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We study the aftermath of the 1968 Washington, DC civil disturbance to illuminate the mechanisms that drive urban redevelopment in the presence of low demand and racial tension. After establishing that civil disturbance property destruction was quasi-random within blocks, we show that destroyed lots were more likely, relative to other lots on the same block, to remain vacant for the next thirty years. We also show that destroyed lots have only recently converged in terms of structure value. Our theoretical framework suggests that the city sought to preclude for-profit land owners from leaving land vacant until demand conditions improved. As a result, the city purchased half of all properties in damaged neighborhoods and aimed to accelerate redevelopment, even if new structures were low value.

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1 Introduction

In 1968 the United States experienced "the greatest wave of social unrest since the Civil War" in an already tumultuous decade (Levy, 2018). The nationwide civil disturbances that followed the assassination of Martin Luther King, Jr. were unmatched in scale until the aftermath of George Floyd's 2020 murder at the hands of police.

The unrest of the 1960s left open wounds in many urban neighborhoods. Shops and residences gave way to rubble and empty lots. In this paper we examine redevelopment in the civil disturbances' aftermath. We seek to understand the market mechanisms underlying redevelopment, and the scope for policy to spur reinvestment in a setting of this kind. The historical setting is crucial context for our analysis. While there is strong evidence that random destruction in the presence of high demand for land can paradoxically pave the way for growth-improving redevelopment (Hornbeck and Keniston, 2017; Siodla, 2015; Dericks and Koster, 2021), the postwar urban American setting forms a less hospitable predicate for economic development. For many affected neighborhoods, destruction came on the heels of a years-long wave of disinvestment caused by many forces, including suburbanization, white flight, redlining, school desegregation, and more fundamentally systemic racism in American society (Baum-Snow, 2007; Baum-Snow and Lutz, 2011; Boustan, 2010; Rothstein, 2017; Asch and Musgrove, 2017b; Schertzer and Walsh, 2019). Some urban neighborhoods have yet to fully recover from the destruction, as Owens III et al. (2020) illustrate in the case of Detroit.

We focus in particular on Washington, DC, where violence and protest erupted in the wake of the King assassination. When the civil disturbances ended four days later, more than 1,000 buildings were burned in one of the most destructive episodes of the 1960s domestic unrest. We concentrate on the three commercial corridors most affected by this destruction.

To undertake this work, we compile a unique and complex data set, centered on these three commercial corridors. We digitally map the corridors using historic atlases, measure destruction using granular archival lot-level data, and build a decennial panel of lot-level characteristics and outcomes from 1960 to today. We trace ownership over time, identify when each property was redeveloped, research the identities of each developer, and map out how lots were assembled over time. We measure ex ante characteristics and trends, including through the use of a rare directory of Black-owned businesses in Washington compiled by Howard University in 1967. Finally, we uncover an extraordinary survey taken by the federal government in the immediate aftermath of the civil disturbances and use it to characterize property owner sentiment in the late spring and summer of 1968.

To estimate the causal impact of destruction on the timing and intensity of redevelopment over the following half-century, we compare destroyed lots to other lots on the same block. This strategy assumes that, within blocks, the intensity of fire damage and patterns of arson were idiosyncratic. Consistent with this assumption, we demonstrate that ex ante characteristics and trends across destroyed lots and their same-block neighbors differ little. With this estimation strategy, we find three key facts about the causal impacts of destruction. First, 30 years passed before destroyed lots were as likely to contain structures as neighboring lots. Second, only recently have destroyed lots converged in terms of the value of capital put in place. Finally, the limited redevelopment activity in the 1970s and 1980s resulted in relatively low-value structures, while later redevelopment produced higher-value structures.

These delays in redevelopment are long lags in an absolute sense. Comparisons with other notable episodes of destruction only make the delay more striking. San Francisco's 1906 earthquake and fire destroyed an order of magnitude more structures than DC's civil disturbance, but develop-

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ers rebuilt 28,000 destroyed structures within a dozen years (Siodla, 2015). After the 1872 Boston fire, burned areas took a decade or less to converge in terms of the value of improvements (Hornbeck and Keniston, 2017). Japanese cities impacted by World War II bombings took fifteen years to return to their places in the city size hierarchy (Davis and Weinstein, 2002). Closer to home, while the District of Columbia struggled to rebuild three commercial corridors over 30 years, its proximate suburbs added almost 600,000 additional housing units from 1970 to 2000 (see Data Appendix 2a.).

We next develop a framework that describes the actors in this redevelopment and their motivations. We posit an urban area with profit maximizing private developers and an electorally motivated city government. The framework implies that when demand is low, only the party that values both immediate household welfare and the welfare of low-income people—the city—should develop. When demand is high, for-profit developers outbid the electorally motivated government.

We then use this framework as a guide to understand the demand conditions for development, which actors develop, and what motivates the policy choices that structure development. We "calibrate" the framework using our main findings and additional qualitative and quantitative evidence. From our three stylized facts, the framework lets us infer that demand is low in the immediate post-disturbance decades and high thereafter, consistent with a broad literature on urban decline and revival. The framework also explains an empirical regularity we document: non-profits under city contract do the vast majority of redevelopment in the 1970s, 1980s, and 1990s; for-profit developers build only later.

The framework's assumption of an electorally motivated government yields a strong preference for rapid development. In contrast, for-profit developers in a low demand environment may prefer to exercise the option to wait on development, in hopes of greater future returns. The government can circumvent this option to hold by purchasing land directly. Consistent with this motivation, we show that at peak, the government owns just under half of all lots and roughly 90 percent of destroyed lots. Furthermore, we show that when the government does sell for redevelopment, it uses contingent contracts that require the return of land in the absence of rapid redevelopment.

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Our final section puts these results in broader context. First, we evaluate whether the "clean slate" that others have suggested may spur redevelopment delivers similar results in our context. We show that, relative to the "clean slate" of irreparably damaged lots, partially damaged lots fare better – not worse. In addition, we also find that substantial land assembly (the legal combination of lots to allow for economies of scale in construction) was relatively ineffective in spurring redevelopment. However, we find that the bifurcated development patterns in the civil disturbance corridors yield the variation in improvement value required for mixed income neighborhoods, and this variation distinguishes these corridors from other urban neighborhoods.

This work contributes to several literatures. Foremost, we provide a new perspective on a strand of urban economics literature that suggests that destruction can paradoxically open doors to economically meaningful development possibilities (Hornbeck and Keniston, 2017; Siodla, 2015; Dericks and Koster, 2021), as destruction lowered frictions to rebuilding and increased the ability of property owners to capture the positive externalities from rebuilding. Our findings suggest that these results are specific to historic contexts featuring cities with rapid growth amidst historic waves of urbanization, ongoing investment, racial homogeneity, and destruction unrelated to ongoing disinvestment. These provocative findings do not translate well to 1968 Washington, where destruction was part of an ongoing trend of disinvestment, and where Black-majority neighborhoods were stigmatized.

In a context of low demand, we also show that even extraordinary government intervention has limited power. We assess the local government response to the destruction of 1968, and complement a long line of work that considers the role of government in urban development. From New Deal programs of the 1930s, to the "Urban Renewal" of the central areas of US cities in the 1950s and 1960s, the federal government has long striven, with at best mixed success, to redevelop urban areas (Collins and Shester, 2013; Cohen, 2019). In recent years, these policies have been replaced by new levers for addressing vacancy and disinvestment: land banks (Whitaker and Fitzpatrick, 2016), tax increment financing (Greenbaum and Landers, 2014), and various tax incentive zones (Neumark and Kolko, 2010; Freedman et al., 2021). Consistent with our findings, none

are heralded as a silver bullet. Issues of redevelopment policy are also salient in the developing world. Like we do, Harari and Wong (2019) find limits to the government's ability to influence neighborhoods, showing that outcomes for poor and informally occupied areas redeveloped via the Indonesian national government's Kampong improvement program lag other similar areas. Like us, however, Harari and Wong view government actions as being limited by substantial constraints.

In addition, we broaden the focus of the quantitative social science work on the political and economic consequences of 1960s Black protests to analyze how destruction and policy co-evolve. The quantitative economics and political science literature on political protests in general (Madestam et al., 2013; Acemoglu et al., 2017; Enos et al., 2019; Skoy, 2021), and 1960s Black protests in the United States in particular (DiPasquale and Glaeser, 1998; Collins and Margo, 2007; Collins and Smith, 2007; Casey and Hardy, 2018; Wasow, 2020), consists largely of quasi-experimental analyses of the political and economic consequences of these protests. We take such an analysis as our starting point, and show that considering the behavior of optimizing agents helps us understand the public- and private-sector response.

Finally, we demonstrate how the presence of option value motivates the design of government policy, and introduce to the option value literature a novel analysis of the interaction between government policy and options. Analysis of option value in real estate has focused on the behavior of private actors and despite theoretical grounding is supported by limited empirical evidence (Décaire et al., 2019); see Womack (2015) for a review, and Titman (1985) for the seminal contribution. While scholars have estimated the value of options in the real estate context, starting with Quigg (1993), and some have focused directly on the redevelopment option (Clapp and Salavei, 2010; Clapp et al., 2012a,b), we know of no work that studies how the incentive to wait and see, induced by option value, modifies government behavior.

We organize the remainder of the paper as follows. The next section of the paper provides historical context. Section 3 discusses our data. Section 4 describes our identification strategy and lays out our main findings on the causal impacts of destruction. In Section 5 we present a framework motivated by these findings to rationalize the observed patterns of investment. Section

6 assesses patterns of development and interprets them in light of our framework, investigating demand, types of developers, and the interaction of policy and option value. Section 7 situates our findings relative to other work that shows destruction unlocking economic value, and then demonstrates that the civil disturbance neighborhoods today have substantially more variation in structure value than the rest of the city. Section 8 concludes.

2 Putting the Civil Disturbance in Context

To ground the work that follows, this section describes the broad outlines of Washington's 1968 civil disturbance, gives context about the economic, demographic, and legal setting in the District prior to the disturbance, and outlines the municipal response to the devastation.

2.1 1968 Civil Disturbance

In the hours after the King assassination, on April 4, 1968, spontaneous gatherings of grief, protest, and violence arose across the country, including in Washington. Some of those gathering in the capital turned to property destruction, including arson, and looting. The unrest, in Washington and elsewhere, has been the subject of myriad news reports, histories, and official reviews (e.g., Kerner Commission (1968), Gilbert, Ben W., and the Staff of the Washington Post (1968), National Capital Planning Commission (1968), Jaffe and Sherwood (1994), Collins and Margo (2007), Risen (2009), Asch and Musgrove (2017a), and Walker (2018)), on which we rely in this section.

The destruction did not wholly subside until four days after the assassination. Destruction was widespread across many parts of the city, but concentrated particularly in commercial corridors along three streets: H, 7th (sometimes referred to as the Shaw corridor), and 14th. Figure 1 shows these corridors. Roughly 20,000 individuals reportedly participated in the unrest, more than 7,000 were arrested, about 1,300 were charged with felonies and serious misdemeanors, and about 1,000 people were injured. By the end, 13,600 national guard soldiers patrolled the streets.

Even among the disturbances of the 1960s, Washington, DC's unrest stands out as among the most destructive to property. Hundreds of businesses and residences were damaged. This damage

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was due in part to violent entry into buildings and theft, but the most severe damage was the result of over 1,000 fires. At peak, arsonists reportedly set thirty new fires an hour. Fire departments responded from as far away as 120-mile distant Lebanon, Pennsylvania.

While the unrest occurred in Black-majority neighborhoods, the owners of commercial real estate in these neighborhoods were mostly White, according to a post-unrest survey of property owners. We find about 150 Black-owned businesses listed along the heavily affected corridors on H, 7th, and 14th streets, according to a directory of Black-owned businesses published in 1967. Most of these businesses likely rented space. We describe these sources–the survey of property owners and the Black business directory–in the data section. The survey responses also suggest that many property owners viewed the probability of further unrest as material, and some noted sporadic further destruction in the spring of 1968.

Despite the severe destruction, the Washington civil disturbance involved less loss of life than other major civil disturbances of the 1960s. Twelve people died in the Washington civil disturbances, many as a result of being trapped in fires. In contrast, 34 people died in the 1965 Watts, Los Angeles unrest and 43 people died in Detroit in 1967.

2.2 Context: Washington in the 1960s

In 1968, Washington, D.C.—like many American urban cores—had both a declining population and an increasing share of Black residents. The city's population peaked in decennial census counts at around 800,000 in 1950, and declined to a low of slightly under 600,000 in 2000 (see Appendix Figure 1). Washington, D.C. became a majority-Black city in the late 1950s, in line with a nationwide pattern of out-migration of White residents toward suburban areas, facilitated by the rise of the car and discriminatory public policy, and by in-migration of Black residents as part of the Great Migration. Amidst these changes, the District's prominence in the metropolitan region declined. In 1950, the District accounted for almost 1 in 2 metropolitan area residents; by 1970 this number was 1 in 3. The share of Black Washingtonians peaked at 71 percent in the District in 1970, up from 35 percent in 1950 (see Census citations in data appendix). Overall, 1950 to 1990

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was a period of disinvestment in Washington's urban core.

While the most heavily damaged commercial corridors were the sites of substantial economic activity before the civil disturbances, they did not receive significant investment in the postwar period. For example, reports from before the civil disturbances describe landlords doing as little as possible to maintain buildings around the 7th Street corridor, knowing that their tenants had few other options given segregation in the city.[2] Newspaper accounts often refer to Black neighborhoods as "slums," and the stigmatization conferred by that term is a sign of the racial tension and ongoing disinvestment that characterized this episode.

2.3 Policy Response

At the time of the 1968 civil disturbance, Washington already had federally funded urban renewal programs in place, like most if not all major American cities. These programs were motivated by poor living conditions in targeted neighborhoods, but they have received heavy criticism for dislodging poor residents, disproportionately impacting Black residents, and disrupting the fabric of urban neighborhoods. Collins and Shester (2013) provide a relatively recent overview of the urban renewal literature. Of the three corridors that received heavy damage, only the 7th Street corridor already had an urban renewal plan in place. Following the destruction, the city issued urban renewal plans for the H Street and 14th Street neighborhoods as well, and a new plan for 7th Street (National Capital Planning Commission, 1969a,b, 1970). The agency charged with executing these urban renewal plans was the District of Columbia Redevelopment Land Agency (hereafter, RLA) (Clement, 2016; Walker, 2018; Howard Gillette, 2006; Howell, 2016; National Capital Planning Commission, 1969a,b, 1970). A board of five directors oversaw the RLA from its inception in 1945 until its diminution in 1974. Of these five directors, two were appointed by the president; the remaining three were the three presidentially-appointed District of Columbia Commissioners (the municipal governing body) (Todd, 1986, p. 69).

The RLA's approach to the corridors we study was to acquire land, assemble it into larger

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[2] "Shaw Landlords Have Poor Repair Records," Washington Post, March 25, 1968, p. A1.

lots, and then find a partner to develop. Overall, the RLA purchased large swaths of land on the corridors along 7th, 14th, and H streets. Our data collection lays out for the first time the full scale of RLA acquisitions, presented in Figure 2(a). In total, the RLA owned at some point 53 percent of all the lots on these corridors. Figure 2(b) shows this value increases to 90 percent for destroyed lots. As late as 2020 the city still owned roughly seven percent of the lots on these corridors, including two entire blocks that form a part of the city's convention center.

The RLA purchased most of these properties in the early 1970s. The pace of purchases dropped in 1972, when the Nixon Administration reduced its budget for further purchases, as part of a wholesale revision of the national approach to distressed urban areas. As part of this revision, the RLA moved into a city department under the control of an elected mayor, directors became mayoral appointees, and the RLA's mandate was greatly circumscribed (Todd, 1986, p. 284-5). In 2001, the RLA was dissolved completely. Its remaining property portfolio was transferred to a newly created body, the National Capital Revitalization Corporation (NCRC). The NCRC in turn was disbanded in 2007 with remaining properties transferred to the city and the Office of the Deputy Mayor for Planning and Economic Development taking over its functions.

3 Data

We now describe the data that allow us to quantify the evolving impact of the 1968 civil disturbance. These include information on individual lots over a more than sixty year period, contemporary reports on 1968 damage, comprehensive data on modern day lots, as well as other survey measures. This section describes the data, and we include complete source information in the data appendix.

Our universe for analysis are the three commercial corridors—stretches of 7th St NW, 14th St NW, and H St NE, as shown in Figure 1 and as defined by National Capital Planning Commission (1968)—that were sites of the most intense and concentrated destruction (Gilbert, Ben W., and the Staff of the Washington Post, 1968; Jaffe and Sherwood, 1994). These corridors were major retail thoroughfares before the civil disturbance. They consist of 76 blocks and contained 915 lots facing

the three corridors.

To locate these lots in space, we consult historic real estate atlases made by the Baist company as of 1959-1967 (R. H. Baist Co., 1967) and hand draw the lots in ArcGIS. We geo-rectify them, overlaying them on modern GIS data, in order to precisely determine the location of each 1967 lot. To understand how lots change over time, we consult property tax data, and verify the shapes of any new lots by consulting official filings in the city of Washington's SURDOCS web application. The appendix provides additional details on how we bridge lot data across property tax data and property ownership data (see Data Appendix 2b).

