The Economic Aftermath of the 1960s Riots in American Cities: Evidence from Property Values

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In the 1960s many American cities experienced violent, race-related civil disturbances. This article examines census data from 1950 to 1980 to measure the riots' impact on the value of central-city residential property, and especially on black-owned property. Both OLS and IV estimates indicate that the riots depressed the median value of black-owned property between 1960 and 1970, with little or no rebound in the 1970s. Census tract data for a small number of cities suggest relative losses of population and property value in tracts that were directly affected by riots compared to other tracts in the same cities.

The course of racial politics in the United States changed abruptly between the passage of the Civil Rights Act of 1964 and the Fair Housing Act of 1968. In August 1965 the torching and looting of the Watts area of Los Angeles was the opening salvo in a series of major urban riots.[1] The 1960s riots were neither the first nor the last race-related "civil disturbances" in American cities in the twentieth century, as examples in the 1910s, 1940s, and more recently vividly attest. Still, in sheer frequency and overall destructiveness the 1960s riots were historically unique. It is not surprising that the riots loom large in historical

[1] During the Watts riot, 34 people were killed, more than 1,000 people were injured, and more than 3,000 instances of arson were recorded. The riot erupted after police arrested a young black man for allegedly driving while intoxicated. Elsewhere, there had been much smaller riots prior to the explosion in Watts, including Philadelphia and New York City in 1964.

accounts of race and cities in the 1960s—it is difficult to ignore major cities in flames—but scholars have not explored the extent to which the 1960s riots affected the course of urban economies. Did the riots truly matter in this sense, or should economic historians think of them as violent sideshows to the real drama of urban economic change? Forty years after Watts, the economic legacy of the 1960s riots remains unclear.[2]

The question is important because the riots may have influenced a wide variety of urban issues that preoccupied scholars and policymakers at the time and that continue to do so today. The popular media have linked the riots anecdotally to the concentration of poverty in urban black neighborhoods, the fiscal problems of inner cities, crime, "white flight," and racial disparities in housing outcomes, but without solid evidence of causality or estimates of magnitude.[3] The economics and sociology literatures have discussed many factors that influenced urban economic and demographic trends after World War II, including changes in technology, crime, and housing and transportation policy. But nowhere, in our view, has the existing literature adequately assessed the impact of the riots.[4]

This article studies the riots' effects through the lens of owner-occupied property values. Property values are especially useful in this context because they capture a broad range of local characteristics and amenities. Like other assets, the current value of a house represents the discounted value of the expected net flow of utility associated with its ownership, including not only the physical quality of the structure, but also security (and risk); proximity to work, family, friends, and entertainment; the quality of municipal services; and the taxes required to support such services. In theory, if a riot causes a sustained decline in perceived amenities (broadly defined) in one location relative to others, we should be able to detect a relative decline in property values.[5] It is entirely plausible, however, that a riot's effect on perceived amenities is small and short-lived, in which case any impact on property values

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[2] There are few quantitative studies from the 1970s or 1980s that consider the riots' economic effects, even as a secondary matter of interest; see, for example, Frey, "Central City White Flight"; and Kelley and Synder, "Racial Violence."

[3] For recent examples, see the exchange about the 1965 Watts riot in the *Washington Post* between Roger Wilkins ("Watts Riot") and John McWhorter ("Burned, Baby, Burned"), or Ze'ev Chafets on postriot Detroit ("Battle Lines") in the *New York Times*.

[4] On factors affecting city growth and decline see, for example, Weaver, *Negro Ghetto*; Kain, "Housing Segregation"; Wilson, *Truly Disadvantaged*; Galster, "Housing Discrimination"; Massey and Denton, *American Apartheid*; Sugrue, *Origins*; Cutler and Glaeser, "Are Ghettos"; Cullen and Levitt, "Crime"; and Yinger, "Housing Discrimination." For recent studies of violence and conflict on economic activity, see Abadie and Gardeazabal, "Economic Costs"; Barro, "Economic Growth"; Alesina and Perotti, "Income Distribution"; and Mauro, "Corruption."

[5] See Roback, "Wages" for a model of the interaction of amenities and property values.

would be transitory. Further, under certain conditions, with large transfers of federal or state resources, a riot's effect might even be positive.

Our primary empirical analysis uses city-level data on median values of owner-occupied housing from the 1950 to 1980 censuses in conjunction with measures of riot severity. We focus on the 1960s and 1970s because the historical legacy of the riots is typically debated within this time frame and because longer-run outcomes are likely to be clouded by additional shocks and factors that could confound our measurements (for example, the spread of crack cocaine). Our identification strategy is two-pronged: first, in an ordinary least squares framework, we measure the correlation between riot severity and property value trends, controlling for city-level variables that may have been associated with a greater likelihood of rioting; and second, we employ an instrumental variables strategy that plausibly isolates exogenous variation in riot severity. Our principal finding is that both moderate and severe riots reduced the growth rate of housing values between 1960 and 1980. The negative effects were most stark for homes owned by African-Americans, but they are also visible in overall property-value trends.

The bulk of the article is devoted to the task of measuring the riots' effects on property values by making comparisons across cities. In the article's final section, however, we discuss the causal pathways that might underlie our central empirical findings. In particular, we discuss the demand-driven nature of the property value declines, the relative strength of the effects on black-owned properties, and the persistence of the effects beyond the 1960s. In this context, census tract-level data provide a more detailed portrait of postriot change *within* a handful of major cities.

THE 1960s RIOTS

The United States has a long history of violent, race-related civil disturbances.[6] Prior to the 1940s, most cases of such violence were instigated by whites who attacked blacks, as in the infamous 1863 draft riot in New York City and the 1921 Tulsa riot. In 1943 there was an outbreak of riots that in character, if not in number, bear a somewhat closer resemblance to those that occurred in the 1960s, including violent clashes between black civilians and police, looting of retail establishments, and arson. Even against the backdrop of the 1943 riots, the 1960s riots were historically unprecedented—in the space of just a few years, hundreds of riots erupted across the country. Although most of

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[6] For a comprehensive history of riots in the United States, see Gilje, *Rioting*.

the 1960s riots did not involve massive loss of life or property destruction, several riots were extremely serious by any metric.

Sociologists have carefully compiled information on the timing and severity of race-related civil disturbances in the 1960s and early 1970s. They have done so with the study of the causes of riots in mind, including several statistical studies of cross-city differences in riot occurrence and severity that we discuss in more detail in what follows.[7] The main sources of information about the riots are the Congressional Quarterly's *Civil Disorder Chronology* (1967), the Kerner Commission Report (1968), reports in the *New York Times*, and the "Riot Data Review" compiled by the Lemberg Center for the Study of Violence at Brandeis University. Each primary source used somewhat different definitions of a riot, collected different dimensions of data, and covered different time frames, but the combination of information provides a detailed picture of riot activity in this period.

The standard academic definition of a 1960s race-related riot, as put forth originally by Seymour Spilerman in two seminal studies, was a "spontaneous event" with at least 30 participants, some of whom were black, that resulted in property damage, looting, or other "aggressive behavior."[8] Disturbances that were directly associated with organized Civil Rights protests, or that occurred in school settings are excluded. Gregg Carter subsequently extended Spilerman's original data set to 1971, verified it by checking alternative sources (when available), and in general, refined the database for subsequent studies.[9] Carter's data set begins in 1964 and includes the dates and locations of more than 700 civil disturbances, as well as the associated number of deaths, injuries, arrests, and occurrences of arson.

We rely on the Carter data to construct a cumulative index of riot severity in each city. Specifically, we assign each riot (indexed by *j*) a value $S_j = \sum_i (X_{ij} / X_{iT})$ where X_{ij} is a component of severity (*i* indexes deaths, injuries, arrests, arson, and days of rioting) and X_{iT} is the sum of component X_{ij} across all riots. S_j is the proportion of all riot deaths that occurred during riot *j*, plus the proportion of all riot injuries that occurred during riot *j*, plus the proportion of all arrests, and so on.

[7] This line of investigation started with Lieberson and Silverman, "Precipitants"; Wanderer, "Index"; and Spilerman, "Causes of Racial Disturbances: A Comparison," "Causes of Racial Disturbances: Test," and "Structural Characteristics." It has continued in more recent work by Olzak et al. "Poverty"; DiPasquale and Glaeser, "Los Angeles Riot"; and, especially, Myers, "Racial Rioting" and "Diffusion." Other notable contributions include Lieske, "Conditions"; and Carter, "1960s Black Riots."

[8] Spilerman, "Causes of Racial Disturbances: A Comparison" and "Causes of Racial Disturbances: A Test."

[9] Carter, "1960s Black Riots."

TABLE 1
THE RIOTS OF THE 1960s, FREQUENCY AND SEVERITY

	1964	1965	1966	1967	1968	1969	1970	1971	Total
Riots	11	11	53	158	289	124	68	38	752
Days of riots	34	20	109	408	739	284	126	82	1,802
Killed	2	35	11	83	66	13	13	5	228
Injured	996	1,132	525	2,801	5,302	861	710	414	12,741
Arrested	2,917	4,219	5,107	17,011	31,680	4,730	2,027	1,408	69,099
Occurrences of arson	238	3,006	812	4,627	6,041	369	283	459	15,835
Index Value	0.163	0.504	0.275	1.349	1.956	0.374	0.230	0.149	5.000
Northeast	0.145	0.003	0.027	0.419	0.288	0.125	0.078	0.023	1.107
Midwest	0.008	0.011	0.180	0.750	0.501	0.079	0.042	0.004	1.574
South	0.010	0.001	0.019	0.107	1.055	0.115	0.104	0.121	1.532
West	0.000	0.489	0.050	0.073	0.112	0.056	0.006	0.001	0.786

Notes: See the text for the definition of a riot. Each riot (j) is assigned a value $S_j = \sum_i (X_{ij} / X_{iT})$ where X_{ij} is a component of severity (days of rioting, injuries, arrests, deaths, and arsons) and X_{iT} is the sum of X_{ij} across all riots. Summed over all riots in the dataset, there are five total index points (a reflection of the five components that enter the index).
Source: The data underlie Carter, "1960s Black Riots," and were received through personal communication.

