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Understanding the Crime Gap: Violence and Inequality in an American City

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The United States has experienced an unprecedented decline in violent crime over the last two decades. Throughout this decline, however, violent crime continued to concentrate in socially and economically disadvantaged urban neighborhoods. Using detailed homicide records from 1990 to 2010, this study examines the spatial patterning of violent crime in Chicago to determine whether or not all neighborhoods experienced decreases in violence. We find that while in absolute terms nearly all neighborhoods in the city benefited from reductions in homicide, relative inequality in crime between the city's safest and most dangerous neighborhoods actually increased by 10 percent. This increase was driven by a greater rate of decline in the city's safest neighborhoods. This crime gap can be partly attributed to the decreasing association between concentrated disadvantage and homicide in the safest neighborhoods. We also find that the decline did not significantly alter the spatial distribution of crime, as homicides remained concentrated in the initially most dangerous neighborhoods and their adjacent areas.

INTRODUCTION

The United States recently experienced one of the longest declines in violent crime in its history. From a peak in the early 1990s when the nation's violent crime reached over 750 per 100,000, violent crime has declined by more than 50 percent to a rate of 368 per 100,000 in 2013 (Zimring 2006). While some cities—most notably New York—witnessed more dramatic declines than others, nearly all major cities, suburbs, and small towns experienced unprecedented crime declines (Ibid). American cities are, on average, safer today than they have been in decades (Sharkey 2018).

But violent crime, like other social phenomena, is not evenly distributed across the population and thus remains an important contributor to urban inequality (Parker 2008). Some populations and places, especially disadvantaged urban neighborhoods, have crime rates that are exponentially higher than the U.S. average (see Peterson and Krivo 2010

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for a review). In theory, if violent crime is concentrated in a small number of urban neighborhoods, then these neighborhoods might have the most to gain from a significant decline in overall crime rates. On the other hand, crime may have very well gone the way of other inequalities in contemporary America, such as the income or education achievement gaps, benefiting more well-to-do communities. Even in a world where neighborhoods, on average, have fewer absolute homicides, how evenly distributed were these gains in safety? This question of relative inequality shifts attention beyond the well documented "crime decline" to what we call the "crime gap," or the disparity in crime rates across urban neighborhoods.

This paper examines the crime gap through a case study of Chicago since the 1990s, with a particular focus on the changes in neighborhood inequality in homicide between the city's safest and most violent neighborhoods. To do this, we examine changes in both the relative and absolute levels of homicide across Chicago neighborhoods over two decades to determine whether declining crime rates altered neighborhood inequality and which neighborhood conditions might be associated with such inequities. Analyzing the crime gap—like the income gap, education gap, and other measures of relative inequality—provides a more comprehensive and specific account of who has benefited most from the crime decline than simply considering the falling rate on its own. Furthermore, accounting for both the absolute crime decline *and* the relative crime gap is key to properly understanding how such changes affect urban inequality more broadly.

THE GREAT CRIME DECLINE

In the 1990s, the United States experienced a historic drop in every major category of crime, a development often referred to as the "great American crime decline" (Zimring 2006). Researchers have characterized the decline's "greatness" along four dimensions (see Levitt 2004). First, the decline in crime rates was historically *steep* considering the "epidemic" level of homicides and violent crime of the 1970s and 1980s (Cook and Laub 2002).[1] For example, national murder rates plunged more than 50 percent over a decade from a high of 10.2 in the 1980s, to lows of 5.5 in the late 1990s (Blumstein and Rosenfeld 1998; Levitt 2004); current national rates have plunged lower still and hovered around 4.9 in 2015 (FBI 2015). Furthermore, the steepness of the decline paralleled its *rapidity*. Murder rates rose and then fell within the span of two decades. Boston, for instance, averaged about 40 firearm homicides per year between 1980 and 1988, peaking at 86 victims in 1990 and then falling to 19 in 1999 (Braga et al. 2010). In addition, the decline was not only steep and rapid, but it was also *persistent*: Homicide rates fell in nine of the 10 years during the 1990s; in fact, the nine consecutive years of drops in reported crimes is the longest uninterrupted decrease in United States history (Zimring 2006). Fourth, the perceived "greatness" of the crime decline also derives from its *universality*. Major cities from New York, Los Angeles, Houston, Detroit, and Philadelphia all experienced declines. This same trend also characterized smaller cities like Honolulu where homicide rates peaked in 1986 at 5.6 and then halved to 2.3 by 2001 (Levitt 2004). In Chicago homicides increased in the late 1960s through the 1970s, peaking in 1992 at 32 per 100,000. Since then, homicides in Chicago have spiked periodically, but have settled at around 14 per 100,000—the lowest rates there in nearly four decades—until a recent and dramatic uptick in 2016 (Papachristos 2013). Yet researchers quickly pointed out that the decline

was primarily driven by a few big cities, in particular New York, which accounted for 32 percent of the 1,200 nationwide declines in homicides from 1993 to 1994 (Blumstein and Rosenfeld 1998; Zimring 2006).

Despite the universality of the crime decline, crime—especially violent crime—continues to concentrate within a small number of socially and economically disadvantaged communities within cities (see Peterson and Krivo 2010). The concentration of homicide and violent crime is especially acute in disadvantaged black communities. In a study of 9,593 neighborhoods across 91 U.S. cities, Peterson and Krivo (2010: 111) show that "only about one-fifth of African American communities have violence levels that are as low as those for 90 percent of white areas," and that if racialized social differences did not exist, "African American neighborhoods would have average rates of violence only 65 percent higher than white neighborhoods, not 327 percent higher" (79). Furthermore, mounting evidence suggests that crime concentrates even further within "micro" places like street corners and face blocks (Braga et al. 2010; Weisburd et al. 2004). For example, a recent study of 30 years of gun violence in Boston found that half of all gun incidents occurred on less than 3 percent of all city street blocks (Braga et al. 2010). While this 3 percent of city streets tended to be located in larger high-crime and disadvantaged communities, most city streets—even within high-crime communities—never experienced a shooting during the three-decade observation period.

THE CRIME GAP

Understanding the crime gap has important implications for how we understand the "great crime decline" as well as its causes and consequences for urban inequality. If city-level crime rates are driven largely by a small number of high-crime communities, how did those same high-crime communities contribute to and benefit from the Great Crime Decline? Did high-crime communities benefit more or less from the Great Crime Decline than low-crime communities? Did the crime gap between communities stay the same? Or, like other parts of American society, did the gap between the best-off and the worst-off within our cities widen?

Two studies take important steps in answering these questions. First, Stults (2010) used census tract-level homicide data in Chicago and found considerable variation in the level and trajectory of homicide rates from 1980 to 2000, with some tracts remaining stable over time, declining, or increasing. He concluded that a cross-sectional city-level analysis obscures important variation within cities across time, and thus the variability in crime trends across neighborhoods merits further analysis. Second, Friedson and Sharkey (2015) analyzed violent crime data on Chicago, Cleveland, Denver, Philadelphia, St. Petersburg, and Seattle and discovered that the historically most violent, poor, and majority-black and Hispanic communities benefited most from a disproportionate share of the overall crime decline of the 1990s and 2000s. Nonetheless, they found that violence was not redistributed across neighborhoods, but rather persisted in the historically most violent areas.[2] Advancing upon these findings about absolute declines in violent crime, this study investigates the relational aspects of the Great Crime Decline and how the pace of violent crime declines in different neighborhoods over time amounted to an enduring crime gap. By focusing on the relationship between the safest and most violent neighborhoods, and the factors that contributed to the different rates at which they experienced

the crime decline, this paper frames the crime decline as both measure of and source of continuing inequality.

