THE ECONOMIC AFTERMATH OF THE 1960s RIOTS IN AMERICAN CITIES: EVIDENCE FROM PROPERTY VALUES

William J. Collins and Robert A. Margo

Vanderbilt University and NBER

April 2005

Abstract: In the 1960s numerous cities in the United States experienced violent, race-related civil disturbances. Although social scientists have long studied the causes of the riots, the consequences have received much less attention. This paper 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 ordinary least squares and instrumental variables 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. Analysis of household-level data suggests that the racial gap in the value of property widened in riot-afflicted cities during the 1970s.

JEL Codes: R0, N92, J15

Mail: Department of Economics, Box 351819-B, Vanderbilt University, Nashville, TN 37235

Email: william.collins@vanderbilt.edu; robert.a.margo@vanderbilt.edu.

Acknowledgments: We are grateful for data shared by Gregg Carter and Michael Haines. We appreciate suggestions from Orley Ashenfelter, Martha Bailey, Elizabeth Cascio, William Dickens, Audrey Light, Justin McCrary, and seminar participants at Boston University, Brookings Institution, UC Davis, Carnegie-Mellon, Davidson College, UC Irvine, University of Kentucky, MIT, Miami University, NBER, Ohio State University, Princeton University, and UCLA. Brett Austin, Hannah Moon, Stephanie Schacht, and Dustin Worley provided excellent research assistance. Part of this research was supported by a National Science Foundation grant (0095943).

I. Introduction

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 Watts, a predominantly black section of Los Angeles, ushered in an unusually violent period in American urban history.[1] In subsequent years scores of riots broke out in urban black neighborhoods, including widespread disturbances following the murder of Martin Luther King in April, 1968. The riots stood in sharp contrast to the carefully orchestrated, non-violent components of the early Civil Rights Movement.

Social scientists have long tried to identify city-level factors associated with the incidence and severity of riots in the 1960s. This line of investigation started with Lieberson and Silverman [1965], Wanderer [1969], and Spilerman [1970, 1971, 1976], and it has continued in more recent work by Olzak et al. [1996], DiPasquale and Glaeser [1997], and Myers [1997, 2000].[2] As we discuss in more detail below, the literature suggests that the most robust city-level predictors of riot severity are the size of the black population and the regional location.

In contrast to the literature on the riots' causes, there are comparatively few studies of the riots' effects [Frey 1970, Kelly and Snyder 1980, Collins and Margo 2004]. Consequently, the riots' economic significance remains largely undocumented. After briefly characterizing the riots in section II, this paper gathers evidence to measure the riots' effect on residential property values between 1960 and 1980. Our fundamental question is straightforward: Did the riots have sizable, long-lasting economic effects on the cities in which they occurred? In answering this question, we rely primarily on city-level data to measure the average effect of riots on property values. We supplement the investigation with evidence from household-level data (when possible) and from tract-level data for a set of cities that experienced severe riots.

---

[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.

[2] Other notable contributions include Downes [1968], Lieske [1978], and Carter [1986].

Our investigation is closely connected to a much larger body of work on the history and economic implications of urban residential segregation, especially the concentration of poverty in predominantly black central-city neighborhoods.[3] Different authors have emphasized different aspects of the story, but the overarching theme features the interplay of four factors. First, discriminatory norms and public policies, large racial gaps in income and wealth, and black migration into central cities led to high levels of urban residential segregation. Second, postwar macroeconomic and technological trends lowered the relative demand for unskilled labor which disproportionately affected black workers. Third, as a larger black middle and professional class emerged, relatively high-income blacks began leaving central-city neighborhoods for the suburbs. Fourth, and potentially endogenous to the first three factors, central-city neighborhoods experienced rising rates of crime and unemployment.

Our analysis should be seen generally in the context of this literature, and specifically, as an investigation of the potential spillover effects from adverse shocks emphasized by Massey and Denton [1993]. Although destructive, the riots of the 1960s did not damage or destroy large portions of any city's stock of buildings, residential or otherwise. However, a riot's direct effect may be much smaller than its indirect effect, which operates through changed perceptions of the city's economic environment. The hypothesis under consideration is that riots in the 1960s imparted negative impulses that contributed to the economic decline of some central cities in the short run (the 1960s) and that persisted through the 1970s.[4] It is entirely plausible, however, that the riots' effects were small and short-lived; indeed, under certain conditions, the effects might even have been positive.

We concentrate on the riots' potential impact on property values for two reasons. First, it is well-established in the urban economics literature that housing values reflect a broad range of city and

---

[3] See, inter alia, Weaver 1948, Kain 1968, Wilson 1987, Galster 1991, Massey and Denton 1993, Sugrue 1996, Cutler and Glaeser 1997, Collins and Margo 2000, and Yinger 2001.

[4] That is, severe riots may have been shocks that were propagated into "bad ghettos", in the sense of Cutler and Glaeser [1997]. In 1990 data, Cutler and Glaeser find a strong adverse correlation between segregation levels and young blacks' socioeconomic status. Collins and Margo [2000] find that this correlation is much weaker before the 1970s.

neighborhood characteristics. Therefore, if a riot contributes to a decline in perceived amenities (broadly defined) relative to other cities, we should be able to detect a relative decline in property values. Second, Collins and Margo [2003] found that the racial gap in housing values widened in central cities in the 1970s and suggested that the widening might be associated with the occurrence of riots. That suggestion, however, stopped far short of a causal interpretation. This paper provides a much more direct test of the hypothesis that the riots were causally linked to changes in property values.

In our examination of census data, we find negative, persistent, and economically significant correlations between riot severity and trends in black-owned property values. Because our research design relies on differences across cities in housing value trends, these estimates might understate the riots' true impact on cities. For example, riots in some cities might have influenced perceptions about the economic prospects of all cities (or about black areas of all cities). Such inter-city spillovers would tend to diminish the magnitude of the riot coefficients in our basic econometric framework.

Alternatively, it is possible, though contrary to much of the existing sociology literature, that omitted variables drove both the variation in riot severity and the variation in observed housing market trends, thereby confounding measures of the riots' impact. We address this problem by controlling for a series of relevant city characteristics: pre-existing trends in housing values and pre-riot measures of city size, black population size, manufacturing employment, residential segregation, crime, and region. We also pursue an instrumental variable approach to estimating the riots' effects. We use variation in the weather around the time of Martin Luther King's assassination and differences in city government structure to isolate exogenous variation in riot severity. From each perspective, the riots appear to have had a strong, persistent, and negative impact on property values.

II. The Riots and Their Measure

The United States has a long history of violent, race-related civil disturbances [Gilje 1996]. In most cases of collective violence prior to the 1940s, the riots were instigated by white civilians who

attacked black civilians and property, 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 closer resemblance to those that occurred in the 1960s. As in the 1960s, some of the 1943 events included violent clashes between black civilians and police, the looting of retail establishments, and several instances of arson, often centered in predominantly black neighborhoods. Since the 1960s, the U.S. has not been immune to large-scale, destructive riots, as outbreaks in Miami (1980) and Los Angeles (1992) vividly demonstrated. Nonetheless, the 1960s riots were historically unusual. They were widespread geographically and tightly clustered temporally, with hundreds of riots and several severe riots (by historical standards) occurring within just a few years.

Sociologists have carefully documented the location, timing, and severity of race-related civil disturbances in the 1960s and early 1970s. 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 with a reasonable margin of error, the combination of information provides a detailed picture of riot activity.

The standard operational definition of a race-related riot, established explicitly in Spilerman's early work [1970, 1971], required a spontaneous event with at least 30 participants, some of whom were black, that resulted in property damage, looting, or other "aggressive behavior". Disturbances that were directly associated with organized protests, or that occurred in school settings were excluded. Carter [1986] extended Spilerman's original data to 1971. He also verified the original data by checking alternative sources (when available), and in general, refined the database for subsequent studies. Carter's dataset covers 1964 to 1971 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 Carter's data to measure variation in riot severity across cities.

To provide a rough quantitative characterization of the riots, we combine five aspects of each riot in an index of severity. 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, arsons, 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. Summed over all riots, there are five total index points, reflecting the five components that enter the calculation. We add the index values for each riot within a city to form a cumulative city-level riot severity measure.[5]

The index has potential shortcomings. First, 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.[6] But the individual components of the index are strongly positively correlated, and so in practice it matters little if we re-weight them in various ways.[7] Moreover, the composite index makes it quantitatively clear that some cities experienced much more severe riots than others. Rather than rely on the exact index values to measure the riot effects, we rely primarily on comparisons across groups of cities. A second potential shortcoming is that we cannot, in general, observe exactly where the riots occurred *within* cities. This is one consideration that precludes extensive use of census tract data. Nonetheless, in section IV.C, we discuss tract-level data for a handful of major cities for which we

[5] 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 and the household-level regressions include area fixed effects and allow for differential trends by city size (see below).

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

[7] 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 one percent level.

carefully matched maps of riot activity to maps of census tracts.

Table 1 summarizes the riot data by component, year, and census region. Clearly, riot activity was highly concentrated in 1967 and 1968, which together account for 3.3 out of the 5.0 total index points. When the index numbers are arrayed by census region, there appears to be a comparatively even geographic spread of riot activity.[8] Although major riots did occur in every region, the 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 DC 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.

III. Riots' Potential Influence on Property Values

The economic consequences of a riot are theoretically ambiguous. People could view a riot as a purely temporary disturbance with few long-run implications, in which case we would expect no significant changes in the economic decisions that affect the city or its property values. Alternatively, a riot could set in motion a dynamic process of deteriorating economic outcomes. The perceived quality of public goods (e.g., security) and amenities might erode, mobile residents and businesses might relocate to more secure environs, and if demand for central-city properties declines then some properties might be allowed to physically depreciate.

