Neighborhood Evolution and Infrastructure Provision *

Pablo Valenzuela-Casasempere†

[PRELIMINARY]

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Abstract

This paper examines the long-run socioeconomic impact of highway construction on U.S. neighborhoods. I construct a balanced panel of neighborhood-level characteristics from 1930 to 2020 for 62 metropolitan areas by combining data from historical census records and decennial censuses. Neighborhood-level aggregates for 1930 and 1940 are created by geocoding address-level information from historical files and then aggregating the data to match census tract boundaries. Using a matched difference-in-differences design, I find that highway construction reduces the total population of neighborhoods. The effects are driven by a relative decline in the Black population, with no significant effect on the white population. There is no evidence of changes in rents, but homeownership rates decrease following highway construction. The analysis suggests that these effects are more pronounced in suburban areas and in neighborhoods with a low initial share of Black residents. Additionally, I find evidence of spillover effects on adjacent neighborhoods.

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†Vancouver School of Economics, The University of British Columbia. pv93@student.ubc.ca

1. INTRODUCTION

The U.S. is currently facing an infrastructure crisis, with aging and outdated systems in urgent need of improvement (American Society of Civil Engineers, 2021). However, the toll these projects take on neighborhoods fuels local opposition, leading to increasing costs and delays (Crockett, 2018). Local residents and policy groups resist these projects due to their negative effects on the environment, increased pollution, and the fragmentation of communities. Thus, understanding the impact of infrastructure projects on neighborhoods is essential for the successful modernization and improvement of U.S. infrastructure.

This paper examines the short- and long-run socioeconomic impacts on neighborhoods of the largest infrastructure project in U.S. history: the construction of the Interstate Highway System (IHS). Beginning in 1956, the IHS connected cities and regions across the country, reshaping urban landscapes and transforming how Americans live and work. During the first fifteen years of construction, the IHS built over 4,500 kilometers of highways in urban areas, displacing thousands of residents and altering the demographic composition of neighborhoods. However, its construction disproportionately impacted neighborhoods with a large Black population and low socioeconomic status (Valenzuela-Casasempere, 2024). Therefore, highway construction offers a unique opportunity to study the effects of large infrastructure projects on neighborhoods.

I study the socioeconomic impact of highway construction between 1950 and 1990 on affected neighborhoods.[1] To achieve this, I construct a balanced panel of neighborhood-level characteristics with consistent boundaries from 1930 to 2020 for 62 metropolitan areas, combining data from historical census records and decennial censuses. The selection of metropolitan areas is based on the availability of spatial information from 1950 (Manson et al., 2023). To expand the data for 1930 and 1940, I geocode address-level information from historical census files and aggregate it to match census tract boundaries. Each neighborhood is then linked to the highway network and matched with its corresponding opening date (Baum-Snow, 2007).

The placement of highways was not random, since many policymakers used it as a tool to advance their political agendas (Lewis, 2013). To account for this, I use a matched difference-in-differences design to estimate the impact of highway construction on neighborhoods. I compare treated neighborhoods, where highways were built, to observationally similar untreated neighborhoods outside the metropolitan area. There is no evidence of differential pre-trends between the treated and control groups across a variety of outcomes, which enhances the credibility of the research design.

[1] Given the structure of the data, I only observe the decade in which a highway segment is open. Therefore, I focus on openings starting in 1950 and ending in 1990. Historical accounts suggest that almost all highway construction occurring in the 1950s happened after 1956 (Rose and Mohl, 2012).

I find that highway construction significantly alters the demographic composition of neighborhoods. Compared to their matched counterfactual, treated neighborhoods experience an average population decline of 10.4 percent two decades after highway construction. This population decrease is primarily driven by an 18.3 percent reduction in the Black population, with no discernible effect on the white population. As a result, the Black share of the population in treated neighborhoods declines. Additionally, highway construction impacts economic activity in affected communities, as homeownership rates decrease by 5.7 percent in the long run, while rents remain unaffected.

Highway construction occurred during a period of significant urban segregation in the U.S. This segregation was driven by the suburbanization of white individuals (Boustan, 2010) and institutional barriers that restricted Black individuals' ability to freely choose where to live (Cutler et al., 1999; Almagro and Sood, 2024). I test whether these two phenomena influenced the impact of highway construction on neighborhoods. First, I analyze the effect of highway construction on neighborhoods that housed Black individuals prior to construction, comparing neighborhoods with above- and below-median initial Black populations. I find that the overall population decline in treated areas is primarily explained by white individuals leaving neighborhoods with a large initial Black population. However, there is no evidence of a decline in the Black population in these neighborhoods, leading to an increase in the Black share of the population. In contrast, neighborhoods with a low initial Black population experience a decrease in the Black population and an increase in the white population, resulting in no net effect on the total population. When examining economic outcomes, I find that homeownership rates decline only in neighborhoods with a high initial Black population, while rents remain unchanged in both types of neighborhoods. These findings are consistent with anecdotal evidence suggesting that highway construction contributed to the creation of "second ghettos."

Second, I examine how suburbanization influences the impact of highway construction on neighborhoods. Previous research has identified highway construction as a key driver of suburbanization in the U.S. (Baum-Snow, 2007). I analyze the heterogeneous effects of highway construction across neighborhoods at varying distances from the Central Business District (CBD) by studying outcomes across different quartiles. The results reveal significant suburbanization effects, with neighborhoods near the CBD experiencing population declines, while those farther away see population growth. Both Black and white populations decrease in neighborhoods close to the CBD, with estimates suggesting that both racial groups relocate to suburban areas. Additionally, I find that homeownership rates decline in neighborhoods near the CBD, while they increase in suburban areas. These findings indicate that the IHS construction was a central force driving suburbanization in the U.S., affecting populations across racial lines.

The 1956 Federal Highway Act did not include relocation provisions for affected residents. Housing alternatives at the time were limited, forcing displaced individuals to relocate to affordable housing in nearby neighborhoods (Archer, 2020). I test for spillover effects of highway construction on adjacent neighborhoods. The results show that adjacent neighborhoods experience a medium-run increase in the Black population and a decrease in the white population. Since construction primarily affected low-income areas, displaced individuals were more likely to be renters than homeowners. I find evidence of a decline in homeownership rates in adjacent neighborhoods, alongside a medium- and long-run decrease in median rent. Overall, this evidence suggests that the effects of highway construction on the urban landscape extended beyond the directly impacted neighborhoods.

This project is important for two key reasons. First, it provides valuable evidence for the design of policies aimed at retrofitting and revitalizing neighborhoods affected by highway construction. Ongoing policy efforts are focused on reconnecting neighborhoods and communities that were divided by these infrastructure projects. For example, the 2021 Inflation Reduction Act allocated over 1.5 billion dollars in grants to reconnect communities divided by highway construction. The findings suggest that highway construction reduced both population and homeownership rates in affected neighborhoods, highlighting the need for these policies to prioritize increasing the housing stock and promoting homeownership in these areas.

Second, this project provides crucial evidence for understanding urban segregation in the U.S. The country has a long history of urban segregation, with the Black population systematically excluded from neighborhoods offering better amenities and opportunities. Recent studies have shown that urban segregation has long-lasting effects on individuals' economic mobility and social outcomes (Ananat, 2011; Chyn et al., 2022). This project highlights the role of infrastructure in shaping the urban landscape and the demographic composition of neighborhoods, offering insight into the underlying causes of segregation.

This paper contributes to three strands of the literature. First, it adds to the broad body of work focused on studying and making historical data available in the U.S. Initial efforts in this area were made by Bogue (2024), who digitized census tract information from 1940 to 1970 for a limited number of cities and neighborhoods. In recent years, these efforts have expanded in both scope and granularity (Manson et al., 2023; Logan, n.d.; Logan et al., 2014; Valenzuela-Casasempere, 2024). This project contributes by constructing spatial data for 1930 and 1940 for neighborhoods that previously lacked spatial information. The data were built by geocoding address-level information from historical census files and aggregating it to match census tract boundaries.

Second, this project contributes to the literature examining the impact of the Interstate Highway System (IHS) on U.S. cities. The literature has explored how the IHS influenced cities' economic activity (Duranton et al., 2014; Herzog, 2021; Chandra and Thompson, 2000; Duranton and Turner, 2012) and how it shaped the urban landscape (Baum-

Snow, 2007; Duranton and Turner, 2011). Recent studies have focused on the IHS's impact on the demographic distribution of cities (Brinkman and Lin, 2022; Brinkman et al., 2023; Weiwu, 2023; Bagagli, 2023), its consequences for residents in affected communities (Valenzuela-Casasempere, 2024), and its role in fostering segregation (Mahajan, 2023). The findings in this paper are the first to demonstrate both the short- and long-run effects of highway construction on neighborhoods, illustrating how neighborhoods adapted to the new infrastructure.

Third, this paper contributes to the literature examining the factors that drive neighborhood change. Previous research has explored how neighborhoods evolve due to spillovers from nearby areas (Guerrieri et al., 2013), natural amenities (Lee and Lin, 2017), the Great Migration (Boustan, 2010), and infrastructure development (Brinkman and Lin, 2022; Baum-Snow, 2007; Weiwu, 2023). In contrast to these studies, I emphasize the pivotal role of infrastructure in shaping the demographic evolution of neighborhoods. Additionally, the findings provide insights into both the short- and long-run effects of highway construction, illustrating how neighborhoods have adapted to new infrastructure over the past century.

This paper is structured as follows. Section 2 provides the historical background of the construction of the IHS and its impact on U.S. cities. In Section 3, I describe the data construction process. Section 4 outlines the research design. Section 5 presents the main results, followed by Section 6, which discusses the mechanisms underlying the findings. Finally, Section 7 concludes.

2. Historical Context

This section provides historical context on the construction of the US Interstate Highway System and its impact on urban neighborhoods.

2.1 The Interstate Highway System

In the early 1940s, President Roosevelt initiated the first effort to establish an interstate network of highways in the US. In April 1941, the Interregional Highway Committee was established to develop a post-war road construction plan (Rose and Mohl, 2012). After years of discussions, the committee devised a plan that led to the Federal-Aid Highway Act of 1944, which proposed the creation of a "National System of Interstate Highways". The act called for the construction of over 40,000 miles of highway, which should be "located, as to connect by routes, direct as practical, the principal metropolitan areas, cities, and industrial centers, to serve the National Defense, and to connect at suitable points, routes of continental importance in the Dominion of Canada and the Republic of Mexico" (National Interregional Highway Committee, 1944). [2] However, despite enacting the Federal-Aid Highway Act, the expected momentum in highway construction did not materialize due to the absence of a precise funding mechanism. It was not until a decade later, during the presidency of Dwight Eisenhower, that federal allocations for highway construction started.

Systematic Federal highway construction started in the U.S. after President Eisenhower signed the Federal-Aid Highway Act of 1956 into law. The Act aimed to improve the nation's transportation infrastructure by constructing a National System of Interstate and Defense Highways. The bill provided 25 billion dollars over twelve years to accelerate the construction of 41,000 miles of interstate highways. The legislation created the Highway Trust Fund to finance the construction, funded by an increase in the federal tax on gas and diesel. The bill ensured that the Federal Government paid 90% of the construction costs, while leaving the routing of the future interstates in the hands of state and local officials (Rose and Mohl, 2012). The construction was expected to be finished by 1972, and the built network should be able to handle 1972's traffic projections. The bill assured that the US would receive the modern, interconnected, transcontinental network of highways that the country was lacking (Murphy, 2009).

2.2 Highway Construction and Neighborhoods

Urban routes proposed by the Federal Government were instrumental in securing the approval of the Federal-Aid Highway Act of 1956. However, these routes were not binding. As Rose and Mohl noted: "Congress and President Eisenhower reaffirmed the longstanding principle that the locus of authority in highway programming rested unambiguously in the hands of state highway officials" (Rose and Mohl, 2012, p. 161). This granted state and local officials the power to determine urban routes, which in turn allowed for the utilization of highways to serve racial and political agendas (Rose and Mohl, 2012, p. 97). Figure A.1 provides evidence that the constructed highway network deviated from the Federal engineering plans which were less likely to be politically influenced (Weiwu, 2023). Although many highway segments aligned with the intended origin and destination points, there were variations in the specific locations where highways were ultimately built compared to the initial plan.

Scholars in the urban affairs literature frequently point to highway construction as the mean to achieve racial agendas, leading to the relocation of Black households from their historical communities. Highway builders envisioned these new highways as means of

[2] Under the Federal-Aid Highway Act of 1944, states submitted proposals for their portion of the network. The collection of these proposals resulted in the National System of Interstate Highways of 1947. This map has previously been used in economic research (Baum-Snow, 2007; Duranton and Turner, 2011; Herzog, 2021). This article, however, does not use this map because it focuses on interstate highways, not including urban segments.

clearing "blighted" urban areas, often at the expense of Black communities. As Alfred Johnson, executive director of the American Association of State Highway Officials, recalled: "Some city officials expressed the view in the mid-1950s that the urban interstates would give them an opportunity to get rid of the local "n*****towns" [...]" (Rothstein, 2017, p. 128). In the mid-1960s, planning experts forecasted that the construction of the interstate network would result in the displacement of more than one million people from their homes, primarily African Americans (Rose and Mohl, 2012, p. 96). As shown in Figure A.1, highways were built in nearly all neighborhoods with a significant Black population. In addition, Federal and local agencies provided little to no assistance to displaced Black households to find new living arrangements. As a result, highway construction forced these households to relocate to the fringe of cities (Rothstein, 2017).

One of the most well-documented cases of highway construction used for Black removal occurred in Miami, Florida. State planners chose to route Interstate 95 directly through the heart of Overtown, a community that was the center of economic and cultural life for the Black population in the city. State officials overlooked an alternative route that would have used an abandoned railway right-of-way and would have resulted in minimal population displacement (Rothstein, 2017). As a result, Interstate 95's construction displaced approximately ten thousand Black individuals from their homes and communities (Archer, 2020). A similar situation unfolded in New Orleans, Louisiana, where local policymakers purposefully avoided the historic French Quarters and instead placed Interstate 10 through the traditionally Black community of Claiborne (Rose and Mohl, 2012). As depicted in the top two panels of Figure A.2, the construction of the highway resulted in the destruction of century-old oak trees that characterized the neighborhood, changing the community irreversibly.

The use of highway construction to remove Black communities was not limited to Southern U.S. For example, in Detroit, Michigan, the predominantly Black neighborhood of Black Bottom was wiped out by the construction of Interstate 75 (Avila, 2014, pp. 89-90). The bottom two panels of Figure A.2 visually represent how Interstate 75 bisected the neighborhood. A similar pattern occurred in St. Paul, Minnesota, where Interstate 94 cut through the city's Black community, displacing one-seventh of St. Paul's African American population. One critic noted that "very few Black individuals lived in Minnesota, but the road builders found them" (Rose and Mohl, 2012, p. 108). In Camden, New Jersey, a State Attorney General Office report concluded that the highway plans "clearly aimed to eliminate the town's Black population" (Rothstein, 2017, p. 129).

The construction of interstate highways played a significant role in shaping the spatial conditions prevalent in modern US cities. Highways razed entire neighborhoods, relocated households, and created physical barriers now perceived as natural, thereby changing the trajectory of urban segregation in subsequent decades (Trounstine, 2018). Furthermore, highways facilitated the migration of primarily white city dwellers to the suburbs. Consequently, urban segregation cannot be viewed as an independent issue from highway construction but rather as a direct result of their location and construction (Archer, 2020; Fotsch, 2007).