CASE STUDY: CHICAGO

This study focuses on Chicago for several reasons. First and foremost, neighborhood-level crime data exist in Chicago for an extended period of time allowing the study of small units of analyses. Second, a large body of research has documented various aspects of Chicago's crime problem and thus provides a useful starting point for testing our hypotheses. For example, the earliest studies by the Chicago School of sociology documented the persistence of high crime communities (e.g., Shaw and McKay 1942) as well as the long-standing association of violence in Chicago with group-based and gang-related activities (e.g., Short and Strodtbeck 1965; Thrasher 1927). Likewise, Chicago-based research has also documented how violence is concentrated in a small number of neighborhoods (Block and Christakos 1995; Griffiths and Chavez 2004; Sampson 2012) and small social networks (Papachristos et al. 2015).

Third, while Chicago's overall rate of violent crime remains above the national average, the city has generally followed the pattern of the Great Crime Decline. 1(a) and (b) display the rate (per 100,000) of index crimes and homicide in Chicago from 1965 to 2013.[3] Chicago's pattern of index crime during this time period is fairly consistent with the Great Crime Decline's overall pattern. Rates of index crime remained relatively stable between 1966 and 1973 at approximately 3,300 per 100,000 and then jumped dramatically around 1973 to 5,882 per 100,000.[4] Index crime rates fell again until about 1983 when they increased to levels greater than 8,000 per 100,000 during the mid-1980s. The apex of index crimes in Chicago occurred in 1991 and then began to fall steadily into the present day. In 2012, for example, the index crime rate was 4,854.5 per 100,000—slightly lower than the index crime rate in 1973.

Figure 1(b) shows that homicide in Chicago followed the same general pattern as index crime from 1965 to 2013. Homicide in Chicago increased rapidly around 1967 before leveling off in the mid-1970s and early 1980s (with some peaks and valleys throughout that time period). Homicide reached its apex in 1992 with a rate of approximately 32 per 100,000, after which it declined drastically over time until 2004 despite some periodic spikes. Between 2004 and 2013, homicide rates hovered around 14 per 100,000, though they jumped in 2012 to approximately 17.6 per 100,000.

Violent crime in Chicago displays two other important characteristics relevant for understanding the crime gap in the United States: the spatial concentration of crime and the persistence of high-crime communities over time. To illustrate this point, Figure 2 displays the mean homicide rate for neighborhoods in Chicago across four periods of time: 1970–1979, 1980–1989, 1990–1999, and 2000–2010. The average neighborhood's mean homicide rate increased from 1970–1979 to 1990–1999 by approximately 39 percent, but decreased by 30 percent from 1990–1999 to 2000–2010. On average, Chicago neighborhoods got safer over time. Yet, consistent with prior research, Figure 2 clearly shows the concentration of homicide in particular parts of the city, most notably the west and south sides—Chicago's most disadvantaged black communities. In short, many of the city's highest crime communities—those with homicide rates greater than 41 per 100,000—continue to have remarkably high rates relative to

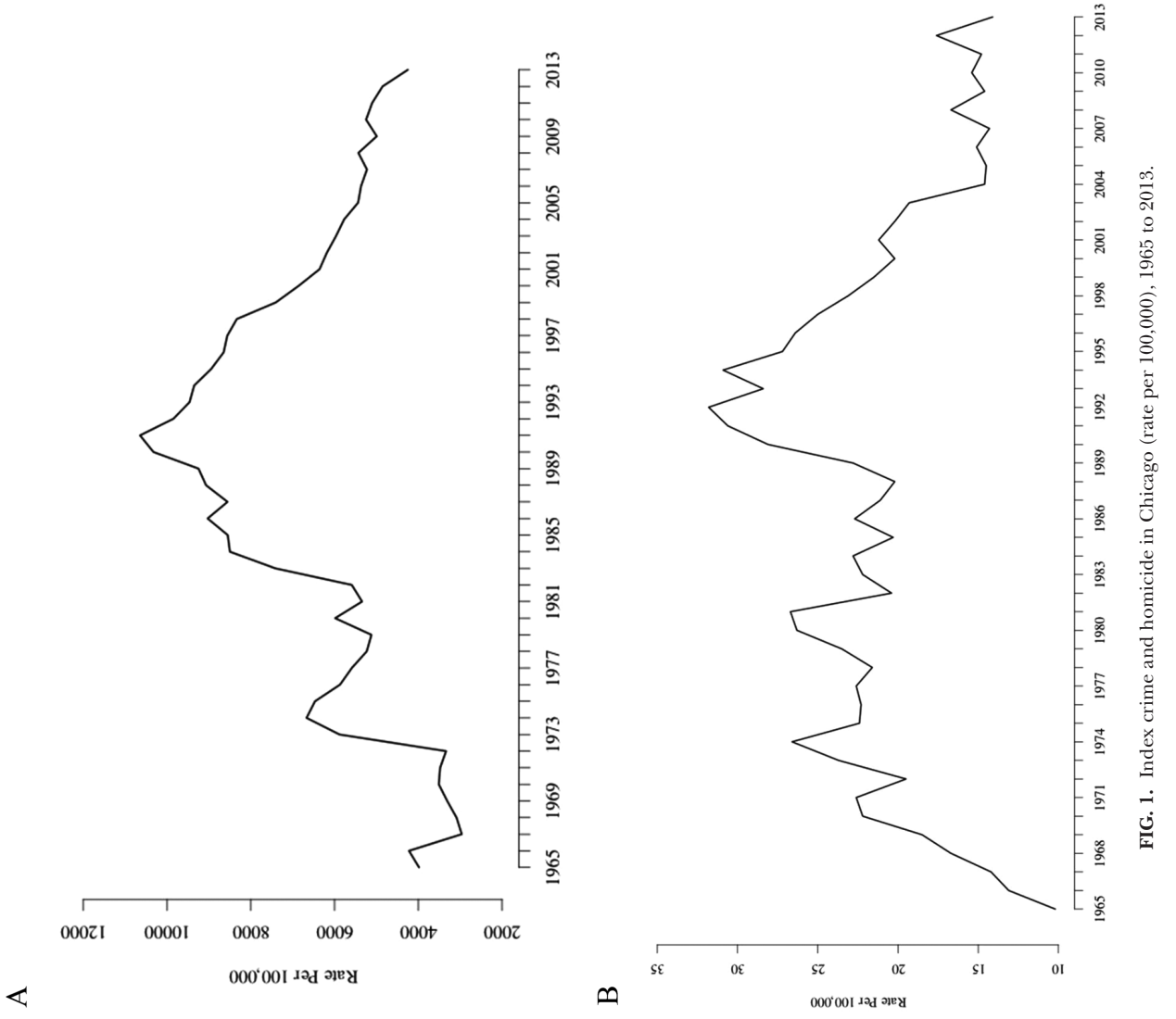

FIG. 1. Index crime and homicide in Chicago (rate per 100,000), 1965 to 2013.

FIG. 2. Mean homicide rates per 100,000 in Chicago by neighborhood cluster, 1970–2010.

other neighborhoods even during the Great Crime Decline. Our objective is to further analyze how neighborhoods such as those in Figure 2 experienced the Great Crime Decline, and whether or not they truly benefited or whether the crime gap simply increased.