Along these lines, Roback [1982] develops a model in which workers and firms are mobile across cities and are responsive to variation in rents, wages, and amenities. For a particular city with a given set of amenities, workers are indifferent along an upward sloping wage-rent schedule (they require higher

[8] Washington DC and Baltimore, which had sizable riots, are counted in the census South.

wages to reside in a place with higher rents), whereas competitive firms are indifferent along a downward sloping wage-rent schedule (they require lower wages to locate in a place with higher rents). In this framework, both schedules will shift if there is a decline in the city's amenities relative to other places, leading to lower relative property values.

In practice, however, a riot could elicit a large flow of outside resources to affected areas (or to people living in those areas), thereby improving the economic quality of life and perhaps even attracting new residents and businesses. The Kerner Commission Report, for example, concluded with a chapter of "Recommendations for National Action" aimed at improving the economic outcomes of African Americans in central cities [Kerner 1968]. Similarly, after the Watts riot, the California Governor's Commission recommended a number of interventions to improve the quality of life of ghetto residents. [9] And post-riot surveys in some cities found that a substantial fraction of black respondents thought that the riot would have positive effects [Welch 1975]. Thus, through the political process, it is possible that a riot could lead to an improvement in local amenities.

A key feature of the "adverse-impact" view is that a riot might shift perceptions regarding the future costs and benefits (broadly construed) associated with residing in, doing business in, or even traveling through a particular area. If a riot imparts a significant negative shock to the expected stream of net benefits associated with central-city properties, it would lead to an immediate decline in property values. This effect could work through a number of channels that feed into the net benefits stream: personal and property risk might seem higher; insurance premiums might rise; taxes for redistribution or more police and fire protection might increase, and municipal bonds may be more difficult to place; retail outlets might close; businesses and employment opportunities might relocate; friends or family might move away; burned out buildings might be an eyesore; and so on.[10] In this regard, Aldrich and Reiss [1970] and

[9] Ex post, the extent to which policy truly responded to the riots is unclear [Hahn 1970, Welch 1975]. In a more general framework, Acemoglu and Johnson [2000] describe how the threat of social disorder might lead a government to redistribute economic benefits and political power.

[10] In some cities, buildings burned in the riots remained partly standing but unrepaired for years; in others, vacant lots remained where the buildings once stood.

Bean [2000] argue that small businesses were especially hard hit by the riots and by subsequent increases in insurance and security costs; Welch [1975] documents differential increases in city spending on police and fire protection between 1965 and 1969 in riot cities compared to non-riot cities; and the *New York Times* reported on investors' negative views regarding the municipal bonds of cities that had riots [Allan, August 13, 1967; November 15, 1967].

The implications for the city's population size and composition are complex. Because the residential building stock is highly durable, supply adjusts slowly to negative demand shocks. This point is illustrated by Glaeser and Gyourko [2001], who find a tight correspondence between changes in a city's population and changes in a city's housing stock. Therefore, in the period after a riot, a leftward shift of demand for housing in the city may lower housing prices without lowering population levels. Rather, as long as there are housing units available, people may live in them (even though they might not be the same people who lived in them prior to the riots). Over a longer period, if properties fall into complete disrepair and are not replaced, then the population should decline correspondingly; or, if new housing investment is increasingly directed elsewhere, the population should decline relative to other places.

IV. Empirical Strategy, Data, and Results

To study the riots' effects, we rely primarily on 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.[11] We focus on the city-level data for three reasons. First, because the existing microdata sample of the 1960 census does not include city codes, it is impossible to use household-level data to explore city-specific changes in economic conditions during the 1960s.[12] Second, because it seems

[11] 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 paper's results are not sensitive to excluding cities with relatively large differences.

[12] We have carried out an analysis using state identifiers – see section IV.B.

unlikely that the effects of riots were contained in the neighborhoods in which they occurred, comparisons across census tracts within cities might greatly understate the overall effects of the riots.[13] Third, a nationwide tract-level investigation is infeasible because we rarely know exactly where riots unfolded within cities and because there were widespread changes in census-tract boundaries between 1950 and 1980. Nonetheless, to supplement our city-level investigation (section IV.A), we examine the 1970 and 1980 microdata samples (IPUMS) of black and white households (section IV.B), and we compiled tract-level population data for five cities that experienced severe riots (section IV.C).

IV.A. City-Level Data and Results

Our econometric approach exploits inter-city variation in riot severity and property value trends. The "city-level" data that we examine pertain to residents of central cities, not to residents of entire metropolitan areas. The reported value of residential property is a combination of land and house value. In the years we study, the variable is a self-reported estimate of current value. While there may be errors in such estimates, it is likely that the errors average out over large numbers of home owners, and to the extent that there is bias, we have no reason to think that the bias changed over time.[14]

The existing literature on the cross-city distribution of riot severity suggests that after accounting for each city's black population size and region, comparatively little variation in severity can be accounted for by standard measures of African Americans' economic status (in either absolute terms, or relative to whites). 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" [1976, p. 789]. Rather, he argues that racial tensions were high nearly everywhere, and

[13]Although our estimates based on cross-city variation might also be diminished by cross-city spillovers, we argue that the problem would be far more serious in estimates based on cross-tract variation within cities.

[14] Kain and Quigley [1972] argue that the self-appraisals are reliable. Ihlanfeldt and Martinez-Vazquez [1986] 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.

therefore, nearly all places with substantial black populations were at risk of a riot outbreak.[15]

After reading the detailed chronologies of specific riots, one might argue many severe riots were essentially idiosyncratic events. 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 variation in riot severity is largely random (conditional on black population size and region), then straightforward Ordinary Least Squares (OLS) techniques may provide reliable estimates of the riots' economic effects. We are concerned, however, that other factors might be associated with both property value trends and riots. Therefore, we include several control variables in the empirics that follow, and we also pursue an instrumental variable strategy. The instrumental variable approach should provide consistent estimates of the riot effects in the presence of omitted variables and should also mitigate attenuation bias associated with measurement error in riot severity.

Some issues of interpretation should be kept in mind. First, even though levels of residential segregation were quite high, the median black central-city home owner might not be located near the epicenter of the riots. Therefore, our measures might not capture changes in the areas of the city most directly affected by riot activity.[16] 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

---

[15] In regressions of three components of riot intensity on a variety of city characteristics, DiPasquale and Glaeser also find that the size of the nonwhite population is the most consistent predictor [1997, table 6]. Additionally, for two out of three components (arrests and arsons), 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.

[16] In Cleveland and Newark (discussed below), the tracts most directly affected by the riots had smaller property value increases (nominal) between 1960 and 1980 than did the median black-owned property value in those cities.

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 considerations come into play, they are likely to diminish the magnitude of measured riot effects in our framework. Therefore, we regard our estimates as fairly conservative.

Ordinary Least Squares Approach

We begin by estimating the following basic specification by OLS over the 1960-1970 or 1960-1980 period, where *i* indexes a particular city, and *DV* 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).

[eq. 1] $$\Delta V_i = \alpha + \beta_1 X_i + \beta_2 \text{Region}_i + \beta_3 \text{Riot}_i + e_i$$

In every specification, the vector of X-characteristics includes the city's total population (1960), the black proportion of the city's population (1960), and dummy variables for census regions. In subsequent specifications, 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 changes in the log median value of all residential properties over the 1950 to 1960 period.[17] Cities with large manufacturing sectors circa 1960 might have been adversely affected by de-industrialization [see Sugrue 1996], and it is possible that labor demand shifts made riots more likely and (independent of riots) depressed property values. 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

[17] Race-specific property values are not available for 1950. The segregation data are from Cutler, Glaeser, and Vigdor [1999]. The crime rate figure for 1962 is calculated from the Federal Bureau of Investigation's annual publication of Uniform Crime Statistics.

the relative attractiveness of cities.

The *Riot* variable is based on the index values described above. We group cities into three categories, and we enter dummy variables for "medium severity" and "high severity" in the regressions. The distribution of the riot index across cities is highly skewed, with a large number of relatively minor riots and a small number of quite severe ones. Therefore, the low-severity category includes all cities below the 50th percentile in the index (0 to 0.009); the medium-severity category includes the 50th to the 88th percentile (0.009 to 0.07); and the high-severity category includes cities above the 88th percentile (0.07 to 0.52).[18] This strikes a reasonable balance between parsimony (with relatively few observations) and flexibility in describing the data.[19] 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 subsequent regressions (some smaller cities do not report race-specific property values and therefore are omitted). 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. Because the city-groups differed along a number of other economically relevant dimensions (including region and size), it may be misleading to interpret the raw

[18] Cities around the 90th percentile had very similar index values, so chose a break at the 88th percentile instead.

[19] 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, non-linear 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.

average differences as estimates of the riots' effect. Instead, we estimate the riots' effect conditional on several observable city characteristics.

The identifying assumption in the OLS regressions is that conditional on the X variables and the regional indicators, variation in riot severity is uncorrelated with the error term in regression equation 1. That is, controlling for X and region, we begin by assuming that there are not contemporaneous shocks to property values that are correlated with the severity of riots. In light of the existing sociology literature, discussed above, and given official descriptions of how particular riots unfolded, such an assumption is defensible. Again, the point is not that the 1960s riots had nothing to do with blacks' economic status in the United States, but rather that the variation in riot severity across places in the United States was highly idiosyncratic. The instrumental variable approach described below helps alleviate remaining concerns regarding omitted variables.

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 14 log points in high-severity riot cities relative to low-severity riot cities (the omitted category). Column 2's specification includes the manufacturing proportion of employment to capture property value trends driven by post-1960 de-industrialization. Column 3 adds the 1950 to 1960 trend in values, and column 4 adds the 1962 crime rate. Column 5 adds a measure of metro area residential segregation (a dissimilarity index). 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 cities with relatively high levels of segregation in 1960 subsequently experienced relative declines in black property values. The pre-riot crime rate appears to have had no significant influence on subsequent property values. Importantly, the negative and significant coefficients on the riot variables are not undermined in any of these specifications.