3. Data

To study how highway construction impact neighborhoods, I construct a balanced panel of neighborhood-level characteristics from 1930 to 2020 for 62 metropolitan areas by combining data from historical census records and decennial censuses.[3] The sample consists of neighborhoods located inside 62 SMAs that had spatial information in 1950. Appendix Table B.1 lists the MSAs used and the number of census tracts available in 1950. Information for the decades between 1950 and 2020 comes from the National Historical GIS census information (Manson et al., 2023).

I expand the spatial information available for 1930 and 1940 by aggregating the definitions of the geocoded complete census into 2010 census tracts. I restrict the sample to tracts that are part of the 62 SMA with spatial information available in 1950.[4] To avoid bias coming from the geocoding process, I drop tracts whose population increased or decreased by a factor of ten in consecutive census years. My approach does a good job of matching the historical characteristics of the neighborhoods for the subsample of neighborhoods with spatial data in 1940, as shown in Appendix Figure C.2. Details of the construction of the historical neighborhood characteristics and a benchmarking exercise can be found in Appendix Section C.1.

I then match each neighborhood to the highway network available. Data on built highways corresponds to the interstate highway system network, segmented into 1-mile equal-length segments. The network is matched with the PR-511 database to determine the opening date of each highway segment (Baum-Snow, 2007; Brinkman and Lin, 2022). I then compute the distance from each census tract to the planned and built highway network. Figure A.3 presents an example of the structure of the data analysis. Each geometry corresponds to a census tract, and the filling represents the number of Black residents in the tract. The built highway network is depicted in red. Treated tracts correspond to those traversed by the highway.

[3] A common challenge while working with neighborhoods over time is that geographic units rarely align across periods. This study addresses this problem by using the crosswalk provided by Lee and Lin (2017) for the years where spatial data is available. The crosswalk uses 2010 census tract definitions. For the census years from 1950 to 1960, the crosswalk weighs by overlapping area. From 1970 onwards, it used population weights. More detailed information about the crosswalk can be found on pages vii-viii of the online appendix of Lee and Lin (2017).

[4] Once the complete count of the 1950 census is released, I will expand the sample to the 169 SMA in 1950.

4. RESEARCH DESIGN

In this section, I discuss the matched difference-in-difference design I use to examine the effects of highway construction on neighborhoods.

4.1 Matching Algorithm

To estimate the effect of highway construction on neighborhood dynamics, I build a sample of consistent boundary neighborhoods from 1930 to 2020. I utilize nearest-neighbor propensity score matching to pair each census tract where a highway was constructed between 1950 and 1990 with a control census tract. To do so, I first group census tracts based on their standard metropolitan area, a proxy for city, and the decade in which a highway was constructed. Then, I select as potential controls all census tracts that were never treated and were not intended to receive a highway on the Yellow Book maps. I exclude from the potential control group those tracts that were planned to receive a highway, as there is evidence that the expectation of highway construction can affect neighborhood dynamics (Brinkman et al., 2023).[5] Additionally, the control group must be located in a different city than the treatment to avoid contamination from spillover effects. Section 6.2 presents evidence in favor of this assumption. To summarize, I match each treated tract with a tract from a different city that was never intended to receive a highway.

Next, I estimate a separate probit model on a cross-sectional sample of tracts consisting of the treated and potential control groups. The probit regressions relate the construction of a highway in the decade of treatment to the proximity of the tract's centroid to the city center, (log) population the three decades prior to construction, (log) white population the decade prior to construction, Black population quartiles before construction, and the (log) median rent in the tract the previous two decades before construction. Finally, using the estimated predicted values as the treatment propensity, each treated tract is matched with the untreated tract having the closest propensity score. The matching procedure matches all the 1,562 events in the data, creating a well-balanced sample. A broader discussion of the matched sample can be found in Appendix Section C.

4.2 Descriptive Statistics

Table 1 reports the summary statistics of the matched sample in the last decade before highway opening. Column (1) reports statistics on the full-matched sample. Columns (2) and (3) display the statistics for treated and control census tracts, respectively. Finally, column 4 presents the p-value of an OLS regression between the variable and an indicator that takes the value one if a highway was built through the tract and zero otherwise.

[5] Figure D.6 shows that the results do not depend on this assumption.

The average census tract has a log total population of 8.28 (3944 inhabitants) and its population is mostly White. The average tract in the sample has a Black share of 12.3%, and most of their population does not own the property where they live. Tracts in the sample are located at similar distances from the city center, with no significant difference between treated and control tracts. Differences in Black share, home-ownership rate, and median home value notwithstanding, covariates are relatively well balanced between treated and control groups. The algorithm matches well variables that were not used in the procedure, such as other race populations, home-ownership, and Black population.

Figure D.1 presents the evolution of the population raw means relative to highway construction. The matched sample has had a similar evolution in the decades leading up to treatment for both control and treatment tracts. Panels D.1a and D.1b show that the total population decreases in absolute terms for both groups in the sample. However, a different picture arises when we split the sample between the Black and White populations. Panels D.1c and D.1d suggest that the Black population is increasing over time for treatment and control tracts. The White population, on the other hand, is decreasing over the sample as shown by panels D.1e and D.1f. Thus, the Black share in both groups is increasing (panel D.3b).

Now, I turn my attention to the evolution of the median rent, home value, and home-ownership rate. Figure D.2 presents these plots. We can see that prices go up after highway construction. Panels (a) - (d) show an upward evolution of both the level and the log level of the mean of median rent and median home value. Finally, we observe that the home-ownership rate decreases after highway construction, as seen in panel D.3d. It is worth pointing out that the matching procedure accurately matches the evolution of the variables excluded from the matching procedure (median home value, home ownership, the Black share) before treatment.

4.3 Empirical Strategy

To study the effect of highway construction on neighborhood characteristics, I estimate the following model:

$$y_{nt} = \alpha_n + \lambda_{c(n)t} + \sum_{k=-2}^{4} \tilde{\theta}_k 1\{t = t_n^* + k\} + \sum_{k=-2}^{4} \theta_k 1\{t = t_n^* + k\} \times HWY_n + u_{nt} \quad (1)$$

where y_{nt} is an outcome variable, such as log Black population, for neighborhood n in decade t. HWY_n is an indicator equal to one if neighborhood n received a highway, the definition of an event, and zero otherwise. I select those highway segments that, once open, remain open until the end of my sample.[6] Thus, highway construction is an absorbing treatment, and the dummy variable takes the value of one for all periods. The variable $1\{t = t_n^* + k\}$ are event time dummies, where t_n^* is the last decade prior a highway opening for neighborhood n.[7] I control for neighborhood fixed effects, α_n, and city-by-decade fixed effects, $\lambda_{c(n),t}$, where $c(n)$ denotes the city associated with neighborhood n. In this specification, I omit the dummy for two decades before the highway opens so that θ_k identifies the changes in outcome y_{nt} between treated and counterfactual neighborhoods relative to the same difference at $k = -1$. I make this decision because I only observe segment openings, but the effect could start showing up when construction begins, which is unobserved in my data. u_{nt} is the error term. The regression results are weighted by the tract population in the decade before highway construction.[8] Standard errors are clustered at the census tract level.

4.4 Validity of the Design

I use a dynamic matched difference-in-differences design to study highway construction's demographic and economic effect on affected neighborhoods, frequently used in the literature (Fenizia and Saggio, 2024). This research design helps circumvent the known challenges to difference-in-difference when the model only relies on the variation in the timing of treatment and the treatment effect at each period relative to the treatment when it is not heterogeneous (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021; de Chaisemartin and D'Haultfœuille, 2022; Borusyak et al., 2024) The key identifying assumption is that the outcomes in treated and control tracts should have followed parallel trends in the absence of highway construction. I cannot directly test this assumption, but the research design allows for an indirect test by looking for violations of parallel trends in the pre-periods. Lending credibility to the design, placebo tests show no evidence of differential pre-trends between treated and control tracts over various outcomes. However, even without parallel trend violations, one might still worry that the matched control sample does not represent a valid counterfactual. I discuss some of these concerns below.

Unobserved sudden shocks. The results from the difference-in-difference design are threatened if treated tracts are affected by an unobserved and unrelated shock at the same time as treatment. Fenizia and Saggio (2024) present evidence of how the research design used in this section ameliorates these concerns. First, highway construction occurred in different decades for different cities, so a single shock to one city/state will only have

[6] Although the movement to tear down highways has gained momentum lately (Lee, 2022), the number of segments that close during the period is low.

[7] Time units will be decades. When using matched tracts, I assign the event time of each treated neighborhood to its matched control. Therefore, the event time dummies are defined for treated and control tracts.

[8] The results are robust to the exclusion of population weights, as shown in Figure D.

minimal effect on the estimates. Second, even if unrelated city shocks coincidentally covary with highway construction, these shocks are absorbed by city-decade fixed effects. Finally, the effects' timing is inconsistent with shocks triggering highway construction. The population responses do not start to materialize after a decade after the highway opens. It is unlikely that there is a large shock that will trigger highway construction but will only affect the population ten years afterward.

Spillovers from other tracts. As discussed in Section 4.1, I match treated tracts to out-of-city potential census tracts so that the control tracts are not indirectly affected by highway construction. However, one potential threat would occur if the control units may still suffer from spillovers from highway construction occurring in their city. To evaluate this, I drop all tracts within 3 kilometers of any highway built from the pool of potential controls. Appendix Figure D.7 shows that the main results are robust to dropping these units.

Differential trends in economic activity. Another potential concern is that an increase in economic activity may induce local governments to trigger the construction of a highway in a certain tract. This could happen if a tract had a boom in manufacturing and the local government decides to connect this place to the rest of the network. There are a few reasons that mitigate this concern. First, recent evidence has shown that the causality is usually reversed: highway construction is the factor that triggers the economic boom to a place (Herzog, 2021; Frye, 2024). Second, these shocks should be reflected in housing prices and homeownership rates, which I do not find any evidence for that. If anything, homeownership rates decrease after highway construction. However, if these economic shocks also have an independent effect on the demographics of the tracts, this would represent a threat to the empirical strategy of this section. I find no evidence consistent with this potential confounder. Appendix Figures D.1, D.2, and D.3 show no systematic differences in the demographic or economic trends between treated and control tracts in the periods leading to treatment.

5. Socioeconomic Effects of Highway Construction

This section examines how highway construction affects the demographic composition and housing market of affected neighborhoods. The first subsection presents the main results, while the second subsection discusses the robustness of the findings.

5.1 Main Results

Figure 1 reports the event-study coefficients $\hat{\theta}_k$ from equation 1 on log total population, log Black and log White population, log Black share, log homeownership, and log median rent.

Panel (1a) shows that the log total population in treated tracts closely follows control tracts in the decades leading to highway construction, lending support to the validity of the research design. The log total population decreases modestly in the first decade after highway construction, and the average difference with the control group is not statistically significant. However, the total population decreases in the next three decades following highway construction, plateauing two decades after opening. The total population is 11% lower in the long run for treated tracts.

Who is leaving the neighborhood after highway construction? I run equation 1 using log Black and log White population as outcomes, the results are shown in Panel (1b) and (1c). Similarly to the log total population, I find that treated and control tracts evolve similarly prior to treatment. Compared to the control tracts, I find that the decrease in total population is due to a decrease in the Black population residing in the tracts. The Black population decreases by 30% in the long run, while the White population remains unaffected. These results decrease the Black share of the treated tracts, as seen in Panel (1d). It is important to note that these results are relative to the control group. As seen in Figure D.1, during the study period, both control and treatment tracts experienced an increase in the Black population and a decrease in total and White population, with the Black share of both groups also increasing.

I study if the demographic changes are accompanied by changes in the housing market. I find that highway construction decreases homeownership rates in the short and long run, as shown in Panel (e). Treated tracts exhibit 10% lower homeownership rates than control neighborhoods. These results hint that highway construction could also impact capital accumulation for individuals living in treated tracts, as there is a strong association between homeownership and wealth (Aneja and Xu, 2021). Panel (1f) presents the results of highway construction on the log median rent. I find that rents modestly decrease after highway construction, with an average decrease of 2% in the three following decades. However, these effects are not statistically significant. Thus, the results suggest that large demographic changes do not affect housing prices, but alter the ownership structure of the neighborhood.

The results for the Black and wWhite population go in a different direction than the findings of Bagagli (2023). Using an event-study design for the city of Chicago, the author finds that the total population decrease associated with highway construction is driven by an increase in the Black share of the tract. These differences arise from the different control group used in the analysis. I match treated tracts to out-of-town control tracts while Bagagli (2023) uses the time variation in treatment for the city of Chicago. My decision to use out-of-town control tracts is motivated by possible spillover effects from treated groups. Both anecdotally and empirically, I find evidence supporting this decision (Archer, 2020). In Figure D.9, I show that the results are robust to using a potential control group within the same city.

Another paper that studies the effect of highway construction on the Black population is Mahajan (2023). Using an instrumental variables approach, the author finds that between 1970 and 1990, highway construction increased the Black population in neighborhoods with a large initial Black population. To overcome the endogeneity concerns, Mahajan (2023) instruments highway construction with historical highway plans and historical exploration routes, as done previously by Baum-Snow (2007), Duranton and Turner (2011), and Duranton et al. (2014). Thus, the results are a LATE and arise from comparing tracts which planned to receive a highway and received it versus those that did not. I drop from the pool of potential controls those neighborhoods that had planned to receive a highway, given the evidence that the expectation of highway construction can change the demographic dynamics (Brinkman et al., 2023). In addition, as discussed in Section 2, local opposition was more effective in stopping highway construction in areas with higher social capital. So, the IV estimates may be conflated by unobserved shocks/amenities to the neighborhood that brought these high social capital residents into the area in the first place.

5.2 Robustness

Appendix Section D shows that the results are not sensitive to: (i) using levels instead of logarithms (Appendix Figure D.4), (ii) the exclusion of population weights (Appendix Figure D.5), (iii) including census tracts that had planned to receive a highway as potential controls (Appendix Figure D.6), (iv) dropping potential controls within three kilometers from any highway (Appendix Figure D.7), and (v) relaxing the out-of-city restriction for potential controls (Appendix Figure D.8).[9]

As an additional robustness check, I also test robustness to matching treated tracts with potential control tracts in the same city. With this procedure, the matching procedure matches only half of the events (772/1,562). Figure D.9 shows that the estimates are noisier and smaller in magnitude, as one would expect with a smaller sample and the presence of spillovers documented in Section 6.2. The results are qualitatively similar: the log total and Black population decreases. Although not statistically significant, the coefficients for the White population are negative. I do not find any effect for the log Black share, homeownership rate, or median rent.

[9] Distance from a tract to a highway is taken from the tract's centroid.

6. Mechanisms

So far I have shown that highway construction is associated with a decrease in the total population of the tract, driven by a decrease in the Black population. In this section, I study how these effects differ with respect to the initial Black population and the distance to the central business district (CBD). Also, I study the general equilibrium effects of construction on adjacent neighborhoods.

6.1 Heterogeneities

Having documented the effect of highway construction on the tracts demographics, I examine whether the effect was homogeneous across neighborhoods with different characteristics. In particular, I study if the effect varies according to the Black population and the distance from the central business district.

First, I study if the magnitude and direction of the effect vary depending on the number of Black families initially living in the tract before highway construction. The motivation for this analysis comes from the lack of relocation assistance provided by the 1956 Federal Highway Act. Hence, displaced individuals had to find housing in economically disadvantaged communities (Archer, 2020). In addition, highway construction occurred in the second part of the twentieth century, a period in which a great number of Black families were migrating from the U.S. south to the rest of the country (Althoff and Reichardt, 2024; Boustan, 2012). Thus, the demographic dynamics may vary depending on how many Black individuals lived in the tract before construction as, during the Great Migration period, migrant families sorted themselves into traditionally Black communities (Derenoncourt, 2022). I examine this by splitting the sample of matched neighborhoods into two groups: above- and below-median Black population in the last decade before construction.