Our unit of observation is the 1967 lot. We use this unit throughout our period of study, from 1960 to 2019, to have a consistent unit of analysis and understand changes relative to this baseline. As an illustration of the sample, Figure 3 shows lots on a portion of the 7th Street corridor. The blue- and green-shaded polygons are lots, which are situated within six distinct squares. The portion of the square not covered by our analysis is shaded grey. On this 7th Street corridor, and our other corridors, we collect data only on lots that face the commercial corridor. Thus, by "block" we technically mean "block face."

We measure treatment—in our case, destruction—with a lot-specific damage measurement taken by city officials shortly after the disturbances, available at the National Archives. Our baseline measure of damage is whether a lot's improvements were "totally destroyed" as denoted by these officials. While this official document does not elaborate on the definition of "totally destroyed," it appears to be buildings whose destruction was measured as 100 percent according to the metric developed by city officials. In practice this generally meant lots where structures were reduced to piles of bricks and ash after severe fire. In our three corridors, almost 20 percent, or 177 of the 915 lots, were totally destroyed. Figure 3 illustrates the coding of "total destruction." Blue shaded lots are those totally destroyed during the civil disturbances. We also use a finer measure of damage that records four levels: none, minor, significant, and irreparable.

To measure property development outcomes, we collect lot-level property tax assessment data roughly every ten years from 1960 to 2019. For all years through 2010 we hand digitize data

from microfiche. (As the municipal archives do not have data from 1980, we use 1979 instead.) We also include 1967, just before the damage, and 1971 and 1972 in addition to 1970, in order to understand the dynamics in the years immediately after 1968 (see data appendix for complete citation). From these data, we observe the presence of a structure, the size of the lot in square feet, and the assessed improvement and land values. From 1967 we additionally digitize information on building quality and use.

The assessment data is likely to be a high-quality measure of the presence of a structure, because the assessor observes this with little noise. We expect that the assessor provides a noisier measure of the quality and value of the structure. Ideally, we would complement these assessed measures with the market value of property from transactions. Because transactions may not suffer from assessment noise, we have attempted to systematically locate every transaction on the properties in our sample after the civil disturbances. We do not believe that the surviving sample is preferable for analysis. Problematically, the transaction records do not record many RLA purchases—properties that we know the RLA owned from later sales and from tax assessment data. These missing purchases are most likely recordation errors. It may also be that the RLA acquired some of these properties via eminent domain (though we believe we can identify such properties through legal advertisements in newspapers), and eminent domain may not be systematically recorded in land records. Given this, we rely on the assessment measures throughout this analysis.

As anecdotal accounts place heavy weight on the race of the tenant in determining the extent of destruction at a lot, we turn to address level measures of Black business ownership. The *Directory of Negro-Owned and Operated Businesses Businesses* published by Howard University (Jones, 1967), lists all Black owned businesses in Washington, DC in 1967. We hand match these businesses to 1967 lots by address. We also use a survey of property owners taken by the federal government in the summer of 1968, preserved in the National Archives.

Finally, in the last section of the paper, we analyze the civil disturbance's impact on the current variance in property value using data on all lots in the the city of Washington, DC as of 2019.

These data come from the city of Washington's Integrated Tax System Public Extract, accessed via the city's open data website.

4   Estimating the Impact of Destruction

We now turn to an assessment of the path of destruction's impact on the physical structure of the city. We begin with an unconditional comparison of totally destroyed lots to all others, and then estimate destruction's causal impact by using quasi-random within-block variation in destruction.

Our primary focus is on the extent and determinants of redevelopment over time. On the extensive margin, we evaluate whether treated properties are more or less likely to have a structure. On the intensive margin, we evaluate whether treated properties differ in capital intensity, according to the value of structures.

4.1   Unconditional Comparison

Figure 4(a) shows that two years after the civil disturbance in 1970, nearly 80 percent of lots with destroyed structures continued to have no structure. The figure reports the percent of lots with a structure present; lots with structures totally destroyed in 1968 are in blue, all others are in green, and shaded areas are standard errors of the mean. Only in 2000, roughly thirty years after the civil disturbance, are totally destroyed lots statistically indistinguishable from all other lots in the likelihood of having a structure. That said, even in 2000, destroyed lots remain roughly five percentage points less likely to have a structure in 2000.

Turning to the intensive margin, Figure 4(b) presents land use intensity. We report log assessed value of structure (that is, improvements) per square foot of land, measurable only conditional on the presence of a structure. As a result, changes over time reflect both the value of structural capital and any change in the subset of lots with structures. In the immediate aftermath of the civil disturbance, the value of improvements across totally destroyed lots and all others is about the same, indicating that to the extent that totally destroyed lots had structures, they did not differ in capital intensity.

After the civil disturbance, according to the 1970 assessment records, about four-fifths of the totally destroyed lots had no structure. To some extent it is surprising to find any totally destroyed lots with structures in the immediate aftermath. We know from our ownership history that only a few of these lots represent actual redevelopment. The rest likely represent measurement error in the determination of total destruction. That said, the structural assessments of these lots tended to fall substantially compared to 1967, indicating they were indeed severely damaged. Over time, developers increasingly built up destroyed lots. Until about 2000, however, the intensive margin remained significantly lower on totally destroyed lots compared to all others, suggesting they were redeveloped at lower capital intensity.

4.2 Estimation Challenge and Identification Strategy

The unconditional comparison in the previous section does not produce an estimate of the causal impact of destruction on redevelopment. If destruction were in any way systematic—targeting particular types of structures, or particular parts of these retail corridors—this unconditional comparison combines the impact of destruction with the impact of these pre-existing features. To the extent that damage may have been more intense in some parts of the retail corridor than others, and to the extent that property characteristics vary little within a block, we can address this type of non-randomness by estimating a specification with block fixed effects that limits to within-block variation.

For the inclusion of block fixed effects to identify the causal impact of destruction on totally destroyed lots relative to all others, it must be the case that, conditional on block, destruction is quasi-random. While we cannot test this claim directly, we can assess whether observable correlates of totally destroyed lots differ from all other lots, and further, whether totally destroyed lots exhibit any differential trends in outcomes before the destruction.

Within a block, there are at least two reasons to be concerned that damage may be non-random. First, anecdotal evidence suggests that looters may have avoided Black-owned businesses. Many accounts describe, and contemporary photos show, Black business owners self-identifying in order

to avoid damage, largely by writing "soul brother" in their windows. Two days after the initial outbreak of violence, the *Washington Post* reported that "looting was nonstop, except for most places near 7th Street with 'Soul Brother' signs painted in the windows" (Asher and Weil, 1968). While there are many accounts along these lines (Kalb and Groom, 1968), there are also many other accounts that are more equivocal, with statements such as "the violence against property seemed indiscriminate" and stories of Black store owners with "Soul Brother" in their windows whose properties were nevertheless hard hit (Gwertzman, 1968). *Post* reporters describe how a "fire spread to a restaurant next door that vainly showed a 'Soul Brother' sign" (Asher and Weil, 1968).

A second form of potential non-randomness could arise from variation in the goods sold across retail stores. Looting was particularly concentrated in stores with goods for immediate consumption or resale, such as liquor or electronics. Indeed, the city compiled a list of liquor stores destroyed across the city, the only type of store singled out by the city for measurement of damage. In a same year retrospective, the National Capital Planning Commission wrote that "On the whole, the general merchandise stores and the liquor dealers appear to have been the most tempting targets for looters and arsonists" (National Capital Planning Commission, 1968). Other accounts emphasize that targeted stores had goods that appealed to those participating in the looting. Also in this vein, ten days after the disturbance, *Washington Star* reporters wrote that "[i]t seemed clear that the looters were at least in part selective" and targeted retail establishments with products that were easy to carry or wear (Kalb and Groom, 1968).

Both of these concerns about within-block non-randomness of the civil unrest are about looting. In this paper, though, we focus on physical destruction of buildings, which is distinct from looting. To the extent that buildings were "totally destroyed"—our key measure—in the civil disturbance corridors, such destruction was largely due to arson rather than looting. However, it is possible that looting and arson are correlated.

To empirically explore whether systematic differences pre-dated and are correlated with destruction, we analyze ex ante characteristics of totally destroyed lots and all others in Table 1. For

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1967, the last year prior to the civil disturbance, we collect a rich set of lot and structure covariates. We present means of these measures in columns 1 and 2 of Table 1 for destroyed lots and other lots.

Column 3 displays p values for a difference-in-means test. This comparison highlights that the quality of construction and type of building material differed little between lots with complete destruction and others. However, totally destroyed lots were statistically significantly more valuable in terms of both land and improvement, much more likely to be built for retail use ("store"), and less likely to be the site of a Black-owned business.

Column 4 reports estimates from a regression of an indicator for total destruction on the full set of 1967 lot characteristics. These estimates report significant differences in land value per lot square foot, use and being the site of a Black owned business. In other words, we confirm that totally destroyed properties and all others differed systematically at least to some degree.

However, this is not the comparison upon which the identification rests. Instead, we rely on the quasi-random nature of within block destruction, assuming no systematic within-block differences between totally destroyed lots and all others. We test this claim by restricting our comparison to within-block variation by including block fixed effects. Within-block comparisons may remove selection into destruction if the civil disturbances were chaotic events, in which spur of the moment decisions determined which buildings were damaged, and the randomness of fire damage caused some to be destroyed and others not. Destruction could be plausibly random within a block if many important determinants of property value are constant within block. For example, if a primary determinant of property value is location, variation in location within block is naturally limited, and within block comparisons therefore substantially limit the impact of location. Similarly, properties on the same block may be more likely to have establishments in related uses, such as related retail, so that within block comparisons also limit variation in tenants or use type.

Figure 3 illustrates the comparison at issue by showing properties along a few blocks of the 7th Street corridor. Rather than compare all properties with total destruction in blue to all other properties in green, we compare blue and green properties only within the same block. We do this

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in regression form in the final column of Table 1, which reports coefficients from a regression of total destruction on lot covariates and block fixed effects.

The introduction of these block fixed effects markedly changes the relationship between co-variates and destruction. We display the results in Table 1 column 5. Many coefficients decline in magnitude, and we now find only one statistically significant difference between destruction and lot characteristics: the presence of stone or concrete construction. In practice, stone or concrete buildings on these corridors are rare and tend to be banks, built to withstand damage, especially fire damage, and violent entry.

Motivated by this conditionally random nature of destruction, our main estimating equation identifies the impact of destruction net of block by year fixed effects. This method assumes that, in the absence of the civil disturbance, totally destroyed lots and all other lots would have evolved similarly. While we cannot test this directly, we can assess whether, before destruction occurred, totally destroyed and all other lots trended differently in value. Specifically, we evaluate whether the pre-disturbance trajectory in outcomes from 1960 to 1967 differed between future destroyed lots and other lots on the same block. We use data from 1960 and 1967 to estimate outcomes as a function of future destruction (D_l) and future destruction in 1967 ($D_l \times I_{t=1967}$):

$$Y_{lt} = \alpha_0 + \alpha_1 D_l \times I_{t=1967} + \alpha_2 D_l + \theta_t * \theta_b + X_{lt}\delta_1 + X_{lt} \times I_{t=1967}\delta_2 + e_{lt}. \tag{1}$$

The outcome of interest here, Y_{lt}, is land or improvement value per lot square foot. We normalize outcomes per lot square foot so that our results are driven by per unit measures, and are not a function of lot size. We do not test for a pre-trend in whether a lot has a structure, since total destruction necessarily requires the presence of a structure.

The coefficient that reports any potential differential change in outcome Y for destroyed lots in 1967 relative to 1960 is α_1. To make within block and year comparisons, we include block-by-year fixed effects, $\theta_t * \theta_b$. We also include covariates X_{lt} and their interaction with an indicator for 1967 to parallel our preferred specification below (Equation 2). These covariates are ex ante characteristics that are either statistically significant in column 5 of Table 1 or are unconditionally

important determinants of destruction. We include an indicator for retail status in 1967, an indicator for the presence of a Black-owned business as of 1967, and an indicator for stone or concrete construction in 1967. Here and throughout, we cluster standard errors at the 1967 lot level. That is, we allow an unrestricted covariance across all lots at the same 1967 location, regardless of whether those lots split or combine, across all years.

We present estimates of the coefficient of interest, α_1, in Table 2. In the first column the dependent variable is the log of assessed improvements per lot square foot. We find that, in 1967, relative to 1960, the value of improvements on lots that were later destroyed grew a small and imprecise three percentage points more compared to other lots. If anything, this suggests an upward trend in the value of destroyed lots, the opposite of what one might expect based on the unconditional comparison of post-1968 improvements.

The next two columns use the assessed value of land per square foot as the dependent variable. In column 2 the sample is slightly larger, since we can now include lots with zero improvements; we do not include these lots in the estimation in column 1 since we take the log of improvements. Column 3 reports results using the same sample as in the first column. Whichever sample we use, we find a very small and imprecise difference in land value in 1967, relative to 1960, for lots that later were destroyed in 1968 relative to other lots. Thus, all told, we see no evidence of a pre-destruction downward trend in improvement value for lots that will end up destroyed in 1968.

Motivated by the conditionally random nature of destruction within blocks and the absence of a pre-trend in improvements, our main estimating equation is

$$Y_{lbt} = \beta_0 + \beta_{1t} D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt} \gamma_1 + \theta_t * X'_{lt} \gamma_2 + e_{lbt}, \tag{2}$$

where Y_{lbt} is the outcome on lot l in block b at time t
($t \in \{1960, 1967, 1970, 1971, 1972, 1979, 1990, 2000, 2010, 2019\}$). The equation includes block-year fixed effects ($\theta_t * \theta_b$) and the small set of covariates that we have identified as potentially affecting the likelihood of destruction (X_{lt}), and that set interacted with year indicators (θ_t) to allow for arbitrary trends in these attributes' impact on the outcome variable.

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Our coefficients of interest are β_{1t}, which report the impact of total destruction, D, on lot l in year t relative to all other lots on the same block and in the same year.

4.3   Results of Conditional Comparison

We now present estimates of the impact of destruction based on these within-block and -year comparisons. We consider both the extensive margin of destruction—the presence of a structure—and the intensive margin—the value of capital in place.

Table 3 presents estimates of Equation 2 where the dependent variable is the absence of a structure on the lot. Column 1 presents the baseline specification. The first row shows that, as we would expect if destroyed lot evolved no differently than all other lots, that destroyed lots were no more or less likely to have a structure in 1967 (coefficient of -0.006). In the immediate aftermath of the civil disturbance in 1970, totally destroyed lots were about 60 percentage points more likely to not have a structure. This gap declines slowly over the decades through 2000, when the difference is still a sizable 7 percentage points. In 2019, destroyed lots are actually slightly more likely to have a structure. This result appears to be driven by a small number of temporarily empty lots that developers razed to begin development.

To ease interpretation and give a better sense of the magnitudes, Figure 5(a) depicts the baseline coefficients from column 1 of Table 3. Dots are coefficient estimates, and the shaded area is the 95 percent confidence interval. As 1960 is the reference, we include it at zero. The figure makes the gradual nature of the convergence quite clear. We use this same depiction for our other results.

The rest of Table 3 presents three additional tests for the robustness of our specification, still using the absence of structure as the dependent variable. While we already control for the presence of Black owned businesses, it could be the case that the impact of being a lot with a Black owned business is poorly approximated with the year-by-year intercept shifts that we include. To evaluate this, column 2 presents results where we omit all lots that have a Black owned business in 1967. This yields estimates very similar to column 1, suggesting that different trends in lots with Black-owned businesses do not drive the results.

An alternative concern is that destruction can, by definition, only occur on lots with structures, and that this requirement may cause sample selection. We address this in column 3, by restricting the sample just to lots that had structures in 1968. Because of this restriction, we must omit the interaction of the total destruction variable with the 1967 dummy, as all lots in this sample by definition had structures in that year and this interaction is therefore collinear with the constant. Again, the results, shown in column 3, change very little.

These results do not rest on specific estimation choices. When we use probit, rather than OLS estimation, we find essentially the same results (see Appendix Table 1 columns 1 to 3; compare to Table 3). When we implement a more flexible clustering strategy, allowing for arbitrary covariance with each square, we find that the standard errors change very little; see Appendix Table 1 column 4.

We turn now to the intensive margin of redevelopment, measured as the assessed value of improvements per lot square foot. Because the log is undefined for lots without improvements, we analyze improvements conditional on the presence of an improvement. Figure 5(b) shows the results of this estimation: a slow pattern of convergence. New improvements on totally destroyed lots remain substantially less valuable than all other same-block improvements through 2010. In 2010, lots that suffered total destruction in 1968 have improvements valued 20 percent lower than same-block neighbors.

These findings are all consistent with contemporary commentary. Newspaper reports in the years following 1968 contain heartbreaking stories about neighborhoods "left to rot," with vacant lots left unbuilt for years given the lack of interest from potential developers and investors (Editorial Board, 1973). Reporters in 1970 saw, on one street, "more than a dozen vacant lots, charred hulks of buildings, vast shells of apartment houses, with doors ajar and their twisted remains exactly as they were the day after they burned–fossils of Washington's riot."[3] These descriptions continued for years. In 1974, a headline stated the "city's core is still in ruins." The same article noted that "the entire west side of the block is empty, long since leveled, and most of the east side has been

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[3]"Scars in People Point Up Riot Areas' Needs," <u>Washington Post</u>, April 6, 1970, p. A1.

abandoned."[4] The *Washington Post* described the condition of the the sidewalk of one street of one street in 1978 as "littered with hypodermic needles and condoms. Buildings boarded up for 10 years slumped between weedy vacant lots" (Loose, 1998).

