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Measuring the Value of Rent Stabilization and Understanding its Implications for Racial Inequality: Evidence from New York City*

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Abstract

Assessing rent discounts implied by rent regulation is challenging because the counterfactual rents of regulated units in the unregulated market are not observed. We estimate these counterfactual rents and predict the quality-adjusted rent discount for each rent-stabilized unit in New York City (NYC) using novel data from 2002 to 2017. We find robust average rent discounts of \$410 per month (34% of contract rents of stabilized units). The aggregate size of these discounts in NYC is between 4 to 5.4 billion USD per year, roughly 10-14% of the federal budget on means-tested housing programs. We document that discounts: (1) increase linearly with housing tenure; (2) are *not* progressively distributed; (3) are larger in Manhattan and increasing in gentrifying neighborhoods; and (4) are three times larger for households correctly aware of being beneficiaries. We find that rent stabilization has disproportionately benefited White tenants. Not only are they more likely to occupy rent-stabilized units conditional on observables, but they also receive higher discounts. On average, Black stabilized tenants get \$150, Hispanics \$135, and AAPI \$43 *less* on monthly rent discounts than White stabilized tenants. This racial gap, which has shrunk over time, is mainly explained by the uneven sorting of households of different races across locations.

Keywords: Rent Stabilization, Rent Regulation, Hedonic Pricing, Policy Incidence, Racial Inequality

JEL Classification: R28, J15, H75, L51

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1 Introduction

Despite being widely criticized by economists and the real estate industry ([Alston et al., 1992](#); [Arnott, 1995](#); [Jenkins, 2009](#)), rent stabilization - a policy that limits rent growth - has experienced a recent revival and gained legislation momentum in many places, including Oregon, New York, Minnesota, and California ([Schuetz, 2019](#)). Furthermore, activist groups in the U.S. claim that rent regulation is an effective tool for achieving equality and social justice ([Chew, 2020](#); [Pratt Center, 2022](#)). However, there is little evidence of the magnitude and distribution of the rent discounts implied by current rent stabilization policies. Rent discounts are challenging to measure because the counterfactual rents that rent-stabilized units would command in an unregulated market are not observed. This paper estimates the rent discounts of all the rent-stabilized units in New York City (NYC) using novel data from 2002 to 2017, identifies stylized facts about the size and distribution of rent discounts, and evaluates racial inequality in rent discounts.

We follow a two-step approach: First, we estimate a hedonic model that uses a rich set of unit, building, and neighborhood characteristics of rental units in the unregulated market. Second, we use the estimated hedonic prices to forecast the rents that each rent-stabilized unit would command in the unregulated market. We define rent discounts as the gaps between the predicted and the actual rents. Since rent discounts are unobservable, we cannot test the prediction quality directly. Instead, we show that the estimates of rent discounts are notably robust to variations in this two-step process, like using propensity scores to select unregulated units in the hedonic estimation and using a repeated rents approach with a panel of rent-stabilized units that become deregulated to control for unobserved housing quality.

We estimate a mean rent discount from rent stabilization of \$410 per month (\$4,920 per year) in 2017 USD.¹ This discount approximately corresponds to 34% of the mean contract rents of rent-stabilized units and 8% of the mean total income of rent-stabilized households annually. The mean masks the dynamic heterogeneity: the mean discount is only \$180 per month in the first year of housing tenancy, and each additional year of tenancy is associated with a \$21 increase in monthly discount (about \$250 per year). We estimate the aggregate discount of the rent stabilization policy to be between \$4 and \$5.4 billion per year. This magnitude is pro-cyclical and roughly 10-14% of the \$40 billion federal budget for means-tested housing programs ([Collinson et al., 2015](#)).

We document a set of stylized facts based on the rent discount estimates: (1) rent discounts increase linearly with housing tenure; (2) rent stabilization is not a progressive policy as its benefits are flat against household income and do little to reduce income inequality; (3) rent discounts are unevenly distributed over space, larger in Manhattan and gentrifying neighborhoods; (4) the policy opacity of rent stabilization² is correlated with discount distribution, as rent discounts are

¹All the monetary values are in thousand 2017 USD throughout the paper unless otherwise specified.

²Around a third of rent-stabilized tenants cannot correctly report their rent regulation status.

significantly larger for households correctly aware of being beneficiaries of rent stabilization than for those who are not, with mean monthly discounts of \$604 vs. \$276.

Finally, we analyze racial inequality in rent discounts. We find Black tenants are 5% less likely to get a rent-stabilized unit conditional on being a renter, and that their expected rent discount is \$150 or 30% lower than the discount of Whites. A similar gap is found among Hispanic stabilized tenants. The racial gap persists when taking education and income into account. We find that the spatial sorting of minority tenants into areas with lower expected discounts explains this gap. Moreover, shorter tenure duration and lower levels of policy awareness are associated with further reductions in the rent discounts received by minorities. Our results point to the poor targeting of the rent stabilization policy, despite also finding that the racial gap in rent discounts has shrunk in recent years.

2 Related Literature

First, this paper contributes to the rent-regulation benefits measurement literature started by [Olsen \(1972\)](#)³ by improving the estimation of counterfactual rents. We follow the literature in defining the rent discounts of rent-stabilized units as the differences between actual contract rents and estimates of counterfactual rents.⁴ [Gyourko and Linneman \(1989a\)](#) use this approach to estimate discounts associated with hard-price rent control in NYC in 1968. Related papers focus on average discounts instead of predicting unit-level discounts ([Marks, 1984](#); [Autor et al., 2014](#)). [Early \(2000\)](#); [Early and Phelps \(1999\)](#) hypothesize that regulating rents of some units may disincentive housing supply, increasing unregulated rents in the same location, and adjust for this in their predictions. [Moon and Stotsky \(1993\)](#) also estimate discounts but use both regulated and unregulated units in a single Tobit regression, where market rents are modeled as a censored variable. Our analysis significantly extends the measures of the unit, building, and neighborhood characteristics used in the hedonic model. We also implement multiple methodologies and show that our estimates are robust. Specifically, we improve the selection of the units used in the hedonic estimation using propensity scores; we also control for unobserved quality using a *panel* of deregulated units in a repeat rents approach. In addition, most papers in this strand of the literature only use one year of data from decades ago with limited housing characteristics. Our analysis uses data from the most recent two decades and identifies stylized facts about discount evolution and implications for racial inequality.

While multiple papers have measured the discount of first-generation hard-price rent control⁵, including [Olsen \(1972\)](#); [Linneman \(1987\)](#); [Gyourko and Linneman \(1989a,b\)](#); [Early \(2000\)](#), we focus

³For excellent reviews, see [Turner and Malpezzi \(2003\)](#); [Pastor et al. \(2018\)](#).

⁴[Svarer et al. \(2005\)](#) take a different approach and use appraisals instead of hedonic forecasts.

⁵The first-generation hard-price rent control is a policy that caps nominal rents directly.

on the *second-generation* rent stabilization, a policy that restricts rent growth. Rent stabilization has become the dominant type of rent regulation, which has gained legislation momentum in many places (Schuetz, 2019). In our case, between 2002 and 2017, about 50% of all rental units in NYC are rent-stabilized, while only 2% have hard-price rent controls. Rent stabilization allows for further rent growth when the landlord makes capital improvements. Kutty (1996) shows that this allowance mitigates some of the adverse effects of rent control on housing quality. This feature makes rent-stabilized units more comparable to unregulated units in housing quality.

Second, rental affordability is particularly acute for racial minorities, as their rental applications are not treated fairly (Yinger, 1995; Hanson and Hawley, 2011; Ewens et al., 2014; Christensen et al., 2020), and they may pay more for similar units (Myers, 2004). We contribute to the strand of this literature that further documents racial inequality in access and benefits of affordable housing policies. Gyourko and Linneman (1989a); Sims (2011) document that minorities are more likely to occupy rent-controlled units. We find a similar result for rent stabilization, mainly driven by minorities' higher likelihood of being renters. Conditional on renting, we find minorities are less likely to get a rent-stabilized unit.

Beyond access, racial inequality can be found in differential benefits from the same policy. For instance, Early et al. (2018) document that Black housing voucher recipients pay higher rents for similar units than their White counterparts, thus receiving lower benefits from the policy. Similarly, Phillips (2017) documents that the voucher penalty⁶ for Black tenants is four to five times larger than for Whites in an experiment in rental applications. Early (2000) finds racial minorities get lower rent discounts from hard-price rent controls in NYC in their baseline estimates but finds no differential racial effect of discounts when incorporating an adjustment for the potential effect that the rent regulation could have on the unregulated market. Gyourko and Linneman (1989a) find White households get higher rent discounts from hard-price rent controls, even relative to income and controlling for the propensity to rent, for NYC in 1968. We document lower rent discounts for racial minorities in the second-generation rent stabilization in the last two decades and analyze potential mechanisms such as sorting.

3 Policy Background and Data

3.1 Rent Stabilization in New York City

In NYC, rent stabilization generally applies to older and larger buildings: apartments in buildings with six or more units are subject to the policy if they were built between 1947 and 1974 or if they were built before 1947 but had tenants who moved in after 1971. Additionally, newer apartments are

⁶Voucher penalty refers to the fact that rental inquiries from renters paying with housing vouchers are less likely to receive replies or positive replies from landlords.

also subject to rent stabilization as a result of participation in affordable housing or tax abatement programs.⁷

Rent stabilization benefits tenants in two ways. First, annual rent increases are capped, and the caps are determined by the Rent Guidelines Board (RGB). This provision implies that the perceived rent discount increases with time in the unit if the cap is binding. The RGB considers financing conditions, owner costs and revenues, and rental vacancy rates to determine the cap. The second benefit is the protection of tenants against arbitrary evictions and the option to pass down the lease to the tenants' children.

Upon vacancy, rents can be readjusted. Alternatively, landlords can request extra rent increases if significant capital improvements are undertaken. Rent-stabilized units can be deregulated if their monthly rents surpass a threshold (called the Deregulation Rent Threshold, DRT)⁸ and one of the following conditions occurs: (1) there is a vacancy, or (2) the tenants' household income is above a threshold (called the Deregulation Income Threshold, DIT).⁹ Deregulation can also occur upon vacancy when a rent-stabilized unit is converted to a condo or when the tax benefits expire.

Importantly, rent stabilization is not a means-tested program, which differs from other federal housing assistance programs such as public housing and housing choice vouchers.¹⁰ Ex-ante, rent stabilization is not designed to benefit any specific group, defined by income or demographics. This paper investigates whether this seemingly neutral design is realized in practice.

3.2 The New York City Housing and Vacancy Survey (NYCHVS)

The New York City Housing and Vacancy Survey (NYCHVS) has been conducted by the Census Bureau every three years since 1965. It is unique as a tool to answer questions about rent regulation for three main reasons. First, NYCHVS contains accurate information on each housing unit's rent regulation status, as it is complemented with administrative records. Second, NYCHVS contains representative samples of the entire housing stock of NYC and contains survey weights that allow for accurate extrapolation. Third, NYCHVS contains detailed information on housing quality at the unit, building, and neighborhood levels.¹¹

We use five waves of NYCHVS between 2002 and 2017.¹² During this period, about two-thirds of the approximately three million housing units in NYC are rental units, of which, on average, 36% are unregulated, 48% are rent-stabilized, 2% are rent-controlled, and 8% are public housing units.¹³

⁷ Apartments in buildings with three or more units built after 1974 with unique tax benefits, such as the J-51 and 421a programs, may also be rent-stabilized. These tax benefits usually expire before 20 years.

⁸ DRT is \$2,774.76 in 2019.

⁹ DIT has been \$200,000 since 2011.

¹⁰ For more comparison between rent stabilization and other federal housing policies, see Jiang et al. (2022).

¹¹ A complete list of characteristics used is reported in Table A1.

¹² We exclude the 2014 NYCHVS because changes in the questionnaire rendered essential variables incomparable to other waves. However, results are robust to including the 2014 wave, and are available upon request.

¹³ The remaining rentals are other types of regulated but not rent-stabilized. See Table A2 for a breakdown of

Rent-stabilized units are unevenly distributed over space: the share of rent-stabilized units among all rental units ranges between 3%-88% across the 55 sub-boroughs, with a standard deviation of 19%.

On average, the monthly contract rent of rent-stabilized units is \$553 (or 31%) lower than that of the unregulated units. Overall, rent-stabilized tenants are 6% more likely to be female, 7.6% less likely to be White, and 4.6 years older than tenants of unregulated units. They also earn \$27,000 less in total household income. On average, rent-stabilized tenants stay 11 years in the same housing units, compared to 6 years for unregulated tenants.¹⁴

4 Measuring Rent Discount

We define the *rent discount* of each rent-stabilized unit as the difference between its actual contract rent and what it could command in the unregulated market.¹⁵ Following [Olsen \(1972\)](#); [Gyourko and Linneman \(1990\)](#), we estimate the *counterfactual market-rate rent* for a rent-stabilized unit using a hedonic rent function.

First, we estimate the rent for a unit j in the *unregulated* market u , R_{ju} , as a function of characteristics, including unit and building traits, X_{ju} , and the characteristics of the neighborhood n where the unit is located, $N_{n(j)u}$,

$$R_{ju} = f(X_{ju}, N_{n(j)u}; \theta_u) + \epsilon_{ju} \quad (1)$$

θ_u refers to the parameter vector, and ϵ_{ju} is an error term.

