Unequal Access to Affordability: Exclusionary Condominium and Cooperatives in New York City

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Abstract

This paper investigates the impact of condominium associations and cooperative boards (HOAs) on residential sorting and racial segregation in New York City. Using novel textual data on the requirements and policies of HOA boards, I construct a building-level measure to quantify the stringency of HOA screening over prospective neighbors. I find that Black, Hispanic and Asian buyers are less likely than White buyers to purchase condo/co-ops with more stringent screening policies, conditional on affordability. To pass the financial screening, minorities are more likely to purchase the property with cash and demonstrate higher income than comparable White buyers. These racial disparities can be traced back to the historically exclusionary practice of redlining. I build and estimate a residential location choice model with individual heterogeneous preference to quantify the role of HOA screening in shaping segregation. The simulation results reveal that stringent screening policies intensify income and wealth sorting, disproportionately affecting minorities with a more pronounced distortion effect.

Keywords: Homeowners Association, Neighborhood Sorting, Racial Segregation

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1 Introduction

For decades, federal, state, and local fair housing laws have prohibited discrimination on grounds such as race, color, national origin, religion, sexual orientation, family status, or disability. However, in the case of condominiums and cooperatives, which account for 40% of the owner-occupied housing stock in New York City, the Homeowners' Associations (HOAs) have substantial discretion in screening prospective buyers. This has led to multiple investigations about alleged housing discrimination.[2] It is challenging and costly for buyers to prove such discriminatory intent, since HOA boards are not required to disclose reasons for rejecting an application, and the evidentiary burden in litigation is high.[3]

The question as to whether HOAs improve social welfare has long been a subject of debate. Some view HOAs as a market-oriented mechanism for addressing local public goods and managing externalities in private communities (Foldvary, 1994; Barton and Silverman, 1994; Glasze et al., 2004; Nelson, 2005), while others argue that HOAs function as largely unregulated entities that may infringe upon owners' property rights and restrict access to housing (McKenzie, 1994; Lucas, 2013; Benson and DeBat, 2014). Despite this ongoing exchange, there have been few systematic empirical analyses on the welfare consequences of HOAs. This has been compounded by the fact that there are few means of measuring the screening stringency imposed by HOAs. This paper aims to fill in this gap in the literature by constructing a novel text-based measure of HOA screening stringency. Combining both reduced-form evidence as well as a structural model of residential location choices under HOA distortions, this paper provides the first empirical study on how HOAs shape racial disparities in housing access, residential sorting, and social welfare, in the context of condo and co-ops in New York City.

The empirical analysis proceeds in three parts. I begin by constructing a new aggregate measure, the HOA Screening Stringency Index, using a novel dataset of building-level requirements and policies for prospective buyers.[4] I manually collect and compile information on

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[2] In 1996, an interracial couple sued the board of the Beekman Hill House, at 425 East 51st Street, after being turned down for a sublet. Court records state that during the interview a board member wrote "black man" on a notepad. A jury awarded the couple $640,000 in damages, holding the board president personally liable for $124,000, according to the news accessed at https://www.jrmcm.com/content/uploads/2021/02/The-Real-Deal-National-May-2021-GC-Rankings.pdf.

[3] In 2011, an African American sued the board of the Dakota cooperative for racial discrimination after it rejected his $5.7 million offer for a unit. The case drew coverage from The New York Times and the buyer's personal financial information—including bank statements and Social Security Number—was leaked. In 2015, the lawsuit was dismissed for lack of sufficient evidence of discrimination, as reported in New York Times accessed at https://www.nytimes.com/2015/09/16/nyregion/suit-accusing-dakota-co-op-board-of-bias-against-blacks-and-hispanics-fails.html.

[4] Although condo associations typically have less stringent screening procedures than co-ops, many still reserve the *right of first refusal* that permit HOA boards to review and reject offers from prospective applicants. In New York City, some condo associations screen buyers in a similar way that co-ops do. Accordingly, condominiums and cooperatives can be viewed as representing less and more stringent screening regimes of HOA Screening Stringency Index, respectively, with overlap in practice. See news report from New York Times accessed at https://www.nytimes.com/2000/02/20/realestate/your-home-tightening-admissions-in-condos.html.

financing requirements including financial statements, minimum down payments, co-purchase rules, refinancing, sale restrictions, subletting, primary-residence use, and pet ownership. I use Principal Component Analysis (PCA) to reduce dimensionality and construct the index.[5] The resulting measure, based on rich underlying information, not only captures HOA boards' strong preferences for financially secure buyers, but also the degree to which HOA boards inquire into buyers' identities during the screening process. Consequently, this index allows us to approximate the access of potential buyers by the degree of HOA control and selectivity over prospective neighbors.

I then document four empirical patterns, combining this measure with a comprehensive data set of transactions from CoreLogic and StreetEasy between 2006 and 2022 in NYC. First, Black, Hispanic, and Asian buyers are less likely than White buyers to gain access to buildings with more stringent screening policies, even conditional on income and wealth. Second, minority buyers are more likely to purchase units in cash and, as shown using HMDA data, to make slightly larger down payments than White buyers when facing higher screening thresholds. Third, minority buyers have higher incomes when purchasing new homes in buildings with more stringent policies, even accounting for affordability. Finally, these racial disparities are correlated with historical exclusionary practices: HOA boards in neighborhoods closer to formerly redlined areas tend to be more stringent in their screening processes, while the highest screening index are observed in "best" neighborhoods on historic redlining maps.

Moreover, I exploit the variations in HOA screening stringency from those historical origins to construct an instrument variable. This instrument variable strategy mitigates identification concerns in the baseline results, including contemporaneous homophily preferences of incumbent residents, and measurement errors in the HOA index. I find my baseline estimates robust in the instrument variable regressions. I also conduct a series of robustness checks by using alternative measures of HOA screening stringency, leveraging different model specifications, and exploiting alternative data sets. The empirical results are stable, and the qualitative results remain unchanged.

To evaluate the welfare and segregation effect of HOA screening policies, I develop and estimate a residential location choice model with heterogeneous preferences. Following Bayer et al. (2007), households choose among property units to maximize indirect utility based on property attributes, costs, and tract characteristics. Each property is defined by a tuple of attributes (e.g., number of bedrooms, property age, amenities), neighborhood racial composition, sale price, and monthly HOA fees. A key variable is the degree of HOA screening stringency, which reflects the extent to which HOA boards screen prospective buyers based on household characteristics.

[5] I follow the construction of Wharton Residential Land Use Regulatory Index (Gyourko et al., 2008).

Households differ by income, wealth, family size, age of household head, and race/ethnicity. Preferences for attributes and elasticity to costs are allowed to vary with household own characteristics. Higher-income and wealthier households may be less deterred by stringent screening, while minority households face disproportionately higher disutility relative to White buyers. The model also incorporates homophily preferences over neighborhood racial composition to vary with a buyer's own race or ethnicity.

I estimate the model using Maximum Likelihood Estimation (MLE) nested with a contraction mapping to recover mean utility and heterogeneous preference parameters, using data on all condo and co-op transactions in New York City in 2010. Using the estimated parameters, I conduct two counterfactual analyses to evaluate welfare and segregation effects. Welfare-wise, removing racial bias in screening yields modest welfare gains for minority households, while eliminating all screening policies produces larger increases in welfare for Black, Hispanic, and Asian buyers and small losses for White buyers. In terms of racial segregation, eliminating screening policies reduces the minority–White dissimilarity index (a measure of segregation) by 13%, with larger declines for Asian–White segregation. These results show that eliminating screening altogether, or even removing only the racial bias in screening, would improve the welfare of minority buyers and facilitate racial integration in the city.

This paper contributes to three strands of literature. Housing economists have documented the rise of homeowners' associations and their effects on housing markets. Using publicly recorded mortgage records, Clarke and Freedman (2019) find HOAs raise single-family home prices by roughly 4% (about $13,500 on average) and that HOA neighborhoods tend to be more affluent and racially segregated than adjacent non-HOA neighborhoods. Cheung and Meltzer estimate that HOAs increase house prices in Florida suburbs by nearly 5%, with the premium declining as subdivisions age (Meltzer, 2013; Meltzer and Cheung, 2014; Cheung et al., 2014; Cheung and Meltzer, 2013, 2014). They also document positive spillovers to nearby properties. Unlike prior work focused on hedonic estimates of HOA premium, this paper quantifies the distortionary effects of HOA screening in the condo and co-op market, using both reduced-form analyses as well as a structural model.

This paper draws insights from the existing literature that explores foreclosure externalities in condo and co-ops in terms of proximity. Agarwal et al. (2016) find that condo loan defaults grow at a faster rate than single-family loan defaults, particularly among investor borrowers, which triggers more subsequent defaults in the same cohort of subprime mortgages in the same location. Fisher et al. (2015) find that a foreclosure within the same association and address decreases the sale price of nearby properties by 2.5%. Closer substitutes suffer more from foreclosure externalities. Consistent with these findings, I show that HOA boards exhibit a strong preference for cash purchases and higher-income buyers, potentially to mitigate the foreclosure externalities existing within the association.

This paper is also closely related to existing research on segregation and racial discrimination in the housing market. (Bayer et al., 2017; Almagro et al., 2023; Bayer et al., 2025) Christensen and Timmins (2022, 2023) demonstrate that housing discrimination can distort sorting decisions by constraining an individual's choice during a search. Ignoring unequal access could understate the willingness to pay for key neighborhood amenities. Regarding the impact of condominium on local demographics, Boustan et al. (2023) find areas with a higher condo share due to local regulations do not show corresponding increases in resident income or education levels. For this reason, they conclude that condo development does not lead to gentrification. This paper is to measure the distortion from existing homeowners and understand resistance to racial integration in today's ownership market.

This work is most closely related to McKenzie (1994), who argues that buyers living with HOAs often lack awareness of extensive Covenants, Conditions, and Restrictions (CC&Rs) prior to purchase, or may not have a non-HOA alternative in their local housing market. McKenzie characterizes HOAs as instruments of exclusion, likening them to successors of racially restrictive covenants that the Supreme Court deemed unenforceable in 1948, and which the Fair Housing Act fully outlawed in 1968. Building on this historical perspective and using redlining maps, this paper provides quantitative evidence on the exclusionary role of HOA screening.

The remainder of this paper is structured as follows. Section 2 provides the institutional background on condo associations and co-op boards and describes the construction of HOA Screening Stringency Index. Section 3 presents reduced-form patterns on the disproportionate impacts of HOA screening on minority buyers. Section 4 outlines the residential location choice model. Section 5 describes the estimation procedures, interprets the results, and discuss the welfare and redistribution implications. Section 6 concludes.

2 Institutional Background and Data on HOA

2.1 Role of Condo Associations and Co-op Boards

Residents of condo and co-op buildings share common space, public goods, and local amenities. HOA boards play a crucial role in enforcing legally binding Covenants, Conditions, and Restrictions (CC&Rs), collecting fees, and overseeing maintenance and operations. Beyond routine management, HOA boards evaluate prospective buyers' financial qualifications by reviewing their financial statements and tax returns. Many boards impose additional financial restrictions, including requiring all-cash purchases and a minimum post-closing liquidity threshold (e.g., one to two years of expenses) that must be met even after the transaction is

completed.[6] Some boards require personal or professional references and conduct interviews as part of the buyer approval process. HOA boards typically require standard application materials including credit reports, Social Security numbers (SSNs), pet ownership records, and employment status.

Moreover, HOA boards can exercise great discretion in screening potential buyers. In certain cases, boards can employ procedural tactics to delay or complicate the application process, such as requesting excessive documentation or increasing fees.[7] Some applications go further by requesting sensitive personal information including marital status and age, reflecting their concerns about potential future residents joining the building. HOA boards also vary substantially in their disclosure practices when rejecting applicants. While some offer no justifications, others may dis-close reasons to preempt housing discrimination claims. Among those frequently cited grounds for rejections, financial concerns are the most common.

These building-level requirements and policies reflect both a preference for financially secure buyers and the extent of the scrutiny applied by HOA boards when assessing prospective residents. This study exploits variations in screening stringency across HOA boards to examine whether, and to what extent, these screening policies affect minority households' access to housing.

2.2 HOA Screening Stringency Index

This paper leverages data from BoardPackager.com, to compile building-level policies (as of 2022) covering 150,000 housing units across 2,715 condo and co-op buildings in New York City.[8] From this dataset, I construct a novel building-level measure, HOA Screening Stringency Index. The design of this index follows the methodology of the Wharton Residential Land Use Regulation Index (WRLURI).

HOA policies are complex, encompassing many detailed rules and clauses that vary in form, scope, and enforcement. Keeping track of them individually results in a high-dimensional measure. To address this issue, I employ Principal Component Analysis (PCA) to consolidate ten

[6] Post-closing liquidity refers to the number of months' worth of mortgage and maintenance payments a buyer retains in liquid assets after closing. Please refer to https://hauseit.medium.com/what-are-post-closing-liquidity-financial-requirements-for-co-ops-in-nyc-9a61de9cd06f for definitions.
[7] In 2019, a co-op owner sued the board at 65 West 87th Street for raising its application fee after learning his prospective buyers were Chinese. The board raised its standard application fee from $2,367 to $14,330. The board subsequently requested additional information over an eight-month period before ultimately rejecting the application, according to https://therealdeal.com/magazine/national-may-2021/not-our-kind/.
[8] From 2006 to 2022, sale prices of condo and co-op units in the BoardPackager sample span the 17.98th to the 97.27th percentiles of the overall price distribution in New York City condo and co-op market. See comparison in Appendix Figure A1.

subindices from seven categories of building policies into one aggregate measure. The summary statistics of those ten subindices are shown in Table 1.

