BRENNAN CENTER FOR JUSTICE

WHAT CAUSED THE CRIME DECLINE?

Dr. Oliver Roeder, Lauren-Brooke Eisen, and Julia Bowling

Foreword by Dr. Joseph E. Stiglitz
Executive Summary by Inimai Chettiar

Brennan Center for Justice *at New York University School of Law*

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FOREWORD

By Joseph E. Stiglitz

Our country has its share of challenges — poverty, unemployment, inequality. Economic analysis can help play a role in understanding and addressing these challenges.

One of the great problems we face today is mass incarceration, a tragedy which has been powerfully documented. With almost 1 in 100 American adults locked away behind bars, our incarceration rate is the world's highest — nine to ten times that of many European countries. This adds up to an overwhelming 2.3 million people in prison and jail today — nearly 40 percent of whom are African American.[1] Yet lawmakers are slow to take action and public outrage is largely absent.

This prodigious rate of incarceration is not only inhumane, it is economic folly. How many people sit needlessly in prison when, in a more rational system, they could be contributing to our economy? And, once out of prison, how many people face a lifetime of depressed economic prospects? When 1 in 28 children has a parent in prison, the cycle of poverty and unequal opportunity continues a tragic waste of human potential for generations.

Americans spend $260 billion every year on criminal justice. That is more than one-quarter of the national deficit.[2] A year in prison can cost more than a year at Harvard. This is not a hallmark of a well-performing economy and society.

This vast fiscal and social toll was created in the name of protecting lives and property. But what do we know about the public safety benefits, the ostensible justification for our prison-centered approach to crime?

Some advocates of this system of mass incarceration seem to contend that while the costs have been enormous, so have the benefits, the dramatic drop in crime. They would like to believe that this can be attributed in large measure to the explosion in incarceration. After all, when offenders go to prison, it would seem they are less likely to commit future crimes. But this instinctive reaction does not comport with the scientific evidence.

This report addresses a critical question: What caused the American crime decline? Was it incarceration? Was it policing? Or was it something else? This groundbreaking empirical analysis from the Brennan Center shows that, on examination, the easy answers do not explain incarceration's effect on crime. This report presents a rigorous and sophisticated empirical analysis performed on the most recent, comprehensive dataset to date.

The authors conclude that incarceration had relatively little to do with the crime decline. They find that the dramatic increases in incarceration have had a limited, diminishing effect on crime. And they have quantified those minimal benefits. At today's high incarceration rates, continuing to incarcerate more people has almost no effect on reducing crime.

These findings raise questions as to whether the toll — fiscal, economic, and societal — of mass incarceration is worthwhile in the face of these negligible crime control benefits. The report also demonstrates the value of interdisciplinary thinking. It melds law, economics, science, criminology, and public policy analysis to address the challenges facing our country.

The United States has limited resources. We must foster opportunity and work to bridge inequality, not fund policies that destroy human potential today and handicap the next generation. The toll of mass incarceration on our social and economic future is unsustainable.

When high levels of incarceration provide scant public safety benefit, it is pointless to continue using — wasting — resources in this way. Instead, the country should shift priorities away from policies proven to be ineffective and focus our energies on truly beneficial initiatives that both reduce crime and reduce mass incarceration. The evidence presented here tells us that these are compatible goals.

Dr. Stiglitz is a University Professor at Columbia University. He is the former Chairman of the United States Council of Economic Advisers and a 2001 recipient of Nobel Memorial Prize in Economic Sciences.

EXECUTIVE SUMMARY

By Inimai Chettiar

For the past 40 years, the United States has been engaged in a vast, costly social experiment. It has incarcerated a higher percentage of its people, and for a longer period, than any other democracy. In fact, with 5 percent of the world's population, the U.S. is home to 25 percent of its prisoners. There are five times as many people incarcerated today than there were in 1970.[3] And prisoners are disproportionately people of color. At current rates, one in three black males can expect to spend time behind bars.[4] This archipelago of prisons and jails costs more than $80 billion annually — about equivalent to the budget of the federal Department of Education.[5] This is the phenomenon of mass incarceration.

Mass incarceration was a distinct response by lawmakers and the public to the social tumult of the 1960s and the increasing crime rate of the 1970s and 1980s. The standard theory supporting incarceration as the primary crime-control tactic posits that incarceration not only incapacitates past offenders, but also deters future ones.[6]

Crime across the United States has steadily declined over the last two decades. Today, the crime rate is about half of what it was at its height in 1991. Violent crime has fallen by 51 percent since 1991, and property crime by 43 percent.[7] What was once seen as a plague, especially in urban areas, is now at least manageable in most places.[8] Rarely has there been such a rapid change in mass behavior.

This observation begs two central questions: Why has crime fallen? And to what degree is incarceration, or other criminal justice policy, responsible?

Social scientists and policy experts have searched for answers. Various explanations have been offered: expanded police forces, an aging population, employment rates, and even legalized abortion. Most likely, there is no one cause for such widespread, dramatic change. Many factors are responsible.

This report isolates two criminal justice policies — incarceration and one policing approach — and provides new findings on their effects on crime reduction using a regression analysis.[9] To fully isolate the effects of these two policies on crime reduction, this report also examines 12 additional commonly cited theories about what caused the crime decline. Effects are also separated out by decade: 1990-1999 ("the 1990s") and 2000-2013 ("the 2000s"). This distinction helps expose the nuanced effects of variables given the different demographic, economic, and policy trends in each decade.

This report issues three central findings, which are summarized in Table 1:

1. **Increased incarceration at today's levels has a negligible crime control benefit:** Incarceration has been declining in effectiveness as a crime control tactic since before 1980. Since 2000, the effect on the crime rate of increasing incarceration, in other words, adding individuals to the prison population, has been essentially zero. Increased incarceration accounted for approximately 6 percent of the reduction in property crime in the 1990s (this could vary statistically from 0 to 12 percent), and accounted for *less than 1 percent* of the decline in property crime this century. Increased incarceration has had little effect on the drop in violent crime in the past 24 years. In fact, large states such as California, Michigan, New Jersey, New York, and Texas have all reduced their prison populations while crime has continued to fall.

2. **One policing approach that helps police gather data used to identify crime patterns and target resources, a technique called CompStat, played a role in bringing down crime in cities:** Based on an analysis of the 50 most populous cities, this report finds that CompStat-style programs were responsible for a 5 to 15 percent decrease in crime in those cities that introduced it. Increased numbers of police officers also played a role in reducing crime.

3. **Certain social, economic, and environmental factors also played a role in the crime drop:** According to this report's empirical analysis, the aging population, changes in income, and decreased alcohol consumption also affected crime. A review of past research indicates that consumer confidence and inflation also seem to have contributed to crime reduction.

What's New in This Report?

- New quantification of the diminishing effect of incarceration on crime reduction, based on more than a decade of new data.
- Specific quantification of the contribution of incarceration to the crime decline nationally and in all 50 states.
- Analysis of 14 major theories of crime reduction, including the effect of theories on each other, providing a more comprehensive look at what caused the crime drop.
- The first national empirical analysis of the police management technique known as CompStat.

Table 1: Popular Theories on the Crime Decline

Decade	Factors Contributing to the Crime Drop	Factors that Did Not Seem to Affect Crime	Disputed Factors
1990-1999	Aging Population (0-5%) Consumer Confidence* Decreased Alcohol Consumption (5-10%) Decreased Unemployment (0-5%) Growth in Income (0-7%) Increased Incarceration (0-10%) Increased Police Numbers (0-10%) Inflation*	Enactment of Right-to-Carry Gun Laws (no evidence of effect) Use of Death Penalty (no evidence of effect)	Decreased Crack Use* Decreased Lead in Gasoline* Legalization of Abortion*
2000-2013	Consumer Confidence* Decreased Alcohol Consumption (5-10%) Growth in Income (5-10%) Inflation* Introduction of CompStat±	Aging Population (no evidence of an effect) Decreased Crack Use* Decreased Lead in Gasoline* Enactment of Right-to-Carry Gun Laws (no evidence of effect) Increased Incarceration (0-1%) Increased Police Numbers (no evidence of an effect) Increased Unemployment (0-3%) Legalization of Abortion* Use of Death Penalty (no evidence of effect)	

Source: Brennan Center analysis.[10]

* Denotes summaries of past research. All other findings are based on original empirical analysis.

± This report found that the introduction of CompStat-style programs is associated with a 5-15 percent decrease in crime in cities where it was implemented. From this finding, it can be concluded that CompStat had some effect on the national crime drop in the 2000s.

Figure 1: Popular Theories on the Crime Decline

Percent of Crime Decline (1990–1999)

- ■ Increased Incarceration (0-7%)
- ■ Increased Police Numbers (0-10%)
- ■ Aging Population (0-5%)
- ■ Growth in Income (5-10%)
- ■ Decreased Alcohol Consumption (5-10%)
- ■ Unemployment (0-5%)
- ■ Consumer Confidence, Inflation (some effect)
- ■ Decreased Crack Use, Legalized Abortion, Decreased Lead in Gasoline (possibly some effect)
- ■ Other Factors

*Use of Death Penalty, Enactment of Right-to-Carry Laws (no evidence of an effect)

Percent of Crime Decline (2000–2013)

- ■ Increased Incarceration (0-1%)
- ■ Growth in Income (5-10%)
- ■ Decreased Alcohol Consumption (5-10%)
- ■ Introduction of CompStat (some effect)
- ■ Consumer Confidence, Inflation (some effect)
- ■ Other Factors

* Decreased Crack Use, Legalized Abortion, Decreased Lead in Gasoline (likely no effect)
* Use of Death Penalty, Enactment of Right-to-Carry Laws, Increased Police Numbers, Aging Population, Unemployment (no evidence of an effect)

Incarceration and Crime

While there has been a paucity of empirical analysis exploring the diminishing returns of incarceration, some recent work has discussed the phenomenon. A 2014 report from the Brookings Institution's Hamilton Project explained that incarceration has "diminishing marginal returns."[11] In other words, incarceration becomes less effective the more it is used. The Brookings report analyzes trends in two regions, Italy and California, to draw this conclusion. Similarly, a 2014 study by the National Academy of Sciences, grounded in a review of past research through 2000, noted that "the incremental deterrent effect of increases in lengthy prison sentences is modest at best."[12]

With the benefit of a decade more of data, this report seeks to update and quantify the diminishing returns of incarceration as highlighted in other reports, and also provide information on theories of the crime decline to further show the diminished effect of incarceration. This report finds that incarceration in the U.S. has reached a level where it no longer provides a meaningful crime reduction benefit. Table 2 summarizes the trends in crime and incarceration from 1990 to 2013. Most notably, the trends do not show a consistent relationship. Specifically, in the 2000s, crime continued to drop while incarceration grew slowly. This evidence indicates a more complicated relationship between the two variables, and that increased incarceration is not effective at its current levels.

Table 2: Crime and Incarceration Rates (1990-2013)

	1990-2013	1990-1999 ("1990s")	2000-2013 ("2000s")
Violent Crime (murder, non-negligent manslaughter, forcible rape, robbery, aggravated assault)	50% decline	28% decline	27% decline
Property Crime (burglary, larceny-theft, motor vehicle theft)	46% decline	26% decline	25% decline
Imprisonment	61% increase	61% increase	1% increase

Sources: Federal Bureau of Investigation, Uniform Crime Reports; U.S. Department of Justice, Bureau of Justice Statistics.[13]

As more low-level offenders flood prisons, each additional individual's incarceration has, on average, a consecutively smaller crime reduction effect. The incarceration rate jumped by more than 60 percent from 1990 to 1999, while the rate of violent crime dropped by 28 percent. In the next decade, the rate of incarceration increased by just 1 percent, while the violent crime rate fell by 27 percent. To be clear, this report does not find that incarceration never affects crime. Incarceration can control crime in many circumstances. But the current exorbitant level of incarceration has reached a point where diminishing returns have rendered the crime reduction effect of incarceration so small, it has become nil.

To isolate the effect of incarceration on crime, the authors considered the effects of 12 other leading theories of crime reduction, as noted in Table 3. These theories were chosen because of their frequency in media and research studies. The authors attempted to secure state-by-state data from 1980 to 2013 in all states for each theory and ran the data through a multi-variable regression that controls for the effects

of each variable on crime, and each variable on other variables. The findings are consistent with the most respected studies on these theories. The authors could not secure state-by-state national data for every year 1980 to 2013 for five variables: inflation, consumer confidence, waning crack use, decrease of lead in gasoline, and legalization of abortion. Data for these variables were not collected at the state level for all the years needed and therefore could not be incorporated into the state-level regression. In those instances, the authors analyzed past research and provided a summary.

Part I of this report presents this state-level analysis, which is summarized in Table 3, noting which findings are based in this report's original analysis and which findings are a summary of past research. Notably, these numbers are estimates, as any regression analysis of a large data set with many variables will not yield one definitive answer. There is always some uncertainty and statistical error involved in any empirical analysis. However, these findings are obtained through statistically valid and economically sound, peer-reviewed procedures to produce best estimates.

Table 3: State-Level Analysis on the Crime Decline (1990-2013)

	Theory	Percentage Factor in Crime Decline 1990-2013	Percentage Factor in Crime Decline 1990-1999 ("1990s")	Percentage Factor in Crime Decline 2000-2013 ("2000s")
Criminal Justice Policies	1. Increased Incarceration	Violent: no effect Property: 0-7%	Violent: no effect Property: 0-12%	Violent: no effect Property: 0-1%†
	2. Use of Death Penalty	No evidence of an effect	No evidence of an effect	No evidence of an effect
	3. Increased Police Numbers	0-5%	0-10%	No evidence of an effect†
	4. Enactment of Right-to-Carry Gun Laws	No evidence of an effect	No evidence of an effect	No evidence of an effect
Economic Factors	5. Unemployment	0-3%	0-5%	No evidence of an effect
	6. Growth in Income	5-10%	5-10%	5-10%
	7. Inflation*	Some effect on property crime	Some effect on property crime	Some effect on property crime
	8. Consumer Confidence*	Some effect on property crime	Some effect on property crime	Some effect on property crime
Environmental and Social Factors	9. Decreased Alcohol Consumption	5-10%	5-10%	5-10%
	10. Aging Population	0-5%	0-5%	No evidence of an effect†
	11. Decreased Crack Use*	Possibly some effect	Possibly some effect on violent crime	Negligible
	12. Legalized Abortion*	Possibly some effect	Possibly some effect	Negligible
	13. Decreased Lead in Gasoline*	Possibly some effect	Possibly some effect on violent crime	Negligible

Source: Brennan Center analysis.[14]

* Denotes summaries of past research. All other findings are based on original empirical analysis.

† Indicated this variable did not increase or decrease significantly during the period to have an impact on crime.

Crime and Policing

Policing is one of the significant criminal justice policies that can affect both crime and incarceration rates. This report seeks to fill a gap in research on the effect of policing on crime. While there has been some empirical analysis on increased *numbers* of police officers and crime reduction, fewer national-level analyses have been conducted on the effectiveness of *how* police fight crime. To provide a glimpse into the link between policing and the crime drop, this report undertakes the first national study of the crime-reducing effect of the police management technique known as CompStat.

It is difficult to measure how different police departments deploy tactics, such as "broken windows policing" (where police focus on low-level crimes such as breaking windows and graffiti on the theory that such enforcement will stop more serious crime), "hot spots policing" (where police focus resources in areas where crime is most likely to occur), or "stop-and-frisk" (when officers stop individuals, who may not be overtly engaged in criminal activity, and conduct a pat-down).[15] It is difficult to study cause and effect of these tactics on a national level because each city and department defines and applies these tactics differently.

Through the authors' research, CompStat emerged as one of the most consistent, easily identifiable, and widespread policing techniques employed during the time period under examination. CompStat is a police management technique — a way to run police departments — that was widely deployed in the nation's cities in the 1990s and 2000s, starting in 1994 under New York City Police Department Commissioner Bill Bratton. Although departments use it differently, the general objective is the same: to implement strong management and accountability within police departments to execute strategies based on robust data collection to reduce and prevent crime. Departments and units deploy different specific tactics, including the ones listed above, to manage crime in neighborhoods. Notably, CompStat should not be conflated with these tactics. CompStat is not equivalent to broken windows, hot spots, or stop-and-frisk.

For the purposes of this report, CompStat comprises a 14th theory about the decline in crime. It serves as one widespread way in which police manage crime in cities across the country. Because policing is a local function, executed on the city and county level, an empirical analysis of CompStat must be conducted at a local level instead of a state level. Part II of this report presents a city-level analysis of CompStat and also explains the nuances of CompStat in further detail.

Table 4: CompStat's Effect on Crime in 50 Most Populous Cities (1994-2012)

	Theory	Percentage Change in Crime (1994-2012)
Criminal Justice Policy	14. Introduction of CompStat	5-15% decline in violent and property crime

Source: Brennan Center analysis.[16]

Note: The city-level analysis relies on monthly data. Monthly city-level crime data were unavailable for 2013 at time of publication of this report and therefore could not be included.

Table 4 shows that CompStat-style programs were responsible for an estimated 5 to 15 percent decrease in crime in cities where it was introduced. Because CompStat is implemented differently in each city, it may have been responsible for more of the crime decline in some cities and less of the crime decline in others. In New York, for example, the introduction of CompStat signified a large shift in departmental priorities and tactics and therefore could have had a different effect on crime than the national average.[17]

Other Factors in Crime Reduction

This report finds that increased incarceration had some effect on reducing crime since 1990 — however, far lower than previously thought and becoming almost zero in the 2000s. Other factors that played a role in the crime decline were increased numbers of police officers, deploying data-driven policing techniques such as CompStat, changes in income, decreased alcohol consumption, and an aging population. A review of past research indicated that consumer confidence and inflation also played a role.

Two other controversial theories — the legalization of abortion and decreasing lead exposure — are among the most frequently cited. The authors of this report were not able to secure annual, state-by state data on these two factors for the complete time span from 1980 to 2013. (Please see Appendix B for a further explanation.) Based on an extensive review of past research, this report concludes these factors could have possibly affected the crime rate in the 1990s. Any effect, if there was one, likely diminished greatly by the 2000s because those variables played less of a role in that decade.

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This report aims to spur discussion of what constitutes effective policies to deter crime. It aims to use science, law, and logic to break the myth that has fueled mass incarceration and resulted in harm to our communities, our economy, and our country. More incarceration does not lead to *less* crime. The United States can simultaneously reduce crime and reduce mass incarceration.

Chettiar is the director of the Justice Program at the Brennan Center.

EXPERT REVIEWERS

Drafts of this report underwent a rigorous review process with the input of interdisciplinary experts. The authors submitted drafts to experts in economics, law, criminology, and policing. These experts provided significant feedback on the report's findings, text, and methodology. The authors then modified and refined the report based on these comments. The findings of this report should not be ascribed to these reviewers, as they served as experts in their respective fields helping to inform this report's interdisciplinary nature.

Expert reviewers included:*

- **Hon. Richard Posner**, Circuit Judge, U.S. Court of Appeals for the Seventh Circuit; Senior Lecturer, University of Chicago School of Law.

- **Daniel Rubinfeld**, Professor of Law and Professor of Economics, University of California, Berkeley; Visiting Professor, New York University School of Law.

- **Richard Rosenfeld**, Professor of Criminology, University of Missouri St. Louis; Chair, National Academy of Sciences Roundtable on Understanding Crime Trends.

- **Jim Bueermann**, President, Police Foundation.

- **Darrel Stephens**, Executive Director, Major Cities Chiefs Association.

- **John Firman**, Research Director, International Association of Chiefs of Police.

- **William Andrews**, Deputy Commissioner, Management Analysis & Planning, New York City Police Department.

- **Preeti Chauhan**, Assistant Professor of Psychology, John Jay College of Criminal Justice, City University of New York.

- **Maurice Classen**, Program Officer, Community & Economic Development, John D. and Catherine T. MacArthur Foundation; former Senior Deputy Prosecuting Attorney, Seattle, Wash.

*Organizational affiliations are included for identification purposes only.

SUMMARY OF METHODOLOGY

This report undertakes a comprehensive study of the drop in the crime rate from 1990 to 2013, paying close attention to the role of incarceration and one aspect of policing.

Before and during their research, the authors conducted a thorough review and analysis of past academic, scholarly, and policy research on the topic. The authors also completed more than 75 formal and informal interviews with legal, economic, and criminology experts and practitioners including:

- criminal law professors, criminal justice experts, and state criminal justice organization leaders;
- economists who research crime or incarceration or have econometric expertise;
- criminologists and sociologists who research incarceration or crime trends;
- members of the National Academy of Sciences Roundtable on Understanding Crime Trends;
- police and law enforcement experts and officers; and
- other experts who have researched the crime decline and incarceration.[18]

The report examines 14 popular theories for the crime decline over the last 20 years.

Part I

The authors' primary focus in Part I is an analysis of incarceration's effect on crime. In order to accurately isolate the effect of increased incarceration, the authors searched for potential confounding variables that could also affect crime. The authors identified 12 additional possible theories and attempted to control for their effect. These theories were chosen because they were the most commonly cited and explored theories in the media and in academic, economic, legal, and policy research on the crime drop.

The authors searched for annual data on these theories for all 50 states from 1980 to 2013. The authors used data beginning in 1980 (to capture the major changes in crime and incarceration rates in the following decades) and ending in 2013 (the year of most recent data). For the following eight theories, the authors were able to secure data in this form:

- increased incarceration;
- increased police numbers;
- use of death penalty;
- enactment of right-to-carry gun laws;
- unemployment;
- growth in income;
- decreased alcohol consumption;[19] and
- an aging population.

Data for these theories were most commonly available at the state level. Authors analyzed these variables using a large dataset for all 50 states and the District of Columbia. The state-level dataset contained over 1,600 yearly data-point observations over 34 years (1980 to 2013). In total, the dataset consisted of over 115,000 data entries. This report uses the most recently available data, which is 13 years of data beyond what other empirical analyses on this subject have examined. The data sources used to inform each variable were critical decisions, informed by criminal law, criminological, public policy, and economic principles and research. The inter-disciplinary team that produced this report was able to bring together expertise from different backgrounds to produce a well-rounded analysis.

The authors then conducted a multi-variable economic regression analysis on data for these variables from 1980 to 2013. The authors' regression analysis controls for the effects of each variable on all other variables, and also controls for demographic variables including age and race. (A regression is a set of mathematical tools for estimating the relationships between or among variables.) The model also accounts for the diminishing returns of incarceration. Such a large dataset allowed the authors to observe aggregate correlations to obtain more reliable estimates of the effects of each variable on crime. The dataset also exhibited substantial variation, both over time and across states, allowing the authors to better identify and isolate the relationship between each variable and its effect on crime. The authors examined the effects of these variables on the crime drop as a whole, as well as on violent crime and property crime specifically. They also separated out effects by decade: 1990-1999 ("the 1990s") and 2000-2013 ("the 2000s") to expose more nuanced effects given the different demographic, economic, and policy trends in each decade.

The authors used reported crimes as a proxy for all crime. The Federal Bureau of Investigation's Uniform Crime Reports (UCR) is currently the most comprehensive source of crime data. Though the UCR does not include unreported crimes (of which there are many) and there remain problems and deficiencies with the UCR, it is the current standard source of national crime data. It is also the data on which the documented "crime drop" is based.[20]

To study the incarceration variable the authors first sought to include the total incarceration rate, including federal prisons, state prisons, and local jails. As explained further in Appendix B, federal prison data and local jail data were not available for all the years analyzed and for all states. For that reason, the authors used state imprisonment data (the number of state prisoners incarcerated in public or private prisons, and the number of *state prisoners* held in local jails). It does not include individuals in the overall jail population (those held pretrial or serving short sentences), juvenile facilities, or immigration detention centers. The use of this subset of incarceration is in line with other research in the field. The exclusion of federal prisoners, juvenile detainees, and the majority of the jail population does not affect the core findings of this report. If that data were included, the rate of incarceration would be even higher than that in the authors' regression. A higher incarceration rate would likely show more dramatic diminishing returns on crime reduction. Accordingly, this report's empirical findings are likely conservative compared to what a more inclusive definition of "incarceration" would produce.

For the following five theories, yearly data were not available state-by-state for all the years analyzed and therefore could not be included in the regression. The authors therefore undertook a sophisticated analysis of past research for these variables:

- inflation;
- consumer confidence;
- decreased crack use;
- legalized abortion; and
- decreased lead in gasoline.

Specifically, state-by-state data could not be secured on the incidence of recorded abortions for 16 years in the year range sought. Data on the amount of lead in gasoline are not collected at the state level by the Environmental Protection Agency. Data on crack cocaine use are available intermittently through surveys, but not in the necessary annual state-level format. These data were requested from other researchers who had studied these theories but could not be obtained.

Of course, there are many other variables that could have affected crime. It is impossible to include all possible theoretical contributors to the crime drop, as the variables could be infinite. Some factors such as technology, sentence lengths, other forms of policing and criminal justice policies, or other social factors could also have contributed to the crime drop. These are areas ripe for further research.

Part II

Given the prevalence of discussions about the effect of policing on crime in media and policy discussions, the authors searched for a method to measure the effect of policing on crime. Because policing occurs at a local level, at the city or precinct level, the authors could not combine their analysis of policing into the state-level analysis. They therefore conducted a separate city-level analysis, which is presented in Part II. As explained in the Executive Summary, the authors chose to examine the police management technique CompStat, as it is a widely used technique.

The city-level panel dataset examined the introduction of CompStat in the 50 most populous U.S. cities. It also analyzed numbers of police in these cities over this same period to attempt to isolate the effect of CompStat on crime. The city-level dataset contained more than 13,000 monthly observations during 23 years (1990-2012) for variables pertaining to crime and police. *Monthly* city-level crime data for 2013 was not available at time of publication. CompStat was first introduced in the U.S. in 1994, in New York City, and therefore the authors used data slightly before that date to observe the results. In total, this dataset contained more than 198,000 data entries.

The authors determined when and whether a city employed CompStat through police departments' self-reported use through their own research. This research was then vetted by expert police leaders who reviewed this report and confirmed by phone calls to each police department.

For a more detailed explanation of the methodology, data sources, and results tables see Appendix B.

I. STATE-LEVEL ANALYSIS OF CRIME

Part I presents the authors' state-level data and analysis and a synopsis of past research. To fully isolate the effects of incarceration and understand the role of incarceration in relation to other theories, the authors controlled for and researched the role of 12 additional variables. These variables, each discussed in turn below, can be broadly categorized into criminal justice policies, economic factors, and social and environmental factors.

Part I first examines the role of incarceration. It then provides brief summaries of the findings on additional variables. Where original data were not available for a variable, it is so noted and a summary of past research is presented in lieu of original analysis.

A. CRIMINAL JUSTICE POLICIES

1. Increased Incarceration

> **Incarceration & Crime:** Based on original empirical analysis, this report finds that increased incarceration at today's levels has a negligible crime control benefit. Incarceration has been declining in effectiveness as a crime control tactic since before 1980. Since 2000, the effect of increasing incarceration on the crime rate has been essentially zero. Increased incarceration accounted for approximately 6 percent of the reduction in property crime in the 1990s (this could vary statistically from 0 to 12 percent), and accounted for *less than 1 percent* of the decline in property crime this century. Increased incarceration has had no effect on the drop in violent crime in the past 24 years. In fact, large states such as California, Michigan, New Jersey, New York, and Texas have all reduced their prison populations while crime has continued to fall.