Given our reliance on census data, it is very difficult to rule out unobserved factors operating between 1960 and 1965 that could have influenced housing markets. Although it is a rough gauge of

changes in local economic conditions just prior to the riots, we can include controls for changes in state-level personal income per capita compiled by the Bureau of Economic Analysis (results not shown in table).[20] Doing so has little effect on the riot coefficients in the base specifications of tables 3A and 3B (results available on request). We also used the IPUMS to calculate a labor demand shift index for the 1960s which 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 a high concentration of workers in industries that were increasing their employment share at the national level. Again, this variable's inclusion does not undermine the OLS riot coefficients.

Columns 6 to 10 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. Although the point estimates are somewhat smaller than those for black-owned property, these estimated effects are economically large, and especially for the high-severity coefficients, statistically significant.[21] The riots' average effect was strong enough to shift the center of the entire value distribution relative to that in other cities.

There is no evidence in table 3B that property values in riot-torn cities bounced back relative to others during the 1970s. If anything, the point-estimates for the 1960-80 period are somewhat larger in magnitude than for the 1960-70 period. In the medium-severity cities, on average, black property values fell by 8 to 10 log points relative to the omitted category between 1960 and 1980. The point estimates for the average decline in the high-severity cities range from 14 to 20 log points. Although the high-severity coefficients for the "all properties" regressions (columns 6 to 10) are less precisely estimated than those for black-owned properties, the coefficients for both medium and high-severity variables remain

---

[20] Personal income per capita data are from the Bureau of Economic Analysis's website: www.bea.doc.gov.

[21] We cannot use the "all races, owner occupied property values" to form a legitimate difference-in-difference-in-difference estimator. But it is worth noting that after entering 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: -0.04 (t-stat= 1.7) for medium severity and -0.08 (t-statistic = 2.4) for high severity.

economically large.

We have tested the robustness of the OLS estimates in several 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.[22] Omitting any one of the high severity cities has little impact on the riot coefficients. Splitting the full sample into non-southern and southern segments dramatically reduces the sample sizes but does not undermine the significant negative relationship between riots and changes in black property values. Quantile regressions (at the median) of the base specifications yield riot coefficient estimates that are similar to the OLS results. Finally, albeit imperfectly, we have assembled data 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. Interestingly, but beyond the bounds of this paper, the urban renewal coefficient is positively and significantly associated with changes in black-owned and all property values.[23]

Controlling for Contemporaneous Changes in Economic Variables

The riots may have affected a broad range of post-1960 economic variables in cities, and therefore, in tables 3A and 3B we have not controlled for contemporaneous and potentially endogenous changes in median black family income, the number of housing units or people in the city, or the black home ownership rate. Nonetheless, doing so might provide some insight into the channels that mediated

---

[22] 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 -0.14 (t-statistic = 1.9) rather than -0.20 (t-statistic = 3.2).

[23] The coefficients suggest (depending somewhat on the period of change and whether using black-specific values) that a one standard deviation change in urban renewal funding per urban resident was associated with a 5 percent improvement in property values. We do not, however, claim that estimates a true "treatment effect". State-level urban renewal data are from U.S. Department of Housing and Urban Development [1970]; city-level urban renewal figures are not reported. Urban population figures for 1960 are from U.S. Department of Commerce [1975].

the observed decline in median black property values. For example, if controlling for the change in black family income were to diminish the coefficients on riot severity, one might infer that the riots' negative effect on property values was mediated largely through a negative impact on blacks' labor market outcomes.

According to table 4, however, adding contemporaneous controls to the base specifications of tables 3A and 3B has a minimal effect on the riots' 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 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 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 substantial 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. Ceteris paribus, changes in city population and in the number of housing units are weakly correlated with black-owned property values.

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). This relative increase in ownership was driven largely by the relatively large decline in housing prices in riot cities. That is, controlling for the change in observed housing values, the relationship between ownership and riots is no longer economically and statistically significant.

Again, given the endogeneity of post-1960 economic variables to the occurrence of riots, we are reluctant to attach strong causal interpretations to the results in this subsection. 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.

Two Stage Least Squares Approach

In tables 3A and 3B, the OLS regressions' inclusion of several city-specific variables should mitigate the possibility that unobserved factors correlated with riot severity had an independent influence on post-1960 property values. 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 April 4, 1968, and subsequently more than 100 riots erupted. Thus, a specific, identifiable event greatly increased the likelihood of rioting during the month.[24] There is considerable anecdotal evidence that people are less likely to engage in collective violence when it rains. Sidney Fine [1989, p. 140] refers to an event in Detroit in 1966 as "the riot that didn't happen" because rainfall helped defuse an emerging riot. The *New York Times* reported that on August 10, 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 [Waldron 1968]. In August 1969, the *New York Times* cited a Washington community activist who claimed that rainfall had "nipped one riot in the bud" [Herbers 1969]. 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" [p. 78]. However, the rioting recommenced the next afternoon (when it was not raining). 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."[25] Finally, the U.S. Army's field manual for civil disturbances (FM 19-15) suggests that spraying water may be highly effective as "a high-trajectory weapon, like rainfall" especially

[24] 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 time-series that riots were more likely in the summer months.

[25] http://www.cnn.com/2003/US/Midwest/06/18/michigan.unrest/

in cool weather.[26]

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 (rather than a mayor). We believe that this predetermined feature of city government did not have a direct effect on changes in property values, 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, black proportion of the population, and manufacturing proportion of employment yields a small and statistically insignificant coefficient on the city manager dummy variable (-0.0039, t-statistic = 0.17). At the same time, it is plausible that city managers, who were supposed to apply professional administrative skills to government operations [Sommers 1958], defused the racial tensions underlying riots more effectively than mayors did.[27] 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 [Greeley and Sheatsley 1971]. Professional city managers, though certainly not immune from local political pressures, faced a national labor market for their services, one in which their reputation for competent management was paramount. We admit that while this interpretation is consistent with the data, it is also speculative, and so we discuss some results obtained from using only the rainfall instrument.

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 0, medium intensity riot cities a severity value of 1, and high intensity riot cities a severity value of 2, and then we instrument for

[26] http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/19-15/CH9.htm

[27] 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 [1976] or Eisinger [1973].

severity-group using the rainfall variable and the city manager dummy. We also check results using the raw severity index as the key independent variable rather than "severity group" (discussed below).

The first-stage regression results indicate that rainfall in April 1968 and the presence of a city manager are useful predictors of variation in riot severity. Appendix table 1 reports several variants of the first-stage regressions. In column 1, which is the basic specification underlying our 2SLS approach, severity group is regressed on region dummies, city size, black proportion of population (in 1960), rainfall in April 1968, and the city-manager dummy. The rainfall coefficient is -0.109 (t-statistic = 3.24) and the city-manager coefficient is -0.229 (t-statistic = 1.64). The F-statistic for their joint significance is 5.5 (and partial R-squared on excluded instruments is 0.08), suggesting that there is potentially weak-instrument bias in the two-stage least squares estimates, which we discuss below.[28]

Importantly, as shown in columns 2, 3, and 4 of appendix table 1, average annual rainfall, average April rainfall, and rainfall in April of 1967 are poor predictors of riot severity compared to the April 1968 variable. This implies that the instrument is not merely picking up a coincidental correlation between rainy-ness (even in April) and riot proneness. For example, in column 2, adding average annual rainfall to the basic first-stage regression yields coefficients of 0.0016 (t-statistic = 0.21) on annual rain and -0.110 (t-statistic = 3.13) on April 1968 rain. Column 5'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 6 is similar to column 1, but it excludes the city manager variable; the rainfall coefficient is only slightly changed. Finally, in column 7, a first-stage regression that uses the

[28] Bound, Jaeger, and Baker 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 [1995, p. 443]. 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 [2002] 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 2). 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 [1997]). 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.

actual severity index (rather than severity group) as the dependent variable returns a coefficient on April 1968 rainfall of -0.0140 (t-statistic = 2.60) and on city manager of -0.0250 (t-statistic = 1.75).

In a reduced form regression of change in black property value (1960-70) on rainfall in April 1968, average annual rainfall, and region indicators, the April 1968 rain coefficient is 0.022 (t-statistic = 2.06). For 1960-80, the coefficient is 0.028 (t-statistic = 1.70). That is, conditional on region and average annual rainfall (and/or rainfall in April 1967), cities with more rain in April 1968 had larger gains in black property values after 1960.

The second-stage regression results are reported in table 5 (columns 2, 3, 5, and 6), along with comparable OLS specifications (columns 1 and 4). The first column is estimated by OLS and is very similar in specification and results to the first column of table 3A, suggesting that the replacement of the severity dummies with the severity-group variable (with values 0, 1, and 2) is a reasonable simplification. In general, the 2SLS coefficients and their standard errors are larger in magnitude than in the OLS analogues. The 2SLS coefficients are uniformly negative, economically large, and remain near conventional levels of statistical significance. 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 1960-70 and 0.27 for 1960-80) that we are reluctant to dismiss the implication of the 2SLS results that the true effects are larger than the OLS estimates.

We noted above that the first-stage F-statistic on the excluded instruments suggests that the 2SLS estimates may be biased toward the OLS estimates. However, we find that 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 2). 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 5, we get somewhat larger coefficients on the severity-group variable: β_{riot} = -0.26 (t-statistic = 1.84) for 1960-70; β_{riot} = -0.40 (t-statistic = 1.71) for 1960-80.

Finally, to check the sensitivity of the basic results to the way we have specified the 2SLS regressions, we have run alternative 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: β_{riot} = -1.60 (t-statistic = 1.93) for 1960-70; β_{riot} = -2.06 (t-statistic = 1.62) for 1960-80. At the mean index value of the medium-severity group, the coefficients imply losses of 0.034 (1960-70) and 0.044 (1960-80); at the mean index value of the high-severity group, the coefficients imply losses of 0.31 (1960-70) and 0.40 (1960-80).[29]

Thus, from every empirical point of view – simple summary statistics, OLS estimates, and 2SLS estimates – the riots are associated with relative declines in central-city property values, particularly for property owned by African Americans. This negative impact manifests itself despite a number of potential biases that could mitigate the estimates, especially inter-city spillovers from the riots that may have made all central cities appear less economically attractive than before the wave of riots.