2.2.1 Detailed Policies

Financing Policies There are 1,068 buildings requiring a financial review or setting a financing-related policy in my sample. 892 of these buildings require at least a 20% down payment, and approximately 40 buildings require more than 80% down payment. I measure HOA's financing policies from two aspects. First, I label whether the HOA requires full financial documentation or specifies financing policies for buyers. Second, I measure the minimum required down payment as a share of the transaction price for a new purchase that ranges from 0 and 100%.[9]

Restrictions on Co-purchase or Guarantor HOA boards often prefer candidates who meet financial qualifications independently than those who rely on a co-purchaser or guarantor, even if the latter might be more financially stable. Co-purchasing involves two or more persons jointly purchasing a unit, whereas guarantors are typically responsible for monthly maintenance payments but not the mortgage itself. I measure whether co-purchasing or the use of guarantors is allowed in the transaction. Among the 641 HOA boards with this information available, approximately 25% of HOA boards explicitly prohibit both co-purchases and guarantors, while the rest 75% of HOA boards accept either co-purchases or guarantors. I assume that guarantors are allowed by default if this information was not provided.

Refinance Restrictions A HOA board may restrict owners from refinancing. I construct a continuous measure of refinance restrictions, with a value of zero representing no stated restrictions and a value of one indicating an explicit prohibition of refinance. For cases without outright bans, I use HOA-imposed refinancing convenience fees to capture intermediate levels of restrictiveness. These fees are rescaled to lie between 0 and 0.8, while explicit refinancing prohibitions are assigned the maximum value of 1.

Sale or Transfer Restrictions Another common type of restriction imposed by HOA boards are on transactions, including convenience fees of sales and the flip taxes. Convenience fees of sales include application processing fees, credit report fees, move-in and move-out charges, and closing fees. I record convenience fees of sales directly from the data by adding up those non-refundable fees, but exclude refundable deposits and conditional fees (e.g., only charged if applicable). The mean convenience fee is $1,729, while some transactions incur as much as $26,675.

Flip taxes Flip taxes capture any additional transfer-related levy beyond government-mandated taxes. In New York State, co-op sales are subject to a $0.05 per-share transfer tax stamp, and

[9] In cases where no minimum down payment is specified, I assume the value to be 0. In transaction data, cash purchases account for 73% of sales in BoardPackager-covered units.

since 2006, transactions exceeding $25,000 have been subject to Real Property Transfer Tax. New York City also levies a "mansion tax" on transactions above $1 million, ranging from 1% to 2.9% of the trans-action price.[10] Beyond these statutory taxes, approximately 60% of buildings impose their own flip taxes, typically 1–3% of the sale price, though some adopt alternative structures such as flat fees per share. These restrictions and costs represent additional financial hurdles for prospective buyers. I construct a dummy variable capturing whether HOA boards impose flip tax for sale.

Sublet Restrictions Subletting is always frowned upon in condo and co-ops. Most HOA boards prefer owner-occupancy over transient occupancy. Some boards prohibit subletting because the underlying mortgages, such as those used to finance maintenance and repairs, require a certain minimum owner-occupancy ratio. Short-term rentals, including AirBnB, are generally prohibited. 2,594 buildings in my sample specify their subletting policies or impose sublet fees. Sublet fee structures vary substantially in the data. 38% impose a one-time fee, 8% charge a percentage of rent, 4% set a dollar amount per share, 23% multiply the monthly HOA fee, and the rest employ a mix of these structures. I take a simplified approach and construct two binary indicators for the presence of any sublet restrictions and the presence of sublet renewal restrictions. The restriction on sublet renewal requires board approval for each sublease renewal term. They are less common, explicitly appearing in only 552 buildings, but represent a stronger ongoing control over resident turnover.

Pied-à-terre A pied-à-terre is an apartment unit used on a temporary basis as a secondary residence. Many HOA boards discourage such arrangements to foster community cohesion, encourage homeowners to participate in building maintenance, and preserve property values.

Pet Restriction HOA boards usually set restrictions on animals out of concerns over nuisance barking, property damage, and dog bites. I construct a discrete value on pet restrictions, where 1 indicates no restrictions, 2 permits pets only with board approval or after a pet interview, 3 allows pets only under partial restrictions (e.g., no dogs, weight limits, or owner-only rules), and 4 prohibits pets entirely.

2.2.2 Policy Aggregation

I implement a PCA analysis by first normalizing each variable and then loading variations on HOA Screening Index with different weights. The PCA loadings are determined without any prior assumptions about which policies are more stringent.

As shown in Column "PCA Loading" in Table 1, I find that the weights are primarily on four variables, including whether the HOA board requires financial documentation and financial

[10] Please refer to https://www.tax.ny.gov/bus/transfer/rptidx.htm for more details about real estate transfer tax in New York City

reviews from prospective buyers, the maximum financing limit or minimum down payment requirement, restrictions on sublet renewal, and restrictions on refinance. This result corroborates HOAs' strong preference for financially secure buyers, as HOA boards tend to review financial statements, impose higher down payments, and limit flexibility on buyers' future refinancing decision. Moreover, restrictions on subletting and sublet renewals capture the extent of an HOAs' screening over the building's resident composition.

For both the empirical analyses, I rescale the HOA Screening Stringency Index to range between 0 and 1 for ease of interpretation. One potential limitation is that there is no within-building time variation in the screening stringency, since the dataset contains only the most recent policies (as of 2022). However, this is the first measure of HOA screening stringency in the economics literature, aggregating detailed building-level policies from multiple dimensions.

Table 1: Summary Statistics and PCA Loading on Building Policies

	Count	Mean	SD	Min	Max	PCA Loading
Financial Doc	2,715	0.38	0.48	0	1	0.75
Min Down Pay	2,715	0.10	0.18	0	1	0.70
No Co-Purchase or Guarantor	2,715	0.05	0.22	0	1	0.18
Restriction on Refinance	2,715	0.08	0.10	0	1	0.55
Convenience Fee of Sales	2,715	1,688	1,358	0	26,675	0.12
Flip Tax	2,715	0.61	0.49	0	1	0.31
Restriction on Sublet	2,715	0.91	0.28	0	1	0.06
Restriction on Sublet Renewal	2,715	0.20	0.40	0	1	0.58
No Pied-a-terre	2,715	0.05	0.23	0	1	0.17
Pet Restriction	2,715	1.88	1.03	1	4	0.16

Notes: The table summarizes ten building-level restrictions used to construct the HOA Screening Stringency Index. Each variable corresponds to a restriction imposed by the HOA boards on prospective buyers. Binary variables equal one if the restriction applies and zero otherwise. Minimum Down Payment, Pet Restriction, and Convenience Fee of Sales are continuous measures that increase with restrictiveness. The final column reports the PCA loading of each variable on the first principal component (i.e., HOA Screening Stringency Index). All statistics are based on 2,715 buildings.

2.3 Data on Property Attributes

I compile detailed information on housing attributes and transaction characteristics for each unit, combining data from CoreLogic and StreetEasy. The CoreLogic data compiles tax assessments and ownership transfer records from localities, providing variables that are consistently available in assessment records. I observe unit-level characteristics, including the number of bedrooms, year built (end year of construction), sale price, and ownership details. I also fill missing values for housing attributes from Multiple Listing Service (MLS) data.

However, because co-op units would not receive individual tax assessments, CoreLogic is un-able to collect detailed information on characteristics for co-op units. To address this issue, I manually collect listing information for co-op units from StreetEasy, a local platform with the most comprehensive information of listings and sales in New York City. I obtain the number of bedrooms, listed HOA maintenance fees, and building-level amenities (e.g., elevator, doorman, pool, gym). I then link StreetEasy data with transaction amount and ownership records from CoreLogic through address matching.

2.4 Data on Household Characteristics

I compile information on household characteristics from InfoUSA Residential Historical Database and Home Mortgage Disclosure Act (HMDA) data. InfoUSA is a commercial consumer database covering all US households since 2006, providing household location (address, latitude, and longitude), estimated income, estimated home value, estimated wealth, length of residence, number of children, race, ethnicity, age of household head, and owner/renter status. These variables are synthesized from both public and private sources including property tax assessment records, utility bills, change-of-address filings, real estate transactions, voter registrations, credit card billing statements, driver's license records, bankruptcy filings, and other public records. Race and ethnicity are predicted using a proprietary model, and I use HMDA data to correct for InfoUSA-predicted race and ethnicity. For neighborhood demographics, I supplement these data with tract-level statistics from the U.S. Census.

One potential data issue is that InfoUSA tends to underestimate population counts for renters and people of color (Ramiller et al., 2024), as InfoUSA primarily relies on administrative sources (like property tax records) from which renters are more likely to be absent. To address this concern, my analysis focuses on the owner sample and uses the HMDA sample to validate regression results. HMDA data provides application-level information for nearly all U.S. mortgage applications, including loan amount, loan type, and borrower characteristics.

Table 2: Summary Statistics

	Count	Mean	S.D.	Min	Max
Panel A: Buyers' Racial Demographics					
White	67,863	0.68	0.47	0	1
Black	67,863	0.04	0.20	0	1
Hispanic	67,863	0.06	0.24	0	1
Asian	67,863	0.20	0.40	0	1
Panel B: Sale and Property Attributes					
HOA Screening Stringency Index	67,863	0.18	0.17	0	1
HOA Fee (in $)	67,863	1,402.10	967.27	20	15,929
Transaction Price (in $)	67,863	1,087,960	748,409	245,000	3,814,364
Indicator of Cash Purchase	67,863	0.73	0.44	0	1
Indicator of Doorman	67,863	0.83	0.38	0	1
Indicator of Elevator	67,863	0.92	0.28	0	1
Year Built	67,863	1,959	33.98	1,800	2,019
Number of Bedrooms	67,863	1.46	0.95	0	10
Indicator of Pool	67,863	0.12	0.32	0	1
Indicator of Gym	67,863	0.55	0.50	0	1
Panel C: Household Characteristics					
Household Income (in $ thousands)	67,863	228.95	150.01	5	500
Estimated Household Wealth Score	67,863	3,188.00	1,159.45	99	9,843
Household Head Age	67,863	45.23	14.28	18	99
Household Size	67,863	1.49	0.84	1	5
Panel D: Neighborhood Demographics					
Tract White Pop Share in 2010	67,863	0.70	0.19	0.01	0.94
Tract Black Pop Share in 2010	67,863	0.06	0.11	0.00	0.88
Tract Hispanic Pop Share in 2010	67,863	0.11	0.10	0.02	0.83
Tract Asian Pop Share in 2010	67,863	0.11	0.07	0.00	0.83
Panel E: Historical Variables					
Distance to Redlined Border (in Meters)	2,475	405.48	639.71	-482	3,725
Redlining Map Rating					
A	465				
B	522				
C	224				
D	679				
No Rating	585				
Tract Minority Share in 1980	2,475	0.25	0.24	0.00	0.99
Building Built before 1980	2,475	0.80	0.40	0	1

Notes: This table reports summary statistics for the main estimation sample of condo and coop transactions in New York City. The HOA Screening Stringency Index is a normalized continuous measure constructed from building-level restrictions on financing, subletting, and sales described in Table 1. Buyers' racial demographics and household characteristics are from InfoUSA. Sale and property attributes are constructed from CoreLogic-StreetEasy matched dataset. Neighborhood demographics are based on tract-level population shares from the 2010 Census data. Historical redlining variables are available for a subset of properties geolocated to the Home Owners' Loan Corporation (HOLC) maps. Negative distance to border denotes locations inside a redlined area. All prices are in U.S. dollars.

2.5 Summary Statistics

The sample includes 67,863 transactions from the CoreLogic-StreetEasy-InfoUSA merged database. Table 2 presents descriptive statistics for the housing characteristics and household demographics. The buyer pool is predominantly White (68%), compared with 4% Black, 6% Hispanic, and 20% Asian buyers. The average HOA Screening Stringency Index is 0.18 (S.D. = 0.17), representing substantial variations across HOA boards. HOA fees are averaging $1,400 per month and the mean transaction price is about $1.09 million. About 73% of units are purchased with cash. Most buildings have doormen (83%) and elevators (92%), and slightly more than half have gyms. On average, the buildings were built around 1960, with an average of 1.5 bedrooms per unit. The average household income is $229 thousand, and the estimated household wealth score is 3,188. Buyers' household heads are roughly 45 years old on average and household size averages 1.5 members. Neighborhoods are predominantly White (the average White share of tracts is 0.70), with average Black, Hispanic, and Asian population shares of 0.06, 0.11 and 0.11, respectively.