Since the 1970s, incarceration in the U.S. has increased steadily and dramatically.[21] Criminal justice policies enacted during the height of the War on Drugs in the 1980s and 1990s expanded the use of incarceration as a response to rising crime and fear of crime. These include mandatory minimums, truth-in-sentencing, "three strikes you're out" laws, federal funding for prison construction, and other sentencing regimes that expanded the prison population.

As explained in the Methodology, federal prison data and local jail data were not available for all the years analyzed and for all 50 states. For that reason, this report focuses on state imprisonment data (the number of state prisoners — either incarcerated in prisons or held in local jails) as a proxy for the full incarceration rate. The use of the state imprisonment subset as a proxy for total incarceration is in accordance with other empirical research in this area, including the national studies described below.

Figure 2: Incarceration and Crime Rates (1980-2013)
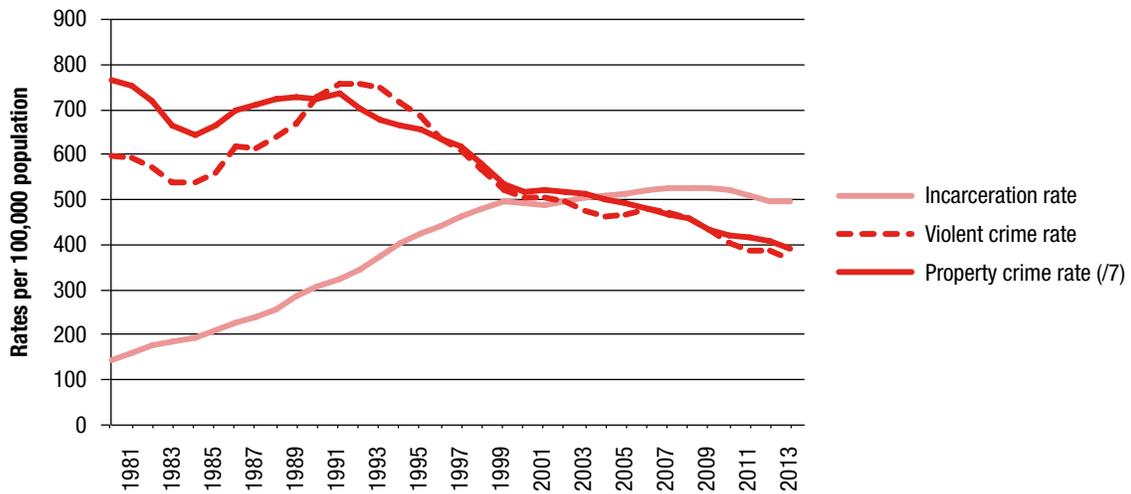
Source: Federal Bureau of Investigation, Uniform Crime Reports; U.S. Department of Justice, Bureau of Justice Statics.[22]

Figure 2 illustrates the total number of state prisoners, alongside the occurrence of violent and property crime. While violent and property crime peaked in about 1991, the imprisonment rate continued to grow. Over roughly the past 20 years there has been a negative correlation between imprisonment and crime: as crime dropped, incarceration continued to increase.

A simple correlation does not, however, imply causation. These trends do not mean that increased incarceration *caused* the drop in crime. After all, in the 20 years previous, the correlation was the opposite: from about 1970 to 1990, incarceration and crime increased simultaneously. It is not possible to draw reliable conclusions by simply observing trends between these two variables.

What's New about this Report's Analysis on Incarceration and Crime

The authors find a significantly lower effect of increased incarceration on crime at today's levels than much of the research that has come before. Why? These three aspects of this report's analysis uncover incarceration's lower effect on crime:

Includes More Than a Decade of Recent Data Than Most National Empirical Analyses: This report uses the most recently available data, which is 13 years of data beyond what most studies in the field have examined, as shown in Table 5. Because the incarceration rate has risen to such an unprecedented level, analyses run on 1990s data may be less informative without the additional insights provided by data from the 2000s.

Accounts for the Effect of Diminishing Returns: When the incarceration rate rises to high levels, additional incarceration will be less effective as a crime-reduction tool. Each additional prisoner will yield less crime reduction. As explained in a 2014 Brookings Institution report: "The crime-reduction gains from higher incarceration rates depend critically on the incarceration rate itself. When the incarceration rate is low, marginal gains from increasing the incarceration rate are higher. This follows from the fact that when prisons are used sparingly, incarceration is reserved for those who commit the most serious crimes. By contrast, when the incarceration rate is high, the marginal crime-reduction gains from further increases tend to be lower, because the offender on the margin between incarceration and an alternative sanction tends to be less serious. *In other words, the crime-fighting benefits of incarceration diminish with the scale of the prison population.*"[23] These benefits diminish because when incarceration levels are higher, individuals who pose relatively little threat to society are more likely to be incarcerated. This effect makes each additional person incarcerated offer fewer crime control benefits. Earlier studies did not use empirical models that accounted for the diminishing returns of incarceration on crime reduction. One exception is the 2006 study by economist Anne Piehl and sociologists Raymond Liedka and Bert Useem.[24] This report builds upon and augments that study's regression model; it also has the benefit of more than 10 years of new data than that study.

Controls for Effects of Other Variables: The authors gathered data on a wide array of factors discussed by the media or researchers as possibly affecting crime. These include: increased incarceration; increased police numbers; use of death penalty; enactment of right-to-carry gun laws; unemployment; growth in income; decreased alcohol consumption; and the aging population. These variables were included in the authors' regression model. Controlling for the effects of these potentially confounding variables allows the authors to further isolate the effect of incarceration on crime.

Highlights of past research on the contribution of incarceration levels to crime are provided below. The authors undertook an extensive review of past research, but not all studies are presented below. Generally, there are three categories of research on incarceration and crime: reports that discuss the "diminishing returns" of incarceration on crime, but do not perform empirical analysis to quantify it; empirical analyses that do not account for diminishing returns; and empirical analyses that do take into account diminishing returns.

A full understanding of the effect of incarceration on crime requires a better understanding of the role of diminishing returns: How does an ever-increasing prison population *change* how incarceration affects crime over time?

One category of studies on this topic is those that note incarceration could have diminishing returns on crime reduction. In a 2004 paper, economist Steven Levitt examined 10 variables that could have contributed to the crime drop. Levitt found incarceration to be a main driver of the 1990s crime drop, but he specifically acknowledged that his analysis did not fully account for the diminishing returns of incarceration.[26] He also noted the potential for "sharply declining marginal benefits" of incarceration on crime, which, if present, could have affected his own findings.[27]

That same year, criminologists James Austin and Tony Fabelo articulated the fiscal implications of incarceration's diminishing returns: with growing corrections budgets and a state budget crisis, states increasingly wanted to know whether each new dollar they applied to incarceration was put to good use in reducing crime.[28] In 2005, the Sentencing Project acknowledged diminishing returns as a top concern, though without an empirical analysis: "While incarceration is one factor affecting crime rates, its impact is more modest than many proponents suggest, and is increasingly subject to diminishing returns."[29] Similarly, in a 2009 Brookings study, economist John Donohue theorized that "social spending" (spending on preschool education, for example) could generate similar crime reduction at a lower social cost than incarceration, and noted the diminishing returns of incarceration on crime.[30]

In April 2014, the National Academy of Sciences (NAS) released a lengthy report on incarceration. That study reviewed past research and concluded that the majority of studies found incarceration probably did reduce crime from the 1970s through 2000, but its effect is "unlikely to have been large."[31] This past body of research generally did not analyze data after 2000 and did not account for diminishing returns. Many of the major studies examined by NAS are included in Table 5.

Researchers examining incarceration and crime in specific regions have also expressed a concern about diminishing returns. A 2013 study from the Washington State Institute for Public Policy cautioned that incarceration rates and police per capita are both susceptible to diminishing returns as to their effect on crime reduction.[32] Most recently, in May 2014, the Brookings Institution's Hamilton Project published a report by public policy professors Steven Raphael and Michael Stoll comparing the recent experiences of Italy and California. They found that in California, which has a much higher incarceration rate than Italy, a recent release of prisoners resulted in very little change in crime. However, a similar prisoner release in Italy, which has a much lower incarceration rate, caused a noticeable increase in crime.

What are diminishing returns and why are they important?

To understand the concept and importance of diminishing returns, consider the example of a hypothetical factory. Basic economics textbooks present this factory hypothetical to illustrate this concept.[25]

Hypothetical Factory: Workers and Output
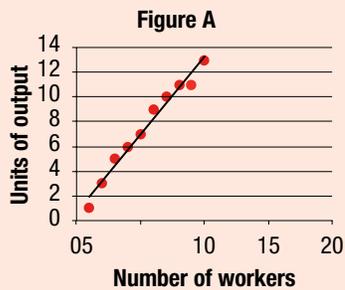
Linear representation of output per worker.
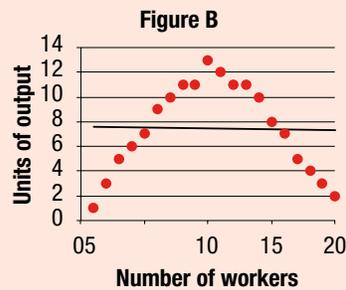
Linear representation of output per worker with added workers.
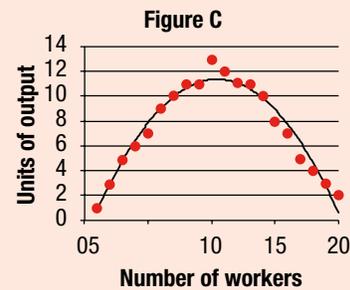
Nonlinear estimate accounting for diminishing returns.

At first, as demonstrated by Figure A, the more workers the factory adds, the higher its production. A simple linear analysis accurately reveals this relationship. However, if the factory adds even more workers, production may not increase in the same way. This could occur because the factory could become too crowded, workers may get in each other's way, it may be harder for supervisors to manage so many workers, or there may not be enough machines for each worker to use. As shown in Figure B, a simple linear analysis cannot capture this relationship. A linear relationship may show no productivity increase, or even a slight productivity decrease.

Only a nonlinear relationship, as exhibited in Figure C, can capture the diminishing returns of adding additional workers. The productivity of each additional hired worker can vary depending on how many workers were hired before him or her.

The same is true for incarceration. Effectiveness depends on prevalence. Incarceration's prevalence has reached an unprecedented level, so any empirical analysis must account for that. As demonstrated by basic figures, diminishing returns become more clearly visible through collection of data over more time. Older data will show a stronger effect of incarceration on crime (as in Figure A), but with newer data and the ability to document a nonlinear relationship, diminishing returns will be exposed (as in Figure C). With more than 10 years of new data and a model accounting for diminishing returns, this report's model reveals updated findings compared to past research.

This is evidence consistent with diminishing returns: when the incarceration rate is lower, there is more of an effect on crime; and similarly when the incarceration rate is higher, there is less of an effect on crime. Raphael and Stoll extrapolated from these examples that diminishing returns are present in incarceration generally and especially at high rates such as those present in the U.S.[33]

A second category of studies on the subject performed empirical analysis but did not account for diminishing returns of incarceration. This categorizes most of the research to date on the topic.

An early empirical study on the topic comes from sociologist and lawyer Thomas Marvell and economist Carlisle Moody in 1994. Marvel and Moody's estimate of incarceration's effectiveness on crime was based on data through 1989. During the 1980s, incarceration had a higher marginal effect on the crime drop because it was less prevalent. The incarceration rate in 1983 was 1 in 364, whereas in 2012 it was 1 in 108 — a 237 percent increase.[34] Applying their estimate to data from the 1990s would indicate that slightly over 30 percent of the crime drop in the 1990s was due to incarceration.[35] In a similar 2002 study, which used data through 1998, economist Robert DeFina and sociologist Thomas Arvanites found that incarceration explained 21 percent of the drop in property crime in the 1990s and had no effect on violent crime.[36]

Levitt's 2004 study found incarceration accounted for 58 percent of the violent crime drop and 41 percent of property crime drop.[37] As noted, he specifically acknowledged that his analysis may not have fully accounted for the diminishing returns of incarceration.

In 2006, sociologist Bruce Western examined how incarceration influenced crime through rehabilitation, incapacitation, and deterrence. Using data through 2000, Western estimated that about 10 percent of the 1990s crime drop could be attributed to increased incarceration.[38] To isolate the effects of incarceration, he controlled for other variables, including: spending on police, various indicators of unemployment, income inequality, racial demographics, sentencing guidelines and practices, and political parties in power. Western also made adjustments for the effect of prison on crime, which includes how prison can actually increase crime (i.e. upon release from prison, research shows, many individuals become more likely to commit more crime).[39] (This effect is often referred to as the "criminogenic" effect of prison. The phenomenon of two variables that simultaneously affect one another is called a "simultaneity effect" in economic analysis. This effect is explained further in Appendix B.)

In a 2008 study, criminologist Eric Baumer found that increased incarceration accounted for 10 to 35 percent of the 1990s crime decline.[40] He relied on data through 2004. Baumer found that the consistent number of people incarcerated in state prison (what he calls prisoner "stock") had a crime reducing effect. However, he found that the number of people entering and exiting prison (i.e. prisoner "flow") had a much smaller and more complex effect on reducing crime. Baumer's results are not represented in Table 5 because he considered incarceration's effect on specific crimes, such as homicide and burglary, and therefore his findings cannot be generalized to apply to the effect of incarceration on violent or property crimes generally.

Some of the largest estimated effects of incarceration on crime came from public policy expert William Spelman. Spelman's 2005 study used data from counties in Texas, from 1990 through 2000. His

findings imply that 85 percent of the drop in property crime in the 1990s and 53 percent of the drop in violent crime in Texas were due to incarceration. Notably, Spelman's model did not account for the diminishing returns of incarceration. Texas increased its incarceration rate more dramatically than the rest of the country. This dramatic increase further subjects Texas to the effects of diminishing returns. The study also did not have the benefit of additional data through 2013, which would further show any effects of diminishing returns in a model that accounts for them. Therefore Spelman's findings are likely much higher than they would be if diminishing returns were accounted for. Spelman himself notes that his findings are not applicable nationally.[41] Other empiricists studying crime have agreed.[42]

Additional research comes from studies that analyzed the effect of other variables on crime but measured the effects of incarceration in the process. In 1999, economist Zsolt Becsi, focusing on the effects of economic and demographic conditions and using data through 1994, estimated that incarceration led to 10 percent of the drop in violent crime and about 18 percent of the drop in property crime in the 1990s.[43] A 2001 report by Raphael and economist Rudolf Winter-Ebmer focused on the effect of unemployment on crime. Analyzing data through 1997, they found incarceration to be responsible for 4 percent of the violent crime drop and 27 percent of the property crime drop in the 1990s.[44]

Because these studies did not explicitly account for the effect of diminishing returns of incarceration on crime, they may drastically overestimate the effectiveness of incarceration.

A third category of studies are those performing empirical analysis accounting for diminishing returns. The authors are aware of only one published national empirical analysis explicitly accounting for the diminishing effects of incarceration: the groundbreaking 2006 study by Liedka, Piehl, and Useem.[45] That study, which analyzed data through 2000, quantified the diminishing effects of incarceration on crime. It found that increased incarceration might even have the effect of *increasing* crime if the level of incarceration were high enough. The study's regression included the following additional variables: age, unemployment, percent of the population that was black, percent of the population living in urban areas, and mean wage for men with a high-school education or less. Both the recent NAS and Brookings reports cite this study to draw their conclusion on the effect of incarceration on crime.[46]

There are a handful of studies analyzing diminishing returns in specific regions. For example, a 2013 study by Raphael and political scientist Magnus Lofstrom examined diminishing returns of incarceration specifically in California.[47] In 2011, the state reduced its prison population by 9 percent with the enactment of the Public Safety Realignment Act ("Realignment Act") after a Supreme Court case ordered the state to reduce its unconstitutionally overcrowded prisons.[48] Lofstrom and Raphael found that California's pre-2011 incarceration rates exhibited diminishing returns: as incarceration rates increased, fewer property crimes were prevented per offender.[49] Their results suggest that in cases of high incarceration rates, such as California and nationally, small increases in incarceration lead to little crime reduction.

But diminishing returns are not only found where incarceration levels are extremely high. Lofstrom and Raphael cited European political scientist Ben Vollaard's 2013 research in the Netherlands, which found diminishing returns even at the country's lower levels of incarceration.[50] Studying a policy that imposes longer sentences for repeat offenders, Vollaard found, "The size of the crime-reducing effect is found to be subject to sharply diminishing returns."

Table 5: National Studies on Increased Incarceration's Impact on Crime

Study	Based on Data Through	Accounts for Diminishing Returns?	1990s Violent Crime	1990s Property Crime	2000s Violent Crime	2000s Property Crime
Marvell and Moody (1994)	1989	No	31%	33%	2%	2%
Becsi (1999)	1994	No	10%	18%	1%	1%
Raphael and Winter-Ebmer (2001)	1997	No	4%	27%	0%	2%
DeFina and Arvanites (2002)	1998	No	0%	21%	0%	1%
Levitt (2004)	1993	No	58%	41%	4%	2%
Western (2006)	2000	No	10%	10%	1%	1%
Liedka, Piehl, and Useem (2006)*	2000	Yes	-3%	-3%	-1%	-1%
Brennan Center (2015)	2013	Yes	0%	6%	0%	0.2%

* Negative numbers indicate a finding of an <u>increase</u> in crime.

Table 5 summarizes past findings of national empirical studies on incarceration's effect on crime along with the Brennan Center findings. Each study used data through the listed year to estimate the "elasticity" of crime with respect to incarceration (i.e. the percentage crime changes when incarceration changes by one percent). Simply put, the elasticity measures how incarceration affects crime. The authors applied previous studies' elasticity estimates to updated crime and incarceration data through 2013 to impute incarceration's effect on the drop in crime in the 1990s and the 2000s. These estimates are useful to compare findings across studies. (See Appendix B for detailed information on how these estimates were calculated.)

b. New Economic Analysis: Diminishing Returns of Incarceration Revealed

This report's model specifically builds on and augments the model of Liedka and coauthors to account for diminishing returns. The authors apply this updated regression model to 13 years of additional data (from 2001 to 2013). It also controls for the effects of eight variables (presented in the next section) to isolate the effect of incarceration on crime. Updated data, even in a similar model, can produce different findings. For these reasons, this report finds a different result than previous studies. (See also "What's New about this Report's Analysis on Incarceration and Crime?")

New National Findings

This report finds that increased incarceration had no statistically significant effect on reducing violent crime and had a small effect on reducing property crime in the 1990s and the 2000s. Crime's responsiveness to incarceration has decreased dramatically over time. Put simply, this report finds that, at current levels, incarceration is no longer as effective a crime-reducing tool as it once was. More incarceration does not always lead to less crime.

Figure 3 graphs the effectiveness of increased incarceration from 1980 to 2013. The dashed lines represent the upper and lower bounds of the estimate. (This is also known as the "confidence interval," i.e., the authors are confident, statistically speaking, that the true value lies between the dashed lines.) The effectiveness of incarceration on reducing crime is defined as the predicted *decrease* in crime resulting from a 1 percent *increase* in state imprisonment.

This report's analysis reveals that incarceration has been decreasing as a crime fighting tactic since at least 1980. Since approximately 1990, the effectiveness of increased incarceration on bringing down crime has been essentially zero.

Figure 3: Effect of Increased Incarceration on Crime (1980-2013)
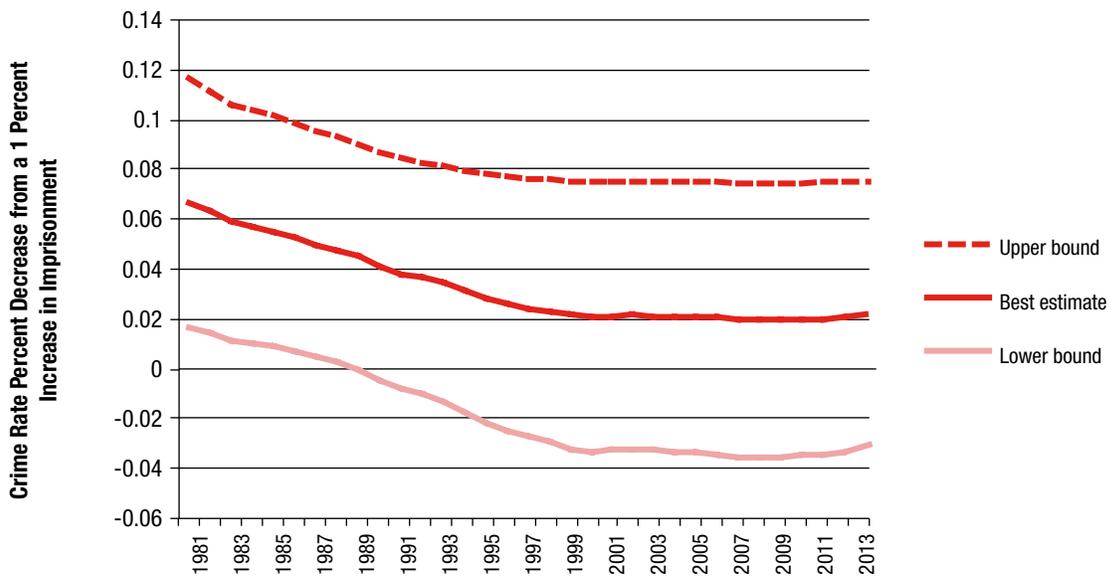
Source: Brennan Center analysis.[51]

As shown in Figure 4, increased incarceration accounted for approximately 6 percent of the reduction in property crime in the 1990s; this could statistically vary from 0 to 12 percent. Increased incarceration accounted for less than one one-hundredth of the decline of property crime in the 2000s. Increased incarceration had no observable effect on the violent crime decline in the 1990s or in the 2000s.

Figure 4: The Role of Increased Incarceration in the Crime Decline

1990s Violent Crime Drop

Other Factors
100%

1990s Property Crime Drop

Incarceration
6%

Other Factors
94%

2000s Violent Crime Drop

Other Factors
100%

2000s Property Crime Drop

Incarceration
0.2%

Other Factors
99.8%
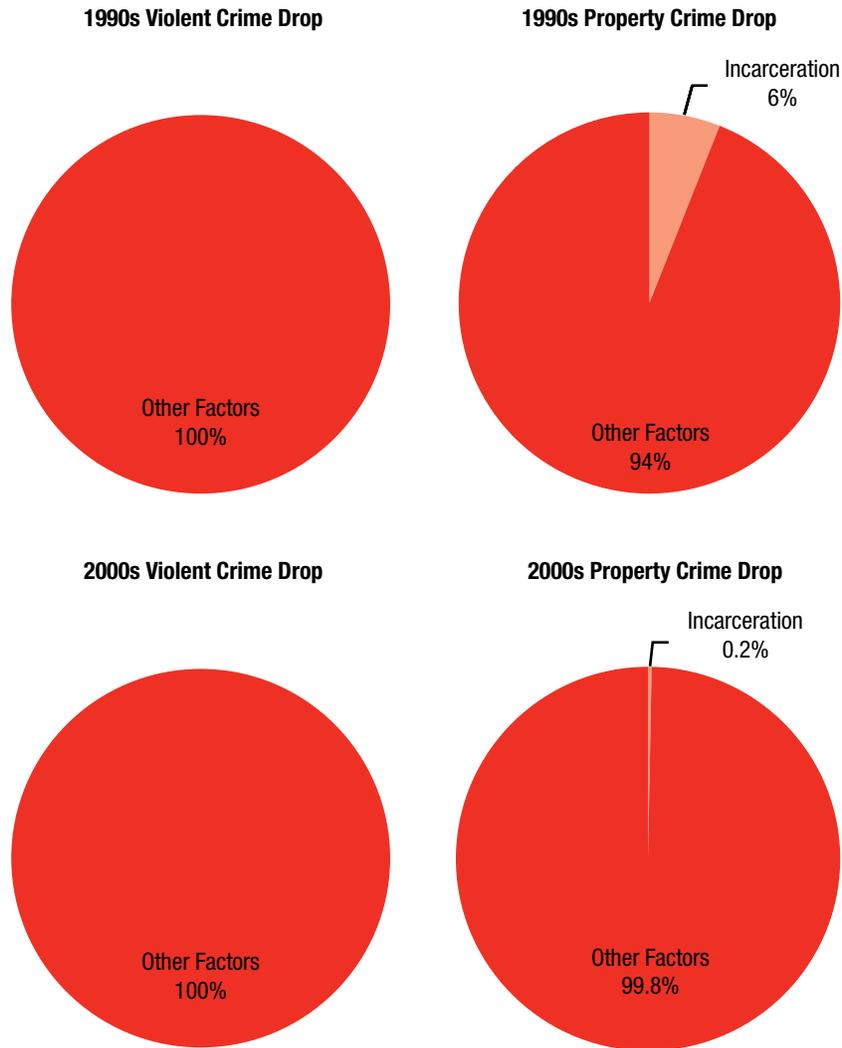
Source: Brennan Center analysis.[52]

Figure 5 illustrates the effectiveness of increased incarceration on decreasing the rates of specific crimes reported in the UCR between 1980 and 2013. Generally, incarceration appears to have played a very minor role in the drop in property crimes and no role in the drop in violent crimes. For instance, the line at the bottom of the Figure 5 shows that the changing incarceration rates had almost no effect on the homicide rate.

Figure 5: Effect of Increased Incarceration on Specific Crimes (1980-2013)
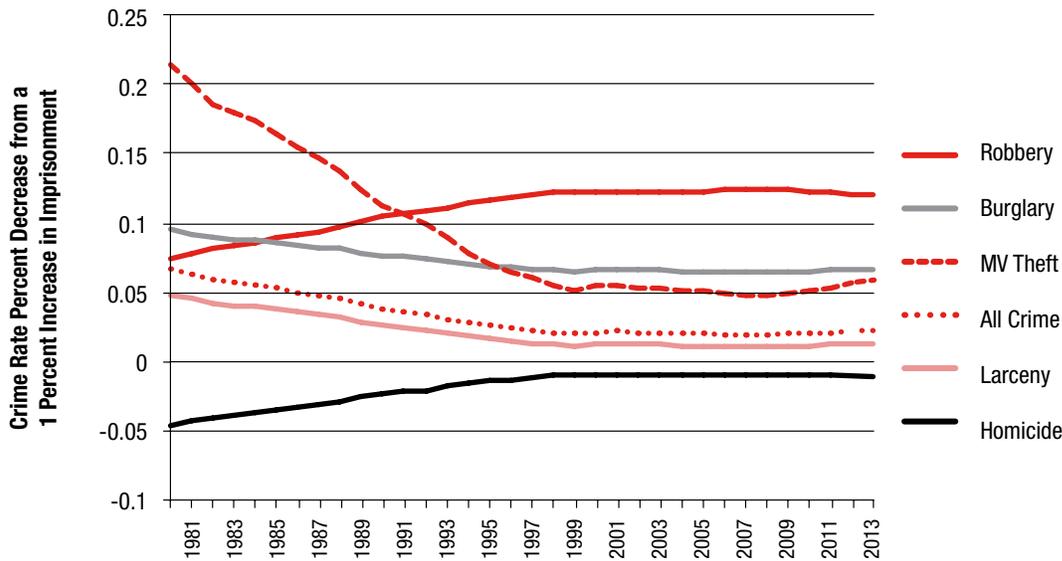
Source: Brennan Center analysis.[53]

Why did incarceration's effectiveness at reducing crime decrease during the past two decades?