Our study differs from prior research—especially Friedson and Sharkey (2015)—in several important ways. First, we seek to understand both the absolute and relative effects of the crime decline across Chicago neighborhoods. An absolute measure of inequality captures the difference in outcomes between the least and most disadvantaged groups. Some have argued that relative measures of inequality, which usually take the form of a ratio between two groups, are more useful for tracking progress; in the context of decreasing crime in all neighborhoods, reductions in relative inequality imply a faster relative rate of improvement among the most disadvantaged neighborhoods (Low and Low 2006). Furthermore, the absolute difference is not scale invariant, a common desirable criterion for measures of income and health inequality (Reardon and Bischoff 2011). In contrast, relative measures distinguish between the overall volume of homicides and its distribution—in the present study, this would refer to whether the rate of improvement is larger in the most dangerous neighborhoods.

This study considers *both* absolute and relative change because each measure offers a distinct perspective on inequality. An *absolute* measure of inequality captures the overall magnitude of disadvantage among the constituent subgroups, and whether they all broadly benefited. Meanwhile, a *relative* measure implicitly prioritizes equality in itself, independent of other considerations: What matters is the rate of improvement of the disadvantaged group relative to its advantaged peers rather than absolute differences. In the case of the crime decline, a drop in the absolute difference is important, as it captures a decrease in the magnitude of crime and a general sense of the harm or benefit experienced on average. At the same time, the severe concentration of crime in a small number of disadvantaged communities enhances this understanding by evaluating how this decrease compares to the decline in the rest of the city. Rather than privileging one measure, we present both relative and absolute metrics to obtain a comprehensive picture of inequality and its change over time (Harper et al. 2010; Mechanic 2007).

A second way this study differs from previous research is that it also considers the degree to which traditional structural correlates of neighborhood crime rates might help explain observed changes in inequality. Third, this study also extends Friedson and Sharkey's analysis of Chicago's crime decline by including an additional 10 years of data that contain the peak of violence in 1991. These additional years allow us to conduct a more temporally refined analysis by examining differential trends between periods within the crime decline. Taken together, these advances in the prior research underscore our main objective: to analyze inequalities generated by Chicago's crime decline and to shed light on the factors driving any observed changes.

Critics, such as Small (2007) and others (see Dear 2001), have suggested that there has perhaps been too much research on Chicago relative to other cities, which has biased our understanding of urban processes to a very particular context. While there is truth to such criticisms and, therefore, limitations in extending any of our analyses to other cities, the overall crime trends in Chicago mirror those of other large U.S. cities over this time period. We believe valuable lessons can be derived from Chicago about America's

Crime Decline that might very well inform future analyses of other cities as data become available.

DATA AND METHODS

DATA

We operationalized "neighborhoods" in Chicago using 342 "neighborhood clusters" developed by Project on Human Development in Chicago Neighborhoods (PHDCN) (Sampson et al. 1997).[5] We examined neighborhood-level homicide rates between 1990 and 2010 reported here as rates per 100,000 neighborhood cluster population. To avoid extreme heterogeneity, homicide rates were smoothed by taking 3-year averages starting in 1991 (e.g., 1990–1992) and centered every 3 years thereafter until 2009 (e.g., 2008–2010). We focus on neighborhood rates of homicide victimization for three reasons. First, detailed data on homicides in Chicago exist for an extended period of time, allowing us to situate each incident in the defined neighborhood boundaries. Second, in contrast to, say, drug-related crimes, whose definition and enforcement changed rapidly during the past 30 years, the definition of homicide victimization has remained stable. Finally, as compared to other types of crime victimization data, homicide victims are (1) more likely to be reported/discovered, and (2) police and medical agencies expend considerable resources investigating and gathering information on homicides.

We obtained homicide data from two different sources to create an extended time series from 1990 to 2010: Data from 1990 to 1995 come from the Chicago Homicide Dataset (ICPSR 6399) (Block et al. 2005) and data from 1995 to the present were provided to the first author by the Chicago Police Department. Address information from each incident was used to geocode the location of the homicide to the corresponding census tract; tract-level homicide counts were aggregated up to neighborhood clusters.[6]

ANALYTIC PLAN

Our analyses aim to answer three questions related to the crime gap in Chicago. First, how did neighborhood inequality in homicide rates change during Chicago's crime decline? Second, do changes in neighborhood structural characteristics explain observed changes in inequality during the period? Third, did the crime decline alter the distribution of homicides across neighborhoods?

In order to answer the first question, we calculated absolute and relative measures of homicide inequality. For the *absolute* measure, we calculated differences in mean homicide rates between the most violent neighborhoods, which we defined as those in the top 10 percent of homicide rates, and the rest of the city (bottom 90 percent). We also compared the top 10 percent to the bottom 30 percent of homicide rates (30) to examine gaps between the top and bottom ends of the distribution.[7] We then calculated yearly absolute differences in homicide rates between each group.[8] Homicide rates between 1991

and 2009 as well as demographic characteristics for the top decile, rest of the city, and bottom 30 percent are shown in the appendix.

For our *relative* measure of inequality we use the Gini index, which measures the extent to which the actual homicide rate distribution deviates from a hypothetical distribution in which every neighborhood has identical shares of homicides. The measure ranges from zero, indicating perfect equality (where each neighborhood has an identical share of homicides), to one, indicating maximum inequality (where homicides occur in only one neighborhood).[9] We also investigated a second measure of inequality, the ratios between different homicide rate percentiles. This approach provides a broad sense of the shape of inequality in terms of the gap between the most violent neighborhoods and the rest of the city. We calculated ratios between homicide rates in the most violent neighborhoods and the rest of the city for each year in the period. We also calculated ratios between the top 10 percent and the bottom 30 percent to examine relative inequality between the top and bottom of the distribution.

To answer the second research question, we conducted a set of counterfactual simulations to determine whether changes in neighborhood structural characteristics explained changes in inequality between the most violent neighborhoods and the rest of the city. We examined three neighborhood structure measures that are well established in studies of crime in Chicago: (1) *concentrated disadvantage*, composed of the household poverty rate, percent of families on government assistance, percent of civilians over age 16 who are unemployed, percent of families with children headed by women, and percent of residents who are black; (2) *immigrant concentration*, composed of the percent of residents who are Hispanic and the percent who are foreign born; and (3) *residential stability*, composed of the percent of residents who lived in the same house in 1995 and the percent of owner-occupied housing. Following Morenoff et al. (2001), we standardized each of the indicators, summed the resulting z-scores, and then divided by the number of indicators in order to construct each scale. This produced a composite measure that evenly weights each of the original variables. Data come from the 1990 and 2010 censuses normalized to 2010 tract boundaries using the Longitudinal Tract Database (Logan et al. 2014) and aggregated up to neighborhood clusters.

In order to answer the third research question, we examined whether the most violent and safest neighborhoods in 1991 remained so during the rest of the period. We ran a Poisson regression where the dependent variable is the number of years a neighborhood was in the top 10 percent after 1991, with the years spaced out every 3 years (1994, 1997, 2000, 2003, 2006, and 2009), and the main independent variable is a neighborhood's percentile placement along the homicide rate distribution in 1991: 90–100, 80–89, 70–79, 60–69, and 0–59, the omitted reference group. The model controlled for population size, concentrated disadvantage, immigrant concentration, and residential stability in 1991. We conducted a similar analysis for predicting the number of years in the bottom 30 percent, and categorized neighborhoods by the following percentiles: 0–29, 30–39, 40–49, 50–59, and 60–100, the omitted reference group.[10] To spatially explore the distribution and persistence of homicide rates across the crime decline, we created descriptive maps showing the location of neighborhoods in the top 10 percent and bottom 30 percent at the beginning and the end of the period.