3 Reduced-form Evidence

3.1 Probability of Minority Buyers

I compare the probability of minority buyers purchasing the properties in condo and co-ops with different HOA screening stringency. The empirical model is shown as equation (1).

$$y_{ijt} = \beta_1 \text{ HOA Screening}_j + X_{it}\boldsymbol{\gamma} + W_{jt}\boldsymbol{\delta} + \alpha_{tract,t} + \varepsilon_{ijt} \quad (1)$$

I use *i* to denote a buyer, *j* to represent a transaction, and *t* to denote a year. y_{ijt} is a dummy variable indicates whether there is a minority buyer in the transaction, which equals 1 if the buyer *i* is Black, Hispanic, or Asian, and 0 if the buyer *i* is White.[11] The interested effect is denoted by β_1, which can be interpreted as the impacts of HOA screening stringency on the likelihood of the unit being purchased by a minority buyer. I control a rich set of variables in the specification, including both household characteristics X_{it} and property attributes W_{jt}. Specifically, X_{it} includes household income, wealth, family size, and age of the household head, reflecting buyers' financial circumstances as well as household composition. W_{jt} includes a series of detailed property attributes such as the number of bedrooms, sale price, monthly HOA Fee, whether the building has an elevator, doorman, pool or gym, as well as property age and school districts. Sale prices also capture the affordability of the units. Moreover, I add tract-by-year fixed effects $\alpha_{tract,t}$ to control for time-varying neighborhood characteristics. Standard errors are clustered at the tract level.

[11] y_{ijt} equals to 1 if there is a minority co-buyer in the co-purchase transactions.

The empirical results are shown in Panel A of Table 3. Column (1) shows that a unit is 6.0% less likely to be purchased by a minority buyer if this unit is in the most stringent building (HOA Screening = 1) compared to the least stringent building (HOA Screening = 0), conditional on property attributes, household characteristics, school districts, and tract-by-year fixed effects. This result provides descriptive evidence that HOA screening policies have unequal impacts on different racial groups and have mainly screened out minority buyers.

I use the full sample in column (1). However, there are concerns about market segmentation such that minority buyers and White buyers might sort into completely different segments of the market. For this reason, I restrict the sample in column (2) to buildings in which at least one Black buyer ever purchased a unit between 2006 and 2022, and then limit the analysis to an either-White-or-Black buyer sample. As shown in Table 3, only 8.3% of properties are purchased by Black buyers and 91.7% are White buyers in 32,330 transactions from this restricted sample. More importantly, I find robust negative impacts of HOA screening stringency on the probability of buyers being Black. A unit is 2.1% less likely to be purchased by a Black buyer if it is in the most stringent building compared to the least stringent building, which are approximately as large as 25% (2.1%/8.3%) of the sample mean.

Columns (3) and (4) follow the same design with column (2) for Hispanic and Asian buyers, respectively, and they present qualitatively similar results. A unit is 4.5% less likely to be purchased by a Hispanic buyer or an Asian buyer for buildings with the most stringent screening policies, which account for 48% (4.5%/9.4%) and 20% (4.5%/23.0%) of the mean likelihood for a buyer to be Hispanic or Asian in the corresponding subsample.

3.2 Probability of Cash Purchase

As shown in the Principal Component Analysis in Section 2.2, HOA boards impose the most stringent screening policies primarily through higher minimum down payments, detailed financial documentation requirements, prohibitions on co-purchasers or guarantors, and limits on refinancing flexibility. These requirements may reflect both HOA boards' concerns about mortgage foreclosure externalities in the condo loan market (Agarwal et al., 2016; Fisher et al., 2015) and preferences for strong signals of cash buyers' "deep pockets." Motivated by these findings, I further examine the effects of HOA screening on the probability of cash purchase across different racial groups and the probability of cash purchase proxies for the financial eligibility of buyers.

The empirical model is specified as follows.

$$y_{ijt} = \alpha_1 \text{ Minority}_i + \alpha_2 \text{ HOA Screening}_j + \beta_2 \text{ Minority}_i \times \text{ HOA Screening}_j + X_{it}\gamma + W_{jt}\delta + \alpha_{tract,t} + \varepsilon_{ijt} \quad (2)$$

Consistent with equation (1), I use *i, j, t* to denote a buyer, a transaction, and a year, respectively. The dependent variable, $Cash_{ijt}$, is a dummy variable indicating whether the property is transacted in cash. α_1 captures the average likelihood of a cash purchase for each racial group, while α_2 measures the baseline effect of HOA screening on the probability of a cash purchase. More importantly, I add the interaction term $\text{Minority}_i \times \text{HOA Screening}_j$, and its coefficient β_2 captures the differential effect of HOA screening stringency on the likelihood of a cash purchase for minority buyers relative to White buyers. I add the same controls for household characteristics X_{it}, property attributes W_{jt}, and tract-by-year fixed effects $\alpha_{tract,t}$ as in equation (1). Standard errors are clustered at the tract level.

The results are shown in Panel B of Table 3, and I have four findings. First, an average of 73.7% of transactions are completed in cash. Second, minority buyers are 5.4% less likely to purchase in cash when the HOA screening is the least stringent. Third, transactions of units with the most stringent HOAs are 30% more likely to be a cash purchase for White buyers, compared to those with the least stringent HOAs. Fourth and most crucially, the coefficient of the interaction term is estimated to be positive and significant, indicating that minority buyers increase their likelihood of cash purchases more than those comparable White buyers when purchasing units in more stringent HOAs. Moving from the least to the most stringent HOA screening increases the probability of cash purchase by 14.4 percentage points more for minority buyers relative to White buyers.

Similar to Panel A, I explore the effect heterogeneity across racial groups in columns (2)-(4). I find that Black buyers are more likely to purchase in cash relative to White buyers under the most stringent screening policies. The effects are also positive and significant for Hispanic buyers and Asian buyers. As a robustness check (Section 3.5), I replace the HOA screening index with the subindex for minimum down payment and financial documents and obtain qualitatively similar results. I further show that minority buyers also make slightly higher down payment in the mortgage transactions when purchasing in more stringent HOAs, as shown in Table 7.

3.3 "Income Premium" on Minorities

Since HOA screening lowers the purchase probability of minority buyers and increases the likelihood of cash transactions for minority buyers, I further examine whether HOA screening increases the income screening threshold of buyers across racial groups. I estimate the effect of HOA screening on buyers' income across racial groups using the same empirical specification as in equation (2), with log(Income) as the dependent variable.

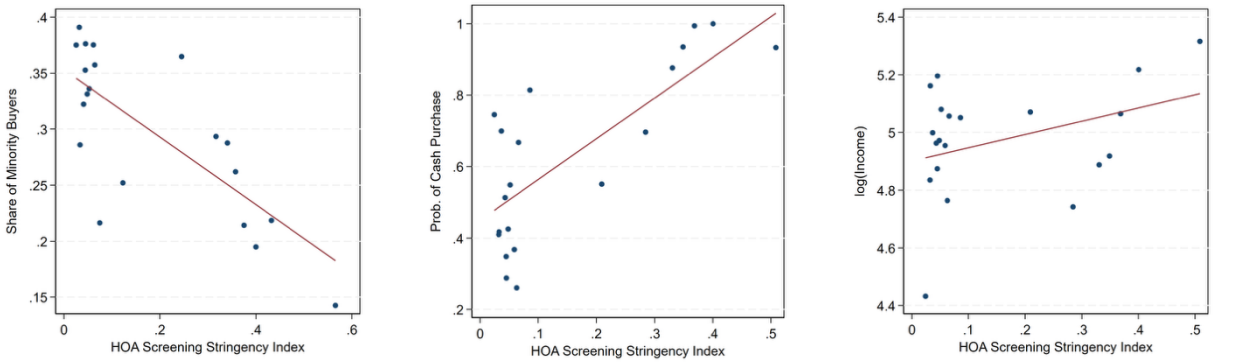
Panel C of Table 3 presents coefficient estimates of the "income premium" for minority buyers. Conditional on a rich set of controls such as sale price, household wealth, and family size among others, the results reveal that minority buyers tend to earn 5% more than comparable

White neighbors when purchasing units in buildings with the most stringent HOA screening. The coefficient estimates are quantitatively stable across Black, Hispanic, and Asian buyers, which suggests that higher incomes may help minorities fulfill tighter screening requirements.

Both the cash purchase and income premium results align with the broader literature on minority "overcompensation" in credit markets, including through higher mortgage interest rates (Cheng et al., 2015; Kau et al., 2019). For example, the existing literature suggests that Black borrowers on average pay about 29 basis points more than comparable White borrowers. In the context of HOA screening, however, the overcompensation is not priced into HOA maintenance fees or sale prices. Instead, minority buyers are more likely to pay in cash or present a stronger income profile to alleviate HOA boards' concerns about financial stability and potential mortgage risk.

Figure 1: Correlations between HOA Stringency Index and Outcome Variables

(a) Share of Minority Buyers (b) Cash (Minority Buyers) (c) Income (Minority Buyers)



Notes: This figure shows correlations between the HOA Screening Stringency Index and buyer outcomes. Panel (a) shows that more stringent HOA screening is correlated with a lower share of Minority buyers. Panels (b) and (c) show a positive relationship between screening stringency and probability of cash purchases and income among Minority buyers, respectively. Patterns for individual racial groups are presented in Appendix Figure A2–A4.

3.4 Historical Origins of HOAs

The reduced-form evidence so far indicates that stringent HOA screening disproportionately affects minority buyers. However, despite the efforts from a rich and granular set of controls, the results still suffer from endogeneity concerns. For example, HOA screening stringency might respond to contemporaneous homophily preferences of incumbent residents. Moreover, stringent boards may publicly document detailed and ostensibly neutral rules, while lenient boards may exercise informal exclusion without explicit policies. To completely address these endogeneity

Table 3: HOA Screening Stringency Index and Buyer Outcomes

	Minority	Black	Hispanic	Asian
Panel A: Probability of Minority Buyers Purchasing Condo and Co-ops				
	Probability of Purchase			
HOA Screening	-0.060***	-0.021**	-0.045***	-0.045**
	(0.016)	(0.010)	(0.011)	(0.018)
Dep. Var Mean	0.294	0.083	0.094	0.230
Adjusted R-squared	0.137	0.364	0.086	0.123
Panel B: Probability of Cash Purchase				
	Probability of Cash Purchase			
Minority	-0.054***	-0.051***	-0.060***	-0.054***
	(0.007)	(0.013)	(0.011)	(0.009)
HOA Screening	0.299***	0.323***	0.297***	0.320***
	(0.038)	(0.065)	(0.044)	(0.043)
Minority × HOA Screening	0.144***	0.099**	0.139***	0.141***
	(0.030)	(0.047)	(0.039)	(0.032)
Dep. Var Mean	0.737	0.764	0.770	0.738
Adjusted R-squared	0.521	0.573	0.541	0.512
Panel C: "Income Premium" on Minorities				
	log(Income)			
Minority	-0.015**	-0.088***	-0.018	-0.004
	(0.006)	(0.023)	(0.013)	(0.008)
HOA Screening	-0.061*	-0.043	-0.071*	-0.057
	(0.033)	(0.047)	(0.040)	(0.037)
Minority × HOA Screening	0.063**	0.066	0.121**	0.058*
	(0.025)	(0.102)	(0.049)	(0.031)
Dep. Var Mean	5.171	5.135	5.204	5.216
Adjusted R-squared	0.714	0.707	0.680	0.686
Household Controls	Yes	Yes	Yes	Yes
Property Controls	Yes	Yes	Yes	Yes
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015

Notes: This table reports coefficient estimates from equations (1)–(2). Household controls include log of household income (except in Panel C), log(household wealth), household size, and age of the household head. Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool, gym, and log(property age). For column (1), I use the full sample, "Minority" equals one if the buyer is Black, Hispanic or Asian, and zero if the buyer is White. Column (2) restricts the sample to transactions involving only White or Black buyers. Columns (3) and (4) apply the same sample restriction to Hispanic and Asian buyers, respectively. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$; $***p<0.01$. See full tables in Appendix Table A1–A3.

concerns is empirically challenging, and I want to acknowledge these limitations upfront. However, I seek to address this puzzle by further investigating the historical origins of HOA screening stringency. The exercise serves two primary purposes. First, what drives the variation in screening stringency remains unanswered in the economics literature, and understanding its historical driving forces is interesting in its own right. Second, historical origins could provide useful variations and mitigate the aforementioned concerns of contemporaneous preferences and measurement errors. Although these factors still cannot separate persistent confounding factors, exploiting historical variation provides more exogenous variations in the HOA screening stringency for our baseline analyses.