It may seem counterintuitive that increased incarceration did not do much to reduce crime. Why might that be?

Overuse of incarceration leads to ineffectiveness: Much of the increase in incarceration was driven by the imprisonment of nonviolent and drug offenders.[54] Today, half of state prisoners are serving time for nonviolent crimes.[55] Almost half of federal prisoners are serving time for drug crimes. Further, two-thirds of jail inmates are merely awaiting trial.[56] Political scientist Jose Canela-Cocho argues that incarceration's incapacitation effect *decreases* when incarceration is increasingly used for less serious offenders.[57] This means incarcerating the two millionth person likely results in much less crime reduction effect than locking up the first. Why? As noted above, when prisons are used sparingly, incarceration is reserved for the highest-risk and most-serious offenders. Today, the U.S., where the incarceration rate is at a historic high, experiences smaller additional (i.e. marginal) crime-reduction gains from further increases in incarceration, as the individuals incarcerated, on average, tend to have committed less serious crimes.

Prison can cause prisoners to commit more crimes upon release: Criminologists often call prison "criminogenic," meaning that it can increase the criminal behavior of prisoners upon release.[58] This effect is particularly powerful on low-level offenders.[59] Once an individual enters prison, they are surrounded by other prisoners who have often committed more serious and violent offenses.[60] Upon release, they often have trouble finding employment and reintegrating into society due to both legal barriers and social stigma.[61] Several studies demonstrate the criminogenic effect of prison. A 2002

study indicates that using prison sentences instead of probation for low-level drug offenders may increase their likelihood of committing crimes upon release.[62] Additional research from the Arnold Foundation indicates that longer pretrial detention is associated with new criminal activity even after the case is resolved.[63] A longitudinal study by the Urban Institute of approximately 700 men exiting prison in Illinois, Ohio, and Texas found that only 46 percent were formally employed seven months after release.[64] Lack of employment and depressed potential earnings due to a conviction can increase the probability of prisoners committing new crimes.[65]

Deteriorating prison conditions can inhibit rehabilitation, thereby increasing recidivism and crime: Unsafe or unsanitary prison conditions can interfere with readiness for reentry into society, increasing prisoners' propensity to commit crimes upon release. In 2007, economists M. Keith Chen and Jesse Shapiro found that harsher prison conditions lead to more post-release crime.[66] This is confirmed by the experience in other countries.[67] Over the last two decades, prisons have become severely overcrowded with poor conditions, poor sanitation, and violence.[68] These conditions, along with inadequate access to medical care and psychiatric treatment, can lead to deteriorating physical and mental health. This can decrease prisoners' likelihood of reintegrating into society and increase the chance of recidivism, more crime, and more incarceration.[69]

Incarceration may not serve as an effective deterrent to crime: One of the primary purposes of punishment is deterrence. Deterrence theory posits that the severity of criminal sanctions dissuades other potential offenders from committing crimes out of fear of punishment. This applies both to the individual punished, who theoretically decides not to commit future crimes because he was incarcerated, and to people in the community who decide not to commit a future crime because they know they too may be incarcerated. However, some question whether prison is effective as a deterrent to crime.[70] Empirical studies have shown that longer sentences have minimal or no benefit on whether offenders or potential offenders commit crimes. The National Academy of Sciences (NAS) concluded that "insufficient evidence exists to justify predicating policy choices on the general assumption that harsher punishments yield measurable deterrent effects."[71] NAS pointed out that all leading surveys of the deterrence research have reached the same conclusion: that "potential offenders may not accurately perceive, and may vastly underestimate, those risks and punishments" associated with committing a crime. Some researchers suggest that incarceration has even less of a deterrent effect for violent crimes. Unlike property crimes, which offer a financial incentive and can replace or supplement legal income, violent crimes are often crimes of passion, not premeditated. Therefore, severe terms of incarceration may not affect an offender's immediate decision to engage in criminal behavior.[72]

New State Findings

The political climate around incarceration policy has shifted. In 2013, criminologists Todd Clear and Natasha Frost noted that not too long ago, "[t]here was a time when even a hint of a policy that might have resulted in prison releases or reductions in sentencing would have spelled certain political death. Today, at least thirteen states are closing prisons after reducing prison populations. That this kind of policy is no longer political anathema is a leading indicator of how much has changed."[73]

These recent state reforms have shown that incarceration can decrease without increasing crime. That is not the result one would expect if high incarceration rates were an effective tool for crime control. This phenomenon is illustrated in Figure 6 for property crime and Figure 7 for violent crime in the 2000s. Each circle represents a state; the bigger the circle, the more populous the state. The horizontal axis is a state's change in its incarceration rate and the vertical axis is a state's change in its crime rate. The lower left quadrant of the graph shows that many populous states experienced reductions in both incarceration and crime in the 2000s.

Figures 6 and 7 reveal several trends in state imprisonment and crime:

- **Imprisonment can decrease while crime continues to decrease:** In the 2000s, 14 states saw declines both in incarceration and crime (both violent and property). As shown in Figure 6, New York saw a 26 percent reduction in imprisonment and a 28 percent reduction in property crime. Imprisonment and crime both decreased by more than 15 percent in California, Maryland, New Jersey, New York, and Texas. These five states alone represent more than 30 percent of the U.S. population. In addition, eight states — Connecticut, Delaware, Massachusetts, Michigan, Nevada, North Carolina, South Carolina, and Utah — lowered their imprisonment rates by 2 to 15 percent while experiencing more than a 15 percent decrease in crime.
- **Imprisonment can increase while crime increases:** As shown in Figure 7, 8 of the 10 states that experienced increases in violent crime in the 2000s also saw increases in imprisonment. Alaska, Maine, New Hampshire, and Vermont saw small increases in violent crime (less than 10 percent), while imprisonment increased. Arkansas and Indiana's imprisonment rates increased over 30 percent, while their violent crime rates increased by about 1 percent.
- **Imprisonment can increase steeply while crime decreases slightly:** As shown in Figures 6 and 7, crime decreased by less than 10 percent in West Virginia in the 2000s, while imprisonment increased by more than 70 percent. In Minnesota, crime decreased by less than 25 percent, while imprisonment increased by more than 50 percent.

Figure 6: Changes in State Imprisonment and Property Crime (2000-2013)
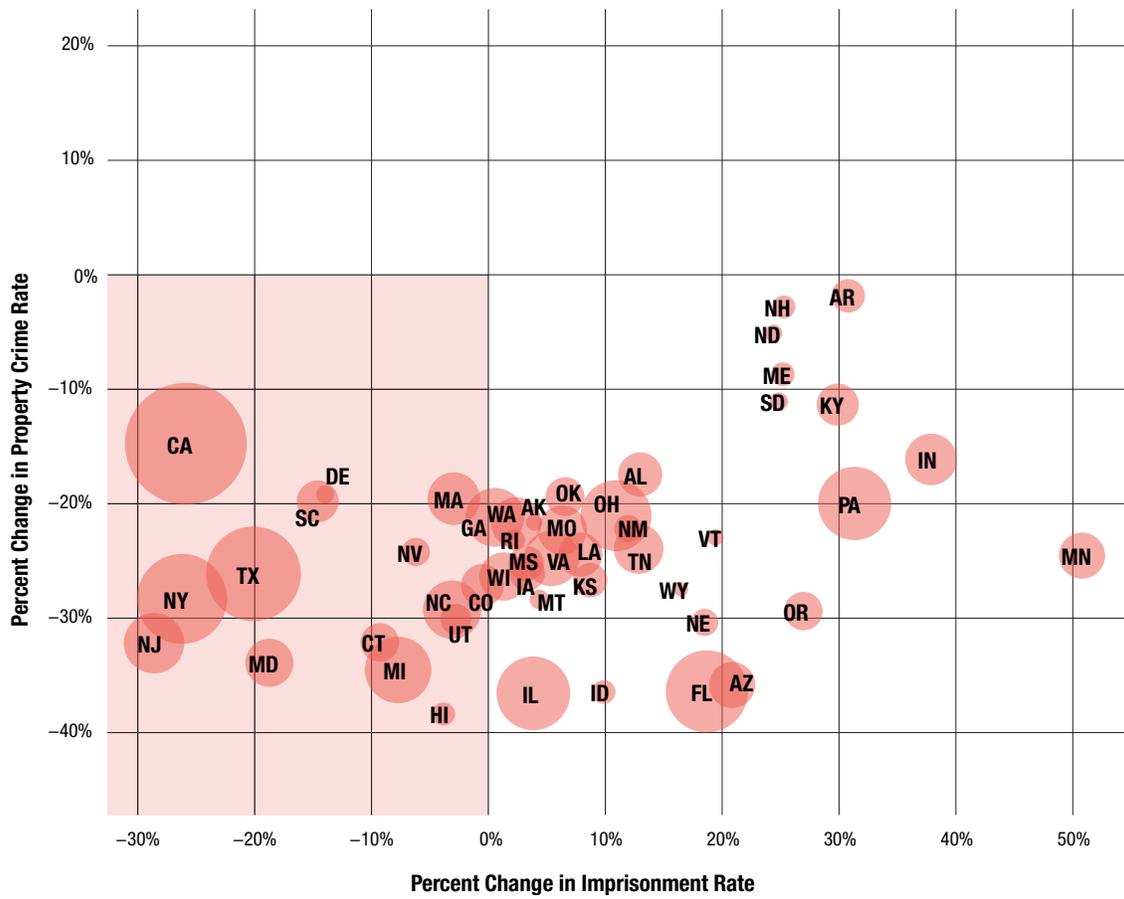
Source: *Federal Bureau of Investigation, Uniform Crime Rate Reports; U.S. Department of Justice, Bureau of Justice Statistics.*[74]

Figure 7: Changes in State Imprisonment and Violent Crime (2000-2013)
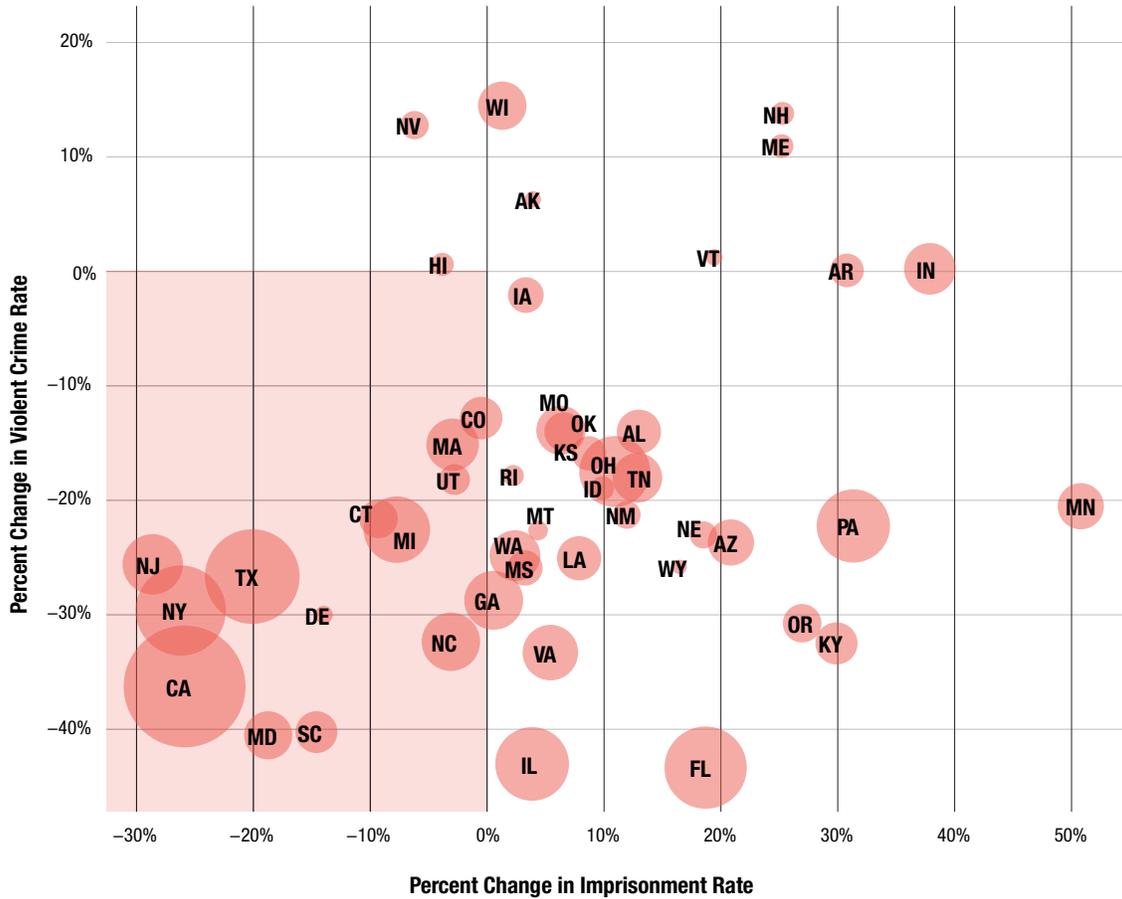
Source: Federal Bureau of Investigation, Uniform Crime Rate Reports; U.S. Department of Justice, Bureau of Justice Statistics.[75]

Imprisonment and crime are not consistently negatively correlated. This contradicts the commonly held notion that prisons always keep down crime. These trends reveal a more complex relationship, consistent with the existence of sharply decreasing marginal returns to incarceration.

For a more in depth look at these trends, data for a selection of 11 states is presented below. These states were chosen based on their significant populations, patterns of incarceration, and differing criminal justice reform efforts. The graphs that follow provide an approximation of the effectiveness of incarceration at reducing crime in each state. Effectiveness is defined as the percent of crime reduced for each one percent increase in incarceration. The graphs apply this report's national effectiveness finding, derived from an analysis of data from all states, to each individual state's incarceration and crime rate.

Graphs for all other states and explanation of how these graphs were created can be found in Appendix A.

California

- California's prison population has exploded since the mid-1970s, partly driven by sentencing policies like the "three strikes you're out" law enacted in the 1990s. With a prison population that increased by 514 percent from 1980 to 2006, the state could not build prisons quickly enough to accommodate the growth.[76] In 2009, the state's prisons were at nearly double their capacity. In 2011, the U.S. Supreme Court found that California prisoners' health and safety were unconstitutionally compromised.[77] It ordered the state to reduce its prison population to 137.5 percent of capacity (approximately 38,000 to 46,000 prisoners) within two years.[78]

- In 2011, to comply with the Court's order, Gov. Jerry Brown signed the Public Safety Realignment Act. "Realignment" shifted low-level offenders from state prisons to local jail facilities and then encouraged release from jail.[79] During Realignment's first two years, counties received more than $2 billion to supervise or house additional prisoners in their jails or in supervised release.[80] A 2012 study by Lofstrom and coauthors indicated that while realignment initially reduced the prison population, the reduction has decreased.[81]

- California's prison population decreased by 29,500 from 2010 to 2012. It stabilized in 2013, decreasing an additional 0.2 percent (or 290 inmates). The state also significantly reduced overcrowding in its prisons, from a high of 199 percent of capacity in 2007 to 143 percent of capacity in 2013.[82] In November 2014, more than 4 million Californians voted in favor of Proposition 47, a ballot initiative requiring the sentencing of certain low-level drug and theft offenses as misdemeanors and affecting thousands of current and future offenders.[83]

- As shown in Figure 8, as incarceration rose since 1980, when California had 24,569 prisoners, effectiveness of increased incarceration steadily declined. By 1997, imprisonment increased five-fold to 132,523 prisoners, and effectiveness on crime declined to essentially zero.[84] In 2013, California had 122,800 prisoners and effectiveness hovered at zero.

Figure 8: Effect of Increased Imprisonment on Crime in California (1980-2013)
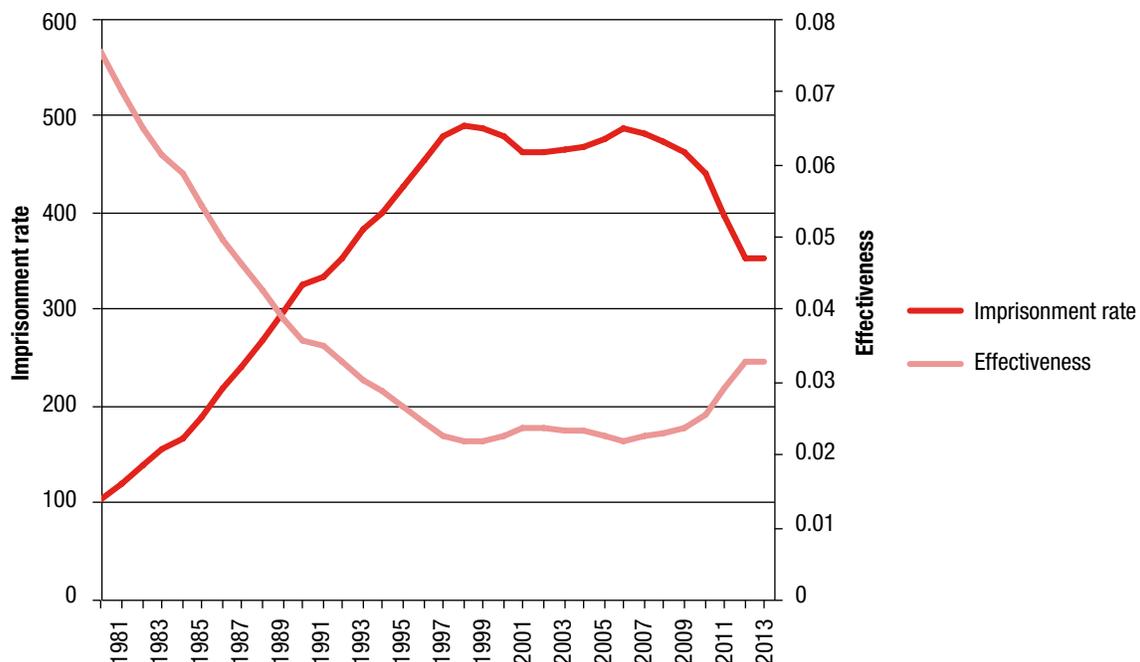
Source: Brennan Center analysis.[85]

Florida

- By 2010, Florida's incarceration rate was 38 percent higher than the national average.[86] Today, the Sunshine State has the third largest correctional system in the nation, after California and Texas.[87] Due to "truth in sentencing" legislation passed in 1995, most Florida prisoners must serve a minimum of 85 percent of their sentences before release.[88] Florida, like most states, also has "three strikes" legislation and a "10-20-life" law, which established mandatory minimum sentences for crimes involving firearms.[89]

- Criminal justice reform in Florida has been slow to arrive.[90] In 2012, the legislature passed a law to reduce mandatory minimums for drug offenders, but it was vetoed by Gov. Rick Scott.[91] In July 2014, legislation to eliminate mandatory minimums for some low-level drug offenders became law.[92] As the first state to create a drug court in 1989, Florida continues to expand its use of specialty courts.[93] But without major reforms, the state continues to suffer from high rates of recidivism, probation violations, and juveniles graduating to the adult system.[94]

- Since 1980, the effectiveness of increased incarceration in Florida, as seen in Figure 9, has been declining. In 1980, the state's prison population was 20,735. In 2002, when the prison population exceeded 75,000, the effectiveness of increased incarceration reached a level that was effectively zero. By 2013, Florida's prison population skyrocketed to 103,028.

Figure 9: Effect of Increased Imprisonment on Crime in Florida (1980-2013)
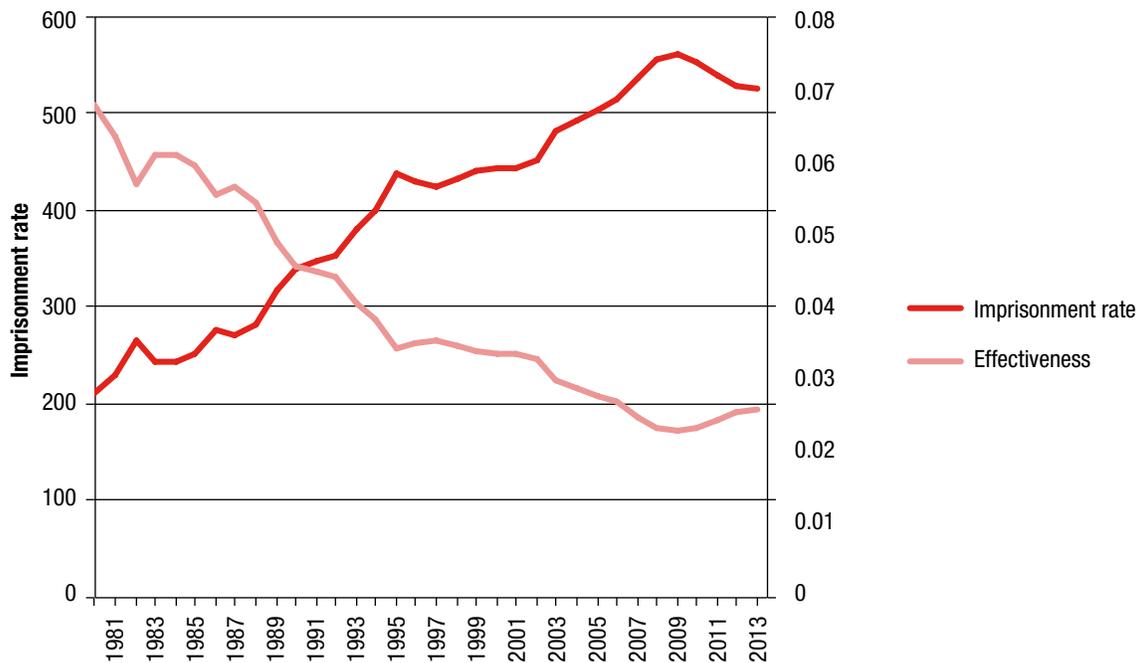
Source: Brennan Center analysis.[95]

Illinois

- While some states reduced their prison populations, Illinois' prison population continued to rise. In 2013, however, it decreased slightly (by 700 prisoners), still leaving it with almost 50,000 prisoners.[96]

- In 2009, Illinois enacted the Illinois Crime Reduction Act aimed at reducing its prison population. The comprehensive reform package was "based on the premise that local jurisdictions — judicial circuits or counties — know best what resources are necessary to reduce crime."[97] Most notably, it created Adult Redeploy Illinois, a new program to divert adults from the state Department of Corrections to alternatives to incarceration. The state invested $2 million in incentive funding as awards to counties that use community-based diversion programs, instead of prison sentences, for non-violent offenders. The program saved an estimated $17 million annually, and in 2014 was expanded to 34 counties, receiving a total of $7 million in grant funding.[98] Additionally, in 2014, the Illinois legislature acted to increase data collection on racial profiling.[99]

- Figure 10 illustrates the declining effectiveness of increased incarceration in Illinois since 1980, when the state's prison population was 11,899. By around 1997, the effectiveness dropped to a level that was essentially zero. By this time, the prison population grew to 40,788, a 243 percent increase from 1980. By 2013, Illinois had 48,653 prisoners with the effectiveness of increased incarceration remaining essentially at zero.

Figure 10: Effect of Increased Imprisonment on Crime in Illinois (1980-2013)
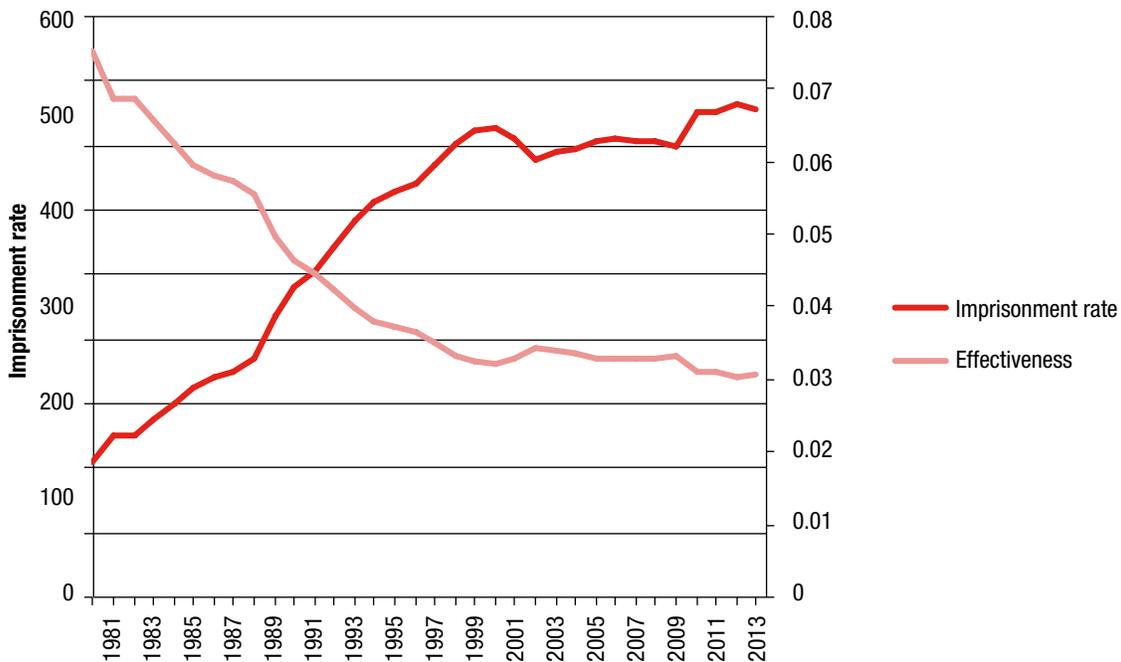
Source: Brennan Center analysis.[100]

Louisiana

- Louisiana has the highest rate of incarceration in the world. One in 75 adult Louisianans is behind bars, nearly twice the national average.[101] In 2013, the *Times-Picayune* reported that "Louisiana's incarceration rate is nearly five times Iran's, 13 times China's and 20 times Germany's."[102] This is partly due to financial rewards given by the state to local sheriffs to keep jails full with state prisoners, a perverse incentive that helps fuel incarceration.[103] But even in this prison capital of the world, crime did not fall notably more than in other states.
- Louisiana advanced several legislative reforms in recent years to reduce imprisonment. It enacted laws in 2011 and 2012 increasing judicial discretion to waive minimum mandatory sentences, allowing parole officers greater discretion to offer non-prison sanctions for parole violations, and creating an early release program for elderly prisoners.[104] In 2014, the state enacted HB 791, which increased the monetary threshold necessary to trigger a felony theft offense from $500 to $750.[105] But in a move that will likely increase the prison population, the law created mandatory minimum sentences of five years for theft of $25,000 or more. Louisiana also passed a law that will sentence people convicted of selling any amount of heroin to a mandatory minimum of 10 years — even for a first offense.[106]
- As shown in Figure 11, the effectiveness of increased incarceration on crime has steadily declined in Louisiana since 1980, when the state had 8,889 prisoners. Around 2000, the effectiveness of increased incarceration was essentially zero. At that time, there were 35,207 prisoners. By 2013, there were almost 40,000 prisoners, yet increased incarceration continued to have almost no effect on reducing crime.