The rent discount for a *rent-stabilized* (denoted by s) unit i is calculated as the difference between its actual contract rent R_{is} and the rent predicted by equation 1 evaluated at the estimated parameter vector $\hat{\theta}_u$ but using the *rent-stabilized* unit and neighborhood characteristics vectors X_{is} , $N_{n(i)s}$,

$$\text{Rent Discount}_{is} = f(X_{is}, N_{n(i)s}; \hat{\theta}_u) - R_{is} \quad (2)$$

Several considerations apply to this method. First, this calculation approximates the revenue that landlords lose from not being able to lease rent-stabilized units at unregulated market rates. This approach assumes rents of the unregulated units are unaffected by rent regulation. However, rent regulation can reduce incentives to supply rental housing ([Diamond et al., 2019](#)), thus increasing the rents of unregulated units. Accordingly, [Early and Phelps \(1999\)](#) find that removing rent control may reduce rents in the unregulated market, and [Early \(2000\)](#) incorporates this adjustment

complete types of housing units by survey year.

¹⁴See Table A3 for more details of the summary statistics.

¹⁵For our empirical analysis, owner-occupied, public housing, rent-controlled, and other types of regulated but not rent-stabilized units are excluded.

in estimating the distribution of tenants' benefits. In the absence of current estimates of this factor, we focus on a more conservative counterfactual scenario in which each stabilized unit is deregulated singly, as opposed to citywide regulation removal, which should not affect unregulated rents.

Second, our calculation is a good approximation of the welfare change for tenants from rent stabilization, i.e., the compensating variation, only when considering a counterfactual in which households do not change the amount of housing services consumed when moving from a rent-stabilized to an unregulated unit.¹⁶ Thus, we consider our estimates as the amount of rents foregone by landlords and focus on their relative distribution. Another interpretation is that we measure the contemporaneous differential discounts of households residing in rent-stabilized units relative to those in private market units.

Third, some of the true rental discounts can be dissipated through increased transaction costs in allocating rent-stabilized rental units, for example, through increased search costs, key money, or waiting time (Barzel, 1974). The actual after-tax rental discount is likely larger than the estimate because the benefit is not taxable.

The quality of predicted rent discounts can rarely be evaluated since the f function and, therefore, the counterfactual market-rate rents of the rent-stabilized units are not observed. We address this concern by comparing multiple forms of f , starting with an OLS linear model where all variables are discretized to capture nonlinearities flexibly. Our estimation also includes a much richer set of quality attributes at the unit, building, and neighborhood levels and sub-borough fixed effects to predict rent in the private market, compared to earlier analyses as Olsen (1972); Gyourko and Linneman (1990) among others. Furthermore, estimation is done separately for each survey year, effectively allowing implicit prices of housing quality attributes to vary over time. All variables included in the estimation are reported in Table 1.

Common Support and Propensity Scores. This hedonic approach relies on the comparability of units between rental regimes, which can be a concern given that rent-regulated units may

¹⁶Under this assumption, our measure gives the decrease in consumer surplus of a tenant moving from the stabilized to the unregulated market. A complementary strand of literature has focused on measuring utility impact when incorporating housing consumption changes in the counterfactual (Olsen, 1972; Early, 2000) so that the difference between the rent charged by a rent-regulated unit and what it could command in the unregulated market is not necessarily equivalent to the compensating variation required to keep utility unchanged if rent stabilization were removed. As an example, consider a rent-stabilized unit with a rent of \$3,000. If the regulation is binding, this same unit would have charged a higher rent in the unregulated market, say \$3,500. Our approach measures the transfer from the landlord to the tenant (\$3,500-\$3,000 = \$500). However, suppose rent stabilization is removed altogether. With higher prices of housing relative to non-housing goods, this tenant may find that her optimal consumption choice is a smaller apartment with a rent of \$3,200 (indeed, Glaeser and Luttmer (2003) find that the incumbent beneficiaries of rent control keep larger units relative to those they would rent in the private market). The utility impact approach focuses on the discount of the rent-stabilized unit relative to the counterfactual optimal consumption when removing rent regulation: \$3,500-\$3,200 = \$300. This welfare impact analysis requires either strong assumptions about structural preferences or observation of households transitioning between regimes. However, our data, or any publicly available data in NYC, do not provide longitudinal identifiers for households. Our estimates are a more accurate description of the overall resources devoted to the policy and the cost to the landlords.

have lower unit quality (Gyourko and Linneman, 1990) or neighborhood quality (Diamond et al., 2019), and that landlords can neglect their maintenance (Downs, 1988). We estimate propensity scores using a logit model that predicts the rent stabilization status.¹⁷ There is a significant overlap in the propensity scores of rent-stabilized and market rental units (Figure B3), suggesting that units of similar quality can be found in both markets.

We re-estimate rent discounts using sub-samples of unregulated and stabilized rental units that share common support based on propensity scores to ensure greater comparability in the spirit of Crump et al. (2009) and Bailey and Goodman-Bacon (2015). We perform the same two-step approach with three different sub-samples. First, we drop units that have a very small propensity to be rent-stabilized, thereby removing unique units with no comparators in the rent-stabilized group. Second, we drop units with very high or low propensity scores to prevent OLS from assigning weights to units outside the common support. Third, we divide the sample into units above and below the half-percentiles of propensity scores.¹⁸

Panel Data and Repeat Rents. Despite the rich characteristics used in the hedonic rent function, the concern for unobserved quality remains. To address this issue, we take advantage of the unique unit-level identifiers available in 2002, 2005, and 2008 NYCHVS. Specifically, 280 rent-stabilized units became deregulated between 2002 and 2005, and 424 between 2005 and 2008, effectively giving us access to repeated rents for the same unit across rental regimes. We estimate rent discounts for these units as negative changes in the observed contract rents *before* and *after* deregulation. This approach controls for unobserved quality, which is inspired by Eichholtz et al. (2012) and Ambrose et al. (2015), who estimate a repeat rent estimator, replicating the repeat sales estimator of Case and Shiller (1989). The short time between observed contract rents somewhat alleviates the concern of unobserved quality differences. This method requires less data than the hedonic approach but suffers from a reduced sample size.

Aggregated Rent Discount. The aggregate magnitude of the resources devoted each year to the policy is obtained by

$$\int_{i \in S} \text{Rent Discount}_{is} \omega_i di \quad (3)$$

where S denotes the set of rent-stabilized units. Survey weights ω_i are used to extrapolate to city-wide aggregates. Discounts estimated for all years are deflated to 2017 USD and pooled.

¹⁷Three building attributes, year of construction, number of units, and number of stories, are excluded from the logit model because they are the main criteria for selecting units into rent stabilization policy (see Section 3.1). Adding them would, thus, significantly reduce the overlap in the propensity scores between unregulated and stabilized units.

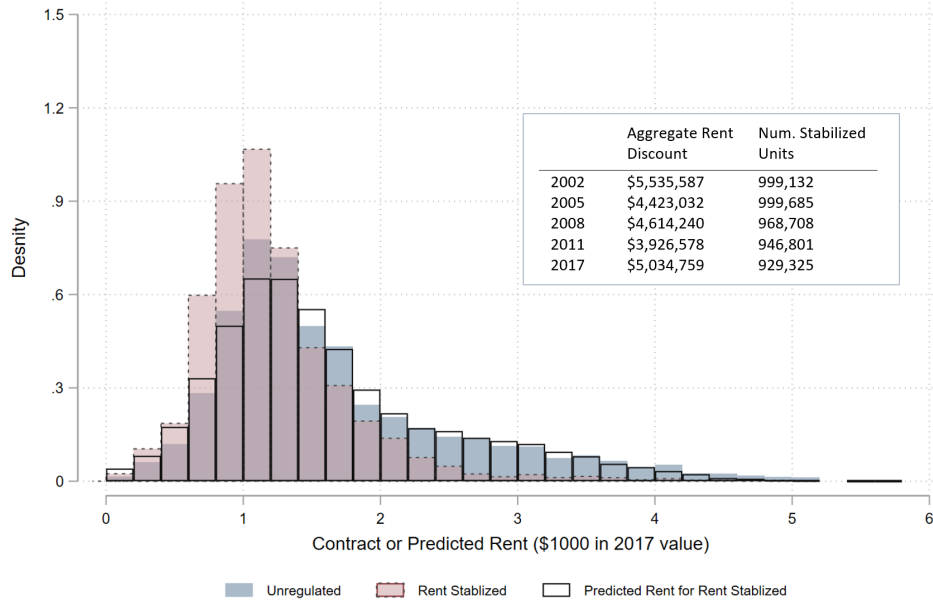
¹⁸The results for other quantiles are virtually equal and are available upon request.

5 Estimated Rent Discounts

In Panel A of Table 1, we present results for different specifications of the hedonic rent function f . We estimate a baseline regression model following the seminal [Olsen \(1972\)](#) and report the predicted rent discounts in the first row. The overall average rent discount is \$589 per month. Next, we progressively add a rich set of unit, building, and neighborhood characteristics in rows 2-6. The estimated rent discounts decrease as we include more housing attributes, especially with the inclusion of sub-borough fixed effects to control for unobserved neighborhood characteristics. We take the extended model in row 6 as the preferred specification: the estimated average rent discount is \$410 per month (\$4,920 per year), roughly 34% of the mean contract rent of rent-stabilized units and 8% of the mean total income of rent-stabilized households annually. The distribution of rental discounts is skewed to the right, with the median monthly discount of \$303.

The distribution of predicted rents by f for rent-stabilized units closely overlaps the observed rents of units in the private market (see Figure 1), which confirms the large overlap in their observed quality.

Figure 1: OBSERVED AND PREDICTED RENTS DISTRIBUTION



Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Predicted rents for rent-stabilized housing units are estimated using the hedonic model shown in row 6 of Table 1. Rent discounts of stabilized units are computed as the difference between predicted and contract rents, as discussed in Section 4. The aggregate rent discount is in thousands of 2017 USD. Aggregate rent discount and the number of rent-stabilized units are calculated using sample weights.

In Panel B of Table 1, we use the model of row 6 but use estimated propensity scores to select more comparable units used in training and prediction. Unregulated and stabilized units that are unlikely to be stabilized are removed in row 7, and the predicted mean discounts only change negligibly. In row 8, we further remove those units with a high likelihood of being stabilized, which barely changes the mean prediction. Finally, row 9 shows the predicted rent discounts when predictions are made separately for units above and below a propensity score of 0.5. Results are remarkably stable.

Panel C of Table 1 shows the estimated rent discounts using the repeat rents approach. This method can only be applied to 2002, 2005, and 2008 – the only years for which panel unit identifiers are available. The average rent discount of the 635 deregulated rental units is \$390. This estimate is very similar to the results that control for quality with a hedonic function. Over time, the mean and median estimated discounts weakly trace a U-shaped curve, decreasing in the early 2000s until 2005 and then picking up again.

Finally, we calculate aggregate rent discounts of all rent-stabilized units using survey weights. The yearly aggregates range between \$4 and \$5.4 billion, as summarized in Figure 1.¹⁹ This magnitude is equivalent to 13% of the \$40 billion annual federal spending on means-tested housing programs²⁰, and roughly 24% of the \$22 billion federal budget for tenant-based rental assistance programs in 2019, including section 8 housing vouchers (U.S. Department of Housing and Urban Development, 2020). The magnitude is also comparable to the \$6 billion annual federal tax expenditures on the Low Income Housing Tax Credit (LIHTC) (Collinson et al., 2015), and the \$7 billion federal budget for public housing in 2019. After 2005, the aggregate discount seems to move procyclically in the real estate market, as captured by NYC’s inflation-adjusted Case-Shiller index.²¹ However, it does not follow unregulated rents, which have been steadily increasing since 2002, or the share of rent-stabilized units, which have slowly but steadily declined as a share of rental and total units since 2002.

In the appendix, we conduct a battery of additional robustness checks. We exclude units whose characteristics are not reported or are unknown, and re-estimate our hedonic model (Table B6). We also test whether results change when we include the rental units whose contract rents are top-coded. The results are remarkably robust (available upon request).

¹⁹Our rent discount estimates include a small number of negative values, which we include in the calculation of the aggregates. Negative rent discounts are an issue that has previously arisen in the literature (for example, Early (2000)) and are discussed in Appendix B.1.

²⁰Means-tested housing programs include public housing, government-subsidized private housing, and tenant-based housing vouchers.

²¹Home prices in NYC, measured by the inflation-adjusted Case-Shiller index, declined between 2006 and 2012, and rose annually from 2012 to 2022 (see <https://fred.stlouisfed.org/series/NYXRSA>).

Table 1: MEAN OF ESTIMATED RENT DISCOUNTS (2002-2017)

	All	2002	2005	2008	2011	2017
Panel A: Hedonic Models						
Baseline Model <i>a la</i> Olsen (1972)	0.5885 (0.0045)	0.6219 (0.0101)	0.5396 (0.0094)	0.5645 (0.0100)	0.5615 (0.0088)	0.6732 (0.0115)
+ Extended Characteristics	0.5693 (0.0043)	0.6026 (0.0097)	0.5280 (0.0091)	0.5605 (0.0098)	0.5309 (0.0085)	0.6387 (0.0112)
+ Unit Quality Issues	0.5611 (0.0044)	0.6040 (0.0097)	0.5247 (0.0091)	0.5450 (0.0099)	0.5194 (0.0088)	0.6227 (0.0113)
+ Building Characteristics	0.5606 (0.0044)	0.5995 (0.0098)	0.5257 (0.0091)	0.5456 (0.0099)	0.5238 (0.0088)	0.6185 (0.0114)
+ Neighborhood Characteristics	0.5475 (0.0043)	0.5880 (0.0097)	0.5183 (0.0090)	0.5277 (0.0099)	0.5130 (0.0088)	0.5998 (0.0113)
+ Sub-borough FE	0.4095 (0.0041)	0.4680 (0.0088)	0.3765 (0.0086)	0.3871 (0.0094)	0.3699 (0.0083)	0.4518 (0.0112)
Panel B: Common Support and Propensity Score						
P-Score Trimmed (≥ 0.1)	0.4077 (0.0041)	0.4641 (0.0089)	0.3720 (0.0086)	0.3876 (0.0094)	0.3710 (0.0083)	0.4501 (0.0113)
P-Score Trimmed ($\in [0.1, 0.9]$)	0.4174 (0.0045)	0.4681 (0.0108)	0.3893 (0.0095)	0.3874 (0.0097)	0.3869 (0.0086)	0.4757 (0.0118)
P-Score Split (cutoff = 0.5)	0.3999 (0.0044)	0.4443 (0.0092)	0.3373 (0.0093)	0.4190 (0.0097)	0.3708 (0.0088)	0.4307 (0.0121)
Panel C: Panel Data and Repeated Rents						
Repeated Rents	0.3897 (0.0298)	0.3176 (0.0420)	0.4352 (0.0407)			

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. The analytical sample contains only rent-stabilized and market rental units. Standard errors of the mean are reported in parentheses.