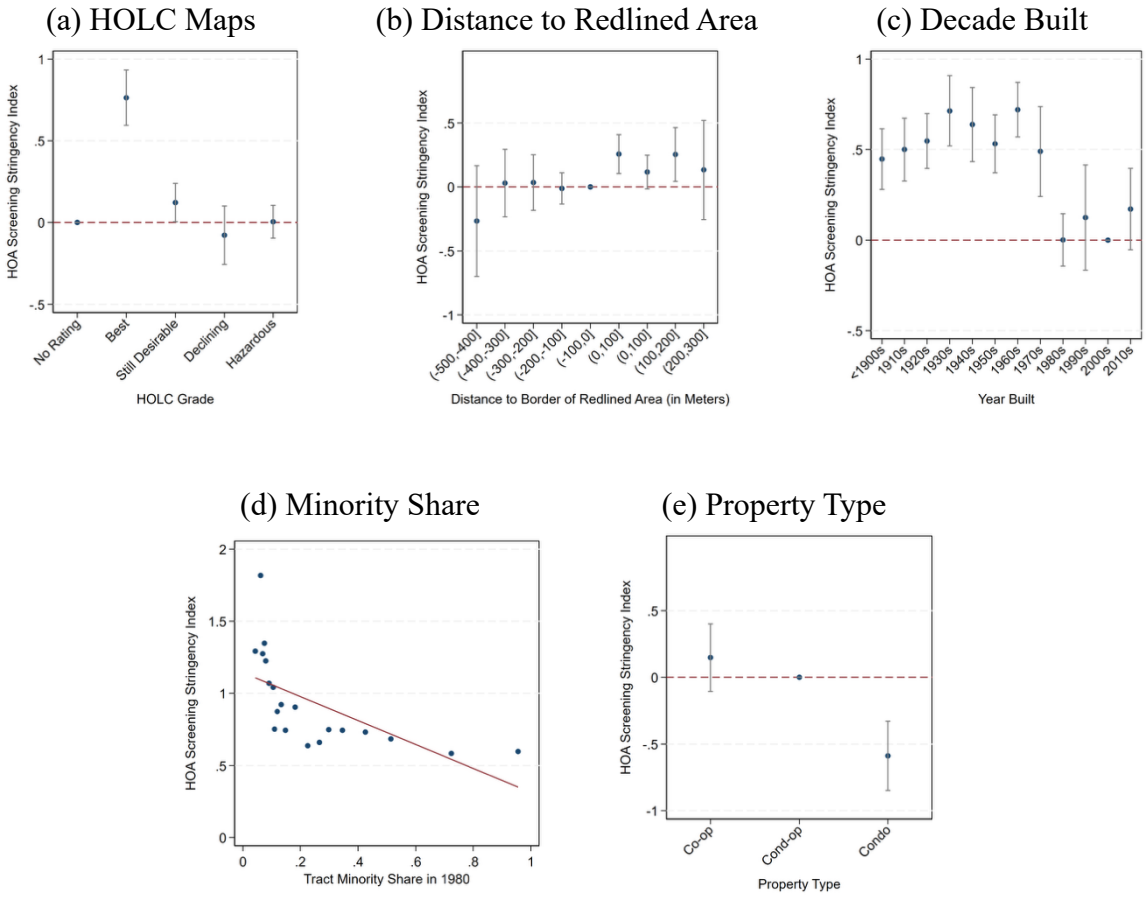
I exploit the legacy of institutional segregation in New York City to investigate the historical roots of screening stringency. The Home Owners' Loan Corporation (HOLC), a federal agency established in 1933 following the Great Depression, appraised neighborhood risk levels for mortgage refinancing and home purchases ranging from "Best" (A) to "Hazardous" (D). These appraisals were based in part on their existing racial composition and socioeconomic background (Fishback et al., 2023; Harriss, 1951). Neighborhoods graded "D" were deemed high-risk and effectively excluded from insurance and mortgage credit, known as "redlining." The HOLC delineated neighborhood boundaries according to those grades, reflecting institutional segregation that arose from both government policies, and private actions such as racial covenants.

In 1980s, around 564 condo and co-ops were converted from rental properties due to the enforcement of the rent control in New York City. While introducing a novel form of homeownership centered on jointly-owned properties, its governance structure permitted boards to wield substantial power over who could purchase condos. Historically, this discretion was often used to exclude religious, racial, and ethnic minorities. While Fair Housing Act and Civil Rights Act of 1968 prohibited discriminatory practices like redlining and racial covenants, HOA boards could act in the best interest of homeowners and work as a substitute for those earlier exclusionary institutions.

Motivated by the historical background of HOA policies, I examine the data variation of HOA boards' screening stringency along the following five dimensions: (1) HOLC grade of the building's location; (2) Distance to the nearest redlined area; (3) Decade when the building was built; (4) Tract-level minority share in 1980s; and (5) Property type. First, I compare the HOA Screening Stringency Index across four HOLC grades, with the no-rating neighborhoods as baseline, which draws insights from previous studies on how racial composition shifts across the different grades of HOLC maps (Hillier, 2003; Faber, 2020; Aaronson et al., 2021). Second, similar to a border-discontinuity design, I examine whether HOA boards closer to formerly redlined areas may have stronger incentives to screen residents. Third, I explore how HOA stringency has varied historically, particularly in relation to when the building was built. Since the revisions of HOA boards policies require homeowners voting approval, the attitude of initial residents towards racial integration may affect how HOA boards would screen their future

owners. If this were true, the decade when the building was built might have an effect on screening. Fourth, in a similar vein, I investigate whether HOA stringency systematically varies with the tract-level minority share in 1980 if the building was built before 1980, which might also reflect the attitude of initial residents towards racial integration. Last, I compare HOA stringency between condo and co-ops, since they became a more popular ownership structure in the later years but with different board discretion and legal ownership. According to Panel E of Table 2, among 2,475 buildings overlapping with redlining maps, they have an average distance of 405 meters to their closest redlining boundary and that 27 percent of properties fall within formerly "C" or "D" rated neighborhoods. 80% of buildings were constructed before 1980s, when the average tract-level minority share is 0.25.

Figure 2: Source of Variation in HOA Screening Stringency



Notes: This figure shows correlations between the HOA Screening Stringency Index and five historical factors. Panel (a) shows that HOAs in historically high-income and predominantly White "Best" HOLC neighborhoods adopt more stringent screening, with "Still Desirable" areas also above the baseline and "Declining" areas similar to the unrated neighborhoods. Panel (b) indicates that outside redlined areas, proximity to the boundary predicts greater stringency. Panel (c) shows that buildings constructed before 1980 tend to have more stringent screening. Panel (d) shows that condos adopt less stringent screening policies than co-ops. Panel (e) documents those buildings in higher-minority neighborhoods in 1980 have less stringent policies.

Figure 2 summarizes the key relationship between the HOA Screening Index and the five historical factors. Panel (a) shows that HOA boards adopt the more stringent policies to keep their buildings exclusive especially in neighborhoods rated "Best", which are historically high-income and predominantly white. HOA boards in "Still Desirable" neighborhoods are also more stringent than "Hazardous" neighborhood, while "Declining" areas are similar to the baseline of those no-rating neighborhoods. I find proximity to redlined boundaries is also predictive as shown in Panel (b). Specifically, outside the redlined areas, HOA boards near the redlined boundary are more stringent. Panel (c) shows how HOA stringency varies with respect to the decade when the building was built. I find that buildings constructed before 1980 tend to have more stringent screening policies and more likely to remain as co-ops. Moreover, pre-1980 buildings located in neighborhoods with higher minority shares in 1980 have less stringent screening, as presented in Panel (d). Property type also matters according to Panel (e). Condo represents a more transparent housing option with fewer screening policies compared with co-ops.

I then use the predicted HOA screening index from these historical drivers as the instrumental variable for HOA Screening$_j$ in equation (1) and re-estimate its impact on the probability of buyers being minorities. Since the instrumental variable picks up variations mostly from historical driving forces, it is helpful in addressing the aforementioned concerns of contemporaneous preferences and measurement errors.

Table 4 reports the IV results. The instruments are strongly predictive of HOA screening stringency (first-stage F-statistics = 20.15). Moreover, the second-stage estimates reveal qualitatively similar findings compared to Panel A of Table 3. The estimated effect of HOA screening stringency on the likelihood of the unit being purchased by a minority buyer is still significantly negative, and the magnitude of the effect is larger than the OLS estimate. These findings mitigate concerns about contemporaneous preferences and measurement error, and underscore the ongoing exclusionary practices that persist over 50 years since the passage of the Fair Housing Act.

3.5 Robustness Checks

Alternative Measures of HOA Screening Stringency In this section, I examine two individual subindices with the highest Principal Component Analysis loadings, minimum down payment requirements and whether HOA boards require individual financial documentation. While the direction of the estimated effects remains consistent with the main results, the individual subindex yields weaker and less stable estimates, suggesting that the composite index captures a broader variation in screening stringency across multiple policy dimensions that no single sub-index can fully explain.

Table 4: Probability of Buyers to be Minorities using predicted HOA Screening

	Minority	Black	Hispanic	Asian
		Probability of Purchase		
	(1)	(2)	(3)	(4)
Predicted HOA Screening	-0.113***	-0.030***	-0.042***	-0.107***
	(0.011)	(0.007)	(0.008)	(0.012)
Household Controls	Yes	Yes	Yes	Yes
Property Controls	Yes	Yes	Yes	Yes
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	63,097	31,106	41,427	52,901
Dep. Var Mean	0.285	0.075	0.092	0.223
Adjusted R-squared	0.129	0.334	0.077	0.119
First-stage F-statistics		20.15		

Notes: This table reports coefficient estimates using predicted HOA Screening Stringency Index from historical factors as an instrumental variable. Household controls include log(household income), log(household wealth), household Size, and age of the household head. Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool, gym, and log(property age). Sample construction of each column follows Table 3. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$; $***p<0.01$. See full table in Appendix Table A4.

Table 5 examines the effect of the minimum down payment. Panel A shows that higher down payment requirements reduce the probability that minority buyers purchase the property. The reduction is approximately 6.5% overall, with smaller but significant effects for Black (–2.3%), His-panic (–5.1%), and Asian (–4.1%) buyers. Panel B reveals that minority buyers are 13.9–16.1% more likely than White buyers to purchase in cash when the HOA boards impose higher down payment requirements. Panel C shows an "income premium" of 6.5% for minorities in buildings with high down payment requirement, and the largest premium is for Hispanic buyers (13.9%).

Table A5 reports results when I use the financial documentation requirement as a proxy for HOA screening stringency. Panel A shows negative yet small effects on the probability of buyers being minorities (–1.2% overall, but insignificant for Black and Asian buyers). Panel B indicates that minority buyers 4.2–5.1% more likely than White buyers to pay in cash when financial documentation is required. Panel C finds smaller income premiums, around 2–4%, concentrated among Hispanic and Asian buyers.

Overall, I find that using individual aspects of HOA screening stringency yields qualitatively consistent results, but these effects tend to be weaker and less accurate. While the aforementioned two subindices carry the highest loadings of HOA screening stringency, each captures only one single dimension of HOA screening variation. The composite HOA Screening Index, by aggregating across multiple correlated but distinct requirements, captures a broader range of screening stringency and yields more stable and precise estimates.

Social Network The second set of robustness check examines the sensitivity of results with respect to the controls of sellers' racial and ethnic demographics. Motivated by the evidence that ethnic social networks incentivize more within-ethnicity transactions in Singapore's housing markets (e.g., Agarwal et al., 2019), I re-estimate the main specification with seller race and ethnicity fixed effects, using a matched dataset of transactions with identifiable seller information.

The results are shown in Table 6. Controlling for sellers' race and ethnicity fixed effects reduces statistical significance of coefficients, especially when I focus on the Black buyer subsample. However, all other estimates are similar to the main results in Section 3. Seller demographics may be shaped by historical HOA screening practices if previously approved owners are more likely to accept offers from demographically similar buyers. Therefore, conditioning on seller identity may attenuate the estimated effects of HOA screening rather than controlling for social network.[12] However, the coefficient estimates are generally stable even if we control for sellers' demographics, which demonstrates that social networks may not be a primary competing story in explaining main empirical results.

Alternative Sample: HMDA Data As I discussed in Section 2.4, one potential data issue is that InfoUSA, which is used for the main empirical analysis, tends to underestimate population counts for renters and people of color. To address this concern, I use the HMDA sample to validate regression results, which provides application-level information for nearly all U.S. mortgage applications. I match housing transactions to HMDA mortgage application records.

The results are presented in Table 7. Because 73.7% of condo and co-op transactions are paid in cash, the matched sample includes only a subset of transactions between 2006 and 2022 with non-missing income, race, and age information of loan applicants. With this matched sample, I find that minority buyers tend to make slightly larger down payments than White buyers in buildings with more stringent HOA screening policies, although the coefficient estimates are less precise due to small samples. However, the qualitative results are consistent with the interpretation that stringent HOA screening incentivizes cash offers and larger upfront payments to offset concerns about mortgage risk as a signal of financial stability.

[12] In 2010, the Fair Housing Justice Center filed a federal lawsuit alleging that a Bronx broker and two hous-ing co-ops used a discriminatory reference policy to exclude Black buyers. White testers were encouraged and offered internal reference, while Black testers were discouraged and denied access. Please see the reference at https://www.fairhousingjustice.org/wp-content/uploads/2012/11/Amelia_Lewis_Press_Release_020410.pdf

Table 5: Alternative Measure: Minimum Down Payment Requirement

	Minority	Black	Hispanic	Asian
Panel A: Probability of Minority Buyers Purchasing Condo and Co-ops				
	Probability of Purchase			
Min Down Payment	-0.065***	-0.023**	-0.051***	-0.041**
	(0.019)	(0.011)	(0.011)	(0.020)
Dep. Var Mean	0.294	0.083	0.094	0.230
Adjusted R-squared	0.137	0.364	0.086	0.123
Panel B: Probability of Cash Purchase				
	Probability of Cash Purchase			
Min Down Payment	0.256***	0.270***	0.262***	0.285***
	(0.048)	(0.090)	(0.059)	(0.058)
Minority	-0.027***	-0.032***	-0.035***	-0.028***
	(0.004)	(0.007)	(0.006)	(0.005)
Minority × Min Down Payment	0.153***	0.161**	0.139**	0.139**
	(0.054)	(0.063)	(0.067)	(0.055)
Dep. Var Mean	0.737	0.764	0.770	0.738
Adjusted R-squared	0.517	0.569	0.538	0.507
Panel C: "Income Premium" on Minorities				
	log(Income)			
Min Down Payment	-0.070**	-0.060	-0.080**	-0.065*
	(0.031)	(0.046)	(0.038)	(0.036)
Minority	-0.003	-0.075***	0.005	0.007
	(0.004)	(0.015)	(0.009)	(0.005)
Minority × Min Down Payment	0.065**	0.092	0.139**	0.056
	(0.029)	(0.128)	(0.062)	(0.035)
Dep. Var Mean	5.172	5.135	5.204	5.216
Adjusted R-squared	0.715	0.708	0.681	0.687
Household Controls	Yes	Yes	Yes	Yes
Property Controls	Yes	Yes	Yes	Yes
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015

Notes: This table reports coefficient estimates using minimum down payment requirements as a proxy for HOA screening stringency. Household controls include log of household income (except in Panel C), log(household wealth), household size, and age of the household head. Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool, gym, and log(property age). Sample construction of each column follows Table 3. Panel A examines the impacts on the probability of minority buyers purchasing condo and co-ops. Panel B examines the impacts on the probability of cash purchase. Panel C examines the "income premium" on minority buyers. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$;$***p<0.01$.