TABLE 1. Three-Year Average Homicide Rates (per 100,000 residents) for Neighborhoods in the Top 10 Percent, Rest of the City, and Bottom 30 Percent, 1991–2009

				Absolute Gap	
Year	Top 10 Percent ($N = 34$)	Rest of the City ($N = 306$)	Bottom 30 Percent ($N = 102$)	Top 10 Percent Rest of the City	Top 10 Percent Bottom 30 Percent
1991	115.37	23.68	2.94	91.68	112.43
1994	107.42	23.65	3.59	83.78	103.84
1997	91.98	19.82	2.84	72.16	89.14
2000	86.07	16.56	2.02	69.51	84.05
2003	78.51	15.19	2.18	63.32	76.33
2006	69.19	12.26	1.13	56.93	68.06
2009	76.94	12.49	1.18	64.45	75.76
Percent Δ 1991–2000	−25.40%	−30.08%	−31.44%	−24.19%	−25.24%
Percent Δ 2000–2009	−11.87%	−32.62%	−71.26%	−7.85%	−10.95%
Percent Δ 1991–2009	−33.31%	−47.28%	−59.97%	−29.70%	−32.62%

RESULTS

INEQUALITY DURING THE CRIME DECLINE

Overall, Chicago experienced a 47 percent decline in homicides between 1991 and 2009 with homicide rates dropping from 31.5 to 16.7 per 100,000 residents. During this crime decline, 75 percent of Chicago's neighborhoods experienced a decrease in homicide rates, including the city's most dangerous communities. To examine the change in homicides among neighborhoods, Table 1 presents mean neighborhood homicide rates in the top 10 percent, the rest of the city, and the bottom 30 percent. We find that the absolute gap in homicide rates between top decile neighborhoods and the rest of the city fell considerably during the period, approximately 38 percent from 91.7 to its lowest observed point in our data of 56.9 in 2006. Since 2006, the gap ticked upwards to 64.5, which still represents a 30 percent decrease since 1991. The absolute gap between the top 10 percent and bottom 30 percent follows a similar trajectory, decreasing substantially from 112.4 in 1991 to 68.1 in 2006 before increasing to 75.8 by the end of the observation period. On the one hand, these results paint a portrait of progress: Overall neighborhood homicides have dropped, the absolute homicide rates for most neighborhoods have decreased, and the absolute decline at the top of the neighborhood homicide rate distribution is meaningful and significant. On the other hand, the magnitude of the absolute crime gap is still disturbingly large, and since 2006 seems to be widening.

Whereas the absolute gap indicates decreasing inequality, relative measures show the opposite. The Gini index increased from 0.57 in 1991 to 0.63 in 2009, representing a 10 percent growth in neighborhood inequality in homicide. One way of interpreting the Gini coefficient is as a measure of dispersion, similar to a standard deviation. The Gini index of 0.57 in 1991 implies that the average homicide rate difference across pairs of neighborhoods was equal to 114 percent (2 times 0.57) of the average neighborhood homicide rate, or roughly 40 homicides per 100,000. Because the average neighborhood

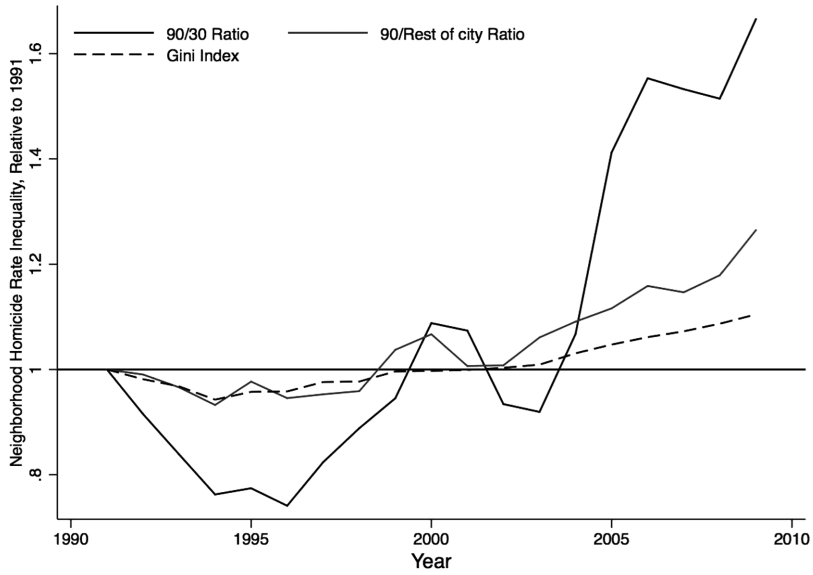

FIG. 3. Trends in neighborhood homicide rate inequality, 1991–2009. All trends are divided by their value in 1991 in order to put the trends on a common scale. 90–Neighborhoods in the top 10 percent in homicide rate. 30–Neighborhoods in the bottom 30 percent. Rest of city–Neighborhoods not in the top 10 percent.

homicide rate decreased in 2009, the absolute difference between pairs of neighborhoods decreased to 28 homicides per 100,000; however, the relative difference increased to 126 percent (2 times 0.63). Importantly, this rise in overall inequality was driven more by a greater decrease in homicide rates in the rest of the city than by decreases or increases in high crime communities—levels of homicide in all neighborhoods improved, but the rate of improvement was greater for those outside of the top 10 percent. The ratio between the top 10 percent and the rest of the city increased by 26 percent from 4.87 in 1991 to 6.16 in 2009. The ratio between the top 10 percent and bottom 30 percent experienced a larger increase, growing 67 percent from 39.25 to 65.39 between 1991 and 2009. In this case, what is remarkable is not that the homicide rate in the top decile decreased considering that the overall rate dropped by half of its former level, but that its decline was slower relative to the rest of the distribution.

Evaluating change from 1991 to 2009 masks important trends occurring *within* these 2 years. Figure 3 shows the changes in the neighborhood Gini index and ratios between the top decile and the rest of the city and the bottom 30 percent relative to their 1991 values. We find that relative inequality decreased during most of the 1990s, went back up and leveled off between 2000 and 2005, and then increased in the latter half of the decade. In particular, the top 10 percent and bottom 30 percent were clearly diverging by the end of the period. In 1991, for every homicide in the lowest-homicide neighborhoods there were more than 39 homicides in the highest-homicide neighborhoods. This ratio increased by 67 percent to 65 to 1 in 2009.