The next outcome we examine is land value. While there is good reason to expect a relationship between destruction and the absence of a structure and the value of improvements, economic theory suggests no expectation for a difference in the value of land between totally destroyed lots and all others, as long as destruction is as good as random conditional on block by year fixed effects. Unlike the value of improvements, the value of land is determined in its entirety by location attributes. If our identification assumption holds, these attributes should vary little with destruction. Figure 5(c) shows the relationship between land value per lot square foot and destruction (Equation 2, where the dependent variable is assessed land value per lot square foot). These estimates yield no economically or statistically significant difference in land value per lot square foot between totally destroyed lot and all others.[5]

Finally, we explore what drives the slow increase in improvements. While Figure 5(b) suggests an increase in building quality over time, this result could also be due to changes over time in the composition of lots with structures.

To assess whether there is a systematic association between time of development and the value of new construction, we limit our analysis to data from 1960, 1967 and 2019. We allow the impact of destruction to vary by year of development as reported in the tax assessment data. Specifically, we estimate

$$
\begin{aligned}
Y_{lbt} = \delta_0 \\
+ \delta_{1te}\mathbf{E}_l * \theta_t + \delta_{2e}\mathbf{E}_l * D_l * 1\{t = 1967\} + \delta_{3e}\mathbf{E}_l * D_l * 1\{t = 2019\} \\
+ \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.
\end{aligned}
\tag{3}
$$

Our outcome of interest, Y_{lbt} is the log of assessed improvements per lot square foot. We define

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[4]"City's Core Still in Ruins," <u>Washington Post</u>, April 4, 1974, p. C1.

[5]We do not wish to overstate the value of this test, as there is some reason to believe that land value assessments within a block are not entirely independent.

the era of development, measured as of 2019 and denoted $\mathbf{E}_l$, as a vector with e levels. For example, if we divide the period of construction from 1968 to 2019 into ten year periods, then $e \in \{1, 2, 3, 4, 5\}$. We allow the era of development to have an annual impact on capital for all lots (δ_{1t}), and a separate impact for destroyed lots in 1967 (δ_{2e}, which should be insignificantly different from zero) and in 2019 (δ_{3e}). Therefore, the coefficient of interest is δ_{3e}, which reports whether destroyed lots built in a given era e have a systematically different value of assessed improvements per square foot relative to all other lots built before 1968.[6]

We report results from this estimation in Table 4. Given that we have no strong theoretical guide on how to periodize the eras of development, we use three different sets of break points; results are not sensitive to the choice of era. In the leftmost panel of the table we report results for three eras of development—1968 to 1983, 1984 to 1999, and 2000 to 2019—and the first two columns report the number of lots developed by era for totally destroyed lots (column 1) and all other lots (column 2). Column 3 reports the regression coefficients δ_{3e}. In this column and all others, the omitted category for era of development is structures built before 1968. We find that, in 2019, structures developed between 1968 and 1984 on destroyed lots are valued 47 percent less relative to structures on the same block and developed in the same era. Destroyed lots with structures developed in either of the two later eras have no systematic differences in value.

The next two panels of the table divide the post-disturbance era into five and then ten periods. The qualitative finding remains: structures on destroyed lots constructed in the 1970s are substantially lower value relative to structures developed in the same era on the same block on all other lots. The middle panel of the table has an anomalously large -2.5 coefficient, but that effect is identified by one single destroyed lot (column 4), so we place little weight on this individual coefficient. In sum, the lower average value of improvements on destroyed lots as of 2019 is driven by the particularly low value construction in the 1970s.

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[6]For parsimony, this equation controls just for the interaction of retail use stone and concrete structure with year, omitting the indicator for Black business as of 1967. The inclusion of the Black business indicator and its interactions with year actually generate larger estimates, but at the expense of being able to estimate coefficients for some eras of development in 2019. We drop 11 observations that report a structure built before 1968 on destroyed lots. We limit to observations with non-zero improvements in all years.

4.4 Summary of findings

We take away three stylized facts from the empirical work in this section. First, as measured by the presence of a structure, lots destroyed in 1968 take 30 to 40 years to catch up to neighboring lots. Second, as measured by the value of the building in place on a lot, destroyed lots have only recently converged. Finally, the value of construction on destroyed lots has a temporal pattern: early developments are lower-value than neighboring buildings, while the value of later developments converges to that of neighboring buildings.

5 Framework: Explaining Delayed and Bifurcated Redevelopment

We now turn to the interpretation of these stylized facts, with the goal of explaining why redevelopment of destroyed lots took place when it did, who carried out the development, and what form the development took. To discipline our interpretation of the stylized facts we first sketch the way in which rationally acting for-profit developers, not-for-profit developers, and the city government might interact. We then calibrate their interaction, so to speak, to match the observed historical pattern of development. We do so at the level of granularity precision of our stylized facts: the goal here is not to replicate developers' profit and loss statements, but to explain the general pattern of who develops when.

This section introduces the key ingredients of the framework: agents, state variables, the order of play, and objective functions. In the next section, we turn to interpretation.

5.1 Agents

Agents are developers, working in a city with many properties. There is a for-profit developer, a non-profit developer and a government. For simplicity, we group the government and the non-profit developer together and refer to them as "the government." We explore this nexus more in depth in the empirical work. Agents take actions based on their objective functions and their knowledge of state variables.

5.2 State Variables

Three state variables encompass all the information the developer and the government use in making decisions. These state variables, in combination with agents' actions, determine developer and government payoffs in each period.

The first of these state variables is the status of the structure on the property, C. Structures are either destroyed, existing and low value, or existing and high value. Notationally, let $C \in \{\text{destroyed}, \text{low}, \text{high}\}$. When the state is destruction, a property's structure is destroyed with a probability greater than zero but less than one. If a property has no destruction, the structure retains its initial value.

The second state variable is the type of property owner. Owners, O, can be either for-profit or the government ($O \in \{p, g\}$), recalling that "government" also includes the non-profit developer.

The final state variable is the level of demand in each period. Demand for the property can be low (l) or high (h). We write demand as $D \in \{l, h\}$. Demand is outside of the city's or the developers' ability to control. It may reflect national trends such as the rise and fall in crime, the crack epidemic of the 1980s, or racial discrimination and suburbanization.

5.3 Order of Play, Shock, and Actions

There are two periods. The first period runs from $t = 0$ to $t = 1$, while the second one runs from $t = 1$ to $t = 2$. Prior to the first period, the state variables have an initial value. The first period starts with a shock to state variables before play begins. We denote this shock s_t. Following this revelation, non-owning developers and the government choose whether or not to make an offer on a given property. The current owner then either accepts the offer or not, and then the (potentially new) owner either builds a structure or does not. If the owner builds a structure, the owner chooses either a high or low value structure. At the end of the period, at $t = 1$, the payoffs for the period materialize and state variables take on their initial value for the second period. The same process unfolds during the second period, after which the world ends for present purposes.

5.4 Objective Functions

The for-profit developer maximizes the discounted stream of profits from a property. (We defer a discussion of the possible role of spillovers until section 7.1.) Notionally, these profits are rents minus investment and carrying costs. Profits in each of the two periods (π_t) are a function of the initial state variables combined with the shock and the actions (X) that agents take. We can therefore write the for-profit developer's total profit as the sum of profit in the first period, π_1 and profit in the second period, π_2, discounted by the developer's discount rate of δ_f:

$$\pi(C, O, D, S, X) = \pi_1(c_0, o_0, d_0, s_1, x_1) + \delta_f \pi_2(c_1, o_1, d_0, s_2, x_2). \tag{4}$$

We note the realized state variables in lower case with period subscripts. These three state variables, as realized in each period (c_t, o_t, d_t), the initial shock (s_t), and the vectors of developer and government actions (x_t) determine profits.

In contrast, the government's objective function is not one of profit maximization. The government makes zero profits and, unlike the for-profit developer, cares about household welfare. By household welfare we narrowly mean the consumer surplus households receive from having access to housing. In effect what we assume is that the government weighs households more equally than developers do, due to electoral considerations. These become particularly important a few years after the civil disturbance, as DC receives home rule and city officials are elected instead of appointed. We might also assume that household welfare is harmed by the presence of local nuisances, particularly those that occur on nearby vacant properties.

The government values household welfare as a function of the state variables and agent actions and denoted as γ:

$$\gamma(C, O, D, S, X) = \gamma_1(c_0, o_0, d_0, s_1, x_1) + \delta_g \gamma_2(c_1, o_1, d_0, s_2, x_2). \tag{5}$$

The inputs to this maximization exactly parallel the for-profit developer's problem, except that the

government maximizes a different function of these inputs, and may have a different discount rate (δ_g need not equal δ_f).

5.5 Comparing Payoffs in Different States

Given this framework, which type of developer builds under which conditions? Consider first development when demand is low. In fact, for-profit developers may not be able to profitably construct housing of any type. In this case, for-profit developers see little incentive to build and will be outbid by the government. Even when market demand is low, households with welfare to maximize remain, and therefore, the government can derive utility from ownership. Thus, when demand is low, the government can construct affordable housing that yields substantial household welfare.

Next, consider when demand is high. In this case, while household surplus from the construction of affordable housing surely exists, we assume that it is less than the profits private developers earn from constructing either high- or low-quality private market housing. Put simply, we postulate that owner profits and willingness to pay increase in demand and do so more steeply than the government's willingness to pay.

Under reasonable assumptions, we may then expect, given low demand and when the government owns a lot, there are no gains from trade. Similarly, when demand is high, the government sells to for-profit developers. When demand is low, the trade from for-profit developers to the government clears the market.

6 Implications for Demand, Policy, and Redevelopment Outcomes

In this section we confront our framework with the delayed and bifurcated pattern of post-destruction redevelopment we document. We are particularly interested in implications for the evolution of demand, the government's and the private sector's role in redevelopment, as well as the impact of policy decisions on long-term outcomes. We draw on additional empirical evidence from a variety of sources on these implications and consider their motivations.

We begin by "calibrating" the framework, asking which shocks and choices in each period are consistent with the prices, presence of construction, and type of construction we observe. To this end, we pair our framework with the three key stylized facts from the historical record and our causal estimation. First, after the initial shock—the civil disturbance in 1968—properties with destroyed structures are likely to remain vacant for a significant period of time. These early years are "the first period" in our framework. Second, to the extent that redevelopment occurred on destroyed lots in the first period, developers built relatively low-value buildings. Third, in more recent years—"the second period"—developers build mostly high value structures on destroyed lots, while a smaller number of totally destroyed lots remain vacant.

6.1 Evidence of low, then high demand

As the first period witnessed either no or low value construction, we infer that realized demand in the first period was low. In the second period, where nearly all remaining destroyed properties without structures receive high-value construction, we infer that demand is high.

We look for empirical validation for this characterization of demand in the two periods using novel data from a contemporary survey and by assessing contemporary commentary. To evaluate owner perceptions of neighborhood demand immediately following the civil disturbance, we rely on a summer 1968 federal government survey that targeted owners whose lots had been heavily damaged, as described in the data section. The survey collected responses from 55 percent of the property owners of destroyed lots on our corridors. While the sample is small, the results clearly point to owner hesitancy about—or perhaps even resistance to—reinvestment. Among respondent property owners, roughly half were considering divesting themselves of their properties, either by selling the site, leasing the empty site to others for development, or simply abandoning the property. In explaining their plans, these respondents emphasized a number of factors behind their decisions to disinvest. Perhaps most common was fear about public safety. Concerns about public safety likely reflect low demand or even translate directly into lowered demand for the neighborhood. Numerous respondents also reported their inability to obtain insurance or financing, without which

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they could not afford to rebuild. Finally, some respondents simply did not want to ever return to the neighborhood, which we interpret as straightforward evidence of reduced demand. Aldrich and Reiss Jr. (1970, p. 196, 199) survey a subsample of destruction-impacted District property owners in 1968 and document similar strong concerns for public safety and lack of enthusiasm for reinvestment.

Other scholarship and governmental publications have also emphasized the role of low demand in explaining development patterns after the 1960s civil disturbances. Collins and Margo (2007) argue that the property price declines they find in the two decades immediately following the civil disturbances are largely demand-driven. They also cite bond ratings declines in cities with the most destruction as evidence of low demand (Allan, 1967a,b). Collins and Smith (2007) find that post-civil disturbance property value declines are linked specifically to neighborhoods hit by destruction or violence, not Black nor central neighborhoods more generally.

Also consistent with limited consumer demand and survey comments about insurance, establishments in inner cities areas faced difficulties obtaining insurance before the civil disturbances of the 1960s, and even greater difficulties afterward. Aldrich and Reiss Jr. (1970, p. 192-4) document that roughly than half of disturbance-impacted business owners received insurance compensation for damages, and that insurers were much more likely to discontinue coverage in civil disturbance areas. The problem was severe enough to attract attention—if not solutions—from the President's National Advisory Panel of Insurance in Riot-Affected Areas (President's National Advisory Panel on Insurance in Riot-Affected Areas, 1968) and for Congress to establish Fair Access to Insurance Requirements (Dwyer, 1978).

The framework's conclusion that demand is high in the second period is consistent with a large literature documenting the rebound in demand for centrally located dense neighborhoods. Couture and Handbury (2020) document the striking rise in the share of college graduates in urban centers since 2000. Ellen et al. (2019) document similar patterns after 1990 and show that they are associated with declines in crime. Indeed, a recent *New York Times* analysis reports that neighborhoods marked by civil disturbance violence in the 1960s are among the most sought-after today (Bad-

ger and Bui, 2020). Carozzi (2020) show that only high demand initiates land re-development in England.

While the extent of the government's role in the urban population rebound remains an area of active scholarly and public debate, it is indisputable that much of the District's early resurgence took place near metro stops—strategically located large government investments (McKenzie, 2015). Certainly, the government aimed to deliberately invest public funds to encourage and coordinate development. If the corridors were stuck in a low-demand equilibrium, developers may have been willing to invest only if they were sure that others would invest as well (as in Owens III et al. (2020)). The metro stop coordinated developer focus by making a large and long-lived fixed capital investment.

Metro-led coordination in Columbia Heights, in the middle of our 14th Street corridor, stands out as at least anecdotal evidence of government infrastructure investments contributing to a high demand equilibrium. With the exact location of stops still under consideration, in 1970 the city re-routed part of the planned Metro system to go through the 14th Street corridor instead of one block away on 13th Street (Schrag, 2014, p. 213). This created the Columbia Heights metro station. The city then used this new Metro stop, on the northern end of the 14th Street corridor, to coordinate development in an area that, by the late 1990s, the RLA had made the least progress in developing.

As far back as 1978, developers were looking to the Metro as a focal point for investment along this part of 14th Street, which the *Post* described as "the centerpiece in redevelopment planning of the Columbia Heights area."[7] Even so, a neighborhood advisory group member reported that " 'developers have told us they had to wait and see what would happen with Metro before they commit themselves to the area."[8] Many observers credited the increase in developer interest to the opening of the Columbia Heights Metro station in 1999. Shortly before the station opened, the *Post* wrote that "Much of the sudden interest in this site is related to the long-awaited arrival of Metrorail in September, when the Columbia Heights station will open. But what the developers realized when they started to study the Columbia Heights area is that despite its troubled past, it

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[7]Washington Post, August 25, 1978, "Metro Asked Not to Delay Columbia Heights Station," p. B3
[8]Washington Post, August 25, 1978, "Metro Asked Not to Delay Columbia Heights Station," p. B3

is an attractive place to set up major retail outlets."[9] Also that spring, the *Post* reported that "[t]he wait for the trains has been long but now, as construction is noisily winding up, commercial interest in the city-owned land around the station, much of it vacant or boarded up, has finally picked up."[10] Thus, many observers viewed Metro investments as a key predicate to the period of high demand at the northern end of the 14th Street corridor.

6.2 Key Role for Non-profit Developers

Given this pattern of low and then high demand, combined with the evidence showing the construction of first low-value and then high-value structures (Table 4), what can we now infer about agents' actions? The framework implies that the modal developer in the first period is the government (or the government acting through non-profit organizations), operating to maximize household welfare, rather than profit. In the second period, the framework implies that the modal developer is a for-profit one.

We test these claims by tracking redevelopers along our sample corridors. For each development project, we establish the identity of the developer using historic property assessment records and property transfer records, as well as contemporaneous newspaper articles about development projects (see Data Appendix 1g). We categorize each developer as either a for-profit private sector developer or a non-profit developer, which includes churches, community organizations, or the city itself. We also research the construction completion date for each project. This date is often available in the 2019 assessment data, but is sometimes missing and we supplement with news media accounts. Since some properties were redeveloped twice, in some instances we track down the date of previous developments in prior years' assessments or news media accounts. In addition, in a few cases, historic buildings were the subject of major renovations rather than rebuilding, and we date the development project to the major renovation rather than the original construction.

We use these data to create Figure 6, which shows the number of projects developed by decade and developer type. Developers in the first period were largely community groups, including

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[9]Washington Post, April 1, 1999, "Columbia Heights Taking Flight," p. DC1.
[10]Washington Post, "The Can-Do Plan", March 27, 1999, p. C1.

churches, foundations, arts groups, and social service agencies. These groups developed more than 300 1967-equivalent lots from 1968 to 2000. These community groups usually worked in partnership with the RLA.