Table 6: Robustness Check: Control for Seller Racial and Ethnic Demographics

	Minority	Black	Hispanic	Asian
Panel A: Probability of Minority Buyers Purchasing Condo and Co-ops				
	Probability of Purchase			
HOA Screening	-0.050***	-0.012	-0.047***	-0.039**
	(0.019)	(0.015)	(0.017)	(0.020)
Dep. Var Mean	0.262	0.082	0.092	0.218
Adjusted R-squared	0.115	0.301	0.049	0.112
Panel B: Probability of Cash Purchase				
	Probability of Cash Purchase			
HOA Screening	0.266***	0.278***	0.276***	0.293***
	(0.032)	(0.057)	(0.042)	(0.037)
Minority	-0.054***	-0.023	-0.046***	-0.060***
	(0.010)	(0.020)	(0.017)	(0.011)
Minority × HOA Screening	0.155***	0.032	0.127***	0.159***
	(0.034)	(0.057)	(0.049)	(0.036)
Dep. Var Mean	0.831	0.889	0.872	0.829
Adjusted R-squared	0.511	0.573	0.537	0.513
Panel C: "Income Premium" on Minorities				
	log(Income)			
HOA Screening	-0.060*	-0.046	-0.076	-0.043
	(0.036)	(0.066)	(0.054)	(0.045)
Minority	-0.013	-0.112***	-0.002	0.001
	(0.010)	(0.038)	(0.019)	(0.013)
Minority × HOA Screening	0.062*	0.143	0.083	0.039
	(0.035)	(0.137)	(0.069)	(0.047)
Dep. Var Mean	5.205	5.148	5.209	5.219
Adjusted R-squared	0.681	0.673	0.653	0.656
Seller Race/Ethnicity FE	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes
Property Controls	Yes	Yes	Yes	Yes
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	30,036	11,196	16,970	24,249

Notes: This table reports coefficient estimates after controlling for sellers' racial and ethnicity fixed effects. Household controls include log of household income (except in Panel C), log(household wealth), household size, and age of the household head. Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool, gym, and log(property age). Sample construction of each column follows Table 3. Panel A examines the impacts on the probability of minority buyers purchasing condo and co-ops. Panel B examines the impacts on the probability of cash purchase. Panel C examines the "income premium" on minority buyers. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$; $***p<0.01$.

Table 7: Alternative Sample: HMDA Data

	Black	Hispanic Down Payment	Asian
	(1)	(2)	(3)
HOA Screening	-0.260	0.006	0.013
	(0.250)	(0.063)	(0.043)
HMDA Black	-0.064**		
	(0.026)		
HMDA Black × HOA Screening	0.334		
	(0.203)		
HMDA Hispanic		-0.035**	
		(0.014)	
HMDA Hispanic × HOA Screening		0.091	
		(0.128)	
HMDA Asian			0.014**
			(0.007)
HMDA Asian × HOA Screening			0.021
			(0.049)
Property Controls	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes
School District FE	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes
Observations	1,122	2,199	4,760
Dep. Var Mean	0.314	0.322	0.338
Adjusted R-squared	0.183	0.169	0.190

Notes: This table reports robustness checks of InfoUSA data quality using HMDA-property linked data. Household controls include log(household income), bins of loan applicant age. Loan controls include loan type (conventional or FHA loan), occupancy type (owner-occupied or renter-occupied). Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool or gym and log(property age). Sample construction of each column follows Table 3. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$; $***p<0.01$.

Summary To sum up, I document that stringent HOA screening policies disproportionately affects minority buyers by reducing their probability of purchases, increasing their likelihood of cash purchases, and imposing a stronger "income premium." The results are stable under the instrumental variable strategy where I exploit historical origins of HOAs. The results are robust to alternative measures, data, as well as competing stories such as social networks.

Motivated by the reduced-form findings, I build a residential location choice model to understand different forces in shaping potential residents' preferences, including affordability, homophily, HOA screening stringency, and other amenities. The structural model and counterfactual analysis enable me to measure the welfare consequences of HOA screening across racial groups, and explore how racial bias embedded in the HOA screening shape the racial sorting in New York City.

4 Residential Location Choice Model

Following Bayer et al. (2007), I model the residential location choice of each household as a static discrete choice of property units with rich preference heterogeneity. Each property unit $j \in J$ is a tuple of property attributes $\mathbf{X}_j$, including HOA screening stringency HOA_j, tract-level shares of minority residents (TractBlack_j, TractHisp_j, TractAsian_j), number of bedrooms, age of the building, amenities, and neighborhood racial composition. The tract fixed effects are denoted as $\theta_{tr(j)}$. $\mathbf{P}_j$ includes the property sale price (in millions of dollars) and the log of monthly HOA fee (in thousands of dollars). Each household $i \in I$ has characteristics z_i, including household income, wealth, family size, and age of the household head. Both household characteristics and property attributes mirror control variables in my reduced-form analysis.

Household i chooses property j to maximize indirect utility V_{ij} as follows. ξ_j represents unobserved property attributes and ϵ_{ij} is an idiosyncratic shock which follows an i.i.d. Type-I extreme value distribution.

$$V_{ij} = \alpha_i \mathbf{X}_j + \beta_i \mathbf{P}_j + \theta_{tr(j)} + \xi_j + \epsilon_{ij}, \text{ with } \beta_i < 0 \tag{3}$$

Household's utility from property attributes α_i and disutility from sales price and HOA fee β_i is allowed to vary with household characteristics. Specifically, I incorporate a key variable HOA_j which characterizes HOA screening stringency. A larger value of HOA_j indicates more stringent requirement, reflecting HOA boards' stronger preference for financially secure buyers. I allow households to value HOA screening stringency by income, wealth, and racial groups.

$$\begin{aligned}\alpha_i^{HOA} \times HOA_j = (&\alpha_0^{HOA} + \alpha_1^{HOA} \log(\text{Income}_i) + \alpha_2^{HOA} \log(\text{Wealth}_i) + \\ &\alpha_3^{HOA} \text{Black}_i + \alpha_4^{HOA} \text{Hisp}_i + \alpha_5^{HOA} \text{Asian}_i) \times HOA_j\end{aligned}$$

I use α_1^{HOA} and α_2^{HOA} to measure whether higher income or wealth mitigates the disutility from HOA screening policies. Positive coefficients indicate that financially secure households are less deterred by stringent screening, increasing their probability of purchasing the units. Similarly, α_3^{HOA}, α_4^{HOA}, α_5^{HOA} capture the heterogeneous impacts of HOA screening on Black, Hispanic, and Asian buyers relative to White buyers. A negative coefficient indicates that minorities get more distorted by stringent HOA screening policies, and thus higher-screening buildings are less accessible to them. However, if these coefficients are positive, they capture the extent to which HOA screening policies are valued by prospective buyers of different incomes, wealth, and racial and ethnic identities.

The utility function V_{ij} accommodates the homophily preference by including neighborhood racial demographics shifters, such as tract-level shares of Black residents (TractBlack_j), Hispanic residents (TractHisp_j), and Asian residents (TractAsian_j). I further allow the homophily preference to vary by the buyers' own race/ethnicity characteristics. The homophily preference is

parameterized as follows. α_1^{Hom}, α_2^{Hom}, and α_3^{Hom} capture the strength of the homophily preference within each racial group. The mean utility of tract-level racial composition is subsumed in the tract fixed effects $\theta_{tr(j)}$.

$$\alpha_1^{Hom}\,\text{Black}_i \times \text{TractBlack}_j + \alpha_2^{Hom}\text{Hisp}_i \times \text{TractHisp}_j + \alpha_3^{Hom}\text{Asian}_i \times \text{TractAsian}_j$$

Another flexibility I build into the model is that it allows preferences for the number of bedrooms to vary with household size. Moreover, I allow heterogeneity of price elasticity. Specifically, the marginal disutility from house price SalePrice_j and HOA fees $\log\left(\text{HOA Fee}_j\right)$ would vary by household income, respectively. The disutility from sales price and HOA fee $\beta_i \mathbf{P}_j$ is parameterized as follows.

$$\begin{aligned}\beta_i \mathbf{P}_j = {} & \beta_1 \text{SalePrice}_j + \beta_2 \log\left(\text{HOA Fee}_j\right) + \\ & \beta_3 \log(\text{Income}_i) \times \text{SalePrice}_j + \beta_4 \log(\text{Income}_i) \times \log\left(\text{HOA Fee}_j\right)\end{aligned}$$

β_1 and β_2 denote the baseline marginal disutility with respect to the house price and HOA fees, while β_3 and β_4 capture preference heterogeneity across household incomes. β_3 and β_4 would be negative if richer households have lower price elasticity.

Therefore, I rewrite the indirect utility V_{ij} in equation (3) into two components, mean utility δ_j that is common to all households, and household-specific utility λ_{ij}. δ_j is shaped by both observed and unobserved property attributes, as well as tract fixed effects. λ_{ij} incorporates rich heterogeneous preferences towards HOA screening stringency, tract-level racial composition and prices across household income, racial groups, demographic characteristics.

$$V_{ij} = \delta_j + \lambda_{ij} + \epsilon_{ij}$$

where

$$\begin{aligned}\delta_j = {} & \alpha_0^{\text{HOA}}\,\text{HOA}_j + \alpha_1 \text{PropertyAge}_j + \alpha_2 \text{Bed}_j + \alpha_3 \text{Pool}_j + \alpha_4 \text{Gym}_j \\ & + \alpha_5 \text{Elevator}_j + \alpha_6 \text{Doorman}_j + \beta_1 \text{SalePrice}_j + \beta_2 \log\left(\text{HOA Fee}_j\right) + \theta_{tr(j)} + \xi_j\end{aligned}$$

and

$$\begin{aligned}\lambda_{ij} = {} & \alpha_1^{\text{HOA}} \log(\text{Income}_i) \times \text{HOA}_j + \alpha_2^{\text{HOA}} \log(\text{Wealth}_i) \times \text{HOA}_j + \alpha_3^{\text{HOA}}\,\text{Black}_i \times \text{HOA}_j \\ & + \alpha_4^{\text{HOA}}\,\text{Hispanic}_i \times \text{HOA}_j + \alpha_5^{\text{HOA}} \text{Asian}_i \times \text{HOA}_j \\ & + \alpha_1^{Hom}\,\text{Black}_i \times \text{TractBlack}_j + \alpha_2^{Hom}\,\text{Hisp}_i \times \text{TractHisp}_j \\ & + \alpha_3^{Hom}\,\text{Asian}_i \times \text{TractAsian}_j + \alpha_1^{\text{Bed}}\,\text{HH size}_i \times \text{Bed}_j \\ & + \beta_3 \log(\text{Income}_i) \times \text{SalePrice}_j + \beta_4 \log(\text{Income}_i) \times \log\left(\text{HOAFee}_j\right)\end{aligned}$$

One potential concern is the degree of HOA screening stringency may be correlated with unobserved HOA maintenance quality, which would be valued differently across income groups. Since HOAs are often organized as non-profits, I assume the efforts of HOA members and

maintenance quality which are unobserved to economists would be visible to owners and priced into HOA maintenance fee. In the heterogeneous preference, I allow buyers' evaluation on HOA fee vary across income levels. By allowing the marginal disutility from HOA fees (β_4) to vary with income, I partially control for this source of heterogeneity in maintenance quality.

5 Estimation and Results

5.1 Estimation Procedure

I estimate the model using data on cross-sectional residential location choices in New York City. The sample consists of all condo and co-op transactions in 2010, supplemented with tract-level Census statistics. The choice set of households is defined by all the condo and co-op units transacted during this one-year period.

For a candidate vector of parameters (α, β), the probability of choosing a unit is given by

$$P_{ij} = \frac{\exp(\delta_j + \lambda_{ij})}{\sum_k \exp(\delta_k + \lambda_{ik})} \tag{4}$$

The log-likelihood function of the joint location choices is

$$\text{Log } L = \sum_i \sum_j I_{ij} \ln(P_{ij}) \tag{5}$$

where I_{ij} equals one if household *i* chooses option *j*, and zero otherwise.

The estimation takes two steps following Bayer et al. (2007). In the first step, the optimal heterogeneous preference parameters ($\alpha_{1-5}^{\text{HOA}}$, α_{1-3}^{Hom}, α_1^{Bed}, β_{3-4}) are estimated by maximizing the log likelihood function (5). I use a contraction mapping in each iteration to recover the corresponding vector of mean utility δ_j. In the second step, given the estimated mean utility $\hat{\delta}_j$ under the optimal heterogeneous preference parameters, I then estimate the mean preference parameters (α_0^{HOA}, α_{1-6}, β_{1-2}) by regressing the mean utility on HOA screening stringency, property attributes, sale price, and HOA fee with tract fixed effects.