An inspection of the homicide rate distribution provides insights into the trends depicted in Figure 3. Figure 4 presents homicide rates by decile from 1991 to 2009 showing the distribution narrowing in the first half of the period—it is clear that both relative and

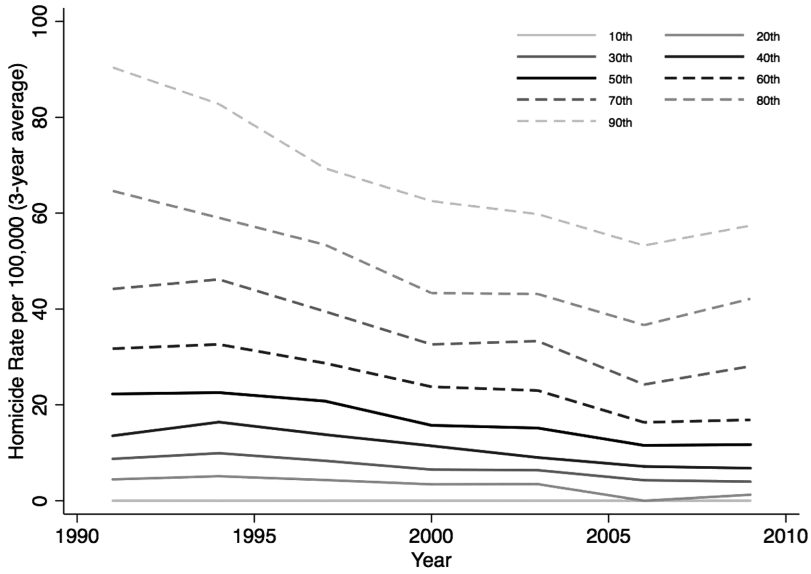

FIG. 4. Three-year average homicide rates (per 100,000 residents) by percentile, 1991–2009.

absolute inequality is decreasing and is driven by the dramatic decreases in homicides at the top of the distribution. However, in the first half of the second period, we see that although decreasing, the top deciles are not dropping as dramatically. In fact, the 70th and 80th percentiles witnessed an uptick. This increase along with the greater relative decline in the rest of the distribution caused inequality to spike back up. The top deciles then experienced an increase from 2006 to 2009, with homicide rates growing by 11 percent in the top decile compared to 2 percent in the rest of the city. These results suggest that, in the first half of the decline period, Chicago's crime decline was driven by declines at the top of the distribution. In the second half, however, the rest of the city, in particular the safest neighborhoods, caught up. The increased inequality observed from 1991 to 2009 was largely concentrated in the latter portion of the period. The crime decline continued for Chicago's safest neighborhoods through 2009, but slowed, plateaued, and reversed several years earlier for the city's most violent communities.

EXPLAINING CHANGES IN RELATIVE INEQUALITY

We next considered a set of hypothetical comparisons that help quantify the role of neighborhood structural disadvantage in explaining Chicago's increasing homicide inequality. In this analysis, we examine some of the structural factors that may help explain the increase in relative inequality between the top decile neighborhoods and the rest of the city.[11] The average homicide rate in the top 10 percent neighborhoods and the rest of the city in a given year t, $\overline{HR}_t^i$, can be explained by a vector of determinants, X_t^i, according to the following regression models

$$\overline{HR}_{\mathrm{t}}^{90} = \beta_{\mathrm{t}}^{90} \bar{X}_{\mathrm{t}}^{90} + \varepsilon_{\mathrm{t}}^{90}$$

TABLE 2. 2009 Ratio Predicted by Keeping Different Combinations of X and β to Their 1991 Values

		Top 10 Percent						Rest of the City					
		Average X			Relationship β			Average X			Relationship β		
Predicted ratio in 2009	Percent diff. from observed[1]	CD	IC	RS	CD	IC	RS	CD	IC	RS	CD	IC	RS
7.28	18.15%	X											
6.18	0.27%		X										
6.10	−1.01%			X									
4.96	−19.45%							X					
6.06	−1.57%								X				
6.23	1.13%									X			
6.49	5.28%				X								
7.67	−24.52%					X							
6.17	0.12%						X						
7.37	19.56%										X		
6.49	5.30%											X	
6.31	2.49%												X

Note: The value X in each cell represents the corresponding column variable that is fixed to its 1991 value.
[1]Observed 90/30 ratio in 2009 is 6.16.
CD: Concentrated disadvantage; IC: Immigrant concentration; RS: Residential stability.

$$\overline{HR}_{\mathrm{t}}^{\mathrm{Rest}} = \beta_{\mathrm{t}}^{\mathrm{Rest}} \bar{X}_{\mathrm{t}}^{\mathrm{Rest}} + \varepsilon_{\mathrm{t}}^{\mathrm{Rest}}$$

The ratio is defined as

$$\frac{\overline{HR}_{\mathrm{t}}^{90}}{\overline{HR}_{\mathrm{t}}^{\mathrm{Rest}}} = \frac{\beta_{\mathrm{t}}^{90} \bar{X}_{\mathrm{t}}^{90} + \varepsilon_{\mathrm{t}}^{90}}{\beta_{\mathrm{t}}^{\mathrm{Rest}} \bar{X}_{\mathrm{t}}^{\mathrm{Rest}} + \varepsilon_{\mathrm{t}}^{\mathrm{Rest}}} \tag{1}$$

where β_t^{90} and β_t^{Rest} represent the association between neighborhood characteristic X and homicide rates HR in time t for neighborhoods in the top 10 percent and the rest of the city, respectively, and ε_t^{90} and ε_t^{Rest} represent the portion of homicide rates for neighborhoods in the top 10 percent and rest of the city that cannot be explained by characteristics X.

We are interested in understanding how changes in Eq. (1) can be explained by changes in β_t^i and $\bar{X}_t^i$ from time $t = 1991$ to $t = 2009$. Because Eq. (1) is not an additive term, it is difficult to use traditional decomposition methods to explain changes due to β_t^i and $\bar{X}_t^i$. We can, however, consider a set of hypothetical comparisons that help quantify the relative role of these components. Using the observed ratio in 2009 as the starting point, Table 2 shows the ratios that would be predicted from different hypothetical combinations of β_t^i and $\bar{X}_t^i$. We obtained these predictions by calculating Eq. (1) using 2009 values but fixing one of its components to its 1991 value (β_{1991}^i or $\bar{X}_{1991}^i$). The β_t^is were obtained through ordinary least squares (OLS) regressions of homicide rates on concentrated disadvantage, immigrant concentration, and residential stability for each year 1991 and 2009 and for neighborhoods in the top 10 percent and the rest of the city separately, weighted by population size in 1990 and 2010. Results for these regressions are provided in the appendix.

In the first three rows of results in Table 2, we predict the ratio in 2009 separately fixing the average concentrated disadvantage, immigrant concentration, and residential stability for neighborhoods in the top 10 percent to their 1991 levels. These analyses predict what the ratio would be, for example, if concentrated disadvantage in the most violent neighborhoods did not change from 1991 to 2009. In the next three rows, we predict the same hypothetical ratios but for the rest of the city. In the final six rows, rather than fixing the average level of each variable to its 1991 value, we fix the variable's relationship to homicide rates in 1991 (i.e., β^{i}_{1991}). The analyses producing these values predict what the ratio would be, for example, if the relationship between concentrated disadvantage and homicide rates in the most violent neighborhoods (or the rest of the city) did not change from 1991 to 2009.

We find that changing the average values and predictive relationships for residential stability has negligible effects on the ratio. For example, if neighborhoods in the top 10 percent experienced no change in average residential stability from 1991 to 2009, the ratio would be 6.10, only 1 percent lower than the observed value of 6.16. We find that changing the average values and relationships for concentrated disadvantage leads to large changes in the ratio. If concentrated disadvantage for top decile neighborhoods did not change from 1991 to 2009, the ratio of homicide rates between the top decile and the rest of the city would have been 18 percent larger. In other words, the substantial decrease in concentrated disadvantage levels in top decile neighborhoods played an important role in decreasing their homicide rates. However, the rest of the city also experienced a substantial decrease in concentrated disadvantage. If concentrated disadvantage in the rest of the city did not change from 1991 to 2009, the ratio would have been 19 percent lower. These results combined indicate that the decrease in concentrated disadvantage was equally experienced in both the top decile neighborhoods and the rest of the city, which yielded a negligible change in the ratio. That is, if concentrated disadvantage for both top decile neighborhoods and the rest of the city remained the same, the ratio would only be 1 percent lower.

