Public housing preferences and welfare in New York City 1930-2010*

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Abstract

This paper estimates the long-run effects of public housing on neighborhood composition and welfare in New York City from 1930 to 2010. At its inception in the 1930s, public housing was designed to revitalize slums and provide housing for working-class families. These projects received substantial public support and were desired by both White and Black households. Using a difference-in-differences strategy, I show that projects built before 1960 led White populations declining by up to 46% over 60 years while Black populations surged by 318%. Nearby areas saw a 17% decline in Whites and a 17% increase in Blacks. Post-1960 projects had minimal effects. Linking reduced-form results to a location choice model, I recover household preferences and show that high-rise developments with wide open space in between are less desirable, while low-rise, compact projects increase demand. Welfare estimates show diverging trends by race. I find that welfare gains for White population turned negative from $109.68 in 1950 to -$372.8 in 2010, gains for Black households remained at $1281 per year. These findings highlight how public housing evolved from a broadly supported urban renewal tool to a policy with racially divergent welfare effects and lasting implications for neighborhood sorting.

JEL codes: I31, R23, R28.

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1 Introduction

Throughout the 20th century, public housing programs have served as a cornerstone in offering affordable housing to low-income families. However, public housing is also a place-based policy. As durable neighborhood alterations, these developments influence their surroundings through both physical design and the characteristics of incoming residents. The introduction of public housing can shape neighborhood composition by influencing household location choices and generating spillover effects on residents and housing markets. Understanding these dynamics is essential for assessing the welfare impacts of public housing, as it requires analyzing both how individuals value neighborhoods and how local housing markets respond to it.

In this paper, I provide new evidence on how individuals value public housing in their neighborhood and the associated costs and benefits for surrounding residents. At its onset in the mid-1930s, federal public housing in the United States was designed to provide "decent" housing for upwardly mobile working-class residents as part of a broader effort to eradicate slums and to address the perceived harms of concentrated poverty (Goetz, 2012; Bloom et al., 2016). These developments were celebrated as an improvement over earlier living conditions and gained substantial public support. To secure public support, housing authorities implemented racially segregating policies that promoted selective tenant selection.[1] By the 1970s, however, federal housing policy underwent a major shift, prioritizing tenant-based rental assistance over new public housing construction.[2] By the 1990s, many public housing developments faced high levels of poverty and crime, with some suffering from mismanagement and extreme levels of economic distress. In response to the deteriorating conditions, policymakers funded the demolition of over 150,000 units between 1993 and 2007, replacing only about half of them (Vale and Freemark, 2012; Goetz, 2012).

To examine the effects of public housing on neighborhood composition and preferences, I combine data on project locations, construction dates, and Black and White census tract populations in New York City (NYC) from the US Census. Moreover, I collect property-level asking rents from the *New York Times* real estate section at ten-year intervals from 1930 to 2010, resulting in 18,996 rental listings. To estimate heterogeneous preferences for living near public housing, I collect information on key project attributes from archival sources, including the racial composition of public housing projects at the time of their

[1] Public housing authorities prioritized households with a 'nuclear family' structure — married, male-headed, and with children — while racial segregation and selective tenant policies shaped demographic composition. Citizenship and nativity also influenced whom officials deemed deserving of public benefits. For example, between 1935 and 1944, the Public Works Administration allocated about one-third of its public housing projects to only African Americans (Radford, 2008).

[2] While not entirely abolished, the Housing and Community Development Act of 1974 reduced funding for new public housing construction. Cash allowances, introduced in 1975 under Section 8, offered vouchers for households to access private housing (Vale and Freemark, 2012).

opening, construction costs, building height, and ground coverage.[3]

I identify the causal effect of public housing by leveraging the staggered implementation of public housing projects across the city. Importantly, the areas targeted by the NYC Housing Authority to build public housing are not random. Thus, I utilize the distance to public housing projects as a measure of treatment intensity, allowing for the estimation of disparate effects on market rents, Black and White populations. Specifically, I assign the treatment at the census tract level and compare tracts with a public housing project to slightly more distant tracts (Blanco and Neri, 2023).

My estimates show that projects built before 1960 had persistent, long-run effects on neighborhood composition, leading to significant declines in White residents and increases in Black residents.[4] Specifically, while White population in public housing tracts increased by 45% within the first ten years of construction, it was 46% lower 60 years later. I document substantial spillover effects in adjacent tracts, where White population declined by 17% in the long-run. Conversely, Black population in treated tracts increased by 318% in the long-run, with nearby areas experiencing a 20% rise in Black residents.

In contrast, public housing projects constructed after 1960 had no significant effect on neighborhood racial composition or market rents. This divergence suggests that policy changes, evolving tenant selection criteria, and shifts in public preferences altered the ways in which public housing influenced neighborhoods in later decades. Effects on market rents also varied by period: while early public housing projects led to increasing market rents ten years after construction, these effects dissipated within 20–30 years, suggesting that initial upward pressure from increased demand was offset by neighborhood disinvestment and negative externalities.

Employing a static equilibrium model of neighborhood choice, following Bayer, Ferreira, et al. (2007) and Almagro et al. (2023), I translate my reduced-form estimates into household preferences for living near public housing. This approach interprets the reduced-form coefficients as composites of the model's comparative statics. As a result, an agent's optimality condition can be estimated directly without recovering all model parameters.

The design and construction quality of public housing significantly influence neighborhood desirability over time.[5] Survey evidence supports this: the 2003 "Housing Illinois" survey found that 47% of residents perceived low-income housing designs as unattractive (Belden and Russonello, 2003). Using the structure of the model and empirically recovered

[3] Ground coverage is defined as the total ground floor area of a project's building footprints divided by the project's total area.

[4] As I show in Section 2, the 1960s mark an era of shifts in tenant selection and funding cuts for public housing construction, which affected new public housing projects. These shifts call into question whether public housing can be considered a common treatment shock.

[5] Architecture as an amenity remains a sparsely studied topic. Ahlfeldt and Holman (2018) find that properties in architecturally distinctive areas command a price premium.

preference parameters, I estimate how much additional rent households are willing to pay in response to changes in public housing characteristics. I find that higher construction costs — interpreted as a proxy for build quality due to improved building materials, amenities — generate moderate, long-run demand effects within treated tracts, but little impact on adjacent areas. Between 40 and 60 years after construction, a $1,000 increase in construction costs raises the marginal willingness to pay (MWTP) by $14.46 for White households and $26.03 for Black households. In nearby tracts, corresponding estimates are close to zero. In contrast, a 100-unit increase in the number of public housing apartments is associated with a long-run MWTP of -$242.64 for White households and -$59.24 for Black households, likely due to lower maintenance and greater deterioration. Taken together, these results suggest that while high-quality, compact public housing may enhance neighborhood desirability over time, larger-scale developments ultimately reduce it.

In the medium run (0–30 years), construction quality has smaller or even negative effects on MWTP, especially for White households. The MWTP for Black households to live in a public housing tract is modest at $6.64 and even negative for Whites (-$17.95). This could reflect potential demand being funneled away from the private market, as larger projects were initially valued. In treated tracts, a 100-unit increase in the number of public housing units is associated with a monthly MWTP of $8.40 for White households and $76.83 for Black households. These results suggest that well-built public housing may initially divert demand from the private housing market, but eventually becomes a valued neighborhood feature — particularly for Black households.

Moreover, urban sociologist Jane Jacobs famously criticized the *Tower in the Park* — slender high-rises surrounded by extensive open spaces, which became emblematic of public housing in the United States (Plunz, 2016) — arguing that they inadvertently fostered crime-ridden and lifeless environments due to the un-policeable indoor and outdoor spaces within these projects (Jacobs, 1992; Newman, 1997).[6] In line with this claim, I find that high-rise buildings and developments with low ground coverage within public housing projects lead to negative demand effects.

An additional storey in the height of a public housing project reduces the marginal willingness to pay (MWTP) to live in tracts with a public housing project by $46.86 per month for White households. Conversely, a one percentage point increase in ground coverage increases the MWTP to live in these areas by $19.80 for White households. Black residents do not exhibit a strong pattern in their preferences for internal public housing characteristics. However, in adjacent tracts, both Black and White households value lower and more compact public housing projects in their neighborhood. The MWTP to live in a tract next to a public housing tract decreases by $34.59 and $29.37 for White and Black

[6]However, Jacobs (1992) never clearly defined what constitutes a *Tower in the Park*.

households, respectively, for a one-storey increase in project height. For a one percentage point increase in ground coverage, the MWTP in adjacent tracts is \$18.55 and \$21.87 for White and Black households, respectively. This suggests that taller projects with expansive open spaces may generate less neighborhood demand than more compact, smaller projects, consistent with the *Tower in the Park* hypothesis.

Finally, I use the framework, preference parameters, census data, and rent prices to calculate the local welfare impact of introducing public housing. I show that public housing generated net positive welfare effects for Black households across all years, while White households experienced declining—and eventually negative—welfare effects over time. In 1950, the estimated welfare from living near public housing was \$109.68 per year for White households and \$1,299.53 per year for Black households. However, by 2010, welfare benefits for White households had turned negative, reaching -\$372.80 per year, while Black households continued to experience positive welfare gains of around \$1,221.67 per year. These results are mostly driven by projects constructed before 1960, which account for 72% of the welfare loss among Whites and 60% of the welfare gains among Blacks in 2010. These findings highlight the divergent welfare implications of public housing developments across racial groups and provide insights into how neighborhood preferences evolve over time.

Previous studies have examined the impacts of affordable and public housing on local neighborhoods. While most papers estimate the impact of public housing demolitions, this paper provides the first quantitative, causal analysis of the impact of public housing construction over an 80-year time horizon. By examining different construction cohorts, I demonstrate how public housing affects neighborhood residents differently depending on its quality, height, and spatial layout. In the context of public housing demolitions in Chicago, previous studies have identified significant positive effects.[7] The demolition of public housing has been associated with substantial increases in nearby home prices (Almagro et al., 2023; Blanco, 2022), significant reductions in crime (Aliprantis and Hartley, 2015; Sandler, 2017), and notable shifts in neighborhood socioeconomic composition (Tach and Emory, 2017; Blanco, 2022). In contrast, in New York City, subsidized housing has generated significant price appreciation in the immediate vicinity (Schwartz et al., 2006). Federal public housing constructed between 1977 and 2000 has not typically led to reductions in property values (Ellen et al., 2007).

Moreover, the price effects of affordable housing construction depend on neighborhood composition. Diamond and McQuade (2019) show that Low-Income Housing Tax Credit

[7] The study of public housing demolition in Chicago dates back to the early stages of initiatives like the Moving to Opportunity projects. However, this body of literature estimates the demolition effect on individual-level outcomes rather than neighborhoods. Studies find moderately positive impacts from public housing demolition, particularly for residents, and minority populations (Jacob, 2004; Chetty et al., 2016; Chyn, 2018). More recent research has extended its scope to examine the consequences of demolitions on a broader range of outcomes, including rental rates and construction trends.

developments lead to price increases in low-income neighborhoods but cause price declines in high-income areas.[8] Revitalization projects or the transition to mixed-income housing can attract higher-income residents in low-income areas (Blanco and Neri, 2023; Staiger et al., 2024).

I focus on the largest urban housing market in the United States, New York City, although the effects should generalize to other cities with large historical public housing policies, such as Chicago. My results show that positive effects on neighborhood composition and welfare from demolition are symmetric for projects constructed before 1960. For example, Almagro et al. (2023) report welfare gains for high- and low-income White households of public housing demolitions in 2010 Chicago of \$230 and \$113 per year respectively. I estimate long-run welfare losses from construction for Whites in NYC of \$268.28 in 2010. Moreover, aside from Diamond and McQuade (2019) and Almagro et al. (2023), few studies apply a theoretical framework to put structure on individual preferences for public housing.

More broadly, my paper is related to the literature that examines the spillovers to neighborhoods of housing policies. Rossi-Hansberg et al. (2010) analyze the impact of an urban revitalization program in Richmond, Virginia, finding that targeted investments led to 2–5% annual land price increases, with housing externalities diminishing by half every 1,000 feet. Redding and Sturm (2024) examine the long-term effects of World War II bombing in London as an exogenous shock to neighborhood composition and property prices. They show that poor-quality post-war construction led to a local decline in post-war property values and a decrease in the share of high-income residents with significant spillover effects on surrounding areas. Asquith et al. (2023) examine the effects of large new apartment buildings on nearby housing prices and neighborhood composition. Similarly, Campbell et al. (2011) examine the effects of housing foreclosure. Autor et al. (2014, 2017) study the impact of ending rent control on nearby real estate prices and crime rates. I provide new evidence on neighborhood effects from public housing. Closely related to the findings by Redding and Sturm (2024), I show that higher-quality buildings had positive long-run effects on the MWTP for these neighborhoods.

Finally, research shows that individuals pay premiums for neighborhood amenities (Bayer, Ferreira, et al., 2007; Bayer, McMillan, et al., 2016; Diamond and McQuade, 2019). Given the racial dynamics of public housing allocation, studies suggest that homophily-driven preferences reinforce neighborhood segregation (Schelling, 1971; Card et al., 2008; Logan and Parman, 2017). In this context, public housing—both directly and through its resi-

[8] Additionally, beyond the direct neighborhood effects of social housing, a broader literature examines the labor market consequences of these public housing availability. For example, Dalmazzo et al. (2022) and Bromhead and Lyons (2022) study the effects of historical housing policies on population dynamics, labor supply, and industry location. Baum-Snow and Marion (2009) and Eriksen and Rosenthal (2010) find significant crowd-out effects of Low-Income-Housing-Tax-Credit developments on new market-rate housing supply.

dents—shapes neighborhood amenities in NYC. I incorporate this idea by explicitly modeling preferences for racial composition. Building on Bayer, Ferreira, et al. (2007) and Almagro et al. (2023), I propose a framework that maps reduced-form coefficients to preference parameters, leveraging NYC's quasi-experimental housing development to identify these parameters over 80 years.

The paper proceeds as follows; Section 2 provides details on the historical context. Section 3 introduces the theoretical model and the estimation procedure of the model's parameters. Section 5 introduces the empirical analysis and Section 4 discusses the data. In Section 6, I estimate the long-run effects of public housing. In Section 7, I obtain marginal willingness to pay estimates for public housing characteristics. Section 8 details the counterfactual mechanism and presents welfare estimates for Black and White population, and Section 9 concludes.

2 Background

In this section, I describe the historical context of public housing in New York City and its role in urban renewal, as well as broader shifts in public opinion and support for federal housing programs in the United States during the 1960s.

Public housing in the US emerged as a central tool in federal efforts to address urban poverty and blight, especially during the transformative years of 1930 to 1960. This period witnessed the construction of projects that aimed to replace slums, stabilize communities, and provide affordable housing to working-class families. However, these developments also had profound implications for the racial and socioeconomic dynamics of neighborhoods, shaping outcomes for residents and communities for decades.

The Great Depression had left cities grappling with soaring unemployment and deteriorating housing stock. Programs such as the Public Works Administration and the Wagner-Steagall Housing Act of 1937 laid the groundwork for public housing initiatives across the country. Slum clearance became a central focus, with housing authorities aiming to replace unsanitary, overcrowded dwellings with new developments designed to foster health and safety (Allen and Van Riper, 2020; Radford, 2008; Fogelson, 2003).

In New York City, public housing became synonymous with ambitious urban reform. The New York City Housing Authority (NYCHA), established in 1934, pioneered a model of public housing that sought to combine high-quality construction with effective management. NYCHA's first development, the First Houses on the Lower East Side, opened in 1935 with great fanfare, attended by First Lady Eleanor Roosevelt (Hunter College, 2025). Early projects reflected the optimism of the era, aiming to replace overcrowded tenements with clean, modern developments envisioned as the future of urban housing. These projects provided safe, affordable homes to working-class families and were seen as pathways to stability and community (Williams, 2014; Bloom, 2008; Marcuse, 1986). Many early residents of public housing projects recalled their initial experiences with great enthusiasm, describing their homes as "paradise" and their communities as close-knit and supportive.[9]

Housing Authorities across the US, like the Chicago Housing Authority or NYCHA, implemented meticulous management, tenant selection policies, and the strategic placement of housing near public transit and schools. Screening measures ensured tenants were married couples with two children and an employed head of household. The Authorities' model of operation mirrored private apartment complexes, emphasizing routine maintenance and community-building efforts. (Hunt, 2009; Bloom, 2008).