To identify the coefficients in the homogeneous preference, I instrument for sale price of the condo and co-op units with the percent of park area which are located between 2 and 3 miles from the property. (Bayer et al., 2007; Park and Hahm, 2023; Barwick et al., 2024; Davis et al., 2024) While the land use of the nearby-but-non-adjacent area affects the sale prices of the units (relevance condition), these areas are unlikely to share the unobserved local amenities (exclusion restriction).

5.2 Estimation Results

Table 8 reports the estimation results. Panel A shows parameter estimates of heterogeneous preference, and Panel B shows parameter estimates of mean utility. The mean preference for HOA screening stringency α_0^{HOA} is negative, revealing that buyers strongly prefer properties with more lenient HOA screening requirements. However, potential buyers with higher income and wealth are less distorted by more strict HOA policies, as indicated in positive values of α_1^{HOA}, α_2^{HOA}. Conditional on income and wealth, Black, Hispanic and Asian households are distorted more by stringent HOA screening than comparable White households.

For the remainder of estimated parameters, α_1^{Hom}, α_2^{Hom}, and α_3^{Hom} indicate strong homophily preferences: Black, Hispanic, and Asian buyers derive higher utility from neighborhoods with larger shares of residents from their own racial or ethnic groups, with the largest effect for Black buyers (α_1^{Hom} = 7.306). Larger households have a stronger preference for units with more bedrooms (α_1^{Bed} = 0.115). As expected, higher sale prices (β_1^{OLS}= -7.935, β_1^{2SLS}= -7.977) and HOA fees (β_2^{OLS} = -2.265, β_2^{2SLS} = -2.102) lower mean utility, conditional on other attributes. The positive β_3 suggests that the marginal disutility of sale price decreases with income. Similarly, the positive β_4 indicates that high-income households are less sensitive to high HOA fees, which may suggest they value more amenities and maintenance quality from HOAs.

5.3 Counterfactual Analysis

Welfare Implications Using the estimated parameters of mean utility and heterogeneous preference, I can compute the ex-ante welfare of the choice set of transacted properties for buyer *i* in 2010 as follows.

$$EU_i^0 = \ln\left(\sum_{j=1}^{J} \exp\left[\hat{\alpha}_i \mathbf{X}_j + \hat{\beta}_i \mathbf{P}_j + \hat{\theta}_{tr(j)} + \hat{\xi}_j\right]\right) + \gamma$$

where the estimated parameters ($\hat{\alpha}_i$, $\hat{\beta}_i$, $\hat{\theta}_{tr(j)}$, $\hat{\xi}_j$) are from Table 8 and $\gamma = E(\epsilon_{ij})$ = 0.5772 as Euler's constant. I then divide the log-sum by the absolute value of the marginal disutility of sale price ($\beta_1 + \beta_3 \log(\text{Income}_i)$) to convert all measures into dollar values. This yields the following measure of ex-ante welfare W_i^0 of the choice set to the buyer with median income level from each same racial groups *r* ∈ {White, Black, Hispanic, Asian}, which is denoted as W_i^0.

$$W_r^0 = \frac{EU_r^0}{\beta_1 + \beta_3 \log(\text{Income}_i)}$$

Table 8: Model Estimation

Coefficient			Parameter	MLE Estimate	S.E.
Panel A: Parameters of Heterogeneous Preference					
log(Income)	×	HOA Screening Index	α_1^{HOA}	0.719	0.193
log(Household Wealth)	×	HOA Screening Index	α_2^{HOA}	0.125	0.051
Black Buyer	×	HOA Screening Index	α_3^{HOA}	-0.280	0.555
Hispanic Buyer	×	HOA Screening Index	α_4^{HOA}	-0.685	0.389
Asian Buyer	×	HOA Screening Index	α_5^{HOA}	-1.342	0.229
Black Buyer	×	Tract Black Share	α_1^{Hom}	7.306	0.431
Hispanic Buyer	×	Tract Hispanic Share	α_2^{Hom}	4.132	0.337
Asian Buyer	×	Tract Asian Share	α_3^{Hom}	5.010	0.556
Household Size	×	Number of Bedrooms	α_1^{Bed}	0.115	0.022
log(Income)	×	Sale Price	β_3	1.359	0.066
log(Income)	×	log(HOA Fee)	β_4	0.430	0.044

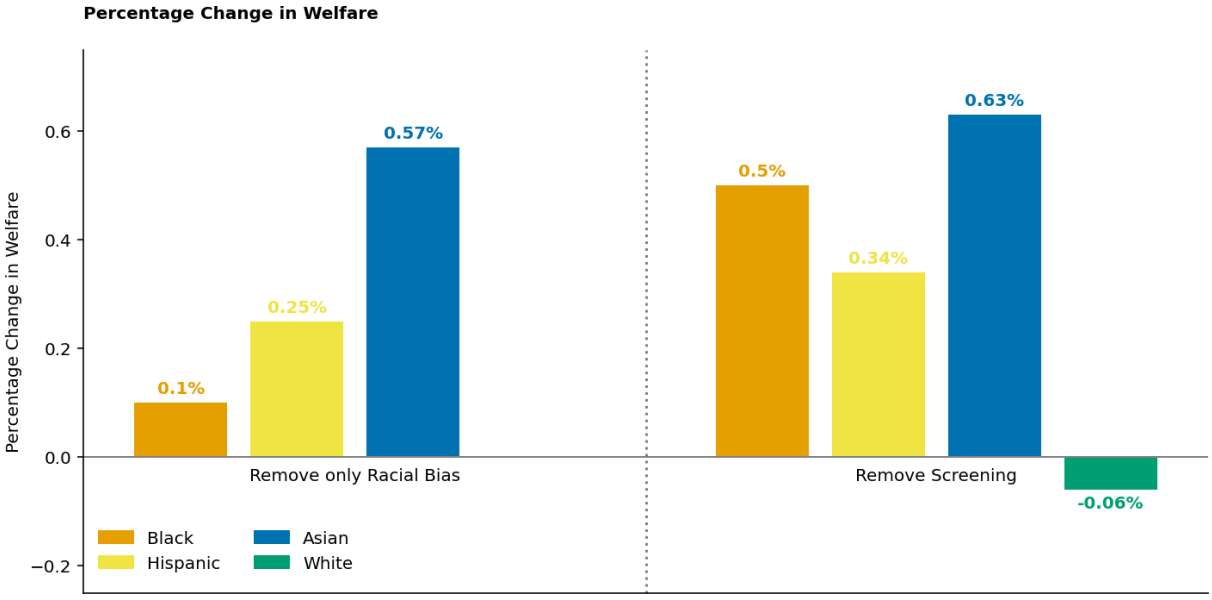
Coefficient	Parameter	OLS	2SLS
Panel B: Parameters of Mean Utility			
HOA Screening	α_0^{HOA}	-4.462	-4.425
		(0.043)	(0.243)
Sale Price (unit: $1,000,000)	β_1	-7.935	-7.977
		(0.033)	(0.902)
log(HOA Fee)	β_2	-2.265	-2.102
		(0.025)	(0.447)
Property Controls		Yes	Yes
Tract Fixed Effects		Yes	Yes
Cluster		Tract	Tract
Observations		4,539	4,539
Adjusted R-squared		0.998	0.992
First-stage F-statistics			51.000

Notes: This table reports the model estimation using condo and co-op transactions in 2010 in New York City. Property controls include log(property age), number of bedrooms, whether the building has an elevator, doorman, pool, gym. Standard errors of MLE Estimation in Panel A are computed from the inverse Hessian of the log-likelihood from the Maximum Likelihood Estimation. Standard errors of OLS and 2SLS regression in Panel B are clustered at tract level in parentheses.

In the first counterfactual exercise, I eliminate racial bias in HOA screening by setting α_3^{HOA}, α_4^{HOA}, $\alpha_5^{\text{HOA}} = 0$ in the individual utility, solve the new location choice equilibrium, and recalculate the counterfactual welfare of the choice set to the median-income buyer from group r, denoted as W_r^1. The results are shown in the left panel of Figure 3. Eliminating racial bias in HOA screening yields modest average welfare gains. The welfare for median-income White buyers stays roughly the same, while the welfare for median-income Black, Hispanic, and Asian buyers increases by 0.1%, 0.25%, and 0.57%, respectively.

In the second counterfactual exercise, I remove all the screening effects by setting $\alpha_0^{\text{HOA}} = 0$ in the mean utility, α_1^{HOA}, $\alpha_2^{\text{HOA}} = 0$ for income and wealth screening, and α_3^{HOA}, α_4^{HOA}, $\alpha_5^{\text{HOA}} = 0$ for racial screening as well. I solve the new location choice equilibrium, and re-calculate the counterfactual welfare of the choice set to the median-income buyer from group r, denoted as W_r^2. Removing all HOA screening effects produces larger gains: a 0.5% increase for the median-income Black buyer, a 0.34% increase for the median-income Hispanic buyer, and a 0.63% increase for the median-income Asian buyer, while the median-income White buyer experience a small welfare loss by 0.06%.

Figure 3: Welfare Effects of Removing Racial Bias v. Removing All Screening Policies



Notes: This figure reports percentage changes in welfare from removing racial bias and removing all screening policies. "Remove Racial Bias" sets $\alpha_3^{\text{HOA}} = \alpha_4^{\text{HOA}} = \alpha_5^{\text{HOA}} = 0$, eliminating the direct effect of race and ethnicity on HOA screening. "Remove All Screening Policies" sets $\alpha_0^{\text{HOA}} = 0$ in the mean utility and $\alpha_1^{\text{HOA}} = \alpha_2^{\text{HOA}} = \alpha_3^{\text{HOA}} = \alpha_4^{\text{HOA}} = \alpha_5^{\text{HOA}} = 0$ in the heterogeneous preference parameters, eliminating all income-, wealth-, and race-based screening effects. Welfare changes are computed for the median-income household within each racial or ethnic group and expressed as percentages of baseline welfare.

Redistribution and Segregation I next examine the impact of HOA screening on residential segregation using the dissimilarity index (DI). The dissimilarity index (DI) quantifies the degree of unevenness in the spatial distribution of two groups across the geographic subunits that comprise a broader area (Massey and Denton, 1993; Boustan, 2013).[13] Following the literature on DI, I create a measure of evenness between minority buyers and White buyers given the condo and co-op buyer sample in 2010 in New York City. As I didn't account for the non-transacted population, I focus more on the change of DI between the baseline and the counterfactual scenarios.

I calculate the probability of buyer *i* purchasing a specific property *j* as P_{ij} according to equation (4). I then aggregate the probability of all the buyers from the same racial and ethnic groups *r* purchasing properties in a specific census tract *k*, and divide them by the total population of buyers N_r from this group *r*. $P_{r,k}$ can be interpreted as the overall probability that buyers from the racial group *r* decides to purchase a unit in tract *k*.

$$P_{r,k} = \frac{\sum_j^J \sum_{i=1}^I \mathbf{1}\{\text{race}_i = r\} \times \mathbf{1}\{\text{tract}_j = k\} \times P_{ij}}{N_r}$$

The dissimilarity index between a minority buyer and a White buyer can thus be defined as in equation (6). I first take the absolute difference of $P_{r,k}$ between a minority buyer and White buyer. I then aggregate the absolute differences over the entire set of census tracts *K*, and divide the outcome by 2.

$$DI_r = \frac{1}{2}\sum_{k=1}^{K} \left|P_{r,k} - P_{\text{White},k}\right|, r \in \{\text{ Black, Hispanic, Asian }\} \tag{6}$$

In the two counterfactual scenarios, I remove the racial bias and screening effects by setting the corresponding coefficients to 0 in the same way as in the welfare calculation. This yields new equilibrium shares of buyers from group *r* purchasing properties in tract *k* ($P_{r,k}^1$, $P_{r,k}^2$) as well as new DIs.

The 2010 sample consists of 3,196 White buyers, 188 Black buyers, 306 Hispanic buyers, and 869 Asian condo/co-op buyers. I calculate the baseline transaction dissimilarity index as 14.28 for minority–White segregation, 43.64 for Black–White, 21.84 for Hispanic–White, and 6.9 for Asian–White. Therefore, according to the criterion proposed by Logan and Stults (2011), Black and White residents are moderately segregated.

