TO THE APPROVED PLANS AND SPECIFICATIONS AND TO THE REQUIREMENTS OF ALL APPLICABLE LAWS, RULES, AND REGULATIONS FOR THE USES AND OCCUPANCIES SPECIFIED HEREIN.

NYC Buildings

Page 1 of 2

Certificate of Occupancy

CO Number: 121814180T001

This certifies that the premises described herein conforms substantially to the approved plans and specifications and to the requirements of all applicable laws, rules and regulations for the uses and occupancies specified. No change of use or occupancy shall be made unless a new Certificate of Occupancy is issued. *This document or a copy shall be available for inspection at the building at all reasonable times.*

A. Borough: Manhattan

Address: 192 SEVENTH AVENUE SOUTH

Building Identification Number (BIN): 1010937

Block Number: 00613

Lot Number(s): 53

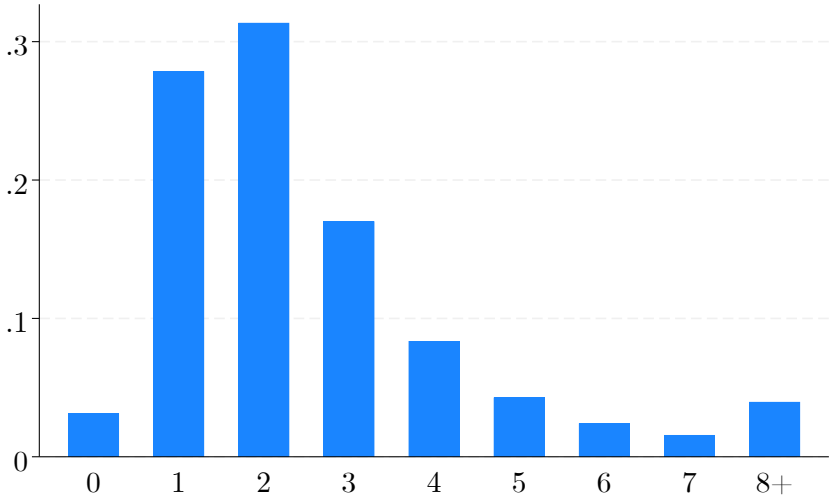
Building Type:

Certificate Type: Temporary

Effective Date: 11/05/2020

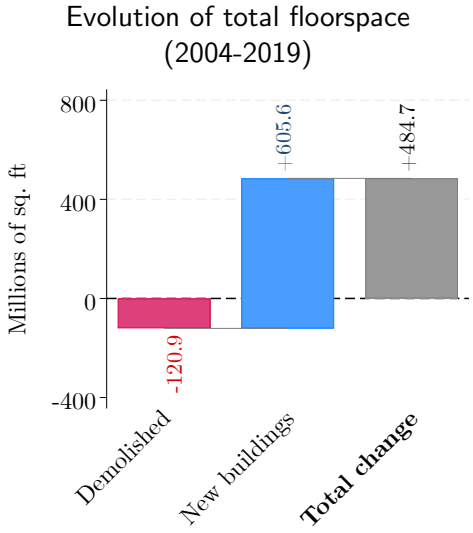
Back

Redevelopment duration (in years)



Back

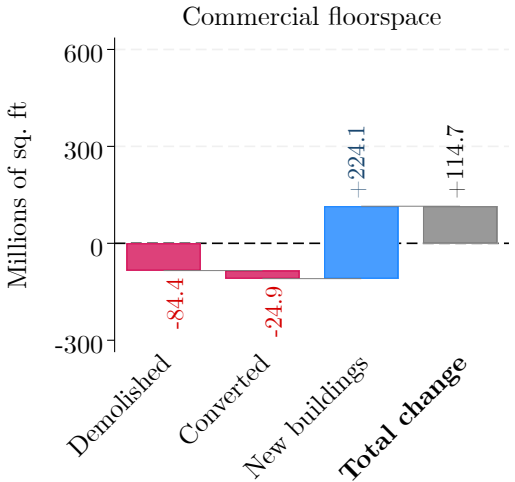
Mature cities grow by redeveloping old structures

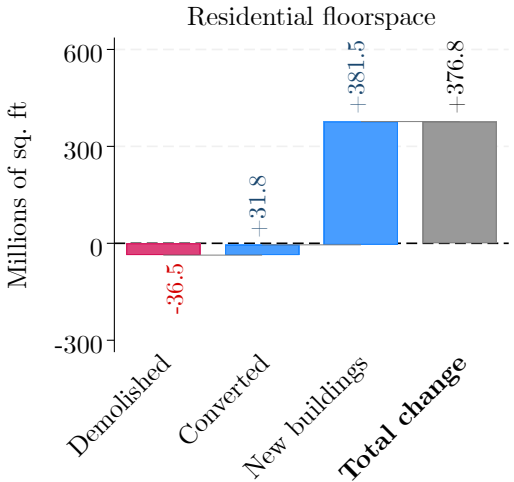


- Since 2004, floorspace in NYC has grown at a rate of $\sim$0.6% per year.

Back

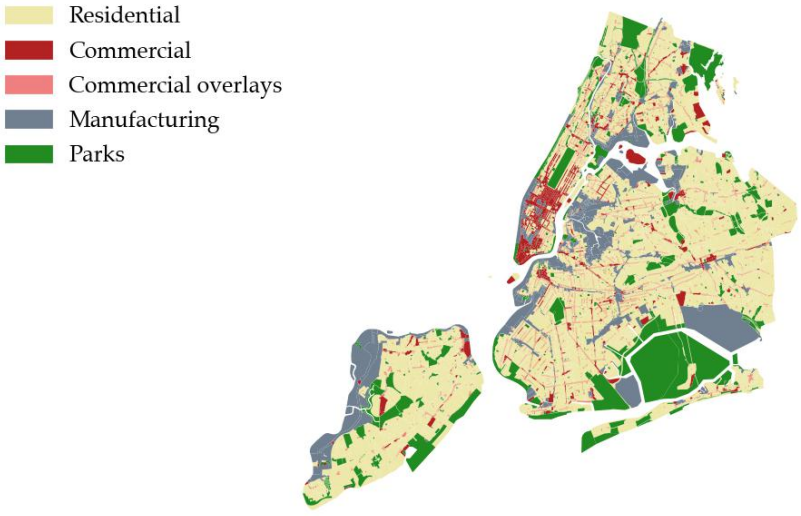
Changes in residential/commercial floorspace





Back

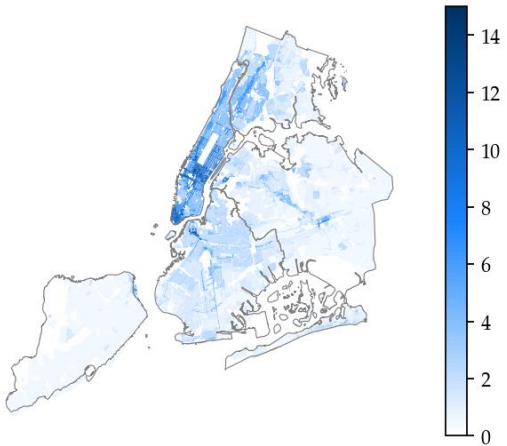
Use restrictions constrain the reallocation of land uses



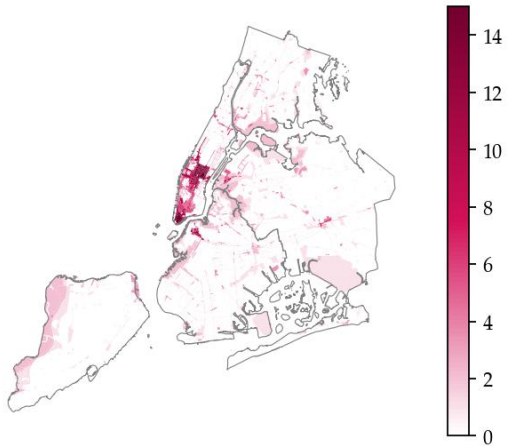
Back

FAR allowances in NYC's zoning map

Residential uses

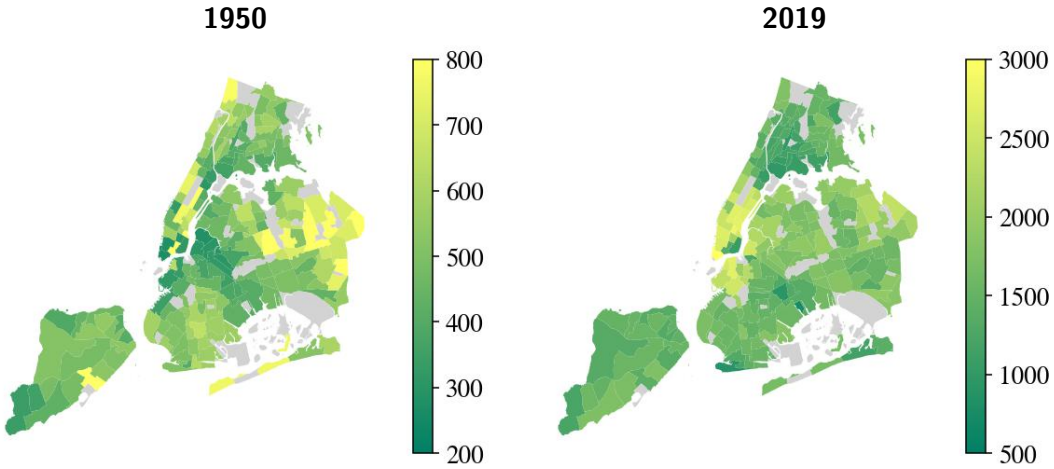


Commercial uses



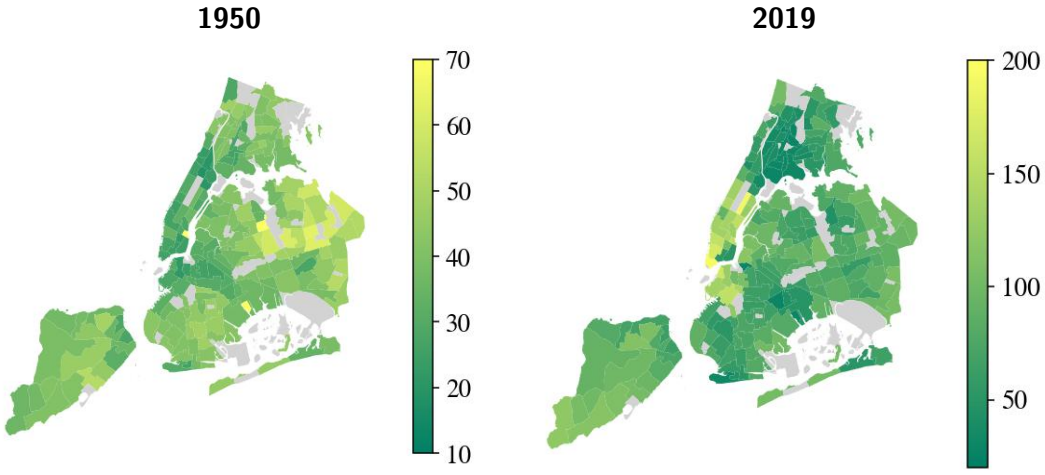
Back

Evolution of median residential rents ($/month)



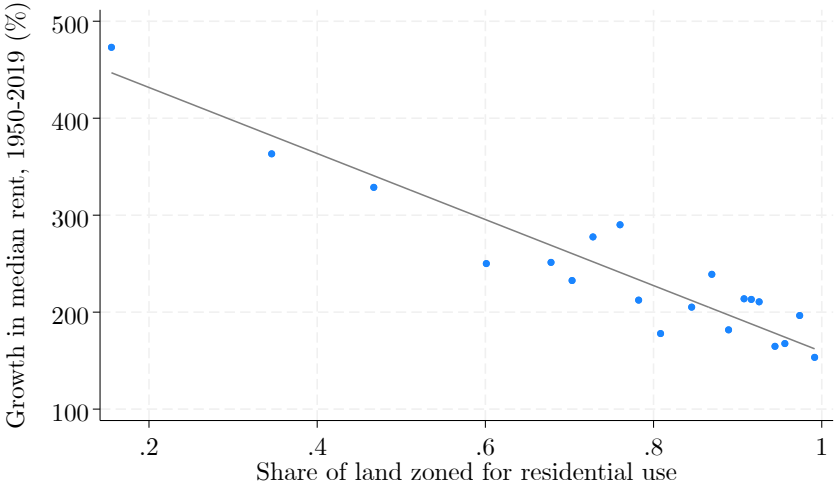
Back

Evolution of median household income ($k/year)



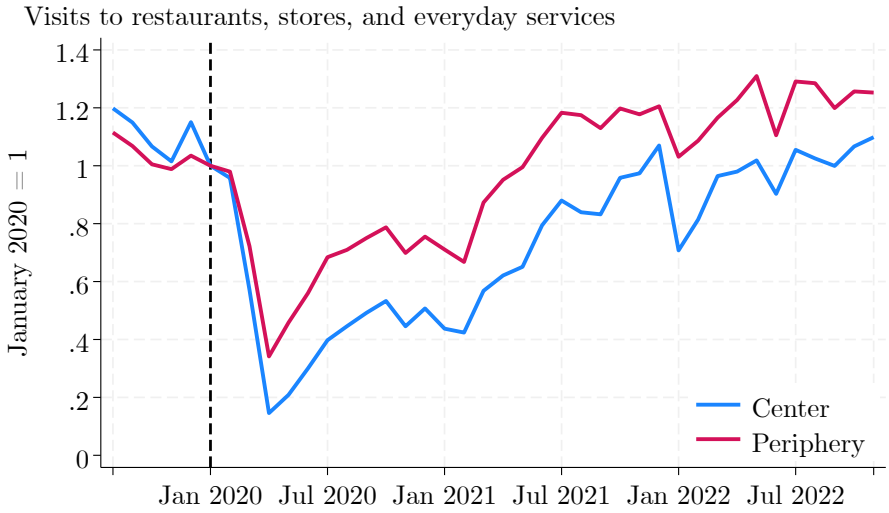
Back

Commercial-oriented areas became more attractive over time



Back

Work from home will likely accelerate existing trends



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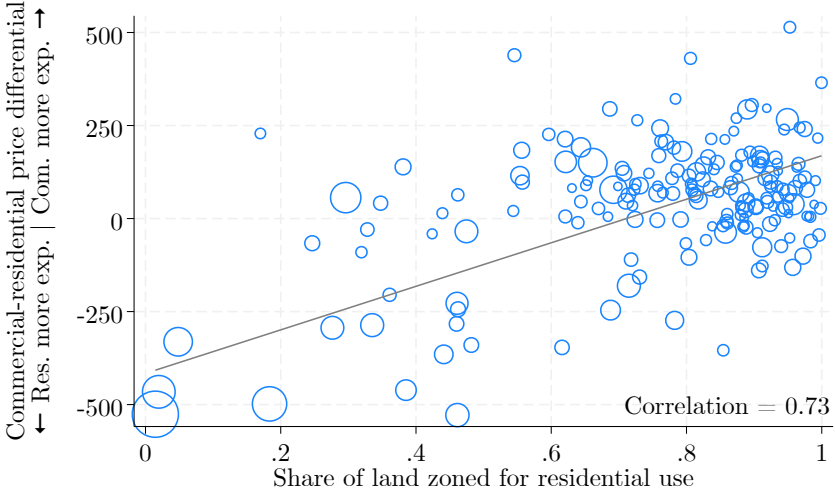
Use restrictions constrain the reallocation of land uses