The baseline model *a la* [Olsen \(1972\)](#) controls the number of bedrooms and other rooms, overall building quality (sound, deteriorating, or dilapidated), year built, number of units in the building, number of stories interacted with elevator availability, and borough dummies.

Extended characteristics are: building owner presents; lease length; rent includes electricity, gas, and other fuels; heating type; additional heating source; plumbing completeness; kitchen completeness.

Unit quality issues are: the presence of mice and rats; exterminator service; cracks/holes in interior walls; holes in floors; broken plaster or peeling paint; water leakage; the number of heat breakdowns; toilet breakdown.

Building characteristics are: sidewalk to the elevator without using steps; sidewalk to the unit without using steps; any issue of building in terms of external walls, windows, stairs, or floors.

Neighborhood characteristics are: the presence of buildings with broken or boarded-up windows on the same street; the self-rating of structures in the neighborhood.

Propensity scores are estimated using logit regression of rent-stabilization dummy on all but three unit, building, and neighborhood characteristics in the model shown in row 6. Year built, number of units, and number of stories in the building are excluded from logit regression because they are determinants of rent-stabilization status. We then trim the sample by dropping housing units with propensity scores below certain thresholds (rows 7&8). We also split the sample of the unregulated and rent-stabilized units into two sub-samples based on propensity scores (row 9) and estimate the hedonic model for each sub-sample.

6 Stylized Facts About Rent Discounts

Rent Discounts and Tenure Duration. Rent stabilization limits rent growth. Under binding caps, the discount would grow with tenancy duration. We regress rent discount on tenure duration and find an additional year of housing tenure is associated with roughly a \$20 increase in monthly rent discount, as is shown in panel A of Table 2.²² The positive estimates can be interpreted as evidence of a binding rent stabilization policy over time.²³

Rent Discounts and Income: Is the Policy Progressive? The rent stabilization policy is not means-tested but has often been championed as a way to ensure housing affordability for low-income households and to achieve income equality and social justice. Olsen (1972); Ault and Saba (1990) find that households in hard-price rent-controlled units have lower incomes than those in unregulated units. Glaeser (2003) reports similar findings for rent-stabilized units. Similarly, we find that the stabilized units are allocated disproportionately to lower-income tenants (see Table A3).

However, we reach the *opposite* conclusion when looking at the distribution of rent discounts across tenants: rent discounts are positively, though weakly, associated with household annual total income (Panel B of Table 2). Although the coefficients on total household income are statistically significant, their magnitudes are close to zero. More importantly, in all cases, we reject the hypothesis that they are negative: poorer households do not receive larger rent discounts.

Social transfers usually reduce income inequality, so that transfers-adjusted income distributions have lower Gini indices (Wimer et al., 2020). To test whether this holds true for rent discounts, we calculate discount-adjusted incomes by adding the estimated rent discount to total household income. We compare the Gini indices of household income and discount-adjusted income distributions and find a marginal decline in income inequality after adding rent discounts (Table C8). The reduction in inequality is small among rent-stabilized households, but becomes even smaller when we add all renters and homeowners to this exercise by assigning them a discount of zero. This pattern suggests that rent discounts do not make income significantly more equally distributed.

Rent Discounts and Spatial Distribution. The largest mean discounts are concentrated in Manhattan (panel C of Table 2). The mean Manhattan rent discount is \$894 per month, \$662 higher than Brooklyn’s, the second-highest. This finding is consistent with historically high rent growth rates in unregulated units in Manhattan, which make stabilization caps constantly binding there. The Manhattan discount premia have remained stable since 2002, while the mean discounts in Brooklyn and Queens have increased by nearly 80% and 60%, respectively. This pattern is consistent with the increasing rents of unregulated rental units during the gentrification of these

²²Fitting a non-parametric LOWESS curve confirms the relationship is close to linear (Figure C9).

²³Tenure is endogenous to factors that may also affect rent discount. The literature has instrumented tenure with predicted tenure estimated using tenants in unregulated units (Gyourko and Linneman, 1989b). Our results are not sensitive to using this prediction.

Table 2: EFFECT OF TENURE, INCOME, GEOGRAPHY AND AWARENESS ON RENT DISCOUNTS

Dependent Variable: Monthly Rent Discount (in thousands of 2017 USD)						
	All	2002	2005	2008	2011	2017
Panel A: Housing Tenure						
Housing Tenure	0.021*** (0.000)	0.021*** (0.001)	0.020*** (0.001)	0.023*** (0.001)	0.019*** (0.001)	0.023*** (0.001)
Constant	0.181*** (0.005)	0.259*** (0.012)	0.167*** (0.011)	0.149*** (0.012)	0.164*** (0.010)	0.152*** (0.014)
Panel B: Total Household Income						
Total household income	0.000 (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	-0.000 (0.000)	-0.001*** (0.000)
Panel C: Geography						
Bronx	0.169*** (0.005)	0.255*** (0.011)	0.162*** (0.012)	0.131*** (0.012)	0.120*** (0.011)	0.184*** (0.015)
Brooklyn	0.232*** (0.006)	0.203*** (0.011)	0.154*** (0.011)	0.215*** (0.012)	0.226*** (0.012)	0.370*** (0.017)
Manhattan	0.894*** (0.009)	0.961*** (0.018)	0.836*** (0.018)	0.905*** (0.022)	0.854*** (0.018)	0.903*** (0.029)
Queens	0.198*** (0.006)	0.203*** (0.011)	0.153*** (0.011)	0.154*** (0.012)	0.191*** (0.013)	0.327*** (0.017)
Staten Island	0.127*** (0.029)	0.101** (0.049)	0.230*** (0.072)	0.138** (0.066)	0.175*** (0.054)	0.013 (0.076)
\bar{Y}	0.409	0.468	0.377	0.387	0.370	0.452
N	24043	5177	5015	5268	4684	3899
Panel D: Awareness						
Correctly Aware	0.289*** (0.013)	0.304*** (0.018)	0.265*** (0.018)			
Constant	0.313*** (0.007)	0.346*** (0.010)	0.282*** (0.010)			
\bar{Y}	0.409	0.468	0.377	0.387	0.370	0.452
N	24043 (Panels A-C), 10192 (Panel D)	5177	5015	5268	4684	3899

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. The dependent variable of the OLS regressions shown in the panels above is monthly rent discounts (in thousands of 2017 USD). Monthly rent discounts are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. Housing tenure in panel A is the number of years a household has stayed in the same unit. The total annual household income in panel B is in thousands of 2017 USD. In panel D, the correctly aware dummy equals one for households who live in rent-stabilized units and correctly reports that they live in rent-stabilized units and zero otherwise. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

two boroughs (Lees, 2003; Barton, 2016; Timberlake and Johns-Wolfe, 2017). Figure C11 shows the spatial distribution of discounts across 55 sub-boroughs, and confirms the same results at smaller neighborhood levels.

Rent Discounts and Policy Awareness. Following Jiang et al. (2022), we measure policy awareness using 2002 and 2005 NYCHVS, which include self-reported and official rent regulation status. We consider rent-stabilized tenants to be *correctly aware* if their self-reported rent regulation status is either rent-stabilized or rent-controlled. Surprisingly, less than 35% of households living in rent-stabilized units are correctly aware of their rent regulation status. Moreover, almost 25% of rent-stabilized tenants are *incorrectly aware*, i.e., they believe their rents are unregulated! In contrast, less than 5% of tenants in unregulated units report that their units are rent-regulated. This pattern illustrates the opaqueness of the policy, which may prevent lower educated and newcomers to the city from benefiting from it. Opacity allows landlords to control to whom they advertise the rent-stabilized status, which may harm integration if landlords have segregationist preferences (Glaeser, 2003).²⁴

Tenants who are correctly aware enjoy a much higher rent discount on average, as Panel D of Table 2 shows. They receive a discount premium of \$290, which raises their discounts to about \$600, almost double the discount of other stabilized tenants. Simultaneously, we observe correctly aware households have tenure duration on average 5 years longer. Longer duration can be associated with both learning the correct policy status and a higher rent discount. Households that are correctly aware also have a higher average total household income. These combined factors make the policy more *regressive*.

7 Implications for Racial Inequality

Racially neutral policies, in design, can have racially discriminatory consequences. First, we document the differential allocation of stabilized units and then analyze the differential access to rent discounts for households of different racial and ethnic groups.

Black tenants are as likely as White tenants to occupy rent-stabilized units, even after controlling for education, household size, and income (Table A4). Hispanics, however, are 10 percent less likely to occupy a rent-stabilized unit. However, this apparent equality is affected by the larger propensity of Black households to be renters. Conditional on renting, both Black and Hispanic tenants are around 5% less likely to occupy a rent-stabilized unit than Whites (Table A5). This finding could suggest discriminatory behavior of landlords in unit assignment (Glaeser, 2003).

Table 3 confirms racial inequality in the rent discounts. The estimates in panel A suggest White households in stabilized units enjoy monthly rent discounts of \$490 on average. By contrast, Black

²⁴Table E20 shows the difference in the demographics of tenants who are aware and those beneficiaries who cannot correctly identify their status. The latter are significantly more likely to be part of a racial minority and be younger.

tenants receive \$150 less in monthly discounts (\$1,800 per year), and Hispanic tenants receive \$135 less in monthly discounts (\$1,620 per year). AAPI tenants also have lower discounts, although the gap with Whites is much smaller.

The racial gap remains when we divide tenants by education levels or income. Table D13 shows that the gap in monthly rent discount is \$140 when comparing Whites and minorities with college degrees but drops to \$90 when comparing Whites and minorities without college degrees. We also calculate the discount-adjusted incomes and their Gini indices for different racial groups. Despite being unequally distributed across racial groups, the rent discount does not significantly reduce the income inequality in any group (Table C9). The vertical inequity of the discount seems to dominate the horizontal inequality across racial groups.

Averages hide essential dynamics. The racial gap in rent discounts between Black and White tenants is significant and large in the early 2000s and becomes smaller after 2008. Since 2011, the racial gap has been statistically insignificant and negligible in magnitude. The racial gaps in rent discounts between other minorities and White have also declined since 2011. The closing of the racial gap between minorities and White tenants is driven by two trends: First, the rent discounts of White tenants have decreased over the years from about \$559 per month in 2002 to \$474 per month in 2017. Second, the average rent discounts for Black tenants increased from \$340 per month in 2002 to \$442 per month in 2017. The share of minorities in unregulated and stabilized units is stable over time, suggesting that gap changes do not correspond to composition changes across rental regimes, but rather to differential dynamics in locations with different concentrations of minorities.

Location is a key mechanism behind the uneven distribution of benefits. Panel B of Table 3 examines the role of being a racial minority on the discounts, including borough fixed effects in the regression. After controlling for location, the negative gap in rent discounts for minorities disappears for the pooled sample. This pattern suggests that the unequal distribution of rent discounts is explained by the sorting of different racial groups into areas with different average rent discounts. In fact, we find a reversal in racial differences after 2008, with Black and Hispanic households having about \$100 and \$80 higher rent discounts compared to White households in 2011, conditional on location. Thus, sorting across locations seems to be a dominant factor in explaining the racial inequality in rent discounts.²⁵

In the context of urban gentrification, racial displacement (Baum-Snow and Hartley, 2020; Brummet and Reed, 2019; Chapple et al., 2021), and a binding rent-stabilization policy, differences in tenure duration could explain the unequal discount distribution. Indeed, adding tenure duration to the location controls (Panel A of Table 4) turns the negative discount gap for minorities into

²⁵The inclusion of additional controls like local neighborhoods with sub-borough FEs (Table D17) and demographic controls like age, income, and education (Table D18) do not change the finding: the measured negative racial gap disappears when controlling for location.

Table 3: RACIAL INEQUALITY IN RENT DISCOUNTS

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Panel A: Racial Inequality in Rent Discounts over Time						
Black	-0.150*** (0.011)	-0.209*** (0.022)	-0.188*** (0.023)	-0.242*** (0.025)	-0.032 (0.022)	-0.032 (0.030)
Hispanic	-0.135*** (0.010)	-0.150*** (0.021)	-0.124*** (0.020)	-0.236*** (0.023)	-0.068*** (0.020)	-0.063** (0.027)
AAPI	-0.043** (0.017)	0.027 (0.041)	-0.050 (0.034)	-0.158*** (0.037)	-0.030 (0.033)	0.045 (0.042)
Constant	0.490*** (0.008)	0.559*** (0.016)	0.461*** (0.015)	0.534*** (0.019)	0.402*** (0.015)	0.474*** (0.020)
Borough FE	No	No	No	No	No	No
Panel B: Racial Inequality within Boroughs						
Black	0.012 (0.010)	-0.028 (0.019)	-0.025 (0.021)	-0.054** (0.022)	0.115*** (0.020)	0.104*** (0.029)
Hispanic	0.013 (0.009)	-0.011 (0.019)	0.016 (0.019)	-0.062*** (0.022)	0.080*** (0.019)	0.091*** (0.029)
AAPI	0.037*** (0.014)	0.112*** (0.031)	0.034 (0.028)	-0.034 (0.032)	0.023 (0.027)	0.078** (0.039)
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Data come from 2002, 2005, 2008, 2011 and 2017 NYCHVS. Only rent-stabilized units are used. Rent discount in both panels is in thousands of 2017 USD and is estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. AAPI stands for Asian American and Pacific Islanders. This race category also includes American Indian and Alaskan Native. Panel A shows coefficients from OLS regression of rent discount on race dummies and a constant term, without controls and fixed effects. The omitted race group is white. Panel B adds borough fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

a positive gap. This finding suggests that the negative gap is associated with minority tenants in rent-stabilized units having shorter tenancies. Indeed, the average tenure duration of White rent-stabilized tenants is 1 year longer than that of minority tenants. Furthermore, although each additional year in the unit is associated with additional \$21 monthly rent discounts, interactions of this variable with race show that this gain is lower for minority tenants (\$6 and \$4 less for Black and Hispanic households, respectively).