Figure 2 reports the event-study coefficients of this analysis. The decrease in total population documented in the previous section comes from neighborhoods with an initial high Black population, as shown in Figure 2a. These tracts experience a decrease in their White population, with the Black population remaining constant (Panels (b) and (c)), increasing the tract's Black share (Panel e). Neighborhoods with an initial low Black population see their Black population decrease while their White population remains constant, thus decreasing the Black share of the tract. White individuals leaving after highway construction, particularly from places with initially high Black population, is consistent with the "White flight" the literature has documented (Boustan, 2010) The results suggest that homeownership rates decrease in tracts with an initial large Black population but remain constant for those tracts with a lower initial Black population. I find no difference in log median rent for both groups, with an estimated effect not statistically different from zero.

How does the effect vary with distance to the CBD? There is evidence that highways are considered a dis-amenities in neighborhoods close to the CBD because the noise and pollution created by highways offset the gains from connectivity to other places of the city. In contrast, in the suburbs, the opposite effect is true (Brinkman and Lin, 2022). In the twentieth century, neighborhoods close to the CBD disproportionately housed racial minorities given their larger job opportunities (Boustan, 2012). In addition, Baum-Snow (2007) finds that highway construction leads to suburbanization, particularly from White households. Thus, the effect of highway construction is expected to vary with respect to distance to the CBD. I examine this by splitting the sample of matched tracts into quartiles of distance to the CBD.[10]

I find that highway construction leads to suburbanization and lower homeownership rates in neighborhoods closer to the CBD, in the line with Baum-Snow (2007). Figure 3 reports the results of the heterogeneity across the distance to the CBD. Highway construction decreases the log total population in tracts close to the city center but increases the total population in the top three quartiles. White households moving in or out of the tract mostly explain the effects on the total population. For tracts in the first quartile, the Black population remains constant for the first decade after construction but decreases in the long run. White households, on the other hand, out-migrates these tracts immediately after construction. The estimated effects for the log Black share are not statistically different from zero, but homeownership rates decrease after construction with no effect on the log median rent.

6.2 Spillovers between Neighborhoods

The 1956 Federal Highway Act did not include relocation provisions for displaced households. Housing alternatives at the time were primarily limited to economically disadvantaged communities (Archer, 2020). Consequently, the effects of highway construction may have spillover to other neighborhoods in the city. I test this hypothesis by examining the effect construction had on tracts next to treated tracts.

The effect of highway construction spread to neighborhoods next to affected tracts. Figure 4 presents the event-study coefficients for neighborhoods adjacent to tracts where highways were built. For this exercise, treatment is define as the construction of a highway in the adjacent tract. The treatment date is inputted from the treated tract, and the matching procedure is the same. Neighborhoods adjacent to treated tracts saw their total population slightly decrease after construction. The Black population in these tracts

[10] The first quartile consists of all neighborhoods between 0 and 3.3 kilometers from the CBD. The second quartile consists of tracts located from 3.3 to 6 kilometers from the CBD. The third quartile from 6 to 11.8 kilometers. Finally, the fourth quartile consists of all the tracts located further than 11.8 kilometers. Distances are taken from the tract's centroid.

increased the two decades after construction, accompanied by a decrease in the White population. As a result, the Black share increases in the two decades following construction, but the effect vanishes in the long run. Both homeownership rates and log median rent respond to these changes in the population. The results suggest that both outcomes decrease following construction. These results present quantitative evidence on the historical accounts that highway construction has spillovers to other neighborhoods in the city (Rose and Mohl, 2012).

7. Conclusions

This paper studies the effects of highway construction on the short- and long-term demographic composition and housing market of affected neighborhoods. The analysis uses a novel dataset of consistent-boundary neighborhoods in the U.S. spanning from 1930 to 2020. The identification strategy relies on a matched difference-in-differences design that compares treated neighborhoods to control neighborhoods that are similar in terms of observable characteristics and trends. The results suggest that highway construction decreases the total population of neighborhoods, with the effects driven by a relative decline in the Black population. Also, homeownership rates decrease following highway construction, with no significant effect on rents.

When looking at the heterogeneous effects of highway construction, the results suggest that the estimates flip sign when considering suburban areas. In suburban areas, highway construction increases the total population of neighborhoods, with the effects driven by an increase in both the Black and white population. City centers, on the other hand, observe a decrease in population, with the effects driven by a relative decline in the white population. Analyzing the effects for traditionally Black neighborhoods, the results suggest that highway construction decreases the total population of these neighborhoods, with the effects driven by the white population leaving the area. The results also show evidence of spillover effects on adjacent neighborhoods.

In short, the findings suggest that highway construction has long-lasting effects on the demographic composition and housing market of affected neighborhoods, with spillovers across the city.

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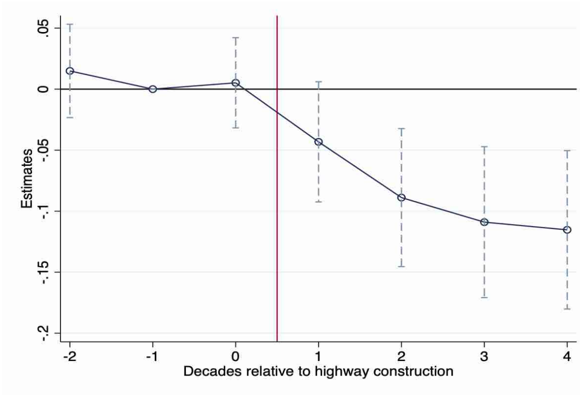
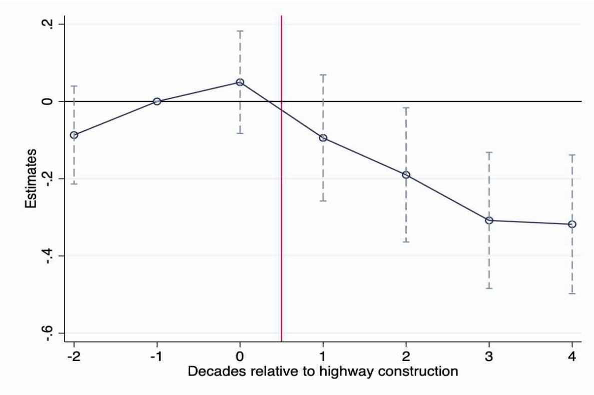
8. FIGURES

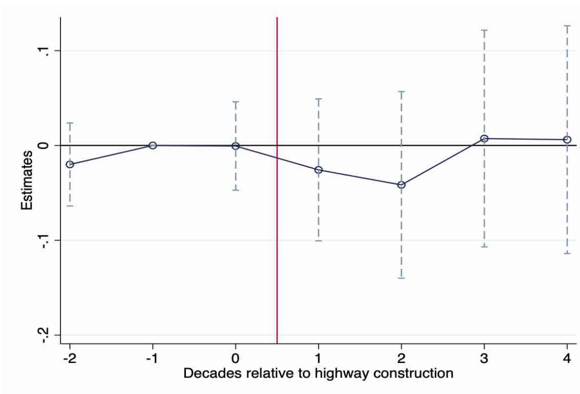
FIGURE 1: Event-Study Coefficients



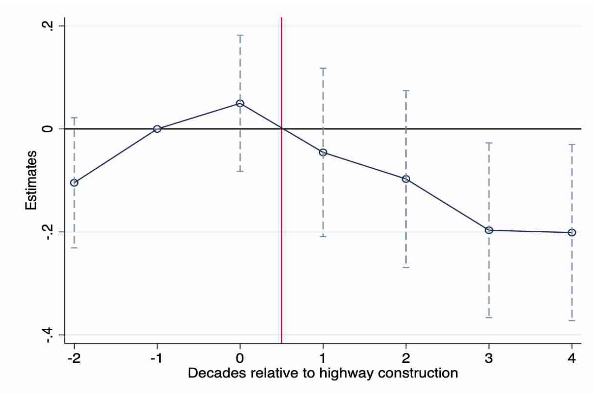
(A) Log Total Population



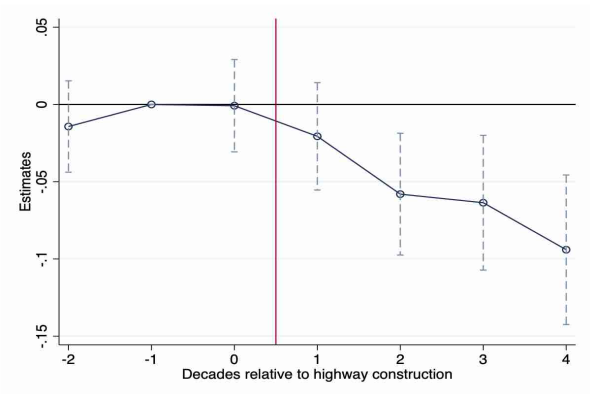
(B) Log Black Population



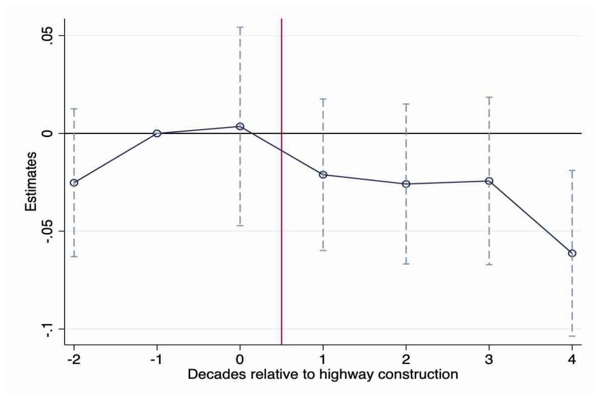
(C) Log White Population



(D) Log Black Share



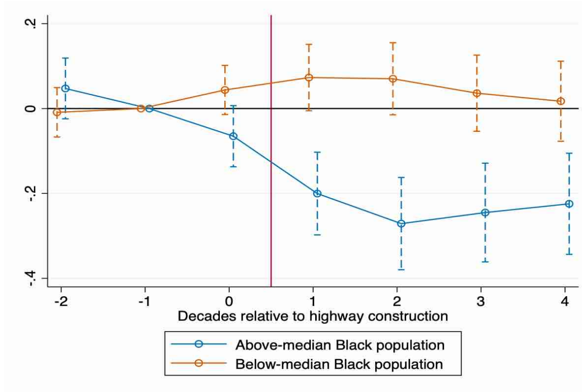
(E) Log Home-Ownership Share



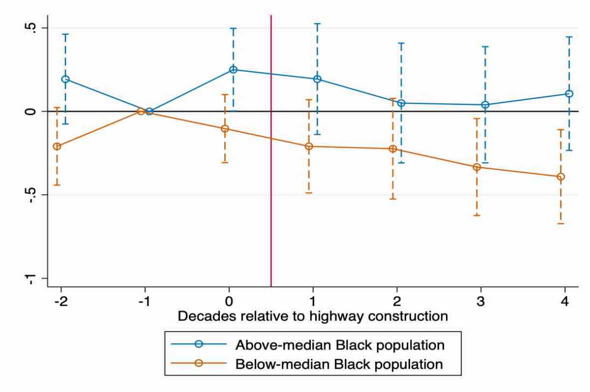
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) on the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

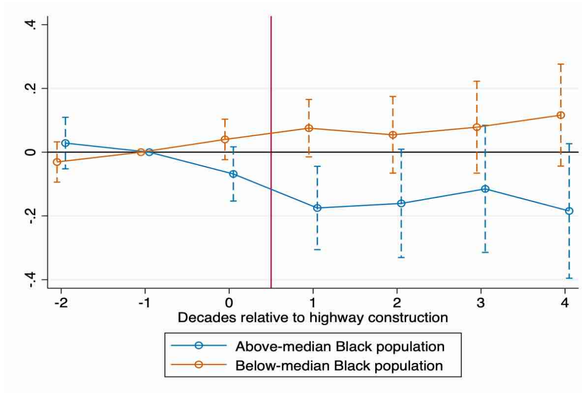
FIGURE 2: Above- and Below-Median Black Population



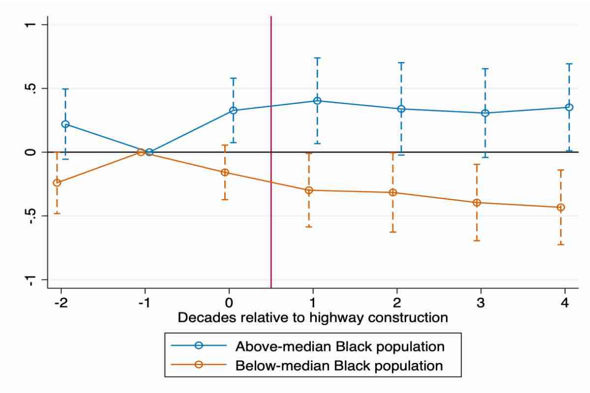
(A) Log Total Population



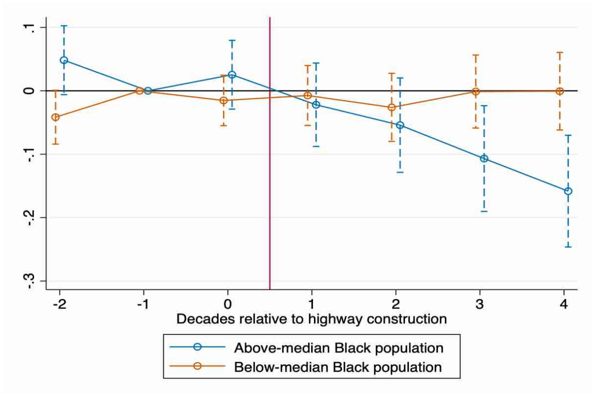
(B) Log Black Population



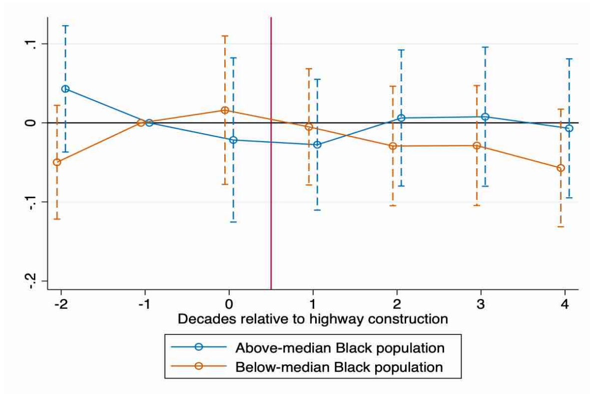
(C) Log White Population



(D) Log Black Share



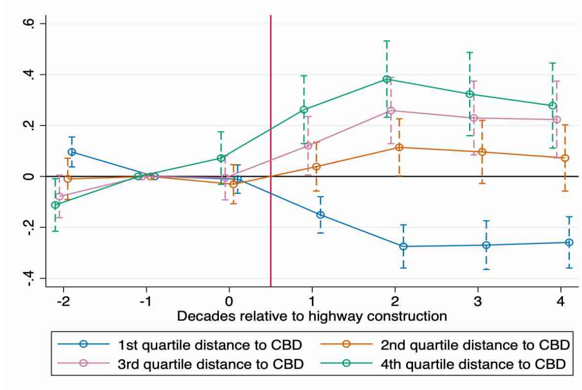
(E) Log Home-ownership Share



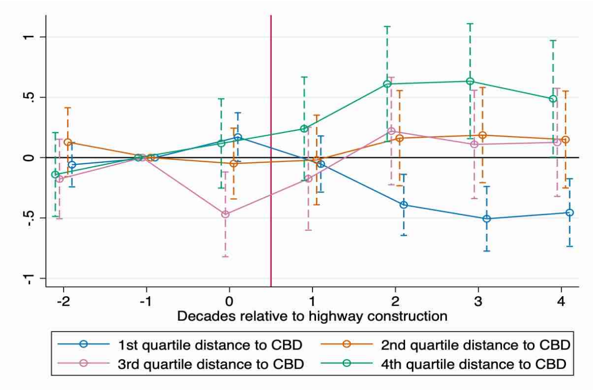
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. Tracts with above-median Black population in the last census before construction are plotted in blue, whereas below-median tracts are plotted in orange. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) for the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