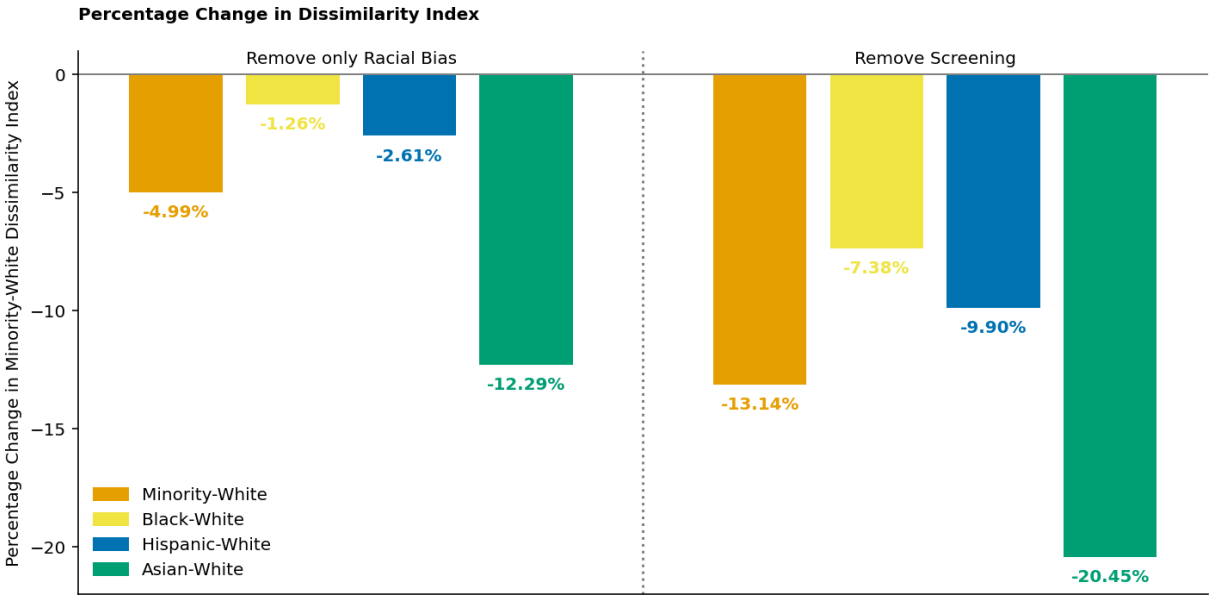
In the first counterfactual scenario, removing racial bias in HOA screening stringency reduces the minority–White DI to 13.57, which is a 4.99% reduction from the baseline level. I also find that the dissimilarity index between Black and White buyers declines slightly by 1.26%,

[13] The DI ranges from zero to one hundred. Logan and Stults (2011) view DI ∈ [0, 30] as well integrated, DI ∈ (30, 60) as moderately segregated, and DI ∈ [60, 100] as highly segregated.

and that between Hispanic and White buyers decreases by 2.61%. There is a larger relative drop of 12.29% between Asian and White buyers.

In the second counterfactual scenario, eliminating all screening power yields larger integration gains. The minority–White dissimilarity index falls to 12.40, reduced by 13.14% from the baseline level. The dissimilarity index between Black and White buyers decreases to 40.42, which still indicates a moderate segregation, but there is a 7.38% reduction from the baseline level. The dis-similarity index between Hispanic and White buyers drops to 19.68 by 9.90% from the baseline level, and the dissimilarity index between Asian and White buyers drops to 5.52 by 20.45% from the baseline level. Therefore, removing HOAs could partially improve the integration between different races and increase social welfare.

Figure 4: Effects of Removing Racial Bias v. Removing All Screening Policies



Notes: This figure reports percentage changes in the Dissimilarity Index (DI) under the same counterfactual scenarios as in Figure 3 "Remove only Racial Bias" and "Remove All Screening Policies." The DI measures the evenness of the distribution of minority (Black/Hispanic/Asian) and White buyers across census tracts in the 2010 condo/co-op transaction sample. Percentage changes are relative to the baseline DI for minority-White, Black-White, Hispanic-White and Asian-White comparison.

6 Conclusion

This paper examines how homeowners' association (HOA) boards shape residential sorting and racial segregation in New York City. Leveraging a novel dataset of HOA board requirements, I construct an HOA Screening Stringency Index that quantifies the degree of board control over

buyer access. This measure captures variation in screening stringency across buildings and allows me to assess its impact on residential segregation.

Reduced-form evidence shows that minority condo and co-op buyers face unequal access to buildings with more stringent HOA screening policies. To pass more stringent screenings, minority buyers are more likely to pay in cash and must earn higher income than comparable White buyers. These disparities are partly rooted in historical exclusionary institutions: buildings in neighborhoods rated as “Best” or “Still Desirable” by the Home Owners’ Loan Corporation exhibit significantly higher screening stringency even more than fifty years after the Fair Housing Act.

A structural residential location choice model shows that HOA screening amplifies both income/wealth sorting and racial segregation. Counterfactual simulations suggest that removing racial bias in screening yields modest but meaningful welfare gains for minority buyers (+0.1% to +0.57% for the median-income household) with no change for White buyers. Eliminating all screening effects yields larger gains (+0.34% to +0.63% for minority buyers) but imposes a small welfare loss on White buyers (–0.06%). On racial segregation, removing racial bias reduces the minority–White dissimilarity index by 4.99%, while eliminating all screening policies lowers it by 13.14%.

The results indicate that HOA screening restricts minority buyers’ access despite being presented as neutral financial assessments. Policies aimed at enhancing transparency, limiting discretionary authority, and reinforcing fair housing enforcement could help reduce resulting economic and racial segregation.

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A Appendix

Table A1: Probability of Minority Buyers Purchasing Condo and Co-ops

	Minority	Black	Hispanic	Asian
	Probability of Purchase			
	(1)	(2)	(3)	(4)
HOA Screening	-0.060***	-0.021**	-0.045***	-0.045**
	(0.016)	(0.010)	(0.011)	(0.018)
log(Sale Price)	0.005	0.001	-0.002	0.020***
	(0.007)	(0.004)	(0.005)	(0.007)
log(Income)	-0.004	-0.019***	0.001	0.005
	(0.004)	(0.004)	(0.004)	(0.004)
log(Household Wealth)	-0.042***	-0.028***	-0.032***	-0.026***
	(0.010)	(0.008)	(0.009)	(0.009)
log(HOA Fee)	-0.080***	-0.004	-0.014***	-0.092***
	(0.008)	(0.004)	(0.005)	(0.009)
Household Size	-0.003	0.012***	-0.007***	-0.005*
	(0.003)	(0.002)	(0.002)	(0.003)
Household Head Age	-0.002***	-0.000***	-0.000	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Elevator	0.003	-0.020	-0.000	-0.011
	(0.011)	(0.015)	(0.010)	(0.013)
Doorman	-0.009	-0.021**	-0.032***	-0.009
	(0.011)	(0.010)	(0.008)	(0.010)
Number of Bedrooms	0.009***	0.001	0.003*	0.008***
	(0.003)	(0.002)	(0.002)	(0.003)
Pool	0.061***	0.002	0.007	0.064***
	(0.013)	(0.006)	(0.006)	(0.015)
Gym	0.013*	0.002	0.000	0.009
	(0.007)	(0.004)	(0.005)	(0.008)
log(Property Age)	-0.038***	0.003	-0.005*	-0.042***
	(0.005)	(0.003)	(0.003)	(0.005)
Constant	1.390***	0.439***	0.527***	1.083***
	(0.087)	(0.072)	(0.072)	(0.098)
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015
Dep. Var Mean	0.294	0.083	0.094	0.230
Adjusted R-squared	0.137	0.364	0.086	0.123

Notes: This table reports the full set of coefficient estimates in Panel A of Table 3. Standard errors are clustered at the tract level in parentheses. $^{*}p<0.10$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A2: Probability of Cash Purchase

	Minority	Black	Hispanic	Asian
	Probability of Cash Purchase			
	(1)	(2)	(3)	(4)
Minority	-0.054***	-0.051***	-0.060***	-0.054***
	(0.007)	(0.013)	(0.011)	(0.009)
HOA Screening	0.299***	0.323***	0.297***	0.320***
	(0.038)	(0.065)	(0.044)	(0.043)
Minority × HOA Screening	0.144***	0.099**	0.139***	0.141***
	(0.030)	(0.047)	(0.039)	(0.032)
log(Sale Price)	-0.214***	-0.184***	-0.207***	-0.215***
	(0.012)	(0.018)	(0.015)	(0.013)
log(Income)	-0.040***	-0.040***	-0.042***	-0.045***
	(0.004)	(0.005)	(0.005)	(0.005)
log(Household Wealth)	0.008	0.002	0.009	0.011
	(0.007)	(0.009)	(0.009)	(0.008)
log(HOA Fee)	0.244***	0.228***	0.248***	0.248***
	(0.014)	(0.021)	(0.017)	(0.015)
Household Size	0.008***	0.010***	0.009***	0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Household Head Age	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Elevator	0.037**	0.047*	0.040**	0.034*
	(0.016)	(0.026)	(0.020)	(0.019)
Doorman	-0.027**	-0.050**	-0.017	-0.025*
	(0.013)	(0.024)	(0.013)	(0.014)
Number of Bedrooms	-0.013***	-0.016***	-0.014***	-0.015***
	(0.003)	(0.005)	(0.004)	(0.003)
Pool	-0.059**	-0.078**	-0.058*	-0.055**
	(0.026)	(0.039)	(0.031)	(0.026)
Gym	-0.033**	-0.026	-0.031**	-0.034**
	(0.013)	(0.018)	(0.014)	(0.014)
log(Property Age)	0.071***	0.066***	0.073***	0.069***
	(0.008)	(0.014)	(0.010)	(0.009)
Constant	1.746***	1.517***	1.609***	1.742***
	(0.133)	(0.178)	(0.158)	(0.142)
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015
Dep. Var Mean	0.737	0.764	0.770	0.738
Adjusted R-squared	0.521	0.573	0.541	0.512

Notes: This table reports the full set of coefficient estimates in Panel B of Table 3. Standard errors are clustered at tract level in parentheses. $^{*}p<0.10$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A3: "Income Premium" on Minorities

	Minority	Black	Hispanic	Asian
		log(Income)		
	(1)	(2)	(3)	(4)
Minority	-0.015**	-0.088***	-0.018	-0.004
	(0.006)	(0.023)	(0.013)	(0.008)
HOA Screening	-0.061*	-0.043	-0.071*	-0.057
	(0.033)	(0.047)	(0.040)	(0.037)
Minority × HOA Screening	0.063**	0.066	0.121**	0.058*
	(0.025)	(0.102)	(0.049)	(0.031)
log(Sale Price)	0.051***	0.049***	0.055***	0.049***
	(0.010)	(0.013)	(0.011)	(0.011)
log(Household Wealth)	1.342***	1.325***	1.314***	1.344***
	(0.016)	(0.022)	(0.020)	(0.017)
log(HOA Fee)	-0.011	-0.022*	-0.014	-0.012
	(0.008)	(0.012)	(0.010)	(0.009)
Household Size	0.029***	0.035***	0.037***	0.034***
	(0.003)	(0.005)	(0.004)	(0.003)
Household Head Age	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Elevator	-0.007	-0.009	-0.013	-0.011
	(0.018)	(0.031)	(0.028)	(0.021)
Doorman	0.009	0.028	0.010	0.010
	(0.016)	(0.028)	(0.020)	(0.017)
Number of Bedrooms	0.012***	0.021***	0.014***	0.013***
	(0.004)	(0.005)	(0.005)	(0.004)
Pool	0.083***	0.067***	0.090***	0.087***
	(0.022)	(0.019)	(0.022)	(0.023)
Gym	-0.008	-0.012	-0.004	-0.011
	(0.012)	(0.018)	(0.014)	(0.013)
log(Property Age)	-0.013*	-0.023**	-0.015*	-0.013*
	(0.007)	(0.010)	(0.009)	(0.007)
Constant	-6.233***	-6.137***	-6.065***	-6.211***
	(0.161)	(0.203)	(0.190)	(0.166)
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015
Dep. Var Mean	5.171	5.135	5.204	5.216
Adjusted R-squared	0.714	0.707	0.680	0.686

Notes: This table reports the full set of coefficient estimates in Panel C of Table 3. Standard errors are clustered at tract level in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table A4: Probability of Buyers to be Minorities using predicted HOA Screening

	Minority	Black	Hispanic	Asian
	Probability of Purchase			
	(1)	(2)	(3)	(4)
Predicted HOA Screening	-0.113***	-0.030***	-0.042***	-0.107***
	(0.011)	(0.007)	(0.008)	(0.012)
log(Sale Price)	-0.019***	-0.006	-0.008	-0.004
	(0.006)	(0.005)	(0.006)	(0.006)
log(Income)	-0.003	-0.018***	0.003	0.005
	(0.004)	(0.004)	(0.004)	(0.004)
log(Household Wealth)	-0.047***	-0.027***	-0.034***	-0.031***
	(0.010)	(0.007)	(0.009)	(0.010)
log(HOA Fee)	-0.050***	0.005	-0.006	-0.061***
	(0.008)	(0.004)	(0.006)	(0.009)
Household Size	-0.003	0.012***	-0.007***	-0.005*
	(0.003)	(0.002)	(0.002)	(0.003)
Household Head Age	-0.002***	-0.000**	0.000	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Elevator	0.009	-0.022	0.003	-0.004
	(0.011)	(0.015)	(0.011)	(0.013)
Doorman	-0.014	-0.019*	-0.031***	-0.014
	(0.011)	(0.011)	(0.008)	(0.010)
Number of Bedrooms	0.008***	0.000	0.003	0.007**
	(0.003)	(0.002)	(0.002)	(0.003)
Pool	0.050***	0.001	0.003	0.054***
	(0.012)	(0.006)	(0.006)	(0.013)
Gym	0.004	-0.000	-0.002	0.002
	(0.007)	(0.003)	(0.004)	(0.007)
log(Property Age)	-0.047***	0.010**	0.002	-0.056***
	(0.009)	(0.005)	(0.005)	(0.009)
Constant	1.675***	0.452***	0.563***	1.386***
	(0.094)	(0.073)	(0.076)	(0.105)
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	63,097	31,106	41,427	52,901
Dep. Var Mean	0.285	0.075	0.092	0.223
Adjusted R-squared	0.129	0.334	0.077	0.119
First-stage F-statistics		20.15		