Summed over all riots, there are five total index points, reflecting the five components that enter the calculation. For each city, we add the index values for each riot that occurred in that city to form a cumulative riot severity measure.[10]

The index has some potential shortcomings. Counts of destructive events do not necessarily correspond closely to economic damage, nor to people's perceptions of the event's severity and implications. Therefore, it is possible that potentially important components are missing from the index, or that given the existing components, some should weigh more heavily than others to capture the true severity of the event.[11] However, the individual components of the index are strongly positively correlated, and so in practice it matters little if we reweight them in various ways.[12] Moreover, the composite index makes it quantitatively clear that some cities experienced much more severe riots than others. Rather than rely heavily on the exact index values to measure the riot effects, we rely primarily on comparisons across cities grouped by degree of severity.

[10] Our measure of riot severity is "absolute" in the sense that we do not scale severity by population. However, our city-level regressions control for population directly.

[11] Consistent value-based measures of property damage do not exist for most riots.

[12] The correlations among deaths, arsons, arrests, and injuries across riots are high: at least 0.64 (deaths and injuries) and as high as 0.87 (deaths and arsons). Correlations of these variables with days of riots are somewhat lower, ranging from 0.32 to 0.48. All correlations are statistically significant at the 1 percent level.

Table 1 summarizes the riot data by index component, year, and census region. Riots occurred throughout the eight-year period, but the bulk of riot activity was concentrated in just two years, 1967 and 1968 (accounting for 3.3 out of 5.0 index points). When the index numbers are arrayed by census region, there appears to be a comparatively even geographic spread of riot activity.[13] This impression is somewhat misleading because the "severity" was heavily concentrated in a relatively small number of events and cities, not spread evenly over them. For example, no deaths occurred in 91 percent of the 752 riots underlying Table 1, and 90 percent of the riots have severity index values of less than 0.01. By far, the deadliest riots were in Detroit in July 1967 (43 deaths), Los Angeles in August 1965 (34 deaths), and Newark in July 1967 (24 deaths). Using the index as a broader severity measure, the riot in Washington, D.C. following Martin Luther King's assassination ($S = 0.34$) joins Los Angeles in 1965 (0.48), Detroit in 1967 (0.44), and Newark in 1967 (0.23) as the most severe events on record.

CITY-LEVEL EMPIRICAL STRATEGY AND RESULTS

To study the riots' effects, we combine the city-level riot severity measures already described with city-level data from the published volumes of the 1950, 1960, 1970, and 1980 censuses, including median property values for black households and for all households. Our sample includes the 104 cities that had at least 100,000 residents and that reported the median property value for nonwhites in 1960.[14] Our analysis starts with an emphasis on the city-level data for two reasons. First, the existing social science literature on the causes of the riots has generally relied on city-level data as an appropriate unit of analysis. For consistency with that literature, therefore, we also use city-level data. Second, because the existing public-use microdata sample for the 1960 census does not include city codes, it is impossible to use household-level data to conduct a consistent, comprehensive analysis that spans the full 1950 to 1980 period.[15]

The city-level data pertain to residents of central cities rather than to residents of entire metropolitan areas. In the years we study, the median

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[13] Washington, D.C. and Baltimore, which had sizable riots, are counted in the census South.

[14] In 1960 the census reports median property values for nonwhite households, rather than black households specifically. In the vast majority of cities in 1960, the nonwhite population is nearly entirely black. The cross-city correlation between the proportion of the population that is black and the proportion that is nonwhite is 0.995. The average difference between proportion nonwhite and proportion black is 0.0065 (or 0.65 percentage points). The article's results are not sensitive to excluding cities with relatively large differences.

[15] See footnote 27 for a brief report on an analysis that uses the public-use microdata to the extent possible.

value variable is based on self-reported estimates of the current value of residential property, including both the land and the house. Although there may be errors in any given individual's estimate, it is likely that such errors average out over large numbers of home owners in a city, and if there is any bias, we have no reason to think that the bias changed over time.[16]

Three additional measurement issues merit attention. First, even though levels of residential segregation were quite high in this period, the median black central-city home owner might not reside very close to the epicenter of the riots. Therefore, the change in median black-owned property value might not capture changes in value in the areas of the city most directly affected by riot activity. Second, a "filtering" process, in which blacks buy formerly white-owned housing of relatively high quality, could have accelerated in cities with severe riots if whites increased their rate of out-migration from such cities. Third, as mentioned already, the riots might have changed perceptions about amenities in *all* central cities, even those with relatively little riot activity. To the extent that these three considerations come into play, they are likely to diminish the magnitude of measured riot effects in the framework we describe below. Therefore, we regard our estimates as conservative.

Ordinary Least Squares

We begin by estimating the following basic specification by ordinary least squares over the 1960 to 1970 or the 1960 to 1980 period, where i indexes a particular city, and ΔV is the change in log median residential property value for black home owners or for all home owners (separate values for whites are not reported in the census volumes).

$$\Delta V_i = \alpha + \beta_1 X_i + \beta_2 \, Region_i + \beta_3 \, Riot_i + e_i \qquad (1)$$

In the most parsimonious regression specification, the set of X-characteristics includes the city's total population (1960) and the black proportion of the city's population (1960). *Region* is a set of dummy variables for census regions. The *Riot* variable reflects the severity index described previously. We group cities into three riot severity categories, and we enter dummy variables for "medium severity" and "high

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[16] Kain and Quigley ("Housing Market Discrimination") argue that the self-appraisals are reliable. Ihlanfeldt and Martinez-Vazquez ("Alternative Value Estimates") claim that whites tend to overestimate value relative to blacks (in Atlanta), but the bias is small. We have no knowledge of whether the degree of mismeasurement changed over time. See Collins and Margo ("Race") for more discussion.

severity" in the regressions. The distribution of the riot index across cities is highly skewed—a large number of cities had minor riots, and a small number had quite severe ones. Therefore, the low-severity category includes all cities below the fiftieth percentile in the index (0 to 0.009); the medium-severity category includes the fiftieth to the eighty-eighth percentile (0.009 to 0.07); and the high-severity category includes cities above the eighty-eighth percentile (0.07 to 0.52).[17] This strikes a reasonable balance between parsimony (with relatively few observations) and flexibility in describing the data.[18] Although the high-severity category is relatively small, the cities in it account for about 70 percent of all riot activity in the sample (as measured by the severity index).

Table 2 presents summary statistics by severity group for the cities that enter the regressions. The average increase in log black-owned property values from 1960 to 1970 was approximately 0.07 higher in low-severity cities than in medium severity cities, and 0.11 higher in low-severity cities than in high-severity cities. The differences in property value changes are larger over the 1960 to 1980 period; black property values in low-severity cities increased by 0.16 more than in medium-severity cities and by 0.31 more than in high-severity cities.

The exogeneity of variation in riot severity is a key concern in interpreting these differences in property-value trends. Table 2 suggests that the city-groups had roughly similar pre-1960 trends in property values (ranging from 0.31 to 0.35), but it is clear that the groups differed in a number of potentially relevant dimensions. As noted, social scientists have long tried to identify city-level factors associated with the incidence and severity of riots in the 1960s. The typical approach has been to predict the likelihood or severity of rioting as a function of city-level characteristics drawn from the 1960 or 1950 published census volumes. In general, the results suggest that after accounting for each city's black population size and region, very little variation in severity can be accounted for by preriot city-level measures of African-Americans' economic status (for example,

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[17] Cities around the ninetieth percentile had very similar index values, so we chose a break at the eighty-eighth percentile instead.

[18] We have also estimated regressions with a quartic in the riot severity index. The results are omitted to save space, and indicate a significant, negative, nonlinear riot effect. For example, a specification similar to that in column 1 of Table 3A, but with a quartic in the riot index, implies a –0.01 effect at the mean index value of the "low severity" group; –0.07 effect at the mean index value for the medium-severity group; and –0.195 effect at the mean index value of the high severity group. By this metric the riot effect in the high severity group looks somewhat larger than in Table 3A (which suggests an average treatment effect of about –0.14 relative to low severity group). The difference reflects the upward turn the quartic function takes near the top of raw index range (well beyond the average index value in the category). This upward turn reflects the fact that black-owned property values in Detroit and Los Angeles had not fallen far behind at the time of the 1970 census, though they did fall back in later years.

