Waiting for Affordable Housing in NYC

Holger Sieg
University of Pennsylvania and NBER

Chamna Yoon
Seoul National University

Affordable Housing Policies

- Affordable housing policies are increasingly popular in many large cities.
- As a candidate, current NYC Mayor Bill de Blasio ran on a platform that promised significant increases the provision of affordable housing.
- He proposed and city council recently adopted a 10-year plan to build or retain 200,000 affordable housing units in the NYC area through various rezoning laws.
- Other large cities such as San Francisco, Los Angeles, Boston, Washington D.C., Seattle, Toronto, and Vancouver have implemented a variety of policies aimed at increasing the supply of affordable housing and limiting future rent increases.
- The popularity of these policies is somewhat puzzling since few economists advocate them.

Why are Affordable Housing Policies so Popular?

- Rental rates and real estate prices have continued to sore in many U.S. metropolitan areas.
- These price increases are probably due to an inelastic supply of housing due to supply restrictions – such as restrictive zoning laws – combined with a rapidly increasing demand in these cities (Gyourko et al. 2013).
- Local governments can increase the supply of housing by changing the zoning law.
- However, landowners and developers will reap substantial windfall gains from rezoning.
- Politicians can redistribute part of the windfall gains from re-zoning to renters by mandating that a certain amount of housing is offered at affordable rate.
- How large are the gains that arise from these affordable housing policies to renters?

Contributions

- We develop a model that captures the existence of three different types of rental markets: public, regulated, and unregulated.
- The model also captures the dynamic incentives faced by households: income dynamics, long waiting lists for public housing, long search times for regulated housing.
- We provide conditions that guarantee that a unique stationary equilibrium exists and discuss its properties.
- We estimate the model using data from the New York City Housing Vacancy Survey in 2011.
- We estimate the willingness to pay for renters to have access to affordable housing.
- We conduct a variety of different policy simulations.

Affordable Housing: Search and Mismatch

- Under New York State's Rent Stabilization Law, any city may declare a housing emergency whenever the city's rental vacancy rate drops below five percent.
- New York City has declared a "Housing Emergency" since 1974.
- As a consequence, stabilized housing units in NYC have 50 percent lower rents than unregulated units.
- The large rental subsidies that create excess demand and mismatch.
- We need a search model to capture the dynamic incentives.

Involuntarily Rent Stabilized Housing

- Rent stabilization generally applies to buildings of six or more units built between February 1, 1947 and December 31, 1973, and to those units that have exited from the rent-control program.
- Involuntarily stabilized units, representing 92 percent of the stabilized stock.
- This law affects units in these buildings with a maximum rent of \$2700.
- Rent stabilization sets maximum rates for annual rent increases. It also entitles tenants to have their leases renewed.

Voluntarily Rent Stabilized Housing

- Approximately 8 percent of the city's stabilized units and nearly all stabilized units in buildings constructed after 1974 were voluntarily subjected to rent stabilization by their owners in exchange for tax incentives from the city.
- Under the 421-a program developers currently have to set aside 20 percent of new apartments for poor and working-class tenants to receive tax abatements lasting 35 years.

Public Housing: Excess Demand, Rationing, and Queuing

- Low- and moderate-income households are eligible in the U.S. for public housing assistance if their income is below a threshold.
- Supply of public housing is often inadequately low to meet the potential demand of eligible households.
- Rents are typically a fixed percentage of household income.
- Hence, there is no price mechanism which guarantees that markets clear, which results in excess demand and rationing in equilibrium.
- Housing authorities rarely evict ineligible households which creates mismatch in the allocation of public housing.
- We need a queuing model to capture the dynamic incentives of households.

Public Housing in NYC

- More than 403,000 New Yorkers reside in NYCHA's 177,666 public housing apartments across the city's five boroughs.
- The NYCHA reported that 270,201 families were on the wait lists for conventional public housing.
- Little is know about the annual flows. The NYT reported on July 23, 2013 that "the queue moves slowly. The apartments are so coveted that few leave them. Only 5,400 to 5,800 open up annually."
- Another 235,000 residents receive subsidized rental assistance in private homes through the NYCHA-administered Section 8 program.
- In addition, 121,356 families were on the waiting list for Section 8 vouchers. This wait list has been closed since 2009. You can therefore treat Section 8 vouchers as a separate market.

Data

- We turn to NYC Housing Vacancy Survey (NYCHVS) in 2011 to characterize the housing markets of NYC.
- The advantage of this data set is that it matches household with units, i.e. it contains detailed information about household characteristics and housing characteristics.
- We have adopted three sample restrictions:
  1. We drop households that receive Section 8 vouchers since the wait list for these vouchers has been closed since 2009.
  2. We drop households whose average incomes exceed 200% of median income level.
  3. We also drop all households not living in Manhattan since housing programs are administered at the borough level in NYC.
- As a sensitivity analysis we also estimate the model for the 5 boroughs of NYC.