The demand for such policies grew rapidly in the postwar years as the US faced a severe housing shortage, exacerbated by the return of millions of servicemen. In response, the 1949 Housing Act was enacted to accelerate public housing construction while maintaining its core objectives, such as providing affordable housing for the working poor and facilitating large-scale slum clearance. New York City became a focal point of this expansion, experiencing a surge in public housing development. During the 1950s, 72,499 units were built, followed by 42,721 more in the 1960s—far exceeding pre-war construction levels and fundamentally reshaping the city's residential landscape (Plunz, 2016). By the 1960s, public housing accounted for 25% of all residential units built in New York City. This era also marked a shift in design philosophy, as earlier low-rise developments gave way to taller, high-density structures. Influenced by modernist urban planning principles, the new projects embraced the *Tower in the Park* model, featuring slim high-rises surrounded by open spaces. [10]

By the end of the 1960s, public housing entered a new phase marked by shifting policies and mounting challenges. At the national level, public housing faced challenges stemming from its design and implementation. Early projects often reinforced racial segregation, with tenant selection policies and housing placements reflecting broader societal prejudices. In New York City, for example, some developments were designated for White families, while others were predominantly Black or Puerto Rican.[11] Furthermore, the reliance on strict tenant screening—prioritizing families with stable incomes and employment—excluded many

[9]For example, Maude Davis, a retired public school principal, described Altgeld Gardens in Chicago - opened in 1945 - as "paradise," noting, "We felt this was just the greatest housing that we could live in! There was pride in it." So did Vonsell Ashford when moving into the 1955 completed Harold L. Ickes Homes in Chicago: "The building was new, and they had a beautiful playground for the children. You couldn't ask for a better location, and the place was just marvelous. I had three bedrooms, a nice storage area, and a linen closet ... I thought I was moving to paradise" (Hunt, 2009).

[10]Figure C.3 shows the evolution of public housing construction by construction cohort.

[11]Moreover, early public housing projects exhibited explicit segregation, with a predominant allocation to White residents Figure C.5. Against this backdrop, tracts with public housing projects followed different demographic trajectories than trends in the rest of New York City. Specifically, tracts designated for public housing had significantly higher White population in 1930. In 2010, the same tracts had a lower White and higher Black population than the average tract in the rest of the city (see Figure C.1).

of the poorest residents, limiting the program's capacity to address the full scope of housing insecurity (Allen and Van Riper, 2020; Vale and Freemark, 2012).

By 1968, NYCHA eased its admission criteria, declaring that it would no longer evaluate applicants based on moral considerations. Moreover, landmark cases such as *Escalera v. NYCHA* in 1970 led to the relaxation of strict tenant screening practices, opening public housing to more economically disadvantaged residents. While these changes reflected broader efforts to promote equity, they also contributed to increasing concentrations of poverty within developments. This period coincided with a decline in federal funding and growing maintenance backlogs, straining NYCHA's resources and infrastructure (Bloom, 2008).

The trajectory of public housing in New York City diverged sharply from its early promise. The optimism embodied in the initial construction boom gradually gave way to concerns about crime, neglect, and physical deterioration. The public housing design, called *Tower in the Park* garnered criticism and reduced public support. Famously, urban sociologist and activist Jane Jacobs and Oscar Newman blamed the *Tower in the Park* as a utopian idea that generates crime-driven and lifeless places by having large, un-policeable indoor and outdoor spaces, lacking potential care of residents and shop-owners. Rising opposition resulted in a policy shift at the local level in favor of low-density public housing (Jacobs, 1992; Newman, 1997).

Despite these challenges, NYCHA retained a level of resilience that distinguished it from other public housing systems. NYCHA's commitment to management and maintenance helped prevent the systemic collapse seen in cities like Chicago and St. Louis (Bloom, 2008). However, NYCHA's developments were not immune to broader urban challenges. As Marilyn Jones, who moved into the Queensbridge housing project in 1970, puts it: "In the beginning for about the first 2 or 3 years it was fine, but then all of a sudden, crime started, people running around with guns, shooting everybody, people throwing people off the rooftops, police all over the place everywhere." (Petrus and Rosner, 2019).

By the 1980s, chronic underfunding and demographic shifts exacerbated social and economic isolation within public housing communities. Redevelopment programs such as HOPE VI sought to address these issues by modernizing or demolishing public housing stock and creating mixed-income neighborhoods (Goetz, 2012; Fernandez, 2010). The 2003 "Housing Illinois" report captures many of the challenges associated with public housing, highlighting public concerns about poor maintenance (66%), increased crime (52%), declining property values (49%), and perceptions that the design of housing for low-income people is unattractive (47%). These sentiments echoed in New York City, fueled growing resistance to public housing developments (Belden and Russonello, 2003).

Today, NYCHA remains both a testament to the early promise of public housing and a reflection of the broader struggles of urban housing policy. Its developments house over 400,000 residents, making it the largest public housing authority in North America. However, it faces a \$40 billion capital repair backlog, with aging infrastructure and funding constraints threatening its future. Nationally, public housing continues to grapple with questions of sustainability, equity, and integration (NYCHA, 2021).

3 Location Choice Model

In this section, I present a theoretical sorting model following Bayer, Ferreira, et al. (2007) and Almagro et al. (2023) to formalize how public housing affects individual preferences about neighborhoods. Moreover, comparative statics are derived from this model to allow for a meaningful decomposition of reduced-form coefficients, outlined in Section 5. The full model is derived in Appendix A.

The city consists of $\sum_g \sum_i (N_i^g) = N$ residents of ethnic groups $g \in B, W$. Residents' i utility depends on consumption of a single city wide final good, housing units, residential amenities and an individual-specific idiosyncratic shock that varies with residence location. Log indirect utility of resident i of group g living in tract m is then given by:

$$V_{im}^g = \varphi_{im}^g + \epsilon_{im} \tag{1}$$

where φ_{im}^g is the component of indirect utility for census tract m that is common to all residents of group g, called mean indirect utility hereafter, and ϵ_{im} is an idiosyncratic shock which are drawn from an Extreme Value Type I distribution. The common component of indirect utility is:

$$\varphi_{im}^g = \beta^g PH_{1m} + \beta^g PH_{2m} + \log(w_m) - \alpha \log(r_m) \tag{2}$$

Here PH_{rm} is an indicator variable for tract m being a tract with a public housing unit or a neighbor. Wages w_m are determined competitively and r_m are rents in census tract m. The model is closed by assuming an isoelastic supply function such that the number of housing units in tract m is given by:

$$S_m = \delta_m r_m^{\phi_m} \tag{3}$$

where δ_{im} is a supply shifter and ϕ_m is the tract-specific supply elasticity. Details on the model's equilibrium are given in Appendix A. Next, I derive two comparative statics to evaluate the equilibrium response of rent prices and population to public housing. First I differentiate equilibrium rents with respect to PH, which yields:

$$\frac{d\log(r_m^*)}{dPH_{1m}} = \underbrace{\frac{\Xi}{\phi_m + \alpha}}_{\hat{\beta}_{PH}^{rent}} \tag{4}$$

Equation 4 reveals that rent prices are a combination of the income share of housing the local housing supply elasticity and probability weighted preference parameter. Using Equation 4 gives the equilibrium population response of group g in tract m to the construction of public housing:

$$\frac{d\log(N_m^{g*})}{dPH_{1m}} = \underbrace{\beta_1^g - \alpha \cdot \frac{\Xi}{\phi_m + \alpha}}_{\hat{\beta}_{PH}^{g}} \tag{5}$$

Equation 4 and Equation 5 give two expressions for the change in equilibrium rents and tract population in treated and adjacent tracts. The orange coefficient corresponds to a reduced form coefficient from a regression of the log of White population, Black population and private market rents on an indicator variable of public housing. It becomes clear that the effect of rent prices is a composite of weighted preferences of Black and White population, Ξ, divided by the tract specific housing supply elasticity and the income share of housing. While $1 > \alpha > 0$ and $\phi_m > 0$, the direction of the effect depends on the relative strength and the sign of the utility weighted preference parameter Ξ. Furthermore, Equation 5 reveals that the population response is attenuated by the effect of public housing on rent prices in equilibrium. Only $\partial \log(r_m^*)/\partial PH_{1m} = 0$ would allow to interpret β as a change in preference. This result is symmetric for $\partial \cdot / \partial PH_{2m}$.

4 Data

This section describes the data used to estimate the effect of public housing on neighborhood composition and preferences. First, I outline the sources and information on public housing, including project locations, construction dates, and key characteristics. Next, I introduce the three key equilibrium variables, as motivated by the theoretical framework in Section 3: market rents, and Black and White population.

Public Housing Characteristics. I obtain information from three sources. First, I utilize the New York City Public Housing Administration (NYCHA) Development Data Book, available annually from 1948 to today. It provides information on construction date, height, number of apartments, construction costs,[12] and ground coverage—the total ground

[12] Construction costs exclude land acquisition expenses, which are accounted for separately as part of development costs.

floor area of a project's building footprints divided by the project's total area. Information for the year 1940 in the NYCHA Development Data Book is inferred from archival sources from the Wagner and LaGuardia Archives. In total, there are 299 projects operated by NYCHA.[13] Second, I supplement this dataset with information on the racial composition of public housing projects, including the number of White and Black residents at the time of their initial opening. For developments constructed up to 1971, I digitize data from the Wagner and LaGuardia Archives. An example of race statistics is shown in Figure C.6. For more recent years, I use the NYCHA Resident Data Book. Since I evaluate the effect of public housing on neighborhoods, I spatially match public housing projects to 2010 census tracts. Due to their size, some projects span multiple tracts. To account for this, I weight demographics, apartments, and ground coverage proportionally to each project's area share.

Market Rents. One of the three key equilibrium variables is private market rents. To obtain private rental market data, I digitize rent prices from the *New York Times* real estate section for each decennial census year from 1930 to 2010 to examine the impact of public housing on rents. Only properties with an exact address or cross-street information were included to ensure accurate geolocation, and the Google Maps API was used to geocode the rental data. Next, I compute the average asking rent per room for each 2010 census tract, which serves as the final outcome variable. Additionally, listings were required to include at least some information on dwelling size. Using property-level rent data presents both advantages and limitations. On the one hand, it circumvents issues inherent to median contract rent reported in the United States census, which is often top-coded and only allows respondents to select from predefined price ranges that vary across years. Additionally, reported median contract rent at the tract level likely reflects rents paid in public housing rather than true market rents. On the other hand, relying on newspaper data, particularly from the *New York Times*, introduces two key limitations. First, as an upper-middle-class newspaper, the *New York Times* may not provide comprehensive coverage across all market segments and is biased toward the higher end of the market. However, no newspaper systematically covers the lower end of the rental market. Second, the dataset is skewed geographically, with stronger representation in Manhattan and the Bronx, although coverage for Brooklyn and Queens is consistent. Staten Island is not consistently represented. As a result, the findings primarily reflect a subset of the real estate market. Figure B.3 in Appendix B illustrates the spatial distribution of the rental data and the location of census

[13]Since I am interested in the construction impact, I disregard redevelopment projects that occurred after 1964. Moreover, not all NYCHA projects were built by public entities. Some were developed under the *Turnkey* program, where private developers purchased and constructed buildings, which NYCHA later acquired. While I include these types of projects, this method was introduced in 1969 and accounts for 76 developments.

tracts containing public housing projects. A full description of the data collection procedure, summary statistics, and an example of the source material are provided in Appendix C, Table C.3, and C.6b.

Demographic Information. The last two equilibrium variables are Black and White population. I obtain population data as well as census tract boundaries from 1930 to 2010 from IPUMS-NHGIS (Manson et al., 2024).[14] A challenge when building a geographically consistent panel dataset is the presence of boundary changes over time. Census tract boundaries underwent substantial changes throughout most of the 20th century, especially in Brooklyn (Kings County) and Queens County. Therefore, I adjust the earlier tracts to 2010 census tract boundaries using overlapping area weights to obtain a balanced panel. A potential drawback of this approach is that it assumes tract-level observations are uniformly spatially distributed. Further details and data sources are provided in Appendix C.4.[15]

Sample The final sample consists of a panel of 2164 census tracts based on 2010 tract boundaries per year from 1930 to 2010. The final set has 225 public housing tracts and ca. 1,500 rental observations per year. All prices and costs had been deflated by the CPI deflator and normalized to the 2010 CPI level. Descriptive public housing statistics can be found in Appendix C.2 and detailed rental statistics are given in Appendix C.3. The following section describes the empirical strategy to estimate the causal effects of public housing and further transformations of the data.

5 Empirical Strategy

This section describes the empirical strategy for estimating the causal effects of public housing on population demographics and rent prices. I employ a difference-in-differences (DiD) approach, leveraging variation in the timing of public housing construction and proximity to treated tracts.

However, a key modification in this strategy is that I estimate separate treatment effects for projects constructed before 1960 and those constructed afterward, to account for policy-driven differences in public housing implementation. The difference in treatment effects across these periods is expected due to shifts in the objectives of public housing, as outlined

[14]Only population, median contract rent, ownership, and Black and White population are consistently available from 1930 to 2010. Other variables such as median home values, dwelling counts, and unemployment are available from 1940 onwards.

[15]While not a primary outcome variable, I use median household income to infer welfare from the model in Section 3. Because median income is not a count variable, I assign it to 2010 census tracts based on spatial overlap. Specifically, each tract receives the median income of the historical tract with the largest area of intersection.

in Section 2. Before 1960, public housing had a dual mission: (i) providing housing for the working poor and (ii) clearing slums. This ensured a more economically diverse tenant base, with rent policies maintaining financial sustainability. After 1960, shifts in tenant selection prioritized extremely low-income households, concentrating poverty in public housing and accelerating neighborhood segregation. Declining federal investment led to the construction of different types of projects. These shifts call into question whether public housing can be considered a common treatment shock. Likely, early projects had stronger effects on racial composition and market rents, while post-1960 projects may exhibit weaker or null effects due to their diminished role in shaping neighborhoods.

Empirically, the approach follows a standard two-way fixed-effects (TWFE) model. Treatment is assigned at the tract level based on whether a tract contained a public housing project at any point within a census year. The completion date serves as the event triggering the treatment effect, as is common in the literature (Asquith et al., 2023; Pennington, 2021).[16]

$$y_{m,t} = \beta \mathbb{1}\left(t \geq Y\right) + \gamma_m + \gamma_t + u_{m,t} \tag{6}$$

Where γ_m denotes group and γ_t the census year fixed effects, $\mathbb{1}\left(t \geq Y\right)$ is an indicator variable equal to one for treated tracts if census year t is larger than the treatment year Y. Moreover, the coefficient β would correspond to the equilibrium comparative statics for Black and White population, and rent prices, Equation 5 and Equation 4.

The main challenge in the empirical analysis is selecting a suitable comparison group that accurately reflects what would have occurred in the absence of public housing. Ideally, one would conduct an experiment randomly assigning public housing projects to census tracts. However, such an experiment is not feasible. Instead, I must address the concern that the allocation of public housing across the city can be correlated with pre-construction tract and household characteristics. For example, construction sites were chosen based on the price of land and population density, which makes such tracts more likely to be selected for construction than those without.

To address this challenge, I utilize a stacked difference-in-differences design following Blanco and Neri (2023) that uses the variation in proximity to public housing projects to define the comparison group. I create rings of census tracts around each treated tract to define proximity and construct two rings of tracts around each treated tract. The outer ring serves as the comparison group to treated tracts and tracts in the inner ring. Because tracts

[16] Since I use decennial census years, projects completed within a given decade first appear as treated at the end of that period. For example, projects completed between 1961 and 1970 are observed as treated in 1970. Consequently, treatment effects in any given census year reflect a weighted average of all projects within the corresponding treatment year cohort.

have fixed boundaries, proximity is defined by being adjacent to a public housing project. Treated tracts have been excluded from any other first or second ring, ensuring that the control group of each treated tract solely consists of never-treated tracts. Doing so for each project requires appending these tract-project rings such that tracts may occur several times in the dataset. Figure 1 illustrates the spatial layout of fixed tract rings and overlapping tracts. The key assumption is that, in the absence of public housing, demographics and rents would change similarly in both the treated tract and the tracts in the control group. Any differences in outcomes should only be due to the impact of public housing.

