

Breaking Down the 2020 Homicide Spike

*Christos A. Makridis and
Robert VerBruggen*

ADJUNCT FELLOW
Manhattan Institute

FELLOW
Manhattan Institute

Introduction

In 2020, amid the outbreak of the Covid-19 pandemic and the protests and riots surrounding the death of George Floyd, America's homicide rate increased by an astonishing 30%, even as many less serious types of crime held steady or even declined.¹

The purpose of this brief is to describe the people and the places most affected by the explosion of lethal violence. Using data on homicides from hundreds of the nation's largest counties, we analyze various demographic characteristics of victims, as well as the geographic correlates of the spike in violence.

Homicide increased for almost everyone in 2020, but it did not increase for everyone equally. Tragically, the demographic groups that started out with the highest homicide rates also saw the biggest surges. Although we need more data to say definitively, we find some evidence that suggests that the nation's political cultures played a role, with homicide increases in GOP-leaning counties tending to be smaller than those in Democratic-leaning counties when we focus on homicides within counties over time. We also find that there is no statistically significant relationship between the growth in the homicide rate and either the number of Covid-19 deaths or the number of guns sold per capita.

ABOUT US

The Manhattan Institute is a think tank whose mission is to develop and disseminate new ideas that foster greater economic choice and individual responsibility.

Data and Measurement

To measure homicides, we rely primarily on mortality data from the Centers for Disease Control and Prevention (CDC). While this includes justifiable homicides in addition to killings legally considered murder or manslaughter, and while some deaths are erroneously classified as homicides (including some gun accidents² and police shootings, the latter of which should be classified as “legal interventions”), the CDC’s death-certificate-based numbers are far more comprehensive than the data from the FBI. The CDC has “essentially full coverage”³; the FBI’s national numbers are drawn from reports voluntarily submitted by police agencies and statistically adjusted to account for underreporting.⁴

Importantly, the CDC data provide demographic information for the deceased and can be broken down by county, which allows us to analyze the geographic correlates of the crime spike. The data for 2020 were finalized late in 2021, though we make some use of “provisional” data running through part of last year.

An important limitation of the county-level CDC data is that death counts below 10 are suppressed for privacy reasons. Thus, numbers for the smallest counties are missing—and data for somewhat larger counties are *selectively* missing depending on whether these counties’ homicide rates are high enough to put them above the threshold of 10 killings. As a result, we obtain roughly 290 counties with complete data in 2019 and 2020. Although that is only a fraction of the total of nearly 3,000 counties, it constitutes 58% of the population. Furthermore, crime is concentrated in these densely populated counties.⁵ When we restrict our analysis to only large counties with over 300,000 people, the results are nearly identical.

We nonetheless acknowledge that there could be discrepancies between the actual state or county levels of crime and the reported quantities in the CDC.⁶ However, we believe that it is better to conduct a sophisticated analysis on a smaller sample than a crude analysis on a larger sample: data quality matters.

Our geographic analysis makes use of variables from several other sources. We draw on the American Community Survey five-year sample between 2015 and 2019, giving us a wide array of demographic factors for each county, including the distribution of gender, marital status, race, education, and median household income. We also use the Quarterly Workforce Indicators to control for year-to-year employment growth and more recent data from the Census Bureau to control for year-to-year population growth.

Lastly, we have a measure of gun sales in 47 states from the National Instant Criminal Background Check System (NICS). Alaska, Hawaii, and Michigan are excluded for data-quality reasons⁷; D.C. is excluded because it is a city rather than a state, and it is in a unique position in terms of local gun sales.⁸

CONTACTS

To request an information packet about MI, or if you have questions about how to support us, contact SUPPORT@MANHATTAN-INSTITUTE.ORG.

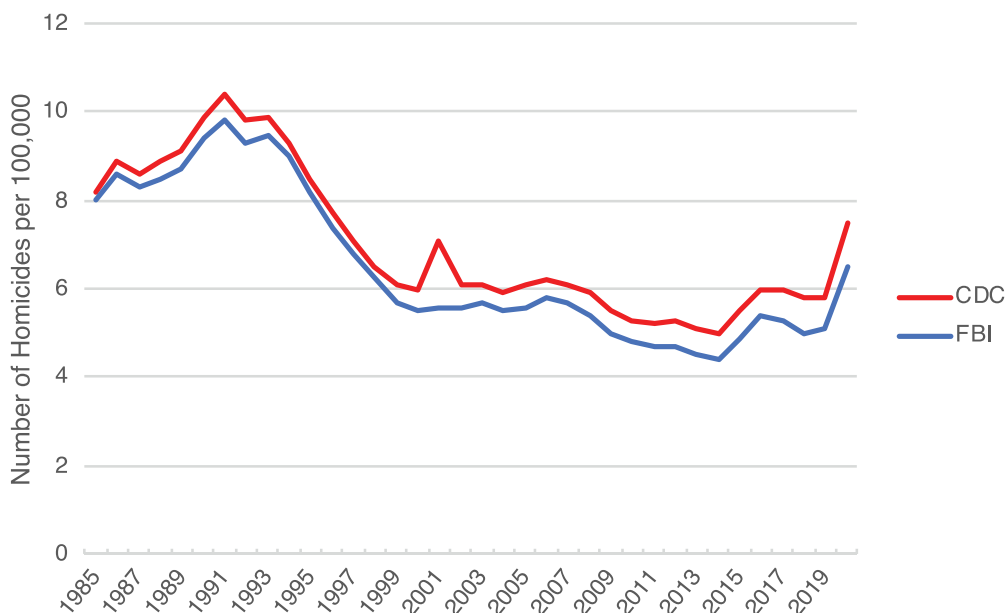
52 Vanderbilt Ave.
New York, NY 10017
(212) 599-7000
INFO@MANHATTAN-INSTITUTE.ORG

The Extent and Timing of the Homicide Surge

The national homicide rate spiked dramatically in 2020, a change obvious both in the CDC data and in the numbers from the FBI. (The FBI measure tends to be a bit lower, in part because it includes only criminal homicides⁹; for example, it excludes those deaths from 9/11 from the homicide rate in 2001.) As shown in **FIGURE 1**, the rate reached its highest level in roughly a quarter-century—though even higher numbers were recorded routinely before the great crime drop of the 1990s. If the homicide rate had remained the same between 2019 and 2020, more than 5,000 additional Americans would be alive today.