For a concrete example, consider the RLA-led Nehemiah Project. This redevelopment was the work of a group of nine religious institutions and nonprofits that sought to revive a stretch of the 14th Street corridor. (Nehemiah is a biblical figure who led the rebuilding of Jerusalem after it had fallen into disrepair.) The project included low-income housing and a shopping center to bring retail to the underserved neighborhood. The city sold lots to this group "at a reduced cost to help make development affordable and to keep sale prices low on 57 homes for low- and moderate-income D.C. residents."[11] In general, religious groups that developed land during this period remain major land owners in these corridors today; we discuss the consequences of this continued ownership in subsection 7.2.

Non-profit groups received criticism for their inexperience and mixed success in completing projects in a timely manner or at all. That said, they also received credit for stepping into a vacuum created by private investors who largely avoided these neighborhoods. The *Washington Post* described them as convincing "banks and foundations that social workers with no building experience could be successful developers. They rehabilitated entire blocks, building apartments, clinics, town houses, day-care centers and even a block-long shopping center."[12] This description is consistent with our assumption in the framework that the government is not maximizing profit, but instead household welfare. It is also consistent with the outsized role non-profits, particularly church-affiliated ones from the Black community, had as redevelopers in other cities (Owens, 2007).

In contrast, by the early 2000s, Figure 6 shows that non-profit development had declined precipitously and for-profit development surged. This rise in private investment coincides with the RLA having sold off most of its major holdings and its disbandment. Indeed, Figure 6 shows that RLA-led projects were essentially all wrapped up by 2010. We interpret this as the market now

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[11]Washington Post, "No Credit Where Credit is Due," November 8, 1992, p. C8.
[12]"The Power Brokers of 14th St," Washington Post, April 4, 1998, p. A1.

being ripe for private development, and that the city in turn was willing to relinquish ownership claims, particularly for reasons we turn to in the next sub-section.

6.3 Policy Designed to Take Account of Option Value Incentives

It is relatively straightforward to explain why the government builds low-value structures in the first period, even when it is maximizing a two-period consumer surplus function: while households that pay low rents may not be attractive to private-sector developers, they can still vote, and keeping land vacant is costly in household welfare terms. Our framework also motivates why private developers choose not to build in the first period: if demand is low, they have do not have a profitable building option. However, why do for-profit owners not hold land?

Our framework can explain this less obvious facet of our empirical findings. If the government outbids for-profit owners for lots in the first period, it must be because it places a high value on first period household welfare. The government therefore attempts to cut off the for-profit sector's ability to hold vacant or destroyed land in hopes of future higher values. Phrased differently, the government places a lower value on the option for future development than do for-profit developers.

Does the evidence support this interpretation? To evaluate this, we look to government behavior: what land did the government buy when, and what conditions did it impose upon resale?

We discuss the substantial land acquisition by the RLA in the decade following the civil disturbance in subsection 2.3. The RLA tried to dispose of its holdings to for-profit developers over the 1970s and 1980s, largely unsuccessfully. Numerous reports throughout the 1970s describe the RLA requesting bids for properties and receiving zero bids in response, which is consistent with the city being the dominant bidder. For example, in 1974 the *Post* reported that "[s]ome of the major parcels of land that the RLA has put together have failed to attract any developer interest... when the RLA solicited development proposals last month for three vacant lots at Euclid and Clifton streets, it got no takers."[13]

The city government also behaved as if it strongly preferred to keep land out of the hands of

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[13]Washington Post, "City's Core Still in Ruins," April, 4, 1974, p. C1

developers of any type who would hold rather than develop. In general, city land sale contracts required near-term development, to prevent developers from buying lots and keeping them empty. As of 1982, the *Post* wrote that "It has been standard procedure in the city's urban renewal projects not to conclude sales of parcels until work is ready to being, often long after development rights have been awarded."[14] Not content with these limitations in the sale contract, the RLA on many occasions clawed back properties when partners failed to commence construction. Over two years in 1981 and 1982, the RLA took back six properties for this reason, a window into the slow development in that era. The *Post* quoted RLA boad member and city housing director Robert L. Moore: "We recognize it is a tough market but we want to have some movement and not a wait-and-see attitude[.]"[15] In other words, the RLA aimed to render "wait-and-see" economically and politically infeasible.

Confronting these empirical facts with our framework highlights the importance of our assumption that the government maximizes something other than profits. Were the government a profit maximizer, and with enough demand in the second period, the government could maximize profits by simply holding land in the first period, in hopes of an improvement in the second.

Since at least 2011, in the high-demand period, the city has tried to deter private actors from holding vacant land via alternative policy instruments. Specifically, rather than directly purchasing land, the city levies a punitive property tax rate on privately held vacant land (District of Columbia Office of Tax and Revenue, 2022). We hypothesize that such a policy may have been infeasible, or excessively slow or costly, in a low-demand world. Specifically, if the government levies a tax and the owner defaults, the government may then seize the property. If the likelihood of payment of the punitive tax is low, because developers in a low demand environment are less sensitive to seizure, it may be better for the government to take control of the property directly rather than incur the nuisance cost of vacancy.

One remaining empirical fact that our framework does not resolve directly is why any land is ever left vacant. The private sector's choice to leave land vacant in the second period may

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[14]Washington Post, "RLA Wants To Take Back NE Property," July 7, 1982, p. C1.
[15]ibid

simply reflect a manifestation of the option value discussed earlier, in expectation of even higher demand in the post-framework future. The government's choice to leave some land vacant in the first period is more puzzling. One possible explanation is that the government was or became liquidity constrained. After the Nixon Administration replaced the open-ended funding of the Urban Renewal Administration with the closed-ended funding of the Community Development Block Grant in 1974, the RLA's access to funding took a substantial hit (Orlebeke and Weicher, 2014).

7 Additional Results: Clean Slate and the Long-Run Creation of a Variation in Structure Value

Having considered neighborhood development choices and motivations, in this penultimate section we expand our horizons. First, we evaluate when a "clean slate" motivates new investments in real property, relating our findings to others in the literature and considering the role of land assembly. We also expand the scope to the city as a whole, testing the implication from our framework that the destruction and bifurcated redevelopment should create greater variation in structure value in civil disturbance neighborhoods relative to the rest of the city.

7.1 "Clean Slate" Need Not Yield Redevelopment

Our findings of long-delayed redevelopment in the wake of destruction stand in stark contrast with prominent work documenting how durable capital and coordination problems inhibit redevelopment and how destruction makes previously infeasible development possible.

If such a "clean slate" more easily allows property owners to internalize positive spillovers, totally destroyed lots should recover more quickly and be developed more intensely than those that are only moderately destroyed. To assess this claim, we use an alternative measure of destruction, which reports four separate grades of destruction. Unfortunately, this measure is missing for 223 lots in our sample because the source covered a slightly different area and also missed some

properties.[16]

This measure classifies 300 lots as undamaged, 152 as having minor damage, 41 with significant damage, and 199 with irreparable damage. "Irreparable" damage is defined as more than 50 percent of the structure damaged according to the metric developed by city surveyors. Therefore, 'irreparable damage" is a broader group than "total destruction," which entailed a building left only as rubble, or essentially 100 percent damaged. Indeed, only about two-thirds of the irreparably damaged lots by this new measure are considered totally destroyed using our previous measure. Minor damage in most cases means broken glass and other damage from theft and breaking and entering during the civil disturbance, but no structural damage from fire or otherwise. Significant damage falls in between and includes buildings with more than just broken glass but that are still salvageable.

To assess the importance of a clean slate, we re-estimate Equation 2, replacing the binary indicator for total destruction with indicators for each grade of damage. If the clean slate hypothesis holds here, irreparably damaged lots should be the most likely to have a new structure in the years immediately following the destruction. To test this, we regress the presence of a structure on indicators for three of the four types of damage (no damage, modest damage, and irreparable damage) interacted with year indicators, block-by-year indicators, and the full set of covariates $X_{l,t}$ from our main estimation.[17]

Figure 8(a) shows that relative to the omitted group of lots with significant damage, the most damaged lots (those with irreparable damage) were less likely have a structure until some point in the 1980s. At peak in the early 1970s, irreparably damaged lots were about 30 percentage points less likely to have a structure. Notably, irreparably damaged lots—those with no buildings after the civil disturbances—fared distinctly worse than significantly damaged lots that still had buildings in the immediate aftermath.

Figure 8(b) shows that this finding holds for assessed improvements as well. For this figure we

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[16]See Data Appendix 1e.

[17]The only difference from Equation 2 is the omission of a separate term for the graded measure not interacted with time (the β_2 term in Equation 2). A time invariant term is collinear with the block-by-year fixed effect, since all properties are assigned into one of the four damage categories.

estimate Equation 2 using the log of assessed value as the dependent variable; these estimates are necessarily conditional on the presence of a structure. Relative to lots with significant damage, lots with irreparable damage do not catch up in the value of capital until 2019. These findings argue against the idea that the presence of a building posed a significant friction to redevelopment for at least the two decades following the civil disturbance.

The fact that destruction alone does not motivate building is entirely consistent with Hornbeck and Keniston (2017)'s description of their results: "There should be no general expectation that city fires or other natural disasters generate economic gains, however, as these events may not encourage such investments in other contexts (e.g., in previously declining cities)." Our context is certainly a city on the decline—suffering from low demand and population loss. Our context also differs in that, unlike destruction by fire, destruction via targeted arson yields pock-marked, rather than wholesale, destruction.

However, the uneven impacts of pock-marked destruction may be mitigated by land assembly, or the legal combination of lots that allows for economies of scale in new construction. Although we document abundant land assembly, our findings suggest that assembly alone is insufficient to spur development.

Our data show a substantial amount of assembly. The number of unique lots in our sample fell by more than half: from 915 in 1967 to 408 in 2019. Many of the new buildings have much wider footprints than the historic buildings, which tend to be narrow and deep. The peak decade for assembly was the 1980s, as is clear in Figure 9(a). Figure 9(a) reports the unconditional likelihood of lot assembly by total destruction status. As soon as the early 1970s, destroyed lots were more likely to be assembled than undestroyed ones, though as we know, this does not translate into immediate development. The difference between the totally destroyed lots and other lots peaks in the 1980s, and as of 2019, nearly all destroyed lots are assembled, compared to sixty percent of all other lots.

We use our within-block analysis to assess whether destruction itself drives this increased assembly. Specifically, we re-estimate Equation 2 with a dependent variable that takes on the value

of one if a lot is assembled in year t, and zero otherwise. The coefficient $\beta_{1,t}$ now measures the differential likelihood of assembly for destroyed lots relative to non-destroyed lots in year t on the same block in the same year. We present results in Figure 9(b), which shows that for three decades—1990, 2000, and 2010—destroyed lots were substantially more likely to be assembled.

In sum, neither the clean slate of destruction, nor the RLA's land assembly were sufficient to spur development in these corridors absent a shift to a high demand equilibrium. This is echoed by a 1998 *Washington Post* article on the disappointing results in Columbia Heights, one of the last parts of the corridors we study to be developed: "Government officials also had bulldozed 70 acres of land in Columbia Heights after the riots, working from the theory that if they cleared it, developers would come. They didn't."[18] In sum, while the government tried to create a clean slate for development by assembling land, assembly did not create enough value to motivate private developers before the 2000s.

7.2 Civil Disturbance Creates Mixed Value Neighborhoods

While the government was unsuccessful in fostering immediate private sector development, our framework suggests that the development the government did spur in the low demand era has had long-run consequences for the civil disturbance corridors. Specifically, our framework suggests that in a world without substantial government intervention—that is, most city neighborhoods— the roughly constant neighborhood demand environment drives private market investment and reinvestment decisions that yield a set of structures relatively homogeneous in value. In contrast, in the civil disturbance corridors both market and non-market forces determine structure value. This mix may yield substantially more variance in structure value.

Heterogeneity in the value of urban structures is of particular interest because it is a necessary predicate for the type of mixed-income neighborhoods to which policymakers aspire and usually fail to execute. Since at least 1968, when Senator Walter Mondale advocated for the Fair Housing Act as a means of providing "balanced living patterns," (Trafficante v. Metro. Life Ins. Co.,

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[18]"The Power Brokers of 14th St," Washington Post, April 4, 1998, p. A1.

1972) federal and local policies have had the creation of mixed-income areas as a direct goal.[19] Nor is interest in mixed-income housing exclusively from the left. The 2002 Bipartisan Millennial Housing Commission report states that at public meetings constituents consistently reported that "[m]ixed-income housing is generally preferable to affordable housing that concentrates and isolates poor families" (Bipartisan Millennial Housing Commission, 2002, p. 3). With a similar aim, in 1992 the Department of Housing and Urban Development began the Hope VI program to finance the demolition of public housing for uniformly poor inhabitants, replacing it with structures targeting a mixed-income population. Locally, inclusionary zoning ordinances that require low-income units in market-rate structures strive toward this same goal. All these policies notwithstanding, the US has become only more segregated by income over the last forty years (Reardon and Bischoff, 2011). Thus, if the civil disturbance can create the predicate for more mixed income neighborhoods, it will succeed where most have failed.

To assess whether the civil disturbance and its aftermath did "succeed," we measure whether civil disturbance corridors have greater variation in structure value relative to the rest of the city. Specifically, we measure heterogeneity in value by taking the coefficient of variation—standard deviation divided by the mean—of assessed improvements per square foot for each "square" of the city of Washington, DC as of 2019.[20] The city defines a square as the full block, including all four sides if it is a rectangle and all sides of the polygon if it is some other shape. Squares are the grey areas, including the lot polygons, in Figure 3.

Figure 10 shows the distribution of coefficients of variation of assessed improvement value per square foot for the 71 civil disturbance squares in blue and for the other 4,042 squares in green. At 0.8, the median coefficient of variation for the civil disturbance squares is one-third larger than the coefficient of variation of 0.6 for all other squares.

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[19]This aim is echoed in the Biden Administration's Affirmatively Furthering Fair Housing rule that says "requiring HUD and recipients of federal financial assistance to take affirmative steps to create an open, integrated society and to eliminate the barriers that stand in the way of truly equal housing opportunities for underserved populations" (Department of Housing and Urban Development, 2021, p. 30781).

[20]We omit the roughly 300 squares that have only one lot and therefore no variance in value. Ideally we would also compare the difference in heterogeneity in 2019 to the same difference in 1967, but we have no complete city property-level data before the 2000s.

Of course, the areas that the civil disturbance touched are different in many ways from the rest of the city—more central, more commercial, more dense—and we are interested in whether heterogeneity remains unequal conditional on these differences. From here forward we use the log of the coefficient of variation to limit the influence of outliers. The first two columns of Table 5 show that civil disturbance squares' log coefficient of variation is about twice that of all other squares. These first two columns also show that the civil disturbance squares differ in many ways from all other squares. While almost one-quarter of all Washington squares are entirely residential, this is true for only four percent of civil disturbance squares. Similarly, ten percent of civil disturbance squares have zero commercial lots, while fifty percent of other squares do. And just over forty percent of non-disturbance squares fall inside the distribution of mean land value per square foot covered by the civil disturbance squares. See t tests for these differences in column 3; four of the six differences are very strongly significantly different.

To make a comparison sample more like the civil disturbance sample, we limit to squares that are not all residential, have at least one commercial lot, and have a mean land value per square foot inside the range of the values of the civil disturbance squares. These limitations modestly shrink the number of treated squares from 71 to 63, and substantially decrease the number of comparison squares by about two-thirds, as shown in Table 5 columns 4 and 5. In this restricted sample, the difference between treated and comparison covariates is much more similar, though the number of lots in a square remains statistically significantly larger in the treated group. Columns 7 and 8 report propensity score weighted means, where the propensity score is a function of the three top variables listed in the table (log of mean assessed land value per square foot, number of lots in square, and share of square lots that are commercial). After weighting, civil disturbance squares and comparison squares no longer show any significant difference in these key covariates (see t test in column 9), suggesting that the restricted and weighted sample has the balance necessary for a reasonable comparison.

Having created a plausible comparison sample, we use regression analysis to further evaluate whether civil disturbance squares do indeed have greater variation in improvements, conditional on

square characteristics. The first column of Table 6 shows that in the full sample, the average civil disturbance square has a log coefficient of variation that is 0.21 higher, or roughly fifty percent higher, that of all other squares. When we restrict the sample as in columns 3 and 4 of Table 5, this coefficient falls, but remains a still-sizeable 0.05, almost twenty percent higher than the comparison group mean of -0.29 (Table 5, column 5), though this estimate is quite imprecise. Table 6 column 3 uses the restricted sample with propensity score weights and finds that the coefficient on civil disturbance squares is slightly larger and more precisely estimated. Columns 4, 5 and 6 add additional controls for value and intensity of land use that have little impact on the coefficient, but which do make the estimates substantially more precise. In our most saturated specification, which includes controls for log of the square average mean improvements per square foot, we find a coefficient of 0.07 for civil disturbance squares. This coefficient implies that civil disturbance squares have coefficients of variation about sixty percent larger than other similar squares.

In other words, the evidence strongly suggests that, in the rather long run, the events of 1968 in Washington, in combination with government action, did create mixed value neighborhoods in a way nearly all other policies have failed to do. That said, we do not recommend destruction as a policy tool. When it occurs, however, it presents what may be a once-in-a-generation (or less) chance to re-imagine urban patterns.

8 Conclusion

The 1968 civil disturbances devastated three core urban majority Black-populated neighborhoods in Washington, DC. Using a within-block identification strategy, we find that the destruction accelerated ongoing disinvestment and locked in place low value forms of land use for decades.