The validity of this strategy requires balanced demographics and rents across control and treatment groups prior to treatment. I test this by checking if significant differences exist in treatment probability based on outcome variables, as reported in Table C.1. For example, a one percent increase in the Black population significantly affects the likelihood of being treated, so I control for this baseline characteristic. For census outcomes I estimate the following event study equation at the census tract/property m, project p, and year t level:

$$y_{m,p,t} = \sum_{r \in R} \sum_{\tau=-30}^{30} \beta_{\tau,r} \left(t - Y_p, r = r(m,p)\right) + \rho_{p,t} + \zeta_{p,k} + \rho_{p,t} \times YEAR + u_{m,p,t} \qquad (7)$$

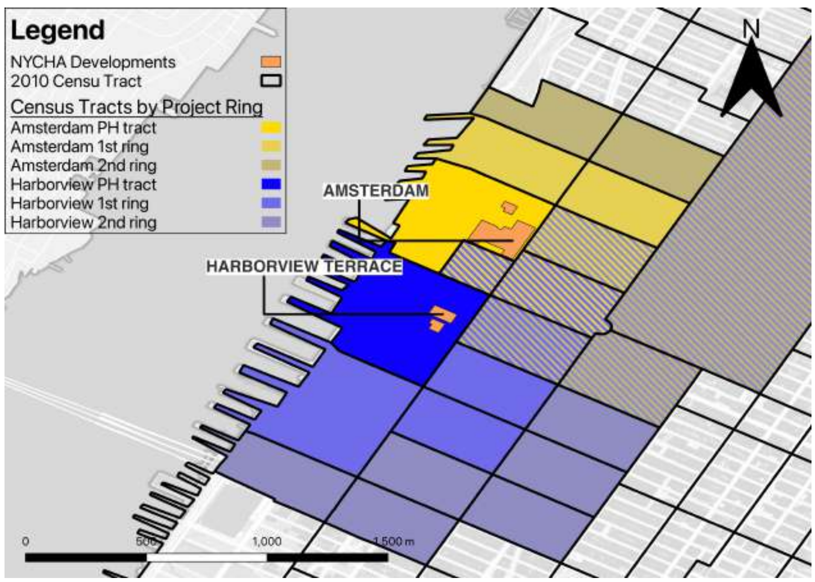
The coefficient of interest, denoted as $\beta_{\tau,r}$, captures the effect of the arrival of public housing on demographics over time in each treated tract, relative to tracts in the outermost rings. I interact each time dummy with an indicator for the ring $r(m,p)$ in which a tract or a housing unit m around project p is located. Y_p denotes the year when a project p was completed and the set of rings is defined as $R = \{Treated, 1st\ ring\}$.

Project-specific controls are included to capture variations in the evolution of outcome variables across rings for each project. Project-census year fixed effects ($\rho_{p,t}$) account for time patterns across all rings surrounding each project p, while project-neighborhood (NTA) fixed effects ($\zeta_{p,k}$) control for baseline differences of neighborhoods across each ring. $\rho_{p,t} \times YEAR$ represent neighborhood-specific trends.

This approach is equivalent to estimating Equation Equation 7 separately for each project and then aggregating the coefficients using regression weights.[17] Since the number of treated and control observations varies across sub-experiments, estimates are weighted by the relative frequency of tracts within each sub-experiment to ensure proportional representation. Standard errors are clustered at the sub-experiment level, which, in this case,

[17] A stacked difference-in-differences design effectively accounts for heterogeneous treatment effects, a limitation of traditional difference-in-differences estimators (Wang et al., 2024).

Figure 1: Treatment construction



Note. Figure 1 provides an illustrative example of overlapping neighborhood/distance rings for two public housing projects: Harborview Terrace and Amsterdam Houses. The concept of neighborhood rings is depicted, with blue and yellow hatched census tracts representing the areas that belong to the respective public housing tract and are located within their respective rings. It is important to note that this tract may appear multiple times in the dataset. If a public housing tract was lying within a neighborhood ring to another public housing tract, it was excluded from the respective ring such that no treated tract appears in the control group.

corresponds to the project.[18]

However, this estimation strategy does not take into account general equilibrium effects, where projects could impact rents and population across the city. Additionally, projects can increase the supply of low-income housing in the city. Thus, one key assumption I make states that these effects should be minimal, with the most significant impact being concentrated near the projects. There is a concern that individuals may move to nearby areas, which would violate the Stable Unit Treatment Value Assumption (SUTVA). In Appendix C in Figure C.2, I show the deviation of the primary outcome variables by treatment and control group from the long-run trend of the average tract in the rest of New York City. The treatment group deviates substantially from the rest of New York City over time, while the control group closely follows the overall city trend. If individuals sorted themselves into the control areas, we would expect those areas to differ from the average trend in the rest of the city. If significant city-wide effects exist, my estimates could be underestimated, but the relative comparisons across rings would remain unaffected. Additionally, rent prices are forward-looking, so the effects on prices should start when information about construction first arrives. These anticipation effects are absorbed, as treatment effects are averages of all projects completed at any time within a census decade, and estimates are a composite of anticipation and completion effects.

6 Reduced Form Results

This section presents the empirical findings on the long-term effects of public housing on neighborhood composition and rental prices. Using a difference-in-differences (DiD) framework, I estimate the impact of public housing projects on three key outcome variables: total Black population, total White population, and average rent per room. The analysis proceeds in two parts. First, Figure 2 examines effects within a window of approximately 30 years before and after construction, separately analyzing projects built before and after 1960. Second, Figure 3 extends the analysis by estimating the long-run effects of pre-1960 projects up to the present day. The results reveal a stark contrast in demographic and rent dynamics between the two periods, with early projects exhibiting persistent racial sorting effects and later projects having minimal long-run impact.

[18] In Appendix D.3, I report event study results using four alternative estimators that correct for the shortcomings of standard TWFE models. In particular I am using the de Chaisemartin and D'Haultfoeuille estimator (De Chaisemartin and D'Haultfœuille, 2020); Callaway and Sant'Anna estimator (Callaway and Sant'Anna, 2021); and Sun and Abraham estimator (Sun and Abraham, 2021). I am estimating a dynamic TWFE specification in a panel setup at the census tract level.

Effects of Public Housing constructed until 1960 vs. later. Figure 2 provides separate estimates for projects constructed before and after 1960, highlighting a fundamental shift in the effects of public housing over time. The panels present treatment effects on log White population, log Black population, and log rent per room.[19]

For pre-1960 projects (Panel (c)), White population initially increases by 45% within 0 to 10 years post-construction. After 30 years, White population in treated tracts (blue) declines by 48%. Adjacent tracts (red) experience no significant losses up to 10 years after construction, but see losses of 12% in the long-run. The red coefficient estimates indicate that these spillover effects are statistically significant, confirming that White flight extended beyond the immediate project boundaries.

For post-1960 projects (Panel (b)), the results are markedly different. White population levels remain statistically unchanged before and after construction, indicating that later public housing developments did not contribute to large-scale racial turnover. This suggests that public housing's impact on neighborhood composition weakened significantly after 1960, likely due to changes in project design, policy reforms, and broader demographic trends.

Panels (c) and (d) reveal contrasting trends in Black population dynamics. For pre-1960 projects (Panel (c)), Black population in treated tracts increases immediately, surging by 573%. This reflects the profound changes public housing brought to neighborhoods. For example, in the tract where Bronx River Houses were built, there were only 21 Black residents the year before construction. Ten years later, that number had risen to 2,689. Unlike the effect on White population, this increase is not confined to the treated tracts. The red coefficient estimates indicate that adjacent tracts (1st ring) also experience statistically significant increases in Black population, rising by 64% in the first decade and stabilizing at 21% in the long-run. These results suggest that early public housing not only increased Black residency in treated areas but also contributed to broader demographic shifts in surrounding neighborhoods.

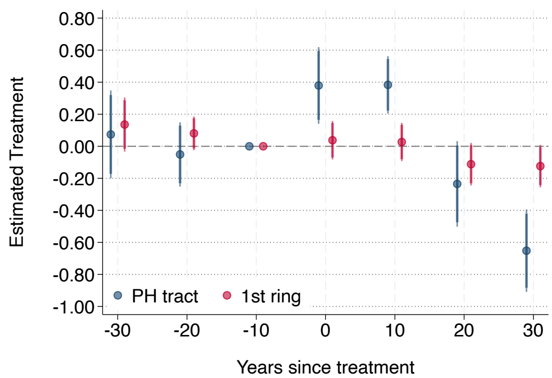
For post-1960 projects (Panel (d)), the effects are significantly muted. However, Black population levels still exhibit notable changes, increasing by approximately 100% in treated tracts and 20% in adjacent tracts before and after public housing construction.

Panels (e) and (f) examine changes in log rent per room. The findings indicate that public housing did not cause significant long-run rent reductions. For pre-1960 projects, rents increase significantly ten years after construction by around 60%, but decline modestly in the following years, but return to baseline levels within 20–30 years. This suggests that any upward rent pressure from increased neighborhood demand is offset by negative

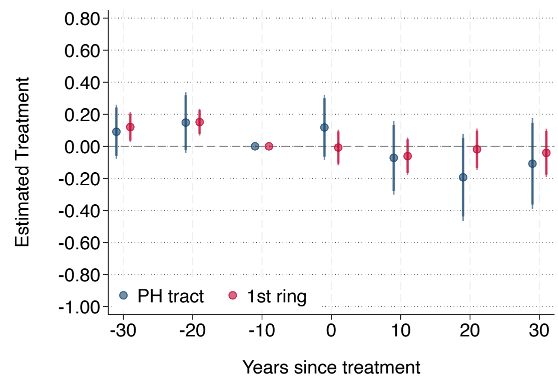
[19] Because I find substantial effect sizes, I convert all point estimates from log points to percent using $exp(\hat{\beta}) - 1$.

Figure 2: Effect on demographics

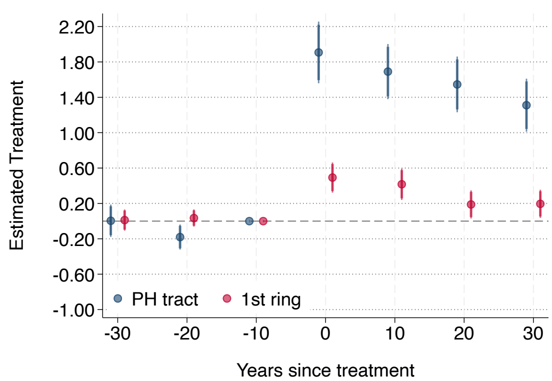
(a) log(White) - pre 1960



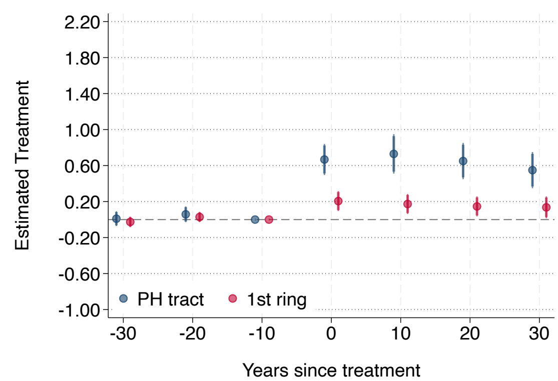
(b) log(White) - post 1960



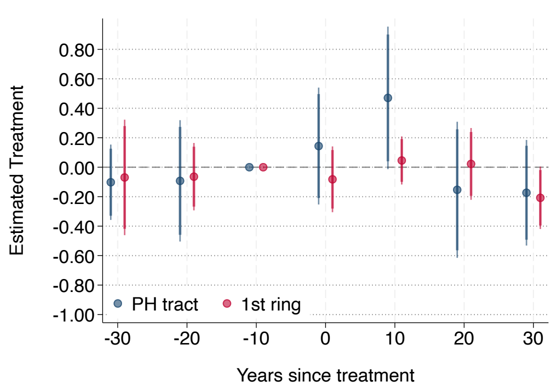
(c) log(Black) - pre 1960



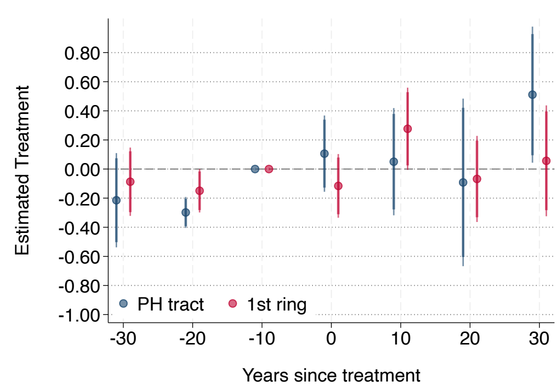
(d) log(Black) - post 1960



(e) log(rent) - pre 1960



(f) log(rent) - post 1960



Note: Figure 2 plots report coefficients $\hat{\beta}_{\tau,r}$ in Equation 7 for each treated tracts and rings around a project; standard errors are clustered at the project level; the vertical lines show the estimated 90% and 95% confidence intervals; the omitted category consists of tracts within a second ring. Panels 4c to 2f use weighted unit counts from the US census; estimates have been weighted by the frequency of census tracts by ring; the sample includes 2162 time-consistent census tracts in New York City.

externalities such as crime, stigma, and neighborhood disinvestment. The red coefficient estimates indicate that adjacent areas do not experience significant rent reductions, further reinforcing the idea that public housing's economic effects were highly localized.

For post-1960 projects (Panel (f)), there is no discernible effect on rents at any horizon. This further supports the argument that public housing's broader economic and demographic influence weakened significantly after 1960.

Long-Run Effects of Pre-1960 Public Housing. To assess the persistence of the effects observed in Figure 2, Figure 3 extends the time horizon, estimating the long-run impact of pre-1960 projects up to 60 years after construction. The results confirm that the racial sorting effects of early public housing projects were not temporary but highly persistent.

Panel (a) tracks log White population, showing a continued decline that stabilizes only after five to six decades. By the final observation period, White population in treated tracts is 46% lower than pre-construction levels. Adjacent areas (first ring) also exhibit long-run White population declines of 17%, reinforcing the notion that early public housing projects reshaped entire neighborhood compositions, not just the immediate project sites. The red coefficient estimates confirm that these spillover effects remain statistically significant, indicating that the demographic transformation extended well beyond the direct public housing sites.

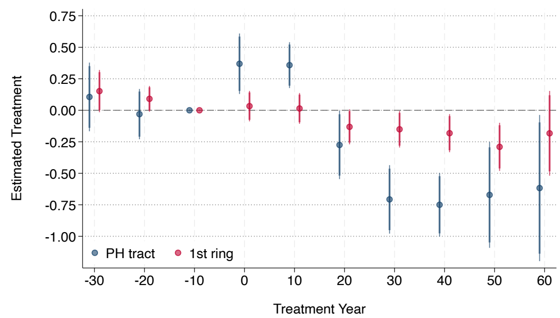
Panel (b) shows the corresponding trend for Black population, which stabilizes between 203% and 318% of its pre-construction levels in treated tracts. The long-run spillover effects remain significant, with Black population increases of 42% to 67% in adjacent areas 0–40 years after construction, demonstrating that public housing reshaped racial composition well beyond the immediate project boundaries.

Panel (c) of Figure 3 examines the long-run trajectory of rent prices. The findings reinforce the conclusion from Figure 2: public housing does not lead to persistent rent reductions. While rents initially surge by 61% immediately after construction, they decline to approximately 12%–30% below baseline levels within 20–40 years. This suggests that any upward pressure from increased demand is offset by negative externalities such as crime, disinvestment, and shifting resident composition. The red coefficient estimates confirm that these effects remain localized, as no significant long-run spillover effects on rent prices are observed in adjacent areas. In Appendix D.1, I use property-level data to test whether the effect varies across alternative distance rings, following the structure of a hedonic rent equation. Notably, these results align closely with those from Figure 3.

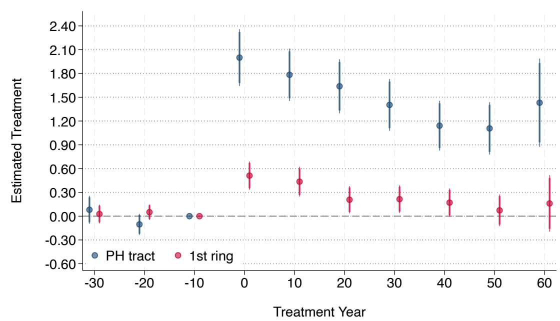
These results suggest that the most lasting impact of public housing was demographic rather than economic. While shifts in White and Black population persisted across gener-

Figure 3: Long-run effects of pre-1960 projects

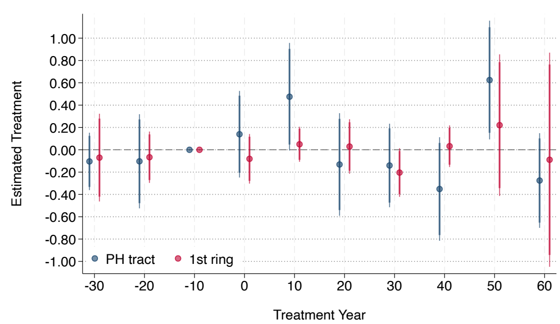
(a) log(White)



(b) log(Black)



(c) log(rent)



Note: Figure 3 plots report coefficients $\hat{\beta}_{\tau,r}$ in Equation 7 for each treated tracts and rings around a project using only projects constructed until 1960; standard errors are clustered at the project level - the level of the experiment; the vertical lines show the estimated 90% and 95% confidence intervals; the omitted category consists of tracts within a second ring. Panels 3a to 3c use weighted unit counts from the US census; estimates have been weighted by the frequency of census tracts by ring; the sample includes 2162 time-consistent census tracts in New York City.

ations, rents remained largely unchanged outside the treated areas.