Notes: This table reports coefficient estimates using predicted HOA Screening Stringency Index from historical factors as an instrumental variable. Sample construction of each column follows Table 3. Standard errors are clustered at tract level in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table A5: Alternative Measure: Financial Document Requirement

	Minority	Black	Hispanic	Asian
Panel A: Probability of Minority Buyers Purchasing Condo and Co-ops				
	Probability of Purchase			
Financial Document	-0.012**	-0.005	-0.012***	-0.008
	(0.006)	(0.004)	(0.004)	(0.007)
Dep. Var Mean	0.294	0.083	0.094	0.230
Adjusted R-squared	0.137	0.364	0.086	0.123
Panel B: Probability of Cash Purchase				
	Probability of Cash Purchase			
Min Down Payment	0.105***	0.118***	0.100***	0.108***
	(0.012)	(0.021)	(0.014)	(0.013)
Minority	-0.030***	-0.035***	-0.037***	-0.031***
	(0.004)	(0.008)	(0.006)	(0.005)
Minority × Financial Document	0.042***	0.023	0.051***	0.042***
	(0.007)	(0.015)	(0.010)	(0.009)
Dep. Var Mean	0.737	0.764	0.770	0.738
Adjusted R-squared	0.521	0.573	0.541	0.511
Panel C: "Income Premium" on Minorities				
	log(Income)			
Financial Document	-0.018	-0.011	-0.020	-0.017
	(0.012)	(0.017)	(0.014)	(0.013)
Minority	-0.005	-0.077***	0.003	0.006
	(0.004)	(0.015)	(0.009)	(0.005)
Minority × Financial Document	0.023***	0.029	0.041**	0.020*
	(0.009)	(0.032)	(0.016)	(0.011)
Dep. Var Mean	5.172	5.135	5.204	5.216
Adjusted R-squared	0.715	0.708	0.681	0.686
Household Controls	Yes	Yes	Yes	Yes
Property Controls	Yes	Yes	Yes	Yes
School District FE	Yes	Yes	Yes	Yes
Sale Year × Tract FE	Yes	Yes	Yes	Yes
Observations	65,950	32,330	42,792	55,015

Notes: This table reports coefficient estimates using financial document requirements as a proxy for HOA screening stringency. Household controls include log of household income (except in Panel C), log(household wealth), household size, and age of the household head. Property controls include log(sale price), log(HOA fee), number of bedrooms, whether the building has an elevator, doorman, pool, gym, and log(property age). Sample construction of each column follows Table 3. Panel A examines the impacts on the probability of minority buyers purchasing condo and co-ops. Panel B examines the impacts on the probability of cash purchase. Panel C examines the "income premium" on minority buyers. Standard errors are clustered at tract level in parentheses. $*p<0.10$; $**p<0.05$; $***p<0.01$.

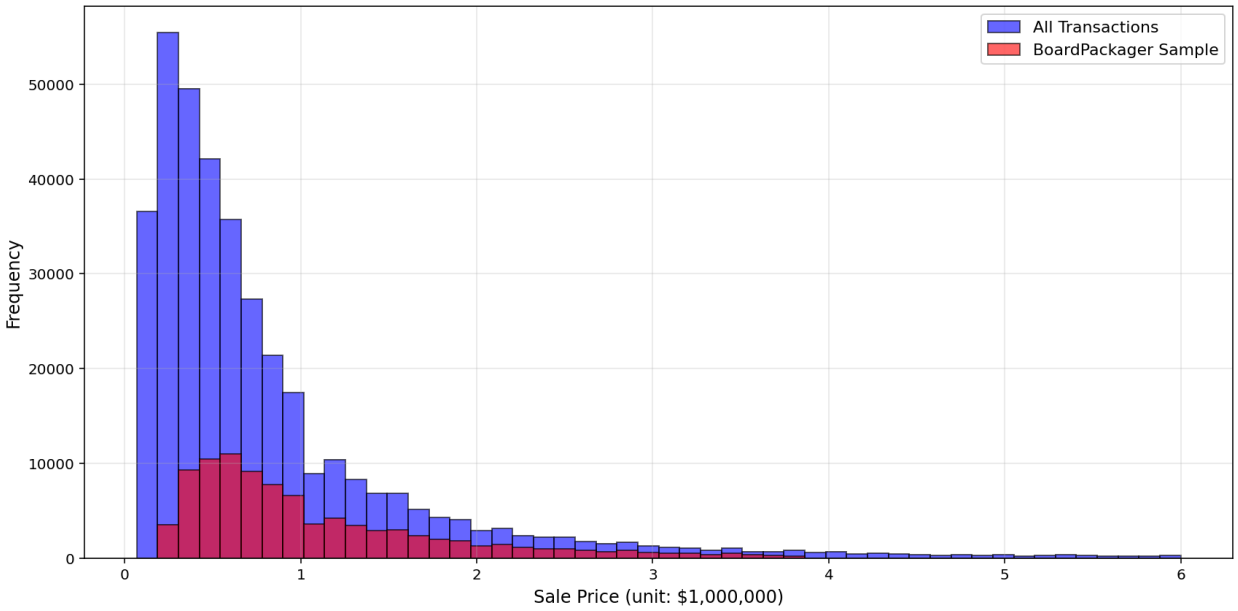
Table A6: Model Estimation

Coefficient			Parameter	MLE Estimate	S.E.
Panel A: Parameters of Heterogeneous Preference					
log(Income)	×	HOA Screening Index	α_1^{HOA}	0.719	0.193
log(Household Wealth)	×	HOA Screening Index	α_2^{HOA}	0.125	0.051
Black Buyer	×	HOA Screening Index	α_3^{HOA}	-0.280	0.555
Hispanic Buyer	×	HOA Screening Index	α_4^{HOA}	-0.685	0.389
Asian Buyer	×	HOA Screening Index	α_5^{HOA}	-1.342	0.229
Black Buyer	×	Tract Black Share	α_1^{Hom}	7.306	0.431
Hispanic Buyer	×	Tract Hispanic Share	α_2^{Hom}	4.132	0.337
Asian Buyer	×	Tract Asian Share	α_3^{Hom}	5.010	0.556
Household Size	×	Number of Bedrooms	α_1^{Bed}	0.115	0.022
log(Income)	×	Sale Price	β_3	1.359	0.066
log(Income)	×	log(HOA Fee)	β_4	0.430	0.044

Coefficient	Parameter	OLS	2SLS
Panel B: Parameters of Mean Utility			
HOA Screening	α_0^{HOA}	-4.462	-4.425
		(0.043)	(0.243)
log(Property Age)	α_1	-0.018	0.040
		(0.011)	(0.021)
Bed	α_2	-0.096	-0.116
		(0.009)	(0.187)
Pool	α_3	0.053	0.131
		(0.044)	(0.091)
Gym	α_4	0.006	-0.019
		(0.012)	(0.047)
Elevator	α_5	0.013	-0.075
		(0.030)	(0.322)
Doorman	α_6	0.051	0.176
		(0.143)	(0.080)
Sale Price (unit: $1,000,000)	β_1	-7.935	-7.977
		(0.033)	(0.902)
log(HOA Fee)	β_2	-2.265	-2.102
		(0.025)	(0.447)
Tract Fixed Effects		Yes	Yes
Cluster		Tract	Tract
Observations		4,539	4,539
Adjusted R-squared		0.998	0.992
First-stage F-statistics			51.000

Notes: This table reports the model estimation using condo and co-op transactions in 2010 in New York City. Standard errors of MLE Estimation in Panel A are computed from the inverse Hessian of the log-likelihood from the Maximum Likelihood Estimation. Standard errors of OLS and 2SLS regression in Panel B are clustered at tract level in parentheses.

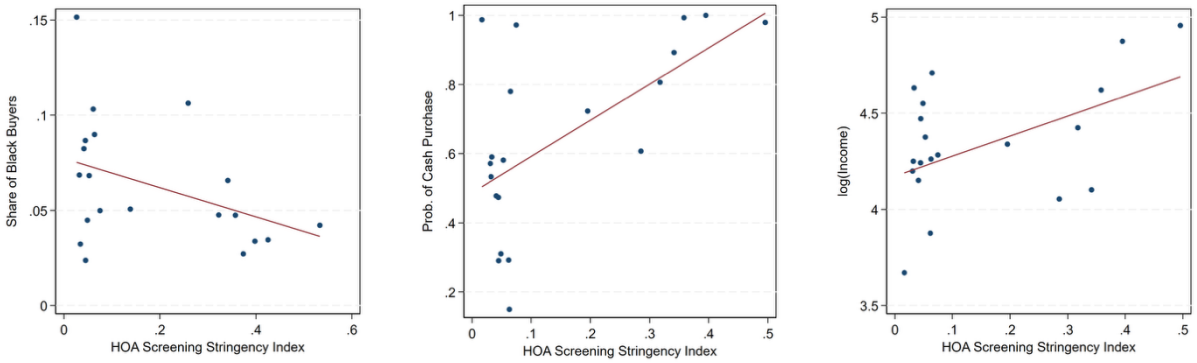
Figure A1: Price Distribution: All Transactions vs BoardPackager Sample



Notes: This figure compares the sale price distribution in the BoardPackager sample against the full population of condo and co-op transactions in New York City between 2006 and 2022 (with prices trimmed at the 1% level).

Figure A2: Correlations between HOA Stringency Index and Outcome Variables

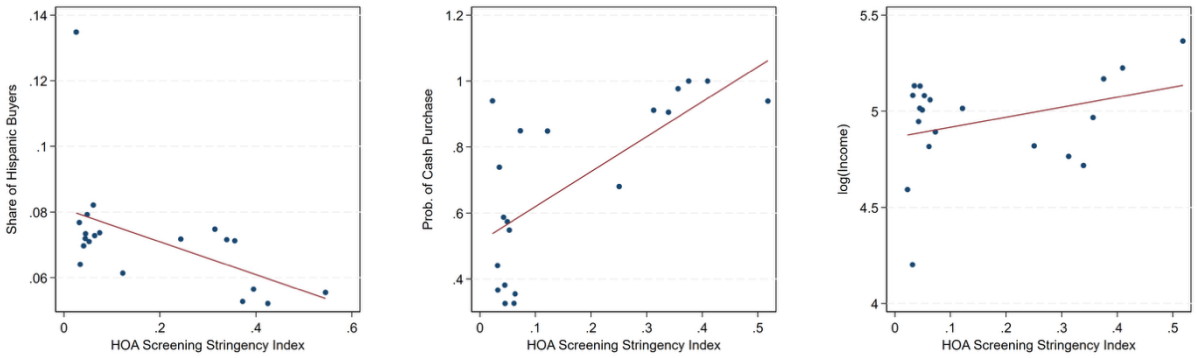
(a) Share of Black Buyers **(b)** Cash Purchase (Black Buyers) **(c)** Income (Black Buyers)



Notes: This figure shows correlations between the HOA Screening Stringency Index and buyer outcomes. Panel (a) shows that more stringent HOA screening is correlated with a lower share of Black buyers. Panels (b) and (c) show a positive relationship between screening stringency and probability of cash purchases and income among Black buyers, respectively.

Figure A3: Correlations between HOA Stringency Index and Outcome Variables

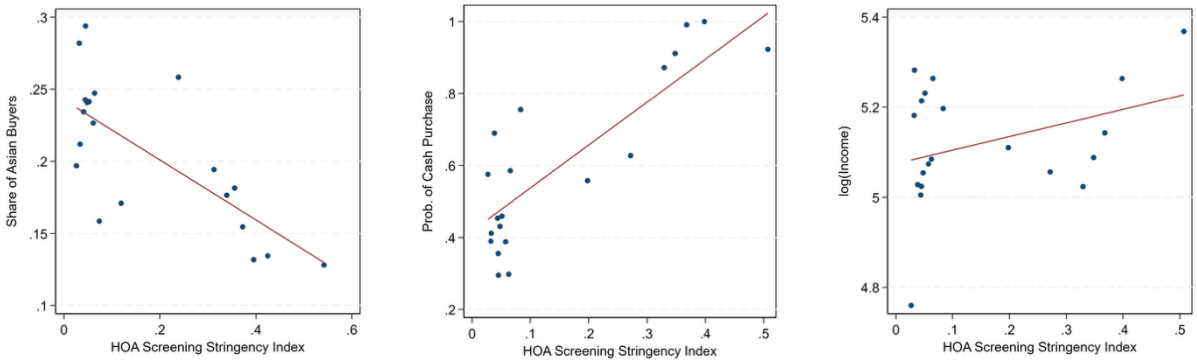
(a) Share of Hispanic Buyers **(b)** Cash Purchase (Hisp Buyers) **(c)** Income (Hispanic Buyers)



Notes: This figure shows correlations between the HOA Screening Stringency Index and buyer outcomes. Panel (a) shows that more stringent HOA screening is correlated with a lower share of Hispanic buyers. Panels (b) and (c) show a positive relationship between screening stringency and probability of cash purchases and income among Hispanic buyers, respectively.

Figure A4: Correlations between HOA Stringency Index and Outcome Variables

(a) Share of Asian Buyers **(b)** Cash Purchase (Asian Buyers) **(c)** Income (Asian Buyers)



Notes: This figure shows correlations between the HOA Screening Stringency Index and buyer outcomes. Panel (a) shows that more stringent HOA screening is correlated with a lower share of Asian buyers. Panels (b) and (c) show a positive relationship between screening stringency and probability of cash purchases and income among Asian buyers, respectively.