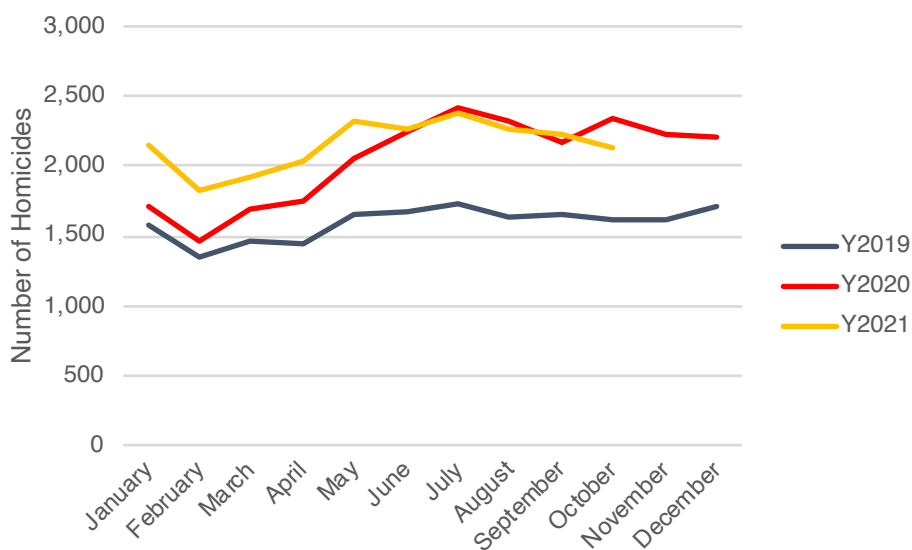
Figure 1

U.S. Homicide Rate by Year



Much attention has been paid to whether this increase was driven by the pandemic and lockdowns or—in an echo of the “Ferguson effect” debate from half a decade ago—by the summer protests and unrest, which could have led to depolicing. Homicide rates early in 2020 were slightly above 2019 levels—and the gap widened in March and April, before the murder of George Floyd in May—but violence truly exploded in the summer (**FIGURE 2**).

Figure 2

U.S. Homicide Deaths by Month, 2019–2021

Note: 2021 numbers are provisional.

As the provisional data from the early months of 2021 show, the increase persisted beyond the end of the year. Another analysis, relying on data from big-city police departments, suggests that homicide rates in 2021 as a whole were even higher than they were in 2020.¹⁰

Demographic Patterns

Homicides went up throughout the country, and for every major demographic group, in 2020, but they did not rise for everyone equally, as is clear when we break down the numbers by race, age, sex, urbanicity, and region of the country.

In making such comparisons, it's important to understand two different ways of measuring such changes. Imagine that one group has a homicide rate of 1 per 100,000, while another group has a rate of 5 per 100,000. If those rates rise to 2 and 10, respectively, both doubled proportionally—but in terms of human costs, the second group was far more affected, with 5 extra deaths versus 1 for the group that started out with a lower rate.

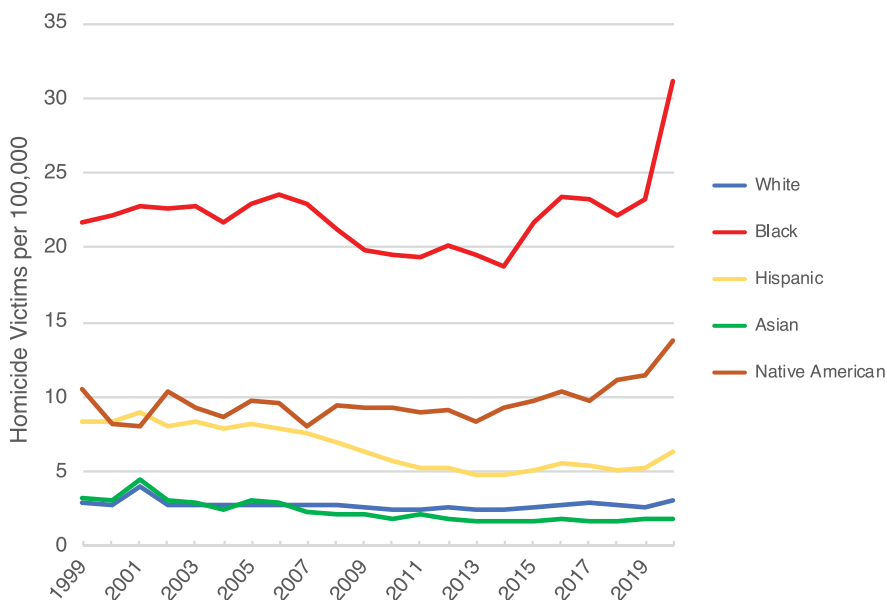
This, tragically, is the pattern we see in the homicide data from 2020. Looking across various groups of Americans, there are relatively modest differences in terms of how much homicide increased proportionally; most of the increases fall in a range of about one-fifth to one-third. Far more dramatic, however, are the differences in the human toll of those increases, thanks to preexisting gaps in homicide rates that the 2020 spike exacerbated.

The racial and ethnic breakdown is perhaps most striking in this regard. Proportionally, homicide rates rose by about 34% for black Americans and about 19% percent for non-Hispanic whites: a notable, but not extreme, gap (**FIGURE 3**). But since the black homicide rate was already many times higher than the white one, this translated into 8 additional black deaths for every 100,000

population—an increase similar to the *total homicide rate* for the country as a whole—while the death rate for whites rose by only 0.5 per 100,000. (Recall that these numbers pertain to the homicide victims, not the killers, though American homicide is overwhelmingly intraracial.)