We have previously documented that tenants who are correctly aware of the rent stabilization have higher discounts, which plays a role in the racial gap. White households are more likely to be correctly aware of the rent-stabilization status (Panel B of Table 4). Approximately 75% of White tenants are correctly aware, compared to 57% of Black tenants, 53% of Hispanic tenants, and 51% of AAPI tenants. Accordingly, White tenants who are *correctly aware* on average enjoy the highest monthly rent discount, \$705, which is approximately 71% and 37% more than the rent discounts of correctly aware Black and Hispanic households. Interestingly, we do not observe similarly large racial gaps in rent discounts among households who are *incorrectly aware* of the rent-regulation status of their housing units.

Table 4: UNDERSTANDING RACIAL INEQUALITY IN RENT DISCOUNTS

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Panel A: Effects of Housing Tenure on Rent Discounts						
Black	0.083*** (0.013)	0.061** (0.026)	0.024 (0.027)	0.046 (0.029)	0.163*** (0.025)	0.220*** (0.039)
Hispanic	0.071*** (0.012)	0.008 (0.026)	0.056** (0.025)	0.050* (0.029)	0.130*** (0.023)	0.180*** (0.037)
AAPI	0.112*** (0.018)	0.127*** (0.041)	0.069* (0.036)	0.042 (0.041)	0.155*** (0.031)	0.192*** (0.049)
Tenure Duration	0.021*** (0.001)	0.019*** (0.001)	0.019*** (0.001)	0.023*** (0.001)	0.018*** (0.001)	0.025*** (0.001)
Black \times Tenure	-0.006*** (0.001)	-0.008*** (0.002)	-0.005*** (0.002)	-0.007*** (0.002)	-0.004*** (0.002)	-0.010*** (0.002)
Hispanic \times Tenure	-0.004*** (0.001)	-0.000 (0.002)	-0.003* (0.002)	-0.008*** (0.002)	-0.003* (0.001)	-0.006*** (0.002)
AAPI \times Tenure	0.001 (0.001)	0.009** (0.004)	0.006* (0.003)	0.003 (0.003)	-0.006** (0.003)	-0.001 (0.003)
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes
N	24043	5177	5015	5268	4684	3899
Panel B: Summary of Rent Discount by Policy Awareness						
	Correctly Aware			Incorrectly Aware		
	Average Discount	N	Pct.	Average Discount	N	Pct.
White	0.705	1892	48.94	0.220	630	27.24
Black	0.412	704	18.21	0.249	529	22.87
Hispanic	0.514	1026	26.54	0.295	914	39.52
AAPI	0.723	244	6.31	0.375	240	10.38
Total	0.604	3866	100	0.276	2313	100

Note: Data come from 2002, 2005, 2008, 2011 and 2017 NYCHVS. The sample only includes rent-stabilized units. Panel A reports results from OLS regression of rent discount on race dummies, their interaction terms with housing tenure, and borough fixed effects. Panel B only uses a subset of households that have reported their rent regulation status in 2002 and 2005 waves of NYCHVS and summarizes average rent discount by race and by households' awareness of rent stabilization policy. Rent discounts in both panels are in thousands of 2017 USD and are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. AAPI stands for Asian American and Pacific Islanders. This race category also includes American Indian and Alaskan Native. Both panels include borough FE. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

8 Conclusion

Amid the rising rental housing affordability crisis in the U.S., rent stabilization is back and gaining popularity. Nevertheless, rigorous evidence of the magnitude and distribution of the benefits of this policy is scarce. Assessing the costs and benefits of this policy is challenging because the counterfactual unregulated rents are not observed for regulated units. An initial wave of literature estimated the magnitudes of the first-generation hard-price rent control policy several decades ago. The early policy differs from second-generation rent stabilization in important ways.

Following a two-step approach, we estimate the rent discount implied by today’s dominant policy, rent stabilization, using novel data for the last two decades in NYC. Compared to previous methodologies, we significantly increase the number of observable characteristics used in a hedonic model, use propensity scores to improve the selection of unregulated units as controls, and implement a repeated-rents approach to control for time-invariant unobserved quality based on a novel panel structure. Results are notably robust and stable based on different methods.

We estimate a mean discount of \$410 per month. The mean discount for the first year is \$180 per month, and each additional year that the household stays in the unit increases it linearly by \$21. We calculate the implied aggregate size of the annual discounts for the whole of NYC to be between \$4 to \$5.4 billion per year, changing pro-cyclically. This total is roughly 10-14% of the \$40 billion federal budget spent on means-tested housing programs ([Collinson et al., 2015](#)).

We report a set of stylized facts: (1) The policy is binding, and discounts increase linearly with tenancy duration; (2) rent stabilization is not a progressive policy as its benefits do not vary with household income and do little to reduce income inequality; (3) rent discounts are larger in Manhattan and increasing in gentrifying neighborhoods; (4) policy opacity is correlated with the discount distributions, with rent discounts being three times larger for households correctly aware of being rent stabilization beneficiaries.

Finally, we apply our rent discount estimates to analyze the access to the benefits by different racial and ethnic groups. We find that, conditional on being renters, racial minorities are less likely to get a rent-stabilized unit. When they do, their rent discounts are lower than White tenants, even after controlling for other demographic characteristics. Our results point to the poor targeting of the rent stabilization policy. We also find that the racial gap in discounts is mainly explained by the spatial sorting of minorities to locations with lower average discounts, and has shrunk over time.

References

- Alston, Richard M, James R Kearl, and Michael B Vaughan**, “Is There a Consensus among Economists in the 1990’s?,” *The American Economic Review*, 1992, 82 (2), 203–209.
- Ambrose, Brent W, N Edward Coulson, and Jiro Yoshida**, “The repeat rent index,” *Review of Economics and Statistics*, 2015, 97 (5), 939–950.
- Arnott, Richard**, “Time for revisionism on rent control?,” *Journal of Economic Perspectives*, 1995, 9 (1), 99–120.
- Ault, Richard and Richard Saba**, “The economic effects of long-term rent control: The case of New York City,” *The Journal of Real Estate Finance and Economics*, 1990, 3 (1), 25–41.
- Autor, David H, Christopher J Palmer, and Parag A Pathak**, “Housing market spillovers: Evidence from the end of rent control in Cambridge, Massachusetts,” *Journal of Political Economy*, 2014, 122 (3), 661–717.
- Bailey, Martha J and Andrew Goodman-Bacon**, “The War on Poverty’s experiment in public medicine: Community health centers and the mortality of older Americans,” *American Economic Review*, 2015, 105 (3), 1067–1104.
- Barton, Michael**, “An exploration of the importance of the strategy used to identify gentrification,” *Urban Studies*, 2016, 53 (1), 92–111.
- Barzel, Yoram**, “A theory of rationing by waiting,” *The Journal of Law and Economics*, 1974, 17 (1), 73–95.
- Baum-Snow, Nathaniel and Daniel Hartley**, “Accounting for central neighborhood change, 1980–2010,” *Journal of urban economics*, 2020, 117, 103228.
- Brummet, Quentin and Davin Reed**, “Gentrification and the location and well-being of original neighborhood residents,” *V manuscript*, 2019.
- Case, Karl E. and Robert J. Shiller**, “The efficiency of the market for single-family homes,” *The American Economic Review*, 1989, 79 (1), 125–137.
- Chapple, K., T. Thomas, and M. Zuk**, “Urban Displacement Project.,” Technical Report, University of California Berkeley 2021.
- Chew, Amee**, “How rent control promotes racial equity,” *Shelterforce*, 2020.
- Christensen, Peter, Ignacio Sarmiento-Barbieri, and Christopher Timmins**, “Housing discrimination and the toxics exposure gap in the United States: Evidence from the rental market,” *The Review of Economics and Statistics*, 2020, pp. 1–37.
- Collinson, Robert, Ingrid Gould Ellen, and Jens Ludwig**, “Low-income housing policy,” in “Economics of Means-Tested Transfer Programs in the United States, Volume 2,” University of Chicago Press, 2015, pp. 59–126.
- Crump, Richard K, V Joseph Hotz, Guido W Imbens, and Oscar A Mitnik**, “Dealing with limited overlap in estimation of average treatment effects,” *Biometrika*, 2009, 96 (1), 187–199.
- Diamond, Rebecca, Tim McQuade, and Franklin Qian**, “The effects of rent control expansion on tenants, landlords, and inequality: Evidence from San Francisco,” *American Economic Review*, 2019, 109 (9), 3365–94.

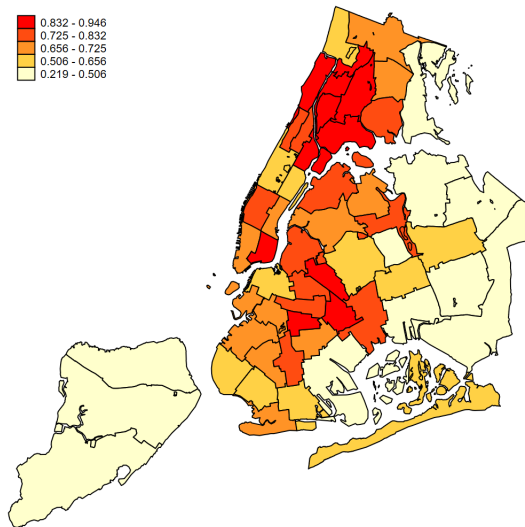
- Downs, A.**, *Residential Rent controls: An Evaluation*, Washington, DC.: Urban Land Institute, 1988.
- Early, Dirk and Jon Phelps**, “Rent regulations’ pricing effect in the uncontrolled sector: An empirical investigation,” *Journal of Housing Research*, 1999, 10 (2), 267–285.
- Early, Dirk W.**, “Rent control, rental housing supply, and the distribution of tenant benefits,” *Journal of Urban Economics*, 2000, 48 (2), 185–204.
- , **Paul E Carrillo**, and **Edgar O Olsen**, “Racial rent differences in US housing markets,” *Available at SSRN 3200655*, 2018.
- Eichholtz, Piet, Stefan Straetmans, and Marcel Theebe**, “The Amsterdam rent index: The housing market and the economy, 1550–1850,” *Journal of Housing Economics*, 2012, 21 (4), 269–282.
- Ewens, Michael, Bryan Tomlin, and Liang Choon Wang**, “Statistical discrimination or prejudice? A large sample field experiment,” *Review of Economics and Statistics*, 2014, 96 (1), 119–134.
- Glaeser, Edward L.**, “Does rent control reduce segregation?,” *Swedish Economic Policy Review*, 2003, 10, 179–202.
- and **Erzo FP Luttmer**, “The misallocation of housing under rent control,” *American Economic Review*, 2003, 93 (4), 1027–1046.
- Gyourko, Joseph and Peter Linneman**, “Equity and efficiency aspects of rent control: An empirical study of New York City,” *Journal of Urban Economics*, 1989, 26 (1), 54–74.
- and —, “Equity and efficiency aspects of rent control: An empirical study of New York City,” *Journal of Urban Economics*, 1989, 26 (1), 54–74.
- and —, “Rent controls and rental housing quality: A note on the effects of New York City’s old controls,” *Journal of Urban Economics*, 1990, 27 (3), 398–409.
- Hanson, Andrew and Zackary Hawley**, “Do landlords discriminate in the rental housing market? Evidence from an internet field experiment in US cities,” *Journal of urban Economics*, 2011, 70 (2-3), 99–114.
- Jenkins, Blair**, “Rent control: Do economists agree?,” *Econ journal watch*, 2009, 6 (1).
- Jiang, Hanchen, Luis Quintero, and Xi Yang**, “Does Rent Regulation Affect Tenant Unemployment? Evidence from New York City,” *Evidence from New York City (February 14, 2022). Johns Hopkins Carey Business School Research Paper*, 2022, (22-04).
- Kutty, Nandinee K.**, “The impact of rent control on housing maintenance: A dynamic analysis incorporating European and North American rent regulations,” *Housing Studies*, 1996, 11 (1), 69–88.
- Lees, Loretta**, “Super-gentrification: The case of Brooklyn heights, New York city,” *Urban studies*, 2003, 40 (12), 2487–2509.
- Linneman, Peter**, “The effect of rent control on the distribution of income among New York City renters,” *Journal of Urban Economics*, 1987, 22 (1), 14–34.
- Marks, Denton**, “The effect of rent control on the price of rental housing: an hedonic approach,” *Land Economics*, 1984, 60 (1).
- Moon, Choon-Geol and Janet G Stotsky**, “The effect of rent control on housing quality change: a longitudinal analysis,” *Journal of Political Economy*, 1993, 101 (6), 1114–1148.