7 Public Housing Characteristics

As shown in Section 2, not only did public support for housing change in the 1960s, but private opinions about public housing also shifted. Moreover, public housing buildings differ in their spatial and architectural layout, which could be perceived differently. Thus, this section examines heterogeneous treatment effects of public housing. I estimate the effect of key attributes—including project height, total number of apartments, construction costs, and ground coverage—as well as the initial racial composition of tenants on the three equilibrium variables: White population, Black population, and rents. These estimates allow for an assessment of how different project designs influenced neighborhood sorting and rent dynamics over time. To quantify these effects, I estimate a household's marginal willingness to pay (MWTP) for each of these time-invariant characteristics for the pre-1960 social housing units, across both medium-run (0–30 years) and long-run (40–60 years) horizons.

Public Housing Characteristics. To quantify the role of public housing characteristics, I estimate the following version of Equation 7 for project constructed until 1960:

$$y_{m,p,t} = \sum_{\substack{\tau \in \{0-30, \\ 40-60\}}} \sum_{i \in ATTR} (\gamma_{0i\tau} PH\ tract_{p,t} + \gamma_{1i\tau} 1st\ ring_{p,t}) \times ATTR_i + \rho_{p,t} + \zeta_{p,k} + \rho_{p,t} \times YEAR + u_{m,p,t} \tag{8}$$

Where **ATTR** is a vector of public housing characteristics, interacted with treatment dummies for being in a public housing tract $PH\ tract_{p,t}$ and in an adjacent tract $1st\ ring_{p,t}$. I restrict the analysis to projects constructed before 1960, allowing for a clear differentiation between medium-run effects (0–30 years post-construction) and long-run effects (40–60 years post-construction). **ATTR** includes: the average construction costs per room in a public housing tract, the total number of public housing apartments, the average project height in a public housing tract, the average percentage of built-up area of a project and initial racial composition in a project. Construction costs serve as a proxy for building quality, while the total number of apartments captures the size of the project within a neighborhood. The height and ground coverage of public housing developments reflect broader concerns about urban design and safety. The *Tower in the Park* model – characterized by high-rise buildings with low ground coverage – has been widely criticized for fostering social isolation and crime (Jacobs, 1992; Newman, 1997). Finally, I test whether Black and White households responded to the racial composition of public housing residents. Projects were not only racially segregated, but the large influx of Black and White tenants may have affected the desirability of these neighborhoods.

Figure 4 shows how key public housing characteristics shape racial composition and rental price dynamics over time. Higher construction costs per room are associated with a significant increase in rental prices in public housing tracts. In the medium-run (0–30 years), a \$1000 in construction costs (\$14312.01) decreases rents by approximately -0.055 log points, reaching -0.012 log points in the long run (40–60 years). In adjacent areas (1st Ring), the effects are weaker and only significant in the medium-run, with a -0.028 log point changes in rent prices. The effects on White and Black population due to a \$1000 increase in construction cost remains only significant for Black households 0.021 in treated tracts in the medium and long run.

The total number of apartments in a public housing tract has a strong, persistent effect on racial composition. A 100 units increase in the number of apartments leads to: A 0.055 log point decrease in White residents in public housing tracts in the long-run; a 0.064 and 0.067 log point increase in Black residents in public housing tracts in the medium- and long-run; and a -0.018 fall in market rents in treated tracts in the long-run. In adjacent areas (1st Ring), the effects are smaller and do not remain significant.

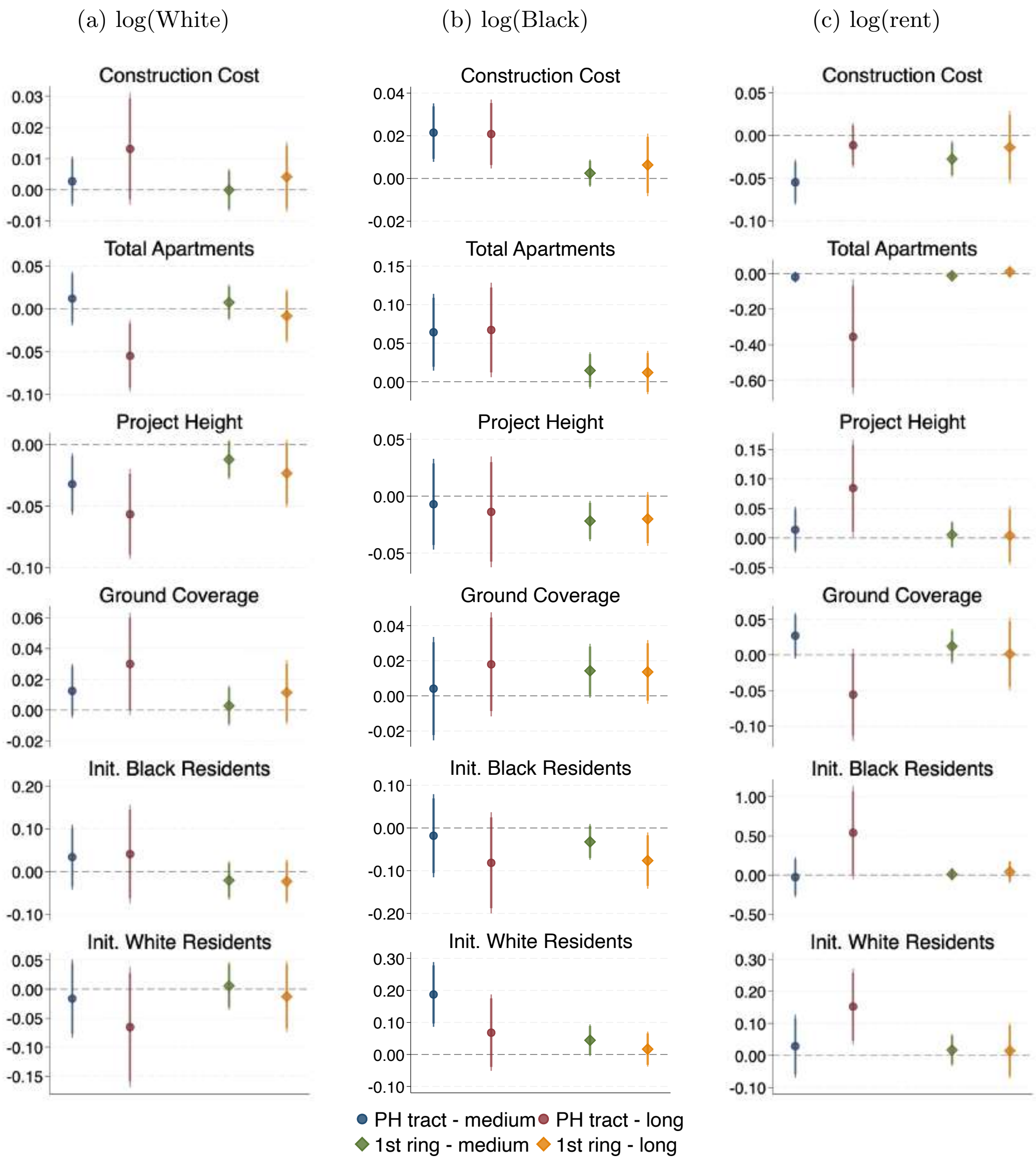
In public housing tracts, a one storey increase in project height (six storeys) leads to a 0.032 and 0.057 log point decline in White residents in the medium-run and long-run in treated tracts. Market rents respond by a long-run 0.085 increase in treated tracts. Effects in adjacent tracts remain broadly insignificant, besides a -0.022 decline in Black population in the medium run.

Unlike project height, greater ground coverage has no significant effect on any outcome. However, a one percentage point (p.p.) increase in ground coverage is associated with a 0.056 decline if markets in the long run in treated tracts.

Finally, I describe the effect of a ten p.p. increase in Black and White public housing residents at the initial project opening. Rent prices in treated tracts react positively to a ten p.p. increase in Black and Black population, increasing by 0.541 and 0.153 log points respectively, though the effect is only significant for the latter. Black population declines significantly in the long run in adjacent tracts by -0.076 due to a ten p.p. increase in Black public housing residents, while a ten p.p. increase in White residents leads to a 0.068 log point increase in the medium run. The effects on White population are all insignificant.

One limitation of these estimates is that they do not allow for a straightforward interpretation. As discussed in Section 3, they represent a combination of supply-side factors and utility determinants, such as wages and housing supply elasticities. In the next step, I use the model's structure to decompose these effects.

Figure 4: Effects of Public Housing Attributes



Note: Figure 4 plots report coefficients $\hat{\gamma}_{0i\tau}$ and $\hat{\gamma}_{1i\tau}$ in Equation 8; standard errors are clustered at the project level; the vertical lines show the estimated 90% and 95% confidence intervals. Each dummy for treated tracts and adjacent areas was interacted with a continuous public housing characteristic aggregated at the tract level; such as the total number of public housing apartments, the average height of a public housing project, the average ground coverage, the average construction costs per room in 2010 dollars and the total number of White and Black residents at the initial opening date for the project; all estimates are weighted by the frequency of census tracts within a ring; the omitted category are tracts within a second ring.

Marginal Willingness to Pay. A key question in evaluating the long-term effects of public housing is how much households value these projects and what aspects of their presence. To quantify this, I obtain marginal willingness to pay (MWTP) estimates for public housing public housing characteristics.[20] That is, holding income constant, how much households would be willing to pay in rent for a change in a public housing attribute.

To recover household preferences, I leverage the reduced-form treatment effects estimated from the previous part. Since there is a direct relationship between the model's comparative statics and the empirical difference-in-differences estimates, I recover preference parameters through a simple decomposition based on Equation 4 and Equation 5:

$$\begin{aligned}\beta^g_{PH,t} &= \frac{\partial \log N^{g*}_{mt}}{\partial PH_{1mt}} + \alpha \times \frac{\partial \log r^*_{mt}}{\partial PH_{1mt}} \\ &= \hat{\beta}^g_{PH,t} + \alpha \times \hat{\beta}^{rent}_{PH,t}\end{aligned} \tag{9}$$

where $\hat{\beta}^g_{PH}$ corresponds to the causal effect of public housing on ethnic group $g \in \{W, B\}$ and $\hat{\beta}^{rent}_{PH}$ to the effect on rental prices in the medium and long-run, $t \in \{0 - 30\ years,\ 40 - 60\ years\}$. For the rest of the paper, I set the housing expenditure share to $\alpha = 0.3$. Next, I am using this simple transformation and Figure 4 and Equation 1 to compute a household's MWTP for attributes of public housing. I report these results in Table 1.

Table 1: Willingness to pay estimates for public housing characteristics

	PH Tract			
	White		Black	
Attribute	0-30 years	40-60 years	0-30 years	40-60 years
Construction Costs	-17.95	14.46	6.64	26.03
Apartments	8.40	-242.64	76.83	-59.24
Height	-36.60	-46.86	-3.76	17.31
Ground Coverage	27.07	19.80	16.08	1.81
Initial Black	33.88	304.32	-33.96	121.01
Initial White	-9.91	-29.77	256.94	170.88
	1st Ring			
Construction Costs	-12.75	-0.09	-8.84	3.39
Apartments	5.95	-8.29	16.78	23.61
Height	-15.94	-34.59	-30.76	-29.37
Ground Coverage	10.01	18.55	27.43	21.87
Initial Black	-26.78	-17.26	-44.72	-99.83
Initial White	16.52	-13.06	75.60	32.97

Note. Table 1 shows marginal willingness to pay (MWTP) estimates derived from the transformation proposed in Equation 9. Given the estimates in Figure 4 I report MWTP for each pooled post treatment periods 0-30 year and 40-60 years; to calibrate the Marginal Utility of rent I use the rent per room averaged over the same periods; values are in 2010 dollars; only projects constructed until 1960 were considered.

For example, higher-cost, well-built projects were generally viewed more positively by

[20] The marginal willingness to pay (MWTP) for a specific attribute i is $-\frac{dV/dATTR_i}{dV/dr_m}$.

both White and Black households 40 to 60 years after construction. In treated tracts (PH tract), a \$1,000 increase in construction costs is associated with a monthly willingness to pay of \$14.46 in the long run (40–60 years) for White households. For Black households, the corresponding MWTP is \$26.03 in the long run, suggesting that construction quality plays a meaningful role in perceived neighborhood desirability over time. Long-run MWTPs of Whites and Blacks for adjacent areas (1st ring) are low, at about -\$0.09 and \$3.39 respectively, suggesting that high-quality buildings do not attract households beyond their immediate neighborhood.

In the medium run (0–30 years), the MWTP for Black households to live in a treated tract for a \$1,000 increase in construction costs is modest at \$6.64 and even negative for Whites (-\$17.95). This could reflect potential demand being funneled away from the private market, as larger projects were initially valued. In treated tracts, a 100-unit increase in the number of public housing units is associated with a monthly MWTP of \$8.40 for White households and \$76.83 for Black households. Thus, public housing may have expanded housing supply at lower rents. Well-built projects could have decreased the local MWTP for private housing.

This pattern continues in adjacent areas (1st ring), where a \$1,000 increase in construction costs is associated with a medium-run MWTP of -\$12.75 for White households and -\$8.84 for Black households. In adjacent tracts, medium-run MWTP estimates for White and Black households of -\$5.95 and \$16.78, respectively, for a 100-unit increase in the number of public housing apartments suggest that high-quality projects may have funneled demand away from private housing.

This relationship reverses in the long run. In treated tracts, a 100-unit increase in the number of public housing units is associated with a monthly MWTP of -\$242.64 for White households. For Black households, the corresponding MWTP is -\$59.24. In adjacent tracts, MWTP estimates are smaller in magnitude: White households have an estimated MWTP of -\$8.29 in the long run, whereas Black households have an MWTP of \$23.61. These results suggest that while tracts with larger developments were initially desirable — especially due to the immediate availability of affordable housing — in the long run, larger buildings rendered these areas less attractive, likely due to lower maintenance and greater deterioration, while tracts with well-built projects became increasingly desirable.

The height and ground coverage of public housing played a crucial role in shaping long-run neighborhood desirability. In treated tracts, White residents consistently disfavored taller buildings, with MWTP falling from -\$36.60 per month in the medium run to -\$46.86 in the long run for a one-storey increase in project height. For Black residents, MWTP for building height is slightly negative in the medium-run, -\$3.76 but positive in the long-run, \$17.31. These results suggest sustained aversion to high-rise structures, particularly among

White households.

In contrast, ground coverage—measured as the share of built-up area—was increasingly valued. White households exhibited a positive MWTP of $27.07 in the medium run and $19.80 in the long run for a one percentage point (p.p.) increase in ground coverage. Black MWTP followed a similar trend, increasing from $16.08 to $1.81 per month, though the effect attenuates over time. These preferences point to growing favorability for low-rise, compact housing designs.

In adjacent areas, White households remained averse to taller projects, with MWTP values of -$15.94 and -$34.59 in the medium and long run, respectively. Black MWTP remained negative as well, with estimates of -$30.76 and -$29.37, respectively. With regard to ground coverage, MWTP estimates in adjacent tracts were positive but generally smaller in magnitude — $10.01 and $18.55 for White residents, and $27.43 and $21.87 for Black residents across the medium and long run, respectively.

Overall, the evidence reinforces the critique of the *Tower in the Park* model: tall buildings with low ground coverage were consistently associated with lower neighborhood desirability, particularly in treated areas and among White households.

I finally report homophilic preferences related to the racial composition of public housing tenants. In treated tracts, a ten p.p. increase in the share of initial Black residents is associated with a monthly MWTP of $33.88 in the medium run and $304.32 in the long run for White households. For Black households, however, MWTP values are negative, at -$33.96 in the medium run and $121.01 in the long run. These mixed responses suggest that while White households appear to value these tracts more over time, Black households may be less attracted to areas initially dominated by Black tenants.

Regarding the share of initial White residents, White MWTP in treated tracts is slightly negative in the medium run (-$9.91) and becomes more negative in the long run (-$29.77), implying increasing aversion over time. In contrast, Black households strongly preferred projects with a larger initial White population, with MWTP values of $256.94 in the medium run and $170.88 in the long run. This may reflect a belief that historically White-occupied projects offered better amenities or management rather than a preference for racial homogeneity. Overall, the data do not support strong homophilic preferences, particularly among Black households, and instead suggest a preference for perceived quality signals associated with initially White-majority projects.

In adjacent areas, MWTP estimates similarly reflect limited evidence of strong homophilic preferences. For projects with a higher initial share of Black residents, White households exhibit negative MWTP values of -$26.78 in the medium run and -$17.26 in the long run. Black households show even stronger aversion, with MWTP estimates of -$44.72 and -$99.83, respectively. These patterns suggest that areas surrounding Black-majority projects were less desirable for both groups over time.

In contrast, for projects with a larger initial share of White residents, White MWTP is slightly positive in the medium run (\$16.52) but negative in the long run (-\$13.06), indicating a reversal in valuation. Black households consistently valued proximity to White-majority projects, with MWTP of \$75.60 in the medium run and \$32.97 in the long run.

Together, these results support the interpretation that initial racial composition served less as a driver of racial sorting and more as a proxy for perceived project quality. Over time, however, the signaling value of these early characteristics appears to have diminished.