NYC Housing Vacancy Survey in 2011: Manhattan

housing type	market share	rent	number of years	income	female head	kids	working family
Public	0.10	—	16.18	32930	0.73	0.92	0.70
Regulated	0.58	1317	9.49	54739	0.53	0.38	0.83
Unregulated	0.33	2640	3.85	71045	0.54	0.17	0.87

Measuring the Discount for Rent-stabilized Housing

- We estimate a log-linear hedonic regression using data for stabilized and non-stabilized units.

	coefficient
regulated	-0.513^{***}
number of bed rooms	0.124^{***}
complete kitchen	0.370^{**}
Constant	7.188^{***}
Observations	1416

$^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$

- The regression also includes dummy variables that indicate whether the building has an elevator, the building age, the building size, a dummy for the fuel type, a dummy for condo/coop, a dummy for bad walls, a unit floor control and household characteristic controls, as well as sub-borough controls.

The Model

- We consider a local housing market with three housing options: public housing (p), rent-regulated housing (r), and unregulated or market housing (m).
- The exogenous housing supply in public and rent regulated housing are given by k_p and k_r.
- Time is discrete, $t = 0, ..., \infty$.
- Households are infinitely lived and forward looking.
- Households have a common discount factor β and maximize lifetime expected utility.
- Households differ by income y which evolves according to a stochastic law of motion that can be described by a stationary Markov process with transition density $f(y'|y)$.
- We assume that the logarithm of income for each household follows an AR(1) process.

Rent Stabilized Housing

- The price per unit of housing services for rent stabilized housing is significantly lower than the price for market housing $p_r < p_m$.
- Each period, there is a positive probability q_r that a household receives an offer to move into a rent regulated unit of quality h_r, $r = 1, .., R$.
- For simplicity, I will develop the theory under the assumption of $R = 1$.
- We estimate the more general model with housing heterogeneity.
- The probability of receiving an offer to move into a stabilized housing unit is endogenous and depends on the voluntary outflow from regulated housing.

Public Housing

- Eligibility is determined by an income cut-off, denoted by $\bar{y}$.
- The priority score of a household is a monotonic function of the time spent on the wait list.
- More formally, let w denote the time that a household has been on the wait list.
- Let $p(w)$ denote the probability that a household that has been on the wait list for w periods will receive an offer to move into public housing.
- The housing authority makes take it or leave it offers, i.e if the household rejects an offer, it will go the end of the wait list, i.e. $w = 0$.
- The outflow of public housing is voluntary, i.e. the housing authority does not evict households from public housing.
- The distribution of priority scores is endogenous.

Flow Utilities: Stone-Geary

Unregulated Private Housing:

$$u_m(y) = \alpha^{\alpha}\,(1-\alpha)^{1-\alpha}\,(y - p_m\underline{h})\,p_m^{-\alpha}$$

Public Housing:

$$u_p(y, h_p) = (h_p - \underline{h})^{\alpha}\,[(1-\tau)y]^{(1-\alpha)}$$

Rent-stabilized Housing:

$$u_r(y, h_r) = (h_r - \underline{h})^{\alpha}\,[y - p_r h_r]^{(1-\alpha)}$$

States and Conditional Value Functions

- The state variables are your lagged housing state, the wait time w, and income y.
- Define the conditional value functions associated with the three choices:

$$
\begin{aligned}
v_p(y) &= u_p(y) + \beta \int V_p(y') \, f(y'|y) \, dy' \\
v_m(y,w) &= u_m(y,p_m) + \beta \int V_m(y',w') \;\; f(y',w'|y,w) \, dy' dw' \\
v_r(y,w) &= u_r(y.p_r) + \beta \int V_r(y',w') \, f(y',w'|y,w) \, dy' dw'
\end{aligned}
$$