Figure 11: Effect of Increased Imprisonment on Crime in Louisiana (1980-2013)
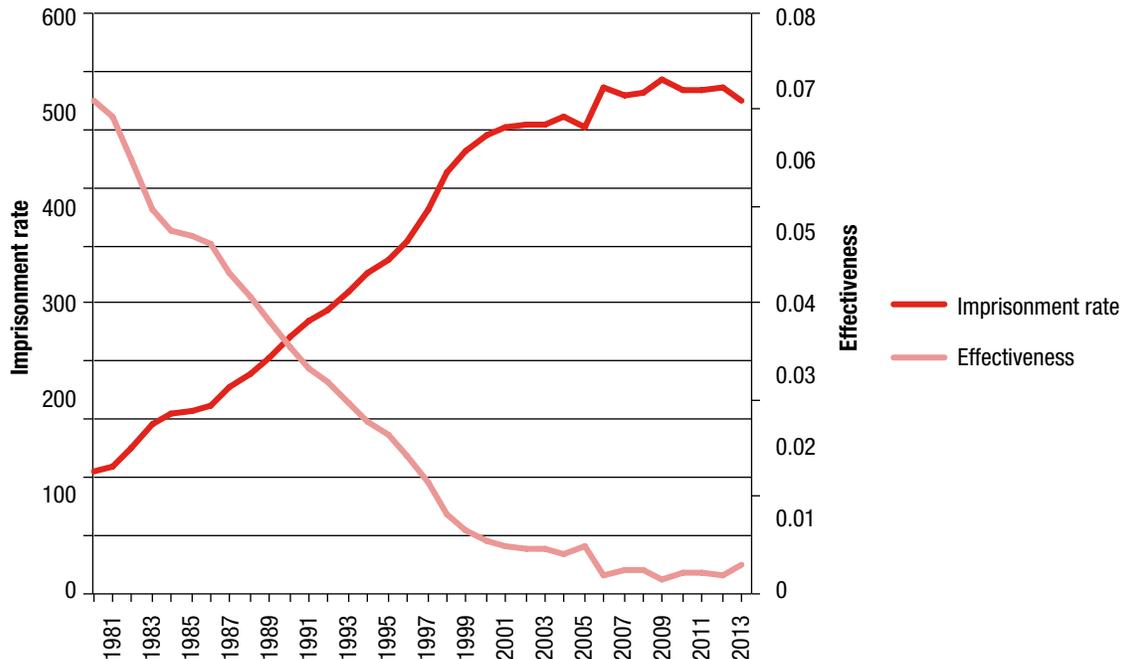
Source: Brennan Center analysis.[107]

Maryland

- Since 1980, Maryland's prison population has tripled. With an annual corrections budget of over $1.2 billion, the state ranks seventh in terms of amount spent per capita on the justice system.[108] The state spends more than 10 times as much on corrections as it does on education.[109] Maryland's prisons nearly reached their full capacity by 2010, though the prison population decreased slightly over the last few years.[110]
- Reform efforts in Maryland have been slow. There have been efforts to shorten parole lengths based on good behavior, and in April 2014, Gov. Martin O'Malley signed legislation decriminalizing possession of small amounts of marijuana.[111]
- The effectiveness of increased incarceration in Maryland dropped suddenly in the early 1980s, and then seemed to plateau until about 1988. During this time, the prison population nearly doubled, landing a little above 14,000. After that, the effectiveness fell further until it reached essentially zero around 1995. By then, the number of prisoners had risen to 21,453. In 2013, the prison population remained stable — around 21,335 — with the effectiveness remaining at essentially zero, as shown in Figure 12.

Figure 12: Effect of Increased Imprisonment on Crime in Maryland (1980-2013)
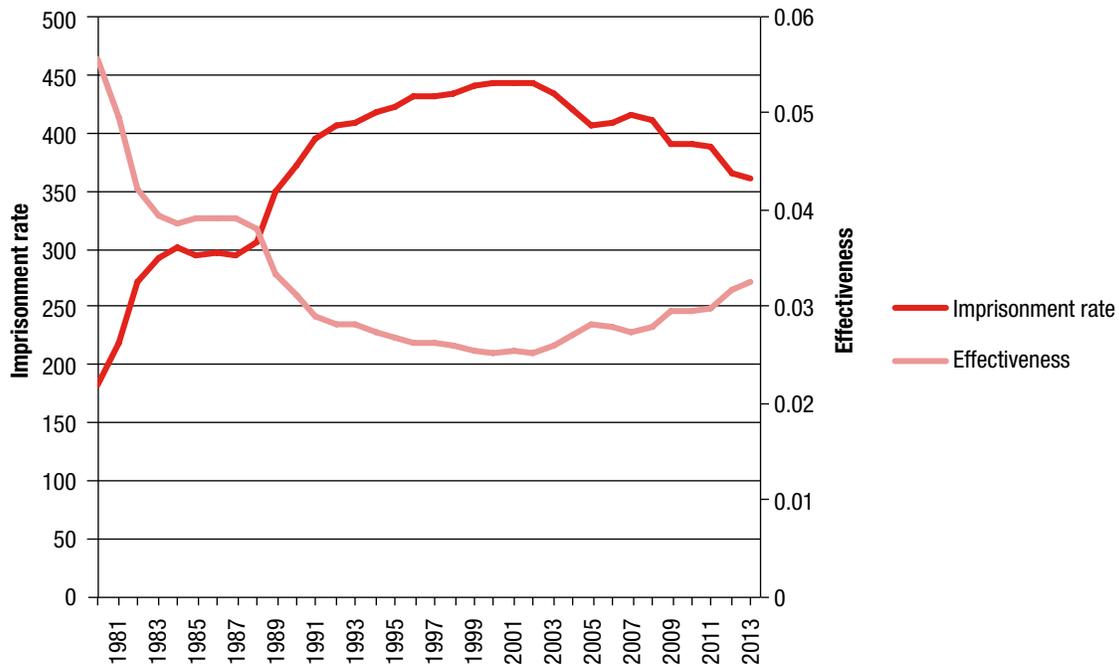
Source: Brennan Center analysis.[112]

New Jersey

- The crime rate in New Jersey is about 22 percent lower than the national average.[113] Yet the state's prisons hold a higher portion of drug offenders than any other state.[114]

- Reforms to reduce incarceration have emerged. In 2010, Gov. Jon Corzine signed a reform to end mandatory minimums associated with drug free school zones, establishing parole and probation as options. In 2013, Gov. Chris Christie and former Gov. Jim McGreevey jointly announced programs for mandatory treatment for substance-dependent low-level, nonviolent offenders, instead of mandatory jail time.[115] Due largely to higher parole rates, reduction in parole revocations, and reforms for drug crimes, the state has reduced its imprisonment rate by more than 15 percent since its peak in 1999.[116] In 2014, a bipartisan effort resulted in a package of legislation to reform bail laws. New Jersey has begun planning the reform implementation to reduce pre-trial detention. Reform implementation is a multi-year process, which may include introduction of risk assessments to make individualized detention decisions, and formation of a pretrial services unit in the court system to provide monitoring and counseling for those awaiting trial.[117]

- The effectiveness of increased incarceration in New Jersey declined throughout the 1980s, as seen in Figure 13. In 1980, there were 5,884 people in prison. By around 1995, when the prison population increased nearly five-fold to 27,066 prisoners, the effect of increased incarceration on crime had reached a level that was essentially zero. In 2013, the state's prison population fell to 23,452 and the effectiveness of incarceration on crime continued to hover at zero.

Figure 13: Effect of Increased Imprisonment on Crime in New Jersey (1980-2013)
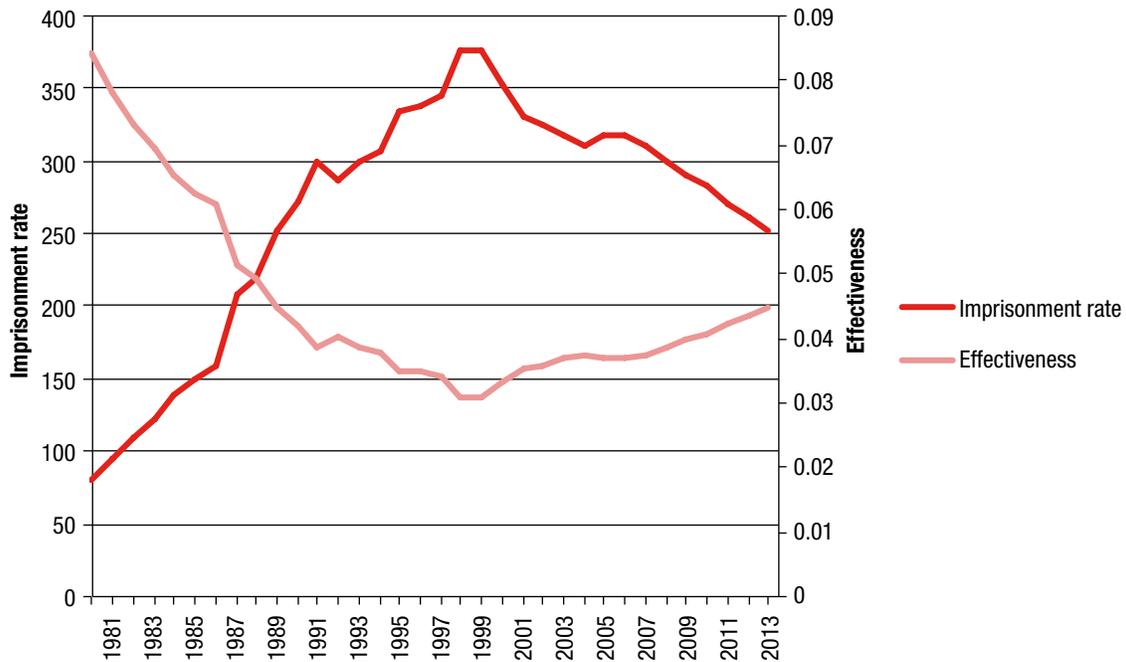
Source: Brennan Center analysis.[118]

New York

- In the last decade, the Empire State has reversed its incarceration trend dramatically, dropping its prison population by 26 percent since 1999.[119] The state was then able to close seven facilities in 2011.[120]
- State imprisonment climbed steadily in the 1980s and 1990s, due in part to former Gov. Nelson Rockefeller's "Rockefeller Drug Laws," enacted in 1973. These laws aimed to combat rising drug use and crime by limiting judicial discretion in sentencing and enacting mandatory minimum penalties.[121] The state's prison population then rose steadily, peaking in 1999 at 72,584 inmates.
- In 2009, the state eliminated mandatory sentences for some drug offenses and reduced minimum sentences for others.[122] It also increased judicial discretion to provide drug court alternatives and introduced robust diversionary programs.[123] A decline in felony arrests in New York City also contributed to the state's decreased prison population. Between 1988 and 2008, felony arrests decreased by 72 percent in the City.[124] Misdemeanor arrests also increased during this period, creating other effects on communities.[125] In 2014, the state agreed to increase public defense funding in five counties to improve the quality of legal representation.[126]
- The effectiveness of increased incarceration in New York, as seen in Figure 14, steadily declined through the early 1990s. By around 1995, when the prison population tripled to 68,486, the effectiveness of increased incarceration had dropped significantly. By 2013, New York's prison population declined to 53,550 with the effect of incarceration on crime remaining close to zero.

Figure 14: Effect of Increased Imprisonment on Crime in New York (1980-2013)

Source: Brennan Center analysis.[127]
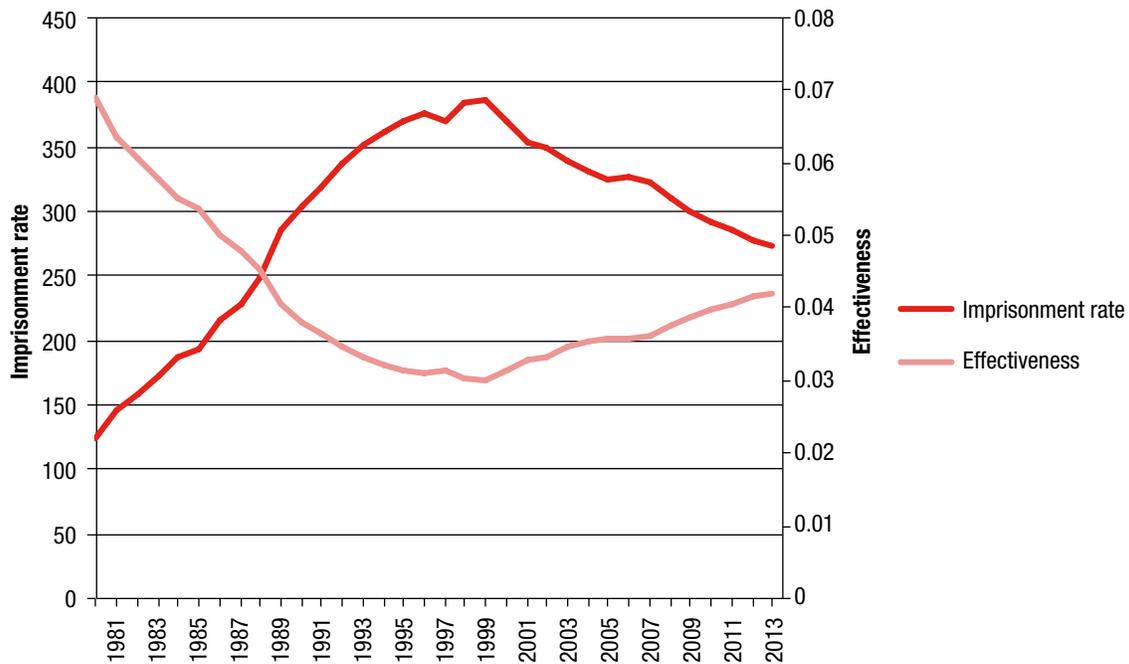
Ohio

- In the past 25 years, Ohio's prison population has more than doubled. Experts found that increases in the average length of an individual's time spent incarcerated, in addition to increased prison admissions, primarily drove this expansion.[128]
- In 2011, Ohio passed a bipartisan law to reduce its prison population. Among other changes, the law reduced the maximum sentences for many crimes, including most burglaries and some drug offenses. It also allowed prisoners to earn time off their sentences by completing education and mental health programs.[129] The state also bolstered statewide community-based alternatives to prison.[130]
- Figure 15 depicts the declining effectiveness of increased incarceration in Ohio from 1980, when the prison population was 13,489. By 1997, when the number of prisoners soared to 48,016, incarceration's effectiveness had declined to a level that was essentially zero. It remained essentially zero throughout the 2000s, as the growth in imprisonment slowed. By 2013, with 51,729 prisoners in the state, increased incarceration had negligible effects on crime.

Figure 15: Effect of Increased Imprisonment on Crime in Ohio (1980-2013)
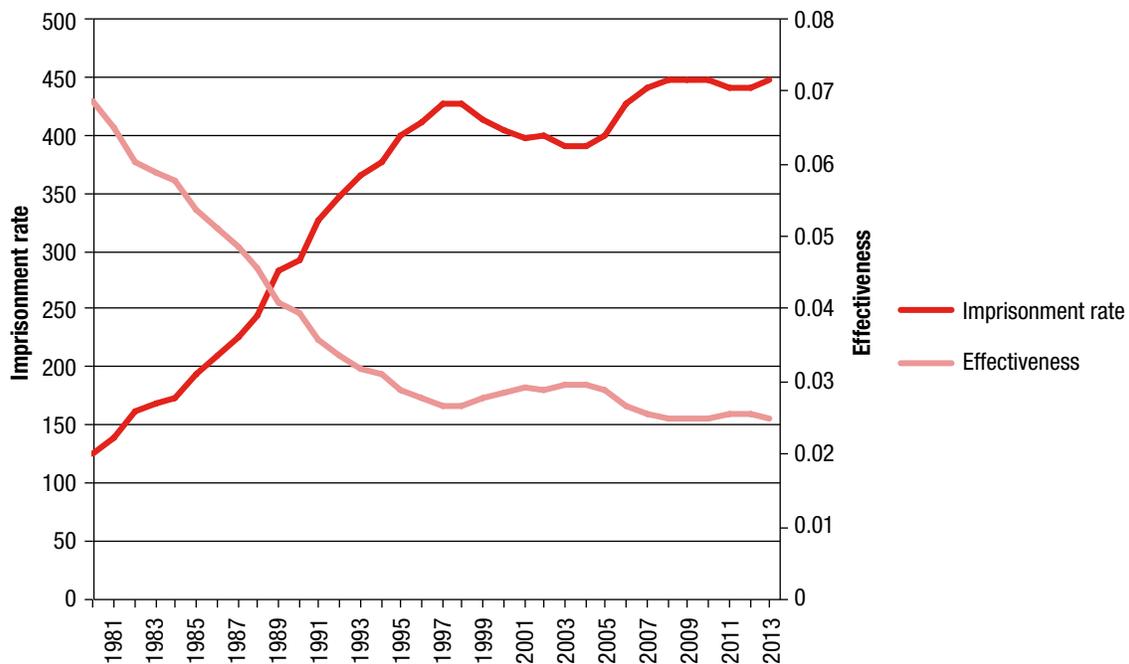
Source: Brennan Center analysis.[131]

Pennsylvania

- As noted by the state itself, "[o]ne in 200 adult Pennsylvanians is currently incarcerated in a Pennsylvania State Correctional Institution."[132] With a 2013 crime rate 22 percent lower than the national average (and property crimes accounting for approximately 86 percent of crimes in the state), Pennsylvania imprisons its citizens at levels only 6 percent lower than the national average.[133]
- In 2012, the state enacted the Criminal Justice Reform Act to reduce reliance on incarceration. The law allows parolees to return to community corrections centers, in lieu of state prison when they commit parole infractions. It also calls for judges to consider risks posed by individuals during sentencing, funds local law enforcement, and provides localities with incentives to divert defendants to county jails.[134]
- As Figure 16 shows, the effectiveness of increased incarceration in Pennsylvania has been steadily declining since 1980, when there were 8,171 prisoners. Incarceration's effectiveness on crime reached a level that was essentially zero in 1992, when the prison population was 24,974. In 2013, there were 50,312 prisoners, yet incarceration's effectiveness remained essentially zero.

Figure 16: Effect of Increased Imprisonment on Crime in Pennsylvania (1980-2013)
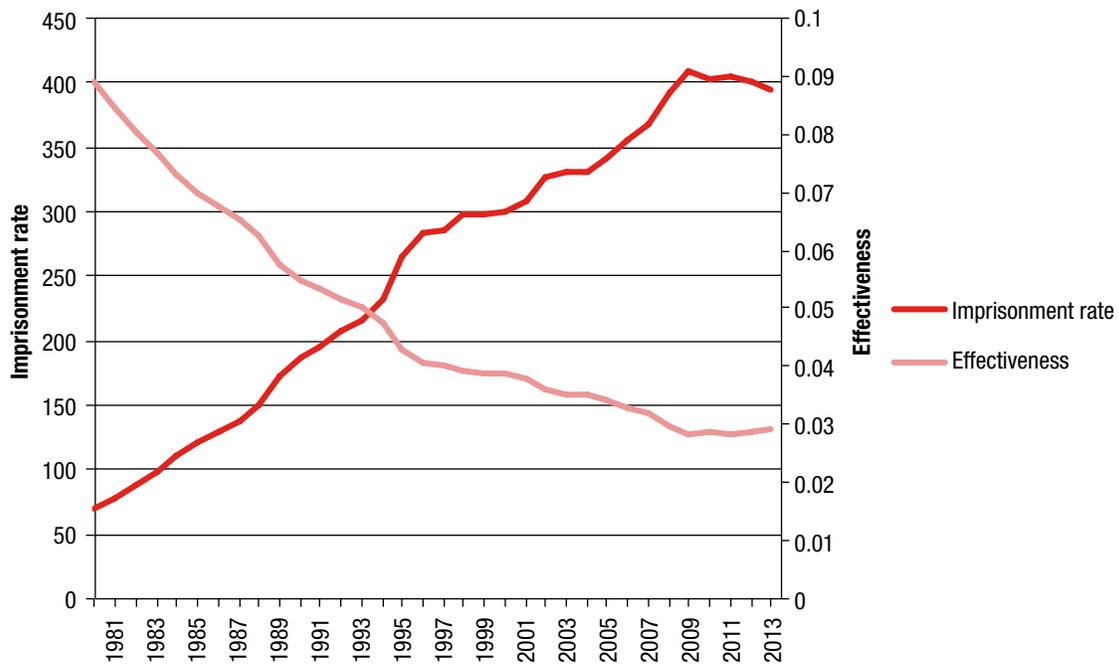
Source: Brennan Center analysis.[135]

Texas

- The Lone Star State has seen one of the more remarkable shifts in its prison population. In 2004, Texas had the nation's second highest incarceration rate; it now has the fourth highest despite a slight uptick in 2013.[136] The growth in incarceration largely occurred in the 1990s and was subsidized by a 205 percent increase in corrections costs since 1990.[137]
- In 2005, the state provided $55 million in incentive funding for probation departments to use sanctions other than incarceration to respond to parole violators.[138] Two years later, the state budget projection showed that if the prison rate remained the same, the state would need to spend $500 million on new prisons.[139] Responding to this fiscal pressure, legislators appropriated $241 million to support an array of alternatives to prison such as: additional substance abuse treatment beds, drug courts, and mental illness treatment programs.[140] In 2009, Texas continued to fund 64 reentry coordinators in order to improve reentry and reduce recidivism.[141] In 2011, the Texas legislature passed two bills, allowing probationers to reduce the length of their probation by completing treatment programs, and allowing prisoners to reduce their sentence lengths by completing educational programs.[142] Texas's imprisonment rate decreased by 10.5 percent since its peak in 1999.
- In Texas, the effectiveness of increased incarceration, as seen in Figure 17, has been decreasing since 1980. Beginning around 1988, the effectiveness started decreasing even more rapidly. At that time, there were 40,437 prisoners in Texas. By around 1995, when the prison population reached 127,766, the effectiveness of increased incarceration was essentially zero. It remained at that level throughout the 2000s. By 2013, there were 168,280 prisoners in Texas, an increase of approximately 2,000 prisoners from 2012.

Figure 17: Effect of Increased Imprisonment on Crime in Texas (1980-2013)
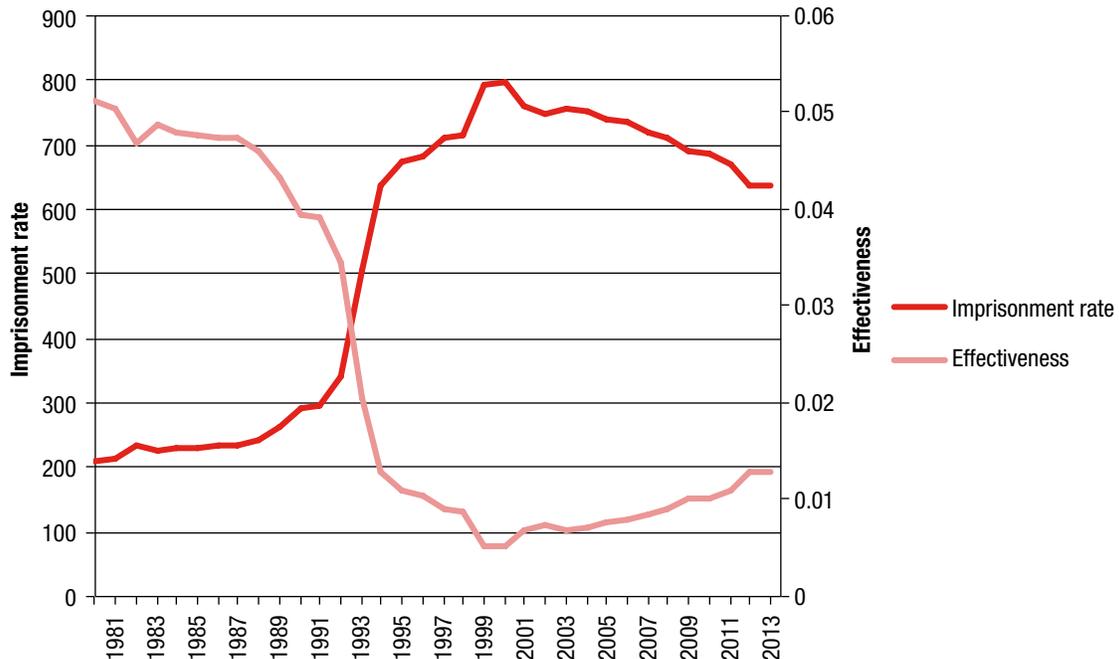
Source: Brennan Center analysis.[143]

Virginia

- Virginia has the third lowest violent crime rate in the nation.[144] Despite this, the state has the nation's 13th highest incarceration rate,[145] with one of every 89 adults incarcerated.[146] In 1995, Virginia eliminated parole and implemented a "truth-in-sentencing" system requiring state inmates to serve at least 85 percent of their sentences.[147] This led to drastic increases in the incarcerated population.

- Efforts to reverse the state's rising imprisonment rate have focused on reducing or eliminating mandatory minimums.[148] Yet major reforms have not been enacted.[149] And though Gov. Terry McAuliffe has indicated he would sign medical marijuana legislation, a bill has not been passed by the legislature.[150]

- As Figure 18 shows, the effectiveness of increased incarceration in Virginia has decreased steadily since 1980, when Virginia had 8,920 prisoners. Around 2000, it reached its lowest levels of effectiveness — essentially zero. In 2000, the incarcerated population was 30,168; by 2013 it grew to about 37,000 while effectiveness on crime still remained essentially at zero.

Figure 18: Effect of Increased Imprisonment on Crime in Virginia (1980-2013)
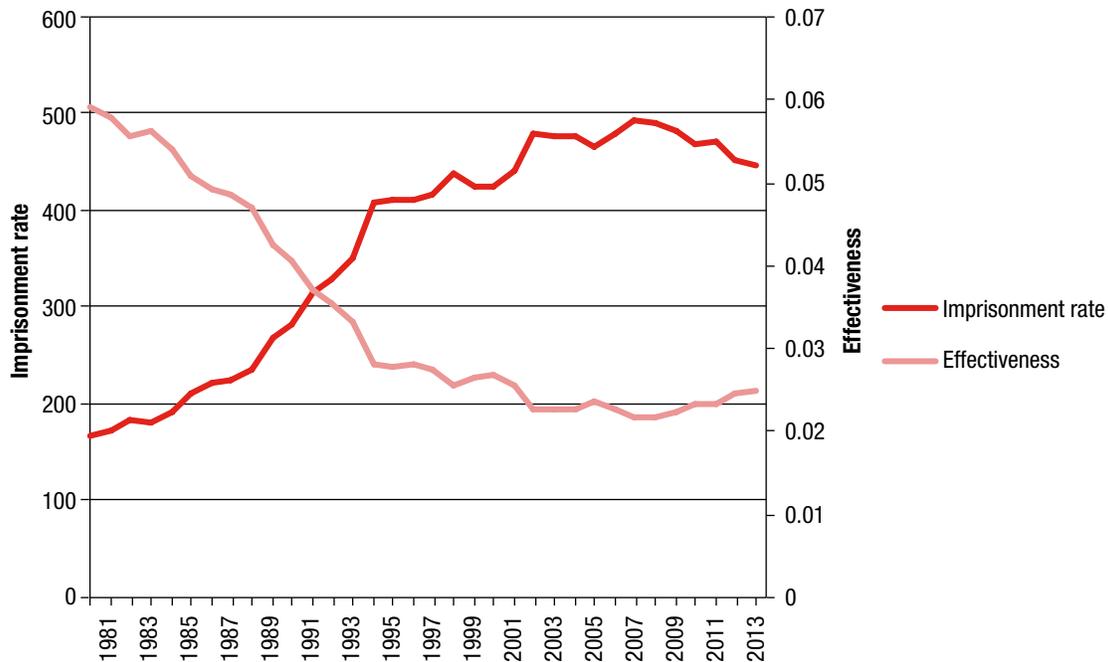
Source: Brennan Center analysis.[151]

The remainder of Part I presents a brief summary of this report's analyses and research on each of the other 12 variables. Accounting for the role of these variables in the declining crime rate helps to isolate the effect of incarceration on crime. This research is presented to provide a general background on the drop in crime and to provide context to compare the effects of these variables in relation to the effect of incarceration on crime.