Back

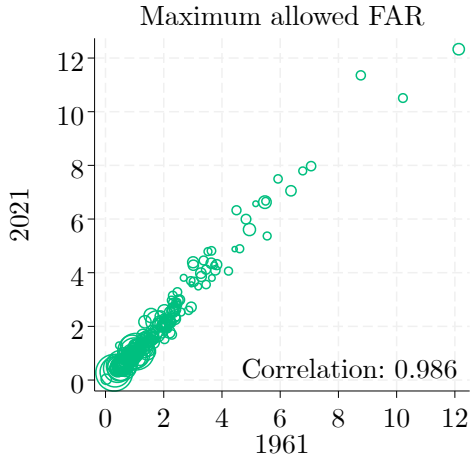
Zoning's goals

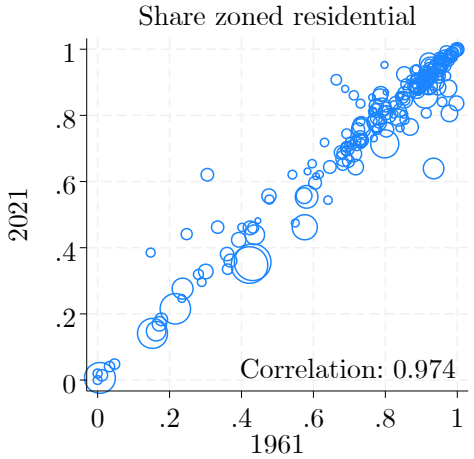
- Current zoning resolution adopted in 1961.
- Planners believed NYC has nearly reached its maximum size.
  → Didn't view the zoning code as restrictive.
- Aims of the 1961 zoning resolution:
  1. Promote tower-in-the-park development.
  2. Better separate commercial/residential uses.

  → De facto: stabilization of existing land uses.
- Current zoning regulations closely aligns with the 1961 ordinance.

Back

Since 1961: Persistence in zoning





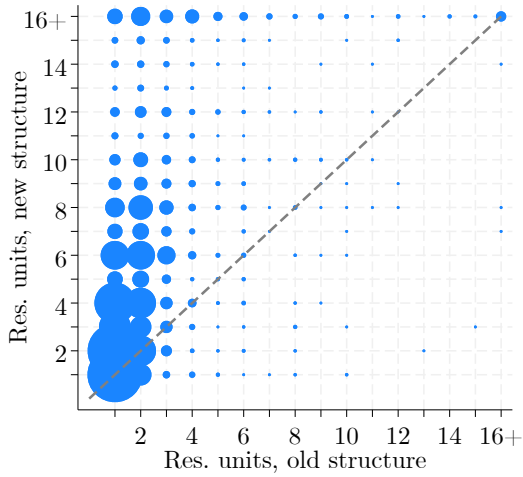
Back

Change in number of units

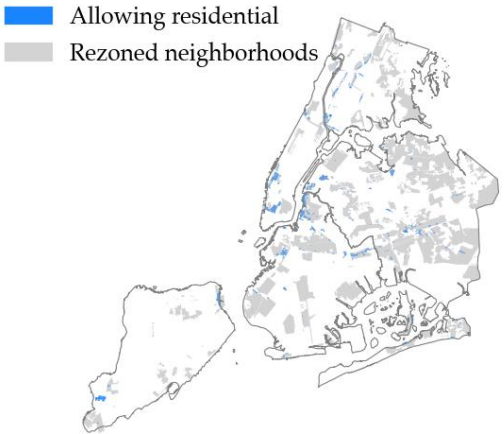
Residential-to-residential redevelopment

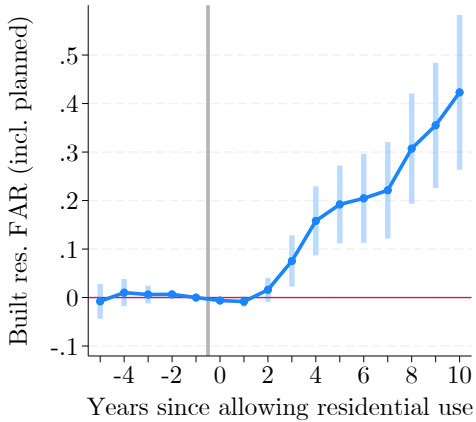
- New residential units are about 10% larger than the ones they replace.
- The number of units in new residential buildings is, on average, 3 times larger than in old structures.

Back



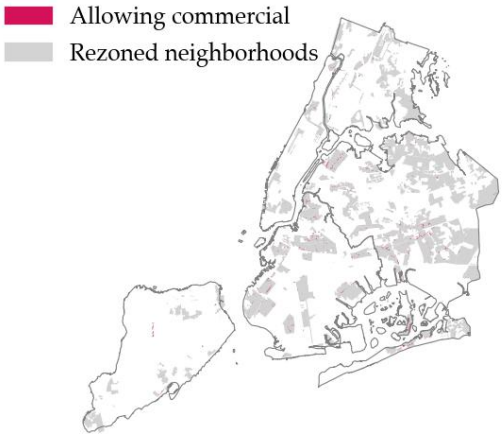
Effects of allowing residential use

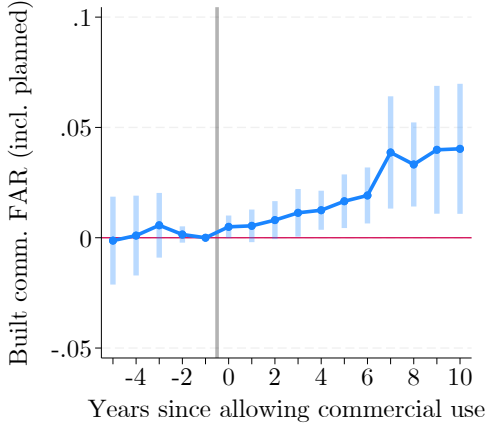




◂ Back (upzoning event study) ◂ Back (price differentials)

Effects of allowing commercial use





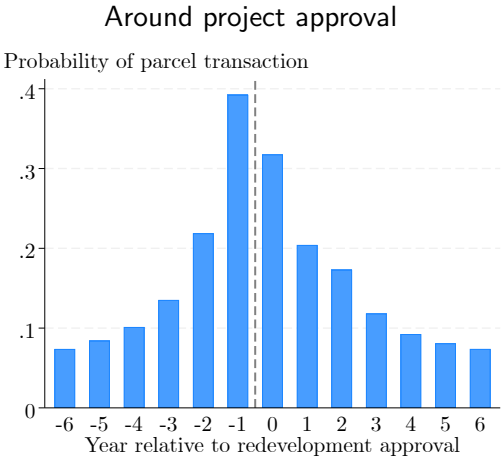
◂ Back (upzoning event study) ◂ Back (price differentials)

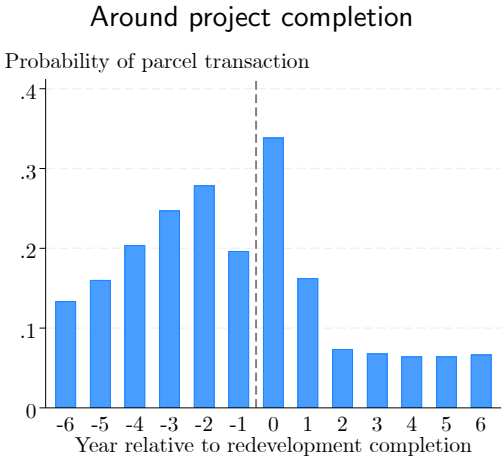
Probability of a parcel sale (probit regression)

	Probit coefficients	
Parcel sold		
Office space (% of total floorspace)	-0.076	(0.006)
Retail space (% of total floorspace)	-0.018	(0.004)
Garage space (% of total floorspace)	0.000	(0.007)
Storage space (% of total floorspace)	0.033	(0.009)
Factory space (% of total floorspace)	0.001	(0.007)
Hotel space (% of total floorspace)	-0.015	(0.020)
Other space (% of total floorspace)	-0.327	(0.006)
Condo/Coop	-0.684	(0.008)
Parcel in Bronx	0.051	(0.003)
Parcel in Brooklyn	0.038	(0.003)
Parcel in Queens	0.036	(0.003)
Parcel in Staten Island	0.023	(0.003)
Constant	-1.615	(0.003)
Observations	13,156,064	

Back

Parcel sales around redevelopment events





Back

Estimation details: Building values

- Using the sales data, I estimate separately for residential and commercial structures:

$$\log(\text{price}_s) = \underbrace{\rho^{\theta}_{1,n(s)}}_{\text{Neigh. FE}} + \underbrace{\rho^{\theta}_{2,bt(s)}}_{\text{Borough} \times \text{year FE}} + \boldsymbol{\beta} \underbrace{(\mathbf{x}_s - \bar{\mathbf{x}}_s)}_{\text{Structure characteristics}} + \nu_s$$

- Expected value of floorspace in a new building: $\bar{p}_{nt} = \exp(\hat{\rho}_{1,n} + \hat{\rho}_{2,b(n)t} + \hat{\sigma}_\nu/2)$
- Negative coefficient on (log) FAR, more negative for commercial.
  - → Less usable floorspace in tall buildings (e.g., because of mechanical space).
  - → Lower floor of commercial buildings is more valuable.

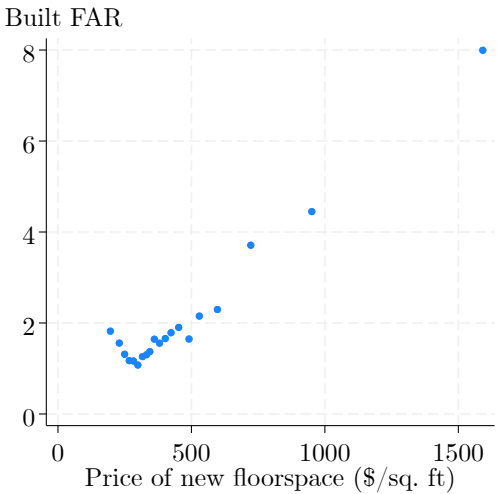
Back

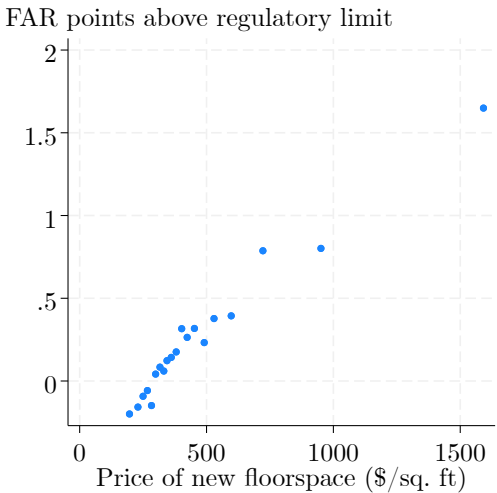
Hedonic regression coefficients

Back

	(1) Residential		(2) Commercial	
(log) Built FAR	-0.027	(0.002)	-0.091	(0.011)
(log) Unit size	-0.065	(0.002)	-0.108	(0.005)
Age	-0.002	(0.000)	0.000	(0.000)
Rent-stabilized	-0.336	(0.002)		
Landmark	-0.078	(0.006)	0.087	(0.060)
Grade A	0.162	(0.003)	0.222	(0.032)
Grade B	0.025	(0.002)	0.095	(0.019)
Grade C	0.007	(0.002)	-0.024	(0.019)
Brick	-0.155	(0.003)	-0.001	(0.084)
Frame	-0.068	(0.003)	-0.224	(0.118)
Masonry	-0.156	(0.003)	-0.071	(0.019)
Office building			0.147	(0.025)
Retail building			0.222	(0.021)
Garage building			0.004	(0.025)
Industrial building			0.030	(0.025)
Hotel			0.352	(0.048)
Neighborhood FE	Yes		Yes	
Borough $\times$ Year FE	Yes		Yes	
Observations	428,338		15,795	

Developers build taller when facing high prices





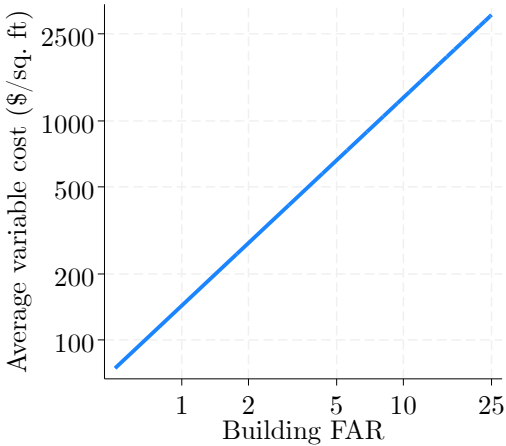
Back

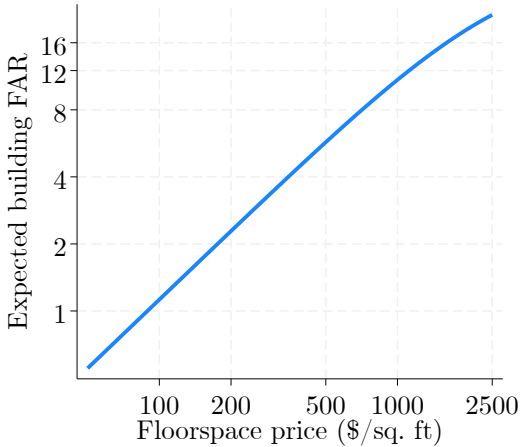
Estimated cost paramters

(a) Variable cost parameters			
α^0	Baseline cost of materials	80.4	(2.3)
ζ	Capital cost share	0.51	(0.005)
σ_η	Cost shock standard deviation	1.08	(0.02)
(b) Fixed cost parameters			
δ^0	Base fixed cost	175.2	(7.7)
$\delta^{\text{demolition}}$	Demolition multiplier	1853.8	(37.6)
δ^{density}	Neighborhood density multiplier	318.5	(11.3)
$\delta^{\text{protected}}$	Protected parcels multiplier	0.77	(0.03)
(c) Profit shock parameters			
σ_ϵ^0	Base profit shock variance	73.7	(2.9)
$\sigma_\epsilon^{\text{demolition}}$	Demolition multiplier	138.8	(5.1)
$\sigma_\epsilon^{\text{density}}$	Neighborhood density multiplier	248.2	(4.9)