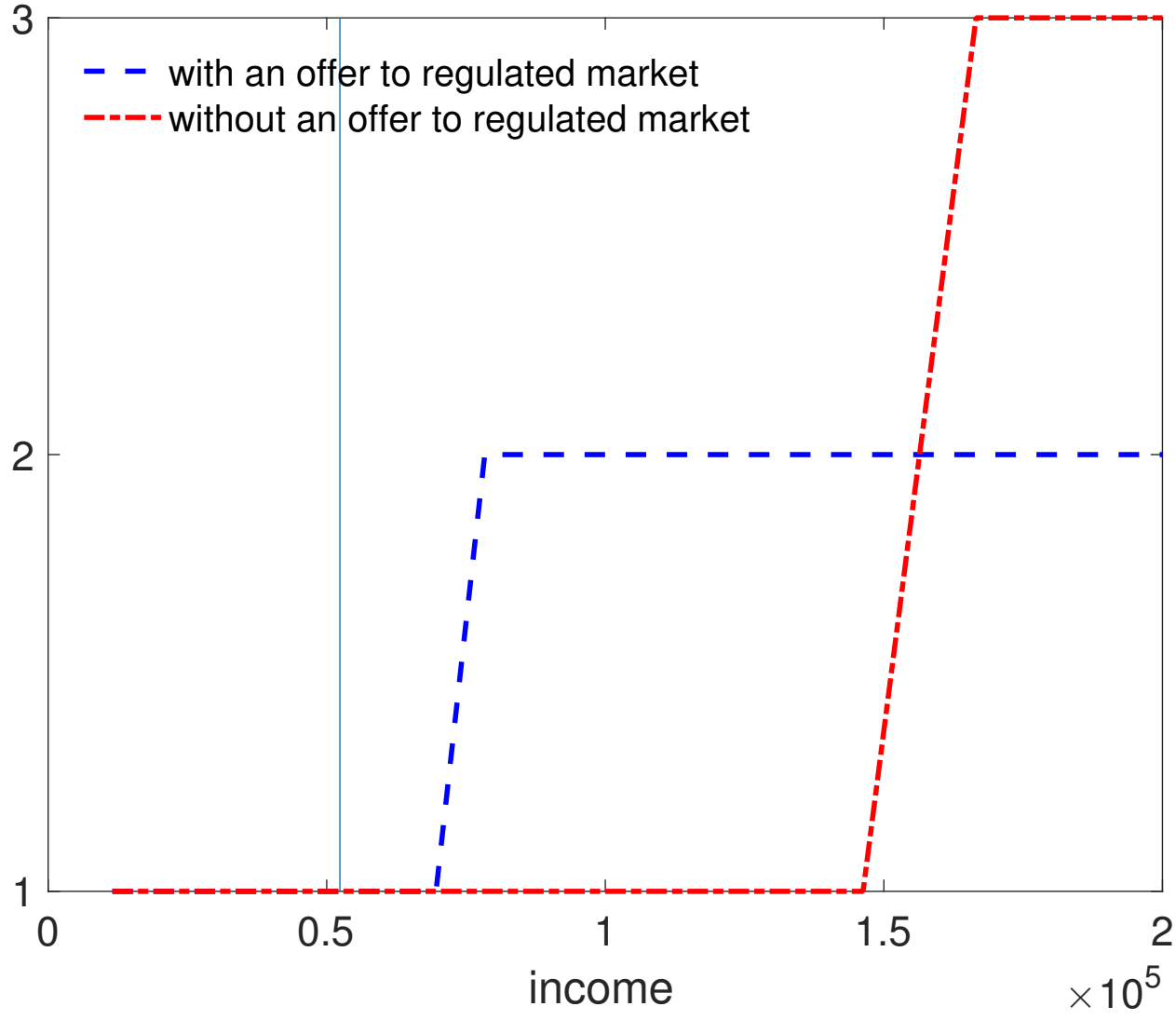
Bellman Equations

The value function for a household with characteristics (w, y) that rents in the regulated market is given by:

$$\begin{aligned} V_r(y,w) &= p(w)\, 1\{y \leq \bar{y}\}\ \max\{v_p(y), v_m(y,0), v_r(y,0)\} \\ &+ (1-p(w))1\{y \leq \bar{y}\} \max\{v_m(y,w+1), v_r(y,w+1)\} \\ &+ 1\{y > \bar{y}\}\ \max\{v_m(y,0), v_r(y,0)\} \end{aligned}$$

Once we have computed the value function, we can characterize the optimal decision rules.

Policy Function: Public Housing



1=public, 2=regulated, 3=private

Flow Equations

- Once we have characterized the optimal decision rules, we can define the flow equations for public housing and rent regulated housing.
- We then derive the law of motions for the key densities. (See Appendix A.)
- We then define a stationary equilibrium with rationing for the model.

Equilibrium

In **stationary equilibrium**, the following conditions hold:

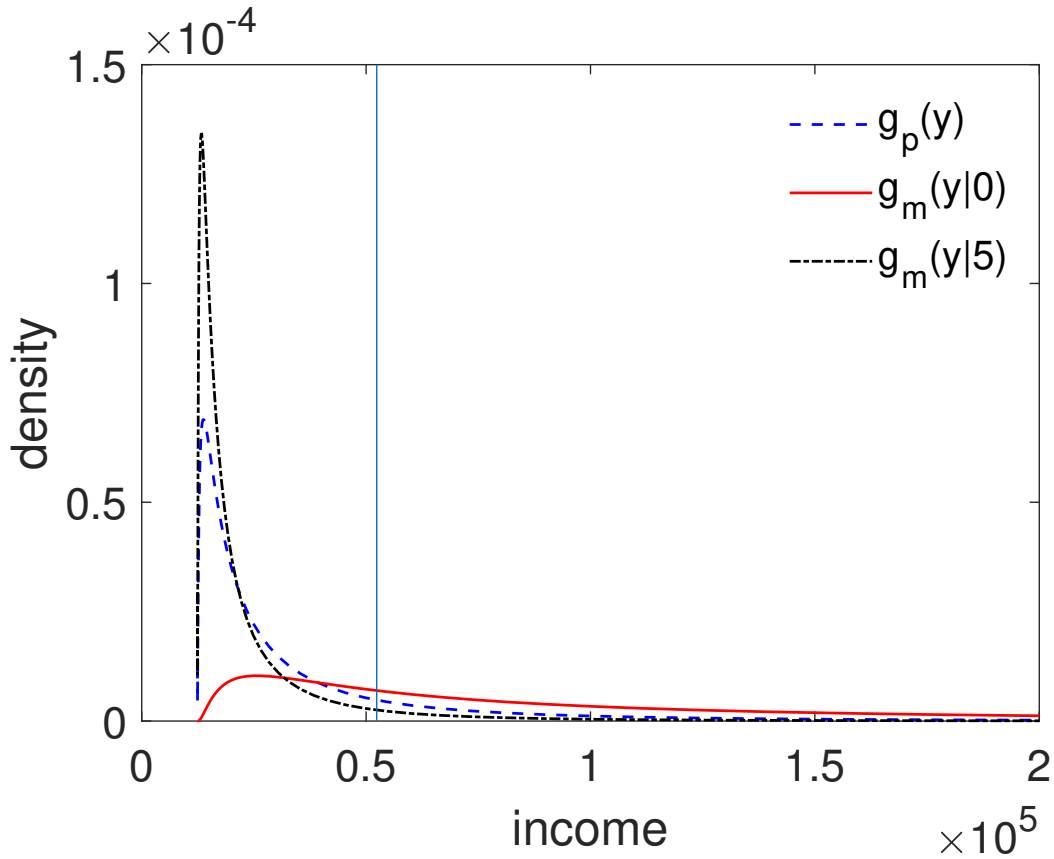
1. Households behave optimally (value functions, decision rules).
2. The housing authority behaves according the administrative rules.
3. The densities are is consistent with the laws of motion and optimal household behavior.
4. $p(w)$ satisfies the market clearing condition for public housing:

$$OF_p = IF_p$$

5. q_r satisfies the market clearing condition for rent regulated housing:

$$OF_r = IF_r$$

Stationary Distributions: Public and Private Housing



Characterizing Stationary Equilibria

- Any stationary equilibrium equilibrium must have the property that there exists a value $\bar{w} < \infty$ such that:
  a) $p(\bar{w} + 1) = 1$,
  b) $0 \leq p(\bar{w}) \leq 1$
  c) $p(\bar{w} - j) = 0$ for all $j \geq 1$
- The equilibrium thus has the property that everybody in the highest priority group obtains an offer to move into public housing.
- In addition, a fraction of the households with the second highest priority also gets an offer.
- Those household in the second highest priority group who do not get an offer will obtain an offer in the next period.

Queuing and Effective Demand

- The discreteness of the priority score effectively partitions the demand for public housing into a finite number of cohorts $(\bar{w} + 2)$.
- We need to smooth out the flow of households into public housing and equate the inflow with the voluntary flow of households out of public housing
- We accomplish that by randomizing among households with the second highest priority score, $p(\bar{\omega})$.

Extensions

- We incorporate mobility costs, denoted by γ, into the model specification.
- We control for additional sources of observed heterogeneity such as race, family size and gender of household head.
- We also allow for differences in preferences among these households.
- We use discrete types to capture these differences.
- We have estimated models that allow for different wait lists by family size.

Estimated Parameters

	I Baseline	II 1 Household Type	III 2 Household Type	
	all	all	female	male
α	0.23 (0.007)	0.28 (0.009)	0.27 (0.017)	0.30 (0.020)
$\underline{h}$	12,395 (1270)	10,480 (149)	10,949 (54)	10,439 (53)
γ	14,014 (40)	11,081 (390)	9,827 (1795)	12,223 (88)
μ_y	9.62 (0.038)	9.74 (0.020)	9.80 (0.025)	9.79 (0.037)
σ	1.12 (0.007)	1.07 (0.008)	1.06 (0.011)	1.01 (0.011)
ρ	0.67 (0.02)	0.67 (0.02)	0.63 (0.03)	0.70 (0.03)
h_p	17,912 (169)	18,069 (203)	19,177 (257)	
h_r	32,172 (219)			
h_r^1		27,499 (378)	28,436 (231)	
h_r^2		34,467 (290)	35,346 (368)	

Standard errors are in parenthesis.