TABLE 2
SUMMARY STATISTICS, CITY-LEVEL DATA, BY SEVERITY GROUP

	Low Severity	Medium Severity	High Severity
Mean Severity Index	0.003	0.021	0.195
	(0.003)	(0.014)	(0.155)
Mean Change in Log Median Property Value, Black-Owned 1960–1970	0.384	0.318	0.270
	(0.144)	(0.128)	(0.097)
Mean Change in Log Median Property Value, Black-Owned 1960–1980	1.327	1.166	1.021
	(0.207)	(0.280)	(0.278)
Mean Change in Log Median Property Value, All Races, 1960–1970	0.303	0.264	0.251
	(0.117)	(0.112)	(0.115)
Mean Change in Log Median Property Value, All Races, 1960–1980	1.303	1.152	1.101
	(0.201)	(0.273)	(0.344)
Mean Change in Log Median Property Value, All Races, 1950–1960	0.344	0.346	0.314
	(0.108)	(0.095)	(0.136)
Black Proportion of Population, 1960	0.153	0.196	0.231
	(0.112)	(0.117)	(0.128)
Total Population, 1960	216,772	313,494	1,549,190
	(137,059)	(201,211)	(1,966,480)
Proportion of workers in manufacturing, 1960	0.210	0.279	0.291
	(0.095)	(0.102)	(0.104)
Northeast	0.14	0.17	0.40
Midwest	0.19	0.35	0.27
South	0.51	0.35	0.20
West	0.16	0.13	0.13
N	43	46	15

Notes: The sample for the summary statistics is the same as that in city-level regressions. The sample excludes cities with missing values for any of the variables. Standard deviations are in parentheses.
Sources: See Table 3A.

median income) either in absolute terms or relative to whites.[19] Thus, Spilerman concludes that "the severity of a disturbance, as well as its location, appears not to have been contingent upon Negro living conditions or their social or economic status in a community."[20] The point is not that the 1960s riots had nothing to do with blacks' economic status in the

[19] In this framework, each black individual may face a probability p of being the catalyst for a riot over any given period. Then, the probability that a riot occurs is $1-(1-p)^N$, where N is the black population size. See DiPasquale and Glaeser ("Los Angeles Riot") for a multiple equilibrium model in which a riot might spiral upward or downward in intensity depending on whether the initial spark exceeds a certain threshold value. Spilerman and subsequent authors have noted that southern cities were less likely to have riots than nonsouthern cities (conditional on black population size), possibly because of a greater fear of subsequent repression by law enforcement.

[20] Spilerman, "Structural Characteristics," p. 789. DiPasquale and Glaeser ("Los Angeles Riot," table 6) also find that the size of the nonwhite population is the most consistent predictor. Additionally, for two out of three components (arrests and cases of arson), they find that police expenditures per capita in 1960 are negatively correlated with intensity. Our black property value regression results (Tables 3A and 3B) are essentially unaffected by the inclusion of police expenditures.

United States, but rather that the variation in riot severity across places was highly unpredictable (beyond region and black population size).

This interpretation is consistent with detailed chronologies that suggest that severe riots were highly idiosyncratic events.[21] That is, in many cases, there were identifiable, idiosyncratic "sparks" that, through a series of unforeseen complications, turned a routine event into a minor altercation, and a minor altercation into a full-blown riot. In Watts, the arrest of an intoxicated black motorist led to a wider altercation with neighborhood residents and eventually an enormous riot. In Detroit, a raid on a "blind pig" (an after-hours drinking establishment) escalated into the decade's deadliest riot. In Newark, rioting commenced after the arrest (and rumored beating) of a taxi driver.

If, conditional on black population size and region, variation in riot severity is largely unpredictable, then the parsimonious OLS regression described by equation 1 may provide a reliable estimate of the riots' effect on property values. Given the existing body of research on the causes of the riots, the identifying assumption that there are no omitted city-specific factors that affected property values and that are correlated with the severity of riots is defensible on *a priori* grounds. However, we do not need to maintain this assumption, and can check the robustness of estimates of β_3 to the inclusion of several additional city characteristics in the regression.

Specifically, we add control variables for the proportion of employment in manufacturing industries (1960), the level of SMSA residential segregation (1960), the crime rate per 100,000 population (1962), and the trend in the log median value of all residential properties over the 1950 to 1960 period.[22] Cities with large manufacturing sectors circa 1960 might have been differentially affected by de-industrialization, and it is possible that the associated labor demand shifts made riots more likely and (independent of riots) depressed property values.[23] Likewise, cities with high levels of residential segregation and crime might have been more prone to riots and subject to forces that subsequently depressed property values. Finally, pre-existing trends (1950–1960) in property values should capture otherwise unobserved trends in the relative attractiveness of cities.

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[21] The notion that the occurrence of a riot might have been idiosyncratic does not negate the possibility that it would have economic effects. As we discuss in the section "The 1960s Riots," the 1960s riots were historically unique in that the underlying risk of riot was clearly far higher than it had been during the immediately preceding decades.

[22] Race-specific property values are not available for 1950. The segregation data are from Cutler, Glaeser, and Vigdor, "Rise." The crime rate figure for 1962 is calculated from the Federal Bureau of Investigation's annual publication of *Uniform Crime Statistics*.

[23] On de-industrialization, see Sugrue, *Origins*.

TABLE 3A
RIOTS AND PROPERTY VALUES, CITY-LEVEL DATA, 1960–1970

	Black-Owned Properties (1)	Black-Owned Properties (2)	All Properties (3)	All Properties (4)
High Riot Severity	–0.148	–0.111	–0.0978	–0.0961
	(0.0400)	(0.0365)	(0.0352)	(0.0410)
Medium Riot Severity	–0.0669	–0.0621	–0.0405	–0.0424
	(0.0259)	(0.0229)	(0.0226)	(0.0222)
Percentage Black	0.274	0.124	0.167	0.0875
	(0.134)	(0.131)	(0.117)	(0.124)
Total Population	2.62 e–09	1.97 e–09	1.99 e–08	1.59 e–08
	(7.25 e–09)	(5.98 e–09)	(6.84 e–09)	(9.13 e–09)
Prop. Manu. 1960	—	0.148	—	0.0902
		(0.189)		(0.123)
Value Trend 1950–1960	—	0.233	—	0.103
		(0.0932)		(0.0878)
Crime Rate 1962	—	0.516	—	2.51
		(1.63)		(2.40)
Residential Segregation	—	–0.638	—	–0.167
		(0.203)		(0.160)
Northeast	0.0612	0.0338	0.0470	0.0400
	(0.0490)	(0.0664)	(0.0362)	(0.0474)
Midwest	–0.0694	–0.0726	–0.0342	–0.0464
	(0.0335)	(0.0403)	(0.0276)	(0.0340)
West	0.0401	0.0299	0.116	0.0897
	(0.0462)	(0.0434)	(0.0338)	(0.0388)
Constant	0.339	0.744	0.254	0.311
	(0.0449)	(0.165)	(0.0338)	(0.136)
N	104	101	104	101
R^2	0.25	0.42	0.21	0.27
Mean dep. var.	0.338	0.340	0.278	0.283

Notes: Robust standard errors are in parentheses. The property value trends for 1950 to 1960 are for all owner-occupied properties in the city (even for columns 1 and 2). Black-specific trends cannot be discerned for many cities for 1950 to 1960 due to incomplete reporting in the 1950 census volumes. The residential segregation variable is a dissimilarity index; see Cutler, Glaeser, and Vigdor, "Rise." Regional assignment follows census convention. Following the Federal Bureau of Investigation's *Uniform Crime Reports*, the crime rate is the ratio of total crimes in 1962 (excluding larceny under $50) to total population in 1960; Montgomery, Alabama's figure is based on 1961 crime data.
Sources: Property values are from the published volumes of the federal censuses of population and housing. Manufacturing and population variables for 1960 are based on census data and taken from issues of the U.S. Department of Commerce, *County and City Data Book* (tabulated in ICPSR 7735 and checked against data compiled by Michael Haines). Riot severity measures are based on data underlying Carter, "1960s Black Riots." The crime rate data for 1962 are tabulated from the Federal Bureau of Investigation's *Uniform Crime Reports*, table 41. The dissimilarity indices are from Cutler, Glaeser, and Vigdor, "Cutler/Glaeser/Vigdor Segregation Data."

Table 3A reports OLS results for the 1960 to 1970 period, and Table 3B reports results for the 1960 to 1980 period. In column 1 of Table 3A, we estimate that during the 1960s, black property values fell by about 7 log points in medium-severity and 15 log points in high-severity riot

Collins and Margo

RIOTS AND PROPERTY VALUES, CITY-LEVEL DATA, 1960–1980

	Black-Owned Properties (1)	Black-Owned Properties (2)	All Properties (3)	All Properties (4)
High Riot Severity	–0.202	–0.139	–0.0804	–0.0630
	(0.0629)	(0.0593)	(0.0653)	(0.0652)
Medium Riot Severity	–0.100	–0.0844	–0.0771	–0.0748
	(0.0412)	(0.0391)	(0.0371)	(0.0383)
Percentage Black	–0.186	–0.373	–0.405	–0.505
	(0.256)	(0.268)	(0.222)	(0.253)
Total Population	–1.04 e–08	–1.31 e–08	9.65 e–09	1.58 e–10
	(1.96 e–08)	(1.25 e–08)	(1.42e–08)	(1.61 e–08)
Prop. Manu. 1960	—	–0.210	—	–0.354
		(0.246)		(0.236)
Value Trend 1950–1960	—	0.131	—	0.0991
		(0.164)		(0.172)
Crime Rate	—	1.29	—	4.67
		(3.11)		(3.61)
Residential Segregation	—	–1.05	—	–0.276
		(0.326)		(0.245)
Northeast	–0.189	–0.177	–0.289	–0.238
	(0.0723)	(0.0857)	(0.0544)	(0.0755)
Midwest	–0.227	–0.159	–0.233	–0.173
	(0.0643)	(0.0719)	(0.0547)	(0.0629)
West	0.247	0.243	0.283	0.250
	(0.0729)	(0.0771)	(0.0554)	(0.0662)
Constant	1.386	2.194	1.400	1.586
	(0.0806)	(0.258)	(0.0587)	(0.216)
N	104	101	104	101
R^2	0.50	0.60	0.60	0.63
Mean dep. var.	1.212	1.214	1.207	1.211

Notes: Robust standard errors are in parentheses, and all variables are as in Table 3A.
Sources: See the sources for Table 3A.

cities relative to low-severity riot cities (the omitted category). The regression specification in column 2 includes the additional control variables for manufacturing employment, pre-1960 property value trends, crime, and residential segregation (a dissimilarity index). The results indicate that, *ceteris paribus*, cities with comparatively strong housing value growth from 1950 to 1960 continued to have relatively strong growth in the 1960s (at least among blacks), and that cities with relatively high levels of segregation in 1960 subsequently experienced relative declines in black property values. The preriot crime rate appears to have had no significant influence on subsequent changes in property values. Most importantly for the purposes of this investigation, the negative and significant coefficient estimates on the riot variables are not undermined or significantly changed in magnitude in column 2—there is still strong evidence of a negative correlation between riots and

post-1960 black-owned property value trends. Columns 3 and 4 of Table 3A indicate that median property values for samples of *all* owner-occupied housing fell by about 4 log points in the medium-severity cities and 10 log points in the high-severity cities relative to low-severity cities in the 1960s.[24]

There is no evidence in Table 3B (estimated over the 1960 to 1980 period) that black property values in riot-torn cities bounced back relative to others during the 1970s. If anything, the point estimates for the 1960–1980 period are somewhat larger in magnitude than for the 1960–1970 period. In the medium-severity cities, on average, black property values fell by eight to ten log points relative to the omitted category between 1960 and 1980. The point estimates for the average decline in black home values in the high-severity cities range from 14 to 20 log points. The estimated effects on overall property values (columns 3 and 4) are smaller than for black property values, especially in the high severity cities.

