Affordable Housing and City Welfare

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Motivation

- Housing in major cities is unaffordable
  - rent burdened: spending more than 30% of pre-tax income on rent
  - 50% of renters in large U.S. cities are rent-burdened and 80% of low-income households
  - Manifests itself also in high house prices and price-income ratios
  - Worsening: Average rents grew faster than inflation and incomes post-GFC + share of renters in large cities grown since 2006
  - Policymakers everywhere vow to expand affordable housing

Motivation

- Housing in major cities is unaffordable
- **Rent control** policies are making a comeback
  - Big in NYC: $\approx$ 40% of housing stock is rent controlled or stabilized; big in Europe
  - Major legislative push in 2019: New York, New Jersey, California, Oregon, Maryland, and D.C. passed major rent control expansions

Motivation

- Housing in major cities is unaffordable
- **Rent control** policies are making a comeback
- **Zoning** policies that relax housing supply restrictions are natural alternative
  - Upzoning: increasing density in urban core
  - Mandatory Inclusionary Housing: sets aside some affordable housing units as prerequisite for zoning changes

Motivation

- Housing in major cities is unaffordable
- **Rent control** policies are making a comeback
- **Zoning** policies that relax housing supply restrictions are natural alternative
- **Housing vouchers**
  - Section 8 Voucher program costs about $30bn a year
  - Cash subsidies do not distort *where* people live
  - May promote “moving to opportunity”

Motivation

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- **Housing vouchers**
- **Tax credits** for developers of affordable rental housing
  - LIHTC program costs $9b annually

Motivation

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- **Rent control** policies are making a comeback
- **Zoning** policies that relax housing supply restrictions are natural alternative
- **Housing vouchers**
- **Tax credits** for developers of affordable rental housing
- *Research question*: What are the implications of these **housing affordability policies** on house prices, rents, the housing stock, city output, the spatial distribution of people (gentrification), inequality within and across neighborhoods, and **welfare** in a realistically calibrated **quantitative equilibrium** model of the city?

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
  - Employment takes place in zone 1 (one labor market)
  - Residents of zone 2 commute; **time and financial cost**
  - Zones have different size (max. residential area $\overline{H}^1$, $\overline{H}^2$)
  - Ownership and rental housing market in each zone
  - Non-housing goods produced with labor; DRS in labor
  - Construction sector produces housing in both zones; DRS in labor and because of zoning: lower housing supply elasticity

$$\Pi^{\ell}_{h,t} = \max_{N_{\ell,t}} \overline{P}^{\ell}_{t} \left(1 - \frac{H^{\ell}_{t-1}}{\overline{H}^{\ell}}\right) N^{\rho_h}_{\ell,t} - W_t N_{\ell,t}$$

  - Zone 1 provides amenities: utility shifter; with luxury component
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies
- Competitive Equilibrium

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
  - Given age, labor productivity, and wealth
  - **Risk averse** households choose each period (4 years)
    - where to live (zone 1 or zone 2),
    - whether to rent or own,
    - how much housing to get (sqft),
    - how much to consume, work, and save,
    - If they own, how large a mortgage to get and how much investment housing to buy (local owners are landlords to local renters)
  - Full life-cycle with working and retirement phase, idiosyncratic **labor productivity risk**, and **mortality risk**
  - Face progressive tax and transfer system $T(y)$; social security
- Affordable housing policies
- Competitive Equilibrium
- Finance meets urban economics

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
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- Affordable housing policies

1. **Rent control**: fraction η^ℓ of rentals set aside by law for affordable housing, allocated by lottery, rent is fraction κ_1 of market rent, income qualification ($< \kappa_2 \times AMI$) and house size restriction, incumbents need not requalify. Incidence of RC born by developer; results in lower price per sqft:

$$\overline{P}_t^\ell = \left(ho_t^\ell + (1 - ho_t^\ell)(1 - \eta^\ell + \eta^\ell \kappa_1) \right) P_t^\ell$$

- Competitive Equilibrium
- Finance meets urban economics

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies
  2. **Upzoning**: loosen restrictions on max amount of buildable land in zone 1, $\overline{H}^1 \uparrow$
- Competitive Equilibrium
- Finance meets urban economics

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies

  3. **Vouchers**: part of the tax and transfer system $T(y)$
     Increase in budget neutral way by increasing tax progressivity
     Extra transfer amount must be spent on housing

- Competitive Equilibrium
- Finance meets urban economics

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies
  4. **Tax credits**: subsidize developers' affordable housing construction costs; earn higher average price $\overline{P}^{\ell}$
- Competitive Equilibrium
- Finance meets urban economics

Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies
- Competitive Equilibrium
  - Households and firms optimize, given prices $(W_t, P_t^\ell, R_t^\ell)$
  - Local labor, housing (2), and rental (2) markets clear
  - Rational expectations
  - Computationally challenging, esp. transition dynamics
- Finance meets urban economics

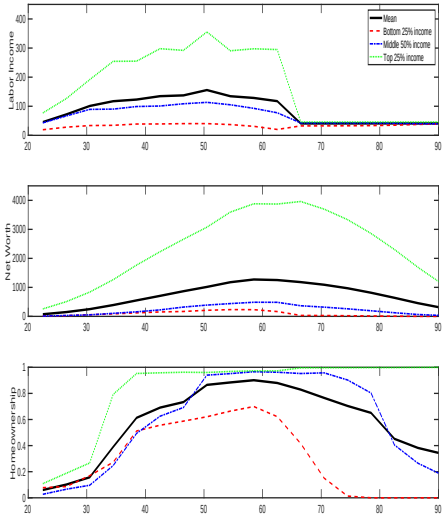
Model

- City/MSA with urban core (zone 1) and periphery (zone 2)
- Household heterogeneity crucial for evaluating welfare
- Affordable housing policies
- Competitive Equilibrium
- Finance meets urban economics
  - Dynamic, spatial equilibrium model
  - With rich consumption-saving and portfolio choice problem; risk and risk averse agents (wealth effects); no absentee landlords
  - Incomplete markets $\Rightarrow$ Housing policies can improve welfare by **providing insurance**, even if they have **distortionary effects** on housing and labor markets

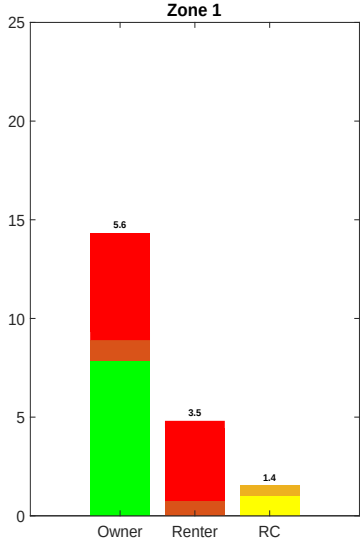
Calibration

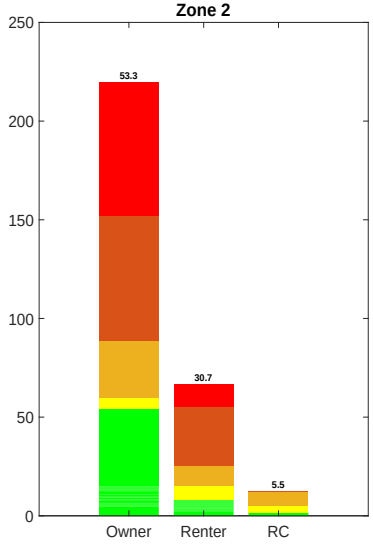
- **Geography**: New York MSA (max buildable resi area, commuting costs)
- **Labor income**
- **Wealth**
- **Housing** (amenities, property tax and depreciation, housing supply elasticity)
- **Rent Control in New York**
  - $RC \equiv$ rent controlled+public housing+Mitchell Lama + all other govt-assisted or regulated housing (*excluded*: rent-stabilized)
  - Set η^1 and η^2 to match 13% of zone 1 and 4.7% of zone 2 hhs in RC
  - RC rent discount: $\kappa_1 = 50\%$
  - Income qualification threshold κ_2 = 40% of AMI to match position of RC recipients in overall income distribution
  - Persistence to match share of tenants in RC for 20yr or more