IV.B. Household-Level Data and Results

The main advantage of household-level data is that one can control for a variety of housing and household characteristics, including race (white-specific figures are not available in the published census volumes for the city-level analysis). The main drawbacks are that the 1950 household sample has no housing data (and therefore trends are not observed), and the 1960 household sample has no city codes, making it is impossible to match people to city-level riot measures in that year.

We have examined the relationship between riots and urban property values using the state identifiers in the 1960 IPUMS sample. Even at that level of aggregation, riots appear to have had a negative effect on black-owned property values. Specifically, equation 2 describes a basic difference-in-

[29] We have also run 2SLS regressions using the natural log of the riot severity index, after assigning fifteen cities with zero index values the minimum non-zero riot severity level in the dataset (0.00055). Results are as follows: riot coefficient for 1960-70 = -0.11 (t-statistic = 1.82); for 1960-80 = -0.14 (t-statistic = 1.56).

difference estimator for a sample of black homeowners who resided in metropolitan areas (drawn from the 1960 and 1970 IPUMS). We assigned "high severity" riot status to a state if it contains a city that had a riot that fell intro the high severity category (as described in previous section).[30] Because we include state fixed effects (γ_j), time-invariant state-level variables are not identified, but the key coefficient (β_3) on the interaction of riot severity and the 1970 year dummy is identified. β_3 reflects 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 (i.e., X allows for such trends).[31]

[eq. 2] $$\ln V = \alpha + \gamma_j + \beta_1 X + \beta_2 1970 + \beta_3 (\text{High Severity}_j \times 1970)$$

The estimate of β_3 is -0.065 (t-statistic = 2.27, adjusted for state clustering). This state-based estimate is necessarily highly imperfect, and it is not directly comparable with city-level estimates, but the general result is consistent with the evidence from the previous section. Regressions that adjust for selection into home ownership based on head's age, educational attainment, state of residence, and gender yield similar results (in either a Heckman two-step procedure, or with controls entered directly in the DD regression).

Because the 1970 and 1980 IPUMS samples both include metropolitan area identifiers (whereas the 1960 sample does not), we can examine the relationship between riot severity and metropolitan-area property value trends in the 1970s.[32] Because our initial year post-dates the most intense period of rioting, the analysis should be seen as a check on the reliability of our "long run" (1960-80) estimates based on

[30] "Medium severity" cities are too numerous and too well dispersed across states to use an indicator for medium severity in the state-based estimation framework. Therefore, the high severity coefficient is estimated by an implicit comparison against states with medium and low severity riots (but not high severity ones).

[31] Similar results are obtained if non-metropolitan residents are included in the analysis.

[32] It is not possible to limit the sample to central-city residents. Therefore, a large number of suburban residents will be included in this analysis. The sets of medium and high severity metropolitan areas are very similar to the sets for the city-level analysis. We exclude metropolitan areas in 1980 that did not exist in the 1970 data set.

city-level data. In particular, the city-level analysis suggested that black-owned property values in riot-afflicted cities did not rebound in the 1970s, and so we expect not to find a positive relationship between riots and the post-1970 value trends. We also use the household-level data to examine changes in the racial gap in property values *within* cities, an analysis that is not possible with the city-level data.

Starting with a sample of all black household heads residing in owner-occupied housing (and reporting housing values), we estimate the following difference-in-difference (DD) regression:

[eq. 3] $\ln V = \alpha + \gamma_j + \beta_1 X + \beta_2 1980 + \beta_3 (\text{Medium Severity}_j \times 1980) + \beta_4 (\text{High Severity}_j \times 1980).$

In this case, g_j is a set of metropolitan-area fixed effects, *Medium* and *High Severity* are indicator variables, and the *1980* indicator equals one for observations from 1980 (and zero for those from 1970). Again, the inclusion of fixed effects implies that coefficients are not identified for any time-invariant city characteristics (such as the level of riot severity). β_3 and β_4 measure the extent to which black-owned property values trended differently across areas depending on the severity of riots that occurred (conditional on X). β_2 captures city-invariant trends in black property values. The vector of X variables allows for differential property value trends across regions, differential trends depending on metropolitan area population size (in 1970), and differential trends depending on the proportion of employment in manufacturing (in 1970). In several specifications, we also control for a list of housing characteristics that includes the number of rooms, number of bathrooms, the age of the building, whether it is air-conditioned, and how it is heated.

Column 1 of table 6 shows that during the 1970s the log value of black-owned housing declined by about 0.16 in high-severity riot areas and 0.04 in medium-severity cities compared to other cities, but the standard errors (adjusted for SMSA clustering) are large. Moreover, allowing for differential regional trends (column 2), halves the high-severity coefficient's point estimate. Allowing for differential trends by city size and the proportion of manufacturing employment (column 3), both of which are negatively

correlated with property value changes in the 1970s, leaves small and statistically imprecise riot coefficients.[33] This is consistent with the city-level results (tables 3A and 3B) which revealed small differences in the coefficient estimates for the 1960-70 period and the 1960-80 period. Black property values in riots-afflicted cities did not bounce back relative to blacks residing elsewhere in the 1970s, but they did not lose much more ground either.

Adding controls for observable housing characteristics in column 4 substantially reduces the high-severity riot coefficient even before allowing differential trends by region, city size, and manufacturing employment. This suggests that during the 1970s, the observable components of the physical quality of black-owned housing in high-severity riot cities declined relative to those elsewhere.

Table 7 expands the analysis to include white household heads in a difference-in-difference-in-difference (DDD) framework. Using whites as an additional comparison group could, in principle, difference out unobserved city-specific shocks to housing values that are correlated with riot severity (and therefore confound the measure of riot effects in the difference-in-difference approach pursued above). But we caution readers that whites are not be a true "control group" to the extent that they too were affected by or responded to the occurrence of riots. Rather, we provide the estimates in table 7 to shed light on how riots influenced the racial gap in property values *within* metropolitan areas.

There is evidence that during the 1970s the racial gap in property values widened substantially in cities that had severe riots compared to cities that did not. In the first three columns of table 7 (without controls for house characteristics) the estimates of the relative decline are between -0.11 and -0.16 for the high severity cities, but much smaller (and statistically imprecise) for the medium severity cities. This provides some support for the aforementioned suggestion in Collins and Margo [2003] that riots influenced the racial gap in property values in some cities.[34] Adding numerous controls for building

---

[33] SMSA size, manufacturing employment, and housing characteristics may be endogenous to the prior occurrence of a riot. If so, the treatment effect is best captured by the regression in column 2.

[34] A regression similar to that in column 1 of table 7, but without variables interacting black, riot severity, and 1980, yields a much larger coefficient on the interaction of black and 1980 (approximately -0.15 rather than -0.05 as in column 1). In this sense, the riot variables account for a substantial portion of

characteristics (in columns 4 to 6) reduces the DDD point estimates, but they remain economically substantial (between 6 and 9 log points). Introducing variables for city size and manufacturing concentration in columns 3 and 6 (interacted with year) has little effect on the size of the riot coefficients.

IV.C. A "Within-City" View from Census Tract Data

Systematic examination of neighborhood-level responses to the riots is infeasible due to the absence of reliable information on the exact within-city location of every riot and due to numerous changes in census-tract boundaries (particularly, between 1950 and 1970).[35] 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 carefully matched maps of riot activity to census-tract maps and census-tract data. The riot map for the Los Angeles riot is from the Governor's Commission report [1965]; the riot maps for Newark and Detroit's riots are from the U.S. Senate report [1967]; the riot map for Washington's riot is from Gilbert [1968], supplemented with a map from National Capital Planning Commission; the tracts involved in the Hough riot in Cleveland were identified by Fred H. Smith [2000 and personal correspondence] on the basis of newspaper accounts. We cannot be sure that the same criteria and care went into the preparation of each map, but for the sake of identifying "riot areas", we believe that the maps provide the best available information.

The most consistently reported and least restricted piece of tract-level information is the population count. We report population changes for riot and non-riot tracts in each city and summed across cities in table 8. To facilitate comparison over time, we limit the comparison to tracts in each central city.[36] The riot tracts unambiguously lost population relative to the non-riot tracts in these cities between 1960 and 1980, by approximately 35 percent (when summed across cities). Relative losses are

---

the widening racial gap in urban areas in the 1970s.

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

[36] We omit suburban tracts because there were large additions of such tracts over time, compromising the usefulness of the comparison groups.

apparent in every city despite substantial differences across cities in terms of total population trends (for example, the total population of Los Angeles continued to grow while that of Detroit did not). Again, it is worth noting that the limited destruction of residential property during the riots cannot directly account for such large population changes.

We are, however, reluctant to interpret these differential trends as measures of riot-induced mobility effects. First, we do not believe that the non-riot tracts are a suitable "control group" for the riot-tracts – rather, we would argue that riot effects were felt throughout the city, potentially inducing out-migration from all areas. Second, there is some evidence that the riot tracts were losing population relative to the non-riot tracts prior to 1960. In both Washington and Detroit, riot tracts appear to have been losing population relative to non-riot tracts during the 1950s.[37] In Cleveland, on the other hand, the riot-afflicted area gained population relative to other areas during the 1950s, but lost population rapidly thereafter in both absolute and relative terms.

For Cleveland, Newark, and Washington [in progress] we can accurately match tracts from the housing census from 1950 through 1980 without serious concern from changes in tract boundaries. For Los Angeles and Detroit, this kind of matching cannot be done nearly as well over the four census dates. The exact matching facilitates a straightforward econometric test for differential trends in property values in riot-afflicted tracts.