- Myers, Caitlin Knowles**, “Discrimination and neighborhood effects: Understanding racial differentials in US housing prices,” *Journal of urban economics*, 2004, 56 (2), 279–302.
- Olsen, Edgar O**, “An econometric analysis of rent control,” *Journal of Political Economy*, 1972, 80 (6), 1081–1100.
- Pastor, Manuel, Vanessa Carter, and Maya Abood**, “Rent Matters: What are the Impacts of Rent Stabilization Measures?,” *Los Angeles: USC Dornsife Program for Environmental and Regional Equity*, 2018.
- Phillips, David C**, “Landlords avoid tenants who pay with vouchers,” *Economics Letters*, 2017, 151, 48–52.
- Pratt Center**, “Racial Justice and the Right to Remain. The Case for Good Cause Eviction Protection.,” 2022.
- Schuetz, J**, “Is rent control making a comeback,” *Brookings, Metropolitan Policy Program*, 2019.
- Sims, David P**, “Rent control rationing and community composition: Evidence from Massachusetts,” *The BE Journal of Economic Analysis & Policy*, 2011, 11 (1).
- Svarer, Michael, Michael Rosholm, and Jakob Roland Munch**, “Rent control and unemployment duration,” *Journal of Public Economics*, 2005, 89 (11), 2165–2181.
- Timberlake, Jeffrey M and Elaina Johns-Wolfe**, “Neighborhood ethnoracial composition and gentrification in Chicago and New York, 1980 to 2010,” *Urban Affairs Review*, 2017, 53 (2), 236–272.
- Turner, Bengt and Stephen Malpezzi**, “A review of empirical evidence on the costs and benefits of rent control,” *Swedish Economic Policy Review*, 2003, (10).
- U.S. Department of Housing and Urban Development**, “Fiscal Year 2020 Budget in Brief,” 2020.
- Wimer, Christopher, Zachary Parolin, Anny Fenton, Liana Fox, and Christopher Jencks**, “The direct effect of taxes and transfers on changes in the US income distribution, 1967–2015,” *Demography*, 2020, 57 (5), 1833–1851.
- Yinger, John**, *Closed doors, opportunities lost: The continuing costs of housing discrimination*, Russell Sage Foundation, 1995.

Measuring the Value of Rent Stabilization and Understanding Its Implications for Racial Inequality: Evidence from New York City (Online Appendix)

Appendix A Data and Descriptive Analysis

Figure A1: SHARE OF RENTAL UNITS AS PERCENTAGE OF ALL HOUSING UNITS (2002-2017)



Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. The percentage of rental units in all housing units is calculated based on survey weight. Units with zero contract rents are dropped.

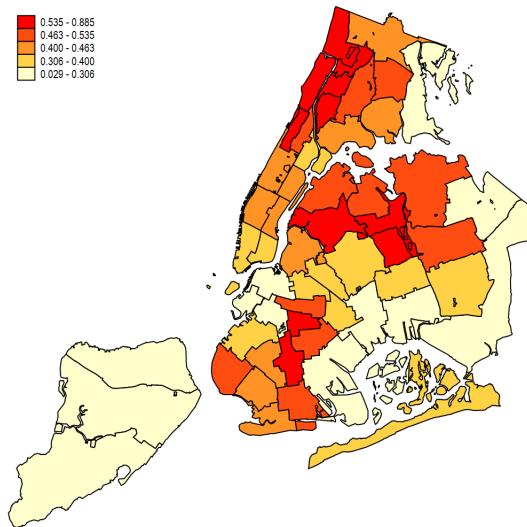
Table A1: List of Unit, Building, and Neighborhood Quality Measures

Unit Quality Measures	Building Quality Measures
<i>Basic Information</i>	<i>Basic Information</i>
Number of rooms	Number of stories in building
Number of bedrooms	Number of units in building
Condo/Coop status	Year built
Floor of unit	Owner live in the building
<i>Plumbing</i>	<i>External walls</i>
Complete plumbing facilities	Missing brick, siding, or other outside wall material
Exclusive use of plumbing facilities	Sloping or bulging outside walls
Toilet breakdowns	Major cracks in outside walls
	Loose or hanging cornice, roofing, or other material
<i>Kitchen</i>	<i>Windows</i>
Complete kitchen facilities	Broken or missing windows
Exclusive use of kitchen facilities	Rotten or loose windows
Kitchen facilities functioning	Boarded up windows
<i>Heat</i>	<i>Stairways</i>
Type of heating Fuel	Loose, broken, or missing stair railings
Heating equipment breakdown	Loose, broken, or missing steps
Number of heating equipment breakdowns	None of these problems with stairways
Additional source(s) of heat	No interior steps or stairways
	No exterior steps or stairways
<i>Issues</i>	<i>Floors</i>
Presence of mice and rats	Sagging or sloping floors
Exterminator service	Slanted or shifted doorsills or door frames
Cracks or holes in interior walls	Deep wear in floors causing depressions
Holes in floors	Holes or missing flooring
Broken plaster or peeling paint on inside walls	
Issue on ceiling or inside walls larger than 8 1/2 X 11	<i>Overall Building Condition</i>
Water leakage inside apartment	Dilapidated
	Sound
	Deteriorating
<i>Lease</i>	<i>Wheelchair Accessibility</i>
Length of lease	Elevator in building
Whether electricity is paid separately	Sidewalk to elevator without using steps
Whether gas is paid separately	Sidewalk to unit without using steps
Whether water and sewer is paid separately	
Neighborhood Quality Measures	
Any buildings with broken or boarded up windows on the same street	
Respondent rating of residential structures in neighborhood	

Table A2: COMPOSITION OF HOUSING UNITS IN NEW YORK CITY

	2002	2005	2008	2011	2017
Owner Occupied	981,814 (0.327)	1,010,370 (0.333)	1,019,345 (0.329)	984,066 (0.319)	1,006,081 (0.324)
Renter Occupied	2,023,504 (0.673)	2,027,626 (0.667)	2,081,953 (0.671)	2,104,816 (0.681)	2,103,874 (0.676)
Private Market	644,991 (0.319)	668,711 (0.330)	755,421 (0.363)	812,124 (0.386)	879,995 (0.418)
Rent Stabilized	1,016,489 (0.502)	1,015,655 (0.501)	981,735 (0.472)	960,870 (0.457)	946,514 (0.450)
Rent Controlled	59,324 (0.029)	43,317 (0.021)	39,901 (0.019)	38,374 (0.018)	21,751 (0.010)
Public Housing	174,490 (0.086)	167,539 (0.083)	183,809 (0.088)	184,946 (0.088)	184,729 (0.088)
Other Renter Occupied	128,210 (0.063)	132,404 (0.065)	121,087 (0.058)	108,502 (0.052)	70,885 (0.034)
Total Housing Units	3,005,318	3,037,996	3,101,298	3,088,881	3,109,955

Notes: The numbers of housing units by different regulation statuses are calculated using household weights in NYCHVS. In rows 1-2, fractions of owner-occupied and renter-occupied units in total housing units are reported in parentheses. In rows 3-7, fractions of each type of renter-occupied units are reported in parentheses. Other renter-occupied units include Article 4 or 5 building, HUD regulated, Loft Board regulated building, Mitchell Lama rental or coop, and in REM, etc.

Figure A2: SHARES OF RENT-STABILIZED UNITS IN ALL RENTAL UNITS (2002-2017)

Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Rental units with zero contract rents are dropped. The percentage of rent-stabilized units in rental units is calculated using survey weight.

Table A3: SUMMARY STATISTICS OF HOUSEHOLD CHARACTERISTICS

	Rent Stabilized		Uregulated Market		Difference
	mean	sd	mean	sd	
Female	0.549	0.498	0.487	0.500	-0.063***
Age	46.278	16.013	41.697	14.398	-4.581***
White	0.362	0.481	0.438	0.496	0.076***
Black	0.221	0.415	0.206	0.404	-0.015***
Hispanic	0.322	0.467	0.219	0.414	-0.103***
AAPI	0.095	0.293	0.137	0.344	0.042***
Monthly Contract Rent	1.209	0.626	1.762	1.179	0.553***
Total Household Income	63.234	89.196	90.783	134.010	27.549***
Housing Tenure	10.867	11.068	5.790	7.283	-5.077***
Observations	24322		18334		

Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Units with top-coded rents are dropped. Gender and race variables in row 1 and rows 3-6 are dummy variables. AAPI stands for Asian Americans and Pacific Islanders and also includes Native Americans and people of two or more races. Monthly contract rent and total annual household income are in thousands of 2017 USD. Housing tenure is defined as the number of years a household has lived in a housing unit. Column 6 reports differences in the means between rent-stabilized and unregulated market rental units. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Who lives in Rent-Stabilized Units? Relationship between Rent Regulation Status and Household Characteristics (All Housing Units)

	Dependent Variable: Rent Stabilization Dummy					
	All	2002	2005	2008	2011	2017
Female	-0.016*** (0.003)	-0.002 (0.008)	-0.019** (0.008)	-0.016** (0.007)	-0.021*** (0.007)	-0.020** (0.008)
Age	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
Black	-0.002 (0.004)	-0.031*** (0.010)	-0.013 (0.010)	0.012 (0.009)	0.009 (0.010)	0.021* (0.011)
Hispanic	0.118*** (0.005)	0.126*** (0.011)	0.123*** (0.011)	0.128*** (0.010)	0.104*** (0.010)	0.109*** (0.011)
AAPI	-0.011** (0.005)	-0.011 (0.013)	-0.000 (0.013)	-0.010 (0.011)	-0.010 (0.011)	-0.018 (0.012)
College & above	0.024*** (0.004)	0.048*** (0.009)	0.045*** (0.009)	0.023*** (0.008)	0.010 (0.008)	0.004 (0.009)
Married	-0.043*** (0.004)	-0.057*** (0.009)	-0.042*** (0.009)	-0.031*** (0.008)	-0.046*** (0.009)	-0.042*** (0.010)
Number of children	0.006 (0.004)	0.003 (0.008)	0.008 (0.009)	-0.006 (0.008)	0.008 (0.008)	0.018* (0.009)
Household size	-0.026*** (0.001)	-0.030*** (0.003)	-0.025*** (0.003)	-0.025*** (0.003)	-0.024*** (0.003)	-0.024*** (0.003)
Household income	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Constant	0.623*** (0.008)	0.704*** (0.018)	0.665*** (0.018)	0.548*** (0.016)	0.635*** (0.017)	0.565*** (0.020)
R-square	0.062	0.078	0.070	0.053	0.067	0.052
N	77886	15662	15363	17757	16115	12989

Note: The data come from 2002, 2005, 2008, 2011, and 2017 waves of NYCHVS. The dependent variable of the linear probability model shown above is rent stabilization dummy (=1 for rent-stabilized units). AAPI stands for Asian Americans and Pacific Islanders and also includes Native Americans and people of two or more races. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Who lives in rent-stabilized units? Relationship between Rent Regulation Status and Household Characteristics (Only Rental Units)

	Dependent Variable: Rent Stabilization Dummy					
	All	2002	2005	2008	2011	2017
Female	-0.008* (0.005)	0.006 (0.010)	-0.001 (0.010)	-0.009 (0.010)	-0.015 (0.010)	-0.019* (0.011)
Age	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	0.001** (0.000)
Black	-0.054*** (0.006)	-0.086*** (0.013)	-0.070*** (0.014)	-0.039*** (0.013)	-0.039*** (0.013)	-0.022 (0.015)
Hispanic	0.045*** (0.006)	0.051*** (0.013)	0.045*** (0.014)	0.065*** (0.013)	0.038*** (0.013)	0.037** (0.015)
AAPI	-0.029*** (0.008)	-0.039** (0.019)	-0.021 (0.018)	-0.022 (0.017)	-0.015 (0.017)	-0.032* (0.018)
College & above	0.041*** (0.005)	0.066*** (0.013)	0.065*** (0.012)	0.043*** (0.011)	0.028** (0.012)	0.021 (0.013)
Married	0.021*** (0.006)	-0.000 (0.012)	0.020 (0.013)	0.038*** (0.012)	0.014 (0.012)	0.026** (0.013)
Number of children	-0.002 (0.005)	0.003 (0.011)	0.012 (0.012)	-0.019* (0.011)	-0.008 (0.011)	0.008 (0.013)
Household size	-0.024*** (0.002)	-0.028*** (0.004)	-0.027*** (0.004)	-0.020*** (0.004)	-0.022*** (0.004)	-0.022*** (0.005)
Household income	-0.000*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Constant	0.564*** (0.010)	0.643*** (0.023)	0.592*** (0.023)	0.484*** (0.022)	0.580*** (0.023)	0.476*** (0.026)
R-square	0.013	0.025	0.017	0.012	0.014	0.013
N	52855	10624	10341	11932	11056	8902

Note: The data come from 2002, 2005, 2008, 2011, and 2017 waves of NYCHVS. The dependent variable of the linear probability model shown above is rent stabilization dummy (=1 for rent-stabilized units). AAPI stands for Asian Americans and Pacific Islanders and also includes Native Americans and people of two or more races. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix B Details on Estimated Rent Discounts

Table B6: ADDITIONAL ROBUSTNESS OF ESTIMATED MONTHLY RENT DISCOUNTS

	Mean	Median	SD	SE of Mean	N
Panel A. Baseline Estimates					
All	0.4095	0.3034	0.6405	0.0041	24043
2002	0.4680	0.3431	0.6357	0.0088	5177
2005	0.3765	0.2873	0.6064	0.0086	5015
2008	0.3871	0.2580	0.6834	0.0094	5268
2011	0.3699	0.2843	0.5674	0.0083	4684
2017	0.4518	0.3482	0.7016	0.0112	3899
Panel B. Add Top-Coded Units					
All	0.3948	0.2614	0.7738	0.0050	24095
2002	0.4816	0.3137	0.7882	0.0109	5189
2005	0.3421	0.2166	0.7340	0.0104	5027
2008	0.3831	0.2302	0.7813	0.0108	5275
2011	0.3240	0.2319	0.7106	0.0104	4692
2017	0.4482	0.3261	0.8488	0.0136	3912
Panel C. Full Characteristics					
All	0.4101	0.3135	0.6366	0.0054	13763
2002	0.4854	0.3553	0.6746	0.0119	3211
2005	0.3610	0.3069	0.5693	0.0105	2951
2008	0.3743	0.2580	0.6534	0.0134	2374
2011	0.3850	0.2911	0.5682	0.0107	2816
2017	0.4344	0.3361	0.7076	0.0144	2411

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Monthly rent discounts are estimated using the two-step process described in Section 4, using the specification in row 6 of Table 1. Panel A reports baseline estimates of rent discounts shown in Table 1. Panel B reports rent discount estimates when units with top-coded monthly contract rents are added to the analytical sample. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. Panel C reports rent discount estimates when units with at least one missing or unreported characteristics are excluded from the sample.