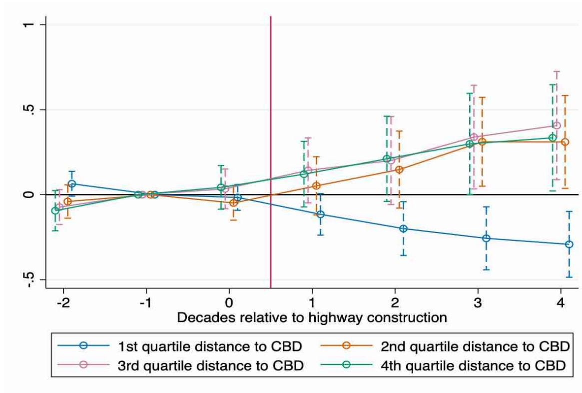
FIGURE 3: Quartiles of Distance to the Central Business District



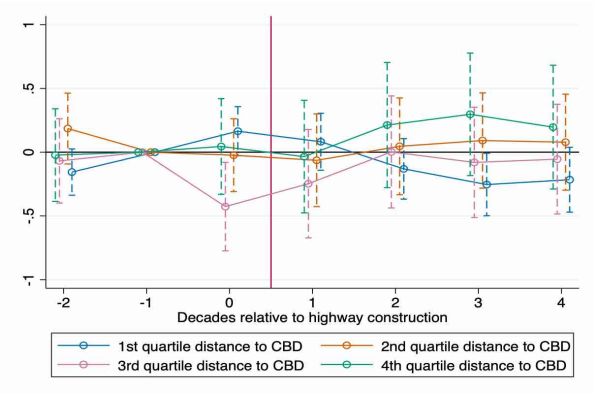
(A) Log Total Population



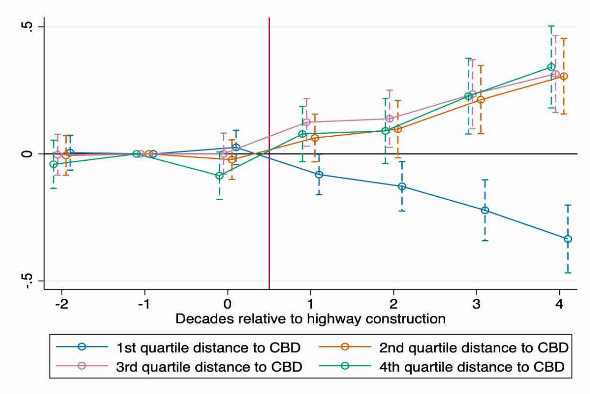
(B) Log Black Population



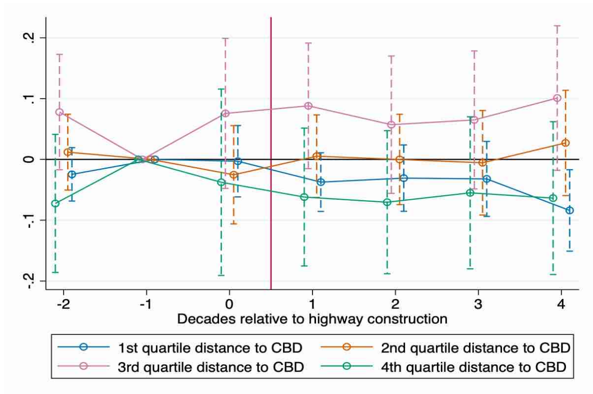
(C) Log White Population



(D) Log Black Share



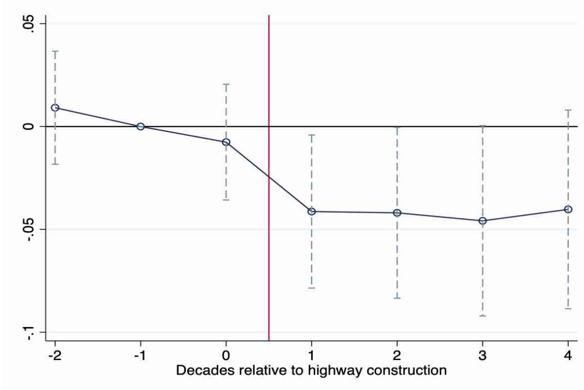
(E) Log Home-ownership Share



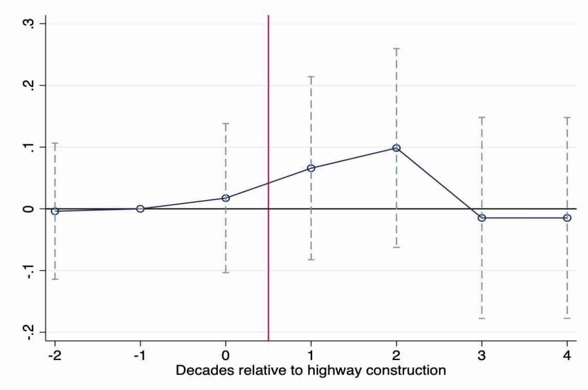
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The first quartile correspond to all tracts which it's centroid is within 3.3 kilometers of the CBD, the second quartiles is within 3.3 and 6 kilometers, the third quartile between 6 and 11.8 kilometers, and the fourth quartile are those located more than 11.8 kilometers from the CBD. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) shows the effect for the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

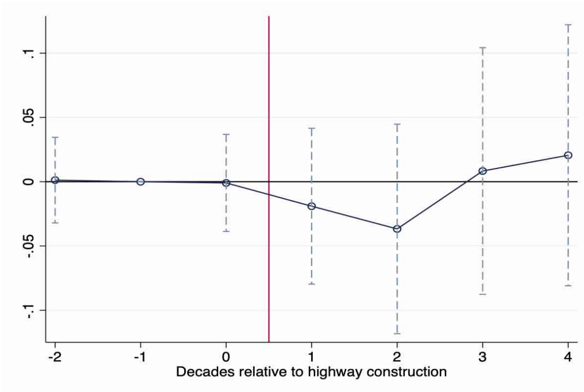
FIGURE 4: Spillovers into Adjacent Neighborhoods



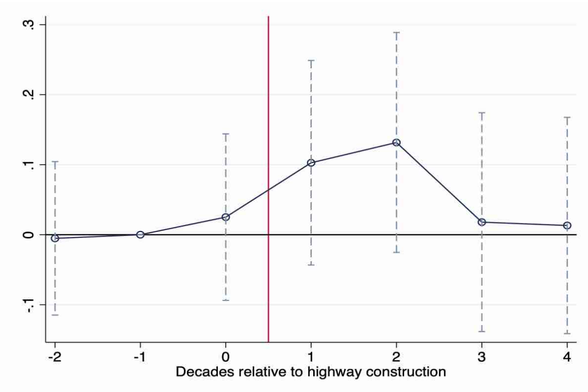
(A) Log Total Population



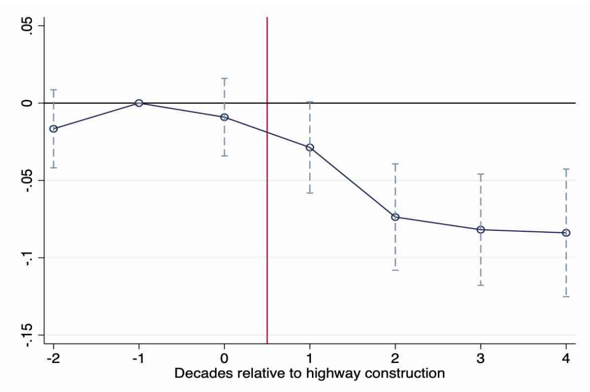
(B) Log Black Population



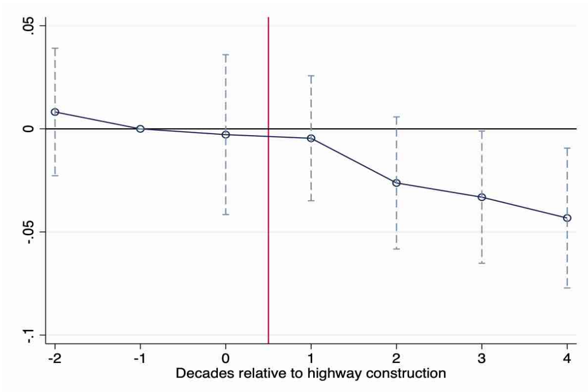
(C) Log White Population



(D) Log Black Share



(E) Log Home-ownership Share



(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 2,071/3,364 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. Treatment es equal to one when a highway is constructed in an adjacent tract, and zero otherwise. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) shows the effect for the log home-ownership rate, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening. Standard errors are clustered at the census tract level, and observations are weighted by the log total population before construction.

9. TABLES

TABLE 1: Descriptive Statistics

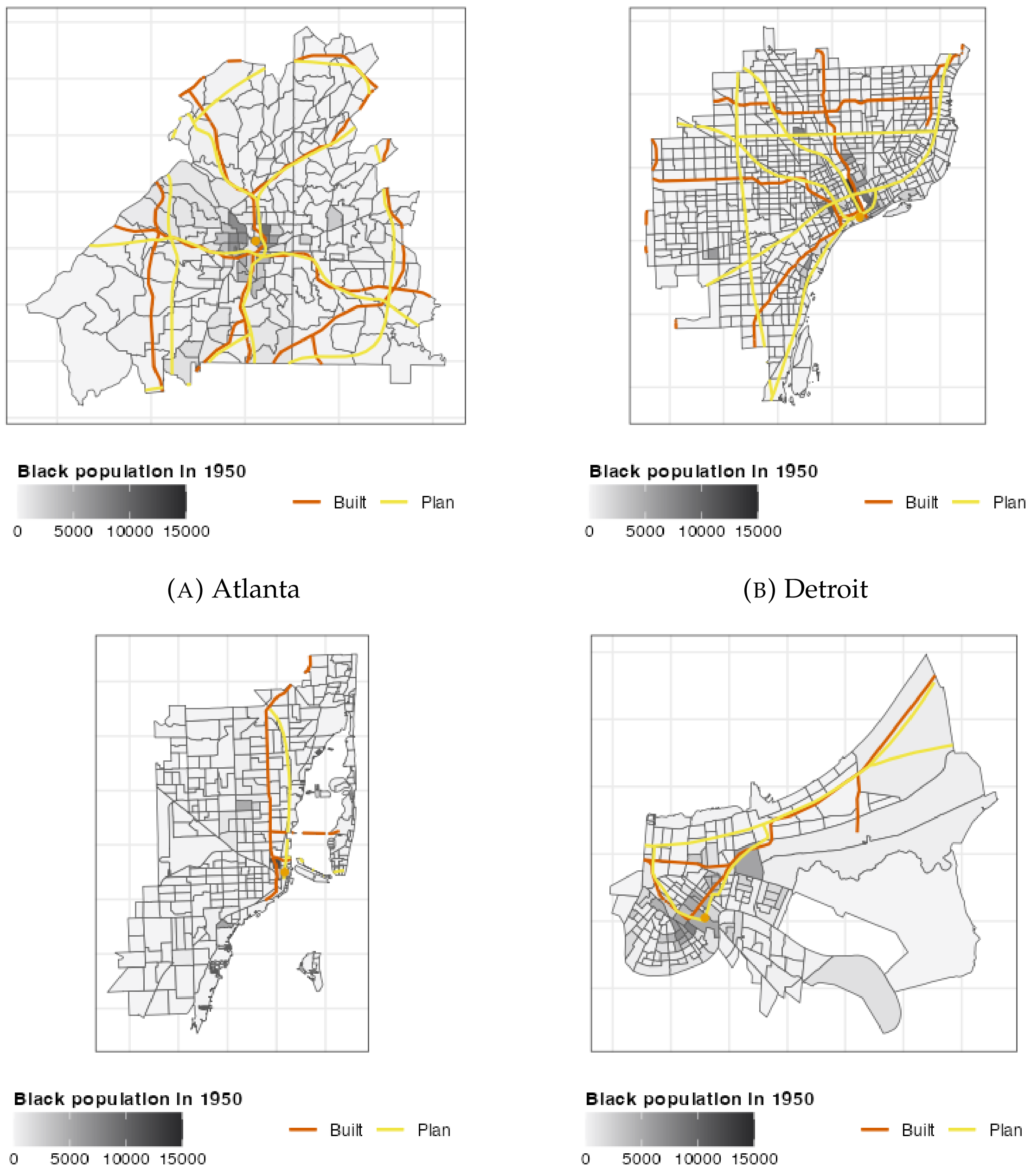
	Matched Sample (1)	Matched Treated (2)	Matched Control (3)	p-val (4)
(log) Total population	8.28	8.30	8.27	0.236
	(0.66)	(0.68)	(0.63)	
(log) Black population	4.19	4.26	4.12	0.158
	(2.66)	(2.72)	(2.59)	
(log) White population	8.02	8.03	8.02	0.759
	(0.83)	(0.83)	(0.83)	
(log) Other population	2.35	2.31	2.38	0.226
	(1.59)	(1.59)	(1.60)	
Black share	12.73	13.53	11.93	0.062
	(23.89)	(24.56)	(23.18)	
(log) Median rent	5.87	5.88	5.86	0.362
	(0.61)	(0.57)	(0.64)	
(log) Median home value	11.04	11.00	11.08	0.071
	(1.13)	(1.15)	(1.11)	
Home-ownership (%)	44.73	45.79	43.68	0.022
	(25.71)	(25.08)	(26.28)	
Distance to CBD	9.00	8.97	9.02	0.878
	(8.81)	(8.88)	(8.73)	
Observations	3,124	1,562	1,562	

Note: An observation is a census tract in the last decade prior to highway construction. Treated tracts are matched to out-of-city potential control tracts. All statistics are calculated across tract-year observations in the decade before highway construction. Column (1) reports statistics on the matched sample, and columns (2) and (3) limit the sample to treated and control tracts, respectively. Column (4) reports the p-value associated with the null hypothesis that the difference in means between treated and control tracts is equal to zero.

Appendix and Supplementary Material

A. Additional Figures

Figure A.1: Racial Distribution, Highways, and Planned Routes



(A) Atlanta

(B) Detroit

(C) Miami

(D) New Orleans

Note: The figure includes maps for Atlanta, Detroit, Miami, and New Orleans. Each observation is a census tract, and its filling corresponds to the number of Black residents in the tract. Depicted in red is the built highway network. The network planned in the Yellow Book is presented in yellow. Finally, the city center is plotted in orange.

FIGURE A.2: Disruptive Effects of Highway Construction

(A) Claiborne before Interstate 10

(B) Claiborne after Interstate 10

(C) Black Bottom before Interstate 75

(D) Black Bottom after Interstate 75

Note: The figure presents a visual representation of two neighborhoods, Claiborne in New Orleans and Black Bottom in Detroit, before and after highway construction.

FIGURE A.3: Structure of Data Analysis

Note: The figure depicts a subset of neighborhoods in Miami, Florida, shaded according to the number of Black individuals living in the tract. The Interstate Highway built subsequently is presented in red.

B. Additional Tables

In this section I present descriptive statistics of the tracts in the last decade before highway construction.