To explore the mechanisms underlying the pattern of reinvestment or its absence, we posit a framework with a household-welfare maximizing government and profit-maximizing developers. "Calibrating" this framework, we deduce that demand in the aftermath of the destruction was low, amidst fear of further violence and lack of insurance and financing. In combination with a fairly well-funded government intervention, this low demand led early redevelopment to be almost ex-

clusively executed by nonprofit groups. These groups, including churches and other community actors, stepped into a void caused by the absence of private investors. Our framework also motivates why, in the early period, the government purchased large swaths of land: It anticipated that private developers would hold land for future development and wishes to preclude this option to encourage near-term development. In contrast, in the two most recent decades, demand for immediate development was high, and eventually, private developers outbid the slow community-based reinvestment amidst the rising national tide of urban reinvestment. The slow and bifurcated pace of redevelopment yielded neighborhoods with structures that are unusually heterogeneous in value. This type of variation in structure value is a predicate for the sought after and rarely found mixed income neighborhood.

We conclude that the civil disturbances revealed and accelerated the underlying disinvestment that characterized many urban American areas in the late 1960s. While in other economic settings the literature finds that random destruction paradoxically creates a clean slate for development, we conclude that this effect is not sufficient for redevelopment in the presence of low demand, even with a well-funded government intervention that did not hesitate to use its power to assemble land.

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Figure 1: Washington, DC Corridors Where Major Damage Occurred
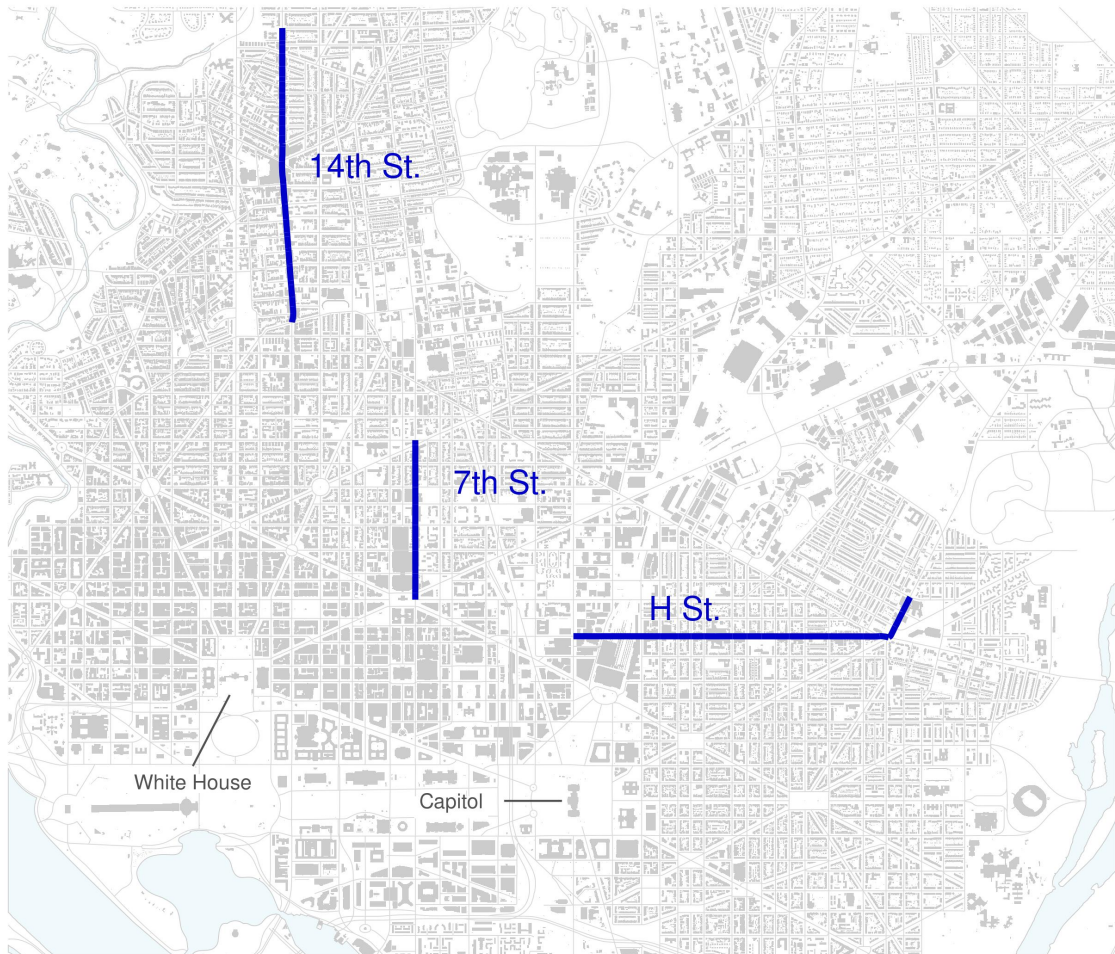
Figure 2: Lot Ownership by the DC Redevelopment Land Agency and Successors

(a) All Lots in Corridors

(b) Totally Destroyed Lots Only
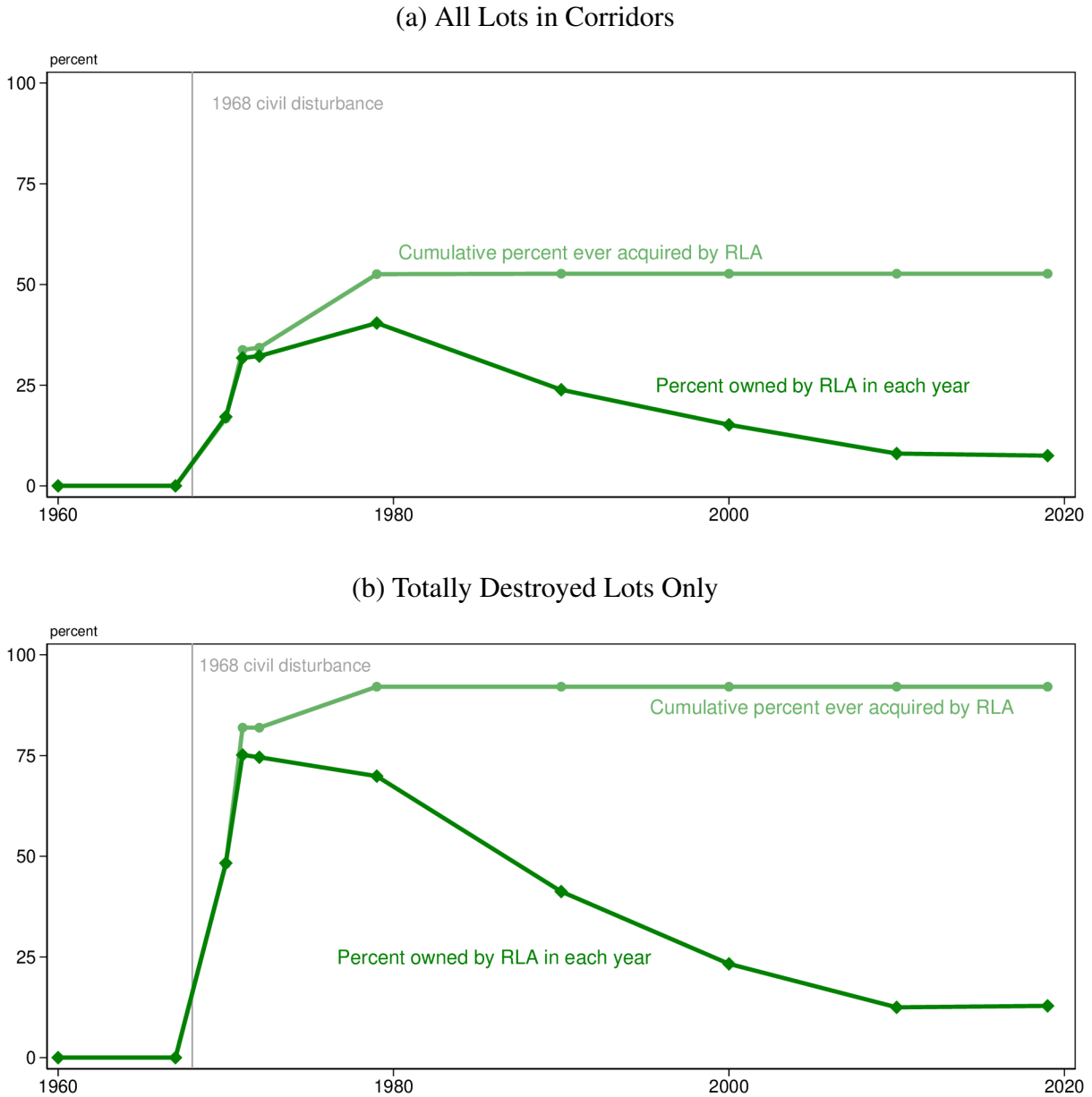
Note: This figure displays the contemporaneous and cumulative percent of 1967 lots owned by the District of Columbia Redevelopment Agency (and its successors) on the H St., 7th St., and 14th St. corridors. The cumulative total includes some lots that the RLA bought and sold in between the plotted observations. Panel (a) shows the percent of all 1967 lots in the three corridors owned by the RLA, while panel (b) repeats the analysis but limits the sample only to the 117 totally destroyed 1967 lots (of 915 total lots). This figure replies on property tax records, 1967 lot definitions, and the measure of total destruction; see Data Appendix sections 1b, 1c, and 1d respectively.

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Figure 3: Illustrating the Within Block Comparison
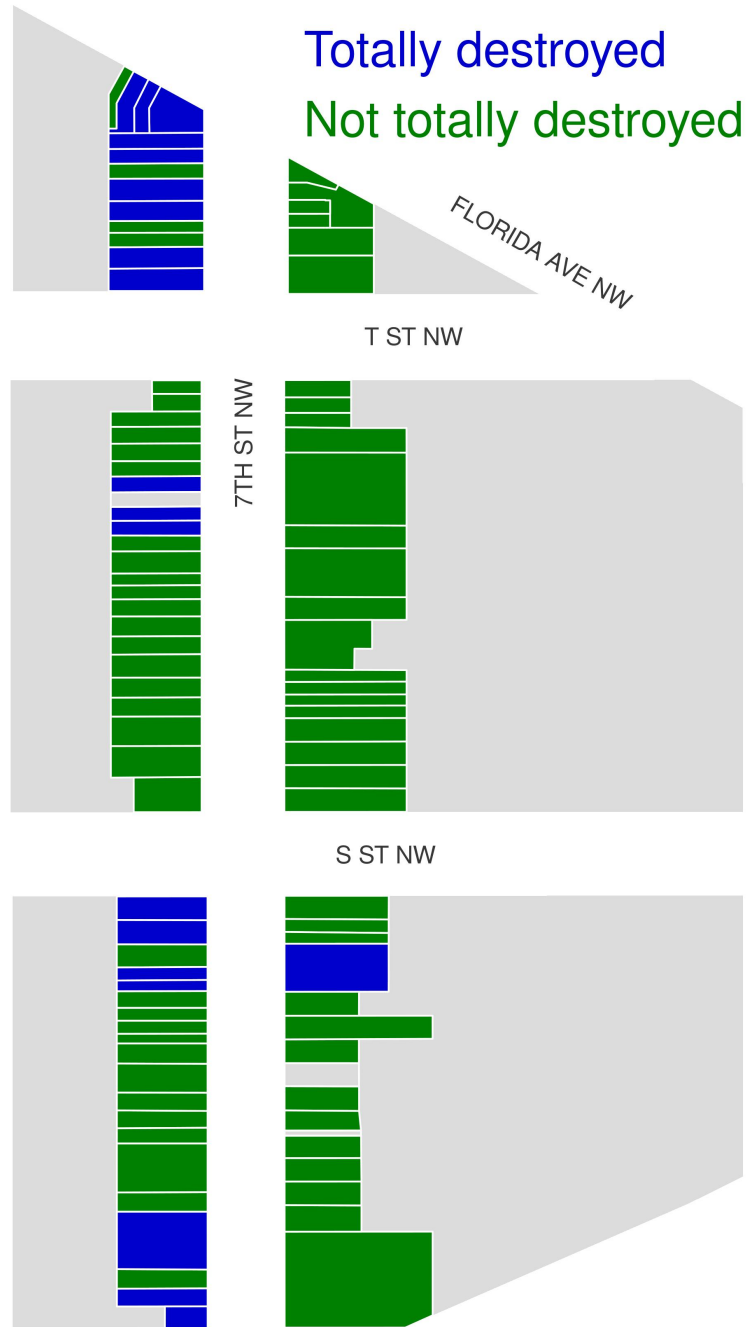
Note: This figure shows the comparison we make to identify the impact of destruction. Within blocks, we compare totally destroyed properties, in blue, to properties that had at least some surviving structure, in green. The map shows that the extent of total destruction varies by block. We display 1967 lots on the northern part of the 7th St. NW corridor using our digitized map (Data Appendix section 1c). This figure uses DC's shapefile of squares and data on total destruction; see Data Appendix sections 1i and 1d, respectively.

Figure 4: Unconditional Comparison of Destroyed and Undestroyed Lots

(a) Absence of structure

percent of lots with no structure

(b) Improvements value (among lots with improvements)

log improvements per square foot
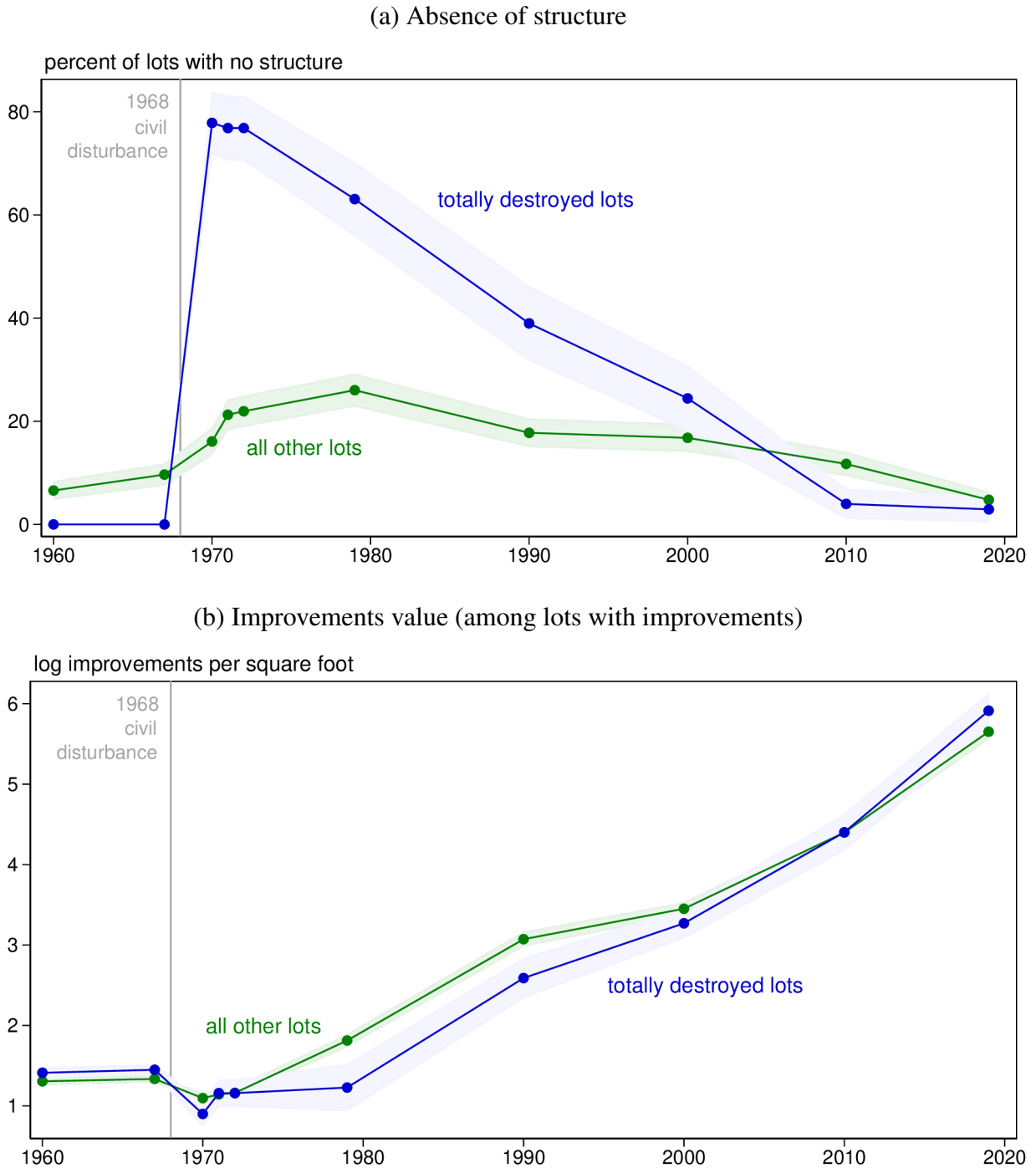
Note: This figure compares mean outcomes on destroyed and undestroyed lots just before and over the fifty years following the 1968 civil disturbance for our three sample corridors. Panel (a) reports the percent of 1967 lots that have no structure by year. Totally destroyed lots are in blue and all other lots are in green. Shaded areas are 95 percent confidence intervals around the mean. Panel (b) uses the same scheme to show the mean log of improvements per square foot. Panel (a) uses all lots; panel (b) uses only lots with a structure in a given year. This figure uses data on total destruction, 1967 lot definitions, and tax assessment data; see Data Appendix sections 1d, 1c, and 1b respectively.