Life-Cycle of Income, Wealth, Home Ownership



Distribution of Households





Model Fit

		Data		Model	
		metro	**ratio zone 1/2**	**metro**	**ratio zone 1/2**
1	Households (thousands)	7124.9	0.12	7124.9	0.12
2	Avg. hh age, cond. age > 20	47.6	0.95	47.4	0.86
3	People over 65 as % over 20	19.1	0.91	21.8	1.00
4	Avg. house size (sqft)	1445	0.59	1449	0.64
5	Avg. pre-tax lab income ($)	124091	1.66	124320	1.69
6	Home ownership rate (%)	51.5	0.42	58.4	0.76
7	Median mkt price per unit ($)	510051	3.11	506420	2.34
8	Median mkt price per sqft ($)	353	5.24	344	3.57
9	Median mkt rent per unit (monthly $)	2390	1.65	2491	1.82
10	Median mkt rent per sqft (monthly $)	1.65	2.78	1.69	2.77
11	Median mkt price/median mkt rent (annual)	17.79	1.89	16.94	1.29
12	Mkt price/avg. income (annual)	3.99	1.71	4.08	1.38
13	Avg. rent/avg. income (%)	23.0	1.00	24.1	1.07
14	Avg. rent/income ratio for renters (%)	42.1	0.81	29.1	0.97
15	Rent burdened (%)	53.9	0.79	48.7	0.93
16	% Rent regulated of all housing units	5.57	2.77	5.98	2.61

- Model matches fraction of households (hhs) in each zone (row 1)
- Model matches fraction of rent controlled hhs in each zone (row 16)

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- Model matches average age in both zones (row 2); younger hhs in Manhattan : costs of commuting weigh more
- Many retirees live in Manhattan (row 3), requires extra taste shifter

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- Labor income higher in Manhattan (row 5)
- HHs in zone 1 are 80% more productive (higher opportunity cost of commuting)

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- Matches house prices and rents well, both levels and differences across zones
- But, price/rent ratio too low in z1/z2$\leftrightarrow$ ownership rate too high in z1/z2

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- MSA housing affordability statistics (rows 13-15). Model generates housing affordability crisis: about 50% of renters who are rent-burdened

Affordable Housing Unit as Insurance Device

- *Access* to insurance
  - = probability that a household, not in RC, experiencing a productivity shock from state 2 $\rightarrow$ 1 or 3 $\rightarrow$ 2 obtains a RC unit
  - 5.6% in benchmark model
- *Stability* of insurance
- *Value* of the insurance
- 6.0% of all HHs are in RC; 14.25% of all those in income Q1
- Volatility of MU_c and MU_h growth is 45%

Affordable Housing Unit as Insurance Device

- *Access* to insurance
- *Stability* of insurance
  - = probability that a household, already in RC, and in income Q1 obtains a RC unit
  - 72.5% in benchmark model
- *Value* of the insurance
- 6.0% of all HHs are in RC; 14.25% of all those in income Q1
- Volatility of MU_c and MU_h growth is 45%

Affordable Housing Unit as Insurance Device

- *Access* to insurance
- *Stability* of insurance
- *Value* of the insurance
  - Depends on the discount and the equilibrium rent: $\kappa_1 R^\ell$
  - Depends on the chosen RC house size
  - Depends on risk aversion coefficient ($\gamma = 5$)
  - Depends on the degree of insurance in society: volatility of MU_c and MU_h growth
- 6.0% of all HHs are in RC; 14.25% of all those in income Q1
- Volatility of MU_c and MU_h growth is 45%

Experiment 1: Better Targeting of Rent Control

- RC system engenders misallocation of housing
  - Upon entry: income cutoff too generous
  - After: have right to stay there even after income rises or wealth rises (retirement)
  - Undeserving people are in, deserving people cannot get in
  - Undeserving rich RC tenants may consume too much RC housing
- How to better target RC to neediest households?
- Large welfare gains (in CEV units)
- Amplification: when RC is sufficiently misallocated, re-qualification replaces undeserving tenants with other undeserving tenants. Once only needy hhs are in, re-qualification replaces tenants who outgrow the RC system with needier tenants. Stability of insurance improves.
- Since needier hhs choose smaller units, more needy hhs can be helped.
- Conclusion: No expansion of RC program needed to create large welfare gains, just a more efficient allocation