Table B.1: List of MSAs Used in the Analysis

Metropolitan Area Name	State	Code	# tracts in 1950	Yellow Book
Akron	OH	80	95	No
Atlanta	GA	520	228	Yes
Austin	TX	640	71	No
Baltimore	MD	720	476	Yes
Birmingham	AL	1000	70	Yes
Boston	MA	1120	596	Yes
Bridgeport	CT	1160	70	No
Brockton	MA	1200	57	No
Buffalo	NY	1280	188	Yes
Chattanooga	TN-GA	1560	50	Yes
Chicago	IL-IN	1600	1547	Yes
Cincinnati	OH-KY	1640	233	Yes
Cleveland	OH	1680	473	Yes
Columbus	OH	1840	284	Yes
Dallas	TX	1920	205	Yes
Dayton	OH	2000	126	No
Denver	CO	2080	126	Yes
Detroit	MI	2160	748	Yes
Duluth-Superior	MN-WI	2240	36	No
Durham	NC	2280	60	No
Flint	MI	2640	113	Yes
Fort Worth	TX	2800	131	Yes
Greensboro-High Point	NC	3120	119	No
Hartford	CT	3280	108	Yes
Houston	TX	3360	785	Yes
Indianapolis	IN	3480	186	Yes
Kalamazoo	MI	3720	46	No
Kansas City	MO-KS	3760	136	Yes
Los Angeles	CA	4480	2348	Yes
Louisville	KY-IN	4520	85	Yes
Memphis	TN	4920	93	Yes
Miami	FL	5000	286	Yes

Continues on next page

Table B.1 – *Continued from previous page*

Metropolitan Area Name	**State**	**Code**	**# tracts in 1950**	**Yellow Book**
Milwaukee	WI	5080	297	Yes
Minneapolis-St. Paul	MN	5120	329	Yes
Nashville	TN	5360	86	Yes
New Haven	CT	5480	41	No
New Orleans	LA	5560	183	Yes
New York-Northeastern NJ	NY-NJ	5600	2491	Yes
Norfolk-Portsmouth	VA	5720	85	Yes
Oklahoma City	OK	5880	144	Yes
Omaha	NE-IA	5920	73	Yes
Philadelphia	PA-NJ	6160	1300	Yes
Pittsburgh	PA	6280	420	Yes
Portland	OR-WA	6440	117	Yes
Providence	RI	6480	53	Yes
Richmond	VA	6760	71	Yes
Rochester	NY	6840	106	Yes
Sacramento	CA	6920	318	No
St. Louis	MO-IL	7040	348	Yes
San Diego	CA	7320	406	No
San Francisco-Oakland	CA	7360	421	Yes
San Jose	CA	7400	47	No
Seattle	WA	7600	283	Yes
Spokane	WA	7840	50	No
Springfield-Holyoke	MA-CT	8000	86	Yes
Syracuse	NY	8160	140	Yes
Tacoma	WA	8200	149	No
Toledo	OH-MI	8400	77	Yes
Trenton	NJ	8480	35	No
Utica-Rome	NY	8680	34	Yes
Washington	DC-MD-VA	8840	266	Yes
Wichita	KS	9040	56	Yes
Total			18,687	

C. Data Appendix

In this section, I describe and discuss the spatial historical data constructed from address information in the 1930 and 1940 censuses.

C.1 Historical neighborhoods

To study the long-term consequences of highway construction, I use a balanced panel of time-consistent neighborhood definitions from 1930 to 020. I expand the spatial information available for 1930 and 1940 by aggregating the definitions of the geocoded complete census into 2010 census tracts. I restrict the sample to tracts that are part of the 62 SMA with spatial information available in 1950.[11] To avoid bias coming from the geocoding process, I drop tracts whose population increased or decreased by a factor of ten in consecutive census years.

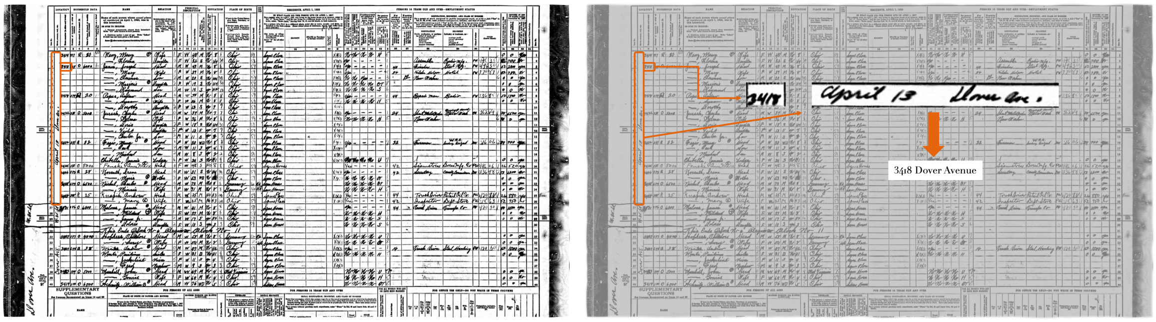
Because census tract definitions change over the decades, I cannot observe the official estimates for the 2010 census tracts in 1940 (or 1930). However, for a sample of 42 cities, I observe the 1940 census tract definition. To test the quality of the geocoding process, I aggregate the geocoded individuals into the 1940 census tracts and compare my estimates to the demographics and economic characteristics available in IPUMS (Manson et al., 2023). Figure C.2 shows that all the estimates are very close to each other, with a $\hat{\beta}$ close to one and a R^2 greater than 0.69 for all the variables of the study. The results suggest that the geocoding process does a very good job matching total, white population, median rent, and median home value. The procedure seems to under count Black individuals in large census tracts ($\hat{\beta} = 1.2$) and to underestimate the homeownership rate ($\hat{\beta} = 0.82$).

As an additional comparison, I benchmark the geocoding estimates to the enumeration district values for 1930 and 1940. By construction, population estimates will lie above the 45-degree line, as the geocoded sample is a subsample of the population in the ED. On the other hand, median home value, median rent, and homeownership rates are a function of the population, so their values could lie above r below the 45-degree line. Figures C.4 and C.3 present the results for the 1930 and 1940 censuses, respectively. Similar to the census tracts, the estimates for the geocoded ED do a good job of matching the variation in ED's socioeconomic characteristics.

[11] Once the complete count of the 1950 census is released, I will expand the sample to the 169 SMA in 1950.

C.2 Additional figures

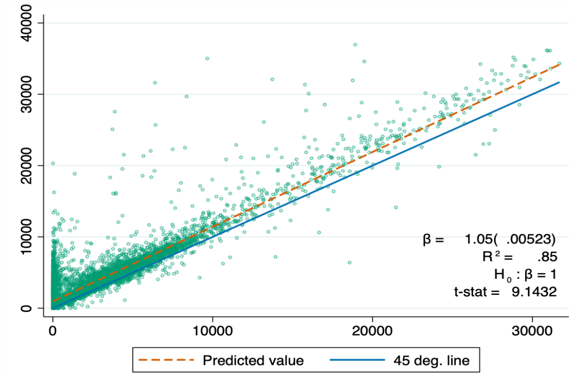
FIGURE C.1: Example of addresses in the 1940 census



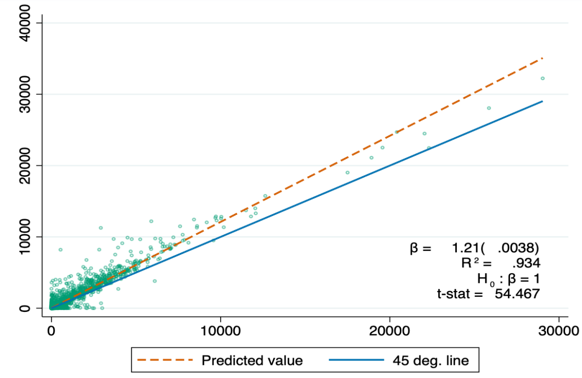
(A) 1940 census (B) Address Information

Note: Panel (a) and (b) highlight the address information in the 1940 census.

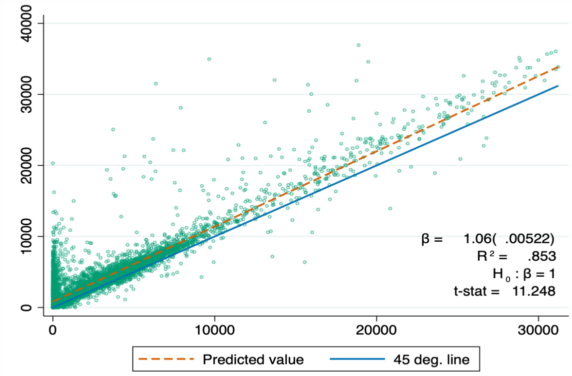
FIGURE C.2: Benchmarking 1940 geocoding: census tracts



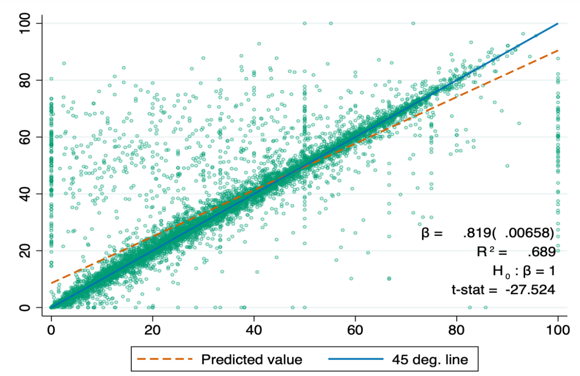
(A) Total Population



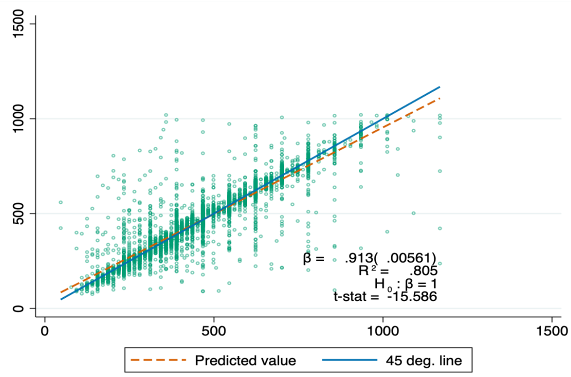
(B) Black Population



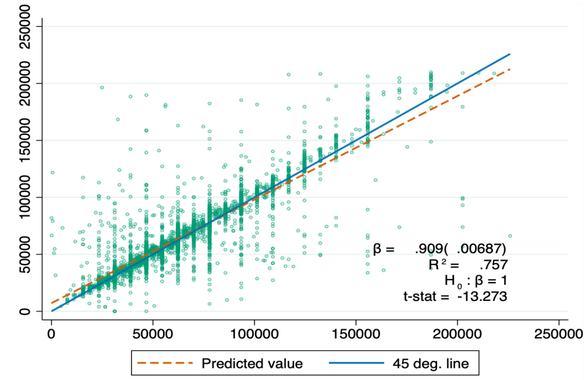
(C) Non-Black Population



(D) Homeownership rate



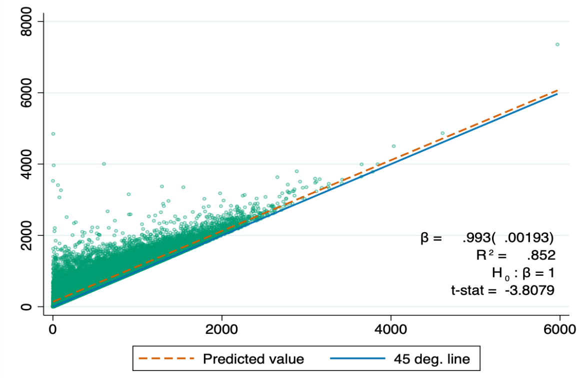
(E) Median Rent



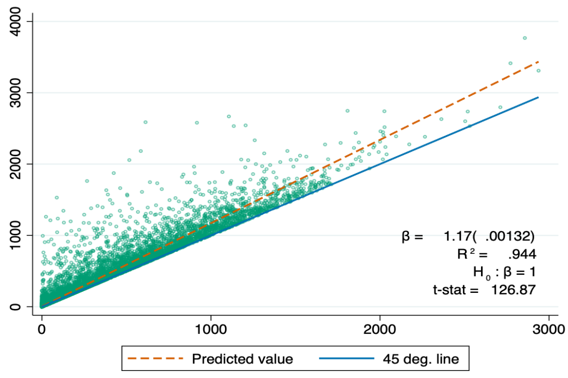
(F) Median Value

Note: Each observation corresponds to a 1940 census tract. The x-axis shows the estimates from the geocoded 1940 census. The y-axis shows the estimates from the 1940 census.

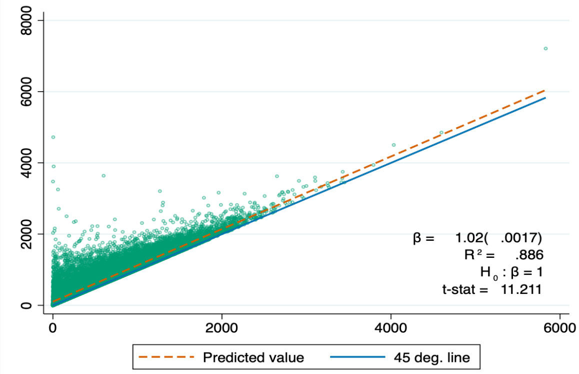
FIGURE C.3: Benchmarking 1940 geocoding: enumeration districts



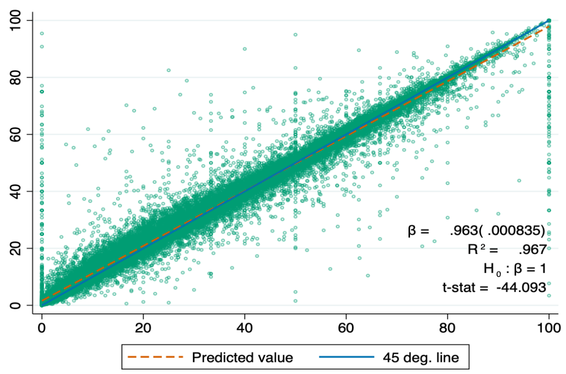
(A) Total Population



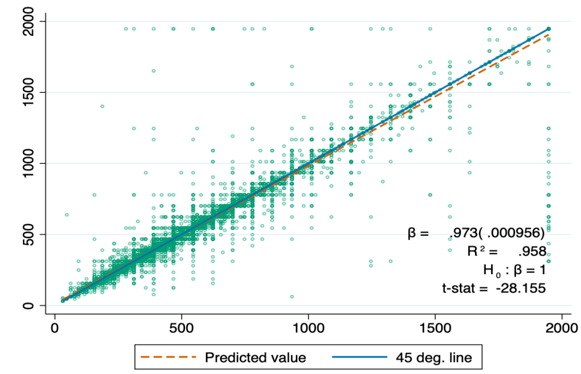
(B) Black Population



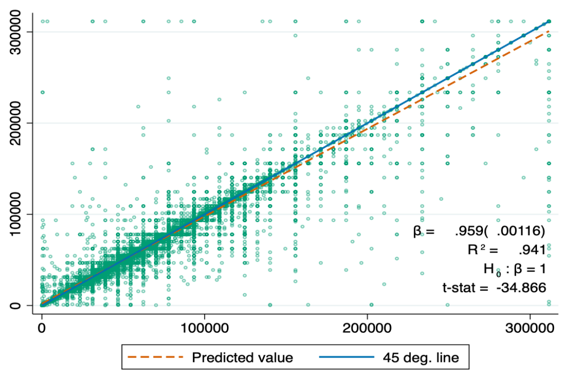
(C) Non-Black Population



(D) Homeownership rate



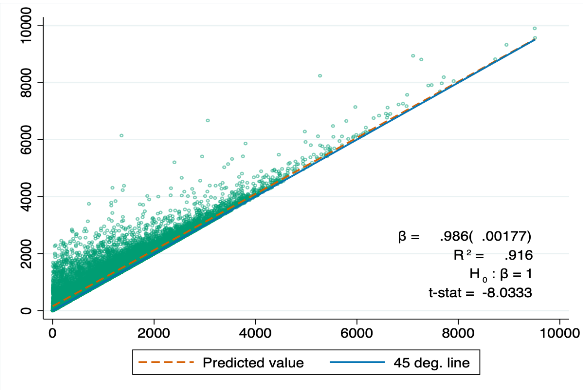
(E) Median Rent



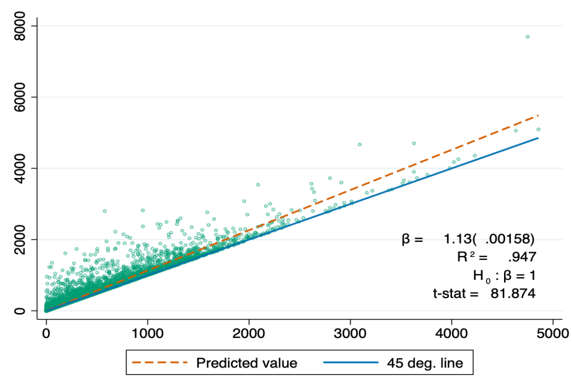
(F) Median Value

Note: Each observation corresponds to a 1940 enumeration district. The x-axis shows the estimates from the geocoded 1940 census. The y-axis shows the estimates from the 1940 census.