Given our reliance on decennial census data and pre-1960 trends to control for initial conditions, it is very difficult to rule out unobserved factors operating between 1960 and 1965 that could have influenced housing markets. However, we can include a control variable for the change in state-level personal income per capita compiled by the Bureau of Economic Analysis as a rough gauge of changes in local economic conditions just prior to the riots.[25] Doing so has little effect on the riot coefficients in the base specifications of Tables 3A and 3B.

We have tested the robustness of the OLS estimates in several additional ways. Excluding cities with relatively small black populations (less than 10,000 in 1960) or relatively large black populations (more than 500,000) has little impact on the OLS riot coefficients.[26] Omitting any one of the high severity cities has little impact on the riot coefficients. Splitting the full sample into nonsouthern and southern segments dramatically reduces the sample size but does not undermine the significant negative relationship between riots and changes in black property values. Quantile regressions of the base specifications, which are less sensitive to outliers, yield riot coefficient estimates that are similar to the OLS results. Finally, albeit imperfectly, we have assembled data

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[24] If we enter the change in the value of all owner-occupied housing as a control variable in the base specification of Table 3A (with the change in black-owned property value as the dependent variable), the riot coefficients remain economically significant: –0.038 (standard error = 0.022) for medium severity and –0.080 (standard error = 0.033) for high severity.

[25] Bureau of Economic Analysis, "Regional Economic Accounts."

[26] There is a dip in the severe-riot coefficient from 1960–1980 when the three cities with more than 500,000 black residents are omitted. The coefficient is –0.142 (standard error = 0.076) rather than –0.20 (standard error = 0.063).

on urban renewal projects at the state level to see if such programs confound our estimates of the riot effects on property values. In specifications similar to the base regressions in Tables 3A and 3B, entering the value of urban renewal grants approved (cumulative to the end of 1970) per urban resident has little effect on the size or significance of the coefficients on riot severity.[27]

Controlling for Postriot Changes in Economic Variables

The riots may have affected a broad range of post-1960 economic variables in cities. Therefore, in Tables 3A and 3B we have not controlled for contemporaneous and potentially endogenous changes in black family income, the number of housing units or people in the city, or the black home ownership rate.[28] Nonetheless, doing so might shed light on the correlates of postriot property devaluation, the channels through which riots affected property values, and the potential for alternative hypotheses to explain the property value declines.

Table 4 reports results for black-owned housing. Adding contemporaneous controls to the base specifications of Tables 3A and 3B has a minimal effect on the riot variables' coefficients. Black family income trends, for example, have a strong positive correlation with contemporaneous black property values (Table 4, columns 2 and 7). This accounts for a small portion of the existing correlation between black property values and severe riots, but the riot coefficients are still large, negative, and statistically significant. Likewise, the change in the black

[27] We also used IPUMS data (see Ruggles et. al. "Integrated Public Use Microdata Series") to calculate a local labor demand shift index for the 1960s that combines information on national-level shifts in three-digit industrial employment and metropolitan area industrial employment structures (in 1970). The index value is relatively high in places with high concentrations of industries that were increasing their employment share at the national level. This variable's inclusion does not undermine the OLS riot coefficients. In addition, we performed a separate analysis using the microdata from the 1960 and 1970 IPUMS. We estimated a difference-in-difference regression in which the key independent variable is the interaction of a dummy variable (set equal to one in states that had a severe riot) and a year dummy for 1970. The riot dummy is defined at the state level because the 1960 public use data do not reveal cities. The regression also includes various state-level variables (for example, the proportion of workers in manufacturing) separately and interacted with the 1970 time dummy, region-time interactions, and state fixed effects. The difference-in-difference coefficient captures the degree to which black-owned property values trended differently between states that had severe riots and states that did not, after allowing for differential trends by region and by degree of manufacturing specialization in 1960. The estimated effect of a severe riot is –0.065 (standard error = 0.029, adjusted for state clustering). This state-based approach is far from ideal, and it is not directly comparable with city-level estimates, but the general result that black-owned, urban property values fell in states that had severe riots relative to other states is consistent with the city-level analysis.

[28] For evidence of effects on incomes and employment, see Collins and Margo, "Labor Market Effects."

TABLE 4: RIOTS AND BLACK-OWNED PROPERTY VALUES, CITY-LEVEL DATA WITH POST-1960 CONTROLS

	1960–70 (1)	1960–70 (2)	1960–70 (3)	1960–70 (4)	1960–70 (5)	1960–80 (6)	1960–80 (7)	1960–80 (8)	1960–80 (9)	1960–80 (10)
High riot severity	-0.148	-0.133	-0.149	-0.136	-0.148	-0.202	-0.159	-0.174	-0.158	-0.166
	(0.0400)	(0.0431)	(0.0413)	(0.0442)	(0.0418)	(0.0629)	(0.0693)	(0.0661)	(0.0605)	(0.0665)
Medium riot severity	-0.0669	-0.0721	-0.0665	-0.0575	-0.0669	-0.100	-0.0947	-0.101	-0.0683	-0.101
	(0.0259)	(0.0246)	(0.0256)	(0.0283)	(0.0256)	(0.0412)	(0.0382)	(0.0411)	(0.043)	(0.0408)
Percentage black, 1960	0.274	0.203	0.274	0.211	0.274	-0.186	-0.192	-0.139	-0.114	-0.121
	(0.134)	(0.121)	(0.135)	(0.121)	(0.135)	(0.256)	(0.247)	(0.255)	(0.235)	(0.253)
Total population, 1960	2.62e–09	-2.48e–10	2.83e–09	4.66e–09	2.57e–09	-1.04e–08	-1.32e–08	-1.43e–08	-7.01e–09	-1.44e–08
	(7.25e–09)	(8.37e–09)	(7.49e–09)	(6.69e–09)	(7.44e–09)	(1.96e–08)	(1.81e–08)	(1.92e–08)	(1.56e–08)	(1.85e–08)
Change in log black family income post 1960	—	0.476	—	—	—	—	0.494	—	—	—
		(0.122)					(0.151)			
Change in log city population post 1960	—	—	-0.0133	—	—	—	—	0.166	—	—
			(0.091)					(0.0984)		
Change in black home ownership rate post 1960	—	—	—	-0.438	—	—	—	—	-0.847	—
				(0.333)					(0.301)	
Change in log occ. housing units in city post 1960	—	—	—	—	0.00397	—	—	—	—	0.201
					(0.0985)					(0.0946)
Regional dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	0.339	0.0909	0.341	0.377	0.338	1.386	0.725	1.34	1.424	1.285
	(0.0449)	(0.0779)	(0.0466)	(0.0405)	(0.0493)	(0.0806)	(0.227)	(0.0813)	(0.0678)	(0.0895)
N	104	104	104	104	104	104	104	104	104	104
R^2	0.25	0.34	0.25	0.28	0.25	0.5	0.55	0.52	0.56	0.53
Mean Dep. Var.	0.338	0.338	0.338	0.338	0.338	1.212	1.212	1.212	1.212	1.212

Notes: See the notes to Table 3A. Following the census, we define the home ownership rate as the ratio of the number of owner occupied housing units inhabited by black households to the total number of housing units occupied by black households. The phrase "post 1960" implies 1960 to 1970 in columns 1 to 5 and 1960 to 1980 in columns 6 to 10.
Sources: See the sources for Table 3A.

home ownership rate is negatively correlated with the change in black property values, and this tends to diminish the riot coefficients, but only slightly. Thus, it seems unlikely that large changes in the sample composition of black-owned properties associated with the filtering of housing are driving the correlation between riots and observed black property values.[29] Finally, adding controls for either the change in the supply of housing or the change in city-wide population does not undermine the strength of the correlation between riots and black-owned property values.

Again, given the endogeneity of post-1960 economic variables to the occurrence of riots, we do not attach causal interpretations to the coefficients reported in Table 4. Rather, the main point is that changes in relevant contemporaneous variables are not primarily responsible for the strong correlation between riots and relative declines in property values. The riots coefficients are not simply picking up the influence of other post-1960 economic trends.

Two Stage Least Squares Approach

In Tables 3A and 3B, the inclusion of several city-specific variables should mitigate concerns that unobserved factors correlated with riot severity had an independent influence on post-1960 property value changes. Alternatively, we can pursue an instrumental variable approach that isolates plausibly exogenous variation in riot severity to measure the riot effect. In this case, a viable instrumental variable should influence the severity of riots but should not have an independent influence on long-run trends in property values.