◂ Back (variable costs) ◂ Back (fixed costs)

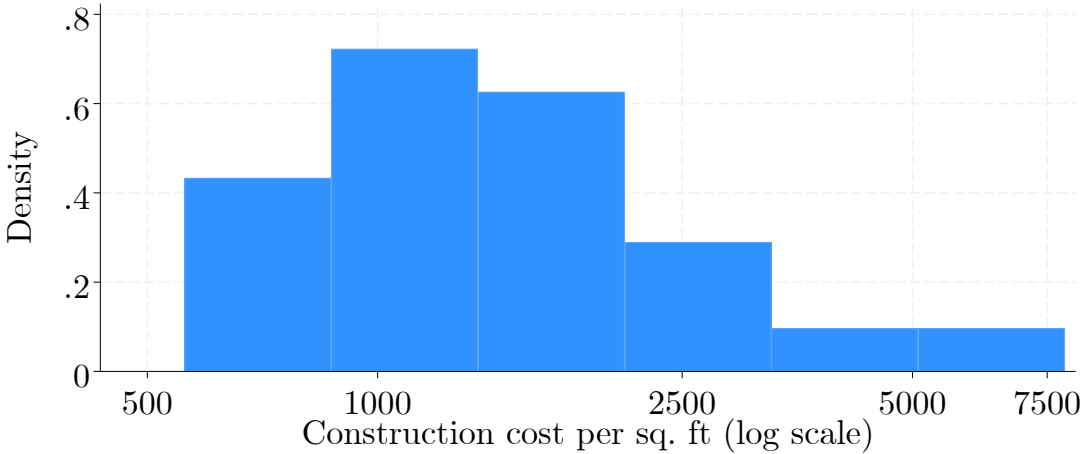
Construction costs





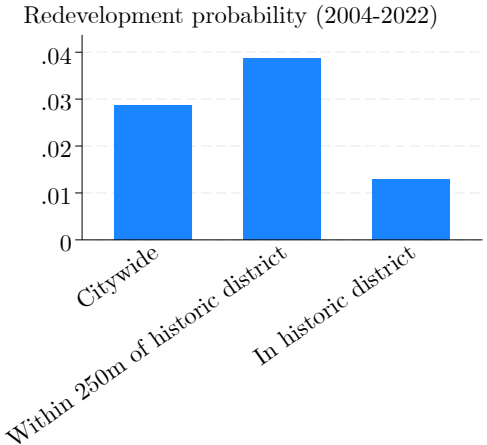
Back

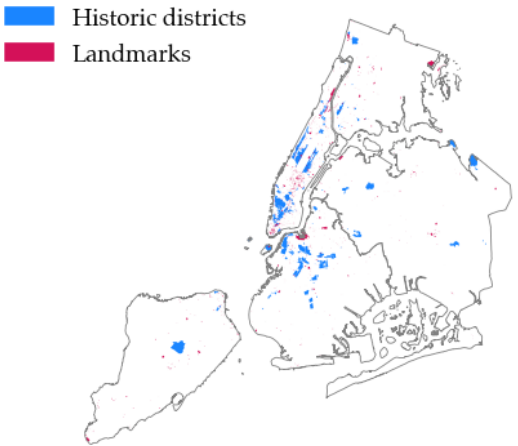
Construction costs for skyscrapers



Back

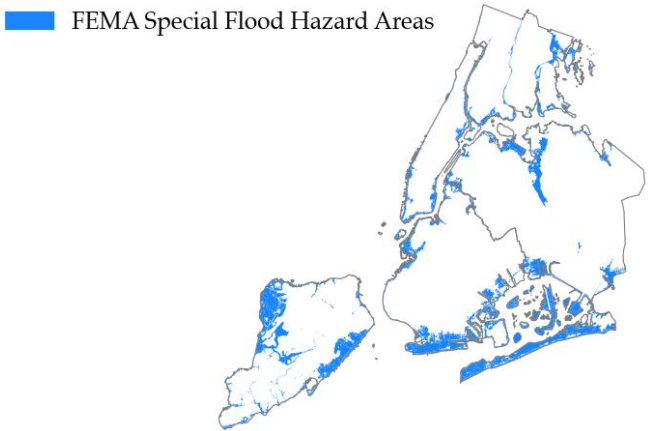
Protected areas





◂ Back (fixed costs) ◂ Back (counterfactuals)

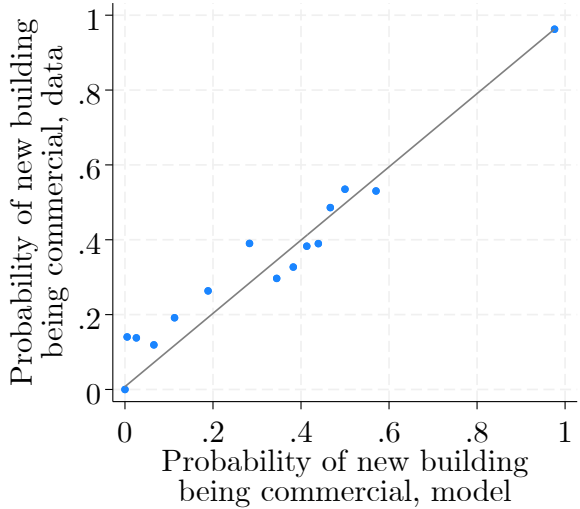
Flood zones

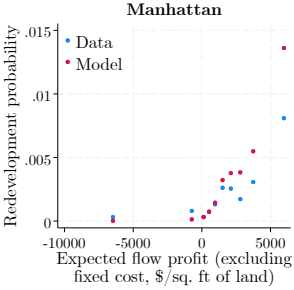


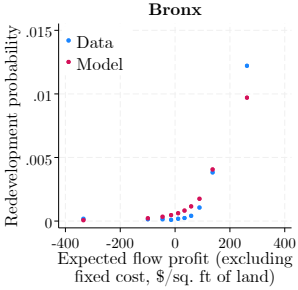
Back

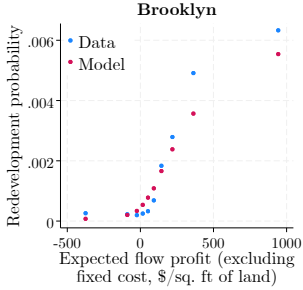
Model fit: Residential vs. commercial construction

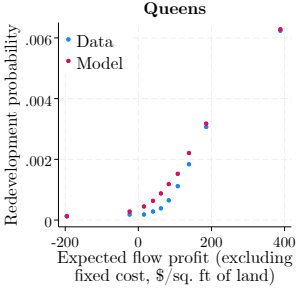
Back

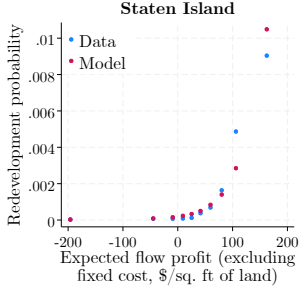



Manhattan
Data
Model
Redevelopment probability
.015
.01
.005
0
-10000
-5000
0
5000
Expected flow profit (excluding fixed cost, $/sq. ft of land)


Bronx
Data
Model
Redevelopment probability
.015
.01
.005
0
-400
-200
0
200
400
Expected flow profit (excluding fixed cost, $/sq. ft of land)


Brooklyn
Data
Model
Redevelopment probability
.006
.004
.002
0
-500
0
500
1000
Expected flow profit (excluding fixed cost, $/sq. ft of land)


Queens
Data
Model
Redevelopment probability
.006
.004
.002
0
-200
0
200
400
Expected flow profit (excluding fixed cost, $/sq. ft of land)


Staten Island
Data
Model
Redevelopment probability
.01
.008
.006
.004
.002
0
-200
-100
0
100
200
Expected flow profit (excluding fixed cost, $/sq. ft of land)

Back

Out-of-sample model fit

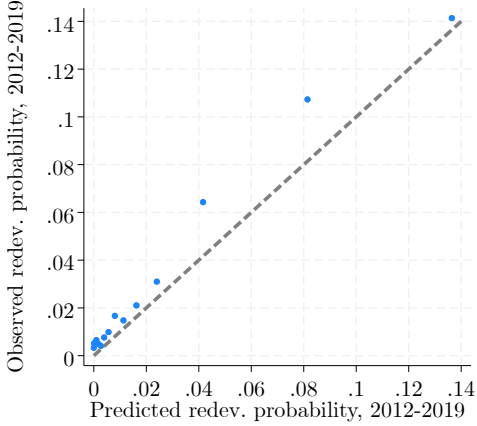
Back

- Re-estimate the model using first half of the data (2004–2011):
  - → Price levels;
  - → Preferences and location fundamentals;
  - → Sale probabilities;
  - → Variable costs;
  - → Fixed costs.
- Predict the evolution of the city over 2012–2019.

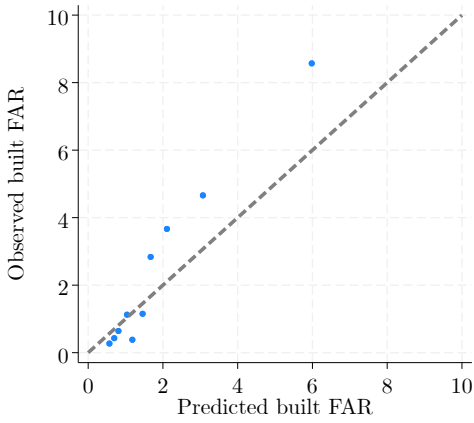
Out-of-sample model fit: Parcel level

Back

Redevelopment probabilities



Built FAR of redeveloped buildings

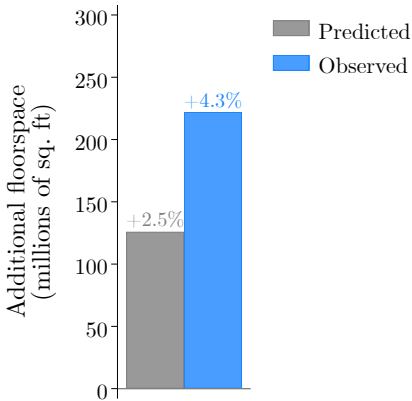


→ Differences explained by high price growth post-2012.

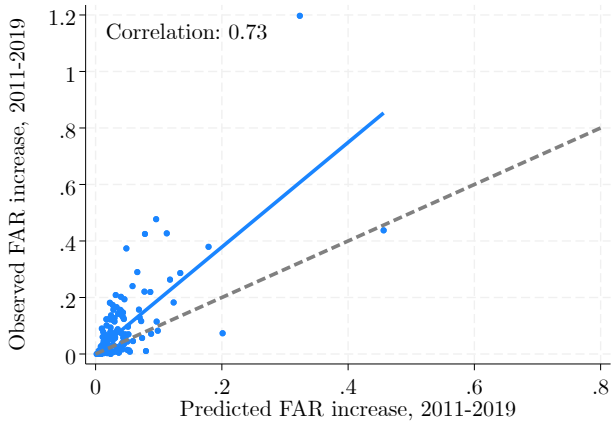
Out-of-sample model fit: Aggregate growth

Back

Citywide floorspace growth

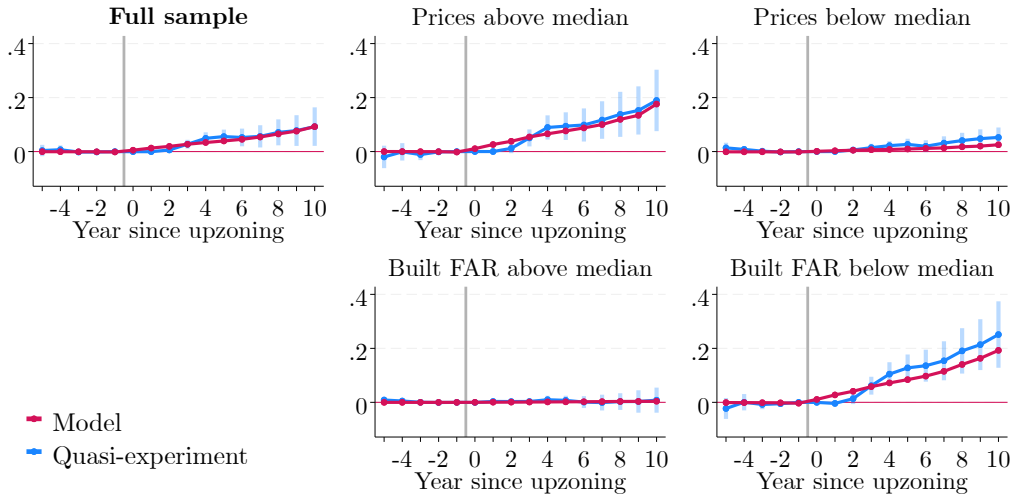


Neighborhood-level growth



→ Differences explained by high price growth post-2012.

Model validation, excluding upzoned parcels



Back

Demand model

Back

- Neighborhoods are endowed with commercial and residential floorspace.
- Workers choose home and work locations (i, j):

$$U_{ij} = \frac{B_i z_i^H z_j^W}{d_{ij}} c^{1-\beta} (h - \bar{h}_i)^{\beta}$$

  - → Workers value housing, other consumption, and amenities.
  - → They dislike commuting.
  - → They dislike high residential prices (budget constraint: $c + R_i h \leq$ Income)
  - → They must consume at least a subsistence amount of housing.
  - → They have (Fréchet-distributed) idiosyncratic preferences for home/work locations.

- Heterogeneous workers, with effective labor supply $s(\vartheta)$, lognormally distributed.
  - → City population increases with expected utility (migration elasticity $\varepsilon_m = 3$).
  - → Congestion worsens as the city grows.