8 Welfare

To assess the welfare implications of public housing, I estimate the counterfactual welfare effects of removing public housing while keeping the overall housing stock constant. This approach allows me to isolate the direct effects of public housing construction and its impact on neighborhood sorting and affordability. Unlike traditional welfare analyses that require a full structural estimation of household preferences Bayer, Ferreira, et al. (2007) and Almagro et al. (2023), I leverage the reduced-form treatment effects estimated in previous sections and the transformation proposed in Section 7.

The counterfactual scenario eliminates public housing by setting the treatment indicators to zero, thus measuring the net welfare gain or loss due to its construction. This counterfactual illustrates what the city might have looked like had public housing never been constructed, in which agents were never exposed to these buildings.

While a usual welfare analysis would require an expenditure function, I rely on the notion of a rent equivalent to compute renter welfare changes from a counterfactual world while keeping rents and wages constant. Using the estimated preference parameters, a specified set of neighborhood characteristics $(\mathbf{r}, \mathbf{w}, \mathbf{PH})$, the group-specific rent equivalent, RE^g, is the increase in rent that is necessary to leave the household indifferent with respect to the baseline values:

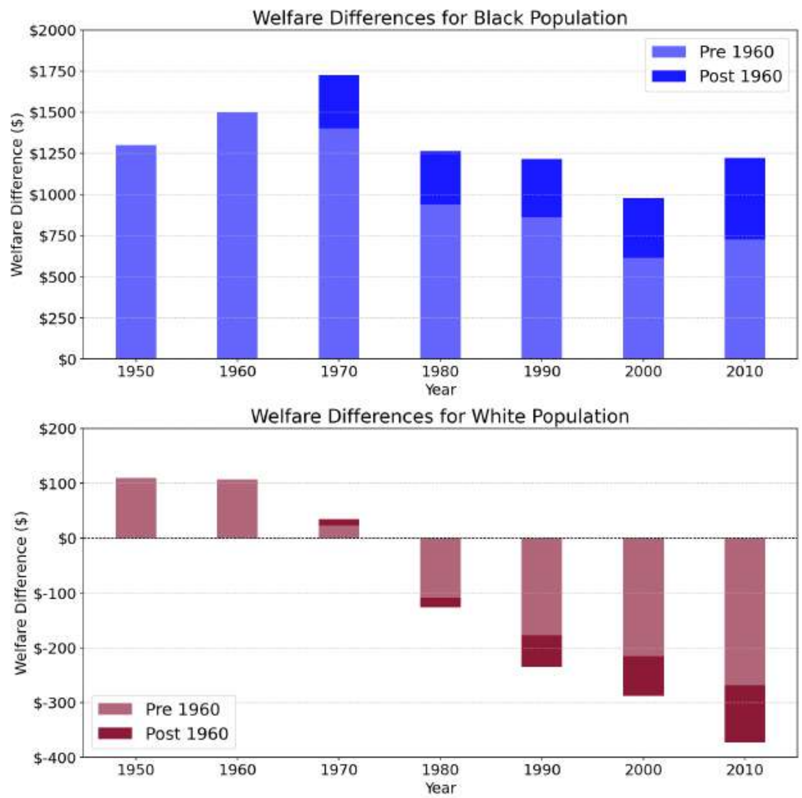
$$\begin{aligned}\Delta CS_t^g = \ln\left(\sum_m \exp(v_{mt}^g(\boldsymbol{\beta}, \mathbf{PH}, \mathbf{r}^1 + RE^g, \mathbf{w}))\right) \\ - \ln\left(\sum_m \exp(v_{mt}^g(\mathbf{PH}, \mathbf{r}, \mathbf{w}))\right)\end{aligned} \tag{10}$$

To estimate Equation 10 I use the average rent per room (in 2010 dollars), $\mathbf{r}$, and the median household income, $\mathbf{w}$, at the census tract level.[21] To compute RE^g, I use

[21] Note that median household income is not available for 1940. I therefore let my welfare estimation begin in 1950. Moreover, I aggregate median household income at 2010 census tract level without reweighting it

the treatment effects from Figure 3 for public housing projects constructed before 1960 and from Figure 2 for later projects, applying the respective treatment year estimates for both public housing tracts and adjacent areas. I match the transformed preferences to the corresponding project tracts and treated tracts for the respective post-treatment period, using the transformation based on Equation 9. In Figure 5, I present population-weighted rent equivalents RE^g in dollars per year for Black and White households over time, based on the counterfactual exercise, which removes all public housing from the city.

Figure 5: Welfare



Note: Figure 5 reports average rent equivalent weighted by tract population due to public housing construction for Black (blue) and White (red) population for each census year. I compare welfare under the actual state - with public housing - to a counterfactual scenario in which all public housing projects have been removed. Welfare is expressed as the change in rents that would make households indifferent between the counterfactual and actual states of the world as expressed by Equation 10. Note that positive values represent welfare gains relative to a counterfactual without public housing.

The welfare estimates in Figure 5 reveal distinct trends in the impact of public housing on Black and White households over time. For White households, welfare gains from public housing projects were initially positive but declined substantially after 1970. In 1950, the estimated welfare gain for White households in tracts with pre-1960 public housing was

using the maximum area share. See Appendix C.4 for more details.

$109.68 per year, suggesting that households would have been willing to pay this amount in higher rents to live near these developments. These gains continued through 1960 ($106.78), but by 1980 had turned negative, reaching -$108.57 and continuing to decline to -$268.28 by 2010. Most of this negative welfare is associated with early (pre-1960) projects, with White households experiencing persistent losses as public housing aged.

For post-1960 projects, White households experienced smaller but still declining welfare: from a modest gain of $11.36 in 1970, to losses of -$17.57 in 1980, -$57.61 in 1990, and -$104.52 by 2010. These patterns suggest that White households increasingly perceived public housing developments—regardless of construction era—as undesirable over time.

In contrast, Black households consistently experienced net positive welfare effects from public housing. In 1950, the estimated welfare gain from pre-1960 projects was $1299.53, rising to $1498.12 in 1960 and $1400.04 in 1970. However, even these high early gains declined over time, falling to $727.03 by 2010—roughly half of the 1950 level.

For post-1960 projects, welfare gains for Black households remained steady or increased, rising from $325.65 in 1970 to $494.64 in 2010. On average, Black households gained $356.68 per year from post-1960 public housing between 1970 and 2010. These results underscore that, while the overall welfare impact of public housing remained positive for Black residents, the desirability of early public housing tracts diminished for both groups.

These results align with research on public and affordable housing investments in New York City. First, as shown by Ellen et al. (2007) federal public housing constructed between 1977 and 2000, federally subsidized developments have not typically led to reductions in property values and have led to increases in some cases. Welfare losses from these projects are modest, averaging around -$48.02 for Whites across periods. However, Black households still perceived an average gain of $372.68. Second, results mirror welfare effects of public housing demolitions in 2010 Chicago across racial and income groups. As shown by Almagro et al. (2023), non-poor White households experienced the largest welfare gains, with a $230 annual increase in welfare, while poor White households gained $113 per year. In contrast, poor Black households faced losses of -$75 per year while rich Black households experienced a slight positive welfare effect of $39 per year. For the same year, I estimate an average welfare gain for White households of $372.80 across all projects and of $268.28 for pre-1960 projects specifically. While these estimates are broadly comparable, the magnitude differs sharply. In 2010, I estimate an average welfare gain of $1221.67 for Black households—about 16 times larger than the gains observed for White households. This is substantial and highlights the importance these projects might have in providing affordable housing for specific communities.

Moreover, this result reflects more recent research on public housing demolitions, showing adverse long-run effects on rent prices (and potentially property prices) (Blanco, 2022;

Hunt, 2009). The sharp decline in welfare—especially between 1970 and 1980—coincides with worsening conditions, rising crime, and increased public disinvestment in public housing. Together, these results point to a shifting public perception of public housing over time, with early projects transitioning from desirable to distressed environments.

9 Conclusion

This paper provides new empirical evidence on the long-term effects of public housing construction on neighborhood composition, housing markets, and welfare outcomes. By leveraging the staggered rollout of public housing projects in New York City, I show how early public housing projects—those built before 1960—had persistent and significant effects on racial sorting and rent dynamics, while later projects exhibited minimal long-term impact.

These results demonstrate that early public housing construction reshaped neighborhoods in ways that persisted for decades. In the tracts where public housing was built before 1960, White population declined by 46% in the long run, with spillover effects leading to a 17% decline 60 years after construction in adjacent tracts. In contrast, Black population increased by 318% in treated tracts and by 17% in adjacent areas, indicating that these developments played a major role in reshaping the racial composition of surrounding neighborhoods. In contrast, projects built after 1960 had no statistically significant effects on neighborhood demographics or rent levels, suggesting that policy shifts, changes in public perception, and evolving tenant selection criteria muted the neighborhood-wide impacts of public housing in later decades.

The characteristics of public housing projects reveal substantial heterogeneity in their effects. Higher construction costs, low-rise buildings, and greater ground coverage are associated with a higher MWTP, while developments with less ground coverage and more total apartments tend to generate negative demand effects. These findings suggest that design and quality shaped the broader economic spillovers of public housing, with higher-cost, compact, and low-rise projects being more desirable than high-rise, expansive developments. MWTP estimates further reinforce this conclusion, showing that both Black and White residents were willing to pay higher rents for better-quality public housing in the long-run.

The welfare analysis highlights divergent impacts across racial groups. Public housing generated positive welfare effects for Black households throughout the sample period, with welfare gains of approximately \$1,299.53 per year in 1950 and \$1,221.67 per year in 2010. However, White households initially experienced welfare gains but saw these benefits turn negative over time, declining from \$109.68 in 1950 to -\$372.80 per year by 1980. These findings indicate that while public housing benefited many low-income residents, it also contributed to sorting patterns that unequally affected Black and White residents.

Taken together, these results provide a more nuanced understanding of how public housing developments shaped urban neighborhoods over the past century. Unlike previous studies that focus solely on short-term effects or localized price impacts, this paper offers a long-run perspective on public housing's role in shaping urban economic geography. The findings suggest that the effects of public housing depend critically on its timing, design, and policy environment, with earlier projects playing a transformative role in shaping neighborhoods, while later projects had a more limited impact.

Future research could explore whether similar patterns hold in other cities with extensive public housing developments, such as Chicago or Philadelphia. Additionally, understanding the mechanisms through which public housing characteristics influence demand—whether through building quality, amenities, or management practices—could provide further insights into how place-based policies shape urban development.

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A Model Details

This section displays the full model from Section 3. The city consists of ethnic groups $g \in B, W$ where $\sum(N^g) = N$. Household's i utility depends on consumption of a single city wide final good, housing units, residential amenities and an individual-specific idiosyncratic shock that varies with residence location. Under Cobb Douglas preferences the utility of household i of group g living in tract m is given by:

$$U^g_{im} = f\left(B^g_{im}, \epsilon^g_{mi}\right) \cdot \left(\frac{C_i}{\alpha}\right)^{\alpha} \left(\frac{h_{im}}{1-\alpha}\right)^{1-\alpha} \tag{A.1}$$

Groupspecific residential amenities B_{gm} capture common features that make a location a more or less desirable place to live. The consumption good C_i is chosen as numeraire. I paremetrize $f\left(B^g_{im}, \epsilon^g_{mi}\right)$ with an exponentail function and assume that the public housing effects amenities by distance:

$$f\left(B^g_{im}, \epsilon^g_{mi}\right) = \exp\left(\beta^g_{1m} PH_{1m} + \beta^g_{2m} PH_{2m} + \epsilon^g_{im}\right) \tag{A.2}$$

The β^g_m and β^g_m are preference parameters for dummies, indicating if a tract m was having a public housing project, $PH_{1m} = \mathbb{1}[m \in PH]$ or m was neighbor of a tract $j \neq m$ with a public housing project, $PH_{2m} = \mathbb{1}[m \in 1st\ ring]$. Log indirect utility is then given by:

$$V^g_{im} = \varphi^g_{im} + \epsilon_{im} \tag{A.3}$$

where φ^g_{im} is the component of indirect utility for census tract m that is common to all households of group g - called mean indirect utility hereafter - , and ϵ_{im} is an idiosyncratic shock which are drawn from an Extreme Value Type I distribution. The common component of indirect utility is:

$$\varphi^g_{im} = \beta^g_1 PH_{1m} + \beta^g_1 PH_{2m} + \log(w^g_m) - \alpha \log(r_m) \tag{A.4}$$

Given the distributional assumption on ϵ_{mt}, the probability that a household i of group g chooses to live in tract m is:

$$\pi^g_{im} = \frac{exp(\varphi^g_{im})}{\sum^M exp(\varphi^g_{ij})} \tag{A.5}$$

It should be noted that the denominator is type-specific but not location-specific. It measures the expected utility of living in the city and is treated as a constant. To see this, define $\bar{v}^g = \frac{1}{C}\sum_{k=1}^{C} \exp\left(\frac{V^H_k}{\sigma^H}\right)$ with $a^g = C\bar{v}^g$. For a given C that is large enough, any change in φ^g_{im} does not affect $\bar{v}^g$.

The demand for living in neighborhood m equals the total number of households, across all groups, that want to live in m. Taking the total population of group g, N^g , in the City of New York City exogenous yields the following housing demand equation:

$$D_m = \sum_g \pi^g_m N^g \tag{A.6}$$

The model is closed by assuming an isoelastic supply function such that the number of housing units in tract m is given by:

$$S_m = \delta_m r_m^{\phi_m} \tag{A.7}$$

where δ_{mt} is a supply shifter and ϕ_m is the tract specific supply elasticity.

Assuming that each household occupies one unit of housing, the model the model is identified after housing markets clear if $S_m = D_m$. Equilibrium rent prices are then given by:

$$\log(r^*_m) = \frac{1}{\phi_m + \alpha}\left[\log\left(\sum_g \frac{exp(\beta^g_1 PH_1 + \beta^g_2 PH_2 + \log(w^g_m))}{\bar{v}^g} N^g\right) - \log(\delta_m)\right] \tag{A.8}$$

Note that I assume the expenditure share of housing to not vary across groups. Using Equation A.8, one can solve for equilibrium population of blacks and whites in tract m:

$$\log(N^{g*}_m) = \beta^g PH_1 + \beta^g PH_2 + \log(w^g_m) - \alpha \log(r^*_m) - \log(\bar{v}^g) + \log(N^g) \tag{A.9}$$

Next, I derive two comparative statics from Equation A.8 and Equation A.9 to evaluate the equilibrium response of rent prices and population to public housing. First I differentiate equilibrium rents with respect to PH_R, where $R \in \{PH\ tract,\ 1st\ ring\}$ indicates the distance relationship to public housing:

$$
\begin{aligned}
\frac{d\log(r_m^*)}{dPH_{R,m}} &= \frac{1}{\phi_m + \alpha} \cdot \frac{1}{\sum\limits_g \frac{\exp\left(\beta_1^g PH_1 + \beta_2^g PH_2 + \log(w_m^g)\right)}{\bar{v}^g} N^g} \\
&\quad \sum_g \frac{\beta_R^g \exp\left(\beta_1^g PH_1 + \beta_2^g PH_2 + \log(w_m^g)\right)}{\bar{v}^g} N^g \\
&= \frac{1}{\phi_m + \alpha} \cdot \frac{\sum\limits_g \beta_R^g \tilde{T}_g}{\sum\limits_g \tilde{T}_g} \\
&= \frac{\Xi}{\phi_m + \alpha}
\end{aligned} \tag{A.10}
$$

Where $\tilde{T}_g = \frac{\exp\left(\beta_1^g PH_1 + \beta_2^g PH_2 + \log(w_m^g)\right)}{\bar{v}^g} N^g$. Equation A.10 reveals that rent prices are a combination of the income share of housing the local housing supply elasticity and probability weighted preference parameter.

Using Equation A.10 gives the equilrbium population response of group g in tract m to the construction of public housing:

$$
\frac{d\log(N_m^{g*})}{dPH_{R,m}} = \beta_1^g - \alpha \cdot \frac{\partial \log(r_m^*)}{\partial PH_{R,m}} = \beta_1^g - \alpha \cdot \frac{\Xi}{\phi_m + \alpha} \tag{A.11}
$$

Equation A.10 and Equation A.11 give an expression for the change in equilibrium rents and tract population in treated and adjacent tracts.