Our first instrument is rainfall in the month of April 1968. Martin Luther King was assassinated on 4 April 1968, and subsequently more than 100 riots erupted. Thus, a specific, identifiable event greatly increased the likelihood of rioting during the month.[30] There is considerable anecdotal evidence that, in general, people are less likely to engage in collective violence when it rains. Sidney Fine refers to an event in Detroit in 1966 as "the riot that didn't happen" because rainfall helped defuse an emerging riot; he writes, "The major ally of the police and the

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[29] It is worth noting that the black home ownership rate did increase in the medium and severe riot cities compared to the low severity group between 1960 and 1980 (by 3 to 5 percentage points). The relative decline in housing prices in riot cities appears to have driven the relative increase in ownership. That is, controlling for the change in observed housing values, the relationship between ownership and riots is no longer economically and statistically significant.

[30] Although many of the riots erupted soon after the announcement of King's death, it appears that the likelihood of riots was higher throughout the month in comparison with previous Aprils. So, we use the entire month. Cross-city variation in temperature is a poor predictor of riot severity, but it is clear from the timing information that riots were more likely in the summer months.

few peacemakers that night was a steady, drenching rain."[31] The *New York Times* reported that on 10 August 1968, after two days of riots in Miami, heavy rains kept the streets empty. Dade County's sheriff referred to the rainfall as "beautiful" and joked that all off-duty police had been assigned to pray for more rain.[32]

In August 1969 the *New York Times* cited a Washington community activist who claimed that rainfall had "nipped one riot in the bud."[33] The Kerner Commission report, in discussing a riot in Plainfield, New Jersey, noted that late one night "a heavy rain began, scattering whatever groups remained on the streets," although the rioting recommenced the next afternoon (when it was not raining).[34] More recently, after riots in Benton Harbor, Michigan in the summer of 2003, a CNN.com headline read "Rain, curfew help bring quiet night to Benton Harbor."[35] Finally, the U.S. Army's field manual for dealing with civil disturbances (FM 19-15) suggests that spraying water may be highly effective as "a high-trajectory weapon, like rainfall" especially in cool weather.[36]

Our second instrumental variable relates to the organizational form of each city's government, and in particular, whether or not the city was administered by a city manager in 1960 (rather than a mayor). We believe that this predetermined feature of city government did not have a direct effect on changes in property values in the 1960s, and that therefore, it is a legitimate instrumental variable. It certainly appears to be a poor predictor of property value trends in the 1950s: a regression of change in property values from 1950 to 1960 on the city manager variable, region dummies, population, and black proportion of the population yields a small and statistically insignificant coefficient on the city manager dummy variable (–0.0037, standard error = 0.16). At the same time, it is plausible that city managers, who were supposed to apply professional administrative skills to government operations, defused local racial tensions underlying riots more effectively than mayors did.[37]

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[31] Fine, *Violence*, p. 140.

[32] Waldron, "Miami."

[33] Herbers, "U.S. Officials."

[34] Kerner et al., *Report*, p. 78.

[35] CNN.com, "Rain, Curfew."

[36] See Department of Army, "Civil Disturbance." The quote in the text was taken from http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/19-15/CH9.htm, but this link is no longer active. A more recently issued (April 2005) field manual for civil disturbance operations notes that "Rainy, cold, and nasty weather has a way of disheartening all but the few highly motivated and disciplined individuals" (pp. 1–5) and cites the effect of rainfall on demonstrators during the G8 Meetings in 2002 (pp. 2–22).

[37] See Sommers, "Council-Management Government." Although some political scientists and sociologists argue that mayors may be more responsive to minority needs than managers, the evidence for the 1960s does not suggest that mayors were associated with fewer riots or protests (*ceteris paribus*); see Spilerman, "Structural Characteristics"; or Eisinger, "Conditions."

Mayors' incentives in this period may have been strongly tied to the votes of local, ethnic white, central-city residents, many of whom held unfavorable views of racial integration and of African-Americans.[38] Professional city managers, though certainly not immune from local political pressures, faced a broader labor market for their services, one in which their reputation for competent management was paramount.

The OLS results in Tables 3A and 3B suggest that the riots' effects were nearly linear in "severity group"—that is, the high severity coefficient is nearly twice the size of the medium severity coefficient (and both are expressed relative to the low severity group). For the two-stage least squares (2SLS) estimates, therefore, we assign the low riot intensity cities a severity value of zero, medium intensity riot cities a severity value of one, and high intensity riot cities a severity value of two, and then we instrument for severity-group using the rainfall variable and the city manager dummy. Strictly speaking, we only need one instrument for identification with this particular specification, but having multiple instruments allows us to perform an over-identification test (described below). Nonetheless, we acknowledge that our interpretation of the city manager variable given above is speculative, and therefore we discuss some results obtained using only the rainfall instrument. We also check results using the raw severity index as the key independent variable, rather than "severity group."

The basic first-stage regression results, which we report in column 1 of Table 5, indicate that rainfall in April 1968 and the presence of a city manager are useful predictors of variation in riot severity (additional controls include region dummies, city size, and black proportion of population). Both the rainfall and city manager coefficients are negative, indicating that riot severity was lower in cities with a lot of rainfall in April 1968 and a city-manager form of local government. The *F*-statistic for the joint significance of the two coefficients is 5.5 (*p*-value = 0.006) and the partial *R*-squared on the excluded instruments is 0.08. Thus, there is some scope for weak-instrument bias in the two-stage least squares estimates.[39]

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[38] Greeley and Sheatsley, "Attitudes."

[39] Bound, Jaeger, and Baker ("Problems," p. 443) note that "in finite samples, IV estimates are biased in the same direction as OLS estimates, with the magnitude of the bias approaching that of OLS" as instruments get weaker. A larger *F*-statistic (where the *F*-statistic pertains to the excluded instruments in the first-stage regression) then implies a smaller finite-sample bias in the IV estimate relative to the bias of the OLS estimate. See Stock, Wright, and Yogo, "Survey," for a concise discussion of the issue. We deal with this concern in two ways: first, estimation by limited information maximum likelihood is less susceptible to weak-instrument bias, and we obtain similar results when we use that method (see Appendix Table 1). Second, when only the rainfall instrument is used (the stronger of the two instruments), we get a first stage *F*-statistic of 8.2 (near the not-weak threshold of 10 proposed by Staiger and Stock, "Instrumental Variables." In this case, the second-stage coefficients are larger in magnitude (more negative) and remain near conventional levels of statistical significance. Results are discussed in the text.

TABLE 5
RIOT SEVERITY AND INSTRUMENTAL VARIABLES

Dependent Variable	Severity Group (1)	Severity Group (2)	Severity Group (3)	Severity Group (4)	Severity Index (5)
Rainfall, April 1968	–0.109	–0.126	–0.106	–0.0934	–0.0140
	(0.0335)	(0.0404)	(0.0354)	(0.0327)	(0.00539)
Rainfall, annual avg.	—	–0.00588	—	—	—
		(0.00834)			
Rainfall, April avg.	—	0.145	—	—	—
		(0.0938)			
Rainfall, April 1967	—	–0.0375	—	—	—
		(0.0323)			
City manager	–0.229	–0.193	–0.229	—	–0.0250
	(0.140)	(0.146)	(0.141)		(0.0143)
Percentage black	2.68	2.51	2.69	2.95	0.311
	(0.513)	(0.585)	(0.509)	(0.506)	(0.105)
Total population	2.51 e–07	2.54 e–07	2.52 e–07	2.71 e–07	3.57 e–08
	(8.01 e–08)	(8.39 e–08)	(8.01 e–08)	(8.92 e–08)	(2.13 e–08)
Value trend 1950–1960	—	—	–0.200	—	—
			(0.557)		
Northeast	0.498	0.445	0.488	0.616	0.0150
	(0.204)	(0.227)	(0.202)	(0.165)	(0.0221)
Midwest	0.499	0.477	0.499	0.577	0.0401
	(0.134)	(0.140)	(0.135)	(0.129)	(0.0224)
West	0.342	0.450	0.348	0.389	0.0405
	(0.203)	(0.212)	(0.209)	(0.222)	(0.0270)
Constant	0.220	0.152	0.281	–0.0248	–0.00757
	(0.210)	(0.335)	(0.243)	(0.142)	(0.0221)
N	104	104	104	104	104

Notes: Robust standard errors are in parentheses. See the text for discussion of severity group variable: group 2 consists of high severity riot cities; group 1 consists of medium riot cities. The construction of the index is described in detail in the text. Column 1 is the first-stage regression corresponding to the 2SLS results in columns 2 and 5 of Table 6. Column 3 is the first-stage regression corresponding to the 2SLS results in columns 3 and 6 of Table 6.

Sources: The city manager instrumental variable is from Aiken and Alford, *Governmental Units*. Rainfall data for April 1968 and April 1967 are from National Oceanic and Atmospheric Administration, "Climate Data Online." Average annual rainfall for the 1931–60 period is from U.S. Department of Commerce, *County and City Data Book.* Average rainfall for the month of April was collected interactively from www.weather.com (details available from the authors on request). See the notes to Table 3A for sources of other variables.