Experiment 1: Better Targeting of Rent Control

- RC system engenders misallocation of housing
- How to better target RC to neediest households?
  1. Lower income threshold κ_2, from 40% $\rightarrow$ 30% of AMI
  2. Re-qualify/go through RC lottery every 4 years
  3. Both
- Large welfare gains (in CEV units)
  1. **+1.17%**; improves *access* to insurance
  2. **+1.66%**; improves *access* to but lowers *stability* of insurance
  3. **+3.59%**; improves *access* to but does not lower *stability* of insurance much
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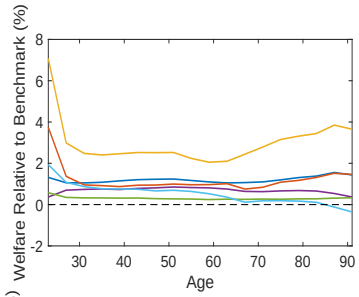
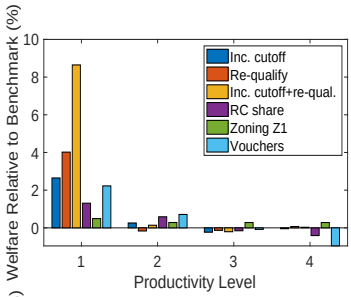
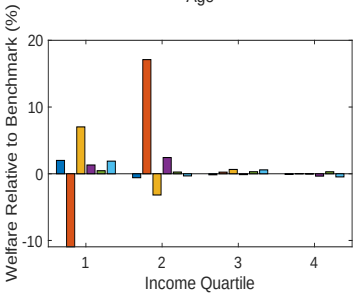
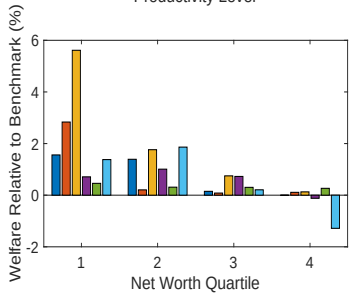
Welfare in the Cross-Section of HHs









Experiment 2: Expanding Scope of Rent Control

- **Increase RC housing share by 50% in both zones** (η^1, η^2)
  1. Increases aggregate welfare by **0.66%** in CEV units
  2. **Insurance improves**: Households in bottom half of productivity and income distribution gain, households in the top half loose
     - Access to insurance improves
  3. **Efficiency falls**: fewer hours worked, lower output, more housing misallocation (worsening targeting)
- **Standard housing affordability metrics deteriorate**
- Increasing RC does **not** lead to **reduction in housing stock**, in contrast to PE logic. It leads to a spatial relocation of the housing stock.
- Conclusion: Expanding scope of affordable housing mandate creates a modest welfare gain.
  Gains are limited because RC is not as well targeted as it could be.
  But worsening of labor and housing market distortions is also limited.

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- **Standard housing affordability metrics deteriorate**
  1. Housing stock in zone 1 falls b/c more distortions to build (-0.35%)
     Rents increase by 1.19% reflecting this scarcity, consistent with Autor et al. 14, Diamond et al. 17. Landlords pass on the "RC tax."
  2. Rents also increase in zone 2 (+1.40%), but housing stock increases by 0.18%. Increasing demand for housing in spatial equilibrium.
  3. Avg rent/income among renters increases in zone 1 (+8.75%), in part due to the lower average income of zone 1 residents (sorting). Fraction of rent-burdened hhs increases by 8.32%
  4. House prices increase (1.18% in zone 1 and 1.40% in zone 2)
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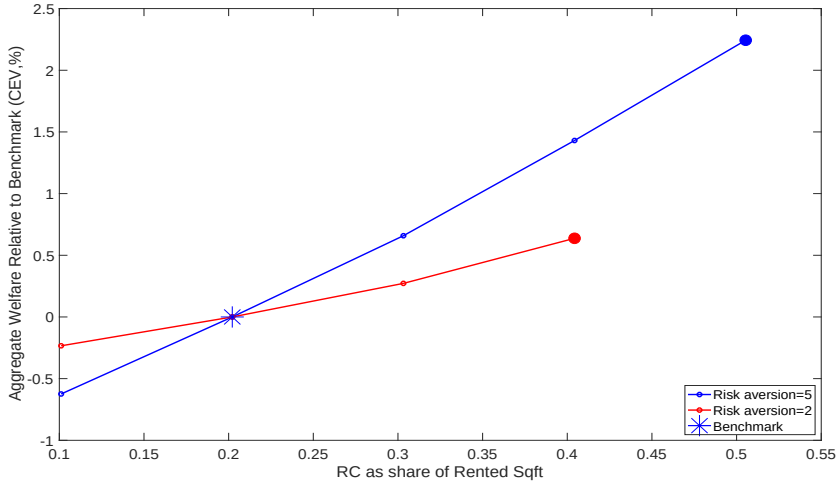
- **Increase RC housing share by 50% in both zones** (η^1, η^2)
- **Standard housing affordability metrics deteriorate**
- Increasing RC does **not** lead to **reduction in housing stock**, in contrast to PE logic. It leads to a spatial relocation of the housing stock.
- Conclusion: Expanding scope of affordable housing mandate creates a modest welfare gain.
  Gains are limited because RC is not as well targeted as it could be.
  But worsening of labor and housing market distortions is also limited.