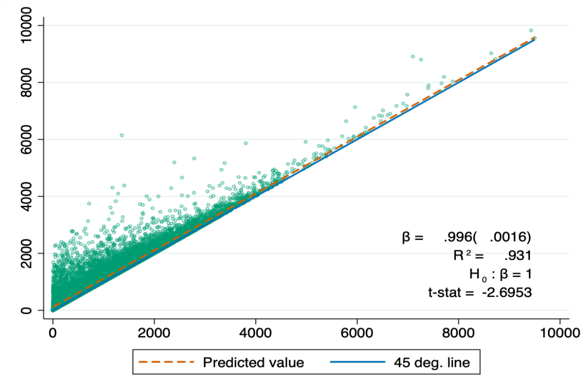
FIGURE C.4: Benchmarking 1930 geocoding: enumeration districts



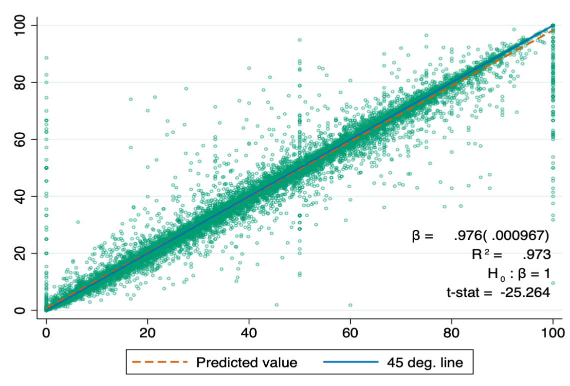
(A) Total Population



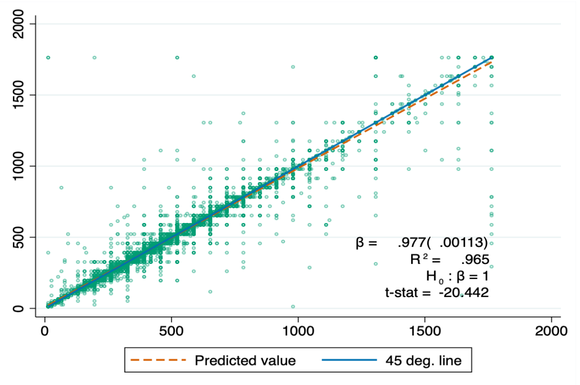
(B) Black Population



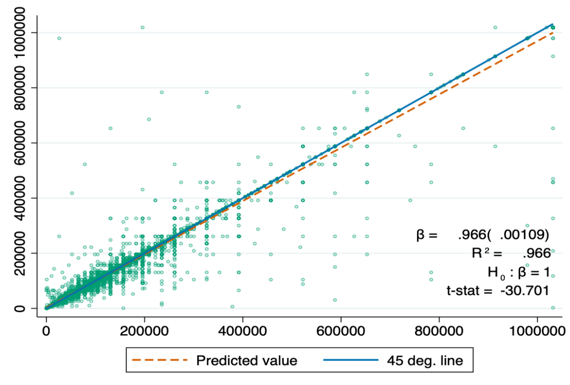
(C) Non-Black Population



(D) Homeownership rate



(E) Median Rent



(F) Median Value

Note: Each observation corresponds to a 1930 enumeration district. The x-axis shows the estimates from the geocoded 1930 census. The y-axis shows the estimates from the 1930 census.

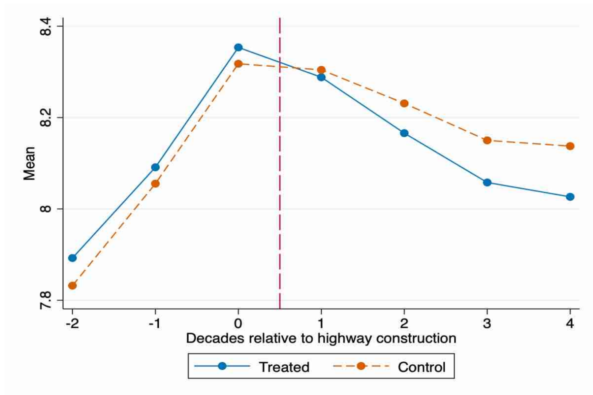
D. Event Study Appendix

In this section I present additional figures and robustness checks for the event-study section.

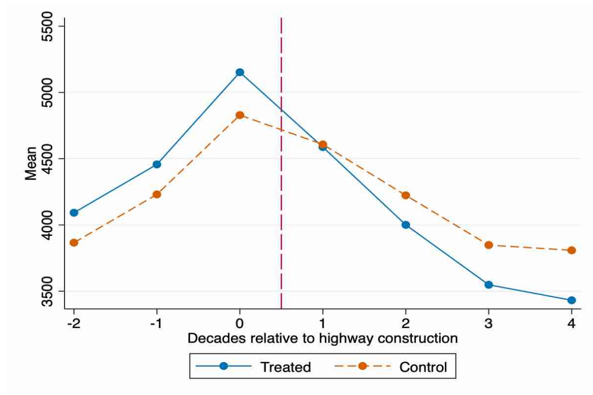
D.1 Additional Figures

In this section, I present additional figures for the event-study section.

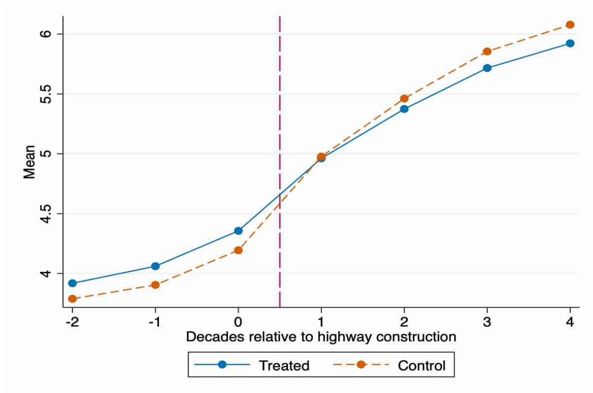
FIGURE D.1: Raw Means Evolution



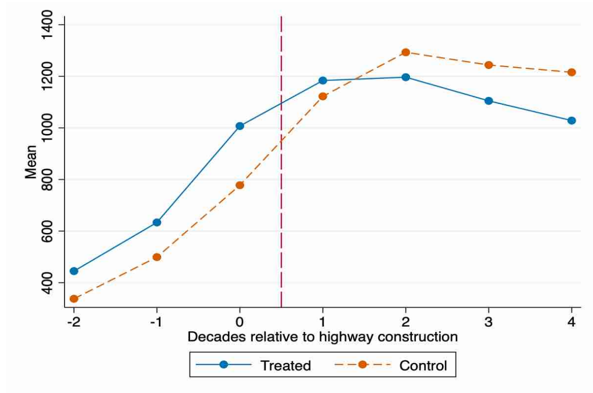
(A) Log Total Population



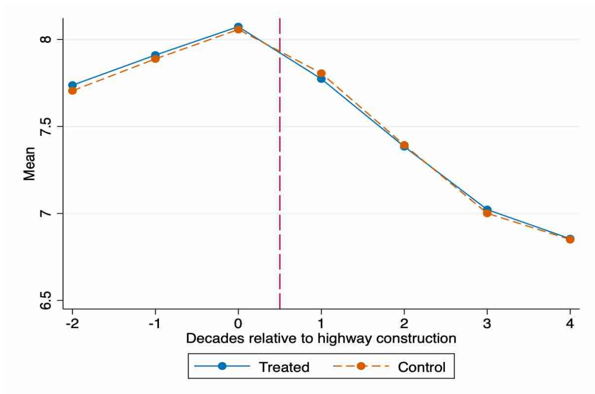
(B) Total Population



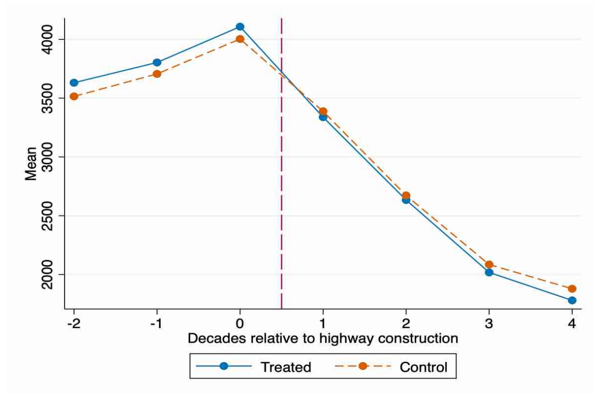
(C) Log Black Population



(D) Black Population



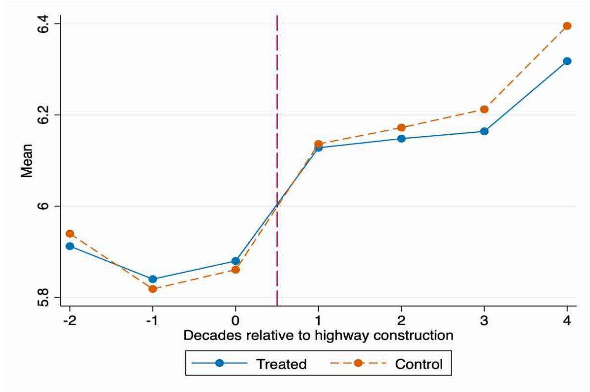
(E) Log White Population



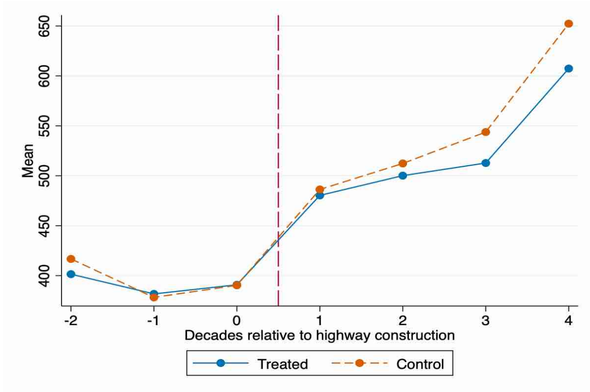
(F) White Population

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the raw means of treated and control tracts relative to the treatment decade. The sample is weighted by the log population of the tract in the decade before highway construction. Panel (a) shows the log total population raw mean, whereas Panel (b) presents the evolution of the total population. Panel (c) shows the log Black population raw mean, whereas Panel (d) presents the evolution of the Black population. Panel (e) shows the log White population raw mean, whereas Panel (f) presents the evolution of the White population. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

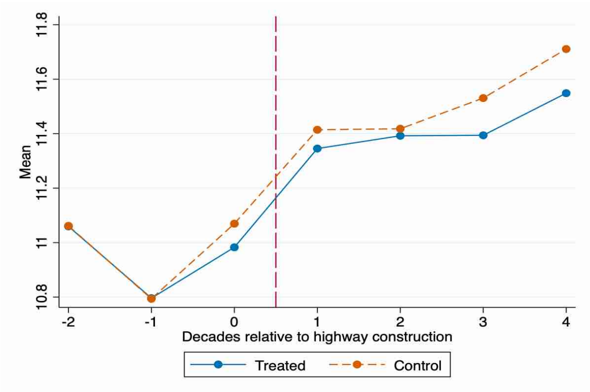
FIGURE D.2: Raw Means Evolution *(continued)*



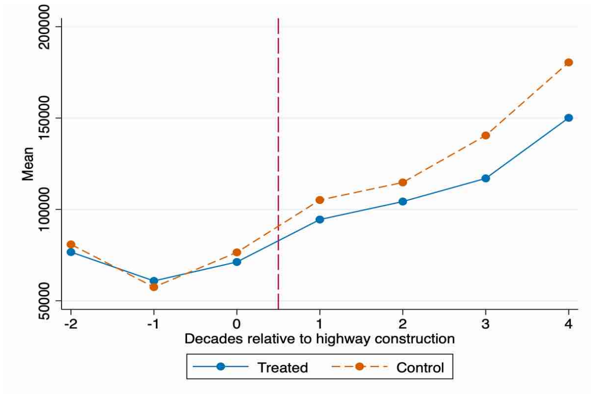
(A) Log Median Rent



(B) Median Rent



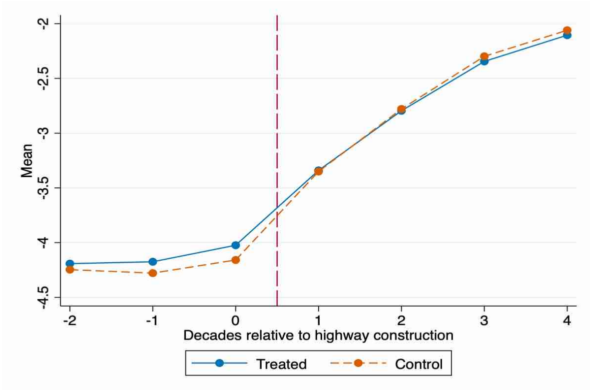
(C) Log Median Home Value



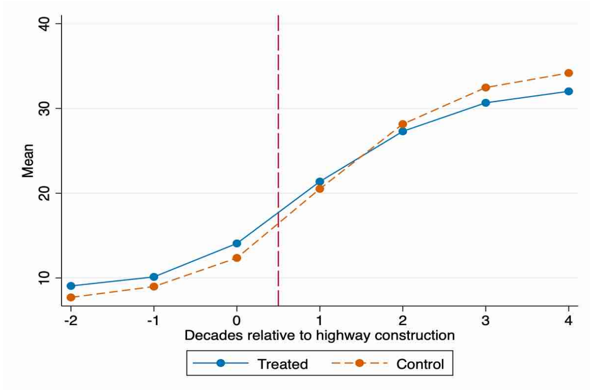
(D) Median Value

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the raw means of treated and control tracts relative to the treatment decade. The sample is weighted by the log population of the tract in the decade before highway construction. Panel (a) shows the evolution of the log median rent raw mean, whereas Panel (b) presents the evolution of the level. Panel (c) shows the evolution of the log median home value raw mean, whereas Panel (b) presents the evolution of the level in the tract's median home value. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