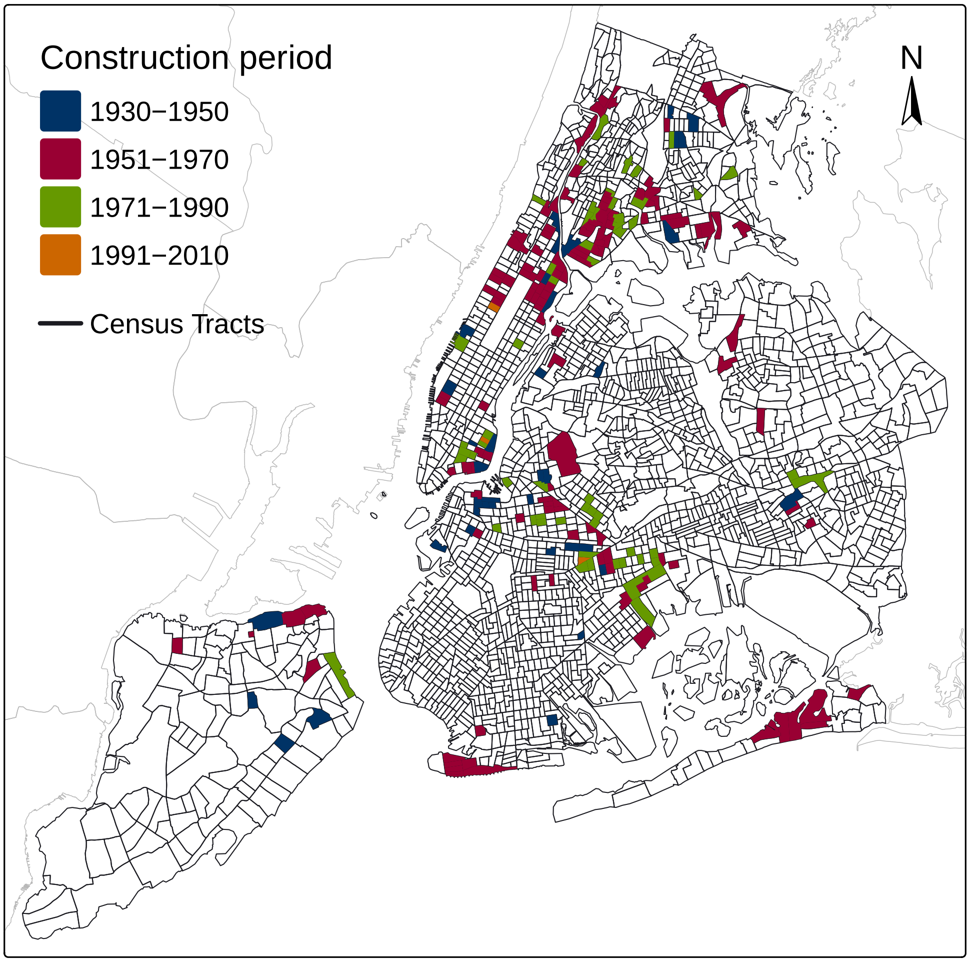
By definition, the consumer surplus is the utility, in money terms, that a household receives in the choice situation. Household n chooses the alternative that provides the greatest utility. Therefore, $CS_n = max_j(U_{nj} = (V_{nj} + \epsilon_{nj},\ \forall\ j)$. Following the argument in Small and Rosen (1981), one can use Marshallian-Demand, Equation A.6, and the definition of the consumer surplus to get:

$$
\begin{aligned}
D_m^g/N_g = CS_m^g &= \int \pi_m^g(\varphi_{mt}^g) d\varphi \\
&= \ln\left(\sum_m \exp(\varphi_{mt}^g(\mathbf{PH}, \mathbf{r}, \mathbf{w}))\right)
\end{aligned} \tag{A.12}
$$

Where φ_{mt}^g is mean indirect utility as defined in Equation A.4.

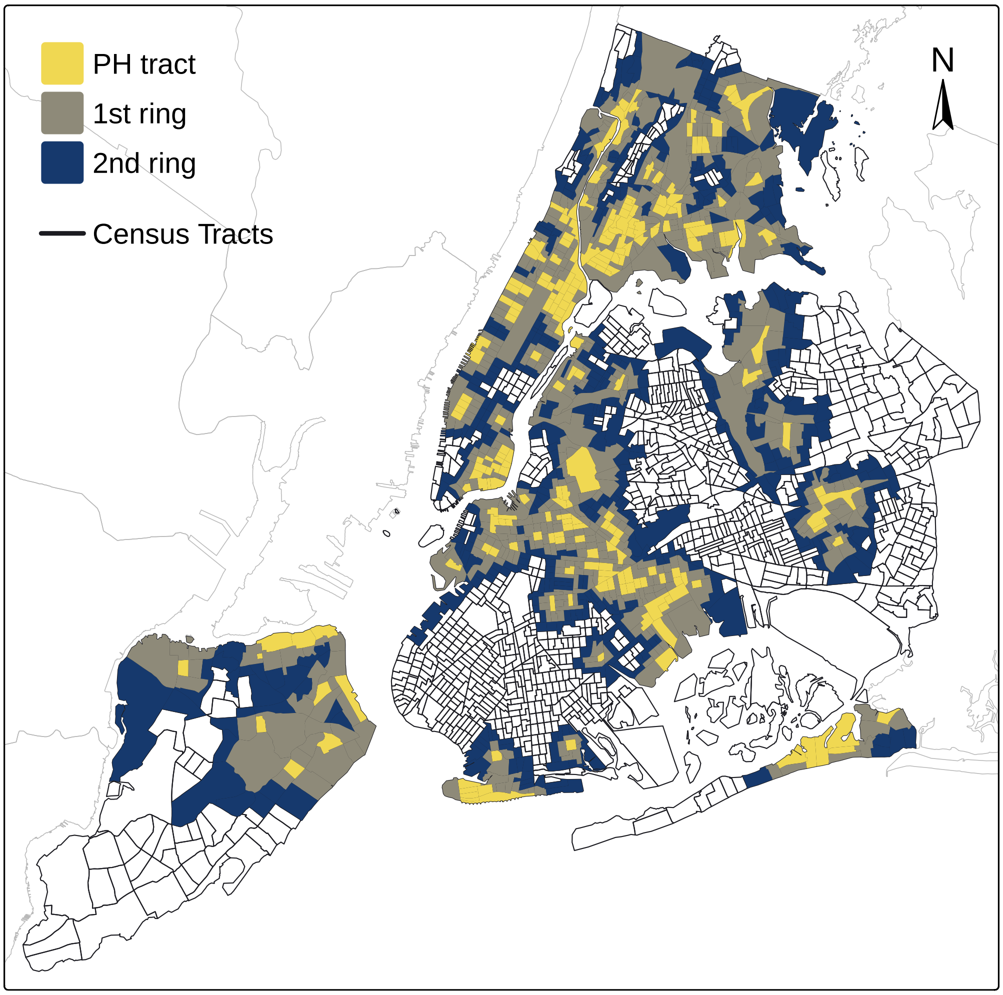
B Maps

Figure B.1: Evolution of public housing by construction period



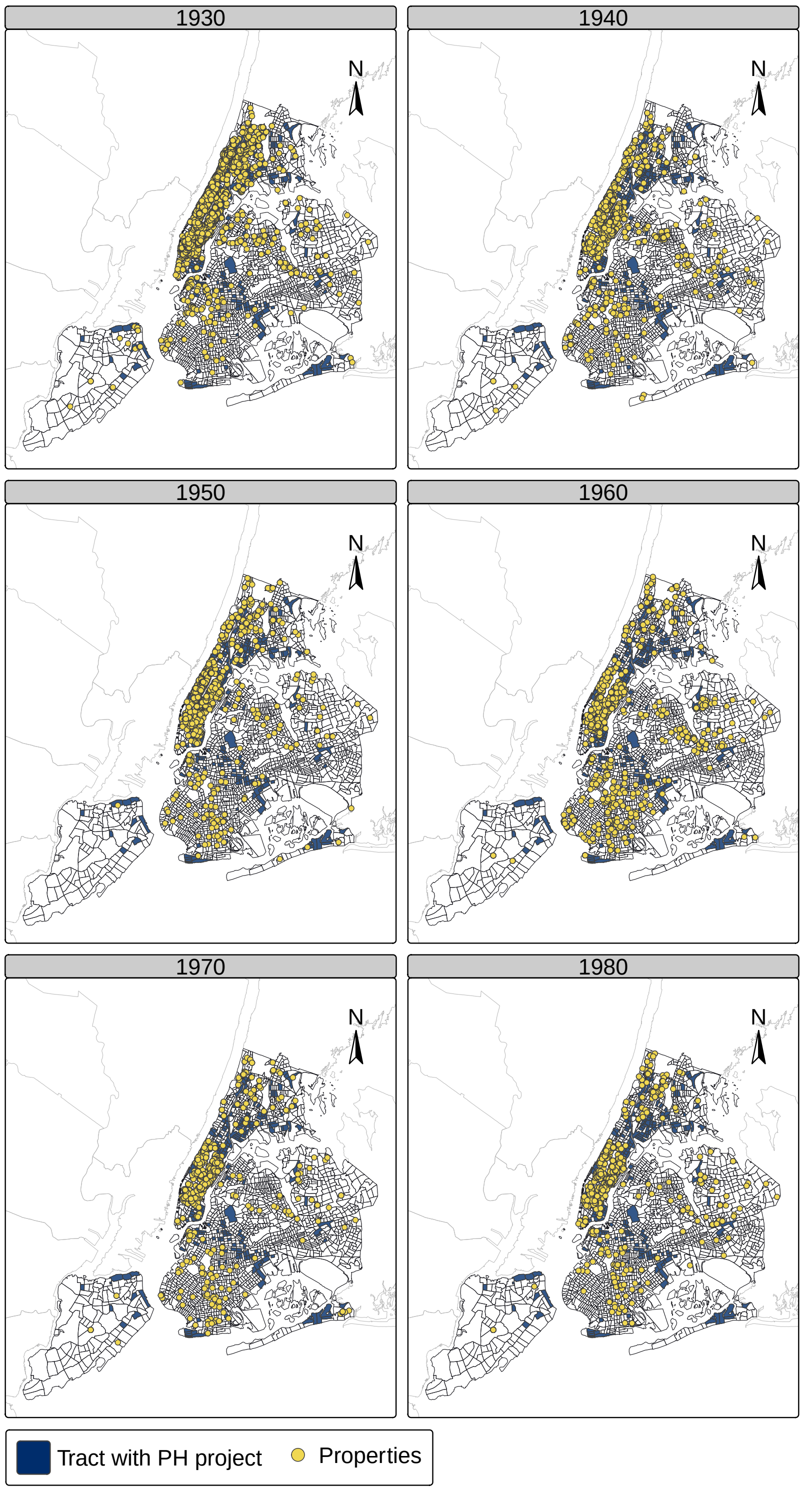
Note: Figure B.1 displays 2010 census tracts. Tracts highlighted in color contained at least one public housing project. Some tracts have more than one project. Public housing tracts have been grouped in construction periods based on the completion date of the first project.
Source. La Guardia and Wagner Archives, NYCHA development data book. Details on the construction of the data set can be found in Section 4.

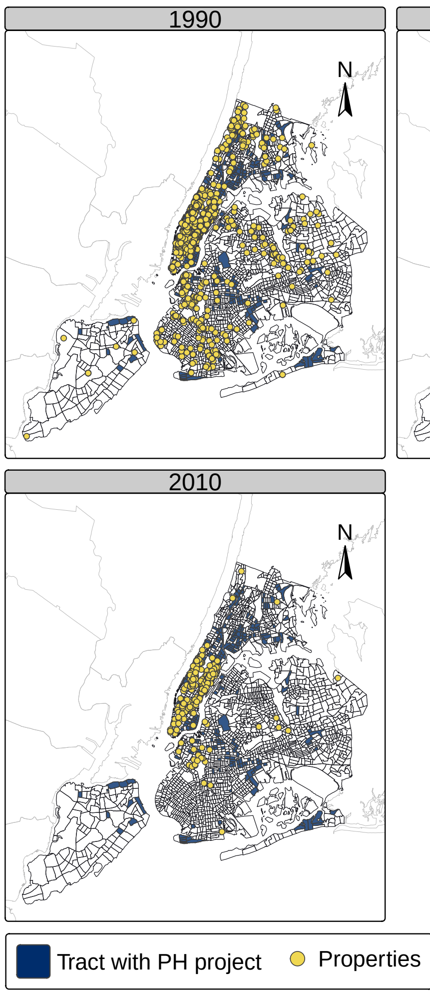
Figure B.2: Tracts by distance relationship to public housing



Note. Tracts by distance relationship as used in the analysis in panel setup.

Figure B.3: Spatial extent of Rental Data



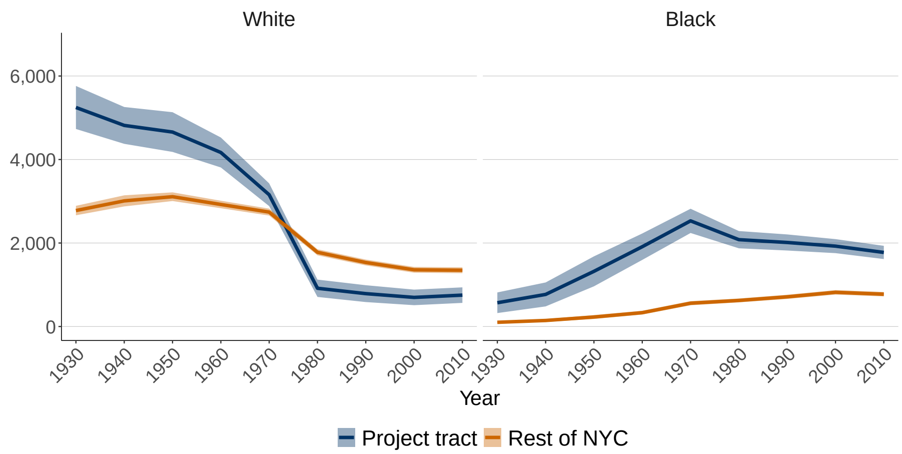


Note: Geocoded rental data fro each given census year are shown as red dots. All census tracts which have had a public housing unit ever during the observation period are colored in blue.
Source. New York Times Real estate sections. Details on the construction of the data set can be found in Section 4.

C Data

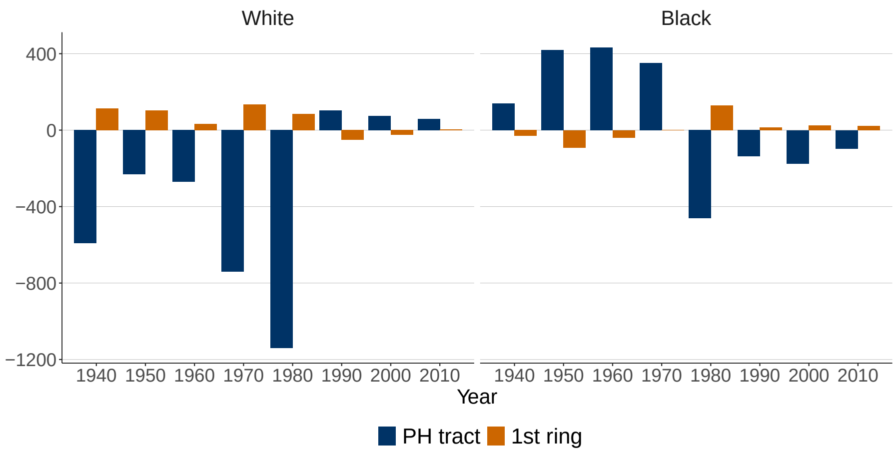
C.1 Public housing statistics

Figure C.1: Demographic trends



Note. Figure C.1 reports trends of the main outcome variables. It shows yearly averages for demographic variables: white and black population; I compute averages for all treated tracts, or, in other words, those which ever had a public housing unit within its boundaries (Project Tract) and all remaining tracts in New York City (Rest of NYC).

Figure C.2: Deviation from average city tract



Note. Figure C.2 reports the deviation of the average treated and control tract as defined in Section 5 from the average tract in the rest of new york city.
Source. US Decennial Census, NYCHA development data book. Details on construction of the data set can be found in section 4.

Table C.1: Probability of Treatment

	PH tract			1st ring		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
log(White)	0.0813			0.1818***		
	(0.0906)			(0.0402)		
log(Black)		0.4160***			0.2575***	
		(0.0793)			(0.0468)	
log(Rent)			0.0118			-0.0651
			(0.1680)			(0.1054)
Fixed-effects						
Project-Year	Yes	Yes	Yes	Yes	Yes	Yes
Project-NTA	Yes	Yes	Yes	Yes	Yes	Yes
Varying Slopes						
Project-NTA-Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,373	3,373	293	8,609	8,609	914
Pseudo R^2	0.05471	0.08245	0.10922	0.07277	0.08006	0.16612
BIC	13,740.1	13,633.1	1,277.4	26,604.5	26,519.2	3,943.4

Table C.1 shows estimates from a logistic regression. In columns (1) to (3), the dependent variable is equal to one if a census tract is treated and to zero if the tract is within the second ring as dependent variable; in columns (4) to (6), the dependent variable is equal to one if a census tract is within the first ring around a treated tract and to zero if the tract is within the second ring as dependent variable; I include project-by-year and project-by-neighborhood (NTA) fixed effects; I allow the outcome variable to vary over time in each neighborhood by including project-by-neighborhood time trends; each treated tract has a consistent first and second ring from neighbouring census tracts; afterwards these project specific panels were stacked together as described in Section section 5; standard errors are clustered at the project level.
Signif. Codes. ***: 0.01, **: 0.05, *: 0.1.