In contrast to the level of concentrated disadvantage, we find that the change in the *relationship* between concentrated disadvantage and homicide rates, specifically for the rest of the city, played an important role in increasing relative inequality. We find that for every one-unit increase in concentrated disadvantage, homicides increased by 26.2 per 100,000 in neighborhoods not in the top 10 percent in 1991. If this relationship remained the same in 2009 rather than decreasing to 19.6 homicides per 100,000, relative inequality would have been 19 percent larger. Although the relationship between concentrated disadvantage and homicide rates in top decile neighborhoods also witnessed a decrease, it was smaller. These results suggest that the rise in inequality was partly driven by the attenuating effect of concentrated disadvantage on homicide rates in neighborhoods not in the top decile. That is, by 2009, concentrated disadvantage played a substantially lesser role in influencing homicide rates in the rest of the city.

We also find that the change in the relationship between immigrant concentration and homicide rates also helps explain rising relative inequality. In contrast to concentrated disadvantage, immigrant concentration is associated with lower homicide rates in both years. This beneficial effect, however, was reduced in top decile (read: high homicide) neighborhoods. Specifically, we find that if the relationship between immigrant concentration and homicide rates in 2009 in top 10 percent neighborhoods (a decrease of 1.3 homicides per 100,000 for a one-unit increase in immigrant concentration) remained

the same as in 1991 (a decrease of 26.4 homicides per 100,000), the ratio would be 25 percent larger. Similar to concentrated disadvantage in the rest of the city, immigrant concentration in top decile neighborhoods played a substantially lesser role in influencing homicide rates. Because immigrant concentration has a protective effect, this reduced role in the most dangerous communities led to an increase in relative inequality. We emphasize that this finding is specific to the most violent neighborhoods. The size of the coefficient on immigrant concentration is similar in both years for the rest of the city.

PERSISTENCE IN THE DISTRIBUTION OF HOMICIDE

Finally, we examine the change and stability in the distribution of homicide rates across Chicago's neighborhoods during the crime decline. We ran multivariate Poisson regression models predicting the number of years a neighborhood is in the top 10 percent or bottom 30 percent between 1991 and 2009 by 1991 percentile controlling for structural disadvantage in 1991.[12] We find that neighborhoods with the highest and lowest homicide rates in 1991 were more likely to have the highest and lowest homicide rates throughout the crime decline. Specifically, neighborhoods in the top 10 percent in 1991 remained in the top 10 percent for more than half of the period. We also find that the neighborhoods that exit the top decile are replaced by neighborhoods largely in the next decile. The average number of years in the top 10 percent drops to near zero for the rest of the distribution. We find similar results for the bottom 30 percent. Neighborhoods in the bottom 30 percent in 1991 appeared in the bottom 30 percent for a majority of the period. The average number of years drops nearly by half for the next decile (30–39) and then reaches near zero for the remainder of the distribution.

The findings from the Poisson regression models do not indicate whether there is persistence in the spatial distribution of homicide rates. Figure 5 maps neighborhoods by their placement in the top 10 percent and bottom 30 percent in 1991 and 2009. By and large, Figure 5 shows that many neighborhoods that were the safest or most violent at the beginning of the period remained so at the end of the period. In particular, those neighborhoods in the Top 10 percent and remained so are, in fact, some of Chicago's most segregated and most socially disadvantaged black neighborhoods—and also those with the highest levels of absolute homicide. Those in the bottom 30 percent in either or both periods tend to be more racially diverse and with lower levels of social and economic disadvantage. Furthermore, neighborhoods in either the top 10 percent or bottom 30 percent in 2009 but not in 1991 were geographic neighbors to the safest or most violent neighborhoods. We can interpret findings from this section to conclude that neighborhoods with the highest and lowest homicide rates in 1991 were more likely to have the highest and lowest homicide rates throughout the crime decline. The neighborhoods that entered the top 10 percent or bottom 30 percent were largely those that were in the next decile in the distribution and geographic neighbors to other violent and safe communities.

CONCLUSION

More than 20 years into the greatest recorded crime decline in American history, violent crime remains stubbornly concentrated in socially and economically disadvantaged

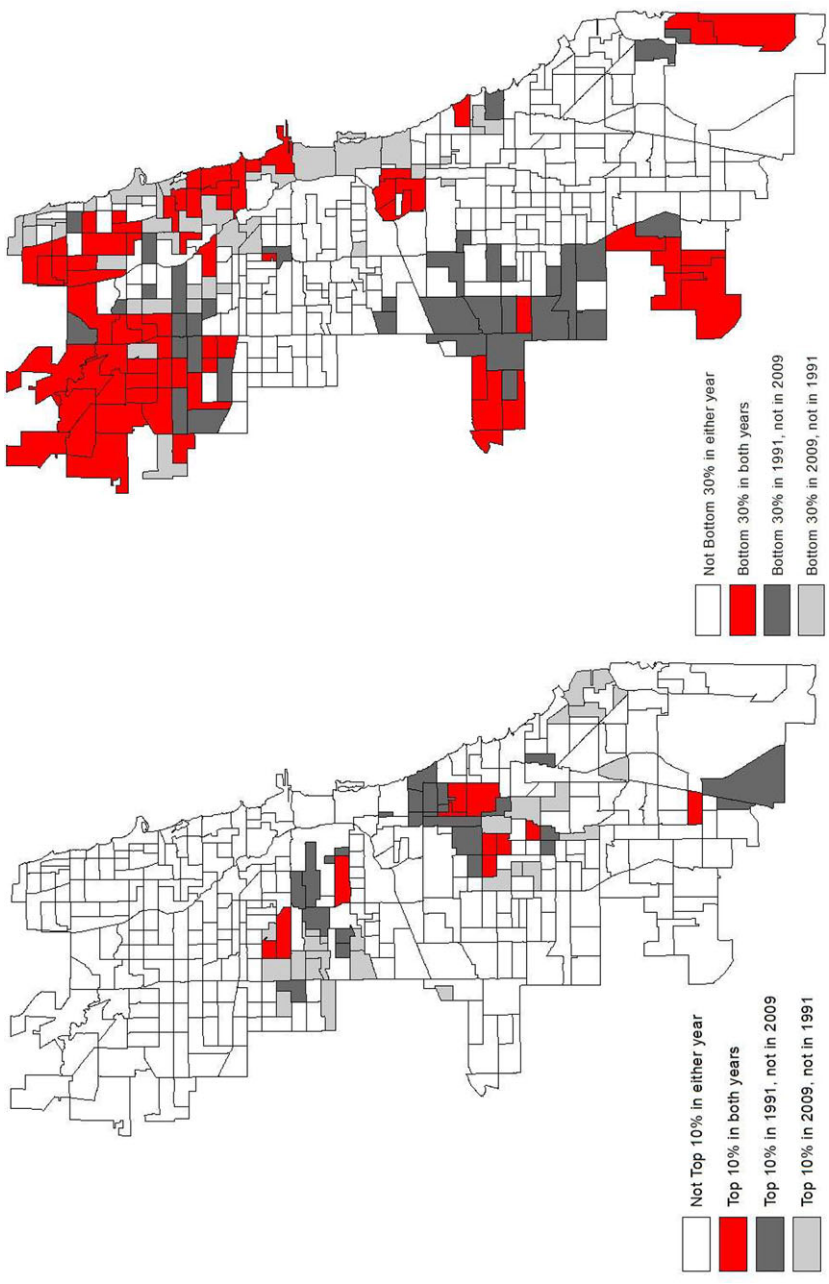

FIG. 5. Neighborhoods in the top 10 percent and bottom 30 percent of homicide rates, 1991 and 2009. [Color figure can be viewed at wileyonlinelibrary.com]