Figure 3

Homicide Rates by Race and Ethnicity



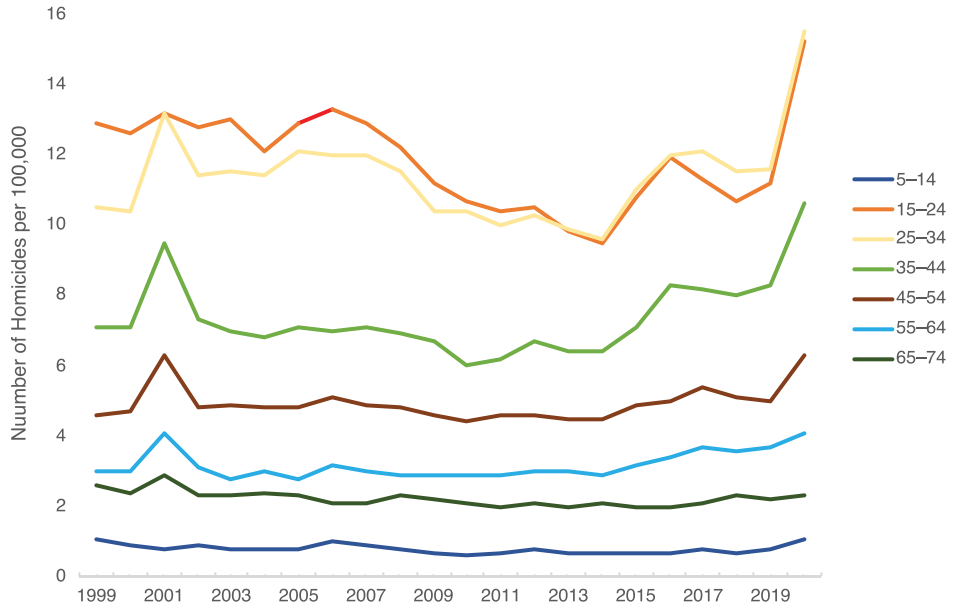
Note: Hispanics are counted solely in the Hispanic-ethnicity category, regardless of race.

The same concept can be seen in other demographic categories, as shown in **FIGURE 4** below. Groups that had higher homicide rates in 2019 tended to have reasonably similar proportional increases but substantially bigger raw increases in 2020. When homicide rates rise, the groups that were already most vulnerable to violence pay the price. (Recall that the 2001 spike in the figures below reflects those who died on 9/11.)

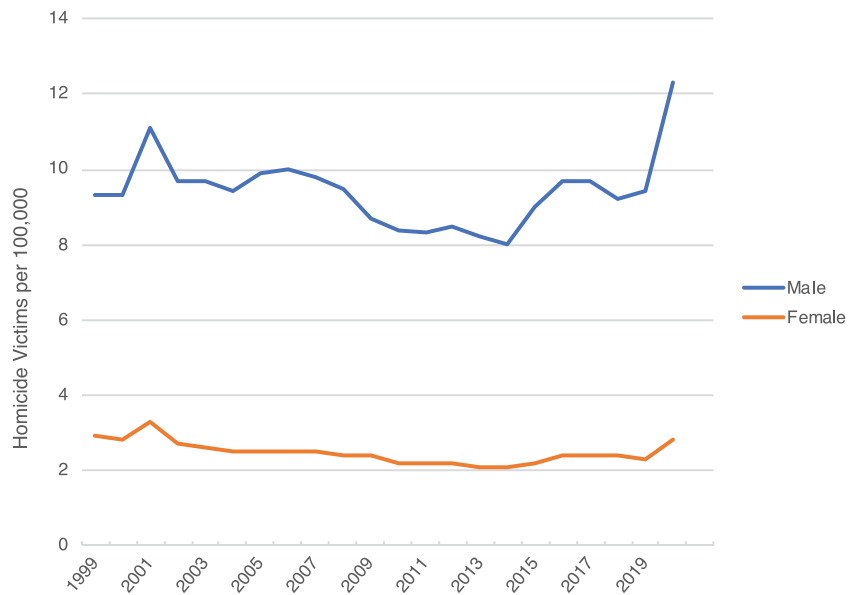
Figure 4

Homicide Rates by Assorted Demographic Characteristics:

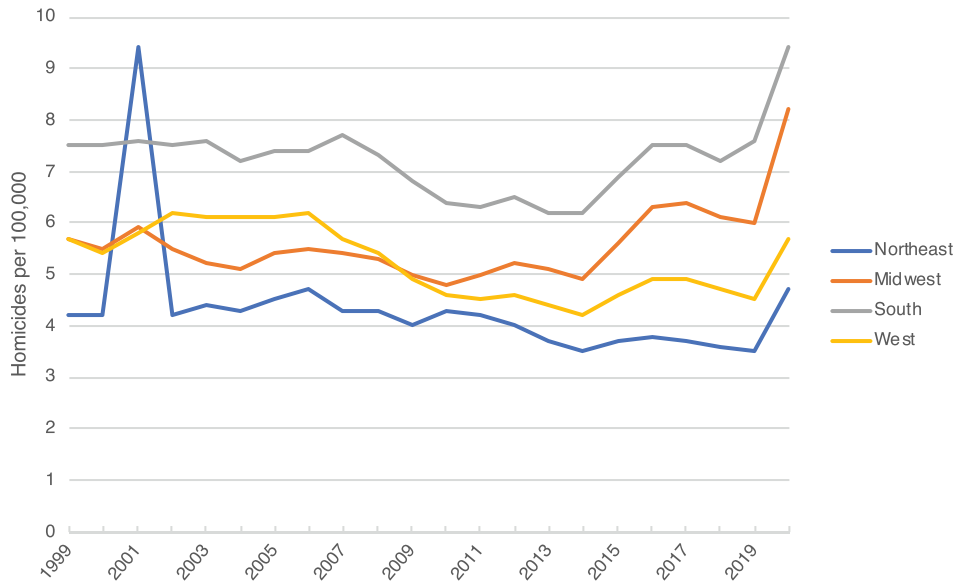
Selected Age Ranges



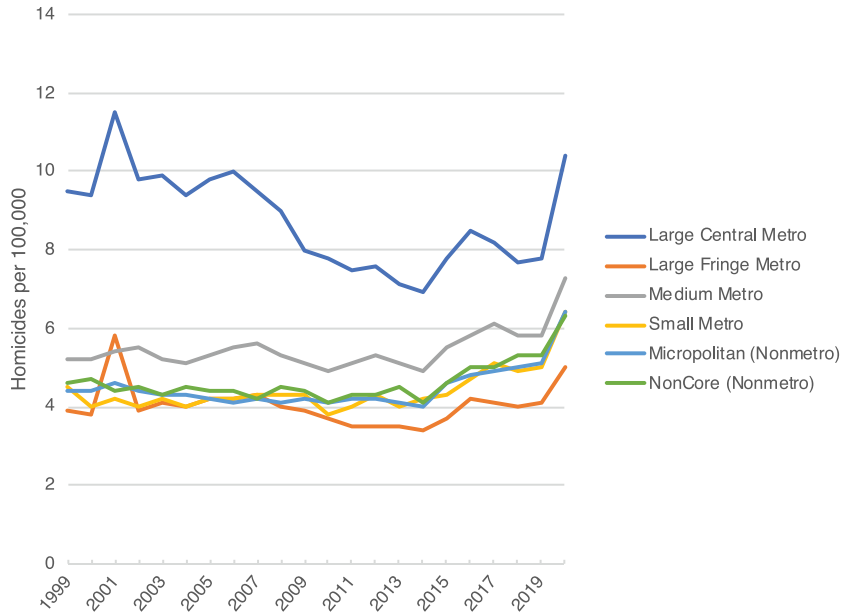
Sex



Region



Urbanicity



Note that two of these figures pertain to regions of the country and urbanicity. Geographic patterns are our next focus.