Starting with Cleveland, we ask whether median property values declined in the area of the Hough riot (1966) relative to other parts of Cleveland, after controlling for pre-1960 value trends and for the

[37] In the tract totals for Detroit we included Hamtramck and Highland Park even though they are administratively distinct. To split the population into riot and non-riot tracts for 1950 in Washington, DC, 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 riot/non-riot 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. In the 1960 data, there are 41 tracts that later had riot activity, so we expect the adjustments for these three tracts to have little influence on the overall trends. Tract-level population data for Newark in 1950 are not available.

proportion of the tract population that was black in 1960. The results are in panel A of table 9.[38] The inclusion of the 1950-1960 trend in values leads to the omission of several tracts for which 1950 values are not available. Columns 1 and 2 simply compare results from samples with and without the "lost" tracts – the coefficient on the Hough riot dummy variable is nearly identical. Column 3's specification adds the 1950-60 value trend, and column 4's specification adjusts for the tract's racial composition in 1960. The inclusion of the value trend slightly diminishes the riot coefficient (comparing column 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 the city.[39]

In column 5, we add a control variable for the change in log population between 1960 and 1980. These population shifts are likely to be endogenous to the riot's occurrence, but the regressions may reveal whether the relative decline in property values in the riot tracts can be accounted for, in a particular sense, by depopulation. The coefficient on the riot dummy declines by two-thirds (from -0.24 to -0.07), implying a strong correlation between depopulation in Cleveland's tracts and property value declines. The Hough riot coefficient remains economically nontrivial.

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 non-riot 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. Adding the change in population from 1960 to 1980 has little effect on the riot coefficient for Newark (unlike Cleveland), implying that differential trends in population cannot account for the differential trends

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

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

in property values between riot and non-riot tracts.

As with the population trends discussed above, these results are descriptive measures of post-riot changes within cities rather than measures of the riots' causal effects. Moreover, given the small number of cities for which we are able to match riot maps to tract maps, and to match exact tracts over time, it is impossible to argue that the findings are representative of all cities that experienced severe riots.[40] Nonetheless, the tract-level evidence appears to support the "adverse view" of how riots influenced urban economies – population shifted away from riot-afflicted tracts, and (at least in Cleveland and Newark) riot tracts lost value relative to others within the same city.

V. Conclusion

In the 1960s numerous cities in the United States experienced violent, race-related civil disturbances. Although social scientists have long studied the causes of the riots, the consequences have received much less attention. This paper uses census data to examine the impact of the riots on the value of residential property, with an emphasis on black-owned property. Precisely measuring the riots' economic effect is difficult because the existing data are imperfect and because the riots may have been endogenous. 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 that the occurrence of a riot significantly depressed the value of black-owned property between 1960 and 1970, and that there was little or no rebound during the 1970s. Smaller, but non-trivial, riot-induced declines are also evident for all owner-occupied property. These findings are based on the analysis of median values of the city-wide distribution of housing values, implying that the riot effects were powerful enough to shift the center of the property value distribution – the effects were not narrowly contained in the areas that experienced the riot activity. Even when instrumented using plausibly

[40] Though the comparisons are highly imperfect in comparison to the Cleveland data, it appears that riot tracts in Newark lost value relative to those elsewhere in the city, whereas riot tracts in Washington DC and Detroit had post-1960 ends that were similar to the rest of the city.

exogenous variation in weather and city-government structures, the riots appear to have had strong negative effects on black property values. Furthermore, analysis of household-level data from the IPUMS samples suggests that the racial gap in housing values widened in riot-afflicted cities during the 1970s. Along with recent work on the riots' labor market effects [Collins and Margo 2004], this paper's findings suggest that the riots were adverse shocks with long-lasting and potentially self-propagating effects, as described more generally by Massey and Denton [1993].

Although the city-level data analyzed in this paper are sufficient to reveal the existence of riot effects on property values, they are too coarse to reveal the precise location, timing, and mechanisms of the decline. Additional geographic detail can be gained by examining the impact of the riots at the census tract-level. We compared riot and non-riot tracts in Washington, Los Angeles, Detroit, Newark, and Cleveland, cities for which we were able to consistently match maps of riot activity to maps of census tracts. Riot-torn tracts lost substantial amounts of population relative to non-riot tracts between 1960 and 1980. This is consistent with a decline in the demand for housing in response to a decline in perceived neighborhood quality. In Newark and Cleveland, properties in riot tracts lost value relative to properties in non-riot tracts in the same city, even after controlling for pre-existing trends and racial composition. We do not attach a strong causal interpretation to the differential trends in census tract data because we think the effects of riots reverberated outside the neighborhoods in which the riots actually occurred. But the tract-level view does provide perspective on changes within cities in the wake of severe riots.

In future research, more detailed case studies may add considerable depth to the emerging portrait of the riots' adverse effects at the neighborhood level. Natural extensions of the city-level investigation might shed light on differential trends in crime rates, political changes (e.g., the election of black mayors) and policy outcomes, fiscal crises, and local investment activity.

References

Acemoglu, Daron and James Robinson. 2000. "Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective." Quarterly Journal of Economics 115 1167-1199.

Aiken, Michael and Robert Alford. 1998. Governmental Units Analysis Data. Inter-University Consortium for Political Research, Study 0028.

Aldrich, Howard and Albert J. Reiss. 1970. "The Effect of Civil Disorders on Small Business in the Inner City." Journal of Social Issues 26: 187-206.

Allan, John H. 1967. "Will the Riots Hurt Municipal Bond Sales?" The New York Times (August 13): 115.

Allan, John H. 1967. "High Bond Rates Bring in Buyers" The New York Times (November 15): 61.

Bean, Jonathan J. 2000. "'Burn, Baby, Burn': Small Business in the Urban Riots of the 1960s," The Independent Review 5: 165-187.

Bound, John, David A. Jaeger, and Regina M. Baker. 1995. "Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable Is Weak." Journal of the American Statistical Association 90: 443-450.

Carter, Gregg Lee. 1986. "The 1960s Black Riots Revisited: City Level Explanations of Their Severity." Sociological Inquiry 56: 210-228.

Collins, William J. and Robert A. Margo. 2000. "Residential Segregation and Socioeconomic Outcomes: When Did Ghettos Go Bad?" Economics Letters 69: 239-243.

Collins, William J. and Robert A. Margo. 2003. "Race and the Value of Owner-Occupied Housing, 1940-1990." Regional Science and Urban Economics 33: 255-286.

Collins, William J. and Robert A. Margo. 2004. "The Labor Market Effects of the 1960s Riots." In W.G. Gale and J.R. Pack (eds.), Brookings-Wharton Papers on Urban Affairs 2004. Washington DC: Brookings Institution, 1-46.

Congressional Quarterly Service. 1967. Urban Problems and Civil Disorder: Special Report No. 36. Washington DC.

Cutler, David M. and Edward L. Glaeser. 1997. "Are Ghettos Good or Bad?" Quarterly Journal of Economics 112: 827-72.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 1999. The Rise and Decline of the American Ghetto. Journal of Political Economy 107: 455-506.

DiPasquale, Denise and Edward L. Glaeser. 1998. "The Los Angeles Riot and the Economics of Urban Unrest." Journal of Urban Economics 43: 52-78.

Downes, Bryan T. 1968. "Social and Political Characteristics of Riot Cities: A Comparative Study."

Social Science Quarterly 49: 504-520.

Eisinger, Peter K. 1973. "The Conditions of Protest Behavior in American Cities." American Political Science Review 67: 11-28.

Fine, Sidney. 1989. Violence in the Model City: The Cavanagh Administration, Race Relations, and the Detroit Riot of 1967. Ann Arbor: University of Michigan Press.

Frey, William H. 1979. "Central City White Flight: Racial and Nonracial Causes, "American Sociological Review 44: 425-448.

Galster, George C. 1991. "Housing Discrimination and Urban Poverty of African-Americans." Journal of Housing Research 2: 87-122.

Gilbert, Ben W. 1968. Ten Blocks from the White House: Anatomy of the Washington Riots of 1968. New York: Praeger.

Gilje, Paul. 1996. Rioting in America. Bloomington, IN: Indiana University Press.

Glaeser, Edward L. and Joseph Gyourko. 2001. "Urban Decline and Durable Housing," NBER Working Paper 8598.

Governor's Commission on the Los Angeles Riots. 1965. Violence in the City: An End or a Beginning? Los Angeles.

Greeley, Andrew M. and Paul B. Sheatsley. 1971. "Attidudes toward Racial Integration." Scientific American 225 (December): 13-19.

Hahn, Harlan. 1970. Civic Responses to Riots: A Reappraisal of Kerner Commission Data. Public Opinion Quarterly 34: 101-107.

Herbers, John. 1969. "U.S. Officials Say Big Riots Are Over." New York Times, August 24, 1969.

Ihlanfeldt, K.R. and J. Martinez-Vazquez. 1986. "Alternative Value Estimates of Owner-Occupied Housing: Evidence on Sample Selection Bias and Systematic Errors." Journal of Urban Economics 20: 356-369.

Kain, John F. 1968. "Housing Segregation, Negro Employment and Metropolitan Decentralization." Quarterly Journal of Economics 82: 75-97.

Kain, John F. and John M. Quigley. 1972. "Housing Market Discrimination, Home Ownership, and Savings Behavior." American Economic Review 62: 263-277.

Kelly, William R. and David Snyder. 1980. "Racial Violence and Socioeconomic Changes among Blacks in the United States." Social Forces 58: 739-760.

Kerner, Otto, et al. 1968. Report of the National Advisory Commission on Civil Disorders. New York: New York Times Company.

Lieberson, Stanley, and Arnold R. Silverman. 1965. "The Precipitants and Underlying Conditions of Race

Riots." American Sociological Review 30: 887-898.