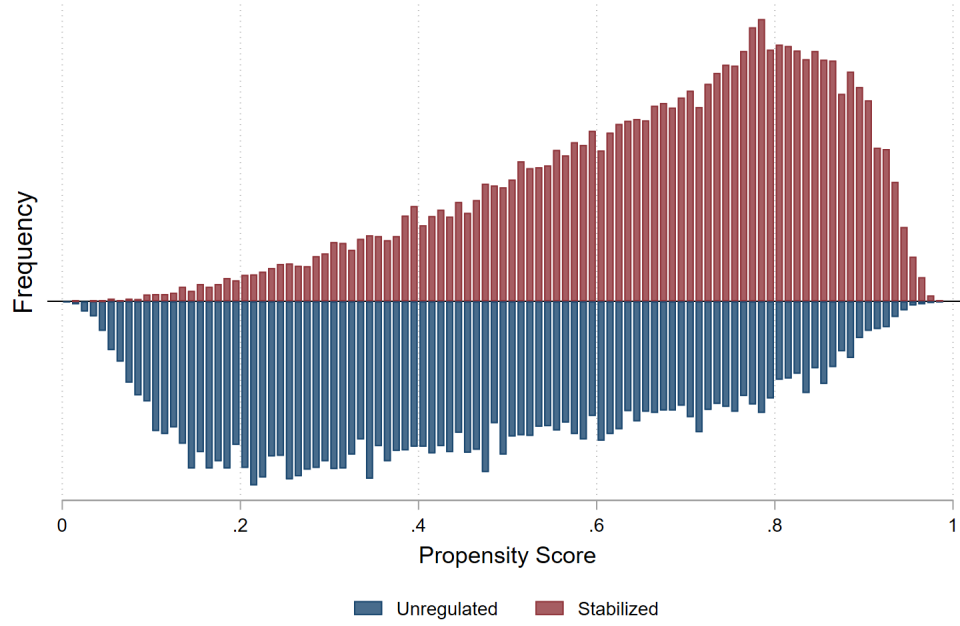


Figure B3: Common Support of Housing Quality Attributes between Unregulated and Rent-Stabilized Units

Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Propensity scores are estimated using a logit model (see Section 4 for details) that regresses rent stabilization dummy (=1 if a unit is rent-stabilized) on all but three building characteristics shown in row 6 of Table 1. The three excluded building characteristics are year built, the number of units, and the number of stories. These three variables are excluded because they are selection criteria for rent stabilization (see Section 3.1 for details). Adding them would significantly reduce the overlap in propensity scores between unregulated and rent-stabilized housing units (i.e., the shrinkage of common support).

Table B7: Regulation Status of Previously Rent-Stabilized Units

	2002-2005		2005-2008	
	Freq.	Pct.	Freq.	Pct.
Owner occupied conventional	8	0.16	11	0.23
Owner occupied private cooperative	105	2.14	144	2.99
Owner occupied condo	14	0.28	24	0.50
Vacant not available	115	2.34	139	2.89
Vacant for sale conventional	0	0.00	1	0.02
Vacant for sale private coop	5	0.10	5	0.10
Vacant for sale condo	3	0.06	4	0.08
Vacant for rent	121	2.46	100	2.08
Private Market	280	5.69	424	8.81
Stabilized	4126	83.90	3846	79.93
Controlled	22	0.45	33	0.69
Public housing	32	0.65	69	1.43
Other regulated	87	1.77	12	0.25
Total	4918	100.00	4812	100.00

Note: Data come from 2002, 2005, and 2008 NYCHVS. These are the only waves of NYCHVS that contain unit-level identifiers with a panel structure. More recent waves of NYCHVS do not have unit-level identifiers that are publicly available. Other regulated units include HUD regulated, Mitchell Lama rental, Mitchell Lama cooperative, Loft Board Regulating Building, and in Rem.

Appendix B.1 Negative Rent Discounts

Following the two-step hedonic method, a small number of predicted rent discounts turn out to be negative, i.e., for some rent-stabilized units, their observed contract rent is higher than the predicted counterfactual rent the unit would command in the unregulated market. Negative rent discounts associated with rent regulation have been common in the literature (for example, [Early \(2000\)](#)). Figure [B4](#) plots the distribution of estimated rent discounts across five waves of NYCHVS. As is shown, although roughly 24% of the 24,043 rent-stabilized units have negative rent discounts, only about 8.7% have estimated negative rent discounts that are statistically significantly different from zero at the 95% level (Figure [B5](#)).

Our reported estimates of the aggregate size of the policy are a conservative measure because we include negative rent discounts. The aggregate rent discounts would increase if we change all rent discounts with a negative point estimate to zero, as is done, for example, in [Early \(2000\)](#).²⁶

We test the robustness of our results to different treatments of the negative rent discounts. First, we drop units that have significantly negative rent discounts in Table [C11](#). As is shown, the correlations between rent discounts and housing tenure, total household income, and location are similar to the results shown in Table [2](#). Similarly, Table [D15](#) shows that our results on racial gaps in rent discounts are also robust to excluding rent-stabilized units with significantly negative rent discounts.

Why could there be estimated negative rent discounts? A negative rent discount could be the result of an incorrect prediction of a hedonic model that uses only observable characteristics if unobserved quality is important in determining rents. If this mechanism is at play, improving the controls, as we do with the propensity score, and controlling for unobserved quality, as we do in the repeat rents approach, should significantly reduce the number of negative rent discounts. However, the number of predicted negative rent discounts is even higher (29%) in the repeated rents method than in the OLS model with the full list of controls.

Alternatively, an estimated negative rent discount could occur in a situation in which landlords of rent-stabilized units preemptively try to recoup future foregone rents by charging a rental when leasing to a new tenant and in which these new tenants are willing to pay this premium in the short run for the benefit of lower rent growth and positive discounts in the long run. Indeed, the likelihood of negative rent discounts is related to housing tenure (i.e., time in unit). Figure [B6](#) shows this with a locally weighted scatterplot smoothing (LOWESS) curve against households' tenure (i.e., number of years in the same unit). The LOWESS curve is convex and decreasing in tenure, with an average reduction of 0.8 percentage points in the likelihood of rent discounts for every additional year spent in the unit.

Finally, Figure [B7](#) shows that, for similar levels of tenure duration, negative rent discounts are much more likely for households who live in rent-stabilized units but think they live in unregulated market units (i.e., incorrectly aware). This incorrect knowledge of the policy could be associated with the willingness to pay for higher rents of new tenants, facilitating the preemptive premia discussed above.

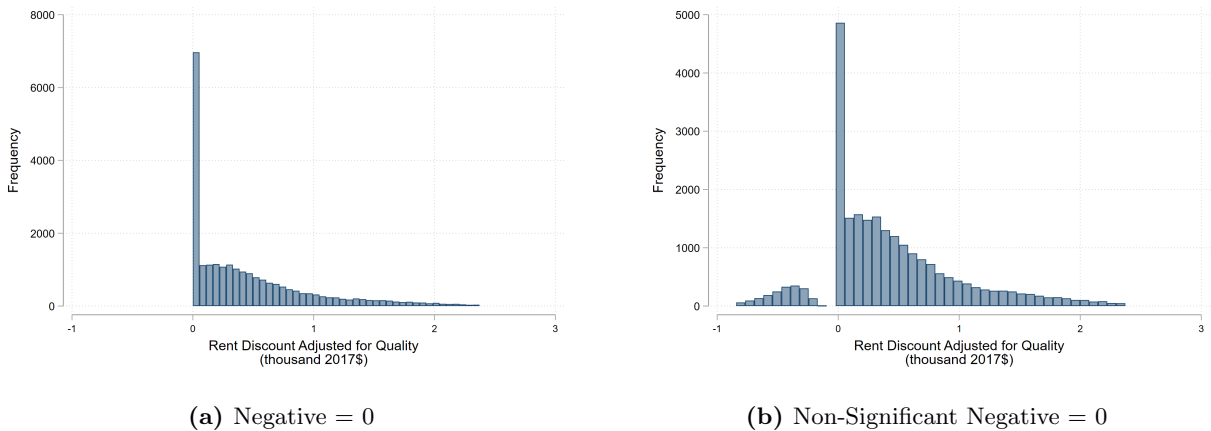
²⁶[Early \(2000\)](#) set negative rent discounts to zero, and adjust positive discounts downwards so that the mean is preserved. This fixes the negative discounts concern, which is difficult to reconcile with their theory, while not affecting the analysis of benefit distribution across tenants. Accordingly, such an adjustment should not affect our results related to distribution or our aggregate magnitude of the policy.

Figure B4: ESTIMATED RENT DISCOUNTS

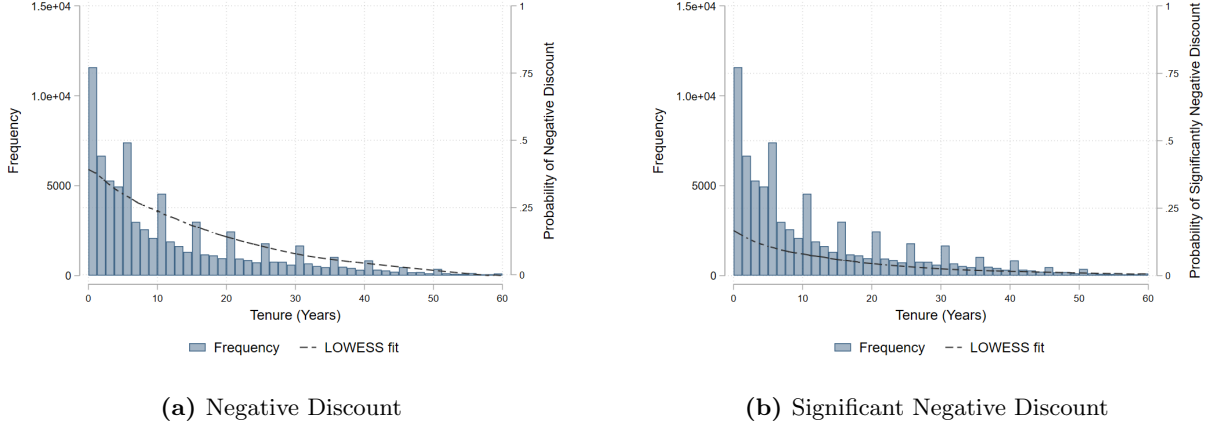


Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Monthly rent discounts (in thousands of 2017 USD) are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, shown in row 6 of Table 1.

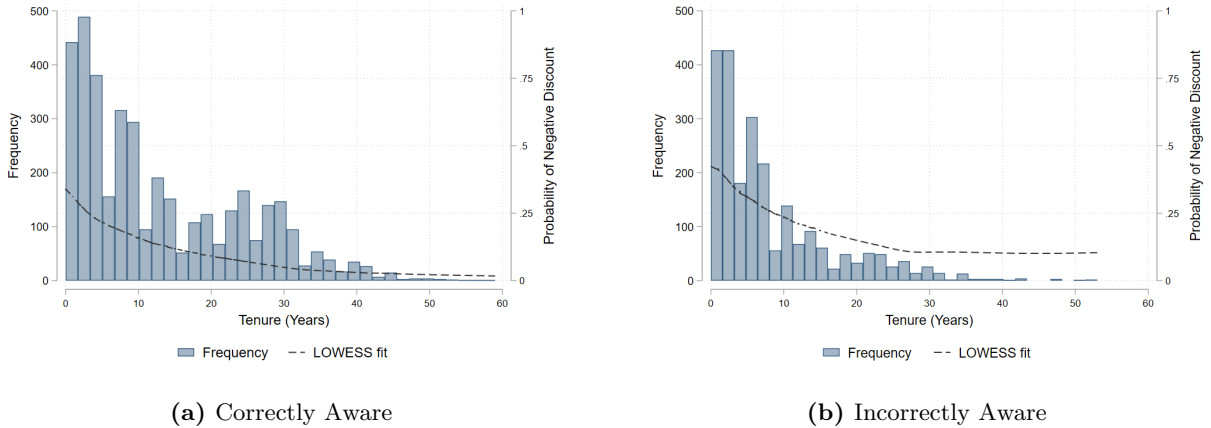
Figure B5: ESTIMATED RENT DISCOUNTS: SETTING NEGATIVE TO ZERO



Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Monthly rent discounts (in thousands of 2017 USD) are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. In the left panel, all negative rent discounts are set to zero, and on the right, only statistically significant negative (at 5% level) rent discounts are set to zero. Outliers are trimmed by dropping units with the top and bottom 1% of rent discounts.