communities. In theory, these high-crime communities had the most to gain from the Great American Crime Decline as they potentially stood to experience the greatest declines. Another possibility, however, is that crime declines went to safer communities and, in so doing, generated additional inequalities by widening the crime gap between the safest and highest-crime neighborhoods. Our study concludes that a version of this latter story took place in Chicago: While nearly all Chicago neighborhoods experienced tremendous declines in crime over the last 20 years, inequality in neighborhood homicide rates increased by over 10 percent during this period, with the larger and more persistent declines in the city's safer neighborhoods driving this increased inequality.

This study set out to analyze the crime gap between high-crime and low-crime communities in one U.S. city with an infamous history of violence: Chicago, Illinois. Like most other U.S. cities, Chicago's rate of crime and homicide mirrored the national crime decline with homicide rates in the Windy City dropping 47 percent from a peak in 1991 to a three-decade low in 2009. We find that homicide rates in the top decile of the neighborhood distribution decreased by 33 percent during this period, leading to a 30 percent decline in the absolute gap between Chicago's most dangerous neighborhoods and the rest of the city. Despite this substantial decline, the number of murders occurring in neighborhoods at the top of the homicide distribution relative to the rest of the city increased, with this increase concentrated in the second half of the period. In other words, although homicide rates at the top of the distribution decreased substantially, their rate of improvement was smaller compared to the rest of the distribution. It is during the second half of the observation period that the pace of decline in high crime neighborhoods slowed and eventually reversed while declines in the safest neighborhoods grew and persisted. Therefore, the rise in inequality was driven by rapid improvements in safer neighborhoods during the second half of the crime decline, thereby increasing the relative gap between the most dangerous neighborhoods and the rest of the city. While our study does not directly measure all of the changing social, economic, and spatial patterns in Chicago (e.g., the demolition of public housing, gentrification, the role of nonprofit agencies, etc.), our results suggest that the increasing crime gap was largely driven by the attenuating effect of concentrated disadvantage on homicide rates in the safest neighborhoods.

Moreover, the spatial patterning of crime in Chicago remained relatively unchanged: The highest- and lowest-crime neighborhoods during the peak of the crime epidemic tended to remain the highest- and lowest-crime neighborhoods relative to other neighborhoods throughout the crime decline. In the years they were not, their spatially proximate neighbors replaced them at the top and bottom of the distribution. A massive disparity in crime between neighborhoods still remains: For every 1 homicide in the lowest-crime neighborhoods there are more than 65 homicides in the highest-crime neighborhoods in 2009. In comparison, this ratio was 39 to 1 in 1991. Thus, while all communities in Chicago experienced significant crime declines, homicides continue to generate massive inequalities across urban neighborhoods.

The study is not without limitations, the most significant of which is the extent to which our findings are based on the experiences of a single city. Yet the broader literature on the concentration of crime within cities, and in particular Friedson and Sharkey's (2015) documentation of a similar gap in additional cities, suggests that similar patterns might very well apply beyond Chicago (Braga et al. 2010; Krivo and Peterson 1996; Peterson and Krivo 2010; Sampson and Wilson 1995; Weisburd et al. 2004). Data availability notwithstanding, future research should consider not just the concentration of crime within

particular neighborhoods, but also how such concentration generates an important source of urban inequality and thereby further contributes to the disadvantages experienced in particular communities.

The results of this study shed light on one of the most significant sources of inequality across urban neighborhoods. Violent crime, especially homicide, takes a dramatic toll on communities, affecting a range of health and social outcomes such as life expectancy at birth (Redelings et al. 2010; Wilson and Daly 1997), cognitive functioning (Sharkey 2010), anxiety and post-traumatic stress (Fitzpatrick and Boldizar 1993; Horowitz et al. 1995; White et al. 1998), distress (Martinez and Richters 1993), attention and impulse control (Sharkey et al. 2012), and a wide range of educational and familial outcomes (see Osofsky 1999). To spread the benefits of the crime decline across communities, an important first step is to pinpoint and disentangle its causes and mechanisms, which includes changes in concentrated disadvantage, community nonprofits (Sharkey et al. 2017), policing (Bratton and Knobler 1998; Messner et al. 2007; Zimring 2012), and other social trends (Donohue and Levitt 2001). While no neighborhood in Chicago would want to return to its 1990s levels of violence, homicides in the city's highest crime neighborhoods—those that are in most dire need of diminishing levels of violence—have not fallen as perhaps they should have; some of these neighborhoods have begun trending upwards even as many of the city's safest communities continue to experience declines. Understanding and acknowledging this crime gap should stimulate a discussion about ways of addressing larger structural inequalities and barriers that have kept rates higher in our most disadvantaged communities. At the very least, it might serve as a caution that while aggregate declines in crime are, on average, a good thing, they often mask greater inequalities within our cities.

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Notes

[1]Homicide, which is a statistically rare event, tends to be the benchmark for determining crime trends in the United States because of the accuracy of its measurement over time and across jurisdictions. This overall pattern of decline, however, applies to every major category of crime whether measured using the Uniform Crime Reports (UCR) or the National Crime Victimization Survey (NCVS). During the 1990s, all seven UCR crimes declined between 23% and 44% (Zimring 2006). Criminal victimizations reported to the NCVS also fell between 45% and 58% during this decade (Levitt 2004).

[2]These results support Ellen and O'Regan's (2009: 31) neighborhood-level study of Cleveland and Denver, which found that crime reductions around the turn of the century were "progressive"—narrowing the differential exposure to violence between the poor and non-poor, whites and non-whites, and foreign-born and native-born.

[3]In this case, index crimes are the total number of murders, criminal sexual assaults, aggravated assaults/batteries, burglaries, thefts, robberies, arson, and motor vehicle thefts. Data for arson were unavailable for the years 1965 to 1980.

[4]Part of this increase in 1973 occurs because the Chicago Police Department began reporting thefts of items valued under $50. However, as seen in Figures 2 and A2, the overall pattern holds for specific crimes even when thefts are not included.

[5]PHDCN researchers designed these neighborhood clusters by joining the 847 Chicago census tracts such that each is internally homogenous on important indicators like housing density and racial/ethnic makeup. The PHDCN includes 343 neighborhood clusters, including one that represents Chicago O'Hare Airport. We excluded the Airport neighborhood cluster, as it is not primarily a residential neighborhood (this decision is in line with other studies that use these data).

[6]Homicides from the Chicago Homicide Dataset were geocoded by the original study PIs. Homicides for the latter time period were coded by the present authors. The 343 original neighborhood clusters are based on 1990 census tract boundaries. After normalizing 1990 boundaries to 2010 boundaries, three neighborhood clusters were absorbed by other clusters. The address of each "incident" refers to the location where the body was recovered, which is not (necessarily) the same address where the incident occurred.

[7]We used a 30th percentile cutoff because the majority of neighborhoods in the bottom two deciles contain zero homicides.