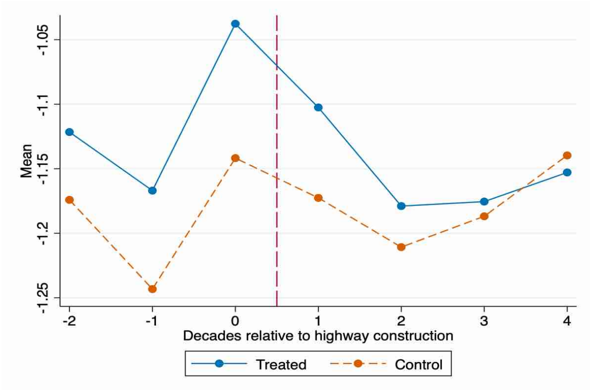
FIGURE D.3: Raw Means Evolution *(continued)*



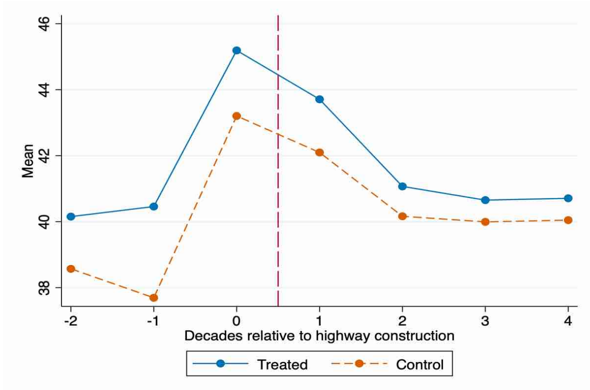
(A) Log Black Share



(B) Black Share



(C) Log Home-ownership Share

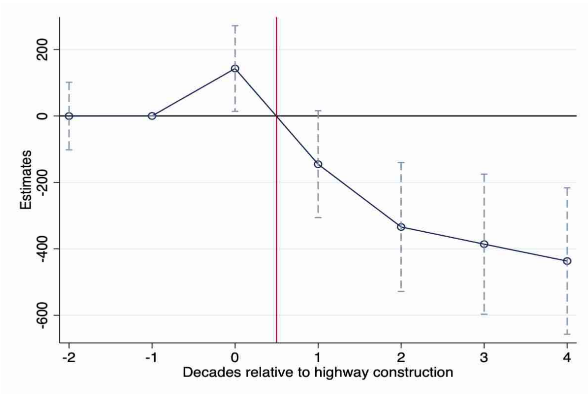


(D) Home-ownership Share

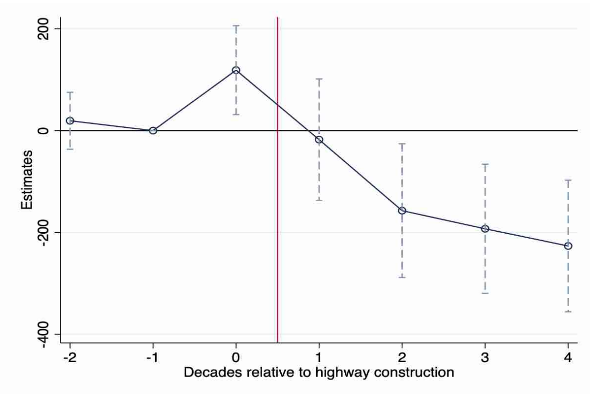
Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the raw means of treated and control tracts relative to the treatment decade. The sample is weighted by the log population of the tract in the decade before highway construction. Panel (a) shows the evolution in the log Black share raw mean, whereas Panel (b) presents the evolution of the level. Panel (c) presents the evolution in the log home-ownership rate, whereas Panel (d) presents the evolution of the level. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

D.2 Robustness Checks

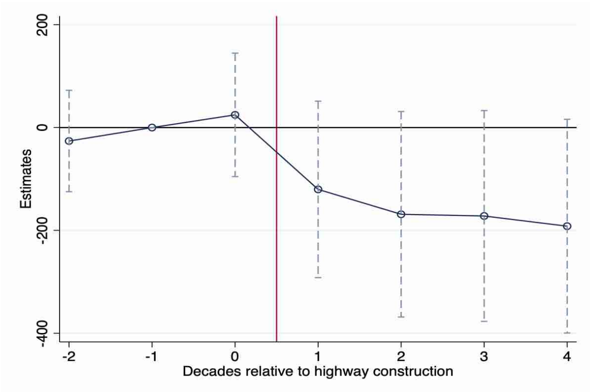
FIGURE D.4: Dependent Variable in Levels



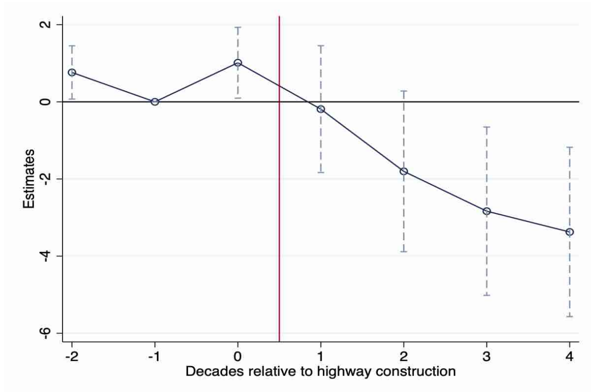
(A) Total Population



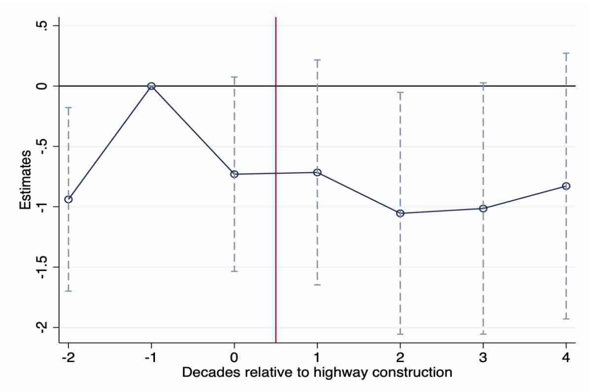
(B) Black Population



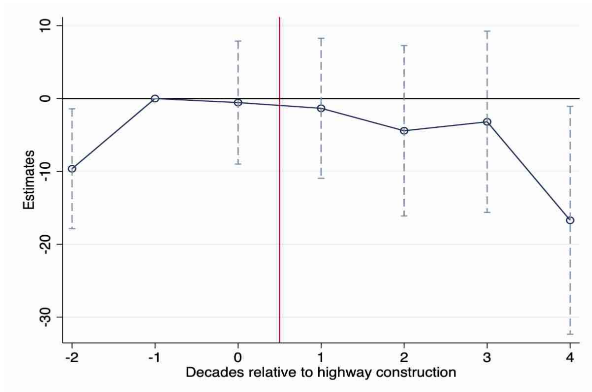
(C) White Population



(D) Black Share



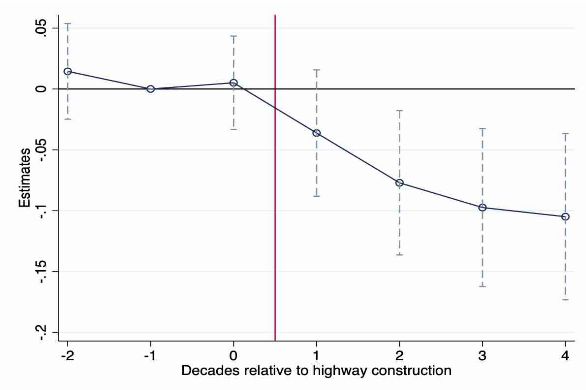
(E) Home-ownership Share



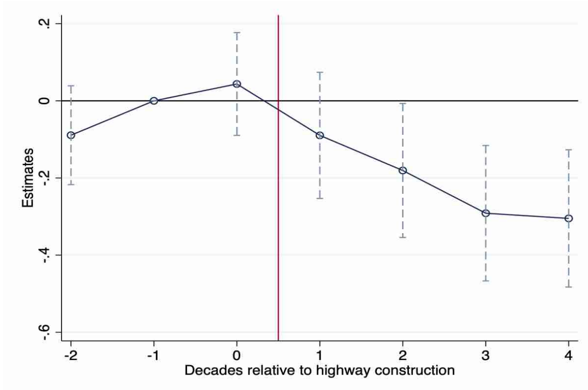
(F) Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share, Panel (e) on the home-ownership share, and Panel (f) shows the effect on the median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

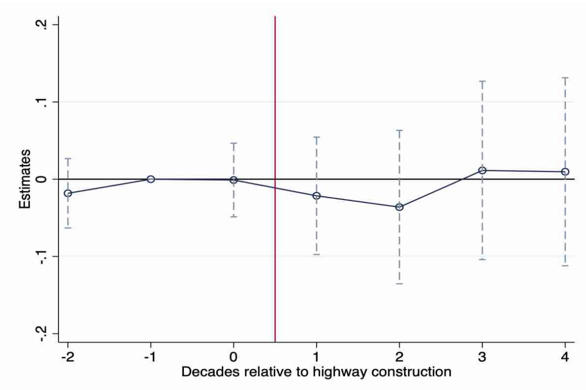
FIGURE D.5: No Population Weights



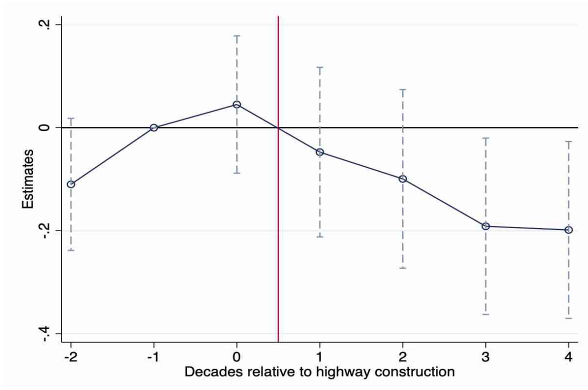
(A) Log Total Population



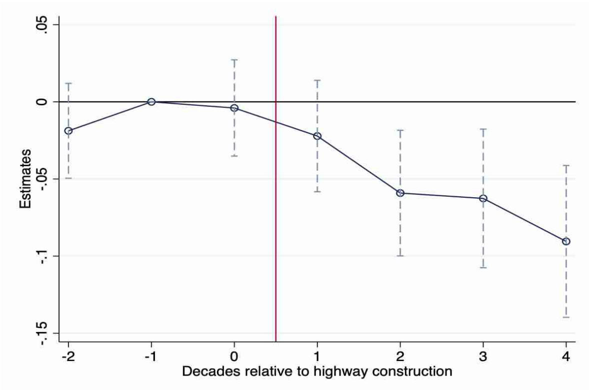
(B) Log Black Population



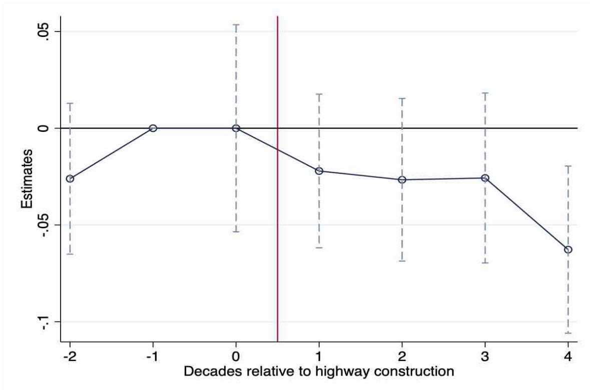
(C) Log White Population



(D) Log Black Share



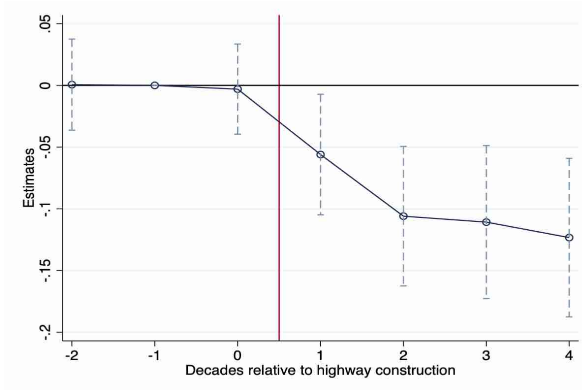
(E) Log Home-ownership Share



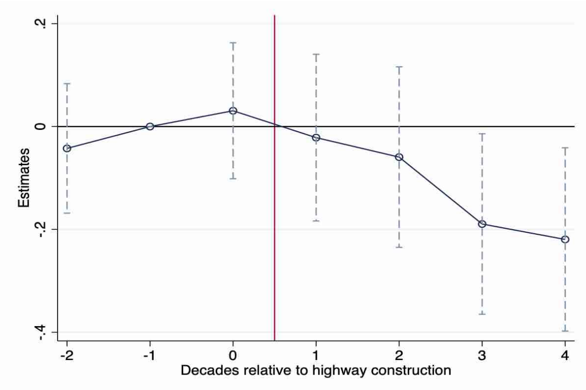
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) for the home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

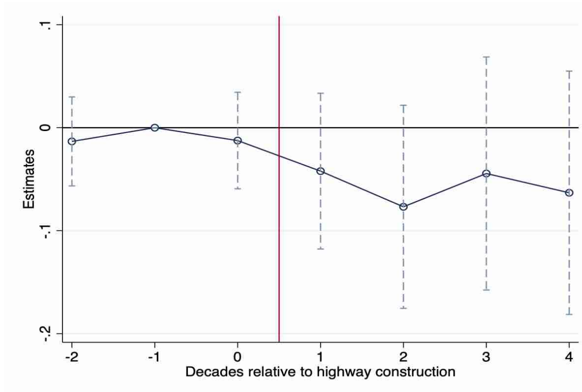
FIGURE D.6: Including Tracts Planned to Receive a Highway



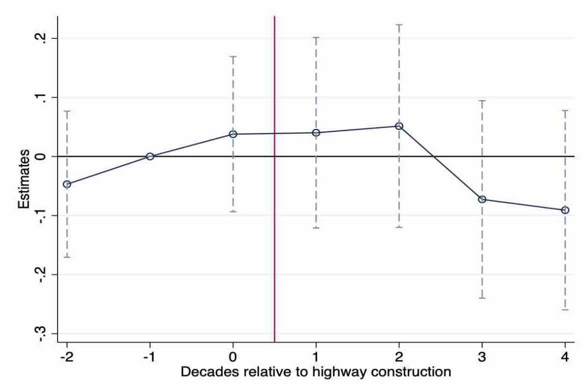
(A) Log Total Population



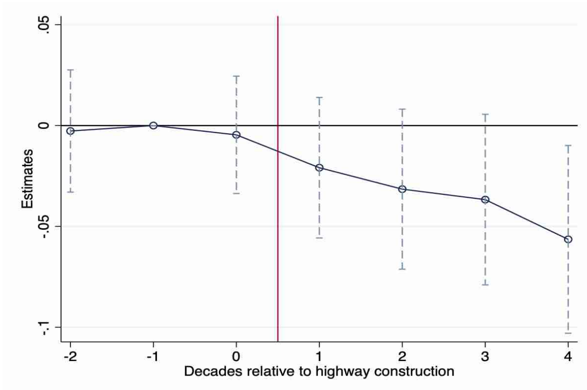
(B) Log Black Population



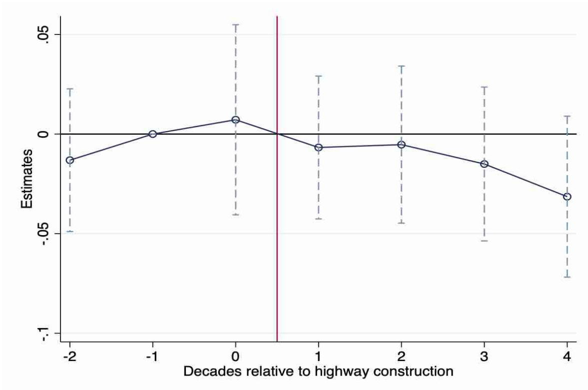
(C) Log White Population



(D) Log Black Share



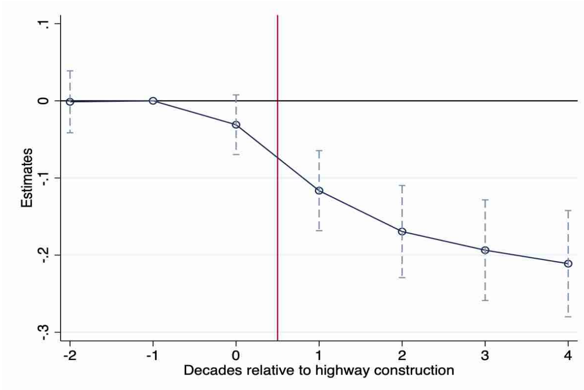
(E) Log Home-ownership Share



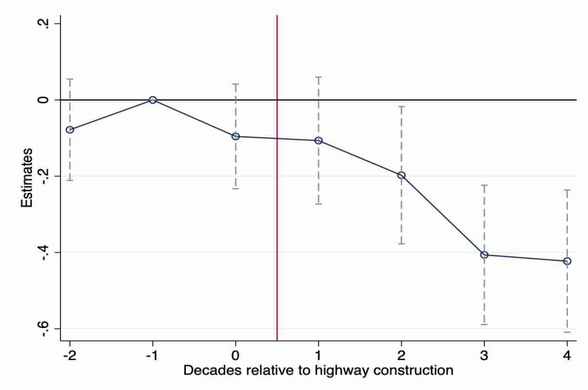
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. Potential control tracts are all the out-of-city tracts that did not receive a highway outside, including those which were planned to receive a highway. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) for the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