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Figure 5: Estimated Effect of Total Destruction

(a) Absence of Structure: Linear Probability Model
probability of no structure

(b) Log Assessed Improvements per Square Foot
log of assessed improvements per lot square foot

(c) Log Land Assessment per Square Foot
log of assessed land value per lot square foot
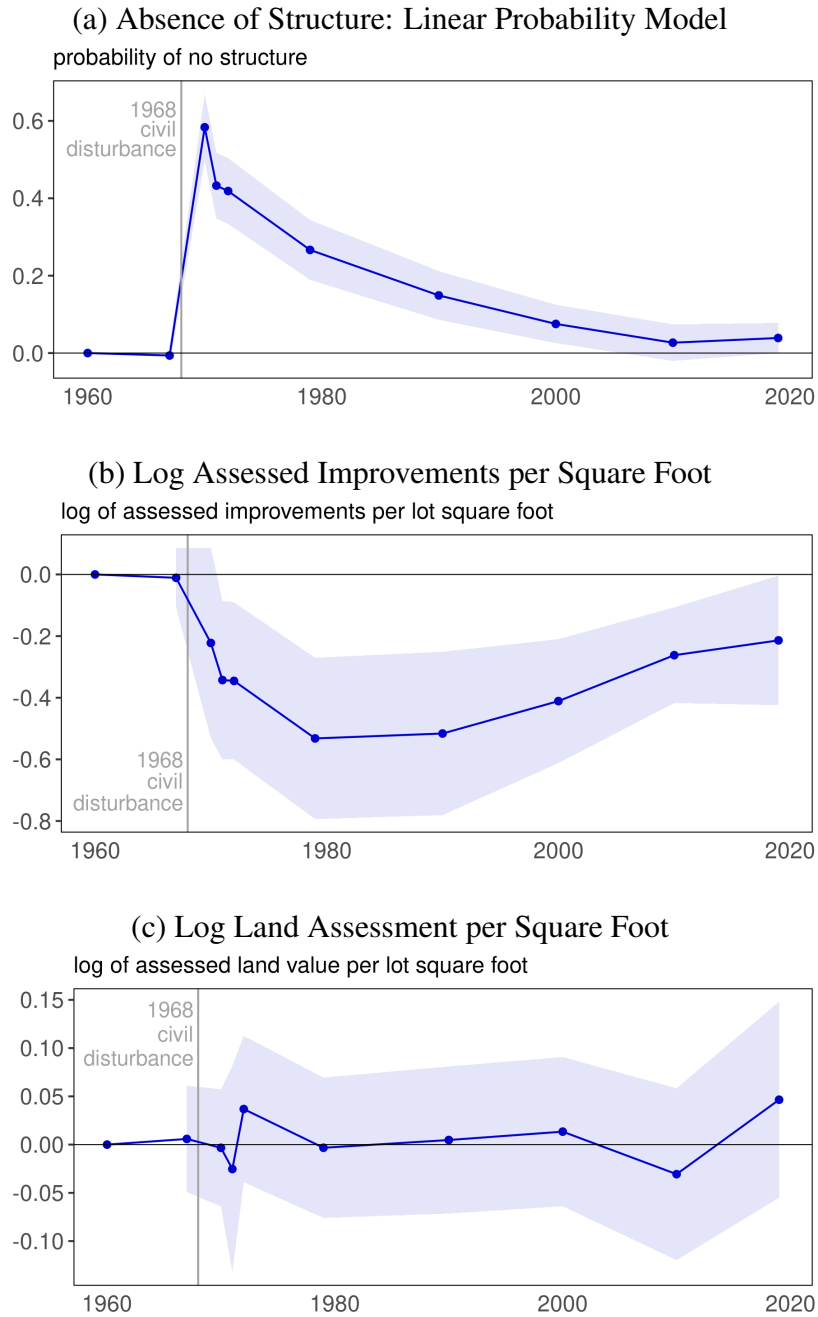
Note: This figure reports the extent to which destroyed lots differ from all other lots over time, in terms of structure presence, and improvement and land value. Each panel reports estimated coefficients β_{1t} from Equation 2:

$$Y_{lbt} = \beta_0 + \beta_{1t}D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.$$

Y_{lbt} is the outcome on lot l in block b at time t. The outcome are an indicator equal to one if the lot has no strucure (panel a), the log of assessed improvements value per lot square foot (panel b), and the log of assessed land value per lot square foot (panel c). The equation includes block-year fixed effects and the small set of potentially relevant covariates (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year fixed effects. We cluster standard errors at the 1967 lot. The shaded area shows 95 percent confidence intervals. See Table 3 column 3 for the coefficients in panel (a), and Appendix Table 2 columns 1 and 2 for panels (b) and (c). This figure uses data on 1967 lot boundaries, the definition of total destruction, tax assessor data and information on Black businesses; see Data Appendix sections 1c, 1d, 1b, and 1j respectively.

Figure 6: Non-Profit Developers Dominant Before 2000; For-Profit Developers Dominant After

number of 1967 lots redeveloped by decade

churches, nonprofits, and RLA

private developers

Decade construction finished
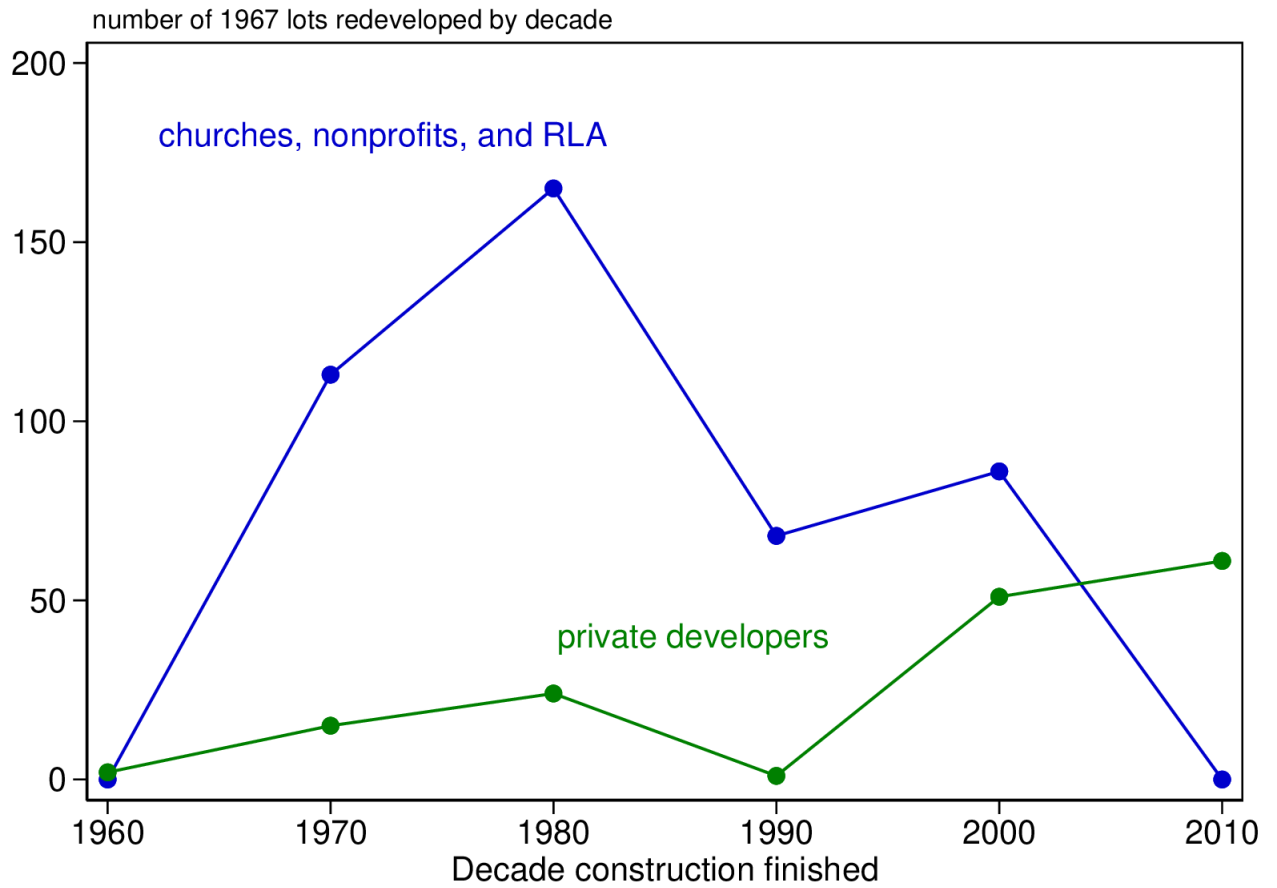
Note: This figure shows post-1968 development in our three sample corridors by type of developer, highlighting the prominence of the government and non-profit developers in the early years and the for-profit sector in later decades. The figure reports the total number of 1967 lots redeveloped by decade and by whether the developer was a private for-profit developer (green) or a non-profit acting with the government (blue). The point for 1970 includes all projects where construction completed between 1970 and 1979; this patterns holds for all other decades. This figure relies on property tax data, and information culled from the District's property document system; see Data Appendix Sections 1b and 1g.

Figure 7: Property owners who expressed survey preferences to leave damaged corridors tended to sell faster to RLA
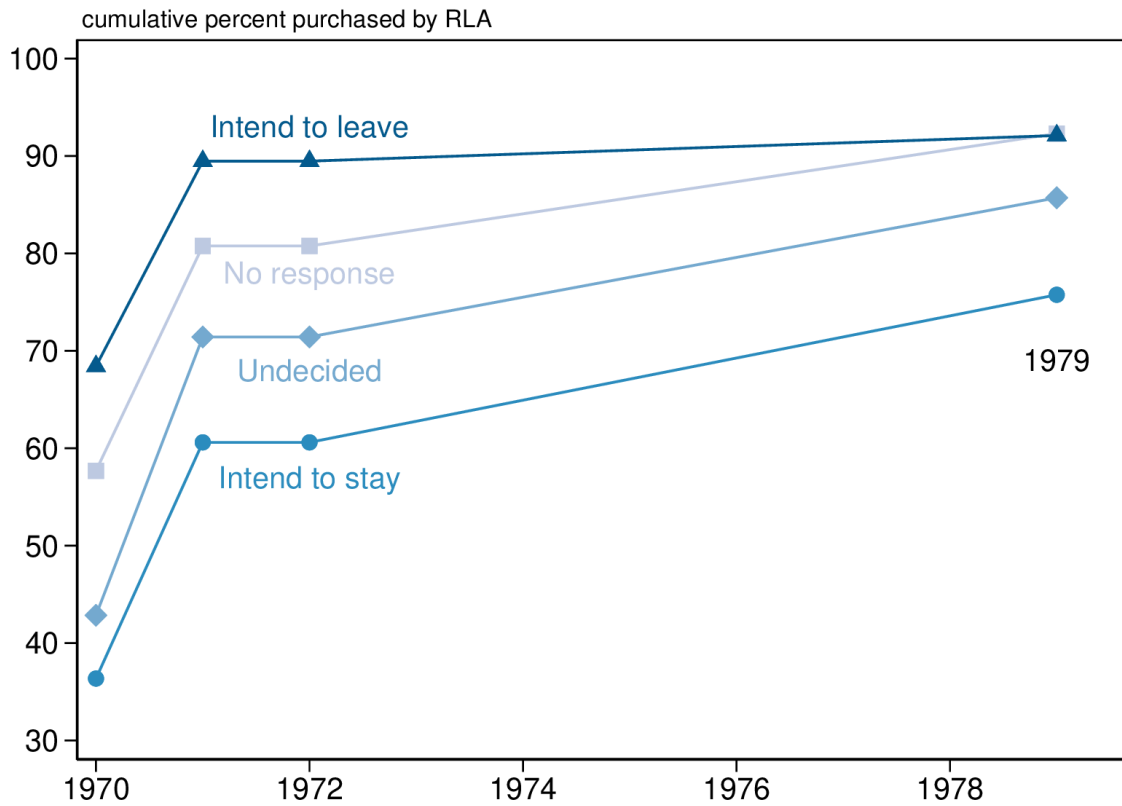
Note: This figure reports on the sample of property owners of totally destroyed lots who responded to the 1968 spring survey about their plans for their properties. See further details in Section 7.1. "Intends to leave" includes "yes" responses to "plans to sell", "plans to lease" and "plans to abandon," as well as a negative response to "plans repair," "plans new structure," and "has other plans." "Intend to stay" indicates the respondent replied yes to "plans to repair" or "plans a new structure," and "no" to "plans to sell," "plans to lease site," "plans to abandon," or "has other plans." We code an affirmative response to "has other plans" as "undecided." The "no response" reply means that the owner of the destroyed lot responded to the survey, but did not answer this question. This figures uses the measure of total destruction and the 1968 survey of property owners; see Data Appendix sections 1d and 1f.

Figure 8: Relative to Partially Destroyed Lots, Entirely Destroyed Lots Fare Worse

(a) Absence of Structure: linear probability model

probability of no structure

(b) Log Assessed Improvements per Square Foot

log of assessed improvements per lot square foot

<u>Note:</u> This figure reports how "irreparably damaged" lots fared, relative to lots with "significant" damage (see Section 7.1 for complete definitions). Specifically, this figure reports the estimated coefficients β_{1t} (points) and 95 percent confidence intervals (shaded area) from Equation 2. In this equation,

$$Y_{lbt} = \beta_0 + \beta_{1t}D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt},$$

Y_{lbt} is the outcome on lot l in block b at time t. Here, rather an an indicator for total destruction, θ_D is a vector for the three types of destruction in the graded damage survey, where the omitted fourth category is lots with significant damage. In panel (a), the dependent variable is an indicator for when a lot has no structure; in panel (b) the dependent variable is the log of assessed structure value per lot square foot. As before, the equation includes block-year fixed effects and the small set of potentially relevant covariates (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year fixed effects. We cluster standard errors at the 1967 lot. This figure uses data on 1967 lot boundaries, the graded definition of destruction, tax assessor data and information on Black businesses; see Data Appendix sections 1c, 1e, 1b, and 1j respectively.

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Figure 9: Association of Destruction and Assembly

(a) Unconditional Comparison of Destroyed and Undestroyed Lots
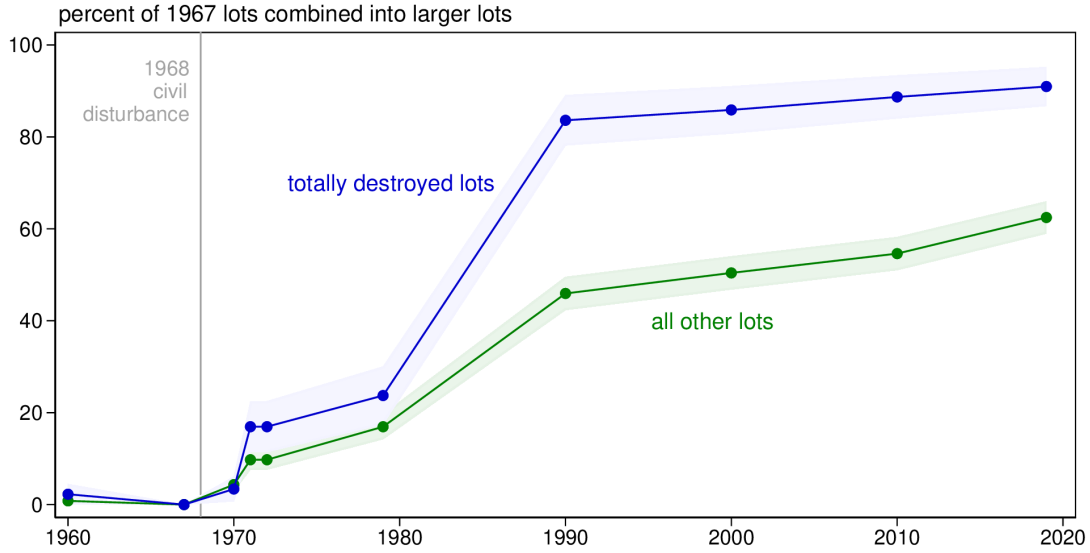
(b) Regression Estimates of Destruction
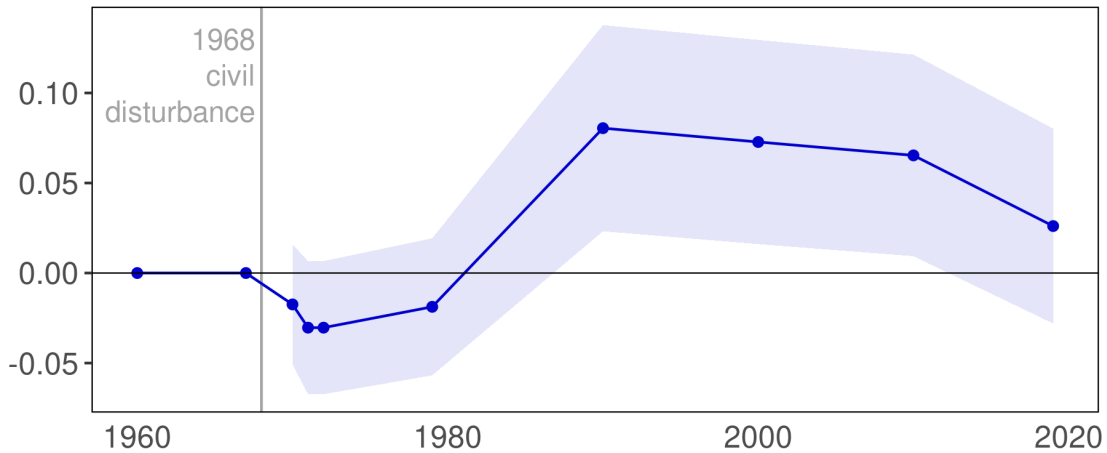
Note: This figure examines the likelihood of land assembly—the legal combination of lots—by whether the lot was totally destroyed in 1968. Panel (a) reports the percentage of 1967 lots assembled by year; the shaded band is the 95 percent confidence interval for this estimate. Totally destroyed lots are more likely to be assembled, particularly after 1980. Panel (b) reports the coefficient from the interaction of total destruction and year, for years 1970 onward using the specification from Equation 2:

$$Y_{lbt} = \beta_0 + \beta_{1t} D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.$$

Y_{lbt} is 1 if lot l on block b is assembled with any other lot between t and the next observation of t, usually one decade later. The equation includes block-year fixed effects and the small set of potentially relevant covariates (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year indicators. We cluster standard errors at the 1967 lot. We omit the year 1960 and year 1967 interactions with the indicator for total destruction, so that all estimated coefficients are relative to both years. As panel (a) shows, there is sufficiently little variation in assembly pre-civil disturbance that the matrix is singular if we include such interactions. We use the same sample as in Table 3. This figure uses data on 1967 lot boundaries, the definition of total destruction, tax assessor data, information on Black businesses, and data on lot combination; see Data Appendix sections 1c, 1d, 1b, 1j, and 1g respectively.