Our interpretation of the rainfall instrument hinges on its timing (April 1968) relative to the King assassination and the subsequent riots. One might argue, however, that cities in which it rained a lot in April 1968 also had a lot of rain in April in other years, or on average throughout the year. However, as shown in column 2 of Table 5, average annual rainfall, average April rainfall, and rainfall in April of 1967 are poor predictors of riot severity compared to the April 1968 variable. Our instrument, in other words, is not merely picking up an incidental

correlation between raininess (even in April) and riot proneness—it is rainfall in April 1968 that matters. Furthermore, in a reduced-form regression of change in black property value (1960–1970) on rainfall in April 1968, average annual rainfall, and region indicators, the April 1968 rain coefficient is 0.0219 (standard error = 0.0106). For 1960–1980, the coefficient is 0.0283 (standard error = 0.0167). That is, conditional on region and average annual rainfall (or rainfall in April 1967), cities with more rain in April 1968 had larger gains in black property values after 1960—it is difficult to imagine a source for such a correlation aside from our hypothesized link between rain and riot severity. Column 3's specification is similar to that in column 1, but it includes the pre-1960 property value trend; the coefficients on rainfall and city manager are nearly identical to those in column 1. Column 4 is similar to column 1, but it excludes the city manager variable; the rainfall coefficient is only slightly changed. Finally, in column 5, we use the actual severity index (rather than severity group) as the dependent variable. The coefficient on April 1968 rainfall is –0.0140 (standard error = 0.00539) and on city manager of –0.0250 (standard error = 0.0143). In sum, the relationship between rainfall in April 1968 and riot severity is robust.

We report the 2SLS regression results in Table 6, along with OLS specifications for comparison. Columns 1 and 4 are estimated by OLS and yield results that are similar to those implied by the first columns of Tables 3A and 3B; this suggests that the replacement of the severity dummies with the severity-group variable (with values zero, one, and two) is a reasonable simplification. Like the OLS results, the 2SLS coefficients (columns 2, 3, 5, and 6) are uniformly negative, implying that riot severity reduced property value appreciation.[40] The 2SLS coefficient estimates are larger in magnitude than the OLS coefficient estimates. Because the standard errors of the 2SLS coefficients are relatively large, one should be cautious not to over-emphasize the point estimates' magnitude relative to the OLS coefficients. However, a possible explanation is that our measure of severity is only a proxy for true

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[40] Results from standard diagnostic tests of the 2SLS regressions are as follows: 1) Durbin-Wu-Hausman tests cannot decisively reject the exogeneity of the severity variable, but the test statistics are large enough (*p*-values of 0.14 for 1960–1970 and 0.27 for 1960–1980) that we are reluctant to dismiss the 2SLS results; 2) because we have two instruments, we can perform an over-identification test for instrument exogeneity; importantly, this test cannot reject the hypothesis that the instruments are exogenous (Hansen J-statistic is 1.49, *p*-value = 0.22); 3) as noted above, the first-stage *F*-statistic on the excluded instruments suggests that the 2SLS coefficients may be biased in value toward the OLS estimates. However, we find that IV estimates obtained using limited information maximum likelihood (LIML) techniques, which are less susceptible to weak instrument bias, are very similar to those from two-stage least squares (LIML results are reported in Appendix Table 1).

TABLE 6
RIOTS AND BLACK-OWNED PROPERTY VALUES, OLS AND 2SLS ESTIMATES

	1960–1970			1960–1980		
	OLS (1)	2SLS (2)	2SLS (3)	OLS (4)	2SLS (5)	2SLS (6)
Severity group	–0.0716	–0.191	–0.165	–0.101	–0.237	–0.220
(0–2)	(0.0185)	(0.0913)	(0.0856)	(0.0281)	(0.133)	(0.129)
Percentage black	0.273	0.593	0.505	–0.186	0.181	0.123
	(0.133)	(0.282)	(0.265)	(0.254)	(0.435)	(0.431)
Total population	1.19 e–09	3.40 e–08	2.60 e–08	–1.06 e–08	2.71 e–08	2.18 e–08
	(7.37 e–09)	(2.64 e–08)	(2.45 e–08)	(1.83 e–08)	(3.55 e–08)	(3.46 e–08)
Value trend	—	—	0.282	—	—	0.172
1950–60			(0.106)			(0.20)
Northeast	0.0607	0.141	0.141	–0.189	–0.0967	–0.0979
	(0.0482)	(0.0768)	(0.0708)	(0.0711)	(0.114)	(0.111)
Midwest	–0.0687	–0.0014	–0.0164	–0.226	–0.149	–0.159
	(0.0339)	(0.0637)	(0.0594)	(0.0643)	(0.100)	(0.0980)
West	0.0401	0.106	0.0902	0.247	0.322	0.312
	(0.0459)	(0.0736)	(0.0676)	(0.0726)	(0.112)	(0.107)
Constant	0.341	0.312	0.223	1.386	1.352	1.298
	(0.0425)	(0.0506)	(0.0593)	(0.0779)	(0.0857)	(0.103)
N	104	104	104	104	104	104

Notes: Robust standard errors are in parentheses. See the text for discussion of severity group variable: group 2 consists of high severity riot cities; group 1 consists of medium riot cities. In columns 2, 3, 5, and 6 rainfall in April 1968 and the presence of a city manager instrument for the riot severity group. The implicit first-stage regression for columns 2 and 5 is reported in Table 5, column 1. The implicit first-stage regression for columns 3 and 6 is reported in Table 5, column 3.
Sources: The city manager instrumental variable is from Aiken and Alford, *Governmental Units*. Rainfall data are from the National Oceanic and Atmospheric Administration, "Climate Data Online." See the notes to Table 3A for sources of other variables.

severity (as perceived by residents at the time) and that the 2SLS approach mitigates this measurement error.[41]

When only the rainfall instrument is used (the stronger of the two instruments, with an *F*-statistic of 8.2) in regressions similar to those in columns 2 and 5 of Table 6, we get somewhat larger coefficients on the severity-group variable: $\beta_{riot} = -0.26$ (standard error = 0.14) for 1960–1970; $\beta_{riot} = -0.40$ (standard error = 0.23) for 1960–1980. Lastly, to check the sensitivity of the basic results to the way we have specified the 2SLS regressions, we have run 2SLS regressions using the raw index of riot severity as the key independent variable (ranging from 0 to 0.5, with mean at 0.04). Again, the results indicate a negative effect on black property values: $\beta_{riot} = -1.60$ (standard error = 0.80) for 1960–1970; $\beta_{riot} = -2.06$ (standard error = 1.23) for 1960–1980. At the mean

[41] Alternatively, the King riots were (at the time) perceived to be more severe, and our instrument is capturing a "local average treatment effect."

index value of the medium-severity group, the coefficients imply losses of 0.034 (1960–1970) and 0.044 (1960–1980); at the mean index value of the high-severity group, the coefficients imply losses of 0.31 (1960–1970) and 0.40 (1960–1980).[42]

Summary: City-Level Results

From each empirical point of view—simple summary statistics, OLS estimates, and 2SLS estimates—the riots are associated with relative declines in black-owned central-city property values. This negative impact manifests itself despite a number of potential biases that could mitigate the estimates, such as intercity spillovers from the riots that may have made all central cities appear less economically attractive than before the wave of riots.

The aggregate effect of the riots on black property values, although felt most strongly in a relatively small number of cities, appears to have been economically significant. To approximate this aggregate effect, we use the results from column 1 of Table 3A and calculate the predicted log value of black-owned housing in 1970 for each city. We also calculated a counterfactual level by adding the estimated "riot loss" back on to the predicted values of cities with medium or high severity riots. After converting from log values, we averaged the predicted actual and counterfactual black-owned property values across cities, weighting by the number of black homeowners in each city in 1970. We assume that the riots had no effect on cities in the "low severity" category, and therefore we believe the counterfactual is a conservative estimate of the loss. Because we are averaging counterfactual medians across cities, the results should be interpreted as no more than a rough guide to the cumulative effects implied by the coefficients. The weighted average of black-owned home values in 1970 is $15,200 in the "no riot" counterfactual compared to $13,700 in the actual data, implying a riot-induced loss of approximately 10 percent.[43]

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[42] We have also run 2SLS regressions using the natural log of the riot severity index, after assigning 15 cities with zero index values the minimum nonzero riot severity level in the dataset (0.00055). Results are as follows: riot coefficient for 1960–1970 = –0.11 (*t*-statistic = 1.82); for 1960–1980 = –0.14 (*t*-statistic = 1.56).

[43] We made slight adjustments to the values to account for the dependent variable's logarithmic form (see Goldberger, "Interpretation"). The interpretation is not sensitive to the adjustments. Although the text emphasizes that the 10 percent estimate is conservative, it should be noted that we are not factoring in any induced changes in black home ownership due to lower property values (see footnote 29). To the extent that home ownership *per se* has positive externalities (see DiPasquale and Glaeser, "Incentives") riot-induced increases in home ownership might offset some or all of the welfare loss associated with reduced property values.

DISCUSSION OF RESULTS AND EVIDENCE FROM CENSUS TRACTS

Our main explanation for the results described above is straightforward: the occurrence of riots resulted in sharp and persistent declines in the demand for housing in riot-afflicted areas relative to nonriot areas. In this section we discuss why we believe the negative effects on housing values were primarily demand driven, why they were evidently greater for African-Americans, and why they persisted for at least a decade. In this context, census tract-level data provide a more detailed portrait of post-riot change *within* a handful of major cities. It remains difficult to prioritize factors within the list of potential demand-side channels, but we speculate that unobservable changes in people's perceptions regarding security, risk, and local amenities were paramount.

In principle the relative decline in housing prices could have occurred because of an increase in relative housing supply or decrease in housing demand. Evidence at both the city-level and tract-level favors the hypothesis of a demand-driven price decline. Recall that in Table 4 of the city-level analysis adding a control variable for the post-riot change in the number of housing units had little effect on the strongly negative riot coefficients. If supply changes had been key to driving the differential price trends across cities, the riot coefficients should have been sharply reduced in that specification. Moreover, from both historical and theoretical perspectives, it is difficult to believe that the riots could have provoked a strongly positive supply-side reaction, unless met by massive government building programs (which did not occur).