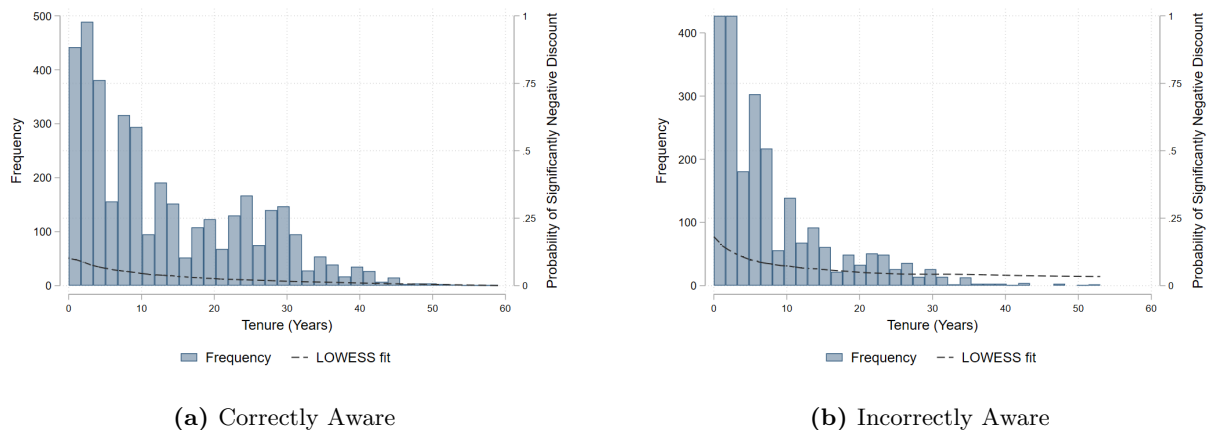
Figure B6: TENURE DURATION AND PROBABILITY OF NEGATIVE RENT DISCOUNTS

Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Locally weighted scatterplot smoothing (LOWESS) is created by locally averaging the negative rent discount dummy (in panel (a)) or significantly negative discount dummy (in panel (b)) over tenure, with a bandwidth of 0.8. Negative rent discount dummy = 1 if the estimated monthly rent discount is less than zero. Significantly negative rent discount dummy = 1 if the estimated monthly rent discount is statistically lower than zero at the 95% level. Monthly rent discounts (in thousands of 2017 USD) are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, shown in row 6 of Table 1.

Figure B7: TENURE DURATION AND NEGATIVE RENT DISCOUNTS BY AWARENESS

Notes: Data come from 2002 and 2005 NYCHVS. Locally weighted scatterplot smoothing (LOWESS) is created by locally averaging the negative rent discount dummy over tenure, with a bandwidth of 0.8. The negative rent discount dummy = 1 if the estimated monthly rent discount is less than zero. Monthly rent discounts (in thousands of 2017 USD) are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, shown in row 6 of Table 1. Renters of rent-stabilized units who are “correctly aware” are those who report living in rent-stabilized or rent-controlled units. Renters of rent-stabilized units who are “incorrectly aware” are those who report living in unregulated market units.

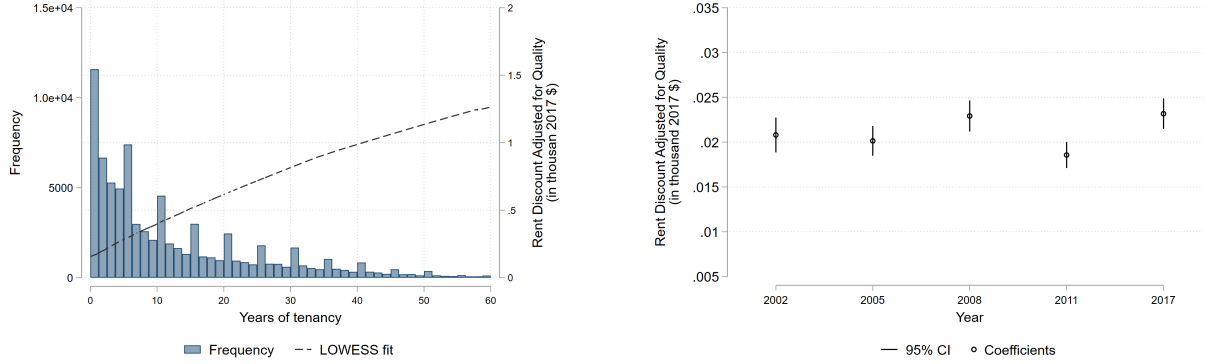
Figure B8: TENURE DURATION AND PROBABILITY OF SIGNIFICANTLY NEGATIVE RENT DISCOUNTS BY AWARENESS



Notes: Data come from 2002 and 2005 NYCHVS. Locally weighted scatterplot smoothing (LOWESS) is created by locally averaging the significantly negative rent discount dummy over tenure, with a bandwidth of 0.8. Significantly negative rent discount dummy = 1 if the estimated monthly rent discount is significantly lower than zero at the 95% level. Monthly rent discounts (in thousands of 2017 USD) are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, shown in row 6 of Table 1. Renters of rent-stabilized units who are “correctly aware” are those who report living in rent-stabilized or rent-controlled units. Renters of rent-stabilized units who are “incorrectly aware” are those who report living in unregulated market units.

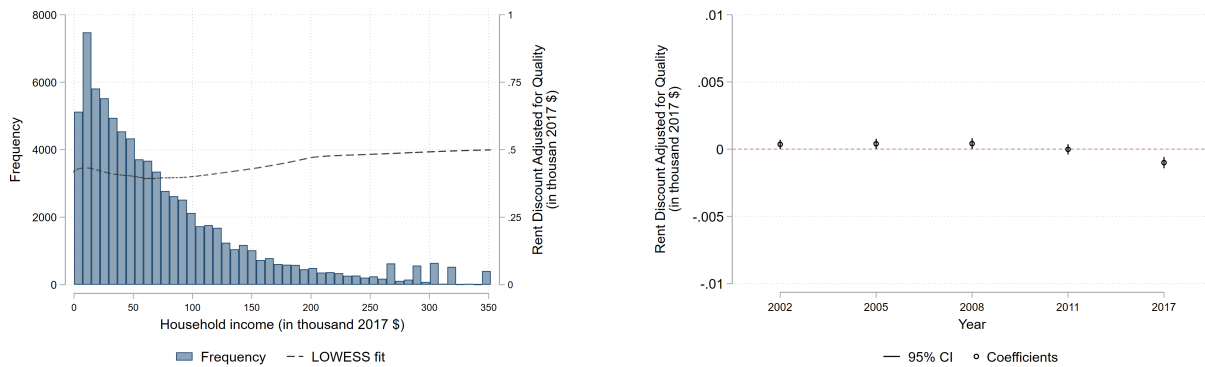
Appendix C Stylized facts: Rent Discounts, Housing Tenure, Household Income, and Geography

Figure C9: RENT DISCOUNTS AND HOUSING TENURE DURATION



Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Monthly rent discounts in both panels are in thousands of 2017 USD and estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. In the left panel, the locally weighted scatterplot smoothing (LOWESS) fit is created by locally averaging units' monthly rent discounts over housing tenure duration, using a bandwidth of 0.8. In the right panel, coefficients from regressing rent discount on housing tenure are plotted.

Figure C10: RENT DISCOUNTS AND HOUSEHOLD INCOME



Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Monthly rent discounts in both panels are in thousands of 2017 USD and estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. In the left panel, the locally weighted scatterplot smoothing (LOWESS) fit is created by locally averaging units' monthly rent discounts over total household income, using a bandwidth of 0.8. In the right panel, coefficients from regressing rent discount on total household income are plotted.

Table C8: Effects of Rent Discounts on Income Inequality as Measured by Gini Coefficients

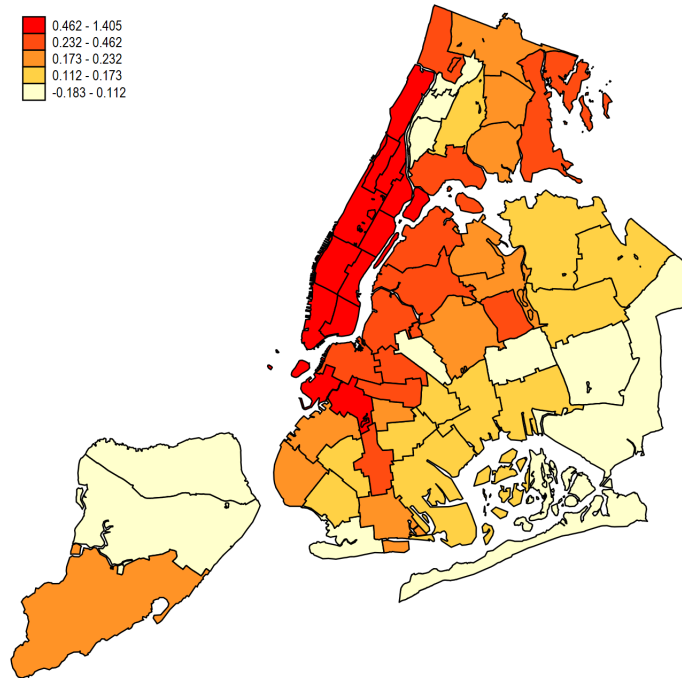
	All Housing Units	Renter-Occupied Units	Rent-Stabilized Units
Total Household Income	0.532	0.529	0.500
Rent Discount	0.863	0.791	0.467
Adjusted Total Household Income	0.519	0.510	0.452
N	77022	46991	18458

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. In calculating the Gini coefficients shown above, rent-stabilized units with negative rent discounts are omitted. Rent discounts are estimated using the model in row 6 of Table 1. Adjusted total household income is the sum of total household income and yearly rent discounts. Top and bottom 1% of rent discount and household income are winsorized to eliminate outliers.

Table C9: Effects of Rent Discounts on Income Inequality as Measured by Gini Coefficients By Race

	All Housing Units		Renter-Occupied Units		Rent-Stabilized Units	
	White	Black	White	Black	White	Black
Total Household Income	0.527	0.474	0.527	0.468	0.516	0.451
Rent Discount	0.878	0.870	0.776	0.817	0.455	0.461
Adjusted Total Household Income	0.517	0.461	0.509	0.452	0.473	0.400
N	30607	16633	16648	11843	6858	4016

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. In calculating the Gini coefficients shown above, rent-stabilized units with negative rent discounts are omitted. Rent discounts are estimated using the linear model shown in row 6 of Table 1. Adjusted total household income is the sum of total household income and yearly rent discounts. Top and bottom 1% of rent discount and household income are winsorized to eliminate outliers.

Figure C11: SPATIAL DISTRIBUTION OF MEAN RENT DISCOUNTS IN NYC

Notes: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Sub-borough average monthly rent discounts shown in map are in thousands of 2017 USD. Monthly rent discounts are estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1.

Table C10: ROBUSTNESS OF EFFECT OF TENURE, INCOME, AND GEOGRAPHY ON RENT DISCOUNTS: UNITS WITH FULL HOUSING CHARACTERISTICS

	Dependent Variable: Monthly Rent Discount (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Panel A: Housing Tenure						
Housing Tenure	0.021*** (0.000)	0.022*** (0.001)	0.018*** (0.001)	0.023*** (0.001)	0.019*** (0.001)	0.024*** (0.001)
Constant	0.157*** (0.007)	0.240*** (0.016)	0.145*** (0.014)	0.117*** (0.017)	0.150*** (0.013)	0.101*** (0.018)
Panel B: Total Household Income						
Total Household Income	0.000 (0.000)	0.001*** (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001*** (0.000)
Panel C: Geography						
Bronx	0.177*** (0.007)	0.237*** (0.014)	0.163*** (0.015)	0.165*** (0.019)	0.138*** (0.013)	0.176*** (0.018)
Brooklyn	0.234*** (0.008)	0.227*** (0.015)	0.189*** (0.015)	0.239*** (0.017)	0.206*** (0.015)	0.317*** (0.022)
Manhattan	0.894*** (0.012)	1.005*** (0.025)	0.777*** (0.024)	0.832*** (0.031)	0.903*** (0.022)	0.926*** (0.034)
Queens	0.201*** (0.008)	0.223*** (0.016)	0.179*** (0.015)	0.131*** (0.017)	0.211*** (0.017)	0.263*** (0.023)
Staten Island	0.111*** (0.036)	0.046 (0.066)	0.290*** (0.099)	0.132* (0.080)	0.258*** (0.056)	-0.046 (0.082)
\bar{Y}	0.403	0.474	0.350	0.372	0.380	0.432
N	14062	3236	2957	2475	2870	2524

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. The dependent variable, monthly rent discount, is estimated using the hedonic model shown in row 6 of Table 1. Only units with non-missing and reported values for all housing characteristic variables are used. In addition, units with zero and top-coded monthly contract rents were dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. In Panel A, Housing tenure is measured in years and is defined as the length of a household's stay in the same rent-stabilized units; the constant term measures average monthly rent discounts of households with tenure of zero (i.e. those who moved in less than a year at the time of the survey). In Panel B, the total annual household income is in thousands of 2017 USD. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C11: ROBUSTNESS OF EFFECT OF TENURE, INCOME, AND GEOGRAPHY ON RENT DISCOUNTS: DROPPING UNITS WITH SIGNIFICANTLY NEGATIVE DISCOUNTS

	Dependent Variable: Monthly Rent Discount (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Panel A: Housing Tenure						
Housing Tenure	0.018*** (0.000)	0.019*** (0.001)	0.017*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.020*** (0.001)
Constant	0.295*** (0.005)	0.328*** (0.011)	0.273*** (0.011)	0.292*** (0.012)	0.276*** (0.009)	0.301*** (0.014)
Panel B: Total Household Income						
Total Household Income	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	-0.000 (0.000)
Panel C: Geography						
Bronx	0.256*** (0.005)	0.293*** (0.009)	0.265*** (0.011)	0.225*** (0.011)	0.209*** (0.010)	0.295*** (0.014)
Brooklyn	0.321*** (0.005)	0.264*** (0.010)	0.234*** (0.010)	0.309*** (0.011)	0.326*** (0.010)	0.485*** (0.016)
Manhattan	0.971*** (0.008)	1.002*** (0.017)	0.890*** (0.016)	1.040*** (0.020)	0.898*** (0.016)	1.045*** (0.026)
Queens	0.273*** (0.005)	0.262*** (0.010)	0.219*** (0.010)	0.246*** (0.011)	0.279*** (0.011)	0.388*** (0.016)
Staten Island	0.208*** (0.027)	0.147*** (0.045)	0.276*** (0.070)	0.254*** (0.063)	0.223*** (0.049)	0.156** (0.068)
\bar{Y}	0.501	0.522	0.461	0.503	0.463	0.568
N	21868	4877	4533	4709	4231	3518