Demand model

Back

- Firms produce using labor and floorspace:

$$Y_j = A_j {H_{Fj}}^{\alpha_j} {L_{Fj}}^{1-\alpha_j}$$

- Amenities and productivities vary with the density of residents and jobs.

$$B_i = \bar{B}_i \tilde{L}_{Ri}^{\gamma_{RR}} \tilde{L}_{Fi}^{\gamma_{CR}} \qquad A_j = \bar{A}_j \tilde{L}_{Rj}^{\gamma_{RC}} \tilde{L}_{Fj}^{\gamma_{CC}}$$

  → γ are the agglomeration elasticities.

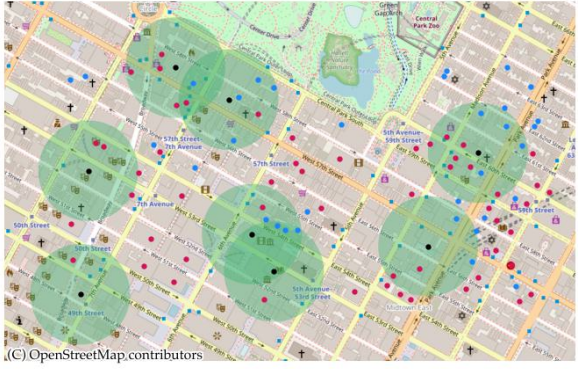
- Income from rented floorspace redistributed proportionally to labor income.

- The calibrated model matches untargeted moments well. Estimation details Engel curve Commuting flows Income sorting Share of floorspace in production Minimal housing consumption Survey data

Price effects of new construction

Back

- To calibrate γ, I measure local demand elasticities for floorspace:
  - → Isolate large new construction events.
  - → Draw 500-ft disks around them.
  - → Compare the evolution of rents in disks treated earlier vs. later.
  - → How do rents react to new construction?



Events (new residential buildings)

New buildings

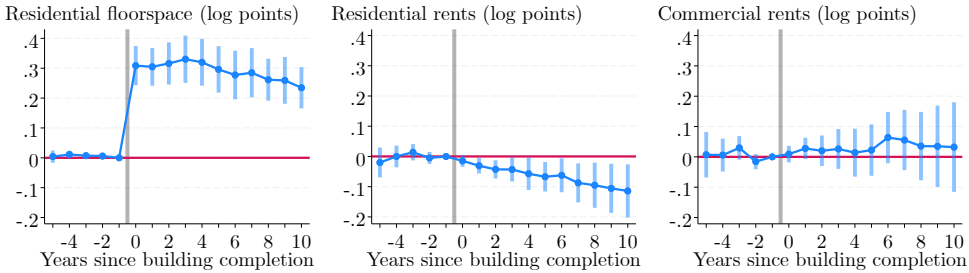
500 ft buffers

Buildings with available rent data

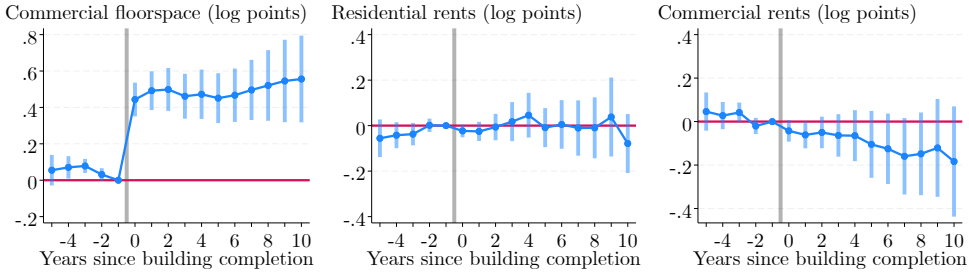
Residential

Commercial

Effects of residential construction



Effects of commercial construction



Price effects of new construction

Back

- I calibrate agglomeration parameters through **indirect inference** to match reduced-form elasticities.

Price effects of new construction

Back

- I calibrate agglomeration parameters through **indirect inference** to match reduced-form elasticities.

- I find agglomeration externalities in line with existing estimates in the literature.
  - → Effect of residents on other residents: $\gamma_{RR} = 0.11$.
  - → Effect of firms on other firms: $\gamma_{CC} = 0.07$.
  - → Corresponding estimates in Ahlfeldt et al. (2015): 0.16 and 0.07.

Event locations | Buffer examples | Excluding overlapping buffers | Spatial decay | Parameter estimates | Sensitivity

Demand model estimation (1)

- Calibrate β to 0.1 using the ACS.
- Estimate the shape of z^W at 4.4 using the commuting data.
- Calibrate wages from the number of people working in each location.
  - → High-wage locations attract more workers, and from further away.
- Calibrate amenities $\boldsymbol{B}$ with residential prices and the number of residents in each location.
  - → Locations attracting many residents despite high prices must have high amenities.
- Calibrate subsistence levels $\bar{\boldsymbol{h}}$ with the total housing consumption in each location.
  - → Higher levels of $\bar{h}$ lead to more housing consumption.
  - → Average $\bar{h}$ of 224 sq. ft (IQR = [170 sq. ft, 265 sq. ft])

Demand model estimation (2)

- Calibrate the shape of z^H to 2.9 match the variance of average neighborhood incomes.
  - $\rightarrow$ Higher variance of $z^H \implies$ less sorting across neighborhood by income.

- Calibrate productivities $\boldsymbol{A}$ and floorspace shares in production $\boldsymbol{\alpha}$ using data on commercial floorspace quantities and prices, the number of jobs in each location, and the calibrated wages.
  - $\rightarrow$ Productivity is estimated to be higher near the center of the city.
  - $\rightarrow$ α averages 0.18 across neighborhoods (IQR $= [0.14, 0.21]$). Close to benchmarks in the literature (0.2 in Ahlfeldt et al., 2015; 0.16 in Greenwood, Hercowitz, and Krusell, 1997).

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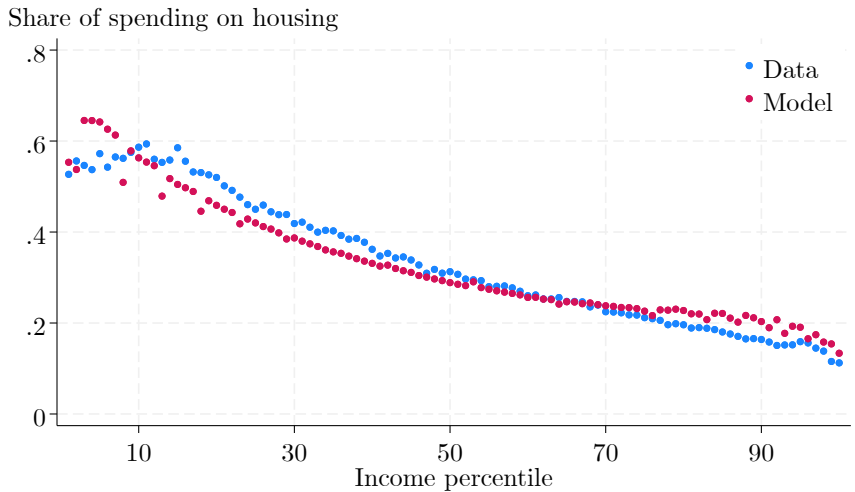
Engel curve for housing



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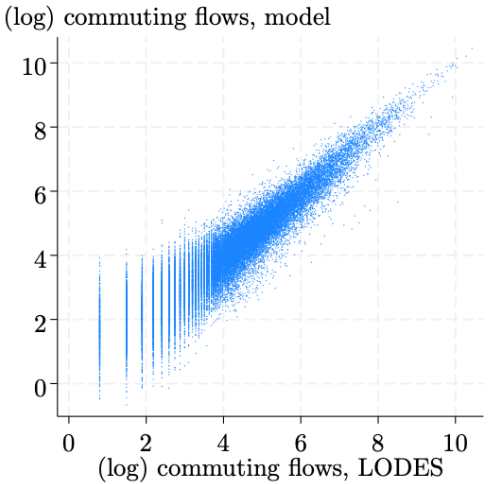
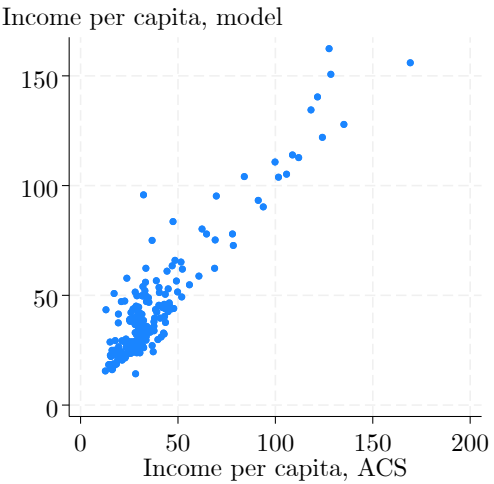
Demand model fit: Commuting flows and sorting





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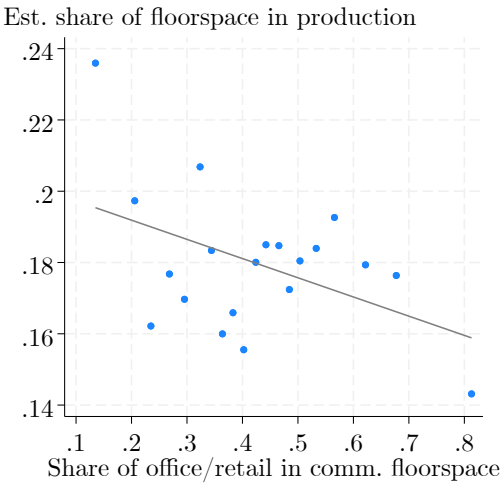
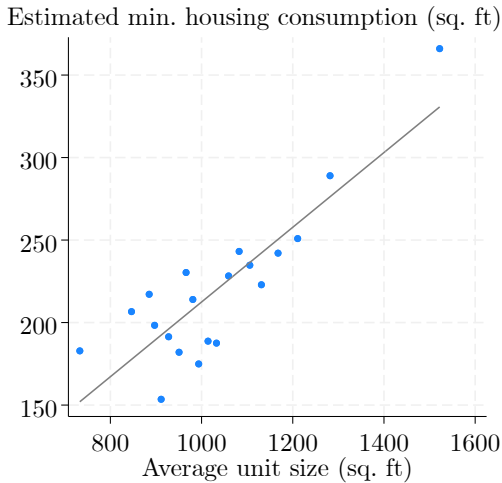
Demand model fit: α and $\bar{h}$





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Amenity	Correlation between share of satisfied residents and B
Neighborhood cleanliness	0.47
Control of street noise	0.07
Household garbage pick-up	0.33
Recycling services	0.34
Snow removal	0.77
Rat control	0.36
Bike safety	0.25
Pedestrian safety	0.53
Street maintenance	0.53
Parking enforcement	0.74
Storm water drainage and sewer maintenance	0.57
Availability of healthcare services	0.52
Availability of cultural activities	0.60
Neighborhood parks	0.86
Fire protection services	0.75
Emergency medical services	0.73
Neighborhood public safety	0.66
Bus services	0.66
Subway services	0.71
Public services	0.63

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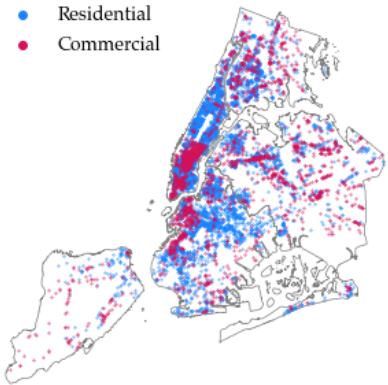
Large construction events

Construction events

Buildings with rent data



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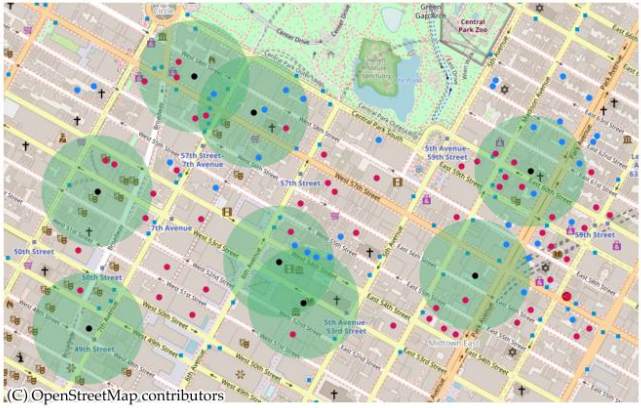
Buffers around new residential buildings



Events (new residential buildings)

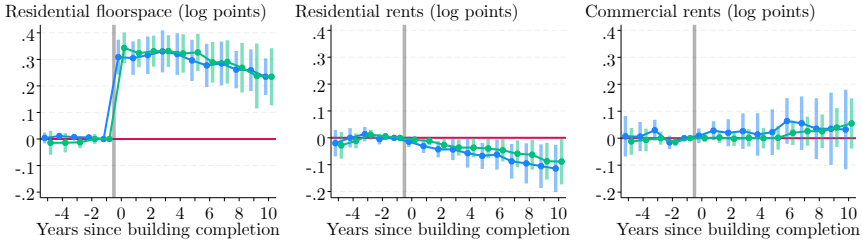
- New buildings
- 500 ft buffers

Buildings with available rent data

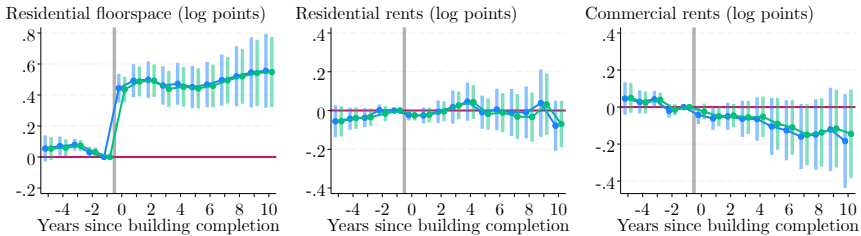
- Residential
- Commercial

Back

Effects of residential construction



Effects of commercial construction



Baseline With overlapping events

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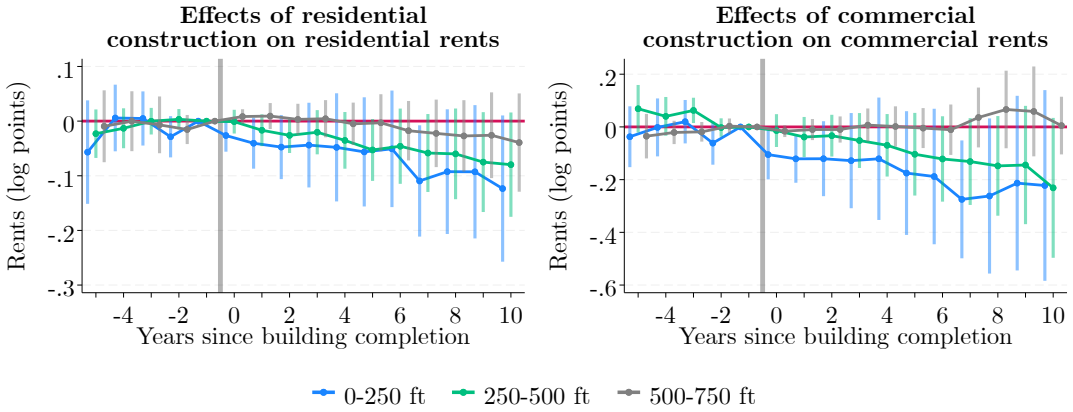
Spatial decay of price effects