[8]We chose to construct the groups based on each year's distribution rather than fixing them to the initial year. Constructing the groups based on initial homicide rates does not significantly alter the results. This is not surprising given that the distribution of neighborhood homicide rates did not dramatically change throughout the period.

[9]The Gini index has several properties that make it an appealing measure of inequality. It is scale invariant, obeys the principles of transfers, is compositionally invariant, and measures segregation as well as inequality (Duncan and Duncan 1955; Reardon and Firebaugh 2002).

[10]We also ran Negative Binomial models in order to test the robustness of our findings to distributional assumptions. The results are similar to the main findings.

[11]We exclude the bottom 30% from these analyses because homicides are relatively rare in these neighborhoods.

[12]The full set of regression results, which includes figures showing the predicted number of years in the top 10% or bottom 30% by 1991 percentile, can be found in the appendix.

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APPENDIX

TABLE A1. Three-Year Average Number of Homicides and Total Population for Neighborhoods in the Top 10 Percent, Rest of the City, and Bottom 30 Percent, 1991–2009

	Top 10 Percent		Rest of the City		Bottom 30 Percent	
Year	Total Homicides	Total Population	Total Homicides	Total Population	Total Homicides	Total Population
1991	299	242,935	616	2,611,316	34	964,894
1994	266	215,034	660	2,673,546	42	993,393
1997	187	222,916	554	2,699,992	27	1,049,747
2000	163	199,063	445	2,758,174	21	1,029,811
2003	173	193,427	424	2,703,279	26	1,044,648
2006	135	183,092	333	2,653,083	11	1,003,080
2009	132	183,418	317	2,592,226	6	1,052,821

TABLE A2. Demographic Characteristics for Neighborhoods in the Top 10 Percent, Rest of the City, and Bottom 30 Percent, 1991 and 2009

	Top 10 Percent		Rest of the City		Bottom 30 Percent	
Variable	1991	2009	1991	2009	1991	2009
Percentage poverty	39.4%	37.8%	18.1%	19.4%	8.7%	13.0%
Percentage female headed households	41.9%	41.5%	18.0%	18.0%	7.4%	9.9%
Percentage unemployment	25.2%	22.7%	10.9%	11.1%	6.0%	7.3%
Percentage non-Hispanic black	93.0%	91.1%	32.3%	28.8%	3.8%	8.7%
Percentage Hispanic	4.6%	7.0%	21.8%	29.9%	17.6%	21.5%
Percentage foreign born	2.4%	3.0%	18.9%	22.8%	22.1%	24.7%
Percentage 15–24 year olds	17.0%	16.9%	15.4%	14.9%	13.3%	13.8%
Percentage households on public assistance	34.6%	9.1%	12.3%	3.8%	4.6%	2.0%
Percentage households moved 10 years or less	41.2%	40.8%	37.2%	37.7%	40.0%	35.4%
Percentage owner-occupied housing units	32.3%	33.0%	45.3%	47.2%	56.5%	50.8%

Note: Data in 1991 and 2009 are taken from the 1990 Decennial Census and 2006–2010 American Community Survey, respectively.

TABLE A3. Ordinary Least Squares Regression Models Predicting Homicide Rates Per 100,000 for Top Decile Neighborhoods and the Rest of the City in 1991 and 2009

	Top 10 Percent		Rest of the City	
	1991	2009	1991	2009
Concentrated disadvantage	18.63^{***}	14.32^{***}	26.18^{***}	19.57^{***}
	0.09	0.10	0.01	0.01
Immigrant concentration	-26.38^{***}	-1.32^{***}	-3.21^{***}	-2.69^{***}
	0.46	0.11	0.01	0.01
Residential stability	1.24^{***}	1.94^{***}	-0.65^{***}	1.97^{***}
	0.12	0.06	0.01	0.01
Intercept	58.25^{***}	65.99^{***}	27.64^{***}	18.48^{***}
	0.38	0.09	0.01	0.01
N	34	34	306	306

$^{***}p \leq 0.001$, $^{**}p \leq 0.01$, $^{*}p \leq 0.05$.

TABLE A4. Poisson Regression Models Predicting Number of Years in the Top 10 Percent and Bottom 30 Percent in the Neighborhood Homicide Rate Distribution between 1991 and 2009 Based on Percentile in 1991 ($N = 340$)

	Top 10 Percent	Bottom 30 Percent
Concentrated disadvantage	0.55***	-0.97***
	(0.13)	(0.13)
Immigrant concentration	−0.47*	−0.09
	(0.22)	(0.07)
Residential stability	0.26*	−0.19***
	(0.11)	(0.04)
Homcide Rate Percentile in 1991[1]		
Top 10 percent	2.76***	
	(0.43)	
80th–89th	2.53***	
	(0.39)	
70th–79th	1.90***	
	(0.40)	
60th–69th	1.62***	
	(0.41)	
Bottom 30 percent		1.04***
		(0.24)
30th–39th		0.89***
		(0.24)
40th–49th		0.55*
		(0.24)
50th–59th		0.33
		(0.25)
Intercept	−11.90***	−9.55***
	(0.31)	(0.17)

Notes: Coefficients represent log years. Standard errors in parentheses. Models use population size as the measure of exposure.

[1]Reference groups are 0–59th percentile in the Top 10 percent model and 60th–100th percentile in the bottom 30 percent model.

***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$.

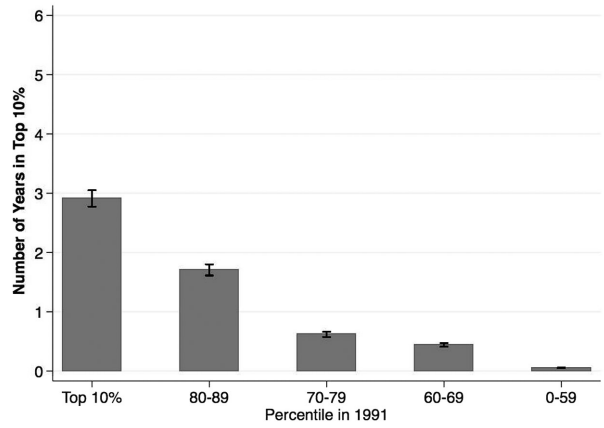

FIG. A1. Predicted number of years in the top 10 percent between 1991 to 2009 by homicide rate percentile in 1991. Error bars represent 95 percent confidence intervals.

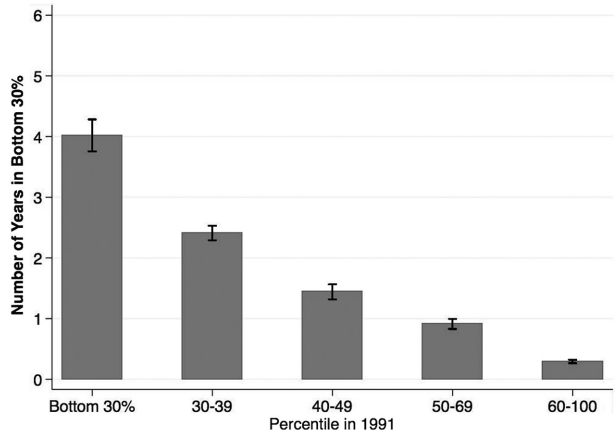

FIG. A2. Predicted number of years in the bottom 30 percent between 1991 and 2009 by homicide rate percentile in 1991. Error bars represent 95 percent confidence intervals.