Lieske, Joel A. 1978. "The Conditions of Racial Violence in American Cities." American Political Science Review 72: 1324-1340.

Massey, Douglas S. and Nancy A. Denton. 1993. American Apartheid: Segregation and the Making of the Underclass. Cambridge, MA: Harvard University Press.

Myers, Daniel J. 1997. "Racial Rioting in the 1960s: An Event History Analysis of Local Conditions," American Sociological Review 64: 94-112.

Myers, Daniel J. 2000. "The Diffusion of Collective Violence: Infectiousness, Susceptibility, and Mass Media Networks." American Journal of Sociology 106: 173-208.

Olzak, Susan, Suzanne Shanahan, and Elizabeth H. McEneaney. 1996. "Poverty, Segregation, and Race Riots: 1960 to 1993," American Sociological Review 61: 590-613.

Roback, Jennifer. 1982. "Wage, Rents, and the Quality of Life." Journal of Political Economy 90: 1257-1278.

Ruggles, Steven, Matthew Sobek, et. al. 2003. Integrated Public Use Microdata Series. Minneapolis: Historical Census Projects, University of Minnesota.

Smith, Fred H. 2000. Real Estate Values and the Location of Economic Activity: A Case Study of the Urban Form of Cleveland, 1915-1980. Nashville, TN: Vanderbilt University Dissertation.

Sommers, William A. 1958. "Council-Manager Government: A Review." Western Political Quarterly 11: 137-148.

Spilerman, Seymour. 1970. "The Causes of Racial Disturbances: A Comparison of Alternative Explanations," American Sociological Review 35: 627-649.

Spilerman, Seymour. 1971. "The Causes of Racial Disturbances: Test of an Explanation," American Sociological Review 36: 427-442.

Spilerman, Seymour. 1976. "Structural Characteristics of Cities and the Severity of Racial Disorders." American Sociological Review 41: 771-793.

Staiger, Douglas, and James H. Stock. 1997. "Instrumental Variables Regression with Weak Instruments." Econometrica 65 557-586.

Stock, James H., Jonathan H. Wright, and Motohiro Yogo. 2002. "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments." Journal of Business & Economic Statistics 20: 518-529.

Sugrue, Thomas J. 1996. The Origins of the Urban Crisis: Race and Inequality in Postwar Detroit. Princeton: Princeton University Press.

U.S. Department of Commerce, Bureau of the Census. 1970. Census of Population and Housing, 1970: Summary Statistics File 4A – Population. [Computer files] Ann Arbor, MI: Inter-University

Consortium for Political and Social Research, Study 9014.

U.S. Department of Commerce, Bureau of the Census. 1971. Census Tract Level Data, 1960. [Computer files] Ann Arbor, MI: Inter-University Consortium for Political and Social Research, Study 7552.

U.S. Department of Commerce, Bureau of the Census. 1975. Historical Statistics of the United States: Colonial Times to 1970. Washington, DC: Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1979. County and City Data Book, Consolidated File, City Data 1944-1977. [Computer files] Ann Arbor: Inter-University Consortium for Political and Social Research, Study 7735.

U.S. Department of Commerce, Bureau of the Census. 1982. Census of Population and Housing, 1980: Summary Tape 3A. [Computer files] Ann Arbor, MI: Inter-University Consortium for Political and Social Research, Study 8071.

U.S. Senate, Committee on Government Operations, Permanent Subcommittee on Investigations. 1967. Riots, Civil, and Criminal Disorders. 90th Congress, First Session, Part 1.

U.S. Department of Housing and Urban Development. 1970. 1970 HUD Statistical Yearbook. Washington, DC: Government Printing Office.

Waldron, Martin. "Miami Drops Bond Against Rioters." New York Times, August 11, 1968.

Wanderer, Jules J. 1969. "An Index of Riot Severity and Some Correlates." American Journal of Sociology 74: 500-505.

Weaver, Robert C. 1948. The Negro Ghetto. New York: Harcourt, Brace.

Welch, Susan. 1975. "The Impact of Urban Riots and Urban Expenditures." American Journal of Political Science 19: 741-760.

Wilson, William Julius. 1987. The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy. Chicago: University of Chicago Press.

Yinger, John. 2001. "Housing Discrimination and Residential Segregation as Causes of Poverty." In S.H. Danziger and R.H. Haveman (eds.), Understanding Poverty. Cambridge, MA: Harvard University Press, 359-391.

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 text for 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 [1986] and were received through personal communication.

Table 2: Summary Statistics, City-Level Data, by Severity Group

	Low Severity	Medium Severity	High Severity
Mean Severity Index	0.003 (0.003)	0.021 (0.014)	0.195 (0.155)
Mean Log Change in Median Black Property Value, 1960-70	0.384 (0.144)	0.318 (0.128)	0.270 (0.097)
Mean Log Change in Median Black Property Value, 1960-80	1.327 (0.207)	1.166 (0.280)	1.021 (0.278)
Mean Log Change in Median All Races Property Value, 1960-70	0.303 (0.117)	0.264 (0.112)	0.251 (0.115)
Mean Log Change in Median All Races Property Value, 1960-80	1.303 (0.201)	1.152 (0.273)	1.101 (0.344)
Mean Log Change in Median All Races Property Value, 1950-1960	0.344 (0.108)	0.346 (0.095)	0.314 (0.136)
Black Proportion of Population	0.153 (0.112)	0.196 (0.117)	0.231 (0.128)
Total Population	216772 (137059)	313494 (201211)	1549190 (1966480)
Proportion of Workers in Manufacturing, 1960	0.210 (0.095)	0.279 (0.102)	0.291 (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: Sample for summary statistics is 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.

Table 3A: Riots and Property Values, City-Level Data, 1960-1970

	1: Black	2: Black	3: Black	4: Black	5: Black	6: All	7: All	8: All	9: All	10: All
High Riot Severity	-0.148	-0.150	-0.136	-0.133	-0.111	-0.0978	-0.100	-0.0955	-0.101	-0.0961
	(0.400)	(0.0397)	(0.0349)	(0.0347)	(0.0365)	(0.0352)	(0.0360)	(0.0367)	(0.0382)	(0.0410)
Medium Riot Severity	-0.0669	-0.0698	-0.0669	-0.0639	-0.0621	-0.0405	-0.0438	-0.0428	-0.0483	-0.0424
	(0.0259)	(0.0251)	(0.0246)	(0.0238)	(0.0229)	(0.0226)	(0.0233)	(0.0231)	(0.0219)	(0.0222)
Percent Black	0.274	0.258	0.235	0.250	0.124	0.167	0.149	0.141	0.114	0.0875
	(0.134)	(0.139)	(0.134)	(0.135)	(0.131)	(0.117)	(0.119)	(0.122)	(0.121)	(0.124)
Total Population	2.62e-09	3.43 e-09	-4.98 e-10	9.86 e-10	1.97 e-09	1.99 e-08	2.08 e-08	1.95 e-08	1.68 e-08	1.59 e-08
	(7.25e-09)	(7.74e-09)	(6.64e-09)	(6.53e-09)	(5.98e-09)	(6.84e-09)	(7.12e-09)	(7.33e-09)	(9.47e-09)	(9.13e-09)
Prop. Manu. 1960	-----	0.0915	0.0272	0.0240	0.148	-----	0.103	0.0810	0.0870	0.0902
		(0.194)	(0.185)	(0.184)	(0.189)		(0.114)	(0.115)	(0.117)	(0.123)
Value Trend 1950-60	-----	-----	0.319	0.310	0.233	-----	-----	0.109	0.126	0.103
			(0.0872)	(0.0892)	(0.0932)			(0.0811)	(0.0827)	(0.0878)
Crime Rate 1962	-----	-----	-----	-1.20	0.516	-----	-----	-----	2.19	2.51
				(1.81)	(1.63)				(2.31)	(2.40)
Residential Segregation	-----	-----	-----	-----	-0.638	-----	-----	-----	-----	-0.167
					(0.203)					(0.160)
Northeast	0.0612	0.0459	0.0728	0.0709	0.0338	0.0470	0.0298	0.0389	0.0424	0.0400
	(0.0490)	(0.0663)	(0.0657)	(0.0655)	(0.0664)	(0.0362)	(0.0432)	(0.0437)	(0.0447)	(0.0474)
Midwest	-0.0694	-0.0839	-0.0763	-0.0775	-0.0726	-0.0342	-0.0505	-0.0479	-0.0456	-0.0464
	(0.0335)	(0.0448)	(0.0428)	(0.0425)	(0.0403)	(0.0276)	(0.0330)	(0.0329)	(0.0338)	(0.0340)
West	0.0401	0.0366	0.0351	0.0430	0.0299	0.116	0.112	0.111	0.0970	0.0897
	(0.0462)	(0.0458)	(0.0443)	(0.0470)	(0.0434)	(0.0338)	(0.0342)	(0.0341)	(0.0389)	(0.0388)
Constant	0.339	0.327	0.231	0.252	0.744	0.254	0.241	0.208	0.170	0.311
	(0.0449)	(0.0552)	(0.0631)	(0.0722)	(0.165)	(0.0338)	(0.0370)	(0.0443)	(0.0609)	(0.136)
N	104	104	104	104	101	104	104	104	104	101
R^2	0.25	0.25	0.31	0.31	0.42	0.21	0.22	0.23	0.24	0.27
Mean Dep. Var.	0.338	0.338	0.338	0.338	0.340	0.278	0.278	0.278	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 the "black value" regressions). Black-specific trends cannot be discerned for many cities for 1950 to 1960 due to incomplete reporting in the 1950 census volumes. Samples in the last five columns are restricted to include the same cities as the first three columns. The residential segregation variable is a dissimilarity index from the Cutler, Glaeser, and Vigdor [1999] dataset. 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 [1986]. The crime rate data for 1962 are tabulated from the Federal Bureau of Investigation's Uniform Crime Reports, table 41. The Cutler, Glaeser, and Vigdor [1999] segregation data are available at www.nber.org.