Properties of Equilibrium

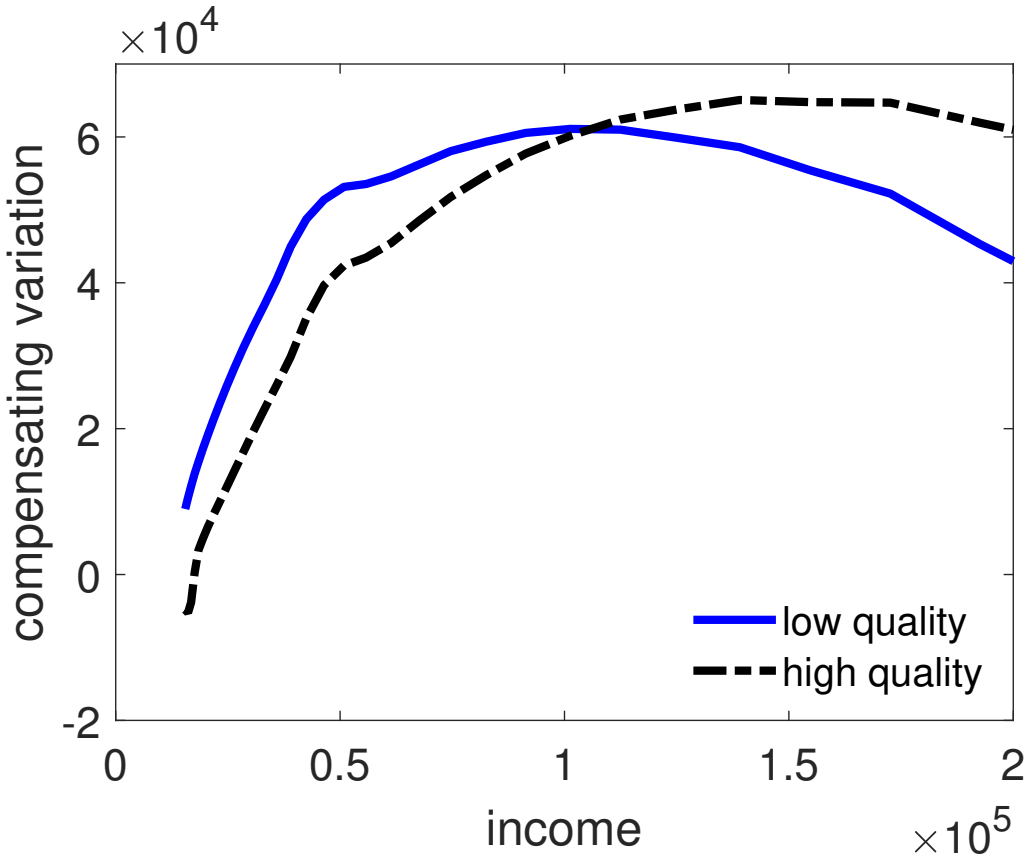
		Baseline	1 Household Type	2 Household Type
wait	$\bar{w}$	20	19	19
times	$p(\bar{w})$	0.77	0.19	0.65
search	q_1	0.26	0.11	0.10
frictions	q_2		0.26	0.22

Model Fit

Table: Model Fit

housing	years		income		market rent		income rage
				Baseline			
	data	model	data	model	data	model	
Public	16.18	17.57	32930	30405	—	—	
Regulated	9.49	9.41	54739	57983	1317	1307	
Market	3.85	2.64	71045	70045	—	—	
					2581	2444	$75000 \leq y < 100000$
					2895	2951	$100000 \leq y < 125000$
					3430	3477	$125000 \leq y < 150000$
				1 Household Type			
Public	16.18	16.81	32930	28872	—	—	
Regulated1	9.18	10.04	49651	49326	1071	1117	
Regulated2	9.81	6.13	59859	63588	1570	1400	
Market	3.85	2.17	71045	69673	—	—	
					2581	2627	$75000 \leq y < 100000$
					2895	3088	$100000 \leq y < 125000$
					3430	3655	$125000 \leq y < 150000$

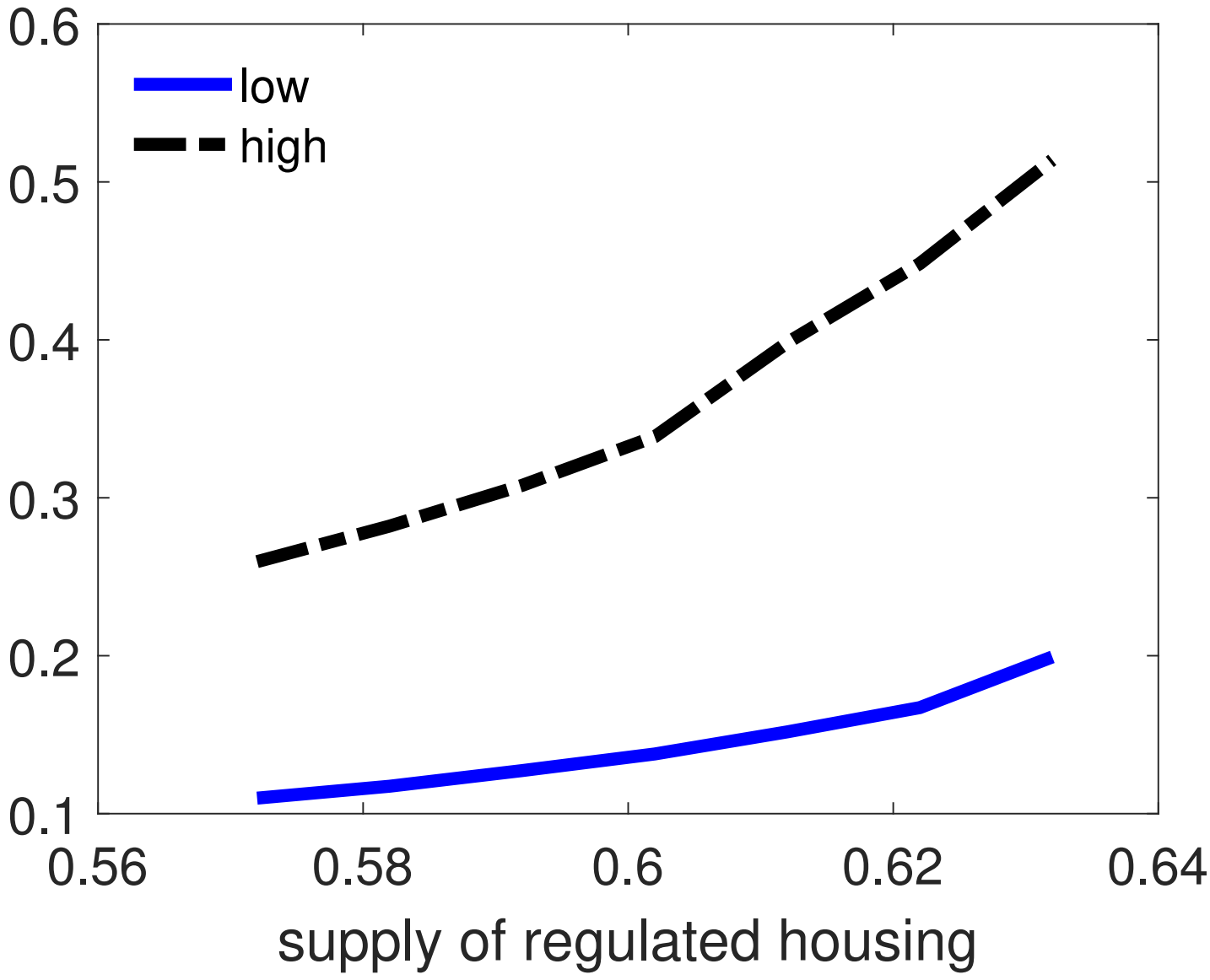
Difference in Welfare between Low Quality Rent Stabilized and Private Housing