2.   Increased Police Numbers

Police Numbers & Crime: Based on original analysis and past studies, this report finds that increases in the number of police officers had a modest, downward effect on crime in the 1990s, likely between 0 and 10 percent. This effect likely became negligible in the 2000s because of a plateau and subsequent slight decrease in the number of police officers during that decade.

As criminologists John Eck and Edward Maguire have noted, "[a]cross time and place, one of the most common reactions to increases in crime is to hire *more* police officers."[152] Just as incarceration surged in the 1990s, so did the ranks of police officers across the country, as shown in Figure 19. From 1990 to 1999, the number of police officers in the U.S. rose 28 percent, from 698,892 to 899,118. From 2000 to 2012, the rise in number of police officers slowed, but still increased by 3 percent. It then fell by 5 percent in 2013.[153]

Figure 19: Sworn Police Officers in the United States (1980-2013)
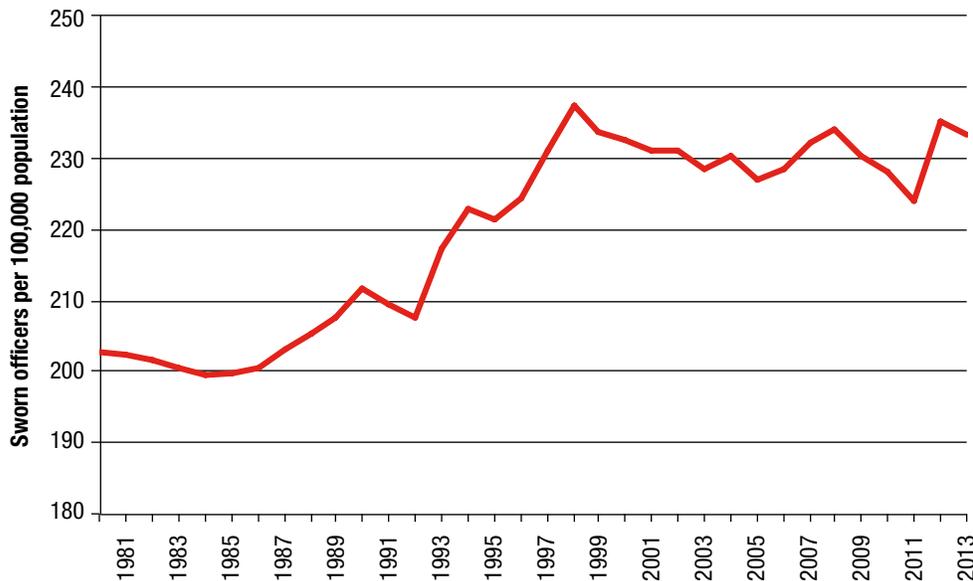
Source: Federal Bureau of Investigations, Uniform Crime Reports; U.S. Department of Justice, Bureau of Justice Statistics.[154]

The federal Violent Crime Control and Law Enforcement Act ("1994 Crime Bill") was one major contributor to this uptick in police officer ranks. The $30 billion Congressional package, which funded both law enforcement and incarceration, provided funding for 100,000 new local police officers.[155] The 1994 Crime Bill also created the Department of Justice's Office of Community Oriented Policing Services ("COPS Office"), which has provided more than $14 billion in funding to date for localities to hire officers, as well as to purchase equipment and technology.[156]

a. Past Research

Several studies have found that hiring more police can reduce crime. Levitt's 2002 study, with data from 122 cities from 1975 to 1995, found increased police numbers brought down violent crime by 12 percent and property crime by 8 percent.[157] Applying Levitt's results to the overall crime decline in the 1990s would attribute 5 to 6 percent of the total crime drop in that decade to increased police hiring.[158]

In 2000, economists Hope Corman and H. Naci Mocan analyzed data from 1970 to 1996 and found a significant effect of police numbers reducing robberies and burglaries, but not on murder or auto theft.[159] Other studies focusing on specific regions have also found that police numbers affected crime. Examining data from Florida in the 1980s and 1990s, criminologists Tomislav Kovandzic and John Sloan's 2002 paper found that increasing police numbers led to fewer robberies, burglaries, and larcenies, as well as less overall crime. They found no effect on aggravated assault or murder.[160]

More recently, in 2011, University of California, Berkeley Law School professor Franklin Zimring published *The City that Became Safe*. Notably, he used police staffing per homicide as the measure of police numbers, instead of the usual measure of police per population. Zimring credited the increasing ratio of police per homicide, as well as changing policing tactics, for the large New York City crime decline.[161] (See Part II for a discussion of Zimring's work on policing tactics.)

b. New Analysis & Summary of Past Findings

This report includes policing numbers in its regression analysis of crime. As is further explained in Appendix B, it relies on data on the number of sworn police officers from the Uniform Crime Reports and Bureau of Justice Statistics.

The authors' analysis found no statistically significant effect of increases in the number of police on crime. One possible reason for this finding is the simultaneity between these two variables, meaning policing and crime can affect each other. For example, in response to more crime, a city may hire more police; similarly, when that city hires more police, it would expect less crime. It is difficult, statistically speaking, to break this simultaneous causal connection and isolate the effect of policing on crime. This simultaneity can cause the effect of police numbers on crime and the effect of crime on police numbers to, in effect, "cancel out" each other. It is also possible that the number of police officers was not great enough over this time period to have a discernible effect on crime. (For a further discussion of simultaneity, see Appendix B.)

Because of this challenge in their results, the authors looked to previous research on this topic for guidance. As noted above, other studies consistently found modest crime-reducing effects of increased police officers. Levitt's 1997 findings on police hiring are among the most cited and well-known analyses on this subject.[162] He also controlled for the simultaneity effect. Searching for a reliable estimate of the effects of police numbers on crime, the authors chose Levitt's estimate as persuasive among the existing research. As noted above, Levitt's estimates would attribute 5 to 6 percent of the crime drop in the 1990s to increased police hiring.[163]

Based on past studies, alongside the regressions' results, this report finds that increases in police officer ranks had a modest, downward effect on crime in the 1990s, likely 0 to 10 percent. This effect likely became negligible in the 2000s because of the plateau and slight decrease in police officer numbers in that decade.

3.   Use of Death Penalty

Death Penalty & Crime: In line with the past research, the Brennan Center's empirical analysis finds that there is no evidence that executions had an effect on crime in the 1990s or 2000s.

Capital punishment's effectiveness in decreasing crime, specifically homicide, has been the subject of much inquiry.[164] Some believe capital punishment could deter future offenders, thereby decreasing crime.[165] On the whole, however, research indicates that the death penalty does not have an effect on bringing down crime. Empirically, capital punishment is too infrequent to have a measureable effect on the crime drop. Criminologically, the existence and use of the death penalty may not even create the deterrent effect on potential offenders that lawmakers hoped when enacting such laws.[166]

As shown in Figure 20, executions increased fairly steadily from 1990-1999, and reached a peak of 98 executions in 1999. Since then, executions have fallen to 39 in 2013.

Figure 20: Executions in the United States (1980-2013)
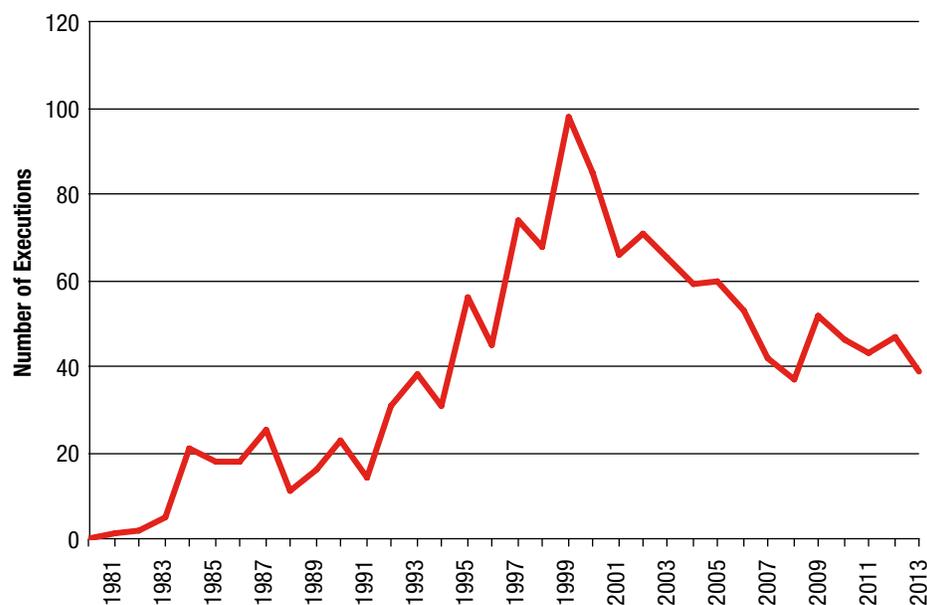
Source: U.S. Department of Justice, Bureau of Justice Statistics.[167]

a. Past Research

In a well-cited study conducted in 1975, economist Isaac Ehrlich estimated each additional execution resulted in approximately seven or eight fewer murders.[168] Writing more recently, economists Mocan and R. Kaj Gittings similarly estimated that five fewer murders would result per one execution.[169] In a 2007 Senate Judiciary Committee hearing, David Muhlhausen of the Heritage Foundation testified that economist Hashem Dezhbakhsh and coauthors found each individual execution could result in as many as 18 fewer murders.[170]

The large body of empirical work, however, suggests that capital punishment has not been effective in reducing crime. For example, in 2003, economists Levitt, Lawrence Katz, and Ellen Shustorovich conducted an empirical analysis finding that capital punishment had no deterrent effect on crime in the 1990s.[171] Their theory essentially runs as follows: in order for capital punishment to depress crime, it would need to be a crime deterrent. When considering the effect of capital punishment on the potential commission of a homicide, the potential offender must consider the probability he would be caught, the probability he would be charged, the probability he would be convicted, the probability he would receive a death sentence, and the probability that he would be executed. After multiplying these probabilities together, the potential offender realizes a small probability of execution occurring, and therefore the possibility of being executed would essentially never affect a criminal decision.[172]

Moreover, it is debatable whether an individual even engages in such objective calculations before committing a crime. Much psychological and sociological research suggests that many criminal acts are

crimes of passion or committed in a heated moment based only on immediate circumstances, and thus potential offenders may not consider or weigh longer-term possibilities of punishment and capture, including the possibility of capital punishment.[173] Donohue and economist Justin Wolfers conducted tests to determine the strength of various analytical models used in past research. They found that the past findings of a deterrent effect were weak.[174] They reasoned that executions were too scarce to have a plausible deterrent effect on crime.[175]

Since the death penalty was reinstated in 1976, 34 states have executed citizens. But since 1990, only 20 percent of states carried out more than five executions per year, and only three — Texas, Oklahoma, and Virginia — have executed more than 10 people in any given year.[176] Taking Ehrlich's high estimate of the effect of death penalty on crime at face value, there were 39 executions nationwide in 2013, which would have prevented 312 murders out of the 14,196, about 2 percent.[177] Even if the highest findings were true, capital punishment could still not explain a meaningful fraction of the aggregate drop in crime.[178]

b. New Analysis & Summary of Past Findings

In line with much of the past research, this report finds that the use of the death penalty has no significant effect on crime. This report's regression analysis includes annual, state-level data on executions from the Bureau of Justice Statistics for all 50 states and the District of Columbia.[179]

The findings show a very weak negative relationship between the use of the death penalty and crime that is essentially zero. The same is true for the effect of the use of the death penalty on homicides specifically. Capital punishment played no appreciable role in the crime drops in the 1990s or the 2000s.

4. Enactment of Right-to-Carry Gun Laws

Right-to-Carry Gun Laws & Crime: Consistent with the most accepted past studies, this report did not find evidence that right-to-carry gun laws affected crime in the 1990s or 2000s.

Some have theorized that laws that increase gun rights could affect crime by affecting the number of legal guns on the streets. A common type of gun rights law is a "right-to-carry" gun law. Right-to-carry laws grant citizens the presumptive right to carry concealed handguns in public, thereby loosening gun control restrictions. The increased presence of guns in public might be thought to affect crime in some way. Open carry laws, which grant citizens the presumptive right to openly carry a gun, may also have their own deterrent effect. Concealed carry laws are more popular than open carry as a theory of potential crime deterrence, and therefore this section focuses on concealed carry laws.

Figure 21: States with Right-to-Carry Laws (1980-2013)
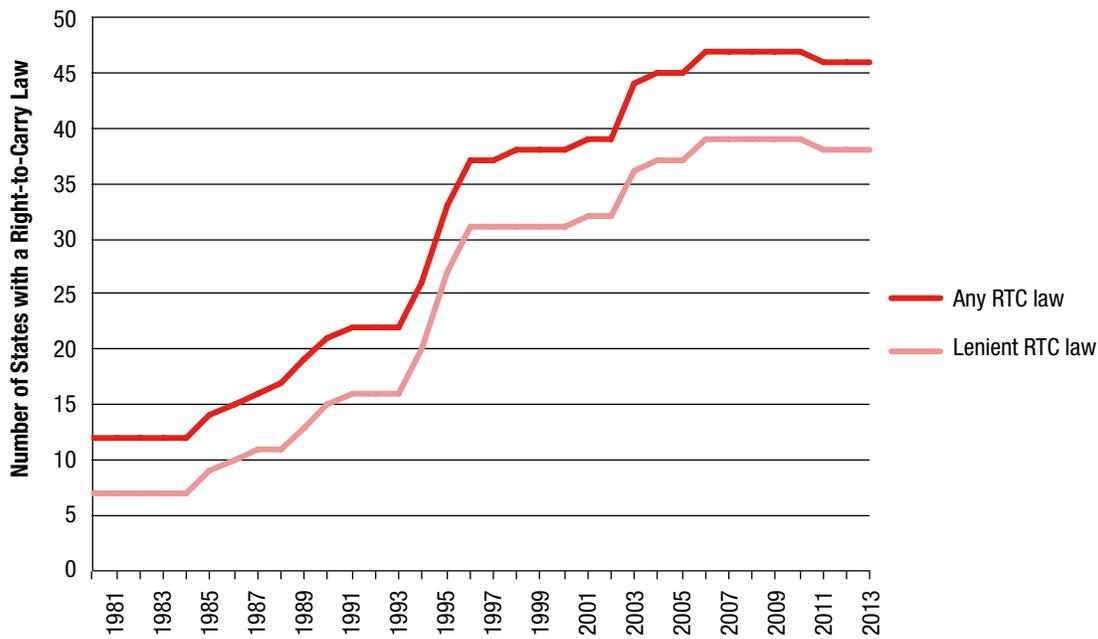
Source: Brennan Center research.[180]

As Figure 21 shows, the number of states with right-to-carry laws has grown steadily. These laws allow governments to issue permits to allow gun owners to conceal their guns when they are brought out in the public, rather than having to keep them visible and in the open. Right-to-carry laws fall under two broad categories. "Lenient right-to-carry laws" (also called "shall issue" laws) are more lenient with the requirements for receiving a concealed carry permit; almost everyone who meets certain criteria can receive one. Arkansas, for example, enacted a lenient law in 2013, that made it legal for citizens to carry a weapon as long as the individual did not intend to use it in the commission of a crime.[181] "Restrictive right-to-carry laws" (also called "may issue" laws) require that the individual receiving the permit have a legitimate reason for needing it. Massachusetts, for example, enacted a restrictive law in 1998 allowing citizens to obtain a license to carry, at the discretion of the police, if the applicant proves good character, good cause, and residency.[182]

Most states over the past few decades have shifted towards enacting lenient right-to-carry laws rather than restrictive ones. Figure 21 depicts this trend in two ways: the rise in lenient right-to-carry laws and the rise in all right-to-carry laws (lenient and restrictive). The number of states with any right-to-carry law has more than doubled from 1990 to 2013, growing from 21 to 46 states. Those with lenient laws increased from 15 to 38 over the same period.

The consensus in the past research is that right-to-carry laws do not prevent crimes and can even cause increases in crime. The National Rifle Association posits that laws allowing the concealed carrying of firearms deter crime. This "more guns, less crime" hypothesis maintains that if potential offenders suspect that a potential victim is more likely to have a concealed firearm, the commission of the crime may be less appealing.

In a widely cited paper, economists John Lott and David Mustard made precisely this argument. They concluded that if states without right-to-carry laws all implemented them, it would prevent almost 1,600 murders annually.[183] They also suggested that such laws would sizably reduce other violent crimes. Furthermore, they argued this result is accomplished with no increase in accidental deaths.

Though Lott went on to publish a well-known book on the subject with the University of Chicago Press,[184] his research has come under criticism. As noted by scholars, when "other researchers delved into Lott's findings, they found no credible evidence that the passage of right-to-carry laws decreases or increases violent crime."[185] Empiricists, including Levitt, found serious quantitative deficiencies in Lott's work.[186] In 2004, the National Academy of Sciences published a study highlighting these deficiencies, specifically focusing on the imprecision in Lott's results.[187]

Other researchers have found evidence of a "more guns, *more* crime" effect.[188] Mark Duggan found in 2001 that gun ownership generally increases the homicide rate, though right-to-carry laws do not increase gun ownership and therefore have no effect on crime.[189] Similarly, Donahue and economist Ian Ayres showed in 2003 that these laws may increase the robbery rate.[190] They also measure the effect of right-to-carry laws on other types of crimes and found that states with these laws are associated with higher levels of property crime.[191] In 2013, Michael Siegel and his coauthors found that for every 1 percent increase in gun ownership, one could expect a 0.9 percent increase in gun-related homicides.[192]

b. New Analysis & Summary of Past Findings

This report's analysis included whether a state had a right-to-carry law. The authors created two different variables to capture the variety of these laws across states as indicated in Figure 22. Using either variable resulted in effectively the same findings.[193]

This report found no evidence that right-to-carry gun laws brought down crime in the 1990s or 2000s. This result is consistent with the most respected studies on the subject.

B. ECONOMIC FACTORS

5. Unemployment

Unemployment & Crime: Consistent with the larger body of research, this report finds that the decrease in unemployment in the 1990s was responsible for about 0 to 5 percent of that decade's crime drop. Increases in unemployment in the 2000s were responsible for a slight but negligible increase in crime during that decade.

Theoretically, unemployment could have a positive or negative effect on crime. On the one hand, higher unemployment may lead to an increase in crime, especially "for-profit" and property crimes. On the other hand, higher unemployment may decrease attractive potential victims of property crime, thus possibly reducing the occurrence of such crimes.[194]

Figure 22: Unemployment in the United States (1980-2013)
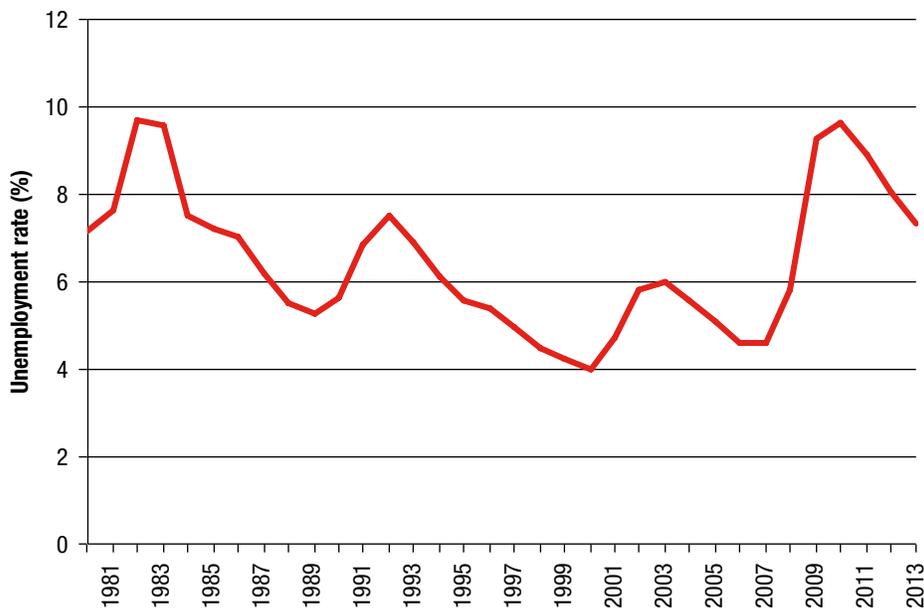
Source: U.S. Bureau of Labor Statistics[195]

As shown in Figure 22, unemployment has fluctuated in recent history. In the 1990s, unemployment steadily declined. In the 2000s unemployment fluctuated but saw a steep increase after the recession of 2008.

On the whole, research indicates that a decrease in unemployment leads to a small decrease in crime. Similarly, an increase in unemployment leads to a slight increase in crime.[196]

Criminologists Shawn Bushway and Peter Reuter in 2004 — as well as Richard Freeman in 1999 — have provided overviews of this past research, finding that job training and unemployment may have some effect on crime.[197] Levitt's 2001 study found that an increase in local unemployment rates leads to an increase in property crime.[198] Raphael and Winter-Ebmer's 2001 study similarly provided strong evidence that an increase in unemployment increased property crime, but did not find similar evidence for violent crimes.[199] Overall, these studies suggest that increased unemployment has a modest effect on increasing crime.

b. New Analysis & Summary of Past Findings

This report's analysis includes data on unemployment. These annual, state-level data are collected through the Federal Reserve Economic Data database.[200]

The analysis finds a positive, but modest, effect of unemployment on crime, consistent with the larger body of past findings. At best estimate, the decrease in unemployment in the 1990s was responsible for 2 percent of that decade's crime drop, but this effect could range from 0 to 5 percent. Increases in unemployment in the 2000s were responsible for a small but negligible increase in crime in that decade. As explained above, scholars have theorized that unemployment increases incentives to commit "for-profit" crimes. It could also increase depression or feelings of despair that could lead to more crime.

6.　　Growth in Income

Income & Crime: In line with the past body of research, this report finds that increases in per capita income were responsible for 5 to 10 percent of the decreases in crime in both the 1990s and the 2000s.

Growth in income, like unemployment, could theoretically increase or decrease crime. Higher legal income can decrease an incentive to engage in illegal activity to gain profits, thereby depressing crime. On the other hand, higher income could theoretically increase the likelihood of crime, as Levitt argues, due to increased crime opportunities.[201] For example, for an individual to steal a car, another person must be able to afford a car. When incomes are higher, there may be more cars, and therefore more opportunities for theft to occur.

Figure 23: Median Household Income in the U.S. (1980-2013)
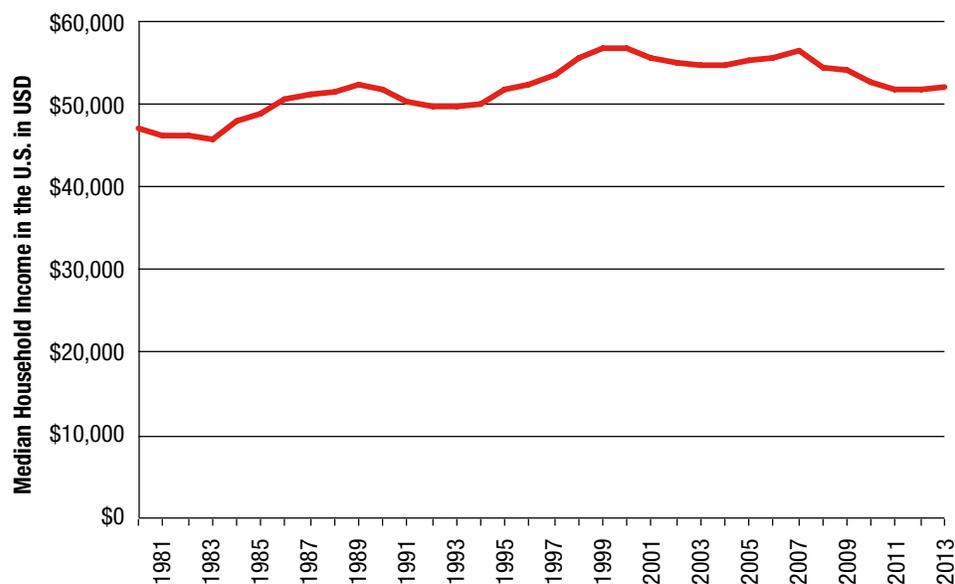
Source: U.S. Bureau of Economic Analysis.[202]

As shown in Figure 23, median household income has fluctuated over time. There was a considerable increase in the mid-1990s, and a sharp decline recently, associated largely with the 2008 recession.

a. Past Research

On the whole, research indicates that a growth in income leads to a modest decrease in crime. There are several ways to study the effect of income on crime. Some researchers consider the effect of median income, while others look at the effect of income inequality.

In Levitt's 1999 study, he used median income as the measure and found that property crime had become increasingly concentrated on victims with lower incomes. He argued that this may be due to security measures, including home security systems, which are increasingly available to those with higher incomes.[203]

Additional studies consider the effect of other income-related factors, including the minimum wage, poverty levels, economic inequality and segregation, and homelessness on crime. They generally find analogous trends. In 1991, criminologist E. Britt Patterson found that more concentrated poverty is associated with higher rates of serious violent crime, but that income inequality was not.[204] Criminologist John Hipp found that areas with high levels of inequality and more economic segregation had much higher levels of property crime (such as burglaries and motor vehicle thefts) regardless of racial composition.[205]

Traditional economic theory argues that higher minimum wages can lead to higher unemployment, because when minimum-wage employees cost more to hire, there are fewer jobs available at the higher wage rate. In an analysis in the 1980s grounded in this logic, economist Masanori Hashimoto found that higher minimum wages increased property crimes committed by teenagers but had no effect on violent crime by teenagers. He also found they had no effect on crimes committed by young adults ages 20 to 24.[206] Economists continue to debate the real world application of this theory. Some argue that increasing the minimum wage increases unemployment, while others have found that increasing the minimum wage does not increase unemployment.[207]

b.   New Analysis & Summary of Past Findings

In accordance with the larger body of research, this report's analysis includes the effect of income on crime in the form of median per capita income. The dataset includes annual, state-level median income data, for the 50 states and the District of Columbia, gathered from the U.S. Bureau of Economic Analysis via the Federal Reserve Economic Data database.[208]

This report finds a significant negative relationship between income and crime: the higher the average income in the state, the lower the crime rate. Specifically, the authors estimate that the increase in per capita income was responsible for 5 to 10 percent of the decrease in crime in the 1990s. Though there was a decline in income after 2008, median income increased from 2000 to 2013. This overall increase in income was responsible for 5 to 10 percent of the decrease in crime in the 2000s. This finding comports with the past body of research on the effect of income on crime.

7.   Inflation

Inflation & Crime: Based on past research, the authors believe that inflation likely had some effect on the drop in property crime in the 1990s and 2000s.

Other, less obvious, economic measures may also affect crime. One example is the rate of inflation. Existing studies indicate that a decrease in inflation could lead to a drop in property crime.