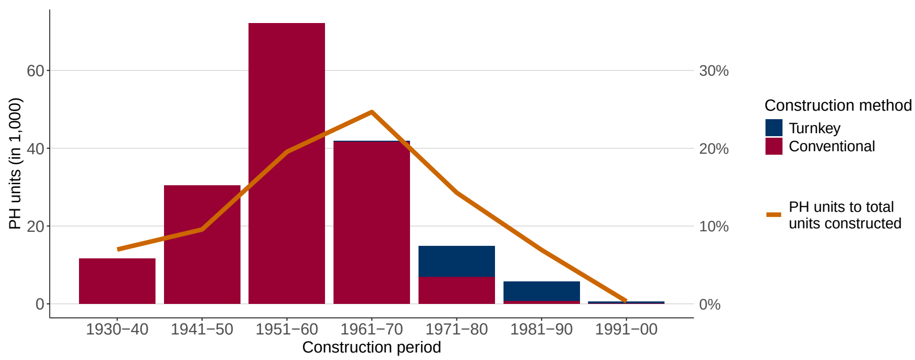
C.2 Public housing statistics

Table C.2: Public housing characteristics by construction decade

	1940	1950	1960	1970	1980	1990	2000
				Total counts			
Projects	9	28	58	80	63	26	9
Units	10244	30382	70601	41933	14911	5715	626
				Median characteristics			
Stories	6	10	14	18	12	7	6
Units	1531	1156	1246	441	221	189	51
Ground coverage	29.74%	18.86%	14.50%	17.62%	33.47%	28.01%	42.68%
Construction cost	$12'854.93	$14'712.01	$13'963.55	$15'409.28	$17'287.91	$25'965.57	$26'962.55
				Average characteristics			
Stories	5.33	9.43	12.78	16.95	12.27	8.12	5.44
Units	1138.22	1085.07	1217.26	524.16	236.68	219.81	69.56
Ground coverage	27.87%	18.29%	14.92%	21.61%	31.86%	28.26%	46.71%
Construction cost	$18'622.04	$16'744.14	$16'626.30	$17'682.21	$17'123.95	$25'097.79	$29'298.38

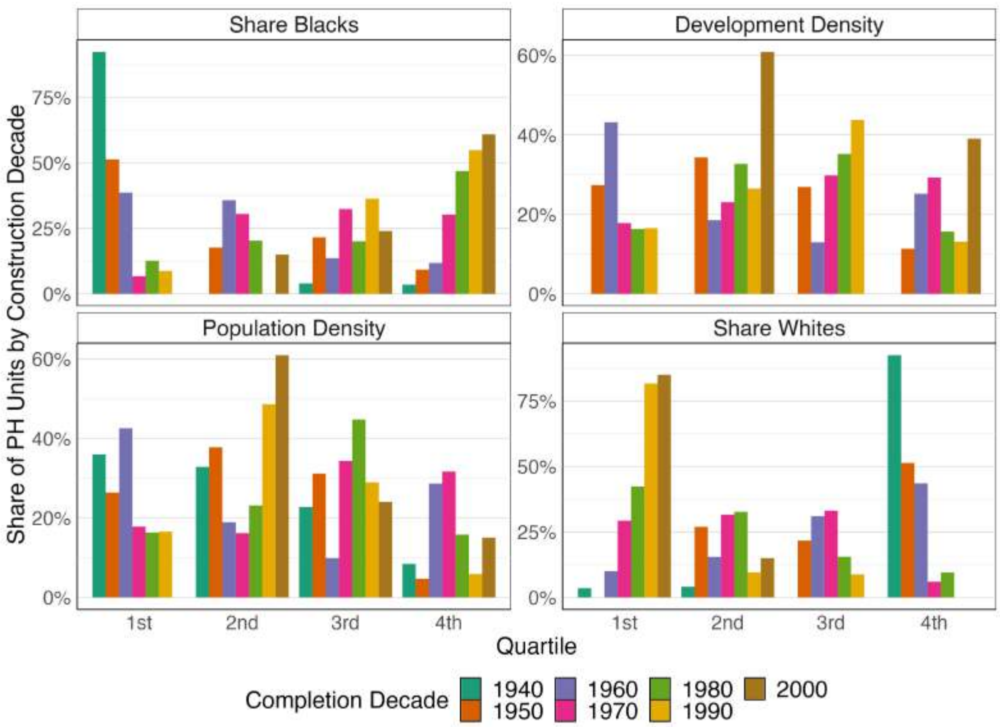
Note. Table C.2 displays public housing project information within the decade of their construction; projects were grouped into construction period cohorts based on their opening date. The first two rows report total counts by construction decade. Row three to six shows median public housing characteristics by construction decade. Rows seven to ten average characteristics. The average was taken across all public housing projects constructed within a decade. Construction cost refer to construction cost per room, are deflated by the CPI and given in $2010.
Source. NYCHA Development Data Book. Details on construction of the data set can be found in Section 4.

Figure C.3: Evolution of public housing by construction period



Note. Figure C.3 reports trends of public housing by construction decade. Projects have been grouped in construction periods by their completion date. The figure shows the total number of units within a decade. There are two acquisition methods. Under the *Conventional Method*, the authority acquires the land and contracts for General Construction, Heating and Ventilation, Elevators, Electrical, and Plumbing work. Under the *Turnkey Method*, the developer buys the land, constructs the development, and sells it to the Authority under the terms of a pre-agreed contract. The orange line shows the total number of public units as a share of total units constructed in New York City within the decade.
Source. NYCHA development data book. Details on the construction of data the data set can be found in Section 4.

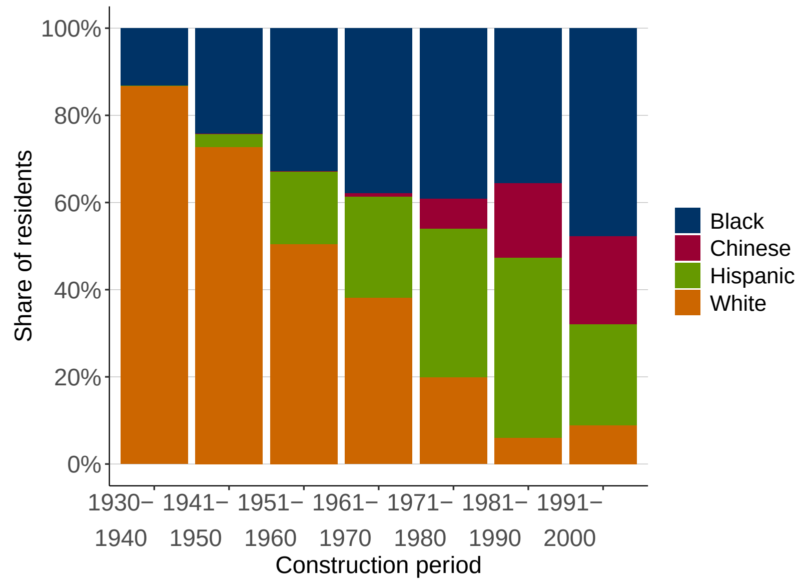
Figure C.4: Public Housing Units by Construction Cohort and Quartile of Baseline Tract Characteristics



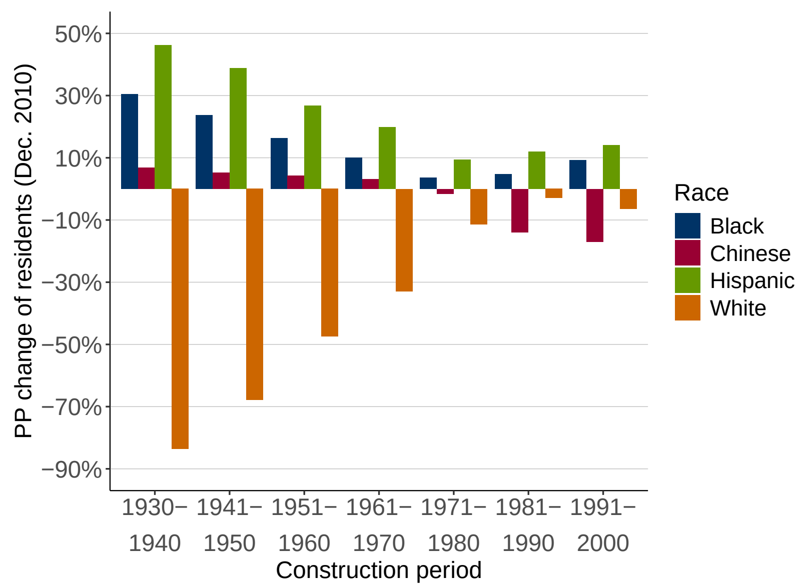
Note: Figure C.4 shows the share of public housing units by construction cohort by quartile of baseline tract characteristics. Tract characteristics were taken the decade before a public housing project arrived. Next, total public housing was grouped by quartile as a share of the total number of units constructed within the decade. Each decade refers to the projects constructed nine years before. Details on Data construction
Source. NYCHA development data book and US federal census. Details on the construction of the data set can be found in Section 4.

Figure C.5: Racial composition by construction decade

(a) Initial allocation of residents



(b) Change of residents



Note. Figure C.5 displays the ethnic composition of NYCHA projects based on their construction decade. Projects have been grouped in construction periods by their completion date. Panel (a) presents the resident shares by ethnicity at the time of initial occupancy. Panel (b) illustrates change for each ethnic group from the project's start date to December 2010 in percentage points.
Source. La Guardia and Wagner Archives, NYCHA development data book. Details on the construction of the data set can be found in Section 4.

C.3 Rent data collection

Rent data were collected from the real estate section of the New York Times (NYT). This was undertaken in context for the Historical Prices in Housing Project (HiPHoP) project at Trinity College Dublin. Figure C.6 Panel (b) gives an example of a typical listing page in the NYT. For each census year, the standard approach was to choose 12 sets of listings, one per month collected on the last Sundays. Sundays were chosen as the day with by far the largest set of real estate listings. This was true for the vast majority of years; where another day of the week had the largest set of listings, this was used instead. Within each set of listings, targets were set for valid rental ads: 1500 rental listings.

Table C.3: Summary rent statistics

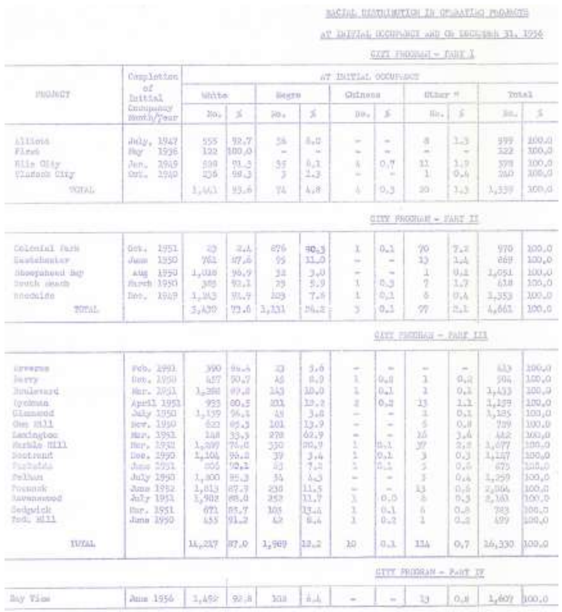
Year	Obs	Avg. rent	Avg. rent pr	Avg rooms
1930.00	8847.00	1850.41	696.78	4
		(1867.02)	(763.06)	(3)
1940.00	1504.00	1067.86	355.85	5
		(2045.92)	(915.35)	(3)
1950.00	1529.00	1107.27	424.16	4
		(1390.38)	(373.08)	(4)
1960.00	1585.00	1042.71	312.52	4
		(856.73)	(218.72)	(2)
1970.00	1425.00	1694.88	560.01	4
		(1310.84)	(446.85)	(2)
1980.00	1435.00	1388.48	533.07	4
		(1506.35)	(535.58)	(2)
1990.00	1527.00	1446.6	632.28	3
		(1457.9)	(611.19)	(2)
2000.00	1032.00	1774.34	640.17	4
		(2701.58)	(873.44)	(2)
2010.00	112.00	1621.8	493.5	4
		(2469.01)	(643.06)	(2)

Note. Table C.3 shows all rental listings used in the corresponding analysis by year. Column "Avg. rent" refers to the average monthly rent, column "Avg. rent pr" is the average rent per room per year and "Avg. room" is the mean of rooms across properties; standard deviations are given in parentheses.
Source. New York Times.

The final listings which were used depended on the fact of having the correct address. For this to have either cross street or street number was required to be available, to ensure the correct location. In a next step the Google Geocode API was used to geocode the addresses. If an address matched main and cross street or with the exact street number the rental listing was included. If not it was not used. This procedure yields the final sample of rental listings shown in Table C.3. The years 1930 and 1940 have more observations than the following years since existing data from HiPHoP had been added.

Figure C.6: Example of data used

(a) Racial distribution in projects



(b) NYT real estate section

Note. Figure C.6 shows examples of archival data sources. Panel (a) shows page three of the Dec. 31st, 1956 NYCHA report "Racial Distribution in Operating Projects", indicating the racial distribution at initial occupancy and Dec. 31st, 1956 for each project. Panel (b) shows page 8W of the *New York Times* real estate section; columns indicate the borough location as well as broad rental characteristics, such as furnished or not.
Source. LaGuardia and Wagner Archives, NYCHA collection, Box. Nr. 0071B6; NYT 28.04.1940.

C.4 Tract Harmonisation

A major challenge in using census tract-level data for longitudinal analysis is that tract boundaries change substantially over time, making it difficult to construct a time-consistent panel dataset. I address this issue by reweighting observations based on overlapping area weights, using 2010 census tract boundaries as the target geography. Specifically, I aggregate count variables such as white and black population—using this method. Let i index 2010 census tracts and j index historical tracts from earlier census years. For each 2010 tract i, the weighted estimate $\hat{y}_i$ for a given outcome variable y is calculated as:

$$\hat{y}_i = \sum_{j \in \mathcal{J}_i} \frac{A_{ij}}{A_j} \cdot y_j,$$

where y_j is the value of the outcome variable in historical tract j, A_{ij} is the area of intersection between historical tract j and 2010 tract i, and A_j is the total area of tract j. The set $\mathcal{J}_i$ contains all historical tracts j that overlap with tract i.

This method assumes that the outcome variable is uniformly distributed within each historical tract, which may introduce error. For instance, if tract j in year t contains a spatially concentrated low-income population, but overlaps evenly with multiple 2010 tracts, the method would misallocate residents uniformly across those tracts—biasing spatial estimates.

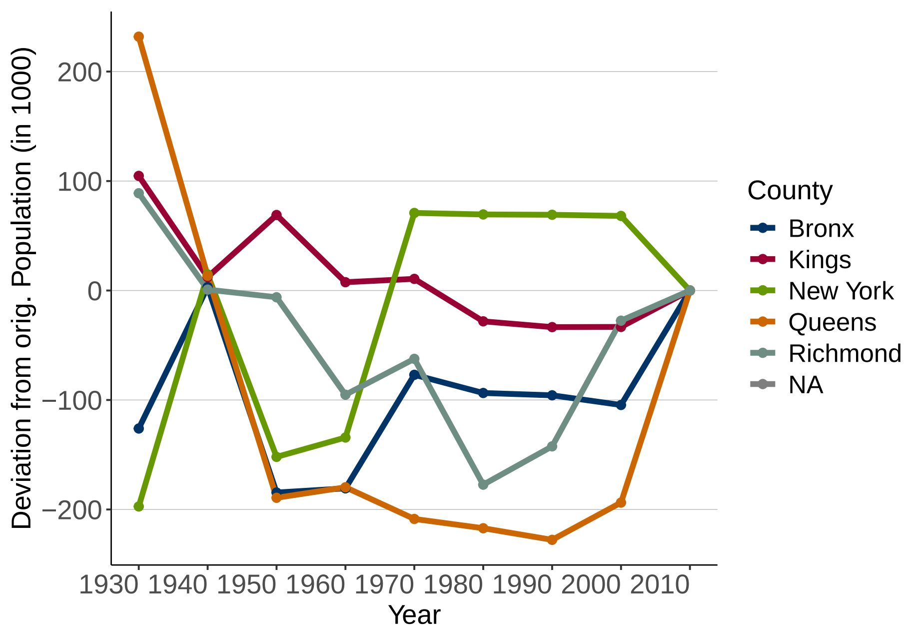
For the welfare estimation in Section 8, I require tract-level estimates of median income. Because median income is not a count variable, I assign it to 2010 census tracts based on spatial overlap rather than weighted aggregation. Specifically, for each 2010 tract i, I assign the median income from the historical tract j in year t that maximizes the ratio of overlapping area:

$$j^* = \arg\max_j \left(\frac{A_{ij}}{A_j} \right),$$

where A_{ij} is the area of intersection between tract i (2010) and tract j (year t), and A_j is the total area of tract j. The income of tract j^* is then assigned to tract i.