Table 3B: Riots and Property Values, City-Level Data, 1960-1980

	1: Black	2: Black	3: Black	4: Black	5: Black	6: All	7: All	8: All	9: All	10: All
High Riot Severity	-0.202	-0.193	-0.181	-0.176	-0.139	-0.0804	-0.0708	-0.0666	-0.0755	-0.0630
	(0.0629)	(0.0587)	(0.0570)	(0.0595)	(0.0593)	(0.0653)	(0.0619)	(0.0616)	(0.0635)	(0.0652)
Medium Riot Severity	-0.100	-0.0879	-0.0855	-0.0803	-0.0844	-0.0771	-0.0643	-0.0635	-0.0725	-0.0748
	(0.0412)	(0.0407)	(0.0406)	(0.0406)	(0.0391)	(0.0371)	(0.0370)	(0.0370)	(0.0368)	(0.0383)
Percent Black	-0.186	-0.122	-0.141	-0.116	-0.373	-0.405	-0.338	-0.345	-0.389	-0.505
	(0.256)	(0.258)	(0.266)	(0.267)	(0.268)	(0.222)	(0.217)	(0.226)	(0.234)	(0.253)
Total Population	-1.04 e-08	-1.38 e-08	-1.70 e-08	-1.45 e-08	-1.31 e-08	9.65 e-09	6.19 e-09	5.02 e-09	5.67 e-10	1.58 e-10
	(1.96e-08)	(1.90e-08)	(1.84e-08)	(1.68e-08)	(1.25e-08)	(1.42e-08)	(1.37e-08)	(1.37e-08)	(1.65e-10)	(1.61e-08)
Prop. Manu. 1960	-----	-0.378	-0.432	-0.437	-0.210	-----	-0.395	-0.414	-0.404	-0.354
		(0.262)	(0.258)	(0.253)	(0.246)		(0.225)	(0.219)	(0.224)	(0.236)
Value Trend 1950-60	-----	-----	0.265	0.249	0.131	-----	-----	0.0952	0.123	0.0991
			(0.158)	(0.159)	(0.164)			(0.153)	(0.161)	(0.172)
Crime Rate	-----	-----	-----	-2.06	1.29	-----	-----	-----	3.60	4.67
				(3.23)	(3.11)				(3.35)	(3.61)
Residential Segregation	-----	-----	-----	-----	-1.05	-----	-----	-----	-----	-0.276
					(0.326)					(0.245)
Northeast	-0.189	-0.126	-0.104	-0.107	-0.177	-0.289	-0.223	-0.215	-0.209	-0.238
	(0.0723)	(0.0827)	(0.0836)	(0.0830)	(0.0857)	(0.0544)	(0.0660)	(0.0657)	(0.0667)	(0.0755)
Midwest	-0.227	-0.167	-0.160	-0.162	-0.159	-0.233	-0.171	-0.169	-0.165	-0.173
	(0.0643)	(0.0789)	(0.0778)	(0.0769)	(0.0719)	(0.0547)	(0.0616)	(0.0609)	(0.0620)	(0.0629)
West	0.247	0.262	0.260	0.274	0.243	0.283	0.298	0.297	0.273	0.250
	(0.0729)	(0.0753)	(0.0735)	(0.0782)	(0.0771)	(0.0554)	(0.0566)	(0.0567)	(0.0635)	(0.0662)
Constant	1.386	1.434	1.353	1.389	2.194	1.400	1.451	1.422	1.359	1.586
	(0.0806)	(0.0897)	(0.105)	(0.115)	(0.258)	(0.0587)	(0.0639)	(0.0816)	(0.107)	(0.216)
N	104	104	104	104	101	104	104	104	104	101
R^2	0.50	0.51	0.52	0.52	0.60	0.60	0.61	0.61	0.61	0.63
Mean Dep. Var.	1.212	1.212	1.212	1.212	1.214	1.207	1.207	1.207	1.207	1.211

Notes: See notes to table 3A.

Sources: See sources for table 3A.

Table 4: Riots and Black-Owned Property Values, City-Level Data with Contemporaneous Controls, 1960-70 and 1960-80

	1:1960-70	2:1960-70	3:1960-70	4:1960-70	5:1960-70	6:1960-80	7:1960-80	8:1960-80	9:1960-80	10:1960-80
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)	(0.0430)	(0.0408)
Percent 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	-1.04 e-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	-----	-----
			(0.0910)					(0.0984)		
Change in Black Home Ownership Rate (post 1960)	-----	-----	-----	-0.438	-----	-----	-----	-----	-0.847	-----
				(0.333)					(0.301)	
Change in Log Occupied Housing Units in City (post 1960)	-----	-----	-----	-----	0.00397	-----	-----	-----	-----	0.201
					(0.0985)					(0.0946)
Northeast	0.0612	0.0902	0.0588	0.0261	0.0619	-0.189	-0.0365	-0.124	-0.239	-0.0992
	(0.0490)	(0.048)	(0.0491)	(0.506)	(0.0493)	(0.0723)	(0.0824)	(0.0747)	(0.0695)	(0.0774)
Midwest	-0.0694	-0.0667	-0.0710	-0.0928	-0.0689	-0.227	-0.144	-0.173	-0.287	-0.158
	(0.0335)	(0.0305)	(0.0331)	(0.0336)	(0.0333)	(0.0643)	(0.0709)	(0.0654)	(0.0574)	(0.0653)
West	0.0401	0.0969	0.0396	-0.000784	0.0403	0.247	0.369	0.263	0.156	0.277
	(0.0462)	(0.0413)	(0.0464)	(0.0573)	(0.0464)	(0.0729)	(0.0799)	(0.0707)	(0.0714)	(0.0709)
Constant	0.339	0.0909	0.341	0.377	0.338	1.386	0.725	1.340	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	0.50	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 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.

Sources: See sources for table 3A.

Table 5: Riots and Black-Owned Property Values, OLS and 2SLS Estimates

	1: OLS, 1960-70	2: 2SLS, 1960-70	3: 2SLS, 1960-70	4: OLS, 1960-80	5: 2SLS, 1960-80	6: 2SLS, 1960-80
Severity Group (0-2)	-0.0716	-0.191	-0.165	-0.101	-0.237	-0.220
	(0.0185)	(0.0913)	(0.0856)	(0.0281)	(0.133)	(0.129)
Percent 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
	(7.37e-09)	(2.64e-08)	(2.45e-08)	(1.83e-08)	(3.55e-08)	(3.46e-08)
Value Trend 1950-60	-----	-----	0.282	-----	-----	0.172
			(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.

Sources: The city manager instrumental variable is from the Governmental Units Analysis Data [Aiken and Alford 1998; ICPSR 28]. Rainfall data are from the National Climatic Data Center website (www.ncdc.noaa.gov). See the notes to table 3A for sources of other variables.

Table 6: Property Values and Riots, Black Household-Level Data, 1970-1980

	1	2	3	4	5	6
High Riot Severity × 1980	-0.160 (0.0902)	-0.0804 (0.0551)	-0.0149 (0.0578)	-0.0570 (0.0812)	-0.0230 (0.0491)	0.0163 (0.0549)
Medium Riot Severity × 1980	-0.0418 (0.0533)	-0.0108 (0.0440)	-0.0122 (0.0413)	-0.0365 (0.0424)	-0.0165 (0.0378)	-0.0179 (0.0358)
Midwest × 1980	-----	-0.0397 (0.0630)	-0.0224 (0.0560)	-----	-0.0291 (0.0581)	-0.0131 (0.0.0513)
South × 1980	-----	0.251 (0.0553)	0.164 (0.0557)	-----	0.164 (0.0505)	0.102 (0.0516)
West × 1980	-----	0.440 (0.0392)	0.406 (0.0411)	-----	0.434 (0.0297)	0.405 (0.0320)
SMSA Size × 1980	-----	-----	-3.31 e-06 (1.53e-06)	-----	-----	-2.00 e-06 (1.29e-06)
Prop. Manu. × 1980	-----	-----	-0.576 (0.197)	-----	-----	-0.448 (0.190)
1980	0.968 (0.0403)	0.765 (0.0539)	0.973 (0.0107)	0.802 (0.0319)	0.660 (0.0441)	0.814 (0.0773)
SMSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
House Characteristics	No	No	No	Yes	Yes	Yes
R^2	0.47	0.48	0.49	0.64	0.65	0.65
N	32114	32114	32114	32114	32114	32114
Metro Areas	123	123	123	123	123	123

Notes: Sample includes all black household heads with housing value reported. Robust standard errors adjusted for clustering by SMSA are in parentheses. SMSA size is based on the number of observations in the IPUMS in 1970, by metropolitan area. Proportion of employment in manufacturing is from the IPUMS 1970 sample, by metropolitan area. Controls for housing characteristics include the number of rooms (linear) and series of indicator variables for: the number of bathrooms; age of building; units in building structure; air conditioning; and heating system type.
Sources: Micro data are from the IPUMS [Ruggles and Sobek 2003]. Riot data are based on Carter [1986]; see table 1 and discussion in text.