Figure 24: U.S. Inflation Rate (1980-2013)
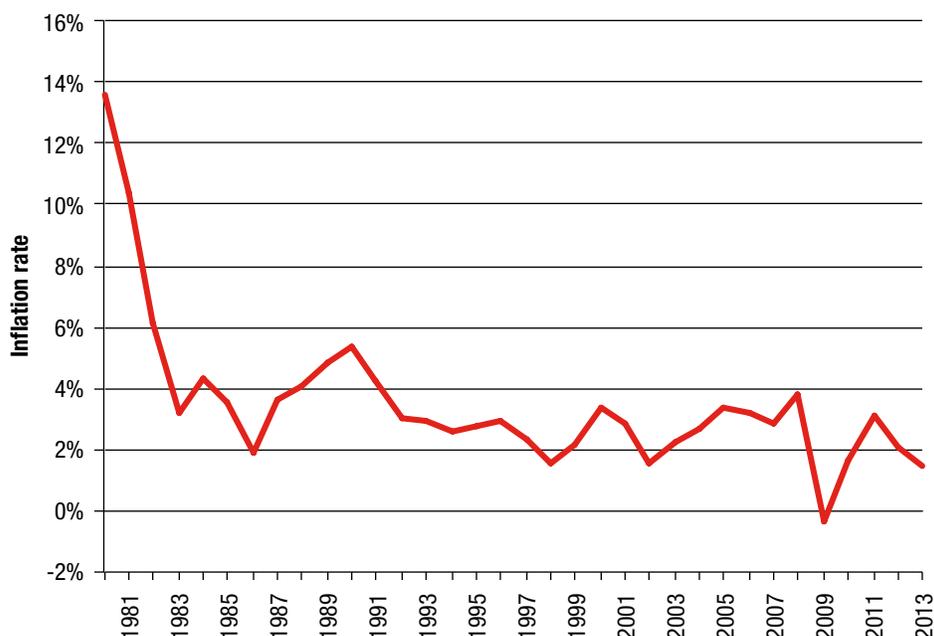
Source: U.S. Census Bureau.[209]

As shown in Figure 24, inflation has fluctuated nationally around 2 to 3 percent since 1982. Inflation is defined as the year over year percent increase in the national Consumer Price Index. The notable exception is the sharp drop and increase between 2008 and 2010, prompted by the recession of 2008.

a. Past Research

Inflation has not been an oft researched subject. The research that exists indicates that inflation has the effect of increasing property crime, but does not affect violent crime.

As explained by criminologist Richard Rosenfeld, "[c]rime rates tend to rise during inflationary periods and fall, or experience a slower increase, when the inflation rate drops," and moreover, "[p]rice increases make cheap, stolen goods more attractive and therefore strengthen incentives for those who supply the underground markets with stolen goods. The reverse occurs when inflation is low."[210] Economists Alan Seals and John Nunley similarly found that inflation has a statistically significant effect on increasing property crime.[211] The higher the inflation rate, the higher the property crime rate. They concluded that inflation stability can considerably reduce property crime.

b. Analysis of Past Findings

Inflation data are recorded as the change in the Consumer Price Index as collected by the Bureau of Labor Statistics. The data are available annually and broken down into four regions of the United States (south, northeast, west, and midwest). It is not available for each state and therefore could not

be included in the state-level national regression analysis.[212] Other research used national or regional regressions and therefore included this data.

The authors therefore analyzed past research on this theory. While it seems likely that changing inflation had some effect on the drop in crime, more research is needed to quantify that contribution. Based on the body of past research, the authors believe that inflation likely had some effect on the drop in property crime, yet are unable to quantify it due to lack of data that can be added into this report's state-level annual dataset and analysis. Forthcoming work by Rosenfeld may provide a more precise estimate showing that lower levels of inflation likely helped bring down crime in the 1990s and 2000s.[213]

8.   Consumer Confidence

Consumer Confidence & Crime. Based on past research, the authors find that consumer confidence likely brought down property crime in both the 1990s and the 2000s.

Consumer confidence is an economic measure, which uses survey data to determine whether consumers are optimistic about the economy and future growth.[214]

Figure 25: Consumer Confidence Index (1980-2013)
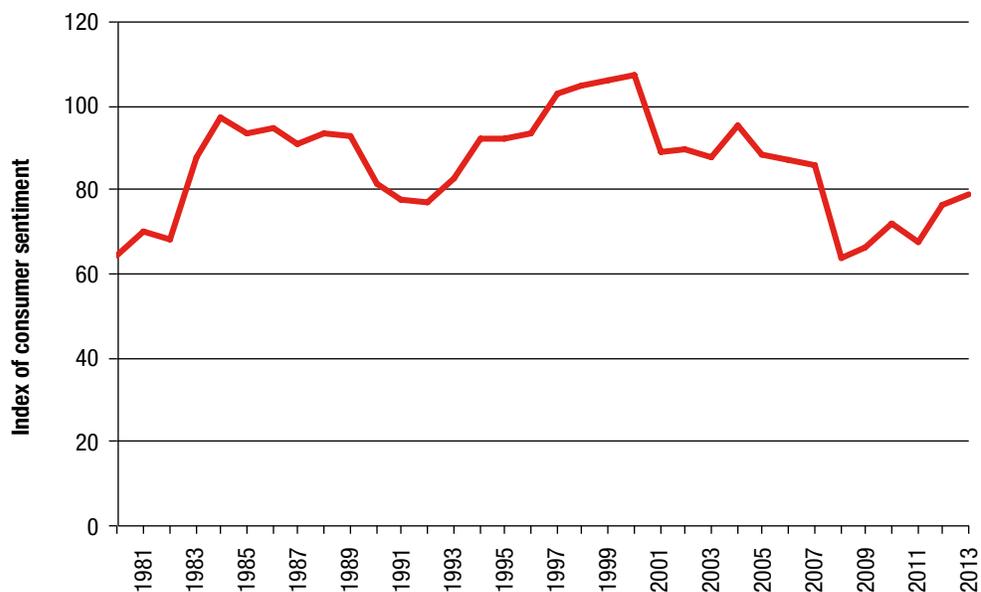
Source: Thomson Reuters and University of Michigan, Surveys of Consumers.[215]

Note: This figure depicts consumer sentiment as a percentage of its 1985 level. This allows fluctuation over time to be observed.

As shown in Figure 25, consumer confidence has fluctuated, sometimes dramatically, over the past 20 years. A prolonged increase occurred throughout the 1990s, and sharply decreased in the late 2000s consistent with the 2008 recession.

a.   Past Research

There are a handful of studies on this topic that indicate a rise in consumer confidence can lead to a decrease in some property crimes.

Rosenfeld and criminologist Robert Fornango's 2007 study found that an increase in consumer confidence in the 1990s was responsible for about 35 percent of the decrease in robbery between 1992 and 2000.[216] They found similarly large effects of increased consumer confidence on bringing down rates of burglary, larceny, and motor vehicle theft.[217] Rosenfeld and Fornango used the Index of Consumer Sentiment in lieu of traditional economic indicators, such as unemployment, arguing that survey respondents are "more reliable guides to their own perceptions of economic conditions than researchers."[218]

However, respondents could easily "misjudge the timing or significance of various economic conditions," which could skew these results to find an effect larger than actually present.[219] In addition, technological advances in anti-theft surveillance likely affected rates of burglary, larceny, and motor vehicle theft, possibly more so than the effect of consumer confidence.[220] Rosenfeld and Fornago do not control for the effect of these technological changes or certain other variables. For these reasons, among others, the effect of consumer confidence on crime could be smaller than projected in this study.

b.   Analysis of Past Findings

Like inflation, data are available annually and broken down into four regions of the United States (south, northeast, west, and midwest). Other researchers used regional or national analysis and could therefore use this data. This data is not at the individual state level.[221] The authors therefore analyzed past research to understand the effect of consumer confidence on the crime rate.

This report finds that Rosenfeld and Fornango's results and other economic and sociological theory indicate that an increase in consumer confidence likely had some effect on reducing property crime. Increasing consumer confidence in the 1990s could have had an effect on reducing crime for certain property crimes. Consumer confidence likely also had some effect on the property crime drop in the 2000s. It likely had a crime-increasing effect as confidence fell through the early part of the decade, and a crime-reducing effect as confidence rose through the later part.

C. SOCIAL AND ENVIRONMENTAL FACTORS

9.   Decreased Alcohol Consumption

Alcohol & Crime: In line with past research, this report finds that decreased alcohol consumption decreases crime. However, because alcohol consumption did not change significantly during the 1990s and 2000s, it did not produce a large shift in crime. A decrease in per capita alcohol consumption led to a 5 to 10 percent decrease in crime during both decades.

One popular theory discussed in research is the effect of alcohol consumption on crime.[222]

As shown in Figure 26, alcohol consumption slowly but steadily declined from 1980 to 2000, and has gradually increased since then. This recent increase has been driven by an increase in the consumption of wine and spirits, while beer consumption has been steady or falling.

Figure 26: Alcohol Consumption Per Capita (1980-2012)
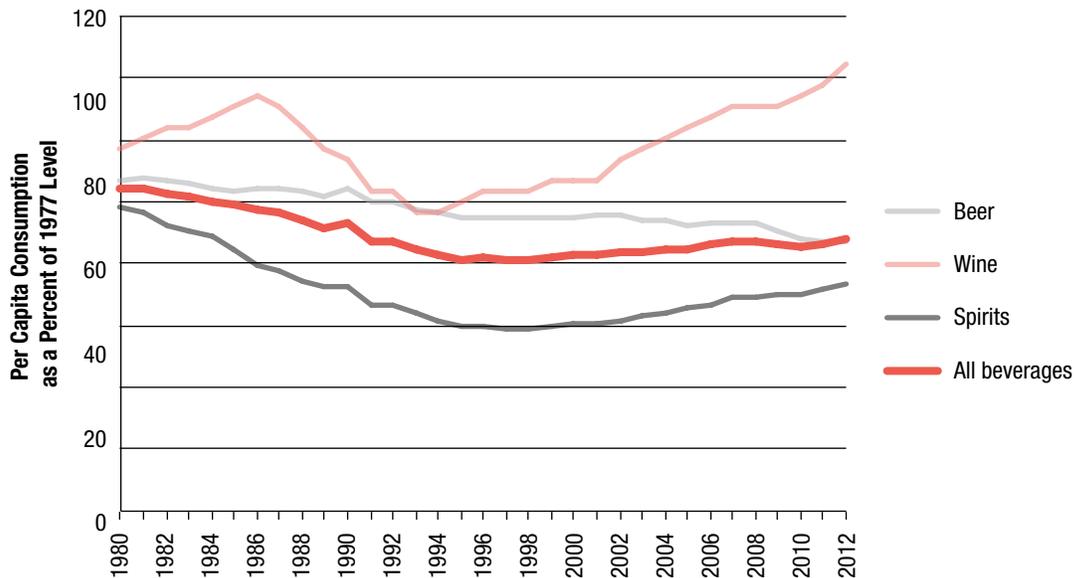
Source: National Institutes of Health.[223]

a.   Past Research

Overall, research indicates that an increase in alcohol consumption contributes to an increase in crime. Sara Markowitz's 2000 National Bureau of Economic Research (NBER) study and Susan Martin's 2001 National Institute on Alcohol Abuse and Alcoholism study are among the most influential.[224] These studies found a positive correlation between alcohol consumption and crime. Today, the National

Partnership on Alcohol Misuse and Crime reports that 40 percent of state prisoners convicted of violent crimes were under the influence of alcohol at the time of their offense.[225] Another recent study found that for every 10 percent increase in the concentration of bars in a neighborhood, there is a corresponding 2 percent increase in the violent crime rate.[226]

b.   New Analysis & Summary of Past Findings

To examine the effects of alcohol on crime, this report's dataset included data provided by the National Institutes of Health on gallons of ethanol sold (in the form of beer) per person per year in each state from 1980 to 2012.[227] Data for 2013 were not available at the time of publication and therefore could not be included in this report's analysis. The authors therefore used a projection for the 2013 data.[228]

The amount of beer sold was chosen as the data source for alcohol consumption for several reasons. It is the most common form of alcohol consumption and generally tracks trends overall alcohol consumption. It is also a common method through which social scientists examine this variable; using the same measure allows for comparison of results. Scholars have also found connections between beer consumption in particular and crime.[229]

The authors' analysis found that alcohol consumption increases crime. However, because alcohol consumption did not change significantly during the 1990s and 2000s (it declined by less than 1 percent in the 1990s and 2000s), it did not produce a large shift in crime in those decades. Of the crime drop in the 1990s, 7.5 percent can be attributed to a decrease in per capita alcohol consumption; this effect could range from 5 to 10 percent. The same holds true for the effect of alcohol consumption on crime in the 2000s. Overall, this is a statistically significant positive effect, meaning that as alcohol use declines, crime declines.

10.   Aging Population

Age & Crime: This report finds that between 2 to 3 percent of the crime drop in the 1990s can be attributed to a decrease in people aged 15 to 29; this effect could statistically range from 0 to 5 percent. Because there was essentially no change in the proportion of this age group from 2000 to 2010, age did not have an effect on the crime drop in the 2000s. This correlation between age and crime is consistent with past research.

The distribution of age in a population has been studied as a potentially important determinant of crime rates.[230] It is commonly believed that the younger a region's population on the whole, the more crimes will be committed. Young adults, specifically those between the ages of 15 and 24, commit the vast majority of crimes and are also victimized at a much higher rate.[231] It is natural to expect, then, that an aging population would experience lower crime rates.

Figure 27: Decrease in Young People in the Population (1980-2013)
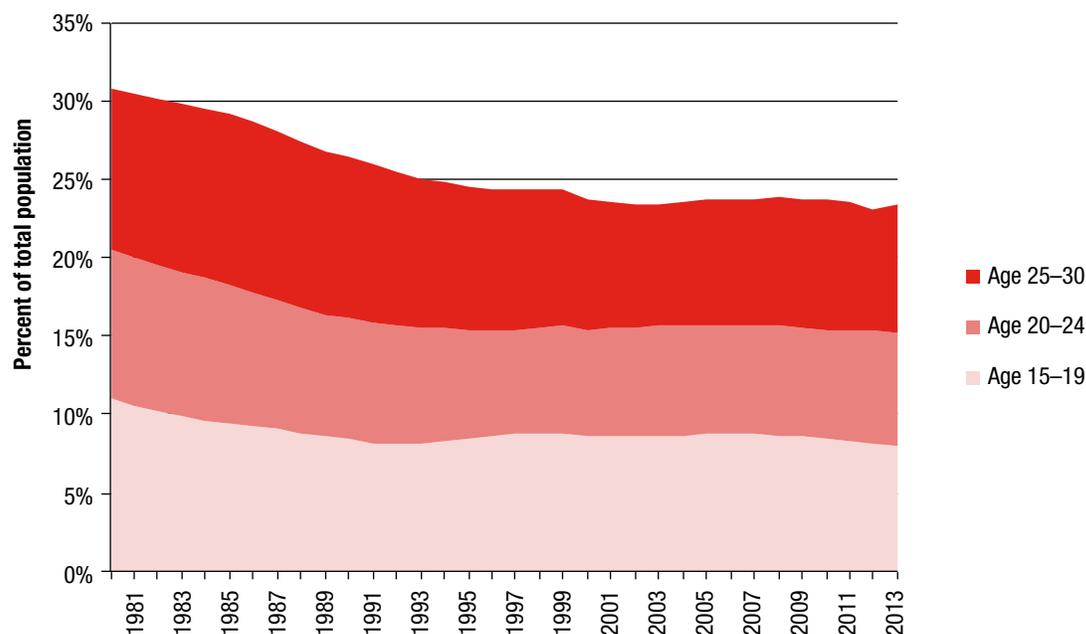
Source: U.S. Census Bureau.[232]

Figure 27 shows the change in the percent of "young people" (defined as individuals between ages 15 to 30) of the total population. The percentage of young people decreased from 31 percent in 1980 to 26 percent in 1990 to 24 percent in 2000, before landing at 23 percent in 2013. Overall, the median age in the U.S. has been rising with every census, from 29.5 in 1960 to 37.5 in 2013.[233]

a.   Past Research

Most of the past research on this theory, conducted by economists and sociologists, found that commission of crimes does indeed vary with age.

In 1983, sociologists Travis Hirshi and Michael Goffredson observed that age and crime were correlated and that this relationship did not vary significantly across time or place.[234] In 1993, they identified self-control as the connection between age and propensity to commit crime, noting that self-control increases with age.[235] In 2003, sociologists Charles Tittle, David Ward, and Harold Grasmick challenged the self-control theory, concluding that age and gender were better predictors of criminal deviance than self-control. Specifically, they found that males were more likely than females to commit crimes, and 18- to 24-year-olds were more likely than their elders to commit crimes. [236]

In 1999, Levitt found a relationship between age and the likelihood of committing crime.[237] He identified individuals between the ages of 15 to 24 as the most likely to commit crime. He found that the aging population accounted for 12 percent of the decline in violent crime and 18 percent of the decline in property crime between 1980 and 1995. Levitt predicted that aging demographics between 1995 and

2010 would lead to a reduction in violent crime by 1 to 2 percent and property crime by 5 to 6 percent.[238] In 2008, Rosenfeld and Alfred Blumstein cited the aging of the postwar "Baby Boomer" generation out of the high-crime age bracket, which occurred around 1980, as a turning point in crime trends.[239]

There are myriad explanations among researchers and academics for this age-crime relationship.[240] Young adults tend to have fewer responsibilities, such as being the primary wage-earner or a parent, which can inhibit crime. Younger people may also spend more free time outside the home, thereby exposing themselves to more opportunities to commit crime. Young people may also simply be more predisposed to take risks, which include committing crimes, and have less overall impulse control and less mature decision-making skills.[241]

b. New Analysis & Summary of Past Findings

This report's regression included data provided by the U.S. Census on age distributions.[242] The data were in percentage of the population in each young adult age group: 15-19, 20-24, and 25-30, in each state from 1980 to 2013. Grouping ages in a regression analysis is a common way to reveal age distribution effects.

This report finds that between 2 to 3 percent of the crime drop in the 1990s can be attributed to a decrease in people aged 15 to 30. This result could range from 0 to 5 percent. There was a noticeable decline in adolescents and young adults as a percentage of the population from 1990 to 2000. However, there was essentially no change in the proportion of the population aged 15 to 30 from 2000 to 2013. Age distribution was therefore not a major factor in the drop in crime in the 2000s.

Breaking down this finding further, the analysis shows no significant impact of 15 to 19 year olds on crime rates. However, it does indicate a significant and positive correlation between 20- to 24-year-olds and 25- to 30-year-olds and crime.[243] Specifically, a 1 percent decrease in the percentage of these young adults in the population is associated with a roughly 0.3 percent decrease in crime. From 1990 to 2000, the percent of Americans in these two age ranges fell 2.9 percent, which would be associated with a 0.78 percent decline in crime. From 2000 to 2013, the percent of young adults actually rose slightly, by 0.2 percent, which would be associated with a very small (0.06 percent) increase in crime.

This report's findings that age and crime are correlated are in line with past research on the topic.

11.   Decreased Crack Use

Decreased Crack Use & Crime: The authors do not draw a conclusion on this theory because they could not secure complete state-level data on this variable for the years 1980 to 2013. Based on the past body of research, the authors believe that the decline in crack use could have played a role in the drop in violent crime in the 1990s.[244] Given that widespread crack use had largely receded by the 2000s, it likely had no effect on the crime drop in that decade.

In the mid-1980s, cocaine use increased in major cities.[245] This particularly occurred in the form of "crack" cocaine, a diluted form of powder cocaine cooked with a variety of substances resulting in "nuggets" that can be easily sold and smoked.[246] Because the diluted product is cheaper and easier to sell on urban streets, it is associated with an increase in drug use and sales in the 1980s, commonly referred to as the "the crack epidemic."

Some have suggested the decline in the use of crack contributed to the decline in violent crime, especially homicides.

a. Past Research

There is research suggesting that increased crack use led to increased homicides in the early 1990s. For example, Levitt asserted in 2004 that the homicide rate for young black males more than tripled between 1985 and 1993 due to increased crack use.[247] He also argued that as crack use declined in the late 1990s and 2000s, it caused a decrease in homicide rates and other violent crime.[248]

Researchers believe that crack use can increase crime either through its "psychopharmacological" effects — the drug may cause violent or irrational behavior in users — or due to "economic-compulsive" violence — whereby users turn to crime to support a drug habit.[249] Some studies find that crack use and distribution increased crime and violence primarily due to disputes over crack sales.[250]

Blumstein and Rosenfeld identify two turning points with respect to crack and crime trends. The first is a rise in young people participating in the crack sales around 1985 and the concurrent increase in gun violence. Second, they note the decline in crack use and demand around 1993, which coincided with a robust economy and shrinking unemployment.[251]

Studies have also focused on crack use in specific cities. In a 1997 paper, social scientist Paul Goldstein and coauthors attributed 25 percent of homicides in New York City in 1988 to crack.[252] They argued the causes of many homicides were disputes over crack distribution. Then, as crack use waned, they posited that it had some effect on the declining homicide and violent crime rates.

b. Summary of Past Findings

Reliable data on crack cocaine use are not easy to obtain. Crack was not widespread before the early-to mid-1980s, and there was a lag before researchers realized its destructive potential. There has been some effort to assemble a measure of crack's prevalence. For example, Roland Fryer and his coauthors constructed a "crack index," based on newspaper mentions, hospital admissions, and other data in 2005.[253]

The authors could not secure data on the crack cocaine epidemic at the state level. The authors were therefore unable to include this variable in their regression.

The main source of drug-use data — the National Household Survey on Drug Abuse which was replaced by the National Survey on Drug Use and Health in 2002 — provides national level data and does not include state-by-state data. It also began collecting data on crack in 1988 — after crack epidemic was

well underway, making it more difficult to see how the waxing and waning of the epidemic affected crime.[254] Other researchers were able to include this data in their analyses because they performed national analyses on years after 1988 or conducted their own surveys to gather the data.

Based on past research, the authors believe that the decline in crack use could have played some role in the drop in violent crime in the 1990s. Given that widespread crack use had largely receded by the 2000s, it likely had no effect on the crime drop in that decade.

12.   Legalization of Abortion

Legalized Abortion & Crime: The authors do not draw a conclusion on this theory because they could not secure complete state-level data on this variable for all the years examined. Based on past research, it is possible that legalized abortion could have affected the crime decline in the 1990s. However, even if there was any such effect, it likely waned in the 2000s. The first cohort that would have been theoretically affected by abortion, 10 years after the 1990s, would be well beyond the most common crime committing age in the 2000s.

One of the most controversial theories for the crime decline, as well as one of the most researched, is the legalization of abortion.

a.   Past Research

In a widely cited and much discussed study, Levitt and Donohue argued in 2001 that there was a causal link between the legalization of abortion, by the U.S. Supreme Court's 1973 decision in *Roe v. Wade*, and the subsequent drop in crime in the 1990s.[255] Levitt noted that this hypothesis was first mentioned in 1990, by former Minneapolis police chief Anthony Bouza.[256] Levitt and Donohue attributed as much as half of the 1990s crime drop to legalized abortion.[257] Levitt's subsequent 2004 study attributed about a third of crime reduction to abortion.[258] This large attribution to legalized abortion for the crime decline has been seconded by other researchers, including economists Jessica Reyes, Anindya Sen (writing about Canada), and Christian Pop-Eleches (writing about Romania). [259]

This theory relies on several assumptions. First, it assumes that children born from unwanted pregnancies are, on average, more likely to commit crime when they become adolescents or adults.[260] Second, the argument assumes that women are more likely to obtain abortions if their pregnancy was unwanted. It then assumes that abortions increased significantly after 1973, which caused the number of children born from unwanted pregnancies to decrease significantly. Some point to a decrease in the number of children placed for adoption after abortion was legalized as evidence of this theory.[261] The theory further argues that this cohort of children would have been more likely to commit crimes in the 1990s, when they would have been of crime committing age. Yet, since these children were not born, these crimes did not occur.

Levitt and Donohue's study has been debated and attacked by many scholars. Economist Ted Joyce criticized the authors' failure to consider illegal and underreported abortion and fertility rates, especially before *Roe*. Joyce states: "As a simple example, Kansas had an abortion ratio of 414 per 1,000 live births in 1973. However, data collected by the Centers for Disease Control (CDC) . . . indicate that Kansas had an observed abortion ratio of 369 per 1,000 live births in 1972!"[262] Thus, in reality, there might not have been the dramatic increase in abortions after *Roe* that Donohue and Levitt hypothesized. If true this would undermine their argument that many children who were predisposed to committing crimes were not born.

Zimring has expressed criticism of Levitt and Donohue's methodology and findings. In a well-respected 2006 study, Zimring performed his own empirical analysis to account for state variation and found no evidence of an effect of abortion legalization on crime.[263] Comparing the city-level, national, and international crime declines in the 1990s, Zimring drew from and challenged past empirical analyses and notions about the factors affecting crime.[264]

Additional criticism comes from Rosenfeld, Blumstein, and researcher Joel Wallman who contended that the offending rates of age groups do not line up with the abortion theory. Adolescent violent and property crime rates did not decline until 1994, when the first cohort after legalization of abortion turned 21. If national legalization impacted crime, they argued crime rates should have fallen much sooner because the likelihood of offending increases significantly in the mid-to-late teens.[265]

b.   Analysis of Past Findings

The authors do not draw a conclusion on this theory because they could not secure data on this variable on a state-level for all the years of data included in the regression. Data on incidents of legal abortions in states are collected by the Guttmacher Institute. Guttmacher did not have data for 16 years between 1980 and 2014 (These are: 1983, 1986, 1989, 1990, 1993-98, 2001-03, 2006, 2009-11).[266] Other researchers were able to include this data in their analysis because they conducted national level analysis, their models did not account for all the years between 1980 and 2014, or they gathered their own data.

Based on an analysis of the past findings, it is possible that some portion of the decline in 1990s could be attributed to the legalization of abortion. However, there is also robust research criticizing this theory.

Even if the abortion theory is valid, it is unlikely that an increase in abortions had much effect on a crime drop in the 2000s. The first cohort that would have been theoretically affected by abortion, 10 years after the 1990s, would be well beyond the most common crime committing ages in the 2000s. Based on available data, the frequency of abortions appears to currently be fairly constant. Since the variable does not appear to be shifting, a change in crime would not be expected. Although it may have had some small residual effect, there would likely be no effect on the 2000s drop attributed to legalized abortion.

13.   Decreased Lead in Gasoline

Unleading of Gasoline & Crime: The authors do not draw a conclusion on this theory because they could not secure complete data on this variable on a state-level for all the years needed for their empirical analysis. Based on past body of research and expert reactions, it is possible that lead played some role in the 1990s violent crime decline. However, lead's effect on crime likely waned in the 2000s, as there was no dramatic change in lead rates after 1985. People born after that year experienced less of a sharp decline in exposure to lead, therefore lead presumably had less of an effect on their propensity to commit crimes in the 2000s.

A decrease in the lead in gasoline after the passage of the federal Clean Air Act is another popular, yet controversial, theory.

a.   Past Research

In a widely cited 2007 paper, Amherst College economist Jessica Reyes linked the removal of lead from gasoline after the 1970 Clean Air Act to the precipitous drop in crime in the 1990s. Her argument is as follows. After passage of the Act, gasoline manufacturers began to remove lead from gasoline.[267] Lead, used as an octane booster, is a highly toxic metal. Exposure to lead has been linked to lower I.Q. scores. It can lead to cognitive and behavioral problems, as well as aggressive behavior.[268] The first generation of individuals not exposed to leaded gasoline (which happened during 1975 to 1985) reached the most common violent crime committing ages in the 1990s (defined by Reyes as 22).