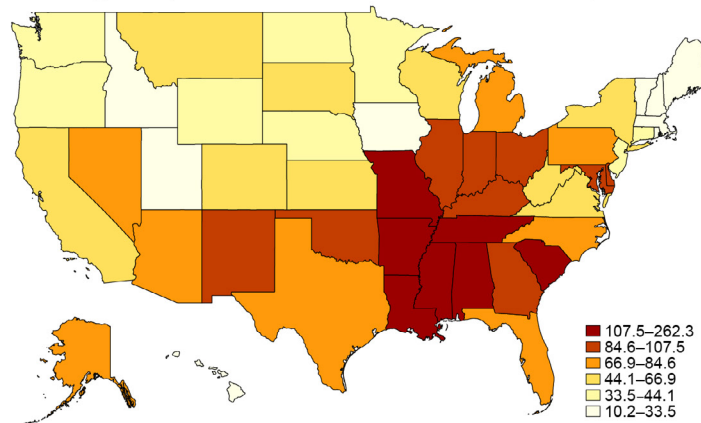
The Geographic Correlates of the Crime Spike

Before exploring the correlation between geographic factors and the growth rate of homicide rates per capita, we begin with a visualization of differences across states. Panel A in **FIGURE 5** plots the homicide deaths per capita (death rate) in thousands (averaged between 2019 and 2020), showing that the highest death rates are concentrated in the South. However, Panel B shows that the greatest increase between 2019 and 2020 is concentrated in the Northeast.

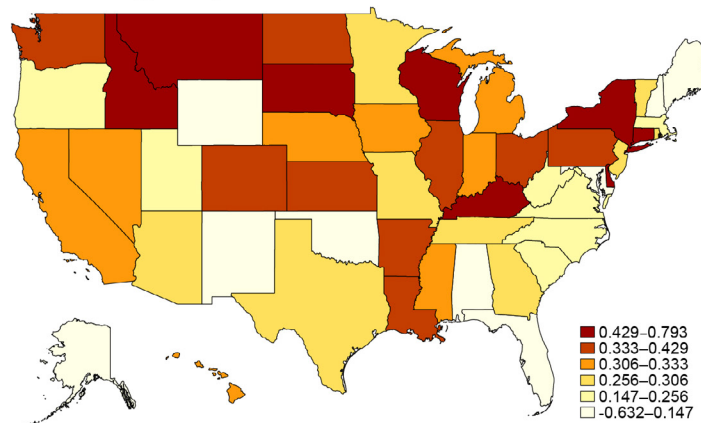
Figure 5

Spatial Heterogeneity in Homicides Across States

Panel A: Heterogeneity in Homicide Death Rates Per Capita, in Thousands



Panel B: Heterogeneity in 2019–20 Homicide Death Growth Rates



Next, we explore the correlation between two geographic factors—population and GOP vote share—and the growth rate in the homicide rate per capita between 2019 and 2020. Each observation is a county whose size is determined by its population, giving larger counties greater weight.

Counties with a higher share of GOP voters not only have lower homicide rates but also a lower growth in homicide rates between 2019 and 2020 (**Figures 6 and 7**).

There is a positive correlation between population in a county and the *growth* in the homicide rate, but the correlation between population and just the homicide rate is slightly negative (**FIGURE 8**). In this sense, even though there are slightly higher rates of homicide deaths per capita in smaller counties, some of those differences could be driven by spurious factors that are correlated with population.