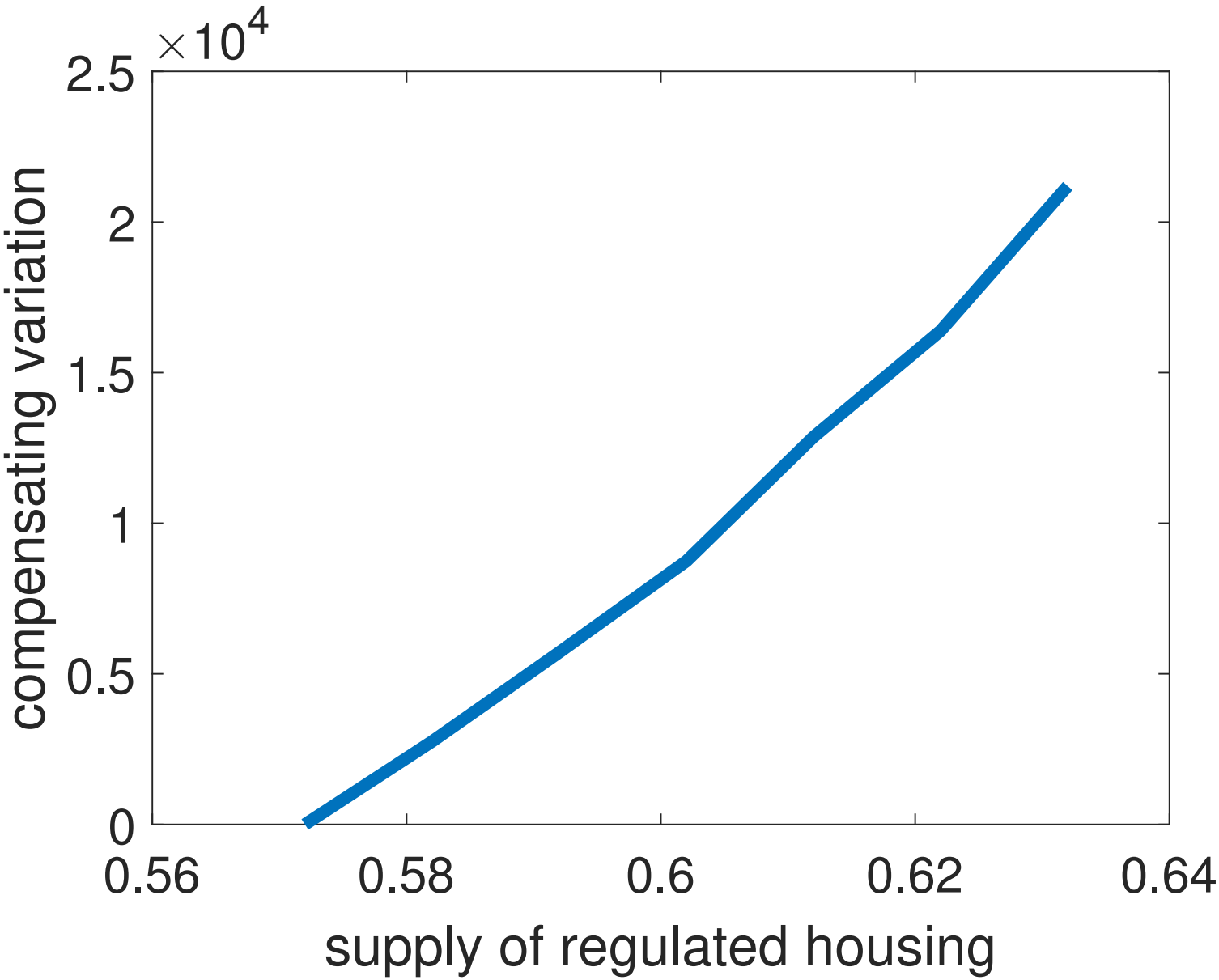
Increasing the Supply of Affordable Housing