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. The dependent variable, monthly rent discounts, is estimated using the hedonic model shown in row 6 of Table 1. Units with significantly negative rent discounts are dropped. In addition, units with zero and top-coded monthly contract rents were dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. In Panel A, Housing tenure is measured in years and is defined as the length of a household's stay in the same rent-stabilized units; the constant term measures average monthly rent discounts of households with tenure of zero (i.e. those who moved in less than a year at the time of the survey). In Panel B, the total annual household income is in thousands of 2017 USD. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C12: ROBUSTNESS OF EFFECT OF TENURE, INCOME, AND GEOGRAPHY ON RENT DISCOUNTS: REPEATED RENTS APPROACH

	Dependent Variable: Monthly Rent Discount (in thousand of 2017 USD)		
	2002-2005	2005-2008	All
Panel A: Housing Tenure			
Housing Tenure	0.018*** (0.006)	0.033*** (0.006)	0.027*** (0.004)
Constant	0.188*** (0.054)	0.194*** (0.040)	0.186*** (0.032)
Panel B: Total Household Income			
Total Household Income	-0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)
Panel C: Geography			
Bronx	0.018 (0.083)	-0.012 (0.049)	-0.004 (0.042)
Brooklyn	0.011 (0.056)	0.078 (0.055)	0.051 (0.040)
Manhattan	0.516*** (0.064)	0.725*** (0.060)	0.644*** (0.045)
Queens	0.098* (0.050)	0.063 (0.057)	0.077* (0.040)
Staten Island	0.295 (0.347)	-0.113 (0.255)	0.091 (0.230)
N	246	389	635

Note: Data come from 2002 and 2005 NYCHVS. The Sample includes 635 recently deregulated rental units. Trimming of outliers are done by dropping units with top and bottom 1% of rent discounts, zero monthly contract rent, or top-coded rents. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. OLS regression results of monthly rent discounts on housing tenure, household income, and borough dummies are reported in panels A-C above. The dependent variable, monthly rent discounts, is calculated as changes in monthly contract rents (in thousands of 2017 USD) of de-regulated units (see Section 4 for details). Deregulated units are occupied rental units that were rent-stabilized in a previous survey but became market units in the next survey. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix D Rent Discounts and Racial Inequality

Table D13: Summary of Rent Discounts by Race and Education

	Mean	Median	SD	SE of Mean	N
White, Below College	0.4502	0.3279	0.6340	0.0109	3403
White, College and above	0.5163	0.4056	0.7635	0.0105	5275
White, All	0.4904	0.3685	0.7162	0.0077	8678
Non-White, Below College	0.3598	0.2715	0.5765	0.0053	11846
Non-White, College and above	0.3769	0.2740	0.6273	0.0106	3519
Non-White, All	0.3637	0.2726	0.5885	0.0047	15365

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Average monthly rent discount in 2017 US dollars, and are estimated using the model shown in row 6 of Table 1.

Table D14: Robustness of Racial Inequality in Rent Discounts: Units with Full Housing Characteristics

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Black	-0.147*** (0.014)	-0.239*** (0.030)	-0.162*** (0.028)	-0.174*** (0.034)	-0.084*** (0.029)	-0.044 (0.038)
Hispanic	-0.144*** (0.013)	-0.234*** (0.028)	-0.101*** (0.025)	-0.197*** (0.033)	-0.104*** (0.026)	-0.050 (0.035)
AAPI	-0.048** (0.023)	0.004 (0.054)	-0.060 (0.043)	-0.112** (0.052)	-0.100** (0.046)	0.052 (0.056)
Constant	0.491*** (0.010)	0.605*** (0.022)	0.427*** (0.020)	0.490*** (0.026)	0.446*** (0.020)	0.454*** (0.026)
N	14062	3236	2957	2475	2870	2524

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Only units with non-missing and reported values for all housing characteristic variables are used. In addition, units with zero and top-coded monthly contract rents were dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. OLS regression results of monthly rent discounts on African American, Hispanic, APPI (Asian American and Pacific Islanders) dummies are shown above. The Dependent variable, monthly rent discounts, is in thousands of 2017 USD and is estimated using the model in row 6 of Table 1. AAPI also includes small numbers of Native Americans and people who reported two or more races. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D15: Robustness of Racial Inequality in Rent Discounts: Drop Units with Significantly Negative Discounts

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Black	-0.192*** (0.010)	-0.267*** (0.021)	-0.191*** (0.021)	-0.310*** (0.023)	-0.077*** (0.021)	-0.073** (0.029)
Hispanic	-0.181*** (0.010)	-0.223*** (0.020)	-0.160*** (0.019)	-0.291*** (0.023)	-0.094*** (0.019)	-0.103*** (0.026)
AAPI	-0.069*** (0.016)	-0.012 (0.040)	-0.068** (0.034)	-0.212*** (0.037)	-0.016 (0.031)	-0.013 (0.041)
Constant	0.609*** (0.007)	0.653*** (0.015)	0.559*** (0.015)	0.689*** (0.018)	0.513*** (0.014)	0.620*** (0.019)
N	21868	4877	4533	4709	4231	3518

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Housing units with zero and top-coded rents are dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. Units with statistically negative rent discounts are dropped. OLS regression results of monthly rent discounts on African American, Hispanic, AAPI (Asian American and Pacific Islanders) dummies are shown above. AAPI also includes small numbers of Native Americans and people who reported two or more races. The Dependent variable, monthly rent discounts, is in thousands of 2017 USD and is estimated using the model in row 6 of Table 1. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D16: Robustness of Racial Inequality in Estimated Rent Discounts over Time: Repeated Rents Approach

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)		
	2002-2005	2005-2008	All
Black	-0.089 (0.117)	-0.263** (0.118)	-0.194** (0.084)
Hispanic	-0.319*** (0.088)	-0.327*** (0.114)	-0.318*** (0.079)
AAPI	-0.075 (0.133)	-0.277*** (0.100)	-0.198** (0.079)
Constant	0.384*** (0.059)	0.560*** (0.057)	0.490*** (0.042)
N	246	389	635

Note: Data come from 2002 and 2005 NYCHVS. The sample includes 635 recently deregulated rental units. Trimming of outliers are done by dropping units with top and bottom 1% of rent discounts, zero monthly contract rent, or top-coded rents. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. OLS regression results of monthly rent discounts on African American, Hispanic, AAPI (Asian American and Pacific Islanders) dummies are shown above. Dependent variable, monthly rent discounts, is calculated as changes in monthly contract rents (in thousands of 2017 USD) of de-regulated units (see Section 4 for details). Deregulated units are occupied rental units that were rent-stabilized in a previous survey but became market units in the next survey. AAPI also includes small numbers of Native Americans and people who reported two or more races. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D17: RACIAL INEQUALITY IN RENT DISCOUNTS CONTROLLING BOROUGH AND TENURE DURATION

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Panel A: Within Sub-Borough Racial Inequality						
Black	0.212*** (0.011)	0.241*** (0.022)	0.173*** (0.022)	0.191*** (0.025)	0.230*** (0.023)	0.288*** (0.033)
Hispanic	0.203*** (0.010)	0.253*** (0.020)	0.208*** (0.019)	0.162*** (0.022)	0.195*** (0.021)	0.226*** (0.030)
AAPI	0.069*** (0.014)	0.164*** (0.028)	0.071*** (0.028)	-0.004 (0.031)	0.036 (0.027)	0.061 (0.041)
Sub-Borough FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Effect of Housing Tenure						
Black	0.263*** (0.014)	0.303*** (0.027)	0.207*** (0.027)	0.265*** (0.030)	0.257*** (0.026)	0.370*** (0.039)
Hispanic	0.242*** (0.012)	0.276*** (0.024)	0.231*** (0.024)	0.243*** (0.028)	0.228*** (0.024)	0.280*** (0.037)
AAPI	0.155*** (0.017)	0.209*** (0.036)	0.118*** (0.035)	0.106*** (0.041)	0.165*** (0.030)	0.177*** (0.049)
Housing Tenure	0.020*** (0.000)	0.020*** (0.001)	0.019*** (0.001)	0.021*** (0.001)	0.018*** (0.001)	0.024*** (0.001)
Black \times Tenure	-0.005*** (0.001)	-0.006*** (0.002)	-0.004*** (0.001)	-0.006*** (0.002)	-0.004*** (0.001)	-0.009*** (0.002)
Hispanic \times Tenure	-0.003*** (0.001)	-0.001 (0.002)	-0.002 (0.001)	-0.006*** (0.001)	-0.003** (0.001)	-0.006*** (0.002)
AAPI \times Tenure	-0.000 (0.001)	0.005 (0.003)	0.004 (0.003)	-0.002 (0.003)	-0.006** (0.003)	-0.002 (0.003)
Sub-Borough FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Units with zero and top-coded monthly contract rents were dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. The dependent variable, monthly rent discount, is in thousands of 2017 USD and is estimated using the linear model with extended housing characteristics, sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. AAPI stands for Asian American and Pacific Islanders. This race category also includes American Indian and Alaskan Native. Both panels include sub-Borough FE. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D18: RACIAL INEQUALITY IN RENT DISCOUNTS CONTROLLING BOROUGH, TENURE, AND DEMOGRAPHICS

	Dependent Variable: Monthly Rent Discounts (in thousands of 2017 USD)					
	All	2002	2005	2008	2011	2017
Black	0.057*** (0.013)	0.041 (0.027)	0.023 (0.027)	0.019 (0.029)	0.129*** (0.025)	0.150*** (0.039)
Hispanic	0.046*** (0.013)	-0.018 (0.027)	0.058** (0.025)	0.027 (0.029)	0.094*** (0.024)	0.116*** (0.037)
AAPI	0.101*** (0.017)	0.109*** (0.040)	0.071** (0.036)	0.034 (0.041)	0.140*** (0.031)	0.169*** (0.048)
Housing Tenure	0.018*** (0.001)	0.018*** (0.001)	0.017*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.021*** (0.001)
Black \times Tenure	-0.005*** (0.001)	-0.008*** (0.002)	-0.004** (0.002)	-0.006*** (0.002)	-0.003** (0.002)	-0.008*** (0.002)
Hispanic \times Tenure	-0.004*** (0.001)	0.000 (0.002)	-0.003* (0.002)	-0.007*** (0.002)	-0.003* (0.001)	-0.005*** (0.002)
AAPI \times Tenure	0.001 (0.001)	0.009** (0.004)	0.006* (0.003)	0.003 (0.003)	-0.006* (0.003)	-0.001 (0.003)
N	24043	5177	5015	5268	4684	3899
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: Data come from 2002, 2005, 2008, 2011, and 2017 NYCHVS. Units with zero and top-coded monthly contract rents were dropped. The top-coded monthly contract rents are \$3500 in 2002, \$3500 in 2005, \$5700 in 2008, \$4800 in 2011; \$5500 in 2014; and \$5995 in 2017. The dependent variable, rent discount, is in thousands of 2017 USD and is estimated using the linear model with extended housing characteristics, Sub-borough FE, and all discretized variables, as shown in row 6 of Table 1. Demographic controls include age, gender, education level (college and above), and total household income. AAPI stands for Asian American and Pacific Islanders. This race category also includes American Indian and Alaskan Native. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix E Details on Rent Discount and Policy Awareness

Table E19: LEGAL STATUS VERSUS SELF-REPORTED REGULATION STATUS

Self-Reported Status	Legal Status		
	Unregulated	Rent-Stabilized	Total
Rent-controlled	70 1.79%	474 8.60%	544 5.77%
Rent-Stabilized	136 3.48%	1409 25.55%	1545 16.40%
Unregulated	2317 59.29%	1338 24.27%	3655 38.79%
Don't Know	621 15.89%	1198 21.73%	1819 19.31%
Not Reported	764 19.55%	1095 19.86%	1859 19.73%
Total	3908 100.00%	5514 100.00%	9422 100.00%

Notes: Data come from pooled 2002 and 2005 NYCHVS. The difference between legal status and self-reported regulation status is first studied in [Jiang et al. \(2022\)](#), who also describe the search costs and informational frictions for renters to find rent-stabilized units.

Table E20: Summary Statistics of Household Characteristics by Awareness

	Correctly Aware		Incorrectly Aware		Difference
	mean	sd	mean	sd	
Female	0.571	0.495	0.554	0.497	0.018
Age	48.035	16.423	42.758	14.667	5.277***
White	0.490	0.500	0.276	0.447	0.214***
Black	0.182	0.386	0.227	0.419	-0.045***
Hispanic	0.265	0.441	0.393	0.489	-0.128***
APPI	0.063	0.244	0.103	0.304	-0.040***
Monthly Contract Rent	1.120	0.525	1.185	0.670	-0.065***
Monthly Rent Discount	0.602	0.668	0.273	0.553	0.330***
Total Household Income	70.327	98.217	61.479	75.008	8.849***
Housing tenure	13.297	11.506	8.196	8.331	5.102***
Observations	3869		2326		

Note: Data come from 2002 and 2005 NYCHVS. Correctly aware refers to rent-stabilized tenants whose self-reported rent regulation status is either “rent-stabilized” or “rent-controlled”. Incorrectly aware refers to rent-stabilized tenants whose self-report rent regulation status is “unregulated” (see Table E19). [0.5em] Gender and race variables in row 1 and rows 3-6 are dummy variables. AAPI stands for Asian Americans and Pacific Islanders and also includes Native Americans and people of two or more races. Monthly contract rent, rent discount, and total household income are in thousands of 2017 USD. Rent discounts are estimated using the hedonic model shown in row 6 of Table 1. Housing tenure is defined as the number of years that renters have lived in the same housing unit. Differences in the means between rent-stabilized and private market rental units are reported in column 6. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.