Figure 6

GOP Vote Share and Homicide Rate Growth

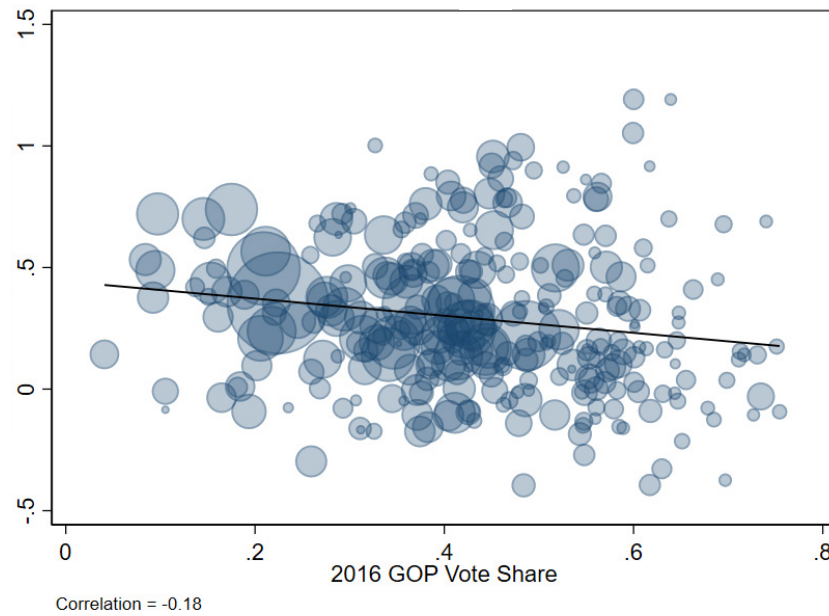


Figure 7

GOP Vote Share and 2020 Homicide Rate

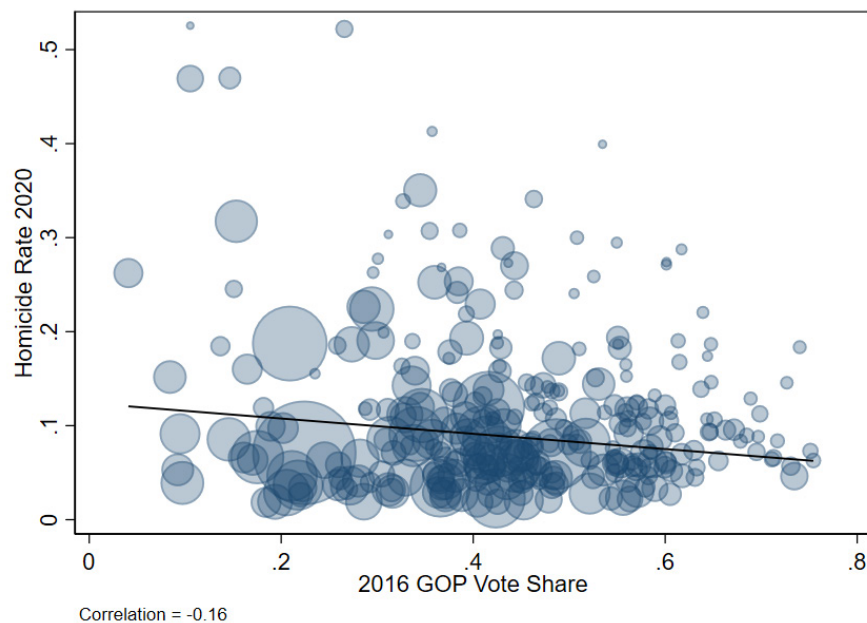
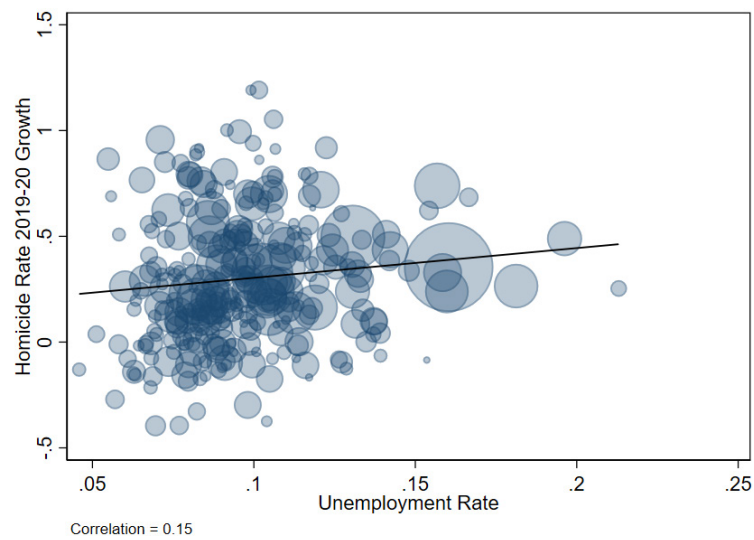


Figure 8

Population and Homicide Rate Growth

We also examine the correlation between the unemployment rate and the growth in homicides at the county level (**FIGURE 9**). We exclude January, February, and March and focus on the remaining months of the year in 2020. Consistent with recent evidence in the *Journal of Urban Health* finding that worsening of economic conditions was correlated with an increase in violence, we also find a 0.15 correlation.¹¹

Figure 9

Unemployment and Homicide Rate Growth

Finally, we examined the relationship between homicide increases and gun sales at the state level. There was a negative correlation between the growth in the gun rate from 2019–2020 and growth in the homicide rate, but a positive correlation between the homicide rate and the rate of gun sales in 2020 (Figures 10 and 11.)

Figure 10

Homicide Rate Growth and Gun Rate Growth

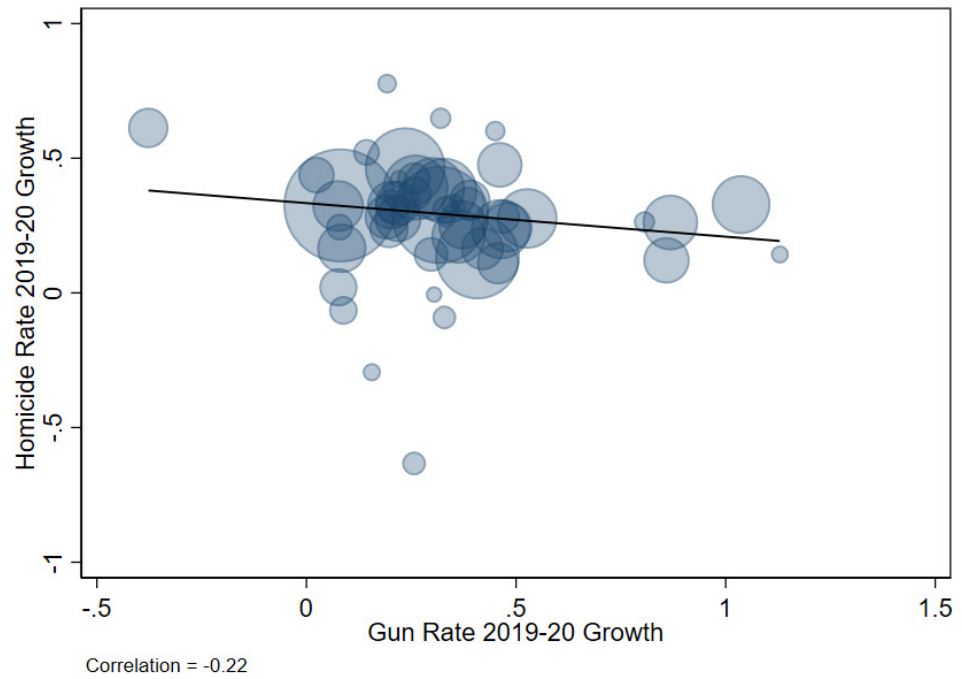
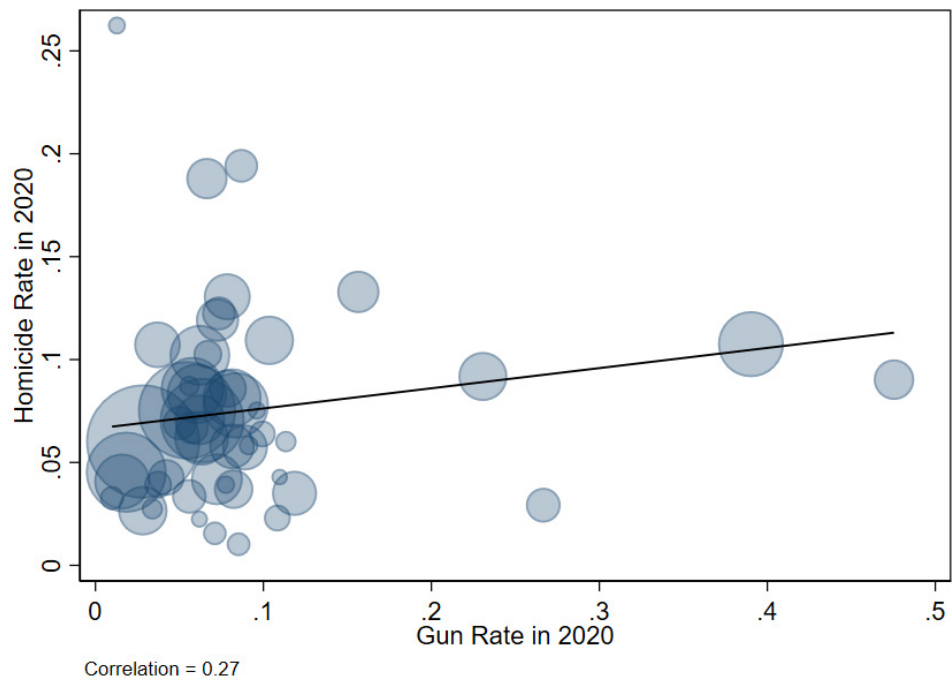