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Estimated spillover parameters

Parameter	Interpretation	Calibrated value	Targeted elasticity
γ^{RR}	Effect of residents on amenities	0.11	$\varepsilon^{RR} =$ -0.42
γ^{RC}	Effect of residents on productivity	0.03	$\varepsilon^{RC} = 0.14$
γ^{CR}	Effect of jobs on amenities	-0.03	$\varepsilon^{CR} =$ -0.03
γ^{CC}	Effect of jobs on productivity	0.07	$\varepsilon^{CC} =$ -0.28

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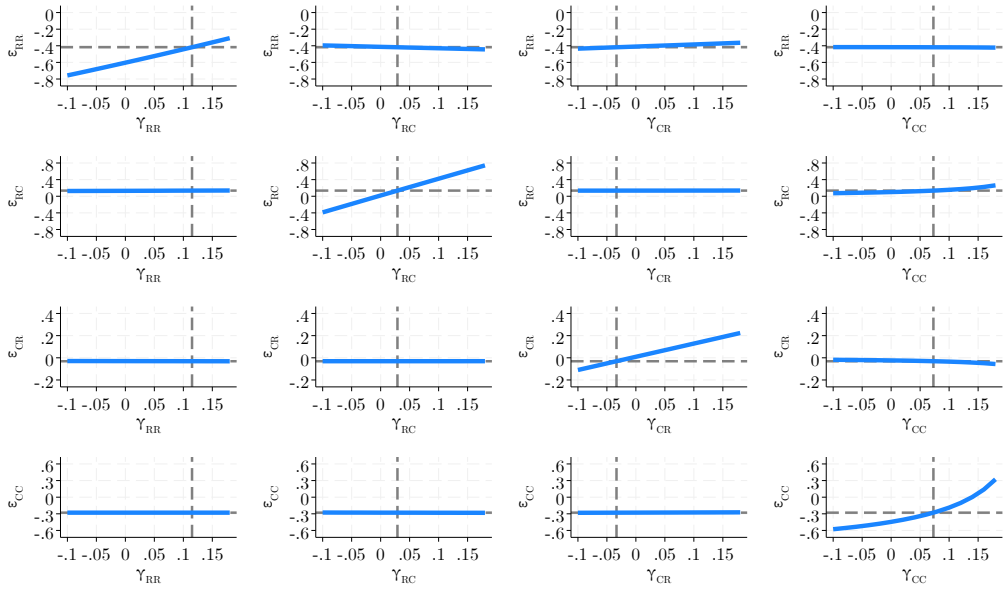
ε_{RR}
ε_{RC}
ε_{CR}
ε_{CC}
γ_{RR}
γ_{RC}
γ_{CR}
γ_{CC}

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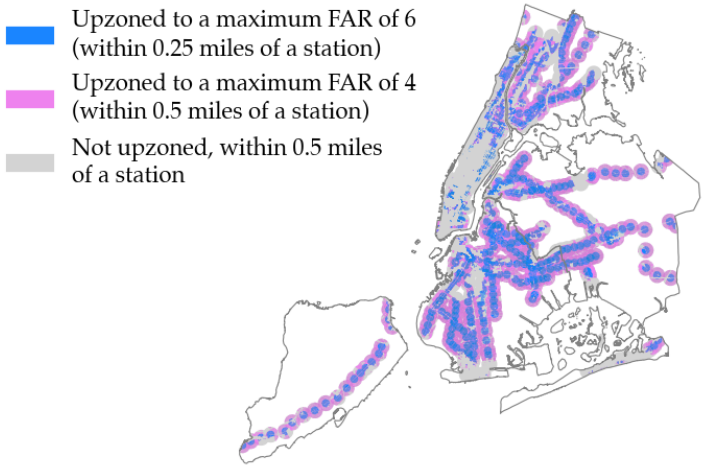
Transit-Oriented Development



→ Upzones 37% of the city, mostly in outer boroughs.

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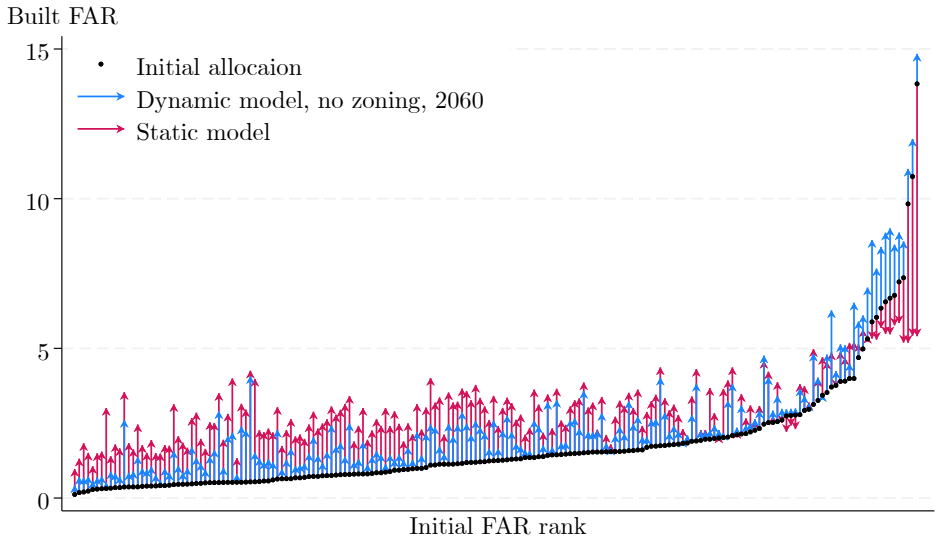
Dynamic vs. static model



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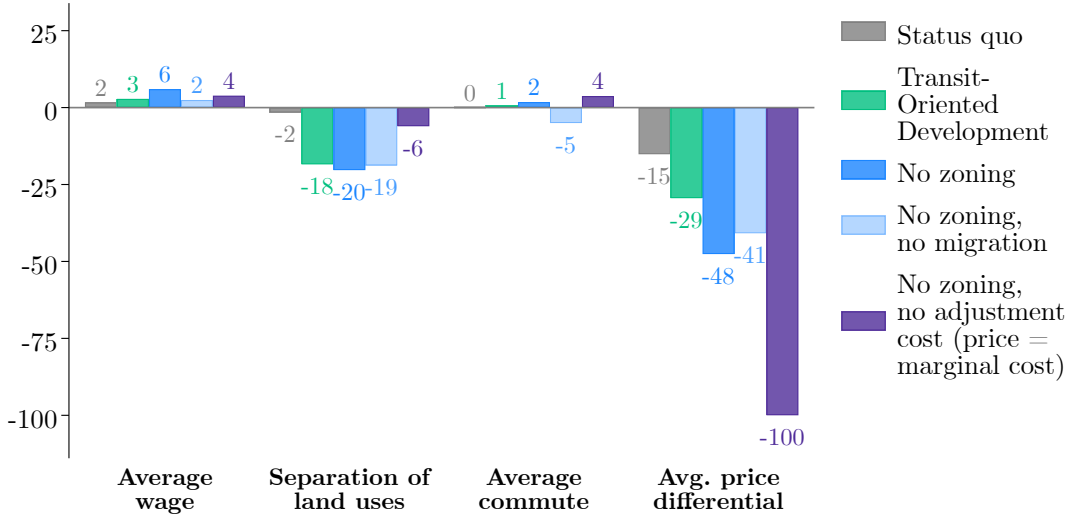
Additional outcomes

Change by 2060, relative to 2019 (%)



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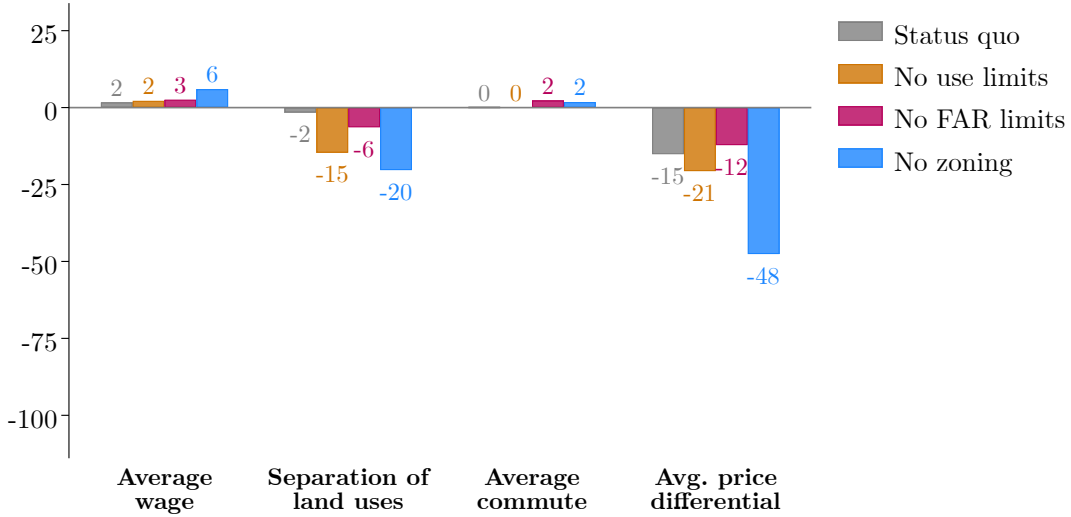
Use vs. FAR limits

Change by 2060, relative to 2019 (%)

Back

Use vs. FAR limits

Change by 2060, relative to 2019 (%)



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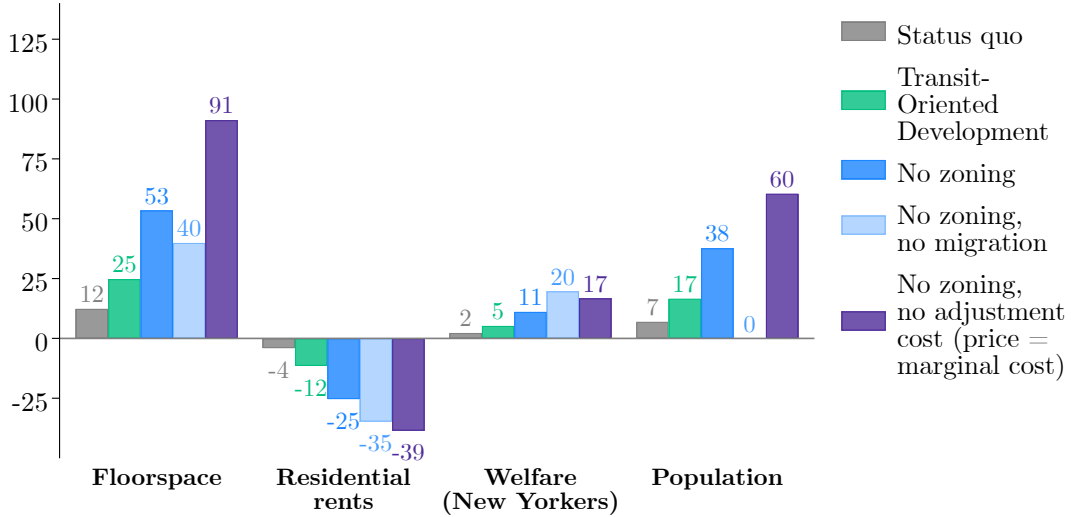
No spillovers

Change by 2060, relative to 2019 (%)



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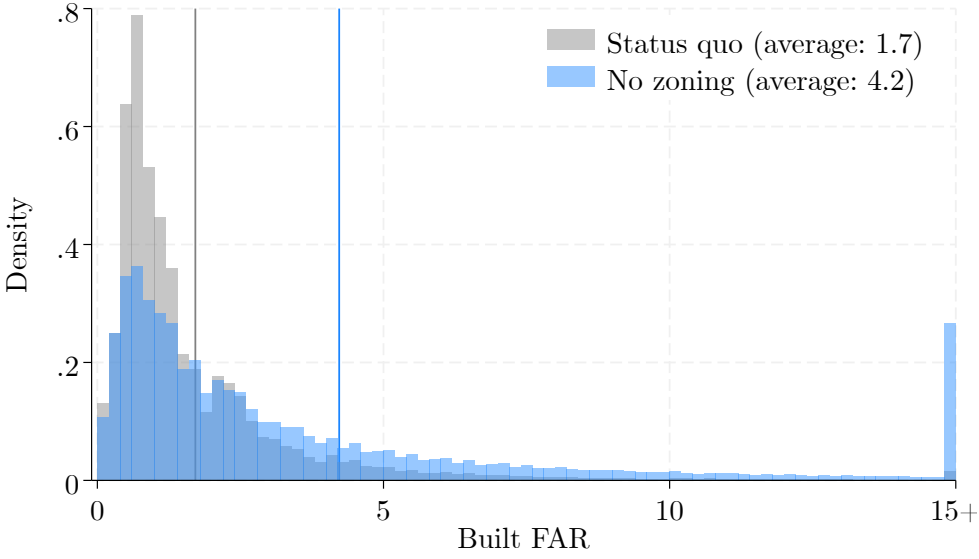
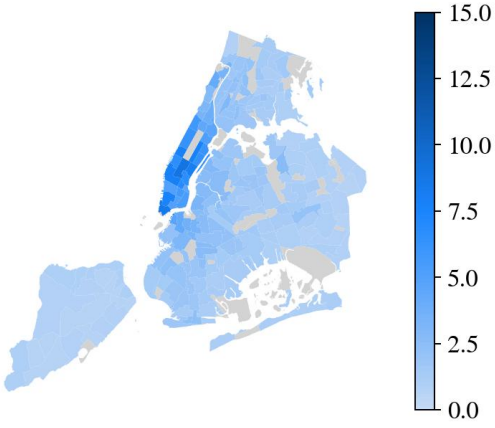
FAR distribution of new buildings