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Figure 10: Squares in Civil Disturbance Corridors Substantially More Heterogeneous in Value Today
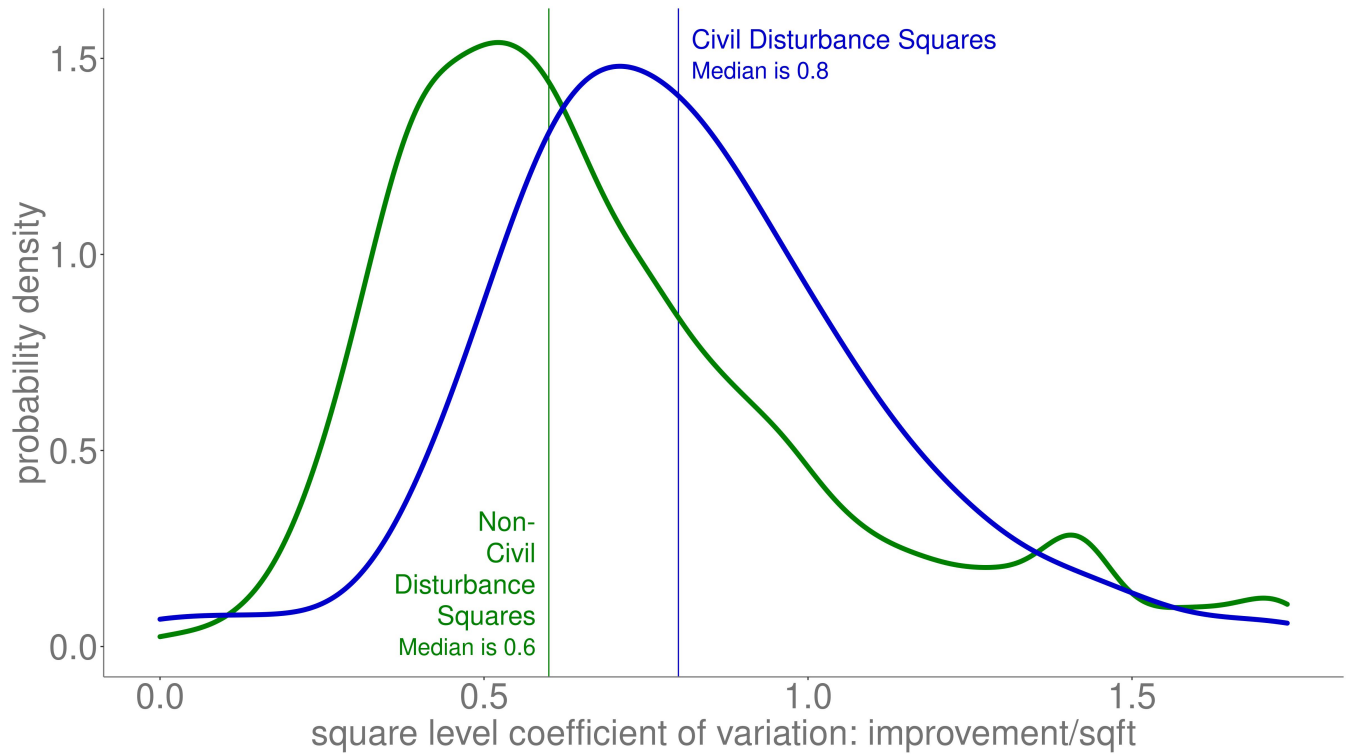
Note: This figure shows the distribution of the coefficient of variation of improvement value per square foot for the civil disturbance and non-civil disturbance squares as we discuss in Section 7.2. Squares most directly impacted by the civil disturbance are in blue, and all others are in green. For visibility, we omit observations with coefficients of variation above the 95th percentile. Civil disturbance squares have noticeably higher variation in improvements value per square foot. This figure uses 2019 property assessment data as in Data Appendix 1b.

Table 1: Conditional on Block, Destroyed Lots Similar To Undestroyed Ones

	1967 Lot Characteristics				
	Means			Regression,	
	Totally destroyed	Not totally destroyed	p-value, $H_0 : \text{diff} = 0$	DV is totally destroyed	
	(1)	(2)	(3)	(4)	(5)
log(land value / lot sq ft)	1.59	1.42	0.00	0.179***	0.004
				(0.035)	(0.066)
log(imp. value / lot sq ft)	1.45	1.35	0.04	-0.012	0.020
				(0.027)	(0.031)
Type of building, commercial use omitted					
Residential	0.04	0.17	0.00	0.056	-0.033
				(0.04)	(0.066)
Store	0.96	0.76	0.00	0.268***	0.085
				(0.04)	(0.058)
Other	0.00	0.01	0.17	-0.038	0.129
				(0.058)	(0.129)
Quality of construction, 1 out of 10 omitted					
2 out of 10	0.05	0.05	0.77	0.004	-0.043
				(0.077)	(0.082)
3 out of 10	0.85	0.80	0.17	0.011	-0.018
				(0.059)	(0.062)
4 out of 10	0.06	0.06	0.98	-0.015	-0.068
				(0.082)	(0.086)
5 or more out of 10	0.01	0.02	0.12	-0.176*	-0.152
				(0.096)	(0.112)
Percent depreciated	52.24	52.48	0.83	0.000	0.002
				(0.001)	(0.001)
Material of construction, brick omitted					
Stone or concrete	0.00	0.01	0.14	-0.029	-0.272*
				(0.064)	(0.142)
Wood frame	0.02	0.02	0.72	0.164	0.057
				(0.103)	(0.122)
Other, non-brick	0.01	0.01	0.54	0.046	-0.126
				(0.114)	(0.115)
Site, Black-owned bus.	0.1	0.20	0.00	-0.124***	-0.046
				(0.031)	(0.028)
Block fixed effects					x
Observations	175	646		821	821
R-squared				0.092	0.394

Note: $* \, p < 0.1$, $** \, p < 0.05$, $*** \, p < 0.01$. This table assesses whether a lot being totally destroyed in 1968 on a lot is related to observable characteristics of that lot in 1967. Building condition is assigned by the assessor and takes on values 1 through 8; we include the one observation with quality 8 with lots of quality 5 (we observe no lots with quality 6 and 7). Larger numbers imply higher-quality buildings. The first two columns use the same sample as the regressions in columns 4 and 5. Columns 1 to 3 present sample means and the difference-in-means t-test p-value. Column 4 presents estimates for a regression of lot characteristics on the probability of destruction:

$$
\begin{aligned}
Y_{lb} \; = \; & \alpha_0 + \alpha_1 \log(\text{assessed land value per sq ft}_l) + \alpha_2 \log(\text{assessed improvements value per sq ft}_l) \\
& + \; \alpha_3 \theta_{\text{type of use},l} + \alpha_4 \theta_{\text{quality of construction},l} + \alpha_5 \text{percent depreciated}_l + \alpha_6 \theta_{\text{building material},l} \\
& + \; \alpha_7 1\{\text{site of Black-owned business}\}_l + e_{lb}.
\end{aligned}
$$

Y_{lb} is 1 if lot l on block b is totally destroyed in 1968, and zero otherwise. The remaining covariates are as listed in the table. Column 5 additionally includes block fixed effects. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, and data on Black business ownership; see Data Appendix sections 1c, 1d, 1b, and 1j, respectively.

Table 2: Destroyed Lots Show No Differential Trend in Value Before Civil Disturbance

Dependent Variable	log(ass'd imp./ lot sqft)	log(assessed land value/lot sqft)	
Sample	Lots w/ improvements	All lots	Lots w/ improvements
	(1)	(2)	(3)
1{Totally Destroyed}*1{t = 1967}	0.029	0.006	0.018
	(0.032)	(0.028)	(0.028)
Year*block fixed effects	x	x	x
Covariates and their interaction with 1{t = 1967}			
Retail in 1967	x	x	x
Stone/concrete in 1967	x	x	x
Black-owned bus. in 1967	x	x	x
Observations	1,699	1,818	1,699
R-squared	0.33	0.77	0.77

Note: $* p < 0.1$, $** p < 0.05$, $*** p < 0.01$. This table assesses whether lots that will see total destruction in 1968 trend systematically differently in land or improvements value before the civil disturbance. Regardless of specification or sample, we see no evidence that properties that will be destroyed have a differential trend in value as measured by assessed improvements or assessed land value. The sample for this analysis is our two pre-treatment years of 1960 and 1967. This table reports coefficients α_1 from the OLS regressions of Equation 1:

$$Y_{lt} = \alpha_0 + \alpha_1 D_l \times I_{t=1967} + \alpha_2 D_l + \theta_t * \theta_b + X_{lt}\delta_1 + X_{lt} \times I_{t=1967}\delta_2 + e_{lt}.$$

The outcome of interest, Y_{lt}, is the log of land or improvement value per lot square foot. D_l equals 1 if lot l in block b in year t will be totally destroyed in 1968. Covariates $\theta_t * \theta_b$ are year by block indicators (76 blocks, and one omitted block). X_{lt} denotes the small set of potentially relevant covariates (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), which we include alone and also interacted with an indicator for 1967. We cluster all standard errors at the 1967 lot. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, and data on Black business ownership; see Data Appendix sections 1c, 1d, 1b, and 1j, respectively.

Table 3: Absence of Structure Persists for Decades

	Dependent Variable: 1{No Structure on Lot}		
	(1)	(2)	(3)
1{Totally Destroyed in 1968}*			
1{$t = 1967$}	-0.006	-0.005	
	(0.013)	(0.014)	
1{$t = 1970$}	0.583***	0.611***	0.588***
	(0.044)	(0.046)	(0.043)
1{$t = 1971$}	0.433***	0.450***	0.425***
	(0.043)	(0.045)	(0.043)
1{$t = 1972$}	0.419***	0.433***	0.412***
	(0.043)	(0.045)	(0.043)
1{$t = 1979$}	0.267***	0.288***	0.263***
	(0.039)	(0.043)	(0.04)
1{$t = 1990$}	0.149***	0.162***	0.144***
	(0.032)	(0.033)	(0.032)
1{$t = 2000$}	0.075***	0.078***	0.072***
	(0.025)	(0.026)	(0.026)
1{$t = 2010$}	0.027	0.03	0.025
	(0.024)	(0.024)	(0.024)
1{$t = 2019$}	0.039*	0.035*	0.041**
	(0.02)	(0.021)	(0.019)
Year*block fixed effects	X	X	X
Sample limitations			
Omit lots w/ Black owned bus.		X	
Omit lots w/o structure in 1968			X
Other covariates			
Retail in 1967 * year FE	X	X	X
Stone/concrete in 1967 * year FE	X	X	X
Black-owned bus. in 1967 * year FE	X		X
Observations	9,020	7,460	8,325
R-squared	0.597	0.626	0.672

Note: $* p < 0.1$, $** p < 0.05$, $*** p < 0.01$. This table evaluates whether totally destroyed lots are differentially likely to have a structure in year t. The table reports coefficients for β_{lt} from the estimation of Equation 2,

$$Y_{lbt} = \beta_0 + \beta_{1t}D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.$$

Y_{lbt} is an indicator equal to 1 if there is no structure on lot l in block b at time t. The coefficient of interest, β_{1t}, reports the by year association of total destruction (D_l) with the absence of a structure. The equation includes block-year fixed effects $\theta_t * \theta_b$ and the small set of potentially relevant covariates X_{lt} (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year indicators. We report standard errors in parentheses, clustered at the 1967 lot. Column 2 repeats this estimation, omitting all omits with a Black-owned business as of 1967. Column 3 is the same specification as Column 1 but omits lots without a structure in 1968. Column 3 does not report a coefficient for total destruction in the pre-destruction year of 1967, since we have limited the sample to only observations with structures in 1968 (and therefore 1967), and there is no longer any variation with which to estimate the coefficient. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, and data on Black business ownership; see Data Appendix sections 1c, 1d, 1b, and 1j, respectively.

Table 4: Era of Development Determines Redevelopment Structure Value

	Three Periods				Five Periods				Ten periods		
	No. Lots				No. Lots				No. Lots		
	Dest.	Others	Coeffs.		Dest.	Others	Coeffs.		Dest.	Others	Coeffs.
	(1)	(2)	(3)		(4)	(5)	(6)		(7)	(8)	(9)
1968 to ≤ 1984	52	107	-0.472*** (0.161)	1968 to ≤ 1978	39	45	-0.457*** (0.151)	1968 to ≤ 1973	12	10	0.000 (0.000)
1984 to ≤ 2000	33	44	0.0642 (0.177)	1978 to ≤ 1988	45	95	-0.0105 (0.179)	1973 to ≤ 1978	27	35	-0.491*** (0.185)
2000 to 2019	81	262	0.0953 (0.175)	1988 to ≤ 1998	1	11	-2.562** (1.083)	1978 to ≤ 1983	13	60	-0.423 (0.336)
				1998 to ≤ 2008	29	74	-0.0126 (0.15)	1983 to ≤ 1988	32	35	0.215 (0.147)
				2008 to 2019	52	188	0.0271 (0.286)	1988 to ≤ 1993	0	9	.
								1993 to ≤ 1998	1	2	-0.111 (0.385)
								1998 to ≤ 2003	4	19	0.0347 (0.55)
								2003 to ≤ 2008	25	55	-0.109 (0.073)
								2008 to ≤ 2013	7	16	-0.0159 (0.024)
								2013 to 2019	45	172	0.0939 (0.355)

Note: $*\ p < 0.1$, $**\ p < 0.05$, $***\ p < 0.01$. This table examines whether the 2019 relationship between destruction and the log of assessed value of improvements per lot square foot depends on the era in which the structure was constructed. It estimates Equation 3:

$$Y_{lbt} = \delta_0 + \delta_{1te}\mathbf{E}_l * \theta_t + \delta_{2e}\mathbf{E}_l * D_l * 1\{t = 1967\} + \delta_{3e}\mathbf{E}_l * D_l * 1\{t = 2019\} + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}$$

The outcome of interest, Y_{lbt} is the log of assessed improvements per lot square foot. We define the era of development, measured as of 2019 and denoted $\mathbf{E}_l$, as a vector with e levels. Columns 1 and 2 of the "three periods" panel of the table reports the number of destroyed lots, and all other lots. Column 3 reports coefficients δ_{3e}. These coefficients describe the 2019 value of destroyed lots (D_l) by era of structure development (E_l) relative to pre-1968 built structures. We organize the two additional panels similarly. All regressions use 2,517 observations from years 1960, 1967 and 2019 and include block by year fixed effects ($\theta_b * \theta_t$), indicators for era of development, era of development interacted with 1967, and an indicator for retail use and stone and concrete construction interacted by year (for parsimony, this is not the full set of covariates as in our main estimation). We omit 11 observations of totally destroyed properties where the structure year built is reported to be before 1968. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, data on Black business ownership, and data from property records; see Data Appendix sections 1c, 1d, 1b, 1j, and 1g respectively.