Figure 11

Homicide Rate and Gun Rate



Multivariate Statistical Models

While the analysis to date presents bivariate correlations and time series patterns on the incidence of crime, specifically homicides, one concern is that we are overlooking heterogeneity in potential unobserved factors. For example, counties with higher crime rates (or larger increases in the crime rate) might also have more lower-income households. Indeed, **Table 1** regresses the log number of homicides and the growth rate on the 2018–2020 data on a range of demographic characteristics, showing that median household income and race distributions are correlated with homicide deaths. Population growth tends to be negatively correlated with homicides, but not all specifications are statistically significant.

Table 1: Demographic Correlates of Homicides in 2019 and 2020

| | log(Number of Homicides) | | Homicide Rate Growth | |
|------------------------------|--------------------------|---------------------|----------------------|---------------------|
| | 2019 | 2020 | 2019 | 2020 |
| Population Growth | .718 [4.826] | -2.640 [4.571] | 1.014 [3.614] | 2.352 [3.909] |
| Employment Growth | -1.934 [2.041] | -.026 [1.572] | -.987 [1.589] | -2.907** [1.230] |
| log(Covid-19 Deaths) | -.168** [.077] | -.115 [.079] | .009 [.055] | .038 [.055] |
| log(Median Household Income) | -1.276*** [.298] | -1.522*** [.246] | .312 [.232] | -.458* [.263] |
| White | -.399 [.393] | -.572 [.433] | .424 [.342] | -.384 [.315] |
| Black | 2.595*** [.502] | 2.242*** [.460] | .589* [.340] | -.605 [.379] |
| Hispanic | .316 [.326] | -.132 [.369] | -.051 [.247] | -.676** [.275] |
| R-squared | .934 | .933 | .078 | .145 |
| Sample Size | 238 | 238 | 219 | 238 |
| County Controls | Yes | Yes | Yes | Yes |
| Year | 2019 | 2020 | 2019 | 2020 |

* $p < .10$; ** $p < .05$; *** $p < .01$

Sources: Centers for Disease Control and Prevention (2018–2020), NYT Covid-19 Tracker (2020), American Community Survey (2015–2019). The table reports the coefficients associated with regressions of the log number of homicides and the year-to-year growth in the homicide rate (homicide/population) on year-to-year county employment growth; year-to-year county population growth; log Covid-19 cases and deaths in 2020; county demographic controls (separately for 2019 and 2020), including: the share who are male; the age distribution (the share under age 18, 18–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, 85+); the education distribution (the share less than high school, high school, some college, college, more than college); and the race distribution (the share of white, black, and Hispanic). Standard errors are clustered at the county level and weighted by population.

To overcome these concerns, we pool our two years of data for 302 counties and estimate multivariate regressions. We examine models with two different outcome variables—the log number of deaths due to homicides and their year-to-year growth rate. We regress these outcomes on an indicator for whether the year is 2020, together with demographic and county controls.

First, we control for year-to-year population and employment growth, which addresses the concern that areas with higher homicide rates are simply those that may have seen bigger declines in their population and employment. We also control for the number of guns per capita, as well

as the log number of Covid-19 cases and deaths. These address the concern that we are detecting an increase in violence due to guns and/or a heightened risk of transmission and mortality from the virus that may have led people to become more violent. Finally, we control for a wide array of demographic controls—log median household income, as well as the age, gender, race, and education distribution—to purge variation that may arise from different local preferences and/or knowledge stocks and capabilities.¹²

Table 2 now documents the results with Equation 1. Starting with columns 1 and 3, we see that 2020 exhibited 24.5% more homicide deaths, relative to 2019, and a 26.4 percentage point (pp) faster growth rate of homicide deaths relative to 2018–2019 growth. As we explained earlier, however, these raw correlations could be spurious. Columns 2 and 4 layer a wide array of demographic controls using the 2015–2019 American Community Survey. The resulting marginal effects decline slightly to 22.9% and 20.9pp, respectively, after the inclusion of these controls. That is consistent with the presence of upwards bias—that is, higher crime areas in 2020 are negatively selected.¹³

Of note, population and employment growth are statistically unrelated to the level and growth in homicides when we control for demographic factors. (If we do not control for demographics, both enter in highly statistically significant ways, consistent with our concern that demographic factors are important to control for to mitigate spurious correlations.) Moreover, if we instead use the 2020 unemployment rate as a control, rather than the 2019–2020 employment growth, we obtain slightly larger coefficient estimates on our indicator for 2020, in part because of a larger sample.

We also see a strong negative correlation between median household income and the number of homicides, but no correlation with the homicide growth rate. Furthermore, we see that Covid-19 deaths are slightly negatively correlated with the number of homicides but not statistically related to the homicide growth rate, which underscores that the rise in crime cannot be explained by Covid-19. In sum, the overall invariance of our estimates to the inclusion of these controls suggests that we are obtaining a genuine causal effect rather than a spurious one.