Back



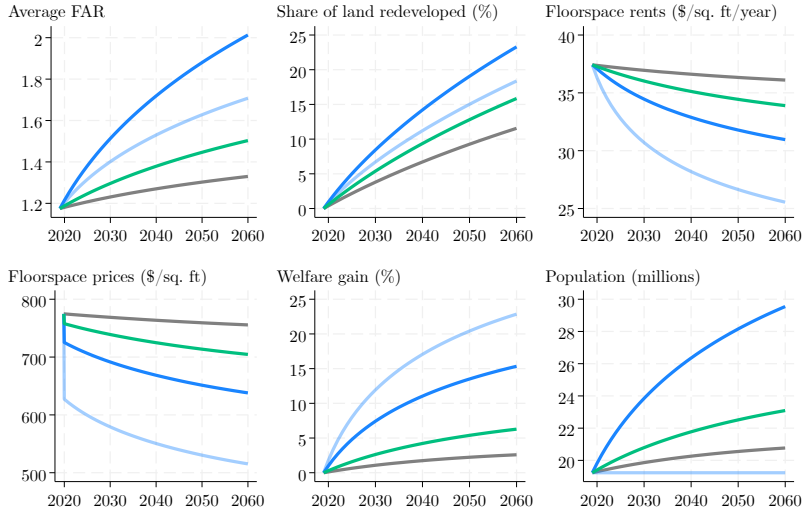
Average FAR of new buildings

Back



Transition paths

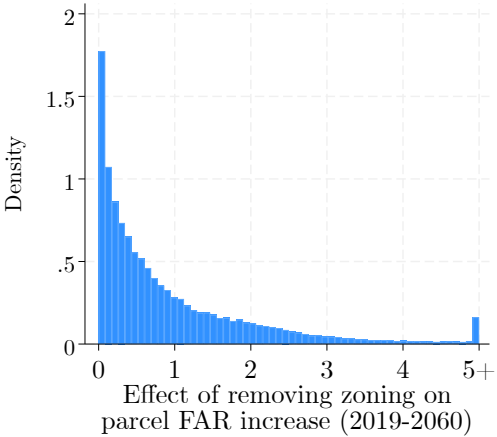
Back



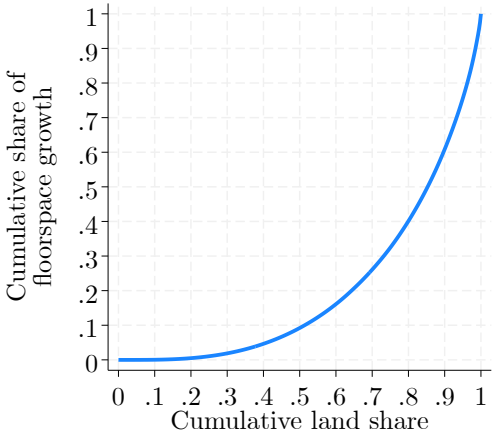
Upzonings' effects are concentrated

Back

Parcel-level distribution of FAR increases

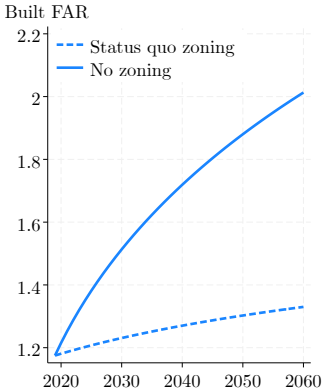


Spatial concentration of floorspace growth

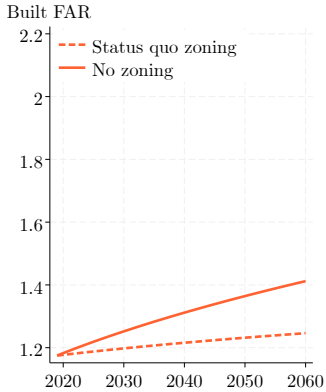


Effects of the aggregate price level

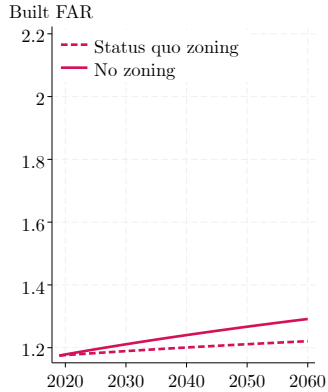
Current price level



50% lower price level (Miami)



67% lower price level (Chicago)



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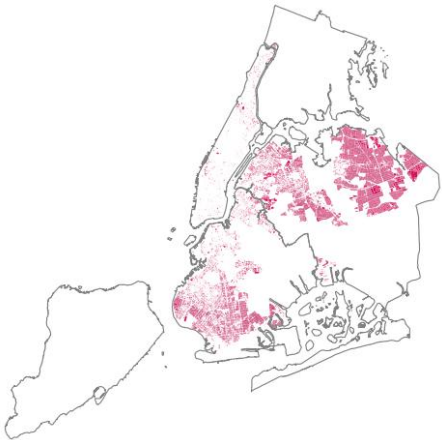
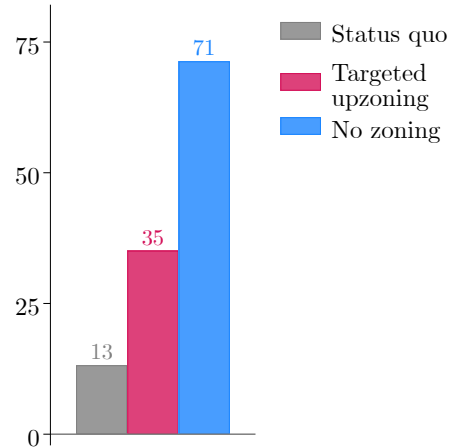
Targeted upzoning

Upzoned parcels



Floorspace growth, 2019–2060



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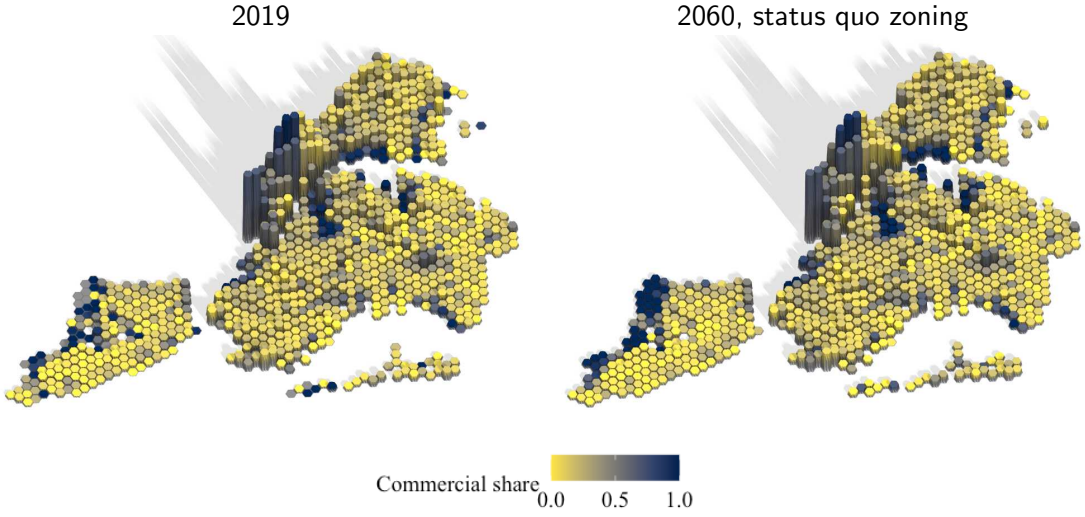
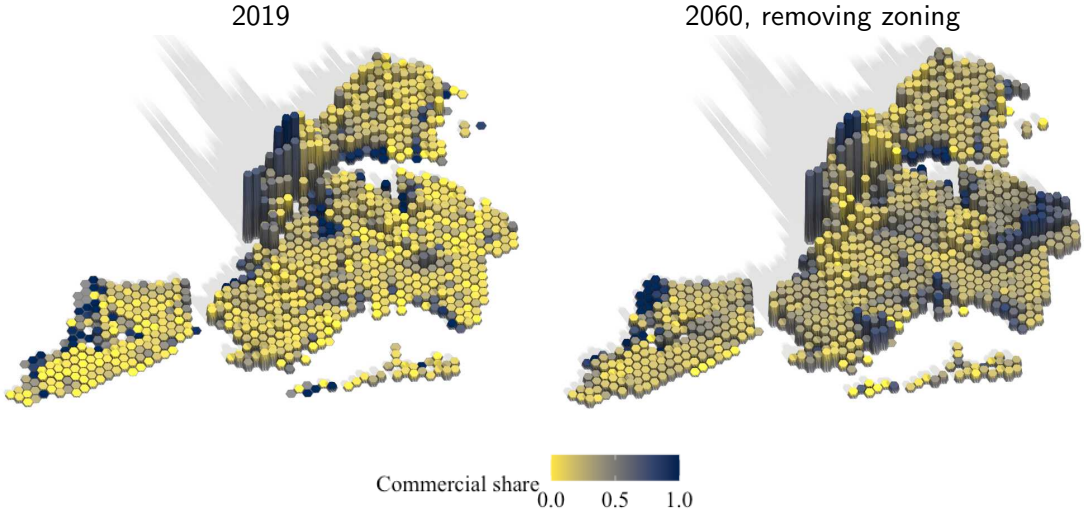
Effects on city structure

Back



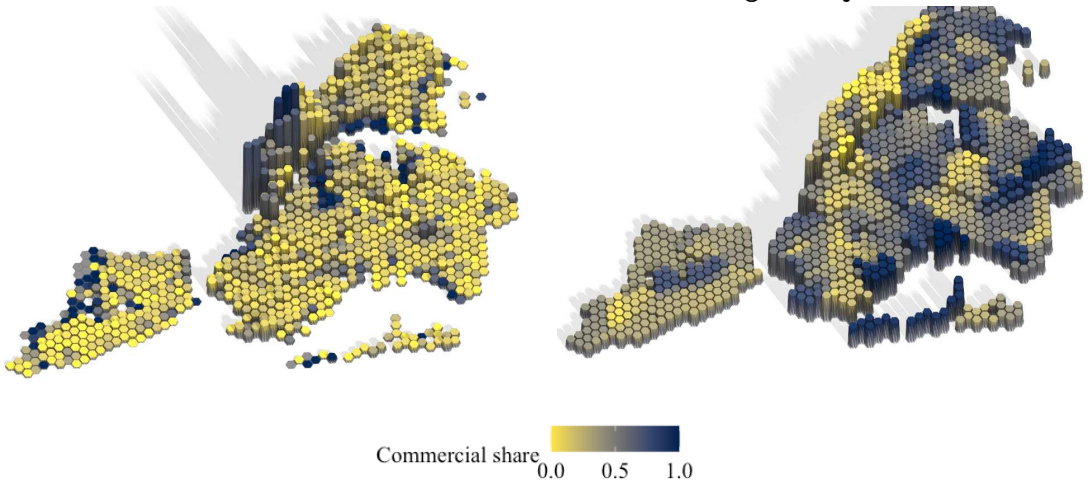
Effects on city structure

Back

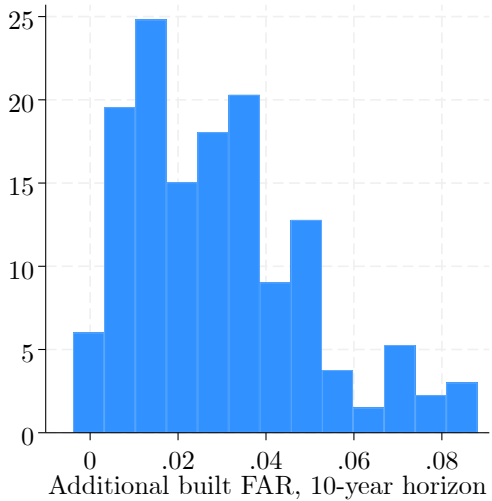


Effects on city structure

Back



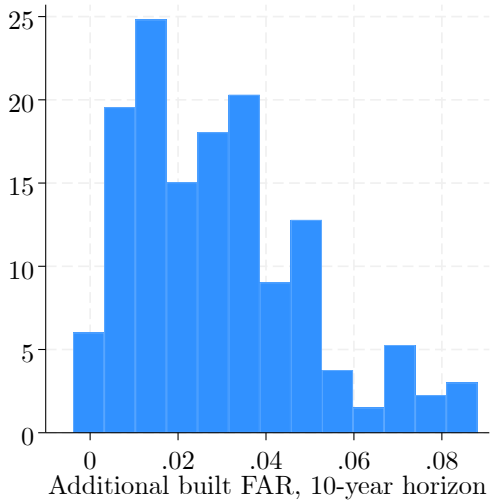
Effects of upzoning vary widely across neighborhoods



- I simulate the effect of a 1.1 FAR point upzoning in each neighborhood and compute FAR increases over a 10-year horizon.
  → For comparison with event study.

Back

Effects of upzoning vary widely across neighborhoods



- I simulate the effect of a 1.1 FAR point upzoning in each neighborhood and compute FAR increases over a 10-year horizon.
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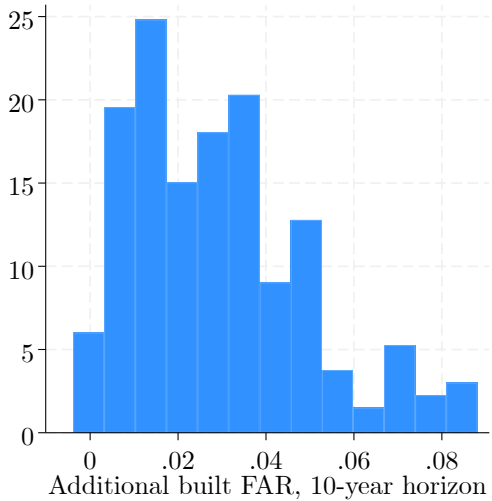
  - → Important consequences if upzoning is politically costly.