Figure C.7 compares the reweighted population series at the borough level to the original series. While overall trends are preserved, deviations from the original data vary across boroughs and over time. The largest deviations occur prior to 1960, particularly for Queens, where cumulative differences exceed 200,000 residents in some years. This reflects more complex boundary changes—such as tract splits and consolidations—that introduce greater error into the reweighting procedure. By contrast, Richmond (Staten Island) exhibits minimal deviation throughout the entire period, consistent with relatively stable tract definitions. Kings (Brooklyn), New York (Manhattan), and the Bronx show moderate discrepancies,

Figure C.7: Deviation due to boundary harmonization



Note. Figure C.2 shows the difference between total population aggregated from original census tracts and total population estimated using area-weighted aggregation based on overlapping boundaries, by borough. *Source.* U.S. Decennial Census.

which decline over time as boundary stability improves. Notably, the deviation does not systematically bias population upward or downward but reflects localized distortions resulting from uniform distribution assumptions. These deviations are particularly relevant when interpreting long-run neighborhood trends and estimating historical baseline conditions.

As discussed in Logan, Zhang, et al. (2021), spatial harmonization accuracy depends critically on the nature of boundary changes, with larger errors expected for non-nested, irregular transitions. While the area-weighting method provides a feasible approach to creating a tract-level panel, it may understate heterogeneity in neighborhoods with high internal variation or complex administrative histories.

D Extended Results

D.1 Property-Level Analysis

In this section I use the test if the effects vary using the geocoded properties. Instead of using census tracts, I use flexible distance rings around projects to utilize the granularity of the property level rental data. I use 250m, 300m, 350m and 400m radii. The sets of rings for alternative radii are $\{0-250m, 250-500m\}$, $\{0-300m, 300-600m\}$, $\{0-350m, 350-700m\}$ and $\{0-400m, 400-800m\}$. A rental observation is considered to be treated if it is located within a ring tract. I compare properties within a treated ring and within the first ring to those properties in the third ring. Properties may appear in multiple rings, as tract rings may overlap. If treated properties occurred in a control ring, they were dropped.

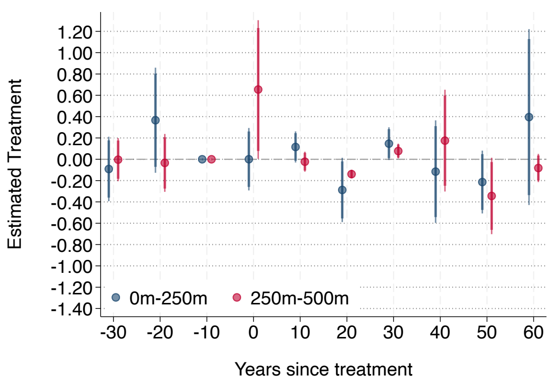
The identifying assumption is that, without public housing, rents change similarly in both rings, and any difference in rents should solely reflect the impact of public housing. I estimate the following event study equation at the property i, census tract m, project p, and year t level:

$$y_{i,k,p,t,m} = \sum_{r \in R} \sum_{\tau=-30}^{60} \beta_{\tau,r} \left(t - Y_p, r = r(i,p)\right) + \delta' \mathbf{X_{i,m,p,t}} + \rho_{p,t} + \rho_{p,m} + \zeta_{p,k} + u_{i,k,p,t,m} \quad \text{(D.1)}$$

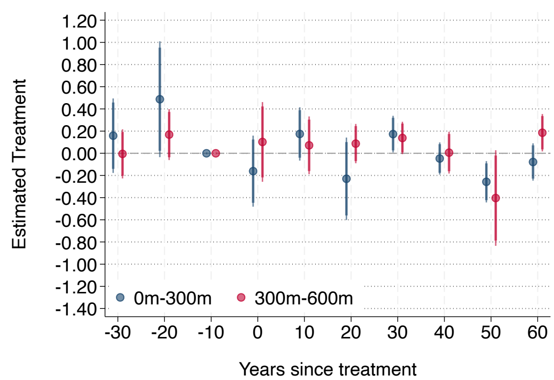
$\beta_{\tau,r}$, captures the effect of public housing on rents for properties within a treated ring, relative to properties in the outermost rings. I interact each time dummy with an indicator for the ring $r(i,p)$ in which a property i around project p is located. Y_p denotes the year when a project p was completed and the set of rings is defined as $R = \{0-250m, 250-500m\}, \{0-300m, 300-600m\}, \{0-350m, 350-700m\}, \{0-400m, 400-800m\}$. Project-census year fixed effects ($\rho_{p,t}$) account for time patterns across all rings surrounding each project p. I control for project-by-month fixed effects, $\rho_{p,m}$, to account for the cyclicality of house prices. Project-by-tract fixed effects, $\zeta_{p,k}$ control for time invariant area characteristics. The vector $\mathbf{X_{i,m,p,t}}$ includes property characteristics such as the number of rooms, whether the dwelling was furnished and had AC, water, or heat included in the rental price. By allowing controls ($\mathbf{X_{i,m,p,t}}$) to vary by project, $\beta_{\tau,r}$ becomes a weighted average of project-specific treatment effects. Specifically, project years are weighted by the frequency of properties in each ring. Standard errors are clustered at the project level for the property-level analysis.

Figure D.1: Effects of public housing on property level rents using alterantive distance rings

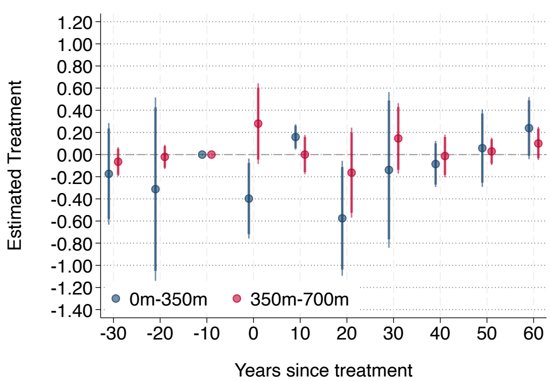
(a) 200m rings



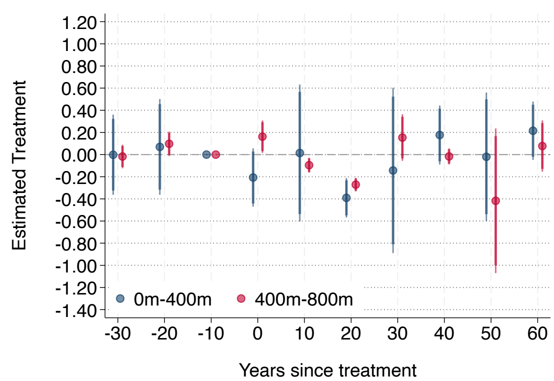
(b) 300m rings



(c) 350m rings



(d) 400m rings

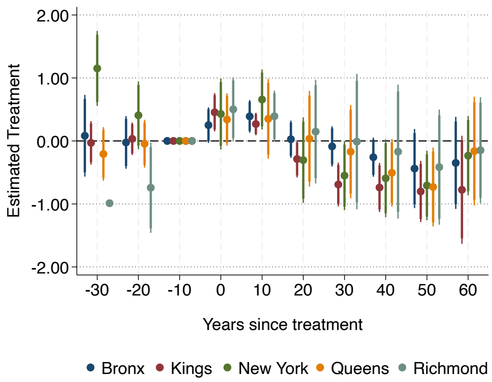


Note. Figure D.1 reports point estimates coefficients $\beta_{\tau,r}$ in Equation Equation D.1; standard errors are clustered at the project level; the vertical lines show the estimated 90% and 95% confidence intervals. Panel (a) to (d) uses property level rent data with alternative distances rings of 250m, 300m, 350m and 400m. The omitted group is within a third distance that is 500m-750m, 600m-900m, 700m-1050m and 800m-1200m respectively.

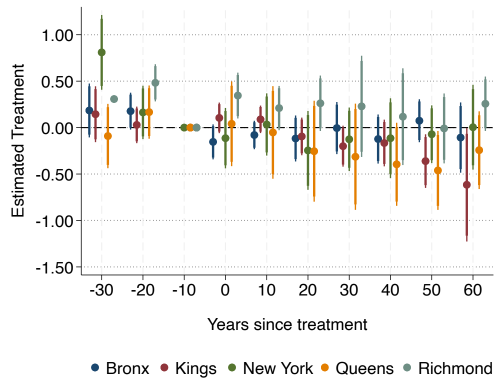
D.2 Heterogeneity by Borough

Figure D.2: Effect on demographics

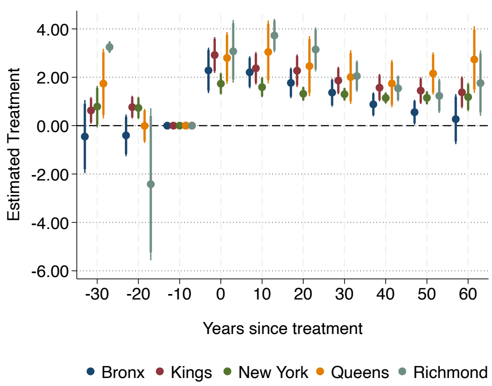
(a) log(White) - PH tract



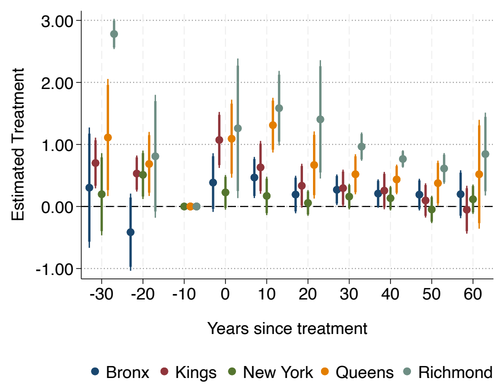
(b) log(White) - 1st ring

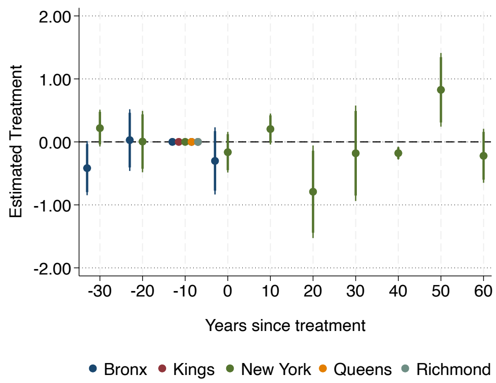


(c) log(Black) - PH tract

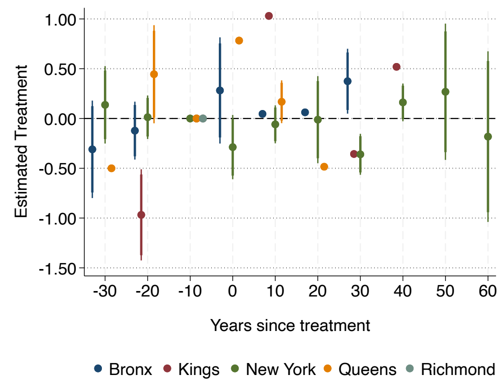


(d) log(Black) - 1st ring





(e) log(Rent) - PH tract



(f) log(Rent) - 1st ring

Note: Figure D.2 plots report coefficients $\hat{\beta}_{\tau,r}$ in Equation 7 for each treated tract and rings around a project; coefficients have been interacted with an indicator variable for each of the five boroughs in New York: Bronx (blue), Kings (red), New York (green), Queens (orange), and Richmond (teal); standard errors are clustered at the project level; the vertical lines show the estimated 90% and 95% confidence intervals; the omitted category consists of tracts within a second ring in each borough. Panels D.2a to D.2f use weighted unit counts from the US Census; estimates have been weighted by frequency by ring; the sample includes 2162 time-consistent census tracts in New York City.

D.3 Event study results - Panel setup

In this Section, I report event study results in this section using alternative estimators that correct for the shortcomings of standard two-way fixed-effects (TWFE) models. Specifically, the literature focused on the “forbidden” comparison between later-treated and earlier-treated units, which the TWFE estimator might not handle correctly. As shown in Goodman-Bacon (2021), the TWFE estimator might choose weights that lead to the estimator having the wrong sign. The estimators proposed in the literature differ in terms of who they use as the comparison group (e.g., not-yet-treated versus never-treated) and the pre-treatment periods used in the comparisons (e.g., the entire pre-treatment period versus the final untreated period).[22]

To test the coherence of the approach using a stacked design, as proposed in Section 5, I use the panel setup. In this setup, a tract is treated when it has had a public housing project within its boundaries at any point in time. To serve as the appropriate control group, I compare treated tracts to tracts in the second ring, surrounding the inner ring. This is motivated by two reasons. First, the second ring serves as a coherent control group from the stacked to the panel setup. Second, since it is reasonable to assume public housing generates spillovers, dropping the first tract ring around public housing will suffice not to violate SUTVA. Figure B.2 shows the spatial layout of treatment and control. I estimate the following dynamic specification:

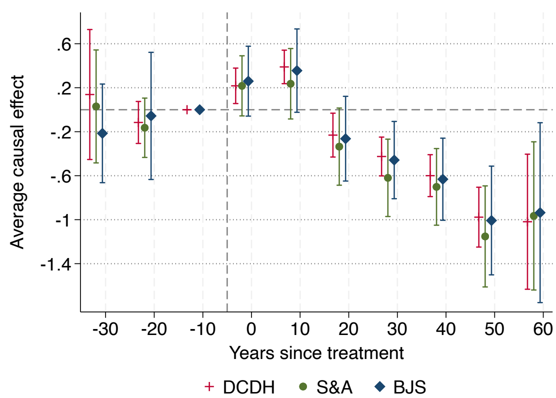
$$y_{i,m,t} = \sum_{\tau=-60}^{70} \beta_\tau \left(t - Y_p\right) + \rho_t + \zeta_i + \Xi_{m,t} + u_{i,m,t} \tag{D.2}$$

The parameter of interest, denoted as β_τ, captures the effect of the arrival of public housing in census year t relative to the year of construction Y_p compared to the outermost rings. I control for census year ρ_t and tract ζ_i fixed effects. Finally, I allow tracts within a neighborhood to trend differently each year by including non-parametric neighborhood trends $\Xi_{m,t}$. Results from estimating Section D.2 are shown in Figure D.2.

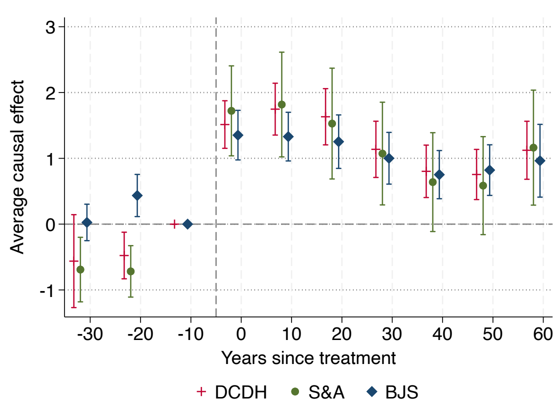
[22] I refer to Roth et al. (2023) for an excellent overview of recent advancements in the DiD literature and practical guidance on how these estimators differ.

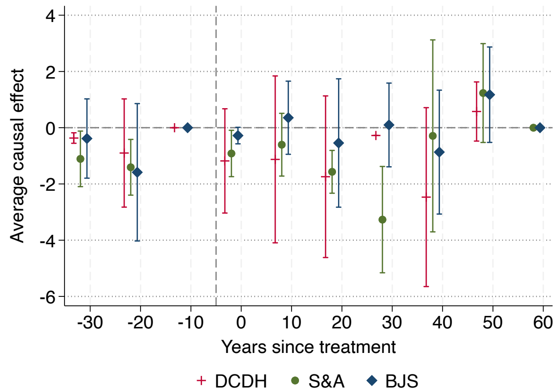
Figure D.2: Effect of public housing

(a) log(White)



(b) log(Black)





(c) log(Rent)

Note. Figure D.2 displays coefficients $\hat{\beta}_\tau$ from estimating Equation D.2. Panel (a) reports results using white population and (b) black population as outcome variable and Panel (c) average rent per room in 2010 Dollars. For furher details on the outcome variables see Section 4. The abbreviations refer to the following estimators: DCDH, de Chaisemartin and D'Haultfoeuille estimator (De Chaisemartin and D'Haultfœuille, 2020); CSA, Callaway and Sant'Anna estimator (Callaway and Sant'Anna, 2021); S&A, Sun and Abraham estimator (Sun and Abraham, 2021). Note that the CSA estimator does not allow for non-parametric neighborhood time trends. Therefore, I control for the outcome variable at baseline. The bar denotes 95% confidence intervals; standard errors are clustered at the neighborhood (NTA) level.