We looked more closely at patterns of change within cities using census tract-level data (a "tract" is the closest census unit to a "neighborhood," usually having about 4,000 residents and separated from other tracts by major streets, streams, or other divisions). This approach is difficult because relatively few riots had their areas of activity carefully recorded and because changes in tract boundaries over time complicate the task of forming consistent comparisons.[44] Nonetheless, for the cities with the four largest riots (Newark, Washington, Detroit, and Los Angeles) and for Cleveland (also in the "high severity" category), we have been able to carefully match extant maps of riot activity to census-tract data.[45] We cannot be sure that the same criteria and care went into the

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[44] In principle, local newspaper accounts from archives could provide more information (albeit imperfectly) on exactly where some more riots occurred.

[45] The riot map for the Los Angeles riot is from Governor's Commission on the Los Angeles Riots, *Violence*; the riot maps for Newark and Detroit's riots are from U.S. Senate, Committee on Government Operations, Permanent Subcommittee on Investigations, *Riots*; the riot map for Washington's riot is from Gilbert (*Ten Blocks*), supplemented with information from the Na-

TABLE 7
TRACT-LEVEL PROPERTY VALUE CHANGES, CLEVELAND AND NEWARK,
1960–1980

	All Tracts (1)	All Tracts with 1950 Value Available (2)	All Tracts with 1950 Value Available (3)	All Tracts with 1950 Value Available (4)
		Panel A: Cleveland		
Riot tract	–0.489	–0.494	–0.407	–0.238
	(0.033)	(0.033)	(0.032)	(0.042)
Value trend 1950–1960	—	—	–0.841	–0.477
			(0.227)	(0.231)
Proportion black 1960	—	—	—	–0.330
				(0.041)
Constant	0.704	0.717	0.980	0.910
	(0.020)	(0.020)	(0.074)	(0.074)
R^2	0.12	0.13	0.25	0.41
Observations	180	151	151	151
		Panel B: Newark		
Riot tract	–0.203	–0.198	–0.212	–0.122
	(0.045)	(0.044)	(0.042)	(0.049)
Value trend 1950–1960	—	—	–0.176	–0.117
			(0.142)	(0.149)
Proportion black 1960	—	—	—	–0.249
				(0.094)
Constant	0.812	0.812	0.867	0.867
	(0.029)	(0.029)	(0.050)	(0.048)
R^2	0.17	0.16	0.18	0.22
Observations	72	71	71	71

Notes: The dependent variable is the change in log median value of owner occupied housing in a tract between 1960 and 1980. Observations are weighted by the number of owner-occupied units reporting value in the tract in 1960. Robust standard errors are in parentheses. Value trend and population change are calculated as changes in log values. The sample includes tracts in the central city (not suburbs). Some tracts do not have median value reported for 1950, and so the sample is smaller in columns 2 to 5 than in column 1. In Newark, tracts 48 and 75 both split in two between 1950 and 1960; we impute a 1950 value for each part (for example, 48.1 and 48.2) by aggregating the split tracts in 1960 (into 48) and then assuming that between 1950 and 1960 each part (48.1 and 48.2) trended like the aggregate tract (48).
Sources: Unless otherwise noted, the tract data are from the published volumes of tract-level information of the United States Department of Commerce, Bureau of the Census, various years (details available from the authors on request). The 1950 value figures for Newark are average values (rather than medians) and are from the block-level volume of the housing census for Newark. Comparable averages where computed for Newark in 1960 (to calculate the 1950–1960 trend) from the computer files of Bogue, *Census Tract Data* (ICPSR study 2932). Population and proportion black in Newark in 1960 are also from Bogue; population for Newark in 1980 is from U.S. Department of Commerce, *Census of Population and Housing, 1980* (ICPSR study 8071).

tional Capital Planning Commission (available from authors on request); the tracts involved in the Hough riot in Cleveland were identified by Fred Smith (*Real Estate Values*, and personal correspondence) on the basis of newspaper and secondary source accounts.

preparation of each map, but for the sake of identifying "riot areas" we believe that the maps provide the best available information.

The most detailed analysis is possible for property values in Cleveland and Newark because we can accurately trace median values in each census tract from 1950 through 1980 without serious concern arising from changes in tract boundaries.[46] Starting with Cleveland, we ask whether median property values declined in the area of the Hough riot (1966) relative to other parts of Cleveland. The results are in panel A of Table 7.[47] The inclusion of the pre-1960 value trend slightly diminishes the riot coefficient (comparing columns 2 and 3), whereas adjusting for the black proportion of the tract's population nearly halves the coefficient. Even with these adjustments, in both column 3 and 4, the value of property in the Hough area declined sharply relative to other parts of Cleveland.[48]

Panel B reports similar regressions for tracts in Newark. In columns 1 and 2, the unadjusted decline in property values in riot tracts relative to nonriot tracts was smaller in Newark than in Cleveland. As in Cleveland, controlling for the pre-existing trend in value has little influence on the riot coefficient in column 3, whereas controlling for the proportion black in 1960 halves the riot coefficient in column 4 (from 0.21 to 0.12). Even so, the riot coefficient remains statistically and economically significant.[49]

William Collins and Fred Smith provide additional detail in a case study of rioting and property values in Cleveland.[50] They measure the straight-line distance from Hough Avenue and 79th Street, the epicenter of riot activity in Cleveland, to the center of each census tract. In the 1950s, there was no correlation between distance, as just defined, and housing value changes, but between 1960 and 1980, changes in housing values were strongly positively related to distance from the riot. Collins and Smith also show that population change in Cleveland was positively related to distance from the riot epicenter.

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[46] For Los Angeles and Detroit, this kind of matching cannot be done nearly as well over the four census dates, and in Washington several tracts have top-coded values in 1960 or 1980, making inference about value trends tenuous.

[47] We get similar results if we use the area affected by the Glenville Shootout (1968) rather than the Hough riot.

[48] We obtain similar results from matching estimators and from a sample that includes only tracts that were 40 percent black in 1960.

[49] As noted above, interpreting data for Washington is complicated by the frequency of top-coded median housing values (about 14 percent of the sample tracts are top-coded, weighted by the number of units reporting values). Bearing that caveat in mind, it appears that on average riot tracts did lose value relative to nonriot tracts between 1960 and 1980 in Washington, D.C., but the standard errors are sufficiently large that in general we cannot reject the hypothesis that there was no difference in trends.

[50] Collins and Smith, "Neighborhood Level View."

TABLE 8
POPULATION CHANGES BY CENSUS TRACTS IN SELECTED CITIES

	1960	1970	1980	1960–1980 Change
		Panel A: Riot Tracts		
Cleveland	71,575	45,487	25,330	−1.039
Detroit	634,406	563,366	397,051	−0.469
Los Angeles	341,349	341,863	337,431	−0.012
Newark	175,411	154,708	116,285	−0.411
Washington	257,562	234,386	187,947	−0.315
Sum	1,480,303	1,339,810	1,064,044	−0.330
		Panel B: Nonriot Tracts		
Cleveland	804,239	706,182	548,643	−0.382
Detroit	1,107,935	1,010,671	855,497	−0.259
Los Angeles	2,137,666	2,473,431	2,629,419	0.207
Newark	229,592	227,537	212,899	−0.075
Washington	506,394	521,993	450,386	−0.117
Sum	4,785,826	4,939,814	4,696,844	−0.019

Notes: Riot tracts were identified by matching maps of riot areas from various sources with census tract maps. This procedure is imperfect due to differences in riot map production and changing census tract boundaries. "Change" is calculated as the difference in the natural log of the population level at each point in time.
Sources: The map for the Los Angeles riot is from the Governor's Commission on the Los Angeles Riots, *Violence in the City*; the map for Newark and Detroit's riots are from U.S. Senate, Committee on Government Operations, Permanent Subcommittee on Investigations, *Riots*; the map for Washington's riot is from Gilbert, *Ten Blocks*; the tracts involved in the Hough riot of Cleveland were identified by Smith ("Real Estate Values" and personal correspondence). The census tract data were extracted from U.S. Department of Commerce data files in ICPSR studies 7552 (1960 census), 9014 (1970 fourth count population summary tape), and 8071 (1980 census). Data for Newark in 1960 are from Bogue, *Census Tract Data* (ICPSR study 2932).

One must be wary about making general inferences on the basis of case studies, but in combination with other evidence, the neighborhood-level property value trends in Table 7 suggest that the riots' effects were most strongly felt in the immediate vicinity of the violence (even after controlling for pre-existing trends and demographic characteristics).

For each of the five cities we can study tract-level population changes. We report tabulations for riot and nonriot tracts by city in Table 8.[51] The riot tracts unambiguously lost population relative to the nonriot tracts in these cities between 1960 and 1980, by approximately 30 percent (when summed across cities). Relative losses are apparent in every city despite substantial differences across cities in terms of total population trends (for example, the total population of Los Angeles

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[51] We omit suburban tracts because there were large additions of such tracts over time, compromising the usefulness of the comparison groups. To be clear, the tract-based population statistics in Table 8 are based on grouping tracts into riot and nonriot categories at each census date, whereas the property value regressions in Table 7 actually link the same tract over time (which is possible only when boundaries change little).

continued to grow while that of Detroit did not). The relatively minor destruction of residential property during the riots cannot directly account for such large population shifts, and pre-existing population trends do not suggest that the riot tracts were uniformly losing population relative to other tracts prior to the riots.[52]

The tract data are helpful in two ways. First, the patterns are consistent with a demand-driven relative price decline (falling population and prices), but not with a supply-driven price decline. Second, the patterns suggest why the previous section's city-level investigation found relatively large effects on black-owned property values: in cities with sizable civil disturbances large portions of the black population resided in the vicinity of the riots, and the negative impact of the riots was felt most strongly in those communities. In 1960, 64 percent of Detroit's black population lived in tracts that would be riot-affected; in Los Angeles, the corresponding figure was 63 percent; in Newark, 77 percent; in Washington, D.C., 45 percent; and in Cleveland, 21 percent resided in the Hough riot area (and many more were very close). Even at their most intense, the 1960s riots did not touch large numbers of people directly in the sense of injury, death, arrest, and personal property destruction. But it appears that many African-Americans must have been indirectly affected—the mayhem occurred not far from their doorsteps.