Back

Effects of upzoning vary widely across neighborhoods

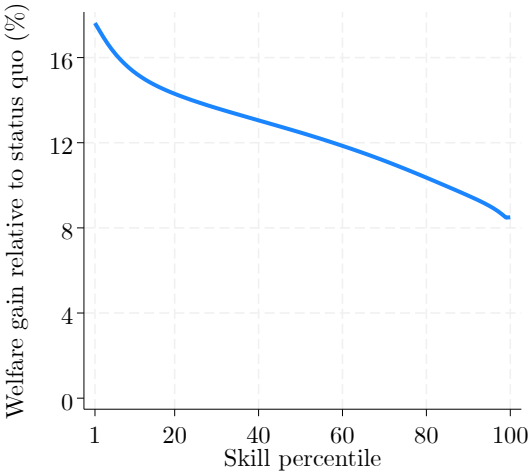


- I simulate the effect of a 1.1 FAR point upzoning in each neighborhood and compute FAR increases over a 10-year horizon.
  - → For comparison with event study.
- Wide heterogeneity in effects.
  - → Important consequences if upzoning is politically costly.
- Realized upzonings were in areas ripe for redevelopment.
  - → They were "selected on gains."

Back

Removing zoning benefits low-income workers more

Back

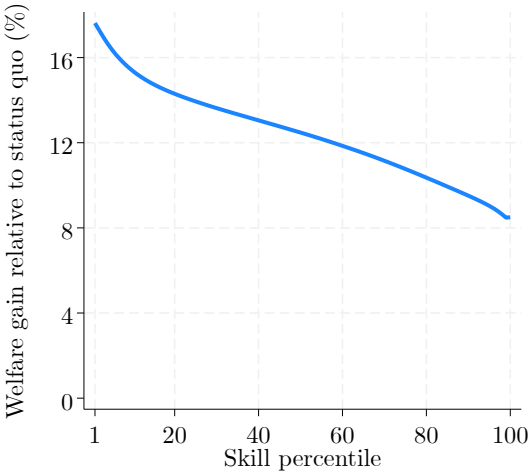


- Lower-income workers spend a larger share of income on housing.

Filtering
Exposure to redevelopment
Decomposition

Removing zoning benefits low-income workers more

Back

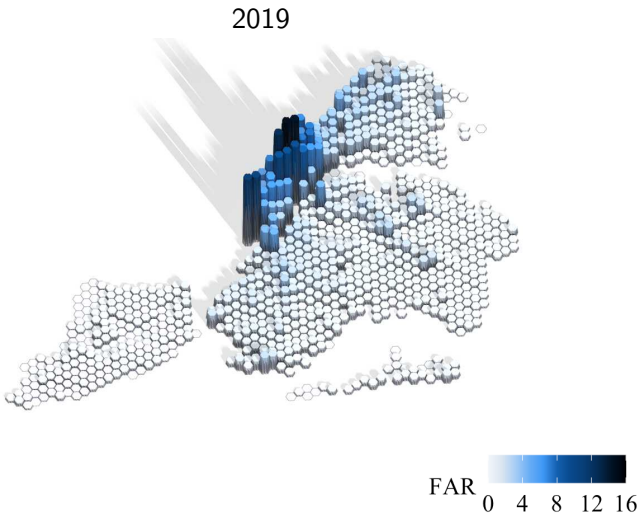


- Lower-income workers spend a larger share of income on housing.
- Increasing the housing stock lowers prices more in cheaper neighborhoods.

Filtering Exposure to redevelopment Decomposition

Effects on city structure

More Back

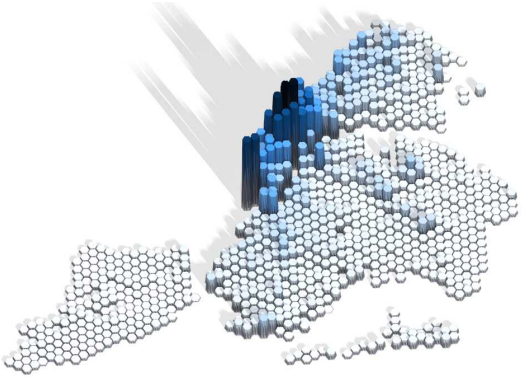


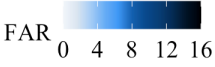
Effects on city structure

More Back

2019

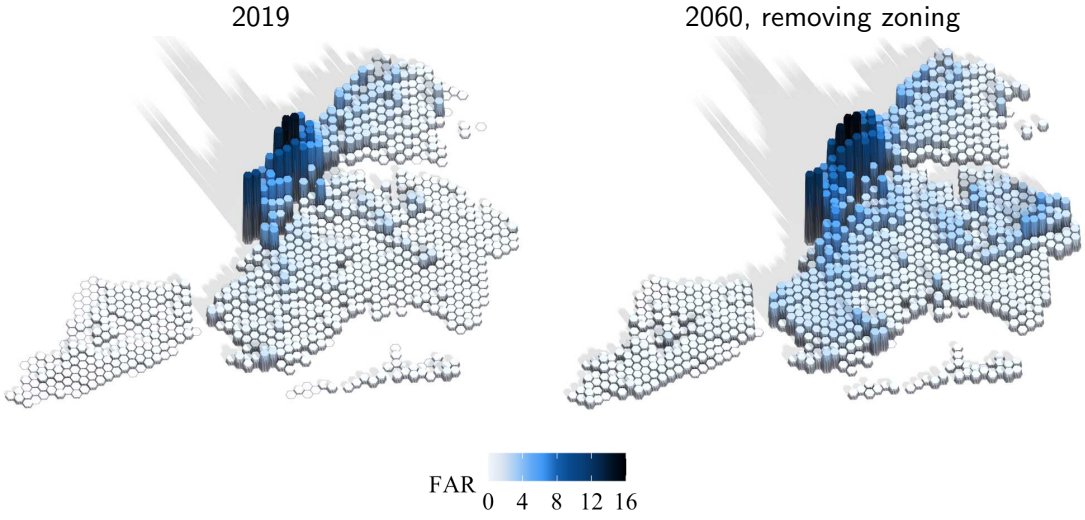
2060, status quo zoning





Effects on city structure

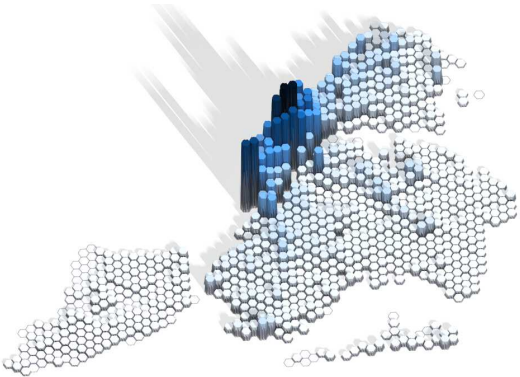
More Back



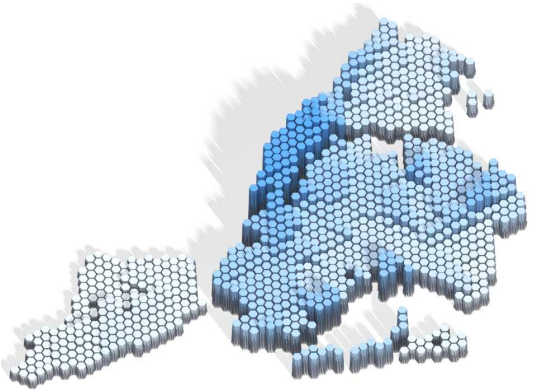
Effects on city structure

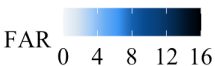
More Back

2019



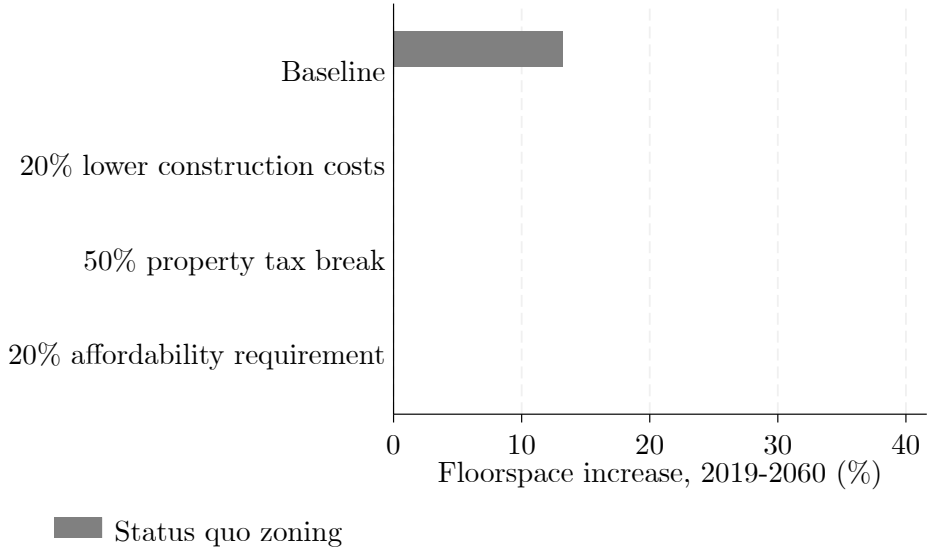
No zoning, no adjustment cost





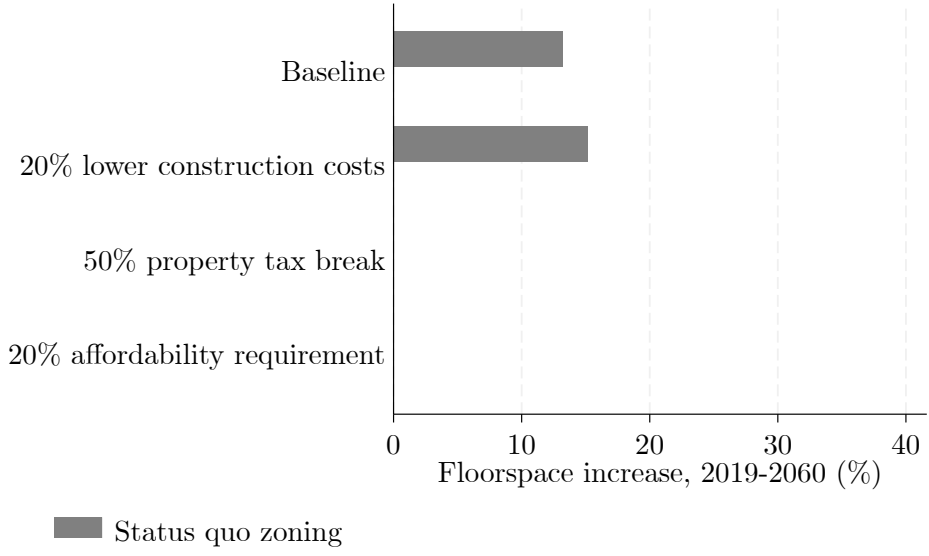
Alternative policies to favor construction and affordability

Back



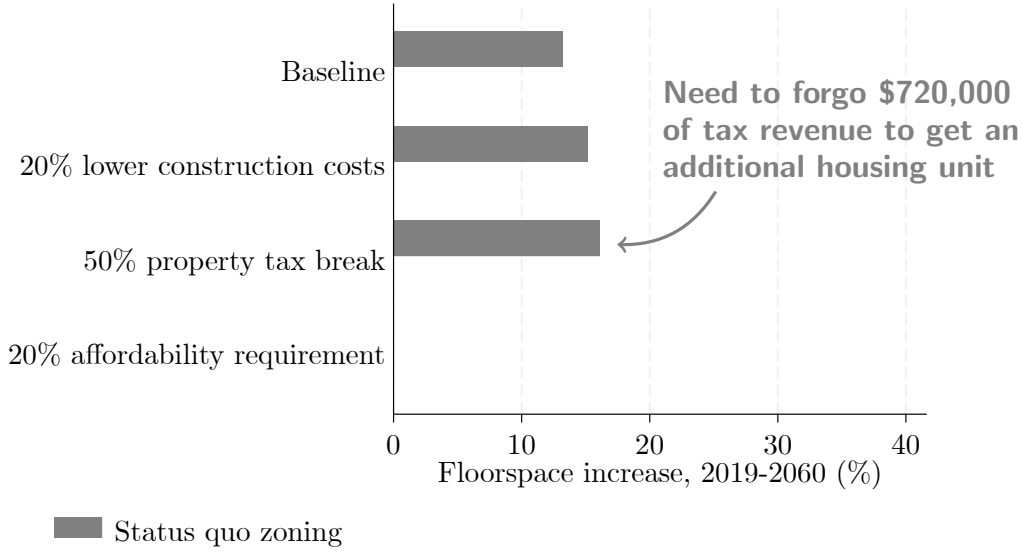
Lowering construction costs marginally boosts construction

Back



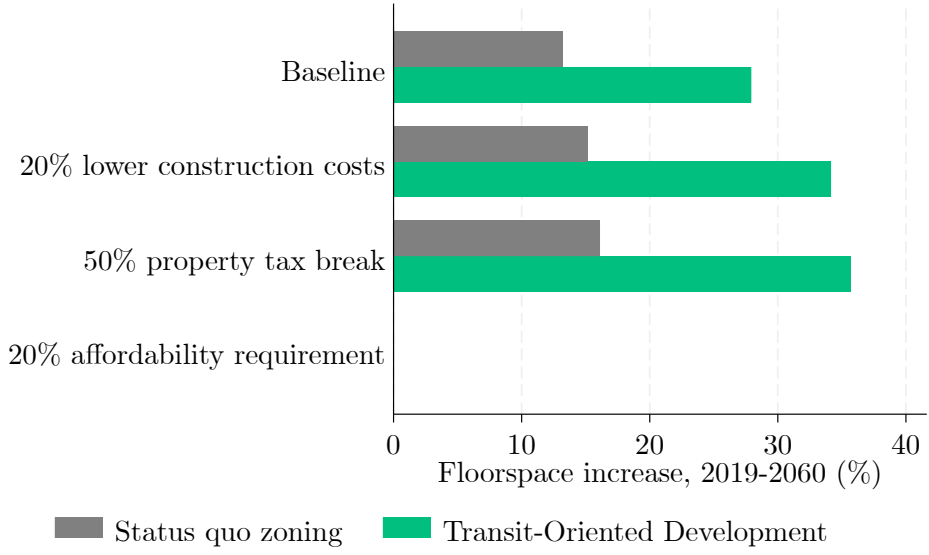
Tax breaks are relatively ineffective and costly