Reyes, and other researchers, have found that lead is connected to aggressive behavior and behavioral problems because it affects brain development of children. Children absorb lead into their systems by breathing lead in the air, which mainly comes from automobile exhaust. Reyes and others argue that these propensities then tend to lead to an increased propensity to commit violent crime. Reyes argues that the post Clean Air Act cohort was less likely to have cognitive or behavioral problems, since they were not exposed to lead, and therefore were less likely to commit crimes when they came of age in the 1990s than previous generations.

Reyes found that the decrease in lead caused a remarkable 56 percent of the decrease in violent crime in the 1990s. When examining state-specific trends, her findings gave lead credit for a much lower 17 percent of the violent crime decline. Reyes did not find a significant effect of lead abatement on property crime in the 1990s.

This theory had been previously suggested by another economist, Rick Nevin, in 1999. He illustrated a similarity in the trends between violent crime and gasoline lead 23 years prior.[269] The lead theory has also been popularized widely in the news media. *Mother Jones*, for one, highlighted the theory in an early 2013 article entitled "America's Real Criminal Element: Lead," which, in part, profiled the research of Reyes and Nevin.[270]

In December 2013, an NAS roundtable discussed the lead theory.[271] There was an extended discussion in which most participants seemed to concur that the 56 percent drop in crime attributed to lead by Reyes was likely too large. Most experts seem to believe that lead played some role, but maybe not as high as the finding presented by Reyes. More research is needed to establish lead's precise role in the crime decline.

b.   Summary of Past Findings

The authors do not draw a conclusion on this theory because they could not secure complete state-by-state data on this variable level for 1980 to 2013, as needed for the regression. The U.S. Environmental Protection Agency does not collect data on the amount of lead in gasoline at the state level. National level data exist since at least 1980.[272] Reyes used an original dataset to conduct her study, and the authors could not recover this data from her.

Based on current research and expert reactions, it is possible that lead played some role in the 1990s drop in violent crime but perhaps not as large as that found by Reyes. Further, lead's effect on the crime drop likely waned in the 2000s. While reduced lead levels in gasoline may continue to depress crime rates, it likely has a minimal role in this decade. The prevalence of lead in gasoline has been at consistently lower levels since the early 1990s. Thus, individuals who were around age 22 in the 2000s were exposed to consistently low rates of lead similar to previous cohorts. Thus, because there was not much change in the prevalence of lead in gasoline, it likely had little effect on propensity to commit crime.

***

This section concludes this report's state-level analysis on 13 theories about the crime decline, with a focus on the effect of incarceration.

II.   CITY-LEVEL ANALYSIS OF CRIME

CompStat & Crime: Based on original empirical analysis conducting the first nationwide study of CompStat's effectiveness on crime, this report finds that the introduction of a CompStat-style program may be responsible for a 5 to 15 percent decrease in crime across cities that introduced it. CompStat is a police management technique — a way to run police departments — that was widely deployed in the nation's cities in the 1990s and 2000s, starting in New York City in 1994. Specifically, a CompStat-style program is associated with a 13 percent decrease in violent crime, an 11 percent decrease in property crime, and a 13 percent decrease in homicide. The effect of a CompStat-style program on crime in a specific city can vary above or below these national averages.

Part II, which delves into the effect of policing on crime, presents this report's 14th theory. Because policing is largely a local function, executed on the city and county level, an empirical analysis of its effect on crime must be conducted at a local level and could not be incorporated into the state-level analysis in Part I.

A.   POLICING

Although the effect of police on crime is a popular topic, there has been much conflation of the ways in which police affect crime. There are two distinct aspects of policing: *numbers* of police and *how* police fight crime. As noted in Part I, there is some research indicating that *numbers* of police can reduce crime. However, is there evidence that specific policing systems, strategies, or tactics aimed at combating crime actually reduce crime? There is little national-level analysis on this question. This report therefore seeks to fill a gap in the research.

Police aim to both prevent and respond to crime, including through enforcing criminal laws. Police are often the most visible element of crime-control policy and are usually citizens' first contact with the criminal justice system. Officers may deter crime by their mere presence. They make the first determination of whether to pull an individual into the criminal justice system. Arrests and searches serve as first contacts that can eventually lead to pre-trial detention, prison, or other forms of punishment. Enforcement can also serve as a deterrent to future crime. Policing tactics can affect both the crime rate and the incarceration rate.

It is difficult to measure how different police departments deploy tactics, such as "broken windows policing" (where police focus on low-level crimes such as breaking windows and graffiti on the theory that such enforcement will stop more serious crime), "hot spots policing" (where police focus resources in areas where crime is most likely to occur), or "stop-and-frisk" (when officers stop individuals, who may not be overtly engaged in criminal activity, and conduct a pat-down).[273] There is great variance from city to city and each department defines these types of tactics in different ways. One way to examine the overall national effect of any of these types of policing would be an extensive survey of individual police departments including an interview process. Even then, such *qualitative* data faces criticisms of subjectivity and the pitfalls associated with different definitions and implementation techniques across departments.

Based on the authors' research, CompStat, however, emerged as one of the most consistent, easily identifiable, and widespread policing techniques. CompStat was widely introduced in the nation's cities in the 1990s and 2000s. Although different departments implement the management technique in different ways, the general objective is the same: to implement strong management and accountability within police departments to execute strategies based on robust data collection, to reduce and prevent crime. CompStat also tends to have a clear date of introduction in a city, which allows for input of that data into an empirical analysis. Regional differences could change CompStat's effect on reducing crime from locality to locality, yet a national effect can still be quantified by aggregating and analyzing cross-city data.

For the purposes of this report, CompStat represents a 14th theory on the crime decline — a way to analyze a national effect on crime of one strategy that police ostensibly use to fight crime. Part II of this report presents a city-level analysis of CompStat by examining its use in the 50 most populous U.S. cities. Part II first explains CompStat and then discusses past research on policing tactics. Finally, it presents the first nationwide analysis of the effect of CompStat implementation on crime reduction.

1. Introduction of CompStat

a. What is CompStat?

CompStat stands for COMParative STATistics.[274] Police Commissioner William Bratton first introduced it in New York City in 1994.[275]

Essentially, a CompStat program requires police to use technology and data analysis to gather timely, accurate information about crime patterns and then respond quickly to break those patterns. Although many police departments custom-tailored CompStat to their own departmental and neighborhood needs, the widely consistent elements of CompStat are its strong management and accountability techniques, as well as its reliance on data collection to inform the choice of crime control tactics deployed to neighborhoods. These aspects play out at regularly occurring meetings, usually every week, in which department executives, detectives, and officers discuss and analyze crime data and strategize tactics aimed at areas of concentrated crime. There is also rigorous follow-up to ensure these tactics are deployed and were effective to ensure their goals. CompStat bridges the divide between policing theories and concrete police tactics, putting policing theory into practice.

In the years after its introduction in New York City, the city experienced a dramatic drop in crime, which inspired other police departments to implement the program or similar programs. The Police Executive Research Forum (PERF) found that 79 percent of medium to large police departments surveyed use some form of CompStat, though often termed a different technical name.[276]

As described by Jack Maple, a former Lieutenant in the New York City Transit Police, who worked with Commissioner Bratton to deploy CompStat, there are four basic principles of CompStat:[277]

- *Accurate, Timely Intelligence*: Information, data, and regional analysis drive the CompStat process. Specifically, statistical analysis digests raw data to assist commanders in making policing decisions. Geographic analysis helps commanders locate crime and target those areas

for increased police presence. This enables police departments to make informed and rapid decisions about how to respond to crime and where to focus resources.

- *Effective Tactics*: Commanders use this data to understand fluctuations of crime in their jurisdictions and then develop plans to address crime. Commanders strategically direct resources at all parts of a problem, including past police resources as well as resources from community, local, state, and federal agencies.
- *Rapid Deployment*: Armed with timely data, analysis, and a targeted policing plan, commanders carry out the plan to quell crime in their jurisdiction. This differs from how many police departments operated in the past, when they primarily addressed crime after the fact. CompStat increases a police department's capability to address crime proactively, deploying resources faster and often before more crime occurs.
- *Relentless Follow-up and Assessment:* A strong results-oriented management is likely the most critical aspect of CompStat. CompStat focuses a department's resources on the overall goal of crime reduction and holds departments, commanders, and officers accountable to achieving that goal. Police departments assess whether the tactics they deployed were successful after each plan is implemented. Commanders adjust the plan if the results indicate the strategy was not successful.[278] Above all, CompStat is a police management technique — a way to run police departments.

Programs vary among cities because police departments adapt CompStat to fit their own budget, organizational structure and culture, and local needs. A 2013 report by the Bureau of Justice Assistance (BJA) and PERF studied the evolution of CompStat and how it is deployed in different cities.[279]

The report found some variations, which include:

- *Tactics Deployed in Identified Areas:* Once CompStat helps identify a high crime area, police departments can vary widely in which tactics officers employ once they arrive in target locations. BJA and PERF found departments may foster internal collaboration between commanders, engage with the community to prevent crime and disorder, or simply increase visibility.[280] These can take the form of specific policing tactics such as hot spots, broken windows, or "community policing" (in which police work in tandem with the community to prevent and solve crimes). Notably, this Brennan Center report does not produce findings or opine on the specific policing strategies that police departments employ in neighborhoods after the use of CompStat to identify target areas. Rather, it focuses on whether a department utilizes CompStat at all.
- *Depth of Integration of CompStat into Policing Culture and Strategy:* Police departments differ in leadership, size, location, and resources, and operate under varying political pressures. This creates variations in how deeply a police department embeds the core tenets of CompStat in its culture and tactics. Departments may deploy CompStat more or less vigorously depending on past mechanisms, bureaucratic systems, and internal resources.[281] For example, New York City implemented CompStat rigorously by deploying a system of accountability and coordination that connected each precinct, borough, and beat cop.[282] Some departments, however, lack the infrastructure to support the core tenets of a CompStat program. For example, the program in Lowell, Mass., "was subject to internal conflicts that made it deviate from New York's prototype. Scarce resources and a veiled sense of competition made commanders reluctant to share resources with sectors that were hardest hit by crime."[283] In Chicago, Police Superintendent

Garry McCarthy utilizes CompStat to target gang related violence. His strategy relies on "gang audits" that provide updated information on activity of the city's almost 600 gang groups. After a shooting occurs, commanders in the city's 22 police districts receive intelligence information on the gangs involved and marshal resources to prevent violent retaliation.[284]

- *Reliability of Data:* Some have noted that the accountability and data-collection pressures associated with CompStat can sometimes lead to data manipulation or quotas.[285] Specifically, a criticism of CompStat is that it has incentivized "a numbers game."[286] There is evidence that some departments have responded to CompStat's increased accountability measures by misreporting crime statistics to provide the impression of decreased crime. In a 2010 survey of retired NYPD officers, criminologists John Eterno and Eli Silverman found that more than half of those responding admitted to "fudging numbers," thereby misrepresenting crime data in relation to their police work.[287] Police leadership has noted the inappropriateness of falsifying data. For example, in response to allegations, Los Angeles Police Department CompStat Unit Officer Jeff Godown has stated that "[m]anipulating crime statistics to reflect more favorably on the crime rate is on its face inappropriate, ethically wrong, and if allowed to be practiced, will erode the credibility of the Department."[288]

Recognizing there is inconsistency among police departments, this report is able to shed light on CompStat's national effectiveness on crime control by observing trends across multiple cities and multiple years.

Despite individual differences, another reason to look at CompStat is that its widespread use coincides with crime reduction this century. By 2006, about half of the 50 most populous cities in the U.S. were using some form of CompStat. By 2014, the number had grown to 43. (Figure 28 depicts only 41 cities because it is unclear exactly when Jacksonville, Fla. and Miami, Fla. implemented some form of CompStat. In three cities (Indianapolis, Ind., Albuquerque, N.M., and Colorado Springs, Colo.), CompStat was implemented and then removed before 2014.)

Figure 28: 50 Most Populous U.S. Cities with CompStat (1994-2014)
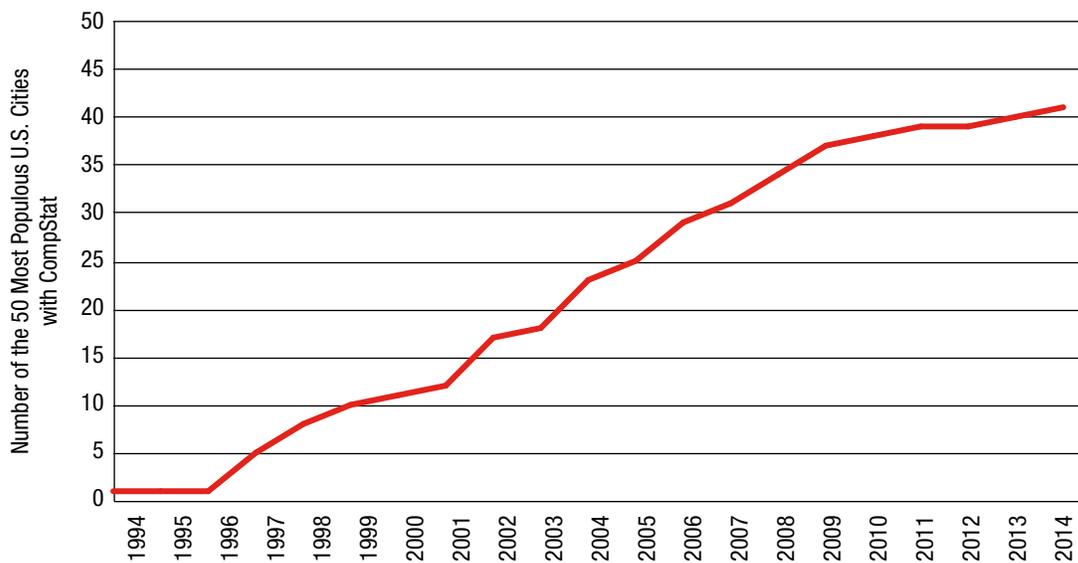
Source: Brennan Center research.[289]

There has been little empirical work on whether specific police tactics have decreased crime, particularly as nationally applied.

In the early 1990s, many crime theorists commonly believed that policing did not work to prevent or manage crime. In 1990, sociologists Michael Gottfredson and Travis Hirschi wrote that no evidence exists that the "augmentation of patrol forces or equipment, differential patrol strategies, or differential intensities of surveillance have an effect on crime rates."[290] A few years later, in 1994, criminologist David Bayley wrote in his book, *Police for the Future*: "Police do not prevent crime. This is one of the best kept secrets of modern life. Experts know it, the police know it, but the public does not know it."[291] Levitt's 2004 study was also skeptical of the effectiveness of police tactics in reducing crime, though he argued police numbers might affect crime.[292]

Recent research, however, has found that policing tactics can indeed be effective at reducing crime. One contribution to this change may be a change in policing strategies themselves. A new wave of policing strategies, grounded in data and new research, has been implemented by several police departments in recent decades. This body of research is largely experimental and focused on specific localities. The discussion below presents examples of research on the effectiveness of three specific policing strategies: "hot spots policing," community policing, and the use of CompStat.

The tactic known as hot spots policing deploys law enforcement resources to areas where crime is most likely to occur.[293] In 1995, criminologists Lawrence Sherman and David Weisburd conducted a randomized experiment and found that hot spots policing was correlated with a 6 to 13 percent drop in 911 calls reporting crimes in Minneapolis, Minnesota.[294] In 2004, a Committee to Review Research on Police Policy recommended "that the National Institute of Justice support a program of rigorous evaluation of new crime information technologies in local police agencies."[295] Criminologist Anthony Braga's 2007 analysis of various experimental studies found that hot spots policing modestly affected crime in cities, including Kansas City, Mo. and Minneapolis, Minn.[296] In 2008, Braga reviewed nine hot spots policing experimental evaluations and found that seven (Minneapolis, Minn., Jersey City, N.J., St. Louis, Mo, Kansas City, Mo., and Houston, Tex.) showed evidence of "significant" reductions in crime.[297]

Researchers have also studied community policing's effectiveness on crime. In this approach, law enforcement works together with members of the community — individuals as well as businesses, nonprofits, and other government agencies — toward its goals. It employs "problem-solving" techniques to "proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime."[298] Techniques can vary from hosting community meetings to implementing foot patrols or neighborhood watch programs.[299] In community policing, law enforcement partners with the community to address crime problems and deploys problem-solving techniques to address the underlying conditions that produce public safety issues.

In 2004, two studies, one from Sherman and Eck and one from the NAS, did not find strong evidence that community policing reduced crime.[300] However, the NAS report noted that community policing programs that employed door-to-door home visits by officers reduced levels of crime victimization in those areas.[301]

Other studies that examined components of community policing have found success in reduction of crime and fear of crime. For example, in 2010, Charis Kubrin and her coauthors defined "proactive policing," as an essential component of community policing, and studied its effect of on robbery in 181 large U.S. cities.[302] Proactive policing aims to deter crime through police presence and engaging the public.[303]

Research on the effectiveness of CompStat style programs on crime is scarce. The few empirical studies that examine CompStat consider its effect on reducing crime in specific cities. Much research has focused on New York City. In the 2011 book *The City That Became Safe*, Frank Zimring gave CompStat much credit for New York City's crime drop. Zimring, as noted in the box on "CompStat in New York City," concluded that CompStat's accountability and management techniques allowed New York City's crime to drop. However, in a 2014 study, sociologist David Greenberg argued that CompStat did not play a role in New York City's crime drop in the 1990s. Greenberg graphed crime trends over time, both before and after CompStat's introduction, and observed no marked change in crime trends.[304] Similarly, in 2005, Rosenfeld found no effect of CompStat on homicide rates in New York City.[305]

Criminologists Hyunseok Jang, Larry Hoover, and Hee-Jong Joo studied CompStat in Fort Worth, Texas in 2010, and found that "[a]t least 90% of the [CompStat] interventions involved target enforcement — specific offenses, at specific times, at specific locations, committed by specific offenders," and resulted in a significant decrease in property crime.[306] Criminologist Lorraine Mazerolle and her coauthors studied a CompStat-style program in Queensland, Australia. They found that crime was 25 percent lower than expected without the program and found a reduction of 3,200 crimes, especially unlawful entries.[307] These past studies offer a glimpse into how CompStat could affect crime in specific cities, yet their findings are limited and cannot necessarily be applied to the national level.

Other research on CompStat-style programs has focused on observing how it spread as a national trend.[308] Weisburd, along with others, has studied the organizational change created by implementation of CompStat in police departments.[309] A 2013 report from the U.S. Department of Justice and PERF describing the evolution of CompStat advocated for its continued adoption based largely on the positive experiences of police as reported in survey data.[310] An article published by the International Association of Chiefs of Police stated that CompStat is associated with "the positive outcome of recurring incremental reductions in crime."[311]

CompStat in New York City

Nowhere is the effect of CompStat on crime more frequently discussed than in New York City.

The late Jack Maple, then a lieutenant in the New York City Transit Police, first implemented the initial principles behind CompStat in the late 1980s. Maple tracked crimes on 55 feet of maps taped to a wall and called them "Charts of the Future." He used the charts to deploy transit police to target areas, and root out crime patterns in the subways. Within a few years, gang robberies on the subways fell from 1,200 per year to 12.[312]

When William Bratton became former Mayor Rudolph Giuliani's first Police Commissioner, he appointed Maple Deputy Commissioner. The two set out to disprove the notion that the police have little control over crime and disorder. In 1994, they created and implemented CompStat with the goal of reducing crime by 10 percent in its first year. Crime dropped 12 percent in that first year.[313] The NYPD created specific plans advancing key objectives: removing guns from New York City's streets, reclaiming public spaces, reducing youth violence, curbing drug dealing, and breaking the cycle of domestic violence. Each goal contained specific, measurable targets. Bratton followed the directives of management experts and used what some have referred to as a "textbook" approach to reorganize the department.[314]

New York's version of CompStat was influential nationally. Some describe the post-CompStat NYPD as "a decentralized organization granting significant autonomy to local commands while maintaining vigorous strategic guidance from the top."[315] A study by the Police Foundation found that an overwhelming number of police departments that observed a CompStat meeting or department did so at the NYPD.[316] New York's experience resulted in policies and practices that embedded CompStat into the fabric of police management.

Some researchers credit much of the crime decline in New York to CompStat. They reason that CompStat's tactical planning and accountability system established a uniform vision, shared from police executives down to line officers, on how to best combat crime. They also point to the steeper drop in crime in New York compared to the national average. Between 1994 and 2012, there was a 63 percent decrease in crime reported to the police in New York City. Nationwide reported crime fell 27.2 percent during the same period.[317] Zimring posited that no other explanation exists for the city's remarkable drop in crime. His research notes that after changes in policing tactics in the 1990s "CompStat information and planning systems pervade all of the strategic changes in the NYPD," and are now "an indivisible part of everything the department does."[318] Zimring argues that CompStat's transforming effect created a "centralized and top down" management structure, "to create a more direct linkage from the top command down."[319] As one example of a shift, he points to how, under CompStat, officers could identify when and where crimes were occurring and together with "[n]ew levels of manpower [that] came into the department with new levels of aggressiveness and new enforcement priorities…the new information and management systems coordinated these efforts."[320]

Other researchers and academics doubt the direct correlation between New York City's implementation of CompStat and the crime decline. As stated previously, Greenberg's 2013 analysis argued that violent and property crime did not significantly decrease after the implementation of CompStat. Both types of crime continued on a consistent downward slope in the city beginning in the early 1990s — before CompStat's implementation.[321]

Some have argued that CompStat has been associated with the practice of stop-and-frisk.[322] For example, some NYPD officers report they were pressured to meet quotas that could have been correlated back to CompStat programs.[323] However, as New York City Mayor Bill de Blasio recently noted, CompStat could be used to counter the overuse of stop-and-frisk. The Mayor recently stated that CompStat meetings are an opportunity to routinely challenge commanding officers regarding the high number of stops in specific precincts.[324] Since Commissioner Bratton's return to the NYPD in 2014, the use of stop-and-frisk in New York City has been declining while the City also continued to see crime decline.[325] Bratton has encouraged the NYPD to embrace the new model of "predictive policing," which uses data streams to anticipate crime patterns and allocate police resources. In 2014, he implemented a policy to issue a summons for marijuana possession below 25 grams, in lieu of arrest.[326] The department also aims to improve the public's confidence in police. It will start by regularly conducting a survey of residents to ask about perceptions of police.[327] In the aftermath of the death of Eric Garner and the national debate on police practices, the NYPD may also undertake additional changes to improve police community relations.

Because of its unique and original application, the New York City experience with CompStat may be an outlier.[328] It is especially difficult to compare New York City's use of CompStat with that of other jurisdictions because the NYPD is the nation's largest, and one of the most well-funded and visible, police departments.[329] Because of these differences, New York City's use of CompStat could have affected crime differently than the national average quantified in this report's findings.

This report undertakes the first national city-level empirical analysis of the effect of CompStat on reducing crime.

This report's analysis examines monthly crime rate data at the city-level for the 50 most populous cities where CompStat was implemented in the U.S. from 1990 to 2012.[330] Monthly city-level crime data were unavailable for 2013 at time of publication of this report and therefore could not be included.

To identify when and where CompStat was implemented, the authors conducted extensive research to determine whether cities self-identified as using CompStat or a comparable program. The authors then verified the information with national police leaders listed as Expert Reviewers, as well as through phone calls to each police department.

Table 6 also provides data on crime the year before and after the introduction of the CompStat program. Clearly, CompStat was not the only factor affecting the crime decline during these years, but these data provide one point of reference. In sum:

- 42 cities were included in the regression:
  - 39 cities implemented CompStat.
  - Three cities did not implement CompStat. Notably, two cities (Seattle, Wash. and Detroit, Mich.) introduced CompStat after 2012 and are therefore included as not using CompStat during the regression period as it only runs through 2012.
- Eight cities were not included because certain elements needed to be included in a monthly regression from 1980 to 2012 were absent:
  - In five cities, (El Paso, Tex., Sacramento, Calif., San Jose, Calif., Jacksonville, Fl., and Miami, Fl.), CompStat was implemented but the authors were unable to identify an exact month of implementation.
  - In two cities (Indianapolis, Ind. and Albuquerque, N.M.), police departments implemented and then terminated a CompStat program within a few years, and the termination month was unknown.
  - In one city (Long Beach, Calif.) there was conflicting evidence as to whether a CompStat program was in place.

Table 6: Crime and CompStat in the 50 Most Populous Cities

City	Name	Date Introduced	Percent Change in Crime Year Before	Percent Change in Crime Year After
New York, N.Y.[331]	CompStat	04/1994	-18%	-7%
Indianapolis, Ind.[332]*	IMAP	1996-Early 2000s	n/a	n/a
Memphis, Tenn.[333]	CompStat	09/1997	-12%	-11%
El Paso, Tex.[334]*	SAC	1997	n/a	n/a
Arlington, Tex.[335]	CompStat	11/1997	1%	-7%
Las Vegas, Nev.[336]	CompStat	11/1997	2%	-13%
Minneapolis, Minn.[337]	CODEFOR	01/1998	n/a	n/a
Louisville, Ky.,[338]	CompStat	03/1998	-5%	-23%
Philadelphia, Pa.[339]	CompStat	03/1998	14%	8%
San Diego, Calif.[340]	ARJIS	04/1999	-11%	-19%
Sacramento, Calif.[341]*	CompStat	1998 or 1999	n/a	n/a
Albuquerque, N.M.[342]*	CompStat	Early 2000s-2005	n/a	n/a
Baltimore, Md.[343]	CitiStat	06/2000	n/a	8%
Raleigh, N.C.[344]	CompStat	09/2001	-5%	1%
Tucson, Ariz.[345]	TOP	05/2002	-10%	7%
Oklahoma City, Okla.[346]	Comstat	07/2002	14%	-6%
Atlanta, Ga.[347]	COBRA	07/2002	-7%	-12%
Fort Worth, Tex.[348]	CompStat	09/2002	16%	-15%
Los Angeles, Calif.[349]	CompStat	10/2002	-3%	-5%
Omaha, Neb.[350]	CompStat	07/2003	-8%	-7%
San Jose, Calif.[351]*	RCITI	2004	n/a	n/a
Nashville, Tenn.[352]	CompStat	03/2004	-4%	5%
Portland, Ore.[353]	Comstat	03/2004	-8%	5%
Virginia Beach, Va.[354]	CompStat	07/2004	-1%	1%
Dallas, Tex.[355]	CompStat	09/2004	-1%	-10%
Kansas City, Mo.[356]	CSTAR	03/2005	-4%	-10%
Cleveland, Ohio[357]	CrimeView	10/2005	5%	4%
Columbus, Ohio[358]	ColumbusStat	01/2006	4%	-1%
Denver, Colo.[359]	Core	02/2006	-27%	-12%
Fresno, Calif.[360]	Crime View	05/2006	-10%	-14%
Mesa, Ariz.[361]	CompStat	08/2006	-18%	6%
Washington, DC[362]	CapStat	01/2007	27%	-4%
Boston, Mass.[363]	CompStat	02/2007	-10%	-7%
Austin, Tex.[364]	CompStat	03/2008	-7%	23%
Charlotte, N.C.[365]	CompStat	04/2008	5%	-22%
Milwaukee, Wis.[366]	CompStat	07/2008	-3%	-8%

City	Name	Date Introduced	Percent Change in Crime Year Before	Percent Change in Crime Year After
Oakland, Calif.[367]	CompStat	01/2009	36%	-4%
Tulsa, Okla.[368]	CompStat	03/2009	3%	-9%
San Francisco, Calif.[369]	CompStat	10/2009	-3%	-23%
Colorado Springs, Colo.[370]	CompStat	12/2010-12/2011	n/a	n/a
Chicago, Ill.[371]	CompStat	07/2011	-20%	-19%
San Antonio, Tex.[372]	StrIDE	10/2011	-19%	-3%
Detroit, Mich.[373]±	CompStat	2013	n/a	n/a
Seattle, Wash.[374]±	SeaStat	2014	n/a	n/a
Jacksonville, Fla.[375]*	CRIMES	Unknown	n/a	n/a
Miami, Fla.[376]*	CompStat	Unknown	n/a	n/a
Wichita, Kan.[377]±	No CompStat	None	n/a	n/a
Houston, Tex.[378]±	No CompStat	None	n/a	n/a
Phoenix, Ariz.[379]±	No CompStat	None	n/a	n/a
Long Beach, Calif.[380]*	Unclear Whether CompStat	None	n/a	n/a

Source: Brennan Center research; Federal Bureau of Investigation, Uniform Crime Rate Reports.[381]

* Cities not included in the regression. See text for explanation.