After the wave of 1960s riots passed, we found no evidence of a bounce back during the 1970s in the city-level data, particularly among black-owned property values. This persistence could be an indication of slow re-adjustment of perceptions in the postriot period (without true changes in each city's economic fundamentals), or it could indicate that certain places experienced real and lasting declines in local amenities relative to other places. A general theoretical mechanism for such endogenous and persistent decline is through external "neighborhood effects" in the context of racially segregated housing markets.[53] In either

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[52] Some evidence indicates that the riot tracts in Washington and Detroit were losing population relative to nonriot tracts before the 1960s. In Cleveland, on the other hand, the riot-afflicted area gained population relative to other areas during the 1950s (an 8 percent rise versus a 6 percent fall). In Newark, the population trends in riot and nonriot tracts appear to be nearly equal during the 1950s (both declining by 8 percent). In the tract totals for Detroit we included Hamtramck and Highland Park. To split the population into riot and nonriot tracts for 1950 in Washington, D.C., we had to make population adjustments for three tracts that experienced some riot activity (in small subsections) but that had been broken into smaller tracts by 1960 (on which we based the initial mapping). We assumed that within the three tracts (in 1950) that the proportion of the population in the riot-afflicted subsection was the same as in 1960. The adjustments for these three tracts should have little influence on the overall trends.

[53] Massey and Denton, *American Apartheid*. Massey and Denton construct a model in which racially segregated neighborhoods are hit by neighborhood-specific negative shocks. A shock reduces income in the afflicted neighborhood and, over time, leads to a deterioration in housing quality and reduced demand for local services. In a related vein, Cutler and Glaeser, "Are Ghet-

case, a sustained negative shift in perceived local amenities would translate directly into lower property values, particularly in the context of housing markets where the downward adjustment of the stock is slow.[54]

It seems unlikely that any single factor can explain the shift in perceptions and, hence, demand. To the extent that proximity to the riots was viewed as a harbinger of persistently higher risk, demand for housing almost certainly would fall. Perceptions of risk are difficult to observe, but this factor's importance is strongly suggested by the fact that insurance rates and security costs for small businesses rose after the riots, and by evidence that city-level spending on police and fire protection also increased. Such risks also apparently registered in the minds of investors: in August and November of 1967, the *New York Times* reported on investors' negative views regarding the municipal bonds of cities that had riots.[55] Local amenities such as access to retail establishments are also valued by households. J. J. Launie; Howard Aldrich and Albert Reiss; and Jonathan Bean have documented that small businesses, especially retail establishments, were more likely to go out of business in riot-afflicted neighborhoods, thereby reducing access to shopping and other retail services.[56] Finally, households value proximity to earnings opportunities, and in related work we have shown that the riots may have had a negative effect on the incomes of black households.[57]

Another potential pathway is that central-city residents may have perceived an increased cost to racial diversity following a riot, such as potentially higher property taxes and more redistribution toward predominantly black neighborhoods.[58] Recent work by Leah Boustan has examined differences in housing prices in the 1960s and 1970s in border neighborhoods between central cities and suburbs.[59] At such borders, political control changes abruptly but housing quality changes smoothly (if at all). Boustan finds that increased racial diversity (percentage black) in central cities was associated with a decrease in hous-

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tos," construct a model of a "good" versus a "bad" ghetto and find that in 1990 ghettos had "bad" effects on their young residents. Collins and Margo ("Residential Segregation") show that ghettos first went "bad" in the Cutler and Glaeser sense in the 1970s.

[54] See Roback, "Wages"; and Glaeser and Gyourko, "Urban Decline."

[55] Allan, "High Bond Rates" and "Will the Riots."

[56] See Launie, "Supply Function"; Aldrich and Reiss, "Effect"; and Bean, "'Burn, Baby, Burn'"; see also Aldrich and Reiss for evidence on insurance rates; and Welch, "Impact," for evidence on urban expenditures.

[57] Collins and Margo, "Labor Market."

[58] Several cities elected their first black mayor not long after the riots (for example, Los Angeles, Detroit, and Washington).

[59] Boustan, "Flight."

ing values on the city side of the border (that is, relative to the suburbs); in this regard, the "discount" for racial diversity was larger in cities that had experienced a severe riot.

CONCLUSION

In the 1960s numerous cities in the United States experienced violent, race-related civil disturbances. In the immediate aftermath of the riots, government at all levels responded with blue-ribbon panels that studied the causes and offered policy recommendations. After the Watts riot, for example, the California Governor's Commission recommended a number of interventions to improve the quality of life of ghetto residents. Three years later, President Johnson's National Advisory Commission on Civil Disorders (the "Kerner Commission") concluded its report with a chapter of "Recommendations for National Action" aimed at improving the economic outcomes of African Americans in central cities thereby (presumably, to the commission) reducing the chances of a future disturbance.[60] Following in the wake of government commissions, social scientists have long studied the underlying causes of the riots, but the economic consequences have received far less attention.

This article has examined census data from 1950 to 1980 to gauge the impact of the 1960s riots on the value of residential property, paying special attention to black-owned property value trends. Precisely measuring the riots' economic effect is difficult because the existing data are imperfect, the riots may have been endogenous, and a host of other factors influenced urban economies at the same time. But we believe that the potential econometric problems are not overwhelming, and nearly all of the evidence we have uncovered points in the same direction. We find significant differences in black-owned property value trends in cities that had medium or severe riots compared to cities with minor disturbances. The relative depression of black-owned property values in riot-torn cities was apparent by 1970, and there was little or no rebound during the 1970s. Even when instrumented using plausibly exogenous variation in weather and city-government structures, the riots appear to have had strong negative effects on black-owned property values.

The results are consistent with a significant and persistent decline in relative demand for residence in the places where riots occurred. We be-

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[60] Kerner et al., *Report. Ex post*, however, the extent to which policy truly responded to the riots is unclear; see Hahn, "Civic Responses"; Welch, "Impact"; and Fine, *Violence*, pp. 425–51). In a more general framework, Acemoglu and Robinson ("Why Did the West") describe how the threat of social disorder might lead a government to redistribute economic benefits and political power.

lieve that changing perceptions of local amenities, including personal and property security, were important factors in driving the decline in demand. From this perspective, our finding (in the city-level analysis) that riots had relatively strong effects on black-owned property values makes sense and squares well with our tract-level case studies—riot activity was concentrated in and around neighborhoods where many African-Americans lived, and property value and population losses show strong signs of localization. Concerns about additional taxes and redistribution may have also played a role in the decline in demand and the depression of housing values relative to other cities, but if this were the dominant factor we would have anticipated less evidence of strongly localized effects within the cities (in this scenario, the net tax-and-transfer would have been least favorable in neighborhoods that were far from the riots). We admit that this prioritization of factors within the demand side is speculative. Future research and more detailed case studies may help clarify the factors underlying the riots' effects.

Residential segregation, urban decay, white flight, and the concentration of poverty in ghetto neighborhoods did not start with the 1960s riots, and so we caution against ascribing too much influence to the riots. Nonetheless, it does appears that the riots left long-lasting, economically significant, negative imprints on the cities and neighborhoods in which they occurred. They vividly illustrated the depth and danger of the social forces that cleaved the United States in the 1960s, and for many places they may have strengthened and accelerated a process of endogenous economic decline.

Appendix

RIOTS AND BLACK-OWNED PROPERTY VALUES, OLS, 2SLS, AND LIML
ESTIMATES

	1960–1970			1960–1980		
	OLS (1)	2SLS (2)	LIML (3)	OLS (4)	2SLS (5)	LIML (6)
Severity group (0–2)	–0.0716 (0.0185)	–0.191 (0.0913)	–0.211 (0.111)	–0.101 (0.0281)	–0.237 (0.133)	–0.296 (0.202)
Percentage black	0.273 (0.133)	0.593 (0.282)	0.647 (0.332)	–0.186 (0.254)	0.181 (0.435)	0.339 (0.602)
Total population	1.19 e–09 (7.37 e–09)	3.40 e–08 (2.64 e–08)	3.96 e–08 (3.20 e–08)	–1.06 e–08 (1.83 e–08)	2.71 e–08 (3.55 e–08)	4.33 e–08 (5.43 e–08)
Northeast	0.0607 (0.0482)	0.141 (0.0768)	0.155 (0.0884)	–0.189 (0.0711)	–0.0967 (0.114)	–0.0568 (0.156)
Midwest	–0.0687 (0.0339)	–0.0014 (0.0637)	0.00993 (0.0732)	–0.226 (0.0643)	–0.149 (0.100)	–0.116 (0.134)
West	0.0401 (0.0459)	0.106 (0.0736)	0.117 (0.0823)	0.247 (0.0726)	0.322 (0.112)	0.355 (0.145)
Constant	0.341 (0.0425)	0.312 (0.0506)	0.307 (0.0538)	1.386 (0.0779)	1.352 (0.0857)	1.338 (0.0959)
N	104	104	104	104	104	104

Notes: Robust standard errors are in parentheses. See the text for discussion of severity group variable: group 2 consists of high severity riot cities; group 1 consists of medium riot cities. In columns 2, 3, 5, and 6 rainfall in April 1968 and the presence of a city manager are the instrumental variables. Columns 3 and 6 are estimated using limited information maximum likelihood (LIML) rather than two-stage least squares. LIML is less susceptible to bias from weak instruments.

Sources: The city manager instrumental variable is from Aiken and Alford, *Governmental Units*. Rainfall data are from National Oceanic and Atmospheric Administration, "Climate Data Online." See the notes to Table 3A for sources of other variables.

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