- The popularity of affordable policies is in stark contrast to long term trends in the supply of affordable housing in NYC.
- Landlords have long been allowed to deregulate vacant apartments if the legal rent for a new renter exceeds a threshold, currently $2,700 a month.
- Between 1993 and 2015 more than 139,000 apartments have been converted to market rates through vacancy decontrol which has led to a significant decline in the supply of affordable housing (WSJ, 2015).
- The NYCHVS suggests that more than 70 percent of all renters in Manhattan with incomes less than $200,000 live in a rent-stabilized unit in 2002.

Offer Probability (p_r)



Change in Welfare



Taxing Ineligible Households in Public Housing

- One notable feature of existing public housing policies is that housing authorities rarely ask a household to leave public housing once its income exceeds the eligibility threshold.
- Approximately 17 percent of households living in public housing in Manhattan have incomes that exceed 80 percent of the median income.
- These households are, thus, likely to be ineligible of housing aid.
- Since evictions are not feasible, we consider progressive taxation as an alternative.

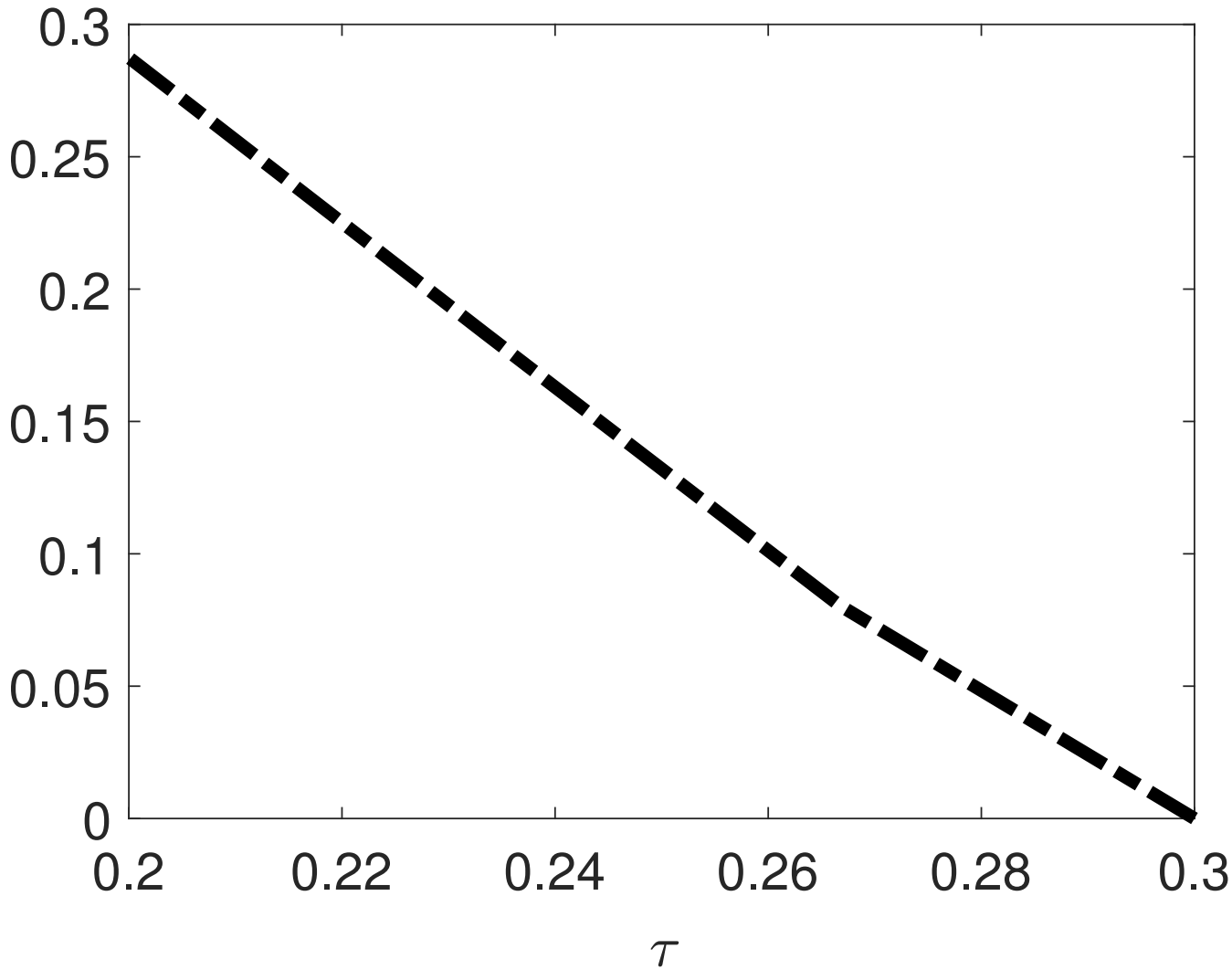
Revenue-Neutral, Progressive Taxation

- Here we explore a piecewise linear tariff with a low marginal rate, denoted by τ, for incomes below the eligibility threshold ($\bar{y}$) and a higher rate, denoted by $\tau + \Delta\tau$, for incomes above the threshold.
- Hence, the new tax function is given by