Table 5: Sample Restrictions and Weighting Create Balance in Covariates

	Full Sample			Restricted Sample			Restricted Sample + Wtd		
	Mean			Mean			Mean		
	CD	Others	t	CD	Others	t	CD	Others	t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(CV of imp/sq ft)	-0.22	-0.43		-0.24	-0.29		-0.22	-0.29	
Matching Variables									
Log of mean land value/sq ft	5.60	4.79	-18.06	5.60	5.54	-1.34	5.56	5.54	-0.38
Lots in square	44.42	33.15	-3.39	45.87	35.53	-2.77	39.8	36.16	-1.02
Share square lots comm.	0.21	0.15	-2.21	0.22	0.27	1.86	0.26	0.27	0.37
Sample restriction variables									
1{All lots residential}	0.04	0.23	7.39	0.00	0.00				
1{Land value per sqft in CD range}	0.00	0.42	53.75	0.00	0.00				
1{Zero com. lots}	0.1	0.5	10.95	0.00	0.00				
Squares	71	4,042		63	1,213		63	1,213	

Note: This table describes the sample we use in our analysis of neighborhood variation in improvement value per square foot. The unit of observation is the square, and we calculate square-level measures from lot-level data. The table is organized in sets of three columns. In each set, the first two columns report sample means by treatment status; the last reports the t statistic for a test of difference in means. The first three columns present data for all squares. The second three columns restrict comparison to only squares where the three sample restriction variables are zero. The third set of three columns reports propensity-score weighted means for the restricted sample. Let $\hat{P}_s$ be the estimated propensity score for square s, and $D_s = 1$ indicate that the square is in the civil disturbance area. The propensity score weights are then $w_s = D_s \frac{1}{\hat{P}_s} + (1 - D_s)\frac{1}{1-\hat{P}_s}$. This table uses property tax assessment data from 2019 and out definition of the civil disturbance corridors; see Data Appendix 1b and 2b

Table 6: Relationship Between Civil Disturbance and Current Square Heterogeneity Robust to Matching and Square Covariates

| | Sample and Weights | | | | | |
| | Full | Restricted | Restricted & Weighted | | | |
	(1)	(2)	(3)	(4)	(5)	(6)
1{Civil disturbance square}	0.210***	0.051	0.072***	0.080***	0.074***	0.074***
	(0.075)	(0.082)	(0.03)	(0.029)	(0.03)	(0.03)
log(mean land val / lot sq ft)				-0.042	-0.026	-0.027
				(0.03)	(0.034)	(0.035)
Number of lots in square				-0.001	-0.002	-0.002
				(0.001)	(0.001)	(0.001)
Share lots commercial				0.325***	0.229***	0.229***
				(0.063)	(0.076)	(0.076)
Log(mean improvements / lot sq ft)					-0.019	-0.019
					(0.017)	(0.018)
Number of commercial lots					0.007**	0.007**
					(0.003)	(0.003)
Mean improvement/land value						-0.001
						(0.006)
R^2	0.002	0.000	0.005	0.045	0.050	0.050
Observations	4,112	1,276	1,276	1,276	1,276	1,276

Note: $* \ p < 0.1$, $** \ p < 0.05$, $* * * \ p < 0.01$. This table evaluates the relationship between being a civil disturbance square and the square-level variation in improvement value. This table estimates

$$Y_s = \gamma_0 + \gamma_1 1\{\text{civil disturbance square}_s\} + X_s\gamma_2 + e_s.$$

Our outcome of interest, Y_s is the log coefficient of variation of assessed improvements per square foot for square s in Washington DC in 2019. Some estimates include covariates X_s, as listed in the table. Column 1 reports results for all squares in the city of Washington, DC. Column 2 reports results for the restricted sample, as we describe in section 7.2. Columns 3 to 6 report results for the restricted sample, where we weight estimations by the propensity score, as we describe in the note to Table 5. This table uses property tax assessment data from 2019; see Data Appendix section 1b.

A Appendix: Data

1. Data Sources

    (a) Figure 1 components

    - Building footprint map: DC Open Data, downloaded May 24, 2019, https://opendata.dc.gov/datasets/DCGIS::building-footprints/about.
    - Water bodies of DC: DC Open Data, downloaded July 24, 2020, https://opendata.dc.gov/datasets/waterbodies-2017.
    - Streets segments: DC Open Data, downloaded July 24, 2020, https://opendata.dc.gov/datasets/street-segments.

    (b) Assessor Lot data

    Tax assessment data for the years up to 2010 are from tax assessment directories, available via microfilm from from the Washington, DC Public Library's Washingtoniana collection. The 2019 tax assessment data are available online as the "Integrated Tax System Public Extra" from the Washington city government's open data portal.

    In the later years of the data, one complication arises from the development of condominium forms of properties, in which the assessment for a single lot is divided amongst two or more condominiums. To address this, we use the "Condo Relate Table," also available from the open data portal, to add up the value of all condominium assessments for a given lot.

    - 1960: Lusk's District of Columbia Real Estate Directory Service, 1960 Edition. Assessment year ending June 30, 1960. Published by Rufus S. Lusk and Son, Inc. Washington, DC, 1960.
    - 1967: Lusk's D.C. Assessment Directory, 1967 Edition. Assessments Year Ending June 30, 1967. Ownership as of May 1, 1967. Published by Rufus S. Lusk and Son, INc. Washington, D.C., 1968.
    - 1970: Lusk's D. C. Assessment Directory, 1970 Edition. Assessments Year Ending June 30, 1971. Published by Rufus S. Lusk and Son, Inc. Washington, D.C., 1970.
    - 1971: Lusk's D.C. Assessment Directory. [cover missing, no further information]. 1971.
    - 1972: Lusk's D.C. Assessment Directory, 1972 Edition. Assessments year ending June 30, 1973. Published by Rufus S. Lusk and Son, Inc. Washington, D.C., 1972.
    - 1979: Lusk's D.C. Assessment Directory. [cover missing, no further information]. 1979.
    - 1990: Lusk's District of Columbia Assessment Director. Rufus S. Lusk and Son, Incorporated. 1990.
    - 2000: 2000 District of Columbia Assessment Directory Volume 1. Published by First American Real Estate Solutions. Tax Year ending September 30, 2000. 2000.
    - 2010: 2010 District of Columbia Assessment Directory, Volume 1. Tax year ending September 30, 2009. Published by First American CoreLogic, Inc. Washington, DC, 2010.

- 2019: Integrated Tax System Public Extract, `https://opendata.dc.gov/datasets/integrated-tax-system-public-extract`, accessed July 31, 2020.
- Condo Relate Table, `https://opendata.dc.gov/datasets/condo-relate-table`, Accessed March 19, 2019.

(c) Baist maps

See R. H. Baist Co. (1967).

(d) Measure of total destruction

National Archives, Pennsylvania Ave, Washington DC, Record Group 328, Entry A1-14, Box 2, folder "Addresses of Damaged Buildings."

File is titled "Totally Destroyed Buildings, April 4-8, 1968 (Initial Listing)", and further says "Planning Research, Riot Damage, L. C. H. – 4/30/68."

This is a field survey of destroyed buildings taken on April 11-12 and supplemented late in the week of April 15. (Source detail comes from folder in this box titled "Source lists." See document titled "Source Lists and Surveys of Damage: D.C. Civil Disturbance," item number 6.)

This folder lists several additional sources that may have been drawn upon: an initial field survey done by city officials on April 7 and 8; a followup "special task force" on April 9-12; a field resurvey beginning April 30; and Emergency Housing Service Register recorded April 8-25; Police Department Survey of Precincts April 12-14; Fire Department list of fire damage; and a Dun and Bradstreet report on damaged businesses.

(e) Graded measure of destruction

National Archives, Pennsylvania Ave, Washington DC, Record Group 328, Entry A1-14, Box 2, folders "H St.", "14th St.", "7th St."

The source for this graded measure of damage is a field survey that reports the name of the firm or individual impacted, whether or not the firm or individual is listed in the phone directory, the address, the phone number, the use if commercial, the extent of damage, the number of housing units affected, and a space for Notes.

(f) Redevelopment Land Agency survey of destroyed areas in summer of 1968

National Archives, Pennsylvania Ave, Record Group 328, Records of the National Capital Planning Commission, entry A1-14, boxes 21-22 and 27-29.

This is the survey of destroyed building owners in our analysis corridors.

(g) SURDOCS: Used for tracing lot boundary changes.

SURDOCS (Office of the Surveyor Land Record Management System) is available, at the time of this writing, at `https://dcraonline-rms.dcra.dc.gov/SurDocsPublic/faces/faces/t0.jsp`.

(h) Decennial Census data

Steven Manson, Jonathan Schroeder, David Van Riper, Tracy Kugler, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. 2021. `http://doi.org/10.18128/D050.V16.0`.

Decennial census total population and total housing units for US counties, 1960 to 2020 (no housing units available in 1960). Population for the District of Columbia, 1910 to 1950.

(i) Shapefile of squares

This is a shapefile that shows squares, or full block aggregations of lots. We accessed from Open Data DC. https://opendata.dc.gov/datasets/84ab8b676a384c339062b53dca3bdfa2_41 Accessed July 30, 2020.

(j) Black Business Directory

Jones (1967)

2. Data Notes

(a) Total change in housing units in region, 1970 to 2000

We use the Decennial Census data above (see 1h) and use the change in the total number of housing units from 1970 to 2000 for Montgomery and Prince George's County, Maryland and Alexandria, Arlington, Fairfax city, Fairfax County, Falls Church City, and Loudoun County.

(b) Specific definition of sample

- 14th St corridor 14th Street NW from Florida Ave. NW to Spring Road NW
- 7th St corridor 7th St NW from New York Ave. NW to Florida Ave. NW
- H St Corridor H Street NE from 4th Street NE to 15th Street NE, and including the continuation of Bladensburg Road NE to Neal Street NE

(c) SURDOCS: Tracing lot and ownership changes over time

We use this system to trace changes in lots and owners over time. These data are our source for all land assembly measurements. For example, if lots are combined, SURDOCS will contain a document describing which lots were combined, showing a plat of the new lot, and providing a date of the action.

(d) Lot definitions

Counting the exact number of lots is complicated by the fact that DC maintains two separate sets of lot delineations: one for tax purposes (tax assessment lots), and one for all other purposes (we call these just lots). The raw total number of lots is slightly higher than 915 when measured with tax assessment lots. For purposes of transaction and development, though, the number of lots is 915. This difference is caused by an oddity in tax records, in which some lots were de facto combined but still recorded as separate lots. As an illustration, consider six contiguous lots with the same owner that have one building spanning all of them. There are some cases in which, as a result of a tax mitigation strategy, the value of improvements for all six lots are assigned to only one lot in the tax data, while the others are listed as having no structure. Cases of this kind account for 54 lots that are functionally only 17 lots. To deal with this in the data, we assign the same average improvement data value within each cluster of lots in order to measure the actual state of improvements on those lots.

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Appendix Figure 1: The District's Population Declined from 1950 to 2000
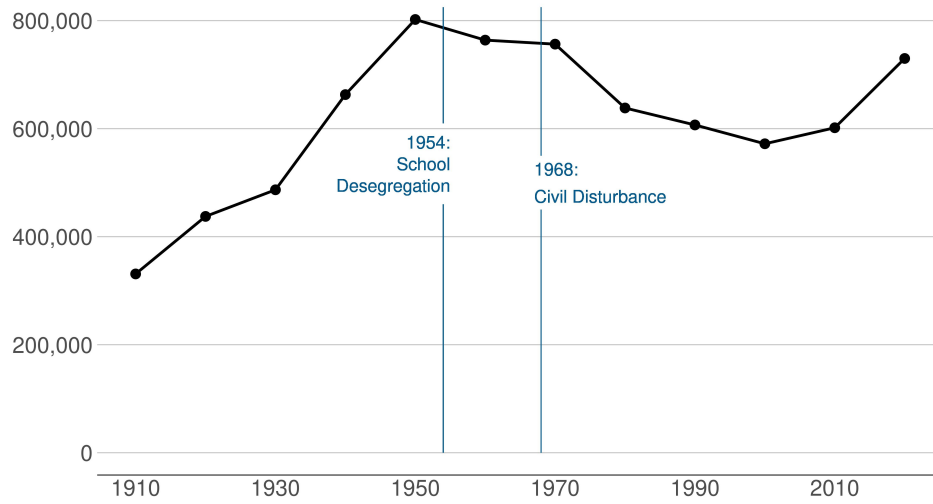
Note: The figure shows Washington, DC's population from 1910 to 2020. The absolute population declined markedly from 1950 to 2000. This figure uses data from the US Census Bureau; see Data Appendix section 1h.

Appendix Table 1: Structure Results Unchanged with Probit Estimation, Clustering on Square

| | Dependent Variable: 1{No Structure on Lot} | | | |
| | Probit | | | OLS |
	(1)	(2)	(3)	(4)
1{Totally Destroyed in 1968}*				
1{$t = 1967$}				-0.006
				(0.014)
1{$t = 1970$}	0.489***	0.527***	0.514***	0.583***
	(0.051)	(0.056)	(0.057)	(0.066)
1{$t = 1971$}	0.414***	0.449***	0.424***	0.433***
	(0.044)	(0.051)	(0.047)	(0.073)
1{$t = 1972$}	0.406***	0.436***	0.414***	0.419***
	(0.045)	(0.051)	(0.048)	(0.071)
1{$t = 1979$}	0.318***	0.351***	0.336***	0.267***
	(0.043)	(0.05)	(0.046)	(0.076)
1{$t = 1990$}	0.301***	0.389***	0.313***	0.149***
	(0.059)	(0.062)	(0.066)	(0.055)
1{$t = 2000$}	0.241***	0.278***	0.281***	0.075**
	(0.063)	(0.071)	(0.075)	(0.03)
1{$t = 2010$}	0.088	0.113	0.125	0.027
	(0.07)	(0.077)	(0.088)	(0.032)
1{$t = 2019$}	0.233***	0.206**	0.460***	0.039
	(0.086)	(0.094)	(0.119)	(0.026)
Year*block fixed effects	x	x	x	x
Sample limitations				
Omit lots w/ Black-owned bus.		x		
Omit lots w/o structure in 1968			x	
Other covariates				
Retail in 1967 * year FE	x	x	x	
Stone/concrete in 1967 * year FE	x	x	x	
Black-owned bus. in 1967 * year FE	x		x	
Standard errors clustered				
1967 lot	x	x	x	
Square				x
Observations	4,507	3,458	2,858	9,020
Psuedo R-squared	0.447	0.438	0.443	
R-squared				0.597

Note: $* \ p < 0.1$, $** \ p < 0.05$, $*** \ p < 0.01$. This table shows that the findings from Table 3 are robust to probit estimation and are little changed if we cluster standard errors at the square, rather than the lot, level. Columns 1 to 3 of the table report coefficients for β_{lt} from the probit estimation of Equation 2:

$$Y_{lbt} = \beta_0 + \beta_{1t} D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.$$

Y_{lbt} is an indicator equal to 1 if there is no structure on lot l in block b at time t. The coefficient of interest, β_{1t}, reports the by year association of total destruction (D_l) with the absence of a structure. The equation includes block-year fixed effects $\theta_t * \theta_b$ and the small set of potentially relevant covariates X_{lt} (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year indicators. We report standard errors in parentheses, clustered at the 1967 lot. Column 2 repeats this estimation, omitting all omits with a Black-owned business as of 1967. Column 3 is the same specification as Column 1 but omits lots without a structure in 1968. Given the more restrictive specification of the probit, we cannot estimate a coefficient for 1967 in any of these specifications. The final column of this table reports results from an OLS regression parallel to that in Table 3, but where we cluster standard error at the square level, rather than the 1967 lot level, as in Table 3. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, and data on Black business ownership; see Data Appendix sections 1c, 1d, 1b, and 1j, respectively.

Appendix Table 2: Improvements, But Not Land Values, Remain Lower on Destroyed Lots Until 2010

Dependent Variable	log(assessed imprvmts/lot sqft)	log(assessed land value/lot sqft)	
Sample	Lots w/ structures	All lots	Lots w/ structures
	(1)	(2)	(3)
1{Totally Destroyed in 1968}*			
1{$t = 1967$}	-0.011	0.006	0.018
	(0.049)	(0.028)	(0.028)
1{$t = 1970$}	-0.222	-0.003	-0.042
	(0.157)	(0.031)	(0.043)
1{$t = 1971$}	-0.343***	-0.025	0.029
	(0.131)	(0.055)	(0.048)
1{$t = 1972$}	-0.345***	0.037	0.058
	(0.13)	(0.039)	(0.054)
1{$t = 1979$}	-0.532***	-0.003	0.011
	(0.133)	(0.037)	(0.037)
1{$t = 1990$}	-0.516***	0.005	0.011
	(0.135)	(0.039)	(0.04)
1{$t = 2000$}	-0.411***	0.013	0.014
	(0.103)	(0.039)	(0.04)
1{$t = 2010$}	-0.262***	-0.031	0.01
	(0.079)	(0.045)	(0.046)
1{$t = 2019$}	-0.214**	0.047	0.034
	(0.107)	(0.052)	(0.053)
Year*block fixed effects	x	x	x
Other covariates			
1967 Retail * year FE	x	x	x
1967 Stone/concrete * year FE	x	x	x
1967 Black-owned bus.* year FE	x	x	x
Observations	7,412	9,020	7,412
R-squared	0.867	0.98	0.984

Note: $* p < 0.1$, $** p < 0.05$, $* * * p < 0.01$. This table reports the estimates in Figure 5, panels (b) and (c). The table reports coefficients β_{lt} from Equation 2:

$$Y_{lbt} = \beta_0 + \beta_{1t}D_l * \theta_t + \beta_2 D_l + \theta_t * \theta_b + X'_{lt}\gamma_1 + \theta_t * X'_{lt}\gamma_2 + e_{lbt}.$$

In Column 1, Y_{lbt} is the log of assessed improvements per square foot; in columns 2 and 3, Y_{lbt} is the log of assessed land value per square foot. The coefficient of interest, β_{1t}, reports the by year association of total destruction (D_l) with the outcome. The equation includes block-year fixed effects $\theta_t * \theta_b$ and the small set of potentially relevant covariates X_{lt} (store in 1967, stone or concrete construction in 1967, site of Black-owned business in 1967), alone and interacted with year indicators. We report standard errors in parentheses, clustered at the 1967 lot. Columns 1 and 3 use the sample of all lots with structures in year t. Column 2 uses the sample of all lots. This table uses the 1967 lot definition, the measure of total destruction, tax assessment data, and data on Black business ownership; see Data Appendix sections 1c, 1d, 1b, and 1j, respectively.