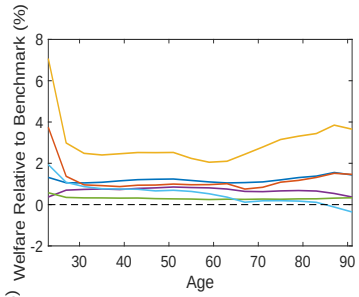
How Much RC?

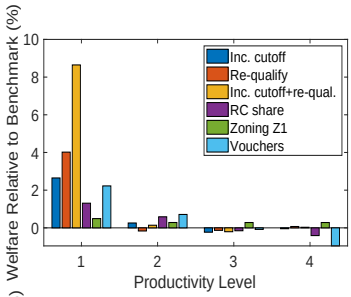

Aggregate Welfare Relative to Benchmark (CEV,%)
RC as share of Rented Sqft
2.5
2
1.5
1
0.5
0
-0.5
-1
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Risk aversion=5
Risk aversion=2
Benchmark

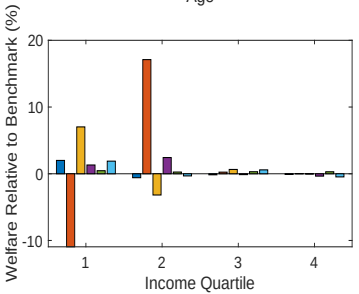
Experiment 3: Upzoning in Urban Core

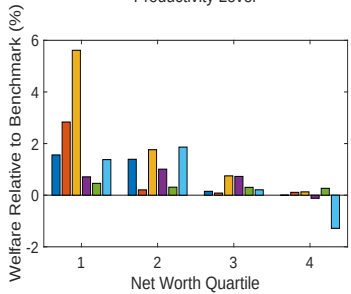
- **Permit more residential housing in zone 1 (more density)**
  1. Expansion in $\overline{H}^1$ leads to 8.86% increase in housing stock and 9.28% increase in population of Manhattan
  2. Mandatory Inclusionary Housing: rules on RC still apply; more hhs in RC
- **Welfare gain**
  1. Increases aggregate welfare modestly: **0.37%**
  2. Everybody gains (in ss) unlike redistributive nature of prior policies
     - Since house prices fall, some owners lose along the transition path
  3. But high-MU hhs do not gain nearly as much as in other policies; housing supply policies are *fairly blunt* instrument
  4. Calculations ignore positive or negative non-price externalities from increased density/agglomeration in urban core

Welfare in the Cross-Section of HHs









Experiment 4: Voucher Expansion

- **Expansion of housing vouchers**
  - Voucher expansion of $730mi by making tax-transfer system slightly more progressive; budget-neutral
  - Targeting: voucher size is larger the poorer recipient
  - Vouchers give free choice of where to live, how much housing to get
- **Welfare increases**
  1. Voucher expansion increases aggregate welfare by **1.04%** CEV
  2. **Inequality falls**: Households in bottom quartile of productivity, income, and wealth distribution, young gain sharply ; rich lose
  3. **Efficiency falls**: distortionary labor income taxes tank hours worked (-1.07%) and output (-0.67%); more commuting (+0.57%) as policy pushes (upper-)middle income hhs out of Manhattan
- Moving to opportunity?
- Consideration of **how housing affordability policies are financed** crucial in welfare analysis

Experiment 4: Voucher Expansion

- **Expansion of housing vouchers**
- **Welfare increases**
- Moving to opportunity?
  - In equilibrium, vouchers do not only **not** allow poor hhs to "move *to* opportunity," consistent with Collinson and Ganong (2018)
  - But they *re*move some high-productivity households "*from* opportunity" (-8.08%)
- Consideration of **how housing affordability policies are financed** crucial in welfare analysis

Experiment 4: Voucher Expansion

- **Expansion of housing vouchers**
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- Moving to opportunity?
- Consideration of **how housing affordability policies are financed** crucial in welfare analysis

Conclusion

- Develop a new framework to evaluate affordability policies quantitatively.
  - Stochastic, dynamic, spatial equilibrium model with wealth effects, endogenous labor supply, location choice, tenure status, housing quantity choice, construction, house prices, and rents
- Calibrated to New York metropolitan area, incl. zoning and RC policies.
- Housing affordability policies have important *insurance* benefits which trade off with *efficiency* costs to determine net *aggregate* welfare effects for the city.
  - We could use a little more insurance in New York.
  - But also a more efficient RC system.
- More experiments in the paper: LIHTCs, moving affordable housing outside the city center with/without transit subsidy for RC tenants.