Back



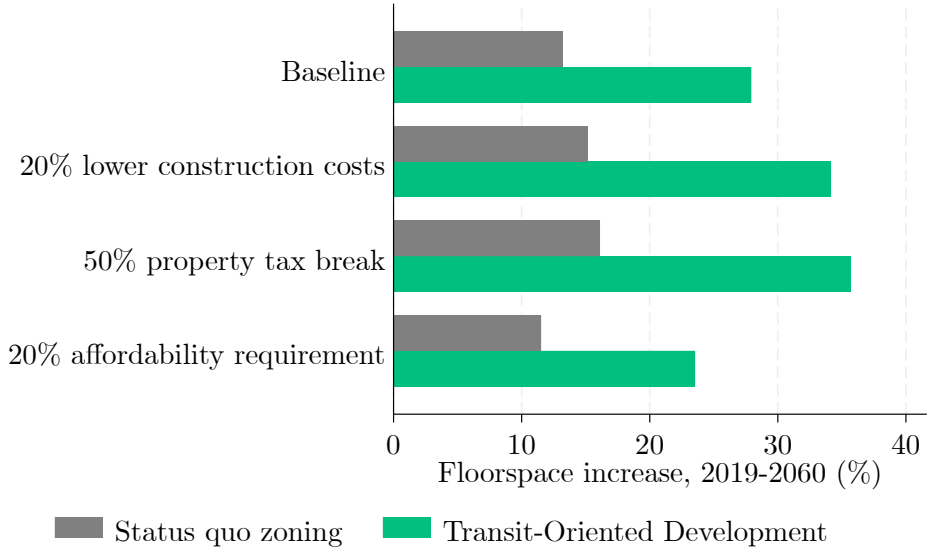
Upzoning dominates alternative policies

Back



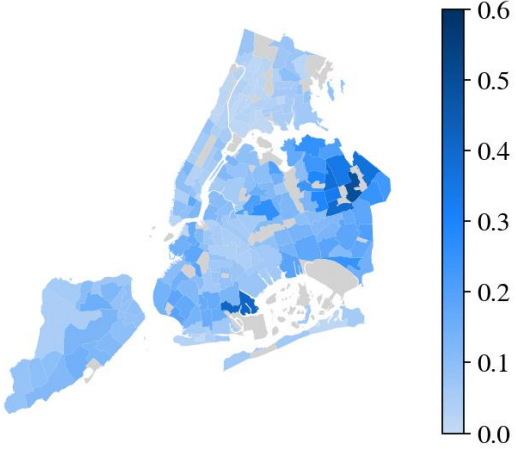
IZ: supply ↓ 0.6 sq. ft per new affordable sq. ft

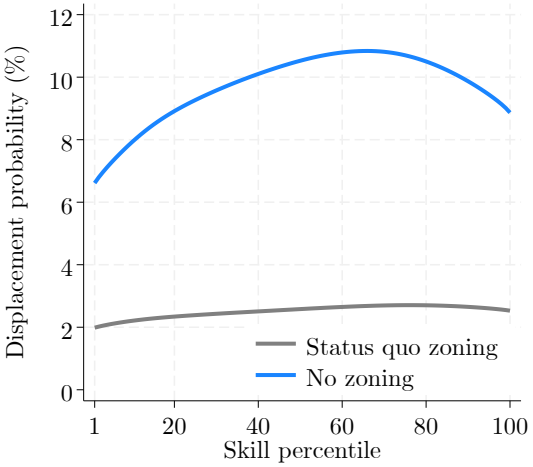
Back



Richer households are more exposed to redevelopment

Share of land redeveloped by 2060
(no zoning regulations)





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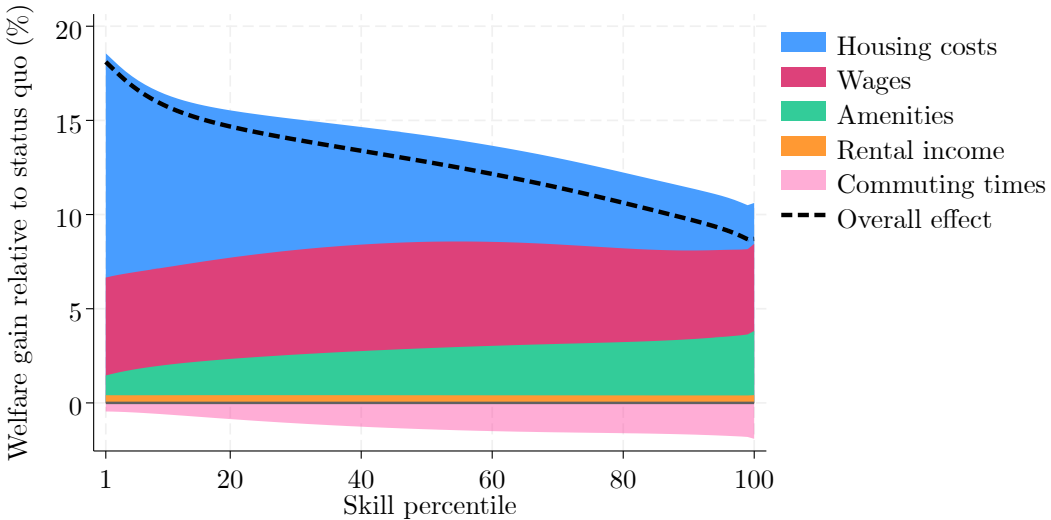
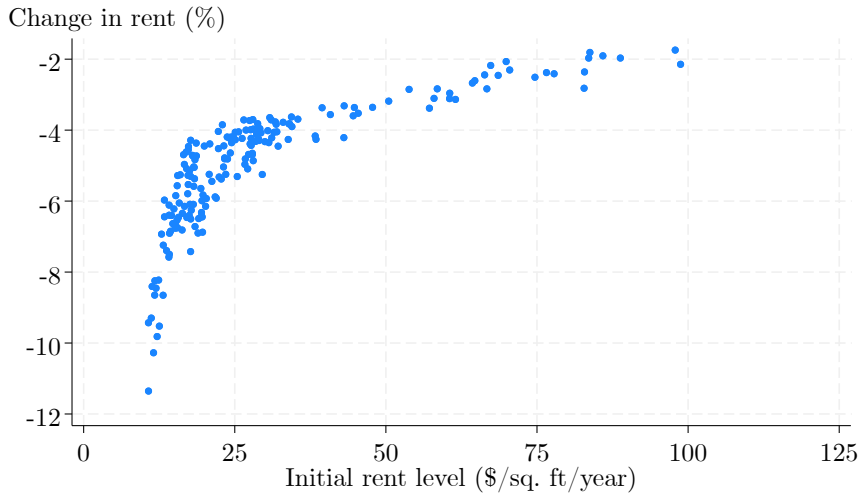
Decomposition of the welfare gains from removing zoning

Back



Effects of a 10% increase in the city's floorspace on rents



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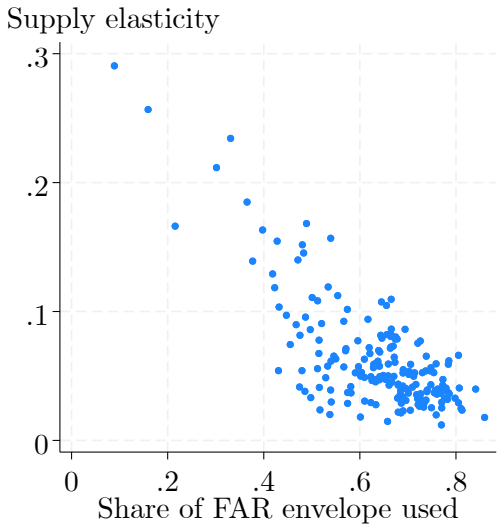
Supply elasticities

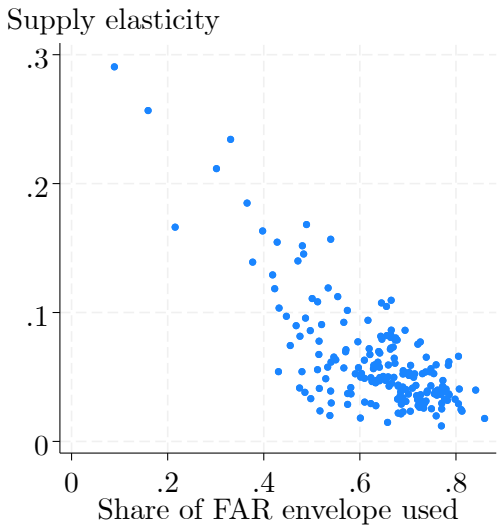
Back



- Supply elasticities are largely determined by the share of the zoning envelope that has already been built out.

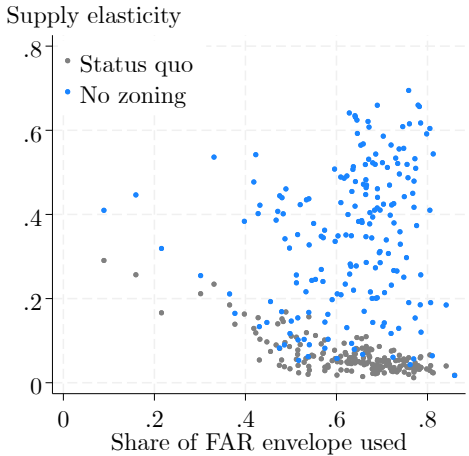
Supply elasticities

Back

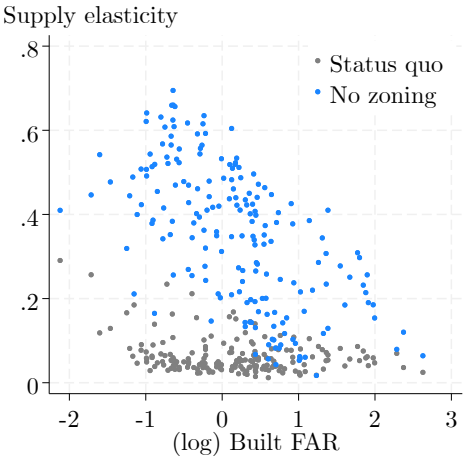


- Supply elasticities are largely determined by the share of the zoning envelope that has already been built out.
- Without zoning, citywide supply elasticity 5x higher.
  → Mostly determined by built density. More

Determinants of supply elasticities



Correlation (status quo): -0.75
Correlation (no zoning): 0.16



Correlation (status quo): -0.30
Correlation (no zoning): -0.61

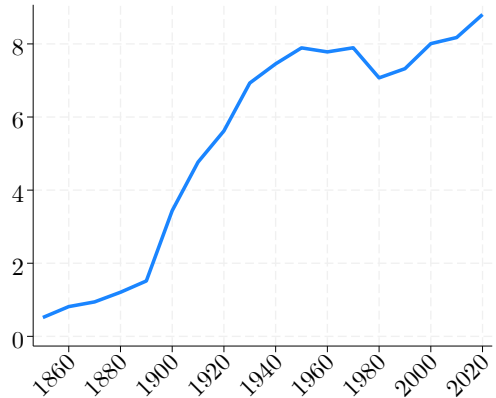
Back

Why did NYC's planners impose such costly regulations? Back

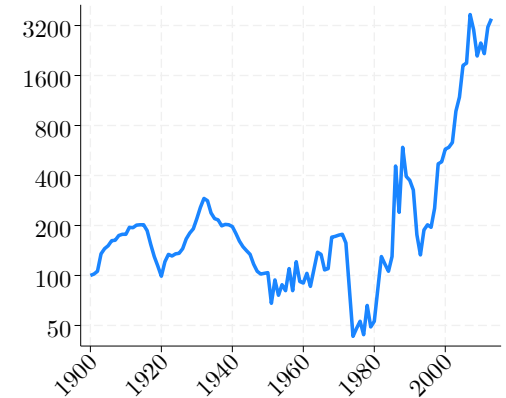
- Zoning creates large welfare losses. Why is it in place?
- When the zoning code was crafted in 1961, restricting construction had limited costs.
  - → Population had plateaued, land values were below historical trend. More
  - → Floorspace prices were close to marginal cost.
- Zoning could help curb negative spillovers from manufacturing. More
- Much has changed since 1961:
  - → Floorspace prices have skyrocketed, manufacturing activity has plummeted. Manufacturing
  - → A typical housing unit is priced at $1M but costs $300k to build.
- But zoning has been much more persistent than planners anticipated and intended.
  - → Rezoning is vulnerable to obstruction by those with a stake in the status quo.

Historical population and land values

(a) NYC population (millions)



(b) Manhattan land values (1900 = 100)



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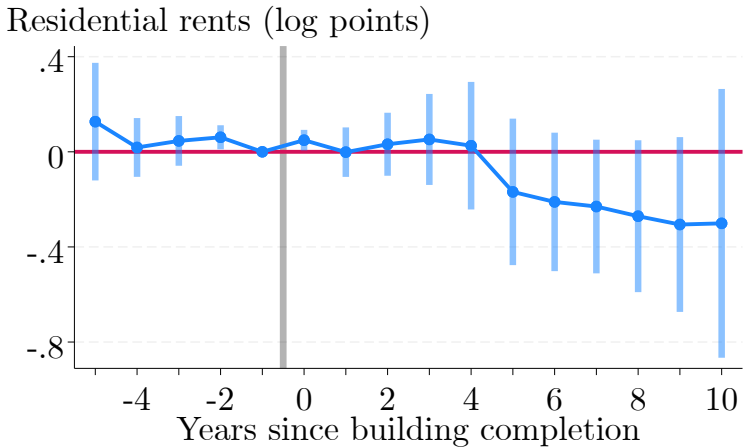
Effects of industrial construction on residential rents



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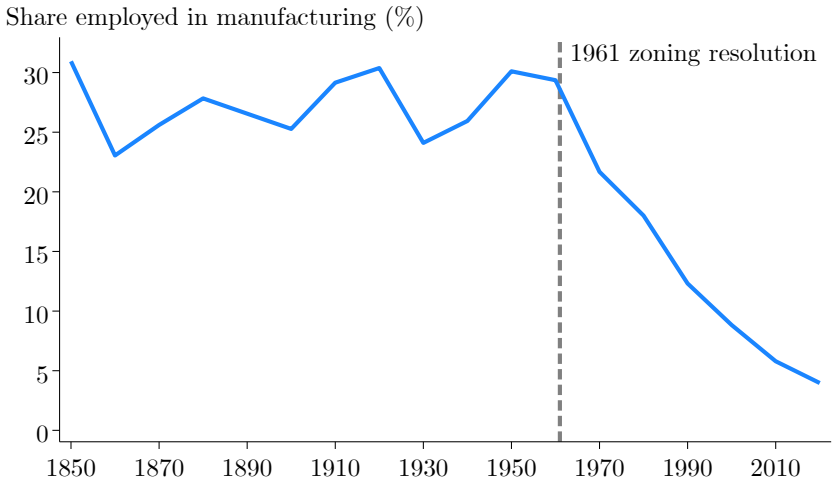
Manufacturing in NYC has collapsed since 1961



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