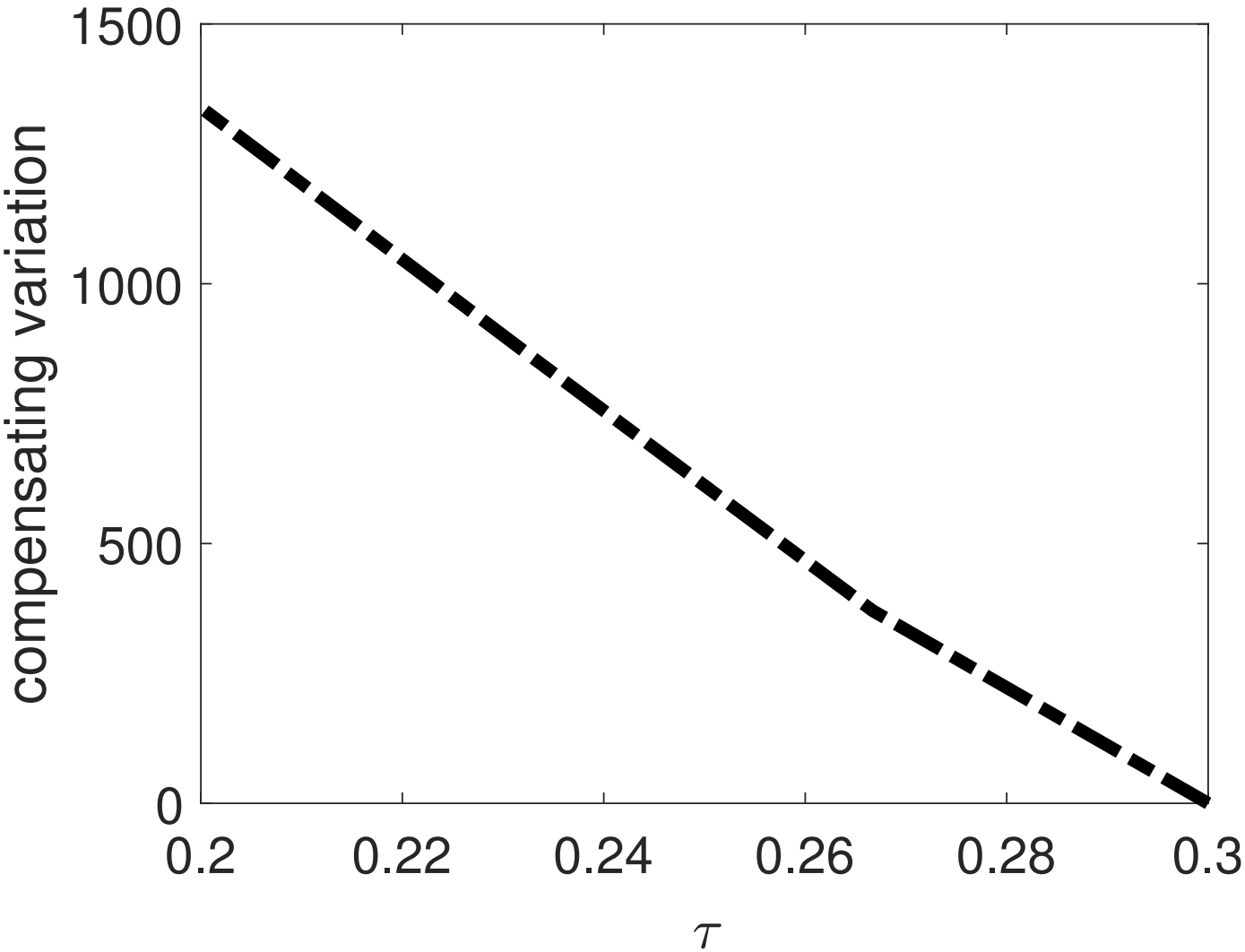
$$T_h(y) \quad = \quad \tau\ y \ + \ \Delta\tau\ \max[y - \bar{y}, 0]$$

- For a given value of τ we can solve for the revenue-neutral value of $\Delta\tau$, using a simple line-search algorithm.

Revenue-neutral Combinations of $\Delta\tau$ and τ



Changes in Aggregate Welfare



Conclusions

- I should point out that we cannot conclude from this analysis that affordable housing policies such as those in NYC are desirable.
- Our analysis does not allow us to measure the costs that are imposed on landlords. Clearly, these policies primarily redistribute wealth and income from landlords to renters.
- The magnitude of the welfare losses imposed on landlords is largely unknown.
- Rent stabilization policies weaken the incentive to invest in housing.
- As a consequence these policies have a significant negative impact on long-term housing supply.