‡ Cities included in the regression as not employing CompStat.

The authors ran a city-level regression comparing the effect of the introduction of CompStat with the crime rate in these cities as noted in the UCR. The regression includes the number of police officers in each city, but does not isolate the effect of numbers of police on the crime drop.[382] Isolating the effect of number of police versus policing strategies is a fruitful avenue for future research. Additionally, there are other factors that could influence CompStat's effect on crime, including changes in police budgets or police leadership. Research on the effect of CompStat would benefit from further exploration of these variables and others. Nevertheless, this report's findings are useful because they shed light on the national effect of CompStat-style programs on crime.

This report finds that the introduction of CompStat-style programs is responsible for a 5 to 15 percent decrease in crime in cities where the programs were implemented. Specifically, the results indicate that the introduction of CompStat-style programs is associated with a 13 percent decrease in violent crime, an 11 percent decrease in property crime, and a 13 percent decrease in homicide. The result for property crime is strongly statistically significant. The results suggest that the implementation of CompStat-style programs may have an effect on homicide and violent crime. This national effect is seen by aggregating and analyzing this cross-city, multi-year data.

Because this report aggregates effects across cities to produce a national finding, it does not provide granular findings on CompStat's effectiveness on reducing crime in any specific city. However, crime rate trends in specific cities before and after the introduction of CompStat, as shown in Figure 29, can serve as a helpful point of comparison. Undoubtedly, CompStat-style programs were not responsible for the entire crime drop in these cities. Several variables, including those described in Part I, played a role in each city's crime drop. Because the implementation of CompStat varies from city to city, CompStat's effect on crime in each city will vary somewhat from the national finding.

Figure 29: Crime Rates Before and After CompStat (1990 to 2012)

Dallas
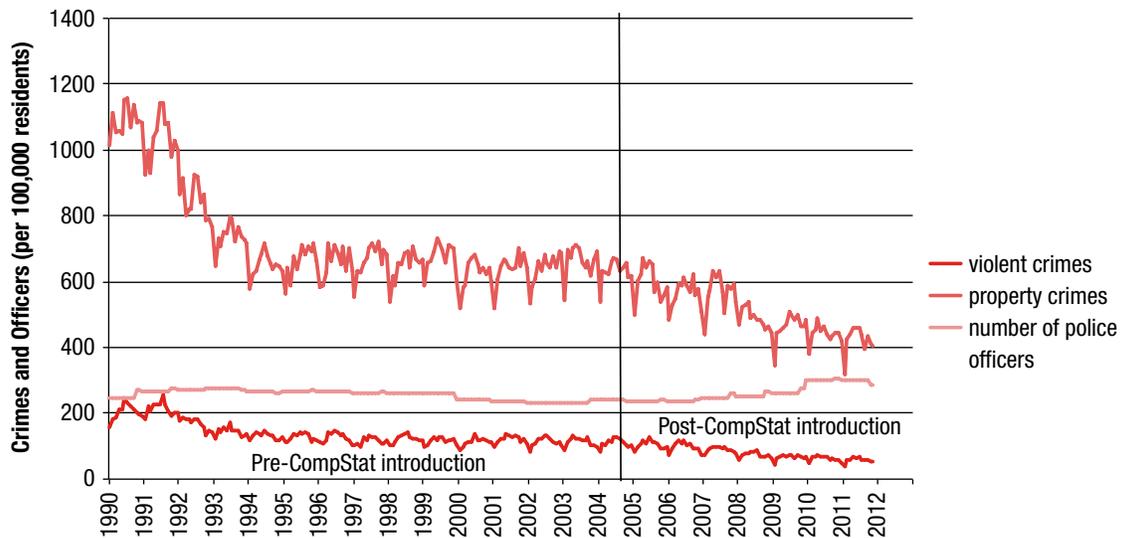
Los Angeles
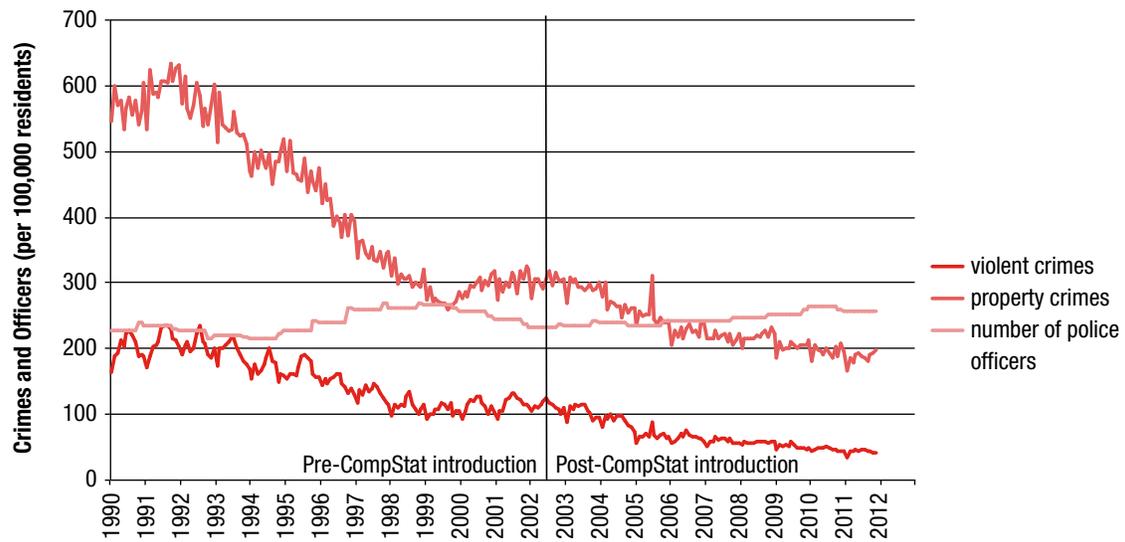
New York City
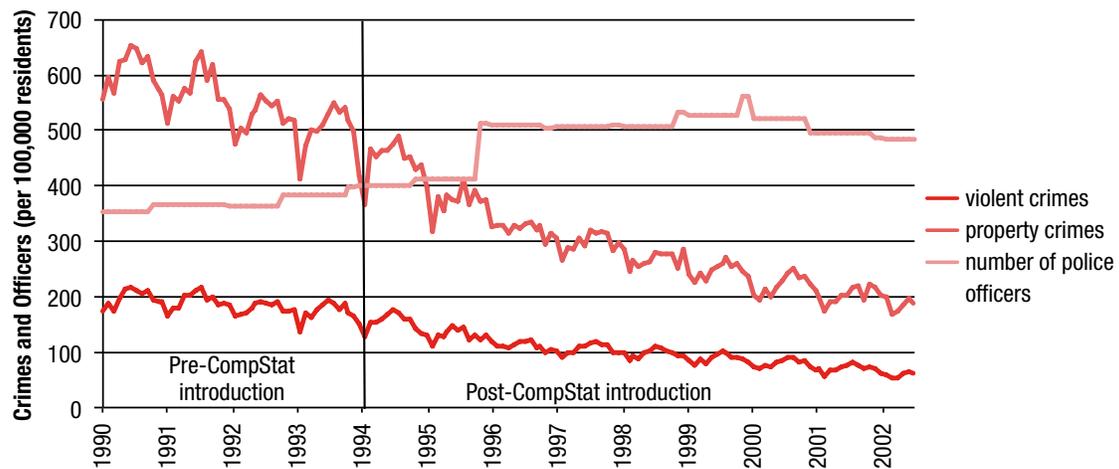
Note: In 2002, New York City changed its crime statistic reporting from monthly to quarterly.

Philadelphia
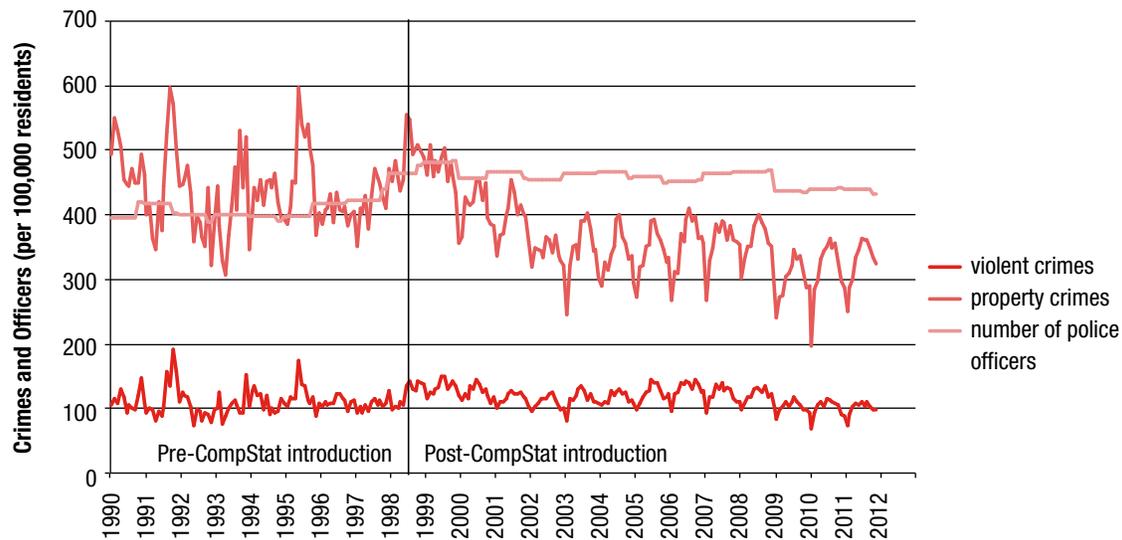
Source: FBI Uniform Crime Reports and Brennan Center research.[383]

Figure 29 reveals the following trends:

- *Dallas*: Crime dropped quickly after the introduction of CompStat in 2004. Through 2012, the city experienced a 43 percent drop in crime.
- *Los Angeles:* The number of police officers remained relatively constant from 1990 to 2012. After CompStat was introduced in 2002, property crime, which had been trending upward, began to decline. Violent crime fell throughout the two decades. Through 2012, crime dropped 63 percent overall in Los Angeles.
- *New York City:* The crime rate was falling even before CompStat's implementation in 1994. That trend accelerated after 1994. Through 2012, crime dropped 63 percent in New York City.
- *Philadelphia*: Although the number of police officers grew slightly before CompStat's introduction in March 1998, the number of police has remained relatively steady since. Property crime, which spiked immediately after CompStat was deployed, has since followed a downward trend. Overall, crime dropped 29 percent in Philadelphia through 2012. Property crime in particular dropped 32 percent during this period.

Though these results vary in degree, the introduction of CompStat in these cities seems to be associated with a subsequent reduction in crime.

CONCLUSION

Public and political pressure to effectively fight crime and improve public safety has been used to justify mass incarceration despite the economic, human, and moral toll. However, as this report finds, during the past two decades the approach of using incarceration as a one-size fits all punishment for crime has passed the point of diminishing returns to actually reduce crime.

This report demonstrates that when other variables are controlled for, increasing incarceration had a minimal effect on reducing property crime in the 1990s and no effect on violent crime. In the 2000s, increased incarceration had no effect on violent crime and accounted for less than one-hundredth of the decade's property crime drop.

This report also finds that one police management technique, CompStat, had a modest effect on reducing crime.

The criminal justice policies of the last half century have played a crucial role in feeding the explosion in incarceration as a primary method to combat crime. However, the findings in this report call lawmakers to seize the current moment for change. In a time of shrinking state and local budgets, policymakers and law enforcement officials are rethinking policies that overburden our justice system. And there are shifts elsewhere — federal lawmakers are rethinking major criminal justice policies. The path forward lies with retooling our laws and practices to advance the twin goals of keeping the public safe while retreating from mass incarceration.

In times of shrinking budgets or economic prosperity, the government should be in the business of investing in and deploying policies that achieve their intended goals. This report offers lasting support that there is a continued need to rethink policies that are bad investments: costly, harmful to society, and now proven to have diminishing effectiveness to control crime.

APPENDIX A: STATE-SPECIFIC GRAPHS ON INCARCERATION & CRIME

The state specific graphs presented below provide a deeper look at how incarceration and crime play out in states. Part I of this report contains the graphs for 11 states: California, Florida, Illinois, Louisiana, Maryland, New Jersey, New York, Ohio, Pennsylvania, Texas, and Virginia. Graphs for the remainder of states are below.

The graphs provide an approximation of the effectiveness of incarceration at reducing crime in each state. They apply this report's national findings from the state-level panel to each state's incarceration and crime rates. Specifically, the authors calculated the changes in state imprisonment and crime using UCR and BJS data, and the elasticity estimate from this report's regression analysis.[384] The authors found the percent change in state imprisonment and multiplied it by the elasticity estimate to get the estimate for the percent change in crime. Then the authors divided the estimated percent change in crime by the real change in crime to get the percent of the crime decline attributable to state imprisonment.

Alabama
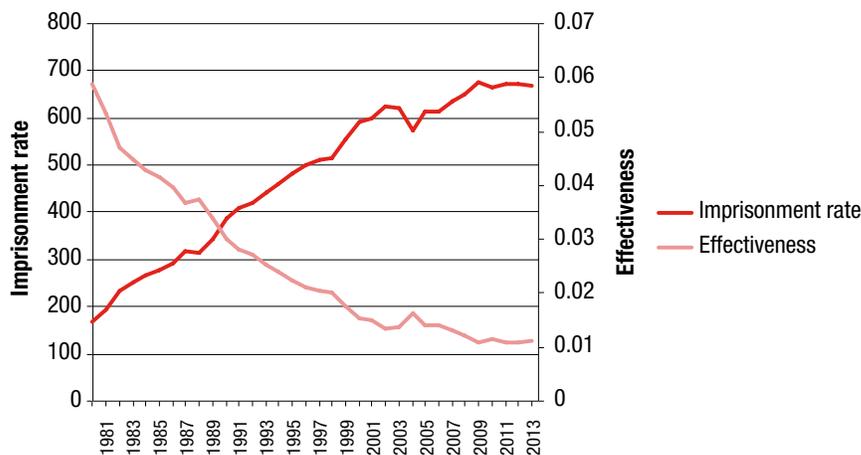
Alaska
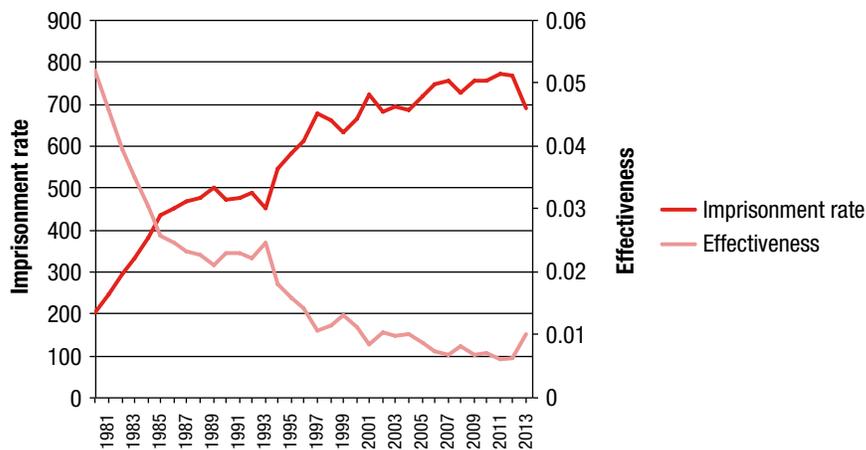
Arizona
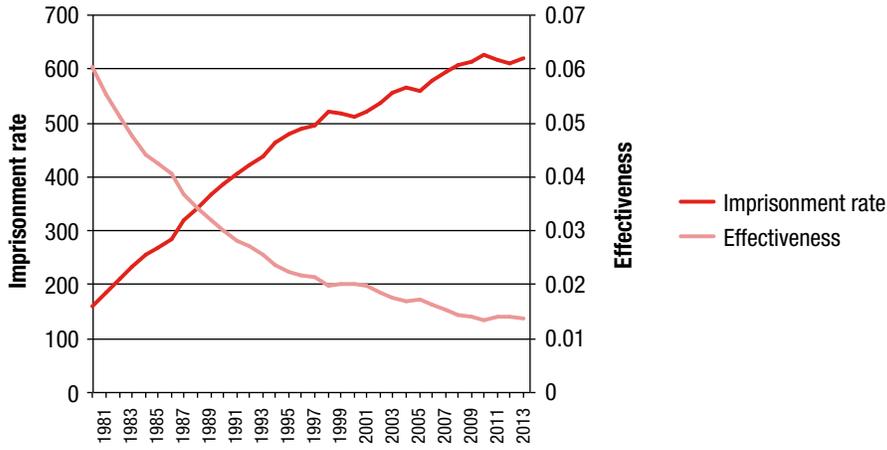
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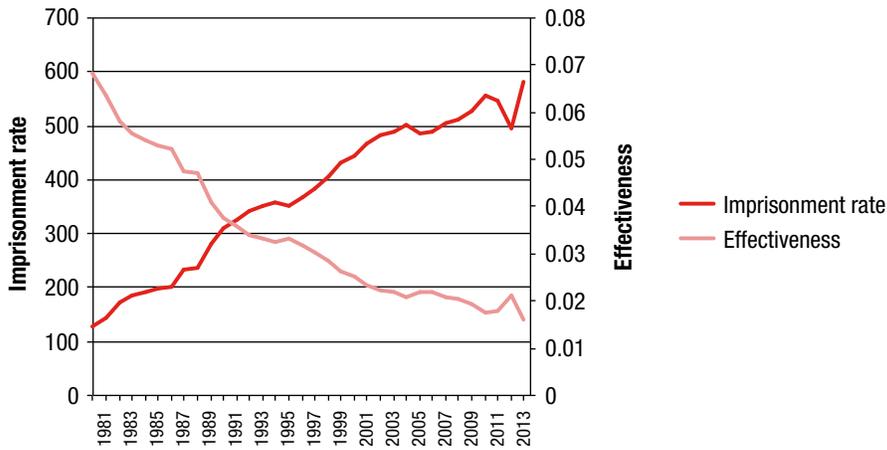
Colorado
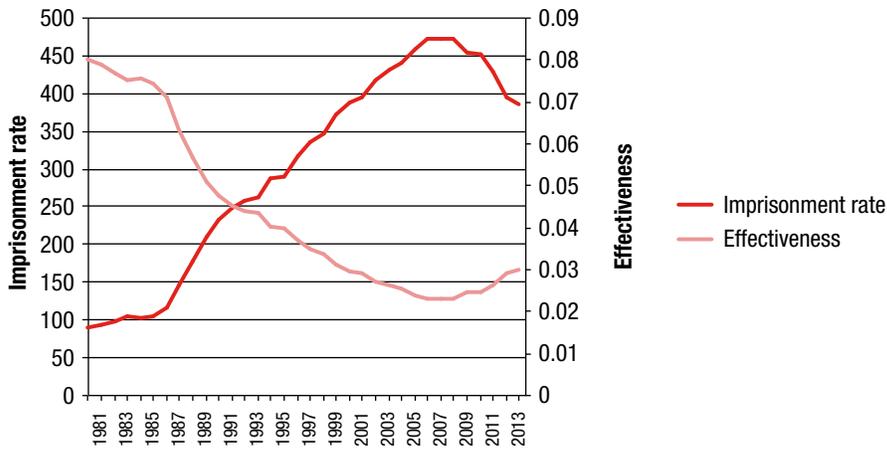
Connecticut
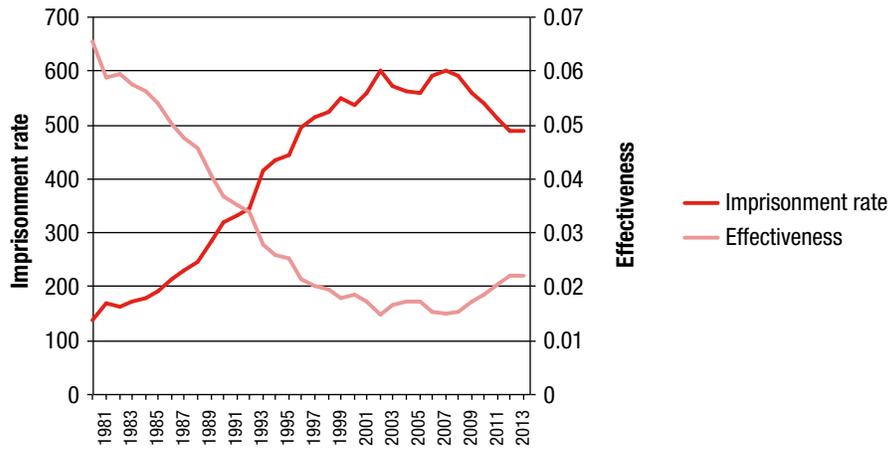
Delaware
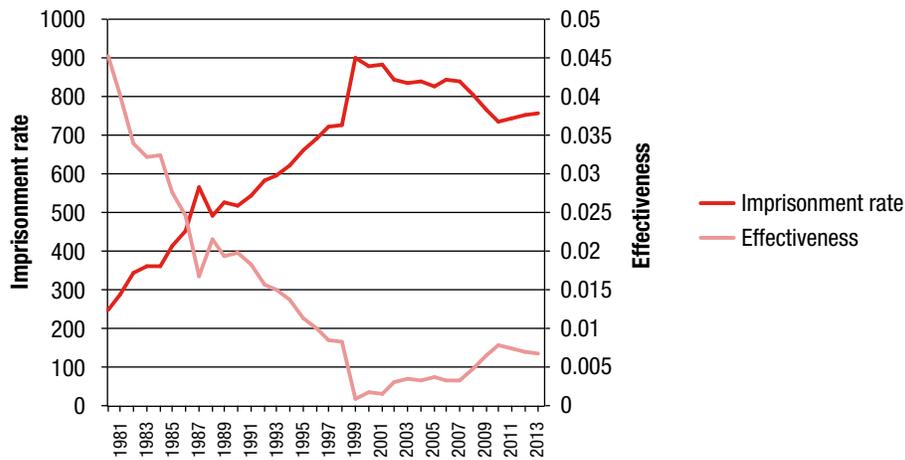
Georgia
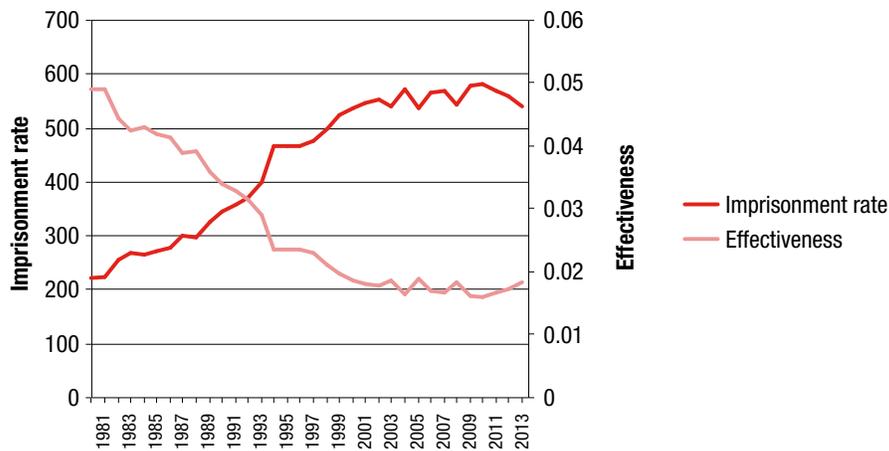
Hawaii
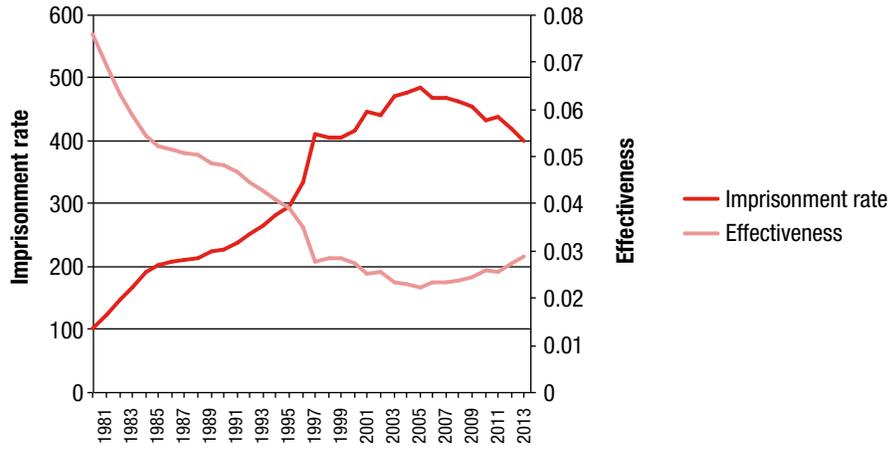
Idaho
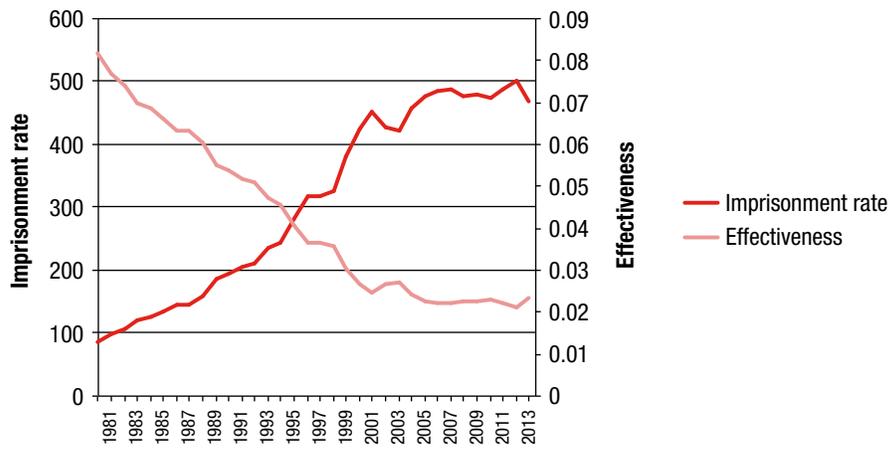
Indiana