Table 2: Evaluating the Changes in Homicides Over Time Across Counties

| | log(Number of Homicides) | | Homicide Rate Growth | |
|------------------------------|--------------------------|---------------------|----------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Year = 2020 | .245*** [.014] | .229*** [.058] | .264*** [.030] | .209*** [.054] |
| Population Growth | | -1.469 [4.127] | | .969 [2.297] |
| Employment Growth | | -.291 [1.056] | | -1.207 [.870] |
| log(Covid-19 Deaths) | | -.145* [.074] | | .032 [.032] |
| log(Median Household Income) | | -1.413*** [.246] | | -.030 [.122] |
| White | | -.504 [.388] | | .022 [.200] |
| Black | | 2.402*** [.448] | | .020 [.205] |
| Hispanic | | .084 [.318] | | -.331** [.137] |
| R-squared | .011 | .933 | .193 | .248 |
| Sample Size | 580 | 476 | 549 | 457 |
| County Controls | No | Yes | No | Yes |

* p<.10; ** p<.05; *** p<.01

Sources: Center for Disease Control and Prevention (2018–2020), NYT Covid-19 Tracker (2020), American Community Survey (2015–2019). The table reports the coefficients associated with regressions of the log number of homicides and the year-to-year growth in the homicide rate (homicide/population) on an indicator for 2020 (normalized to 2019), conditional on year-to-year county employment growth; year-to-year county population growth; log Covid-19 cases and deaths in 2020; county demographic controls, including: the share who are male; the age distribution (the share under age 18, 18–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, 85+); the education distribution (the share less than high school, high school, some college, college, more than college); and the race distribution (the share of White, Black, and Hispanic). Standard errors are clustered at the county level and weighted by population.

An additional concern is that we are still failing to control sufficiently for county-specific factors. In **Table 3**, we interact county-level factors with our 2020 indicator and control for both county and time fixed effects, comparing counties that vary in some capacity over 2019 to 2020. We focus on three factors: the 2016 GOP vote share, the 2015–2019 share of blacks, and the 2015–2019 log median household income. Unfortunately, our small sample of counties means that we have limited variation, but these results nonetheless highlight three interesting results. First, counties with higher 2016 GOP vote shares have lower levels of homicides and a lower growth in homicides from 2019 to 2020. Second, counties with higher median household income have a slightly higher level of homicides but a lower growth rate, although these estimates are especially statistically noisy. Third, counties with higher shares of blacks have slightly higher levels of homicides but a lower growth in homicides.

While we caution that these estimates are statistically insignificant at conventional levels and are based on a limited sample of counties, we also conduct additional diagnostics using additional specifications. For example, we use homicide deaths per capita as an outcome. Furthermore, to better fit the distribution of homicide deaths, we use a Poisson estimator instead of ordinary least squares. These results are reported in the appendix, showing that each of the interaction effects are not statistically significant at conventional levels. Nonetheless, to avoid any perception that we are cherry picking our results, we retain the baseline specification.

Table 3: Examining the Role of County-Specific Heterogeneity

| | log(Number of Homicides) | | | Homicide Rate Growth | | |
|------------------------------|--------------------------|----------------|----------------|----------------------|-----------------|-----------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Year = 2020 × GOP Share | -.159 [.106] | | | -.194 [.250] | | |
| Year = 2020 × % Black | | .070 [.094] | | | -.085 [.196] | |
| Year = 2020 × log(HH Income) | | | .021 [.063] | | | -.038 [.132] |
| R-squared | .992 | .992 | .992 | .474 | .473 | .473 |
| Sample Size | 580 | 580 | 580 | 518 | 518 | 518 |

Sources: MIT Election Lab (2016), Centers for Disease Control and Prevention (2018–2020), NYT Covid-19 Tracker (2020), American Community Survey (2015–2019). The table reports the coefficients associated with regressions of the log number of homicides and the year-to-year growth in the homicide rate (homicide/population) on an interaction between an indicator for 2020 (normalized to 2019) and either the 2016 GOP vote share, the 2015–2019 share of blacks or the 2015–2019 log median household income, conditional on county and year fixed effects. Standard errors are clustered at the county level and weighted by population.

Next, we replicate all our results at the state level. One concern is that our results reflect a small subset of counties that are not representative. While we have explained our sample selection and caveated it, we nonetheless reproduce our main results in **Table 4**. Importantly, we see that the raw correlations change only minimally. For example, in 2020, there were 23.2% more homicides and a 23.2pp higher growth in homicides. When we control for state-level demographic factors, the former coefficient declines to only 17.7%, and the latter rises slightly to 24.7pp. In both cases, we cannot statistically distinguish them from one another.

Table 4: Evaluating the Changes in Homicides Over Time Across States

| | log(Number of Homicides) | | Homicide Rate Growth | |
|------------------------------|--------------------------|---------------------|----------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Year = 2020 | .232*** [.033] | .177*** [.048] | .232*** [.055] | .247*** [.058] |
| Guns sold per capita | | 3.691 [2.422] | | -1.056 [1.266] |
| log(Covid-19 Deaths) | | .205* [.118] | | .044 [.041] |
| log(Median Household Income) | | -2.015*** [.663] | | .039 [.263] |
| White | | -2.436*** [.853] | | .304 [.350] |
| Black | | .883 [.952] | | .160 [.397] |
| Hispanic | | .759 [.595] | | -.497* [.262] |
| R-squared | .008 | .971 | .236 | .305 |
| Sample Size | 94 | 94 | 94 | 94 |
| County Controls | No | Yes | No | Yes |

* p<.10; ** p<.05; *** p<.01

Sources: Centers for Disease Control and Prevention (2018–2020), NYT Covid-19 Tracker (2020), American Community Survey (2019). The table reports the coefficients associated with regressions of the log number of homicides and the year-to-year growth in the homicide rate (homicide/population) on an indicator for 2020 (normalized to 2019), conditional on state log Covid-19 cases and deaths in 2020; 2019 state demographic controls, including the share who are male, the age distribution (the share under age 18, 18–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, 85+); the education distribution (the share less than high school, high school, some college, college, more than college), and the race distribution (the share of white, black, and Hispanic). Standard errors are clustered at the state level.

Of note, we also include the number of guns sold per capita. While we see a positive coefficient in column 2, it is statistically insignificant. Moreover, we see a negative coefficient in column 4. Even if the results were statistically significant, these results suggest that any increases in the number of guns sold per capita are negatively, not positively, associated with the rise in homicides in 2020. In fact, if we interact the 2020 indicator with guns per capita and include both state and year fixed effects, the interaction effect is negatively associated with both outcomes, although it is statistically insignificant.