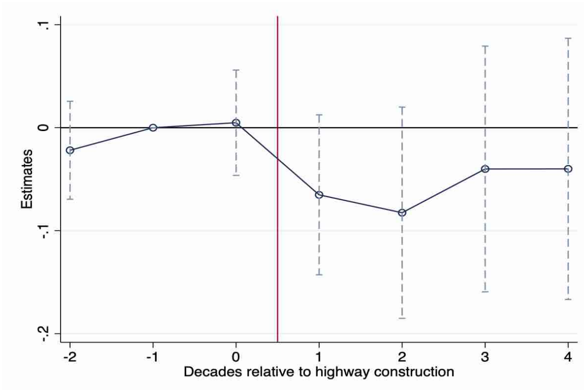
FIGURE D.7: Potential Controls 3 Kilometers from Highways



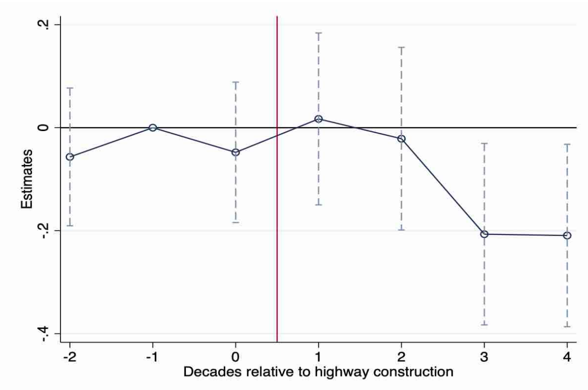
(A) Log Total Population



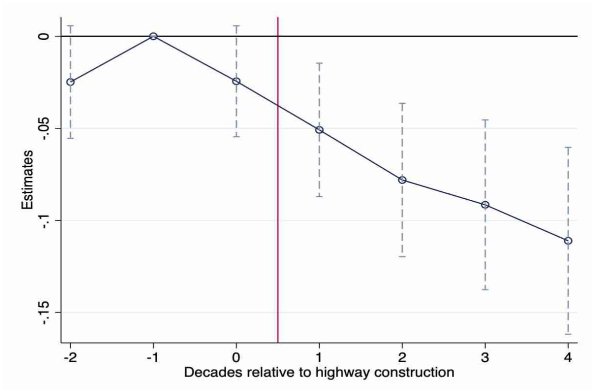
(B) Log Black Population



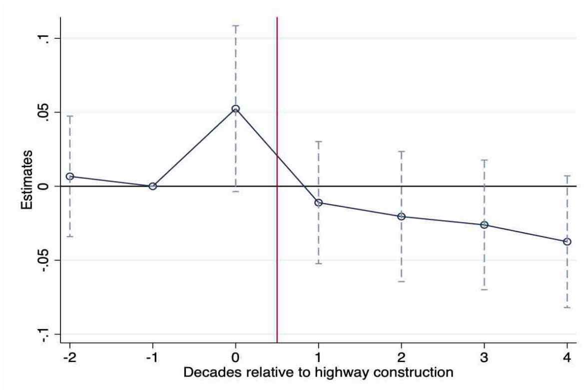
(C) Log White Population



(D) Log Black Share



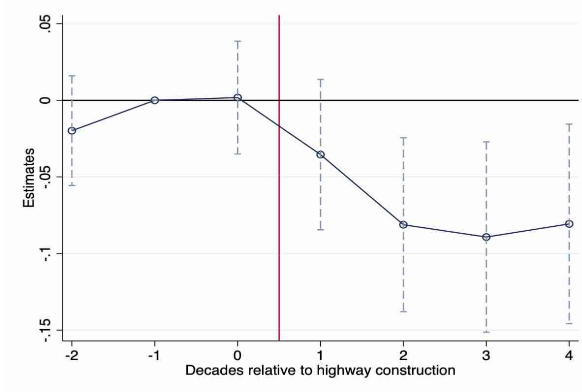
(E) Log Home-ownership Share



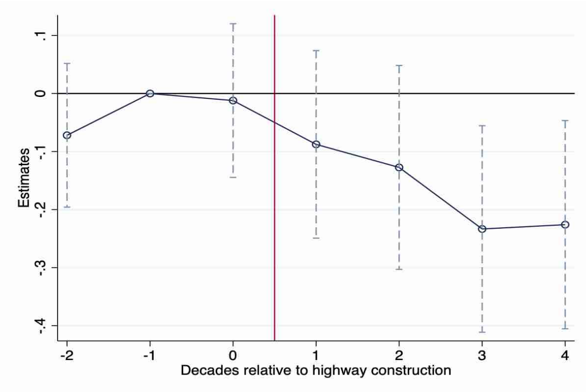
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. The distance between the potential controls' centroid and the closest highway is at least three kilometers. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) for the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

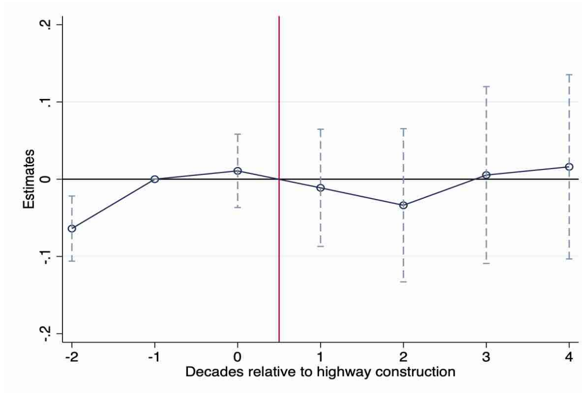
FIGURE D.8: All Cities



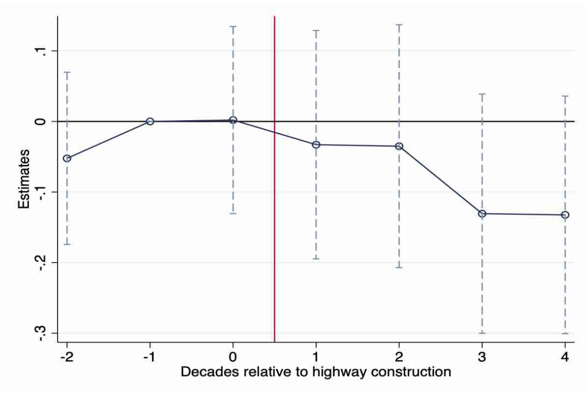
(A) Log Total Population



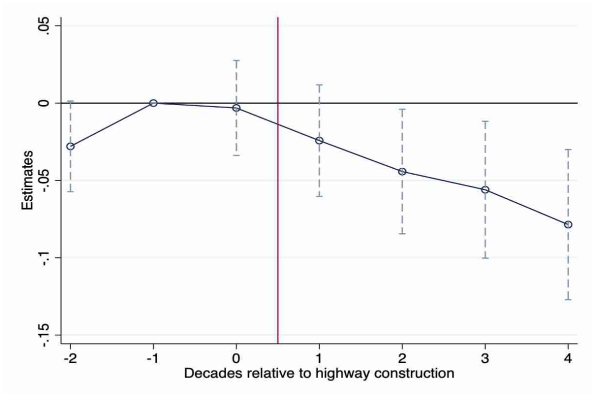
(B) Log Black Population



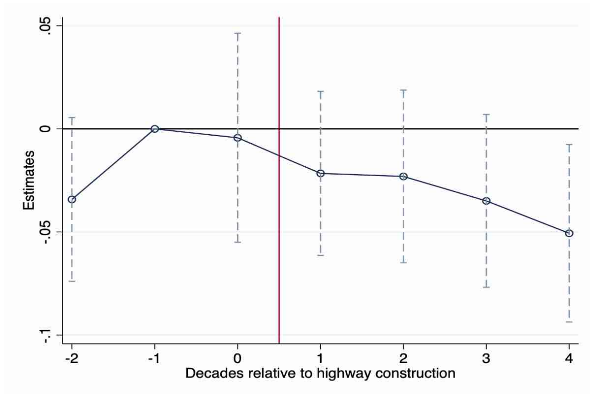
(C) Log White Population



(D) Log Black Share



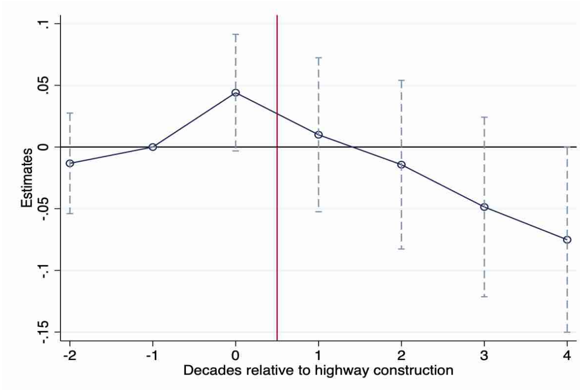
(E) Log Home-ownership



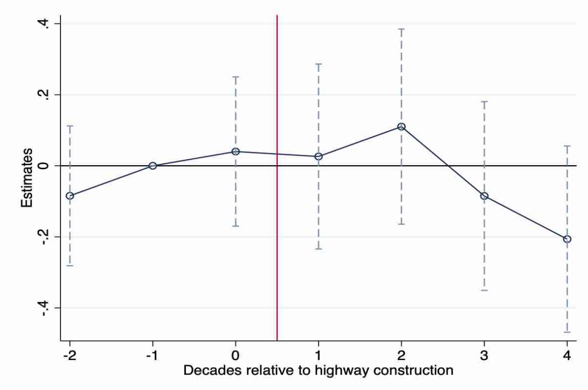
(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 1,562/1,562 events. Potential control tracts are located in any city. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) for the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

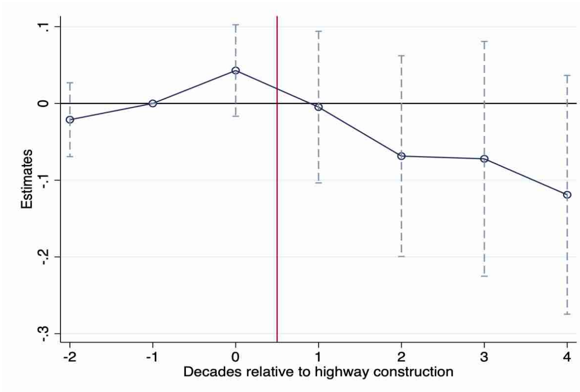
FIGURE D.9: Potential Controls in the Same city



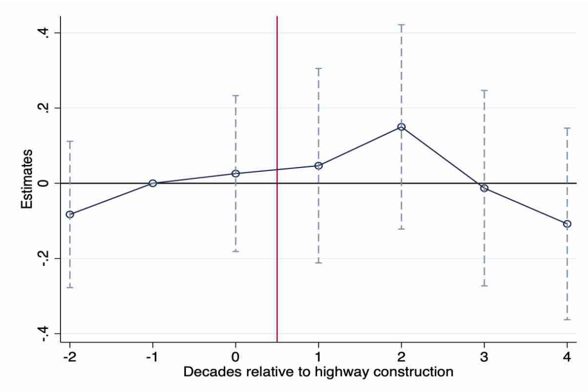
(A) Log Total Population



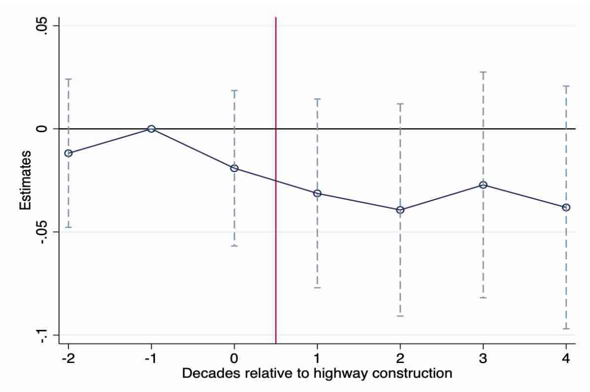
(B) Log Black Population



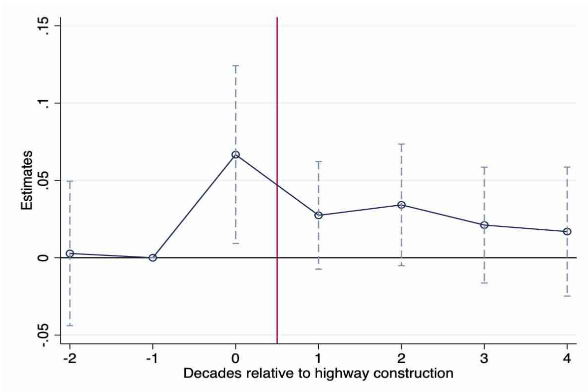
(C) Log White Population



(D) Log Black Share



(E) Log Home-ownership Share



(F) Log Median Rent

Note: Matched tracts sample, consistent boundary census tracts from 1930 to 2020. The matching algorithm managed to match 772/1,562 events. Potential control tracts are located in the same city. All panels display the coefficients and the associated 95% confidence intervals for the difference between trated and control tracts. The coefficients at $k = -1$ are normalized to zero. The sample is weighted by the log population of the tract in the decade before highway construction, and standard errors are clustered at the census tract level. All regressions include tract, decade, decades relative to treatment, and city-by-decade fixed effects. Panel (a) shows the effect of highway construction on the log total population, Panel (b) and Panel (c) show the effects for Black and White population. Panel (d) shows the effect on the log Black share of the tract, Panel (e) on the log home-ownership share, and Panel (f) shows the effect on the log median rent. The x-axis indexes event time. An event time equals to zero is the last decade before the highway opening.

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MANSON, S., J. SCHROEDER, D. VAN RIPER, K. KNOWLES, T. KUGLER, F. ROBERTS, AND S. RUGGLES (2023): "IPUMS National Historical Geographic Information System: Version 18.0 [dataset]." Minneapolis, MN: IPUMS.