Table 7: Property Values and Riots, Black and White Household-Level Data, 1970-1980

	1	2	3	4	5	6
Black × High Riot Severity × 1980	-0.158	-0.115	-0.120	-0.0897	-0.0646	-0.0669
	(0.0494)	(0.0523)	(0.0510)	(0.0431)	(0.0485)	(0.0477)
Black × Medium Riot Severity × 1980	-0.0494	-0.0264	-0.0282	-0.0272	-0.0162	-0.0171
	(0.0385)	(0.0399)	(0.0393)	(0.0379)	(0.0401)	(0.0393)
Black × High Riot Severity	0.0372	0.0136	0.0163	0.0184	0.00428	0.00552
	(0.0472)	(0.0394)	(0.0401)	(0.0430)	(0.0395)	(0.0398)
Black × Medium Riot Severity	0.0199	0.00673	0.00756	0.0137	0.00744	0.00782
	(0.0362)	(0.0340)	(0.0344)	(0.0252)	(0.0239)	(0.0242)
Black × 1980	-0.0477	-0.0640	-0.0582	-0.106	-0.127	-0.120
	(0.0313)	(0.0537)	(0.0547)	(0.0316)	(0.0543)	(0.0555)
High Riot Severity × 1980	0.0487	0.0459	0.0802	0.0594	0.0579	0.0903
	(0.0452)	(0.0458)	(0.0685)	(0.0386)	(0.0391)	(0.0558)
Medium Riot Severity × 1980	0.0256	0.0240	0.0262	0.00882	0.00809	0.0103
	(0.0372)	(0.0371)	(0.0372)	(0.0331)	(0.0330)	(0.0318)
1980	0.840	0.841	0.887	0.783	0.784	0.785
	(0.0622)	(0.0630)	(0.0861)	(0.0528)	(0.0538)	(0.0717)
Black	-0.497	-0.488	-0.492	-0.294	-0.280	-0.286
	(0.0898)	(0.0752)	(0.0742)	(0.0572)	(0.0455)	(0.0438)
SMSA Size × 1980	-----	-----	-1.46 e-06	-----	-----	-1.49 e-06
			(1.46e-06)			(1.24e-06)
Prop. Manu. × 1980	-----	-----	-0.115	-----	-----	0.0380
			(0.155)			(0.144)
Region × Year	Yes	Yes	Yes	Yes	Yes	Yes
Black × Region	Yes	Yes	Yes	Yes	Yes	Yes
Black × Region × Year	No	Yes	Yes	No	Yes	Yes
SMSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
House Characteristics	No	No	No	Yes	Yes	Yes
R^2	0.53	0.53	0.53	0.74	0.74	0.75
N	418360	418360	418360	418360	418360	418360
Metro Areas	124	124	124	124	124	124

Notes: Sample includes all black and white household heads with housing value reported. Robust standard errors adjusted for clustering by SMSA are in parentheses. SMSA size is based on the number of observations in the IPUMS in 1970, by metropolitan area. The proportion of employment in manufacturing is also calculated using the IPUMS 1970 sample, by metropolitan area. Controls for housing characteristics include the number of rooms (linear) and series of indicator variables for: the number of bathrooms; age of building; units in building structure; air conditioning; and heating system type.

Sources: Micro data are from the IPUMS [Ruggles and Sobek 2003]. Riot data are based on Carter [1986]; see table 1 and discussion in text.

Table 8: Population Changes by Census Tracts in Selected Cities

Panel A: Riot Tracts				
	1960	1970	1980	1960-80 Change
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: Non-Riot Tracts				
	1960	1970	1980	1960-80 Change
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 report [1965]; the map for Newark and Detroit's riots are from the U.S. Senate report (1967); the map for Washington's riot is from Gilbert [1968]; the tracts involved in the Hough riot of Cleveland were identified by Fred H. Smith [2000 and personal correspondence]. The census tract data were extracted from U.S. Department of Commerce, Bureau of the Census data files available from the Inter-university Consortium for Political and Social Research (ICPSR) studies 2932 (Newark) and 7552 (1960 census), 9014 (1970 fourth count population summary tape), and 8071 (1980 census).

Table 9: Tract-Level Property Value Changes, 1960-1980

	1: All tracts	2: All tracts with 1950 value available	3: All tracts with 1950 value available	4: All tracts with 1950 value available	5: All tracts with 1950 value available
Panel A: Cleveland					
Riot Tract	-0.489	-0.494	-0.407	-0.238	-0.072
	(0.033)	(0.033)	(0.032)	(0.042)	(0.049)
Value Trend 1950-60	---	---	-0.841	-0.477	-0.213
			(0.227)	(0.231)	(0.177)
Proportion Black 1960	---	---	---	-0.330	-0.276
				(0.041)	(0.036)
Population Change 1960-80	---	---	---	---	0.315
					(0.062)
Constant	0.704	0.717	0.980	0.910	0.907
	(0.020)	(0.020)	(0.074)	(0.074)	(0.056)
R-squared	0.12	0.13	0.25	0.41	0.54
Observations	180	151	151	151	151
Panel B: Newark					
Riot Tract	-0.203	-0.198	-0.212	-0.122	-0.125
	(0.045)	(0.044)	(0.042)	(0.049)	(0.050)
Value Trend 1950-60	---	---	-0.176	-0.117	-0.0737
			(0.142)	(0.149)	(0.170)
Proportion Black 1960	---	---	---	-0.249	-0.178
				(0.094)	(0.116)
Population Change 1960-80	---	---	---	---	0.0706
					(0.0884)
Constant	0.812	0.812	0.867	0.867	0.850
	(0.029)	(0.029)	(0.050)	(0.048)	(0.0543)
R-squared	0.17	0.16	0.18	0.22	0.23
Observations	72	71	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 in 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 (e.g., 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. 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 1950-60 trend) from the computer files of ICPSR study 2932 (1960 Bogue File). Population and proportion black in Newark in 1960 are also from ICPSR study 2932; population for Newark in 1980 is from ICPSR study 8071.

Appendix Table 1: Riot Severity and Instruments

Dependent Variable	1: Severity Group	2: Severity Group	3: Severity Group	4: Severity Group	5: Severity Group	6: Severity Group	7: Severity Index
Rainfall, April 1968	-0.109	-0.110	-0.132	-0.126	-0.106	-0.0934	-0.0140
	(0.0335)	(0.0352)	(0.0399)	(0.0404)	(0.0354)	(0.0327)	(0.00539)
Rainfall, Annual Avg.	----	0.00165	-0.00377	-0.00588	----	----	----
		(0.00786)	(0.00828)	(0.00834)			
Rainfall, April Avg.	----	----	0.105	0.145			
			(0.0945)	(0.0938)			
Rainfall, April 1967	----	----	----	-0.0375	----	----	----
				(0.0323)			
City Manager	-0.229	-0.223	-0.204	-0.193	-0.229	----	-0.0250
	(0.140)	(0.141)	(0.143)	(0.146)	(0.141)		(0.0143)
Percent Black	2.68	2.64	2.57	2.51	2.69	2.95	0.311
	(0.513)	(0.573)	(0.585)	(0.585)	(0.509)	(0.506)	(0.105)
Total Population	2.51 e-07	2.53 e-07	2.54 e-07	2.54 e-07	2.52 e-07	2.71 e-07	3.57 e-08
	(8.01e-08)	(8.27e-08)	(8.32 e-08)	(8.39 e-08)	(8.01 e-08)	(8.92e-08)	(2.13e-08)
Value Trend 1950-60	-----	-----	----	-----	-0.200	----	----
					(0.557)		
Northeast	0.498	0.495	0.434	0.445	0.488	0.616	0.0150
	(0.204)	(0.210)	(0.231)	(0.227)	(0.202)	(0.165)	(0.0221)
Midwest	0.499	0.511	0.458	0.477	0.499	0.577	0.0401
	(0.134)	(0.129)	(0.141)	(0.140)	(0.135)	(0.129)	(0.0224)
West	0.342	0.371	0.398	0.450	0.348	0.389	0.0405
	(0.203)	(0.216)	(0.221)	(0.212)	(0.209)	(0.222)	(0.0270)
Constant	0.220	0.162	0.104	0.152	0.281	-0.0248	-0.00757
	(0.210)	(0.307)	(0.322)	(0.335)	(0.243)	(0.142)	(0.0221)
N	104	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. The construction of the index is described in detail in the text.

Sources: The city manager instrumental variable is from the Governmental Units Analysis Data [Aiken and Alford 1998; ICPSR 28]. Rainfall data for April 1968 and April 1967 are from the National Climatic Data Center website [www.ncdc.noaa.gov]. Average rainfall for the 1931-60 period is from the County and City Data Book [1962]. Average rainfall for the month of April is taken from www.weather.com. See the notes to table 3A for sources of other variables.

Appendix Table 2: Riots and Black-Owned Property Values, OLS and 2SLS Estimates

	1: OLS, 1960-70	2: 2SLS, 1960-70	3: LIML, 1960-70	4: OLS, 1960-80	5: 2SLS, 1960-80	6: LIML, 1960-80
Severity Group (0-2)	-0.0716	-0.191	-0.211	-0.101	-0.237	-0.296
	(0.0185)	(0.0913)	(0.111)	(0.0281)	(0.133)	(0.202)
Percent Black	0.273	0.593	0.647	-0.186	0.181	0.339
	(0.133)	(0.282)	(0.332)	(0.254)	(0.435)	(0.602)
Total Population	1.19 e-09	3.40 e-08	3.96 e-08	-1.06 e-08	2.71 e-08	4.33 e-08
	(7.37e-09)	(2.64e-08)	(3.20e-08)	(1.83e-08)	(3.55e-08)	(5.43e-08)
Northeast	0.0607	0.141	0.155	-0.189	-0.0967	-0.0568
	(0.0482)	(0.0768)	(0.0884)	(0.0711)	(0.114)	(0.156)
Midwest	-0.0687	-0.0014	0.00993	-0.226	-0.149	-0.116
	(0.0339)	(0.0637)	(0.0732)	(0.0643)	(0.100)	(0.134)
West	0.0401	0.106	0.117	0.247	0.322	0.355
	(0.0459)	(0.0736)	(0.0823)	(0.0726)	(0.112)	(0.145)
Constant	0.341	0.312	0.307	1.386	1.352	1.338
	(0.0425)	(0.0506)	(0.0538)	(0.0779)	(0.0857)	(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 the Governmental Units Analysis Data [Aiken and Alford 1998; ICPSR 28]. Rainfall data are from the National Climatic Data Center website [www.ncdc.noaa.gov]. See the notes to table 3A for sources of other variables.