Discussion and Conclusion

There is still much to be learned about why homicide began to increase in 2020, but the data reviewed here make a few things clear. First, homicides indeed rose substantially, and the increase disproportionately affected the people and groups who had already been at the highest risk of violence.

Second, the increase cannot be explained by other confounding effects, such as the presence of Covid-19 or a change in the number of gun sales. No matter how we cut the data—whether by county or state, or whether we control for a wide array of demographic and economic factors—we continue to see over a 20-percentage-point increase in the growth rate of crime in 2020, relative to 2019.

Nonetheless, our results leave several questions open for future research. For example, how might the results change if we measure crimes other than homicide? Similarly, how might the results change when a larger sample of counties are available to conduct inference on? While we do not believe these changes would qualitatively alter our results, future research along these lines remains important. We also believe it is useful to continue tracking the dynamics of crime across counties and study how they evolved in 2021.

Appendix

Table A1 reports the results associated with our tests for heterogeneous treatment effects using the homicide death rate as an outcome variable, and as the number of homicide deaths (using a Poisson estimator). Here, we find that counties with higher shares of GOP voters have a much lower homicide death rate and a lower number of deaths in 2020. We also find that differences in race are statistically significant when the outcome variable is the homicide death rate, but these are not as conclusive and may reflect other confounding factors. Furthermore, we see that areas with higher median household income also have lower homicide death rates.

Table A1: Alternative Empirical Specifications with County-Specific Heterogeneity

| | Homicide Death Rate | | | Homicide Deaths (Poisson) | | |
|------------------------------|---------------------|----------------------|---------------------|---------------------------|----------------|-----------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Year = 2020 × GOP Share | -4.312** [1.717] | | | -.213* [.127] | | |
| Year = 2020 × % Black | | 10.457*** [1.958] | | | .024 [.109] | |
| Year = 2020 × log(HH Income) | | | -4.113*** [.772] | | | -.004 [.066] |
| R-squared | .958 | .966 | .962 | | | |
| Sample Size | 580 | 580 | 580 | 580 | 580 | 580 |

Sources: MIT Election Lab (2016), Centers for Disease Control and Prevention (2018–2020), NYT Covid-19 Tracker (2020), American Community Survey (2015–2019). The table reports the coefficients associated with regressions of the homicide death rate and the number of homicide deaths (using a Poisson estimator) on an interaction between an indicator for 2020 (normalized to 2019) and either the 2016 GOP vote share, the 2015–2019 share of blacks, or the 2015–2019 log median household income, conditional on county and year fixed effects. Standard errors are clustered at the county level and weighted by population (except for the Poisson estimator, which does not weight the observations).

Endnotes

- ¹ See, e.g., Richard Rosenfeld and Ernesto Lopez, “Pandemic, Social Unrest, and Crime in U.S. Cities: Year-End 2021 Update,” Council on Criminal Justice, Jan. 24, 2022.
- ² Catherine Barber et al., “Underestimates of Unintentional Firearm Fatalities: Comparing Supplementary Homicide Report Data with the National Vital Statistics System,” *Injury Prevention: Journal of the International Society for Child and Adolescent Injury Prevention* 8 (October 1, 2002): 252–56.
- ³ David McDowall, “The National Violent Death Reporting System and Police-Involved Firearm Deaths,” *American Journal of Public Health* 109, no. 4 (Apr. 1, 2019): 537–38.
- ⁴ Federal Bureau of Investigation (FBI), Crime in the United States 2019: Table 1 Data Declaration.
- ⁵ To be clear, the average county in our sample has a 524,375-person larger population than the set of total counties. For example, the mean (median) county not in our sample has a population of 38,032 (21,047), whereas the mean (median) in our sample has a population of 562,408 (332,172).
- ⁶ We note, for example, a recent report from Kylie Murdock and Jim Kessler, “The Red State Murder Problem,” *Third Way*, Mar. 15, 2022, who collect data from a combination of sources, including states directly. We defer to the CDC data because of their uniform approach to collecting and harmonizing data, so any measurement error is common and will get absorbed when we focus on changes and/or include year fixed effects. For example, in 2020, the CDC reported 404 homicides in Kentucky, but the state reported 640. If such measurement error is random, then we will simply have more attenuated (statistically noisy) estimates, and if the CDC systematically undercounts crime, then we will underestimate the overall increase that took place in 2020. When we turn to our regression-based approach, we control for factors that might be correlated with the measurement error, thereby producing more statistically reliable estimates.
- ⁷ In excluding Hawaii and Alaska, we follow Julia P. Schleimer et al., “Firearm Purchasing and Firearm Violence during the Coronavirus Pandemic in the United States: A Cross-Sectional Study,” *Injury Epidemiology* 8, no. 1 (July 5, 2021): 43. (We also follow Schleimer et al. in measuring gun sales as the sum of transactions classified as handgun, long gun, multiple, and other.) Meanwhile, pursuant to federal rules, Michigan stopped allowing the use of concealed-carry permits to bypass background checks during 2020; see Dru Stevenson, “Michigan Legalizes Marijuana, Loses Its ‘Permanent Brady Permit’ Status With ATF,” Duke University Center for Firearms Law, *Second Thoughts* (blog), Mar. 18, 2020.
- ⁸ Stephen Gutowski, “DC to Get First Range, Gun Store,” *Washington Free Beacon*, May 3, 2016.
- ⁹ See U.S. Dept. of Justice, Bureau of Justice Statistics, “The Nation’s Two Measures of Homicide,” July 2014; Jacob Kaplan, “Uniform Crime Reporting (UCR) Program Data: A Practitioner’s Guide,” ch. 6.
- ¹⁰ Rosenfeld and Lopez, “Pandemic, Social Unrest, and Crime in U.S. Cities: Year-End 2021 Update.”

- ¹¹ Julia P. Schleimer et al., “Unemployment and Crime in US Cities During the Coronavirus Pandemic,” *Journal of Urban Health* 99, no. 1 (February 2022): 82–91.
- ¹² We estimate these regressions using least squares, but our results are also robust to estimating count models through negative binomial or Poisson when the outcome is the number of homicides.
- ¹³ To be clear, these explanatory variables should be interpreted with reference to the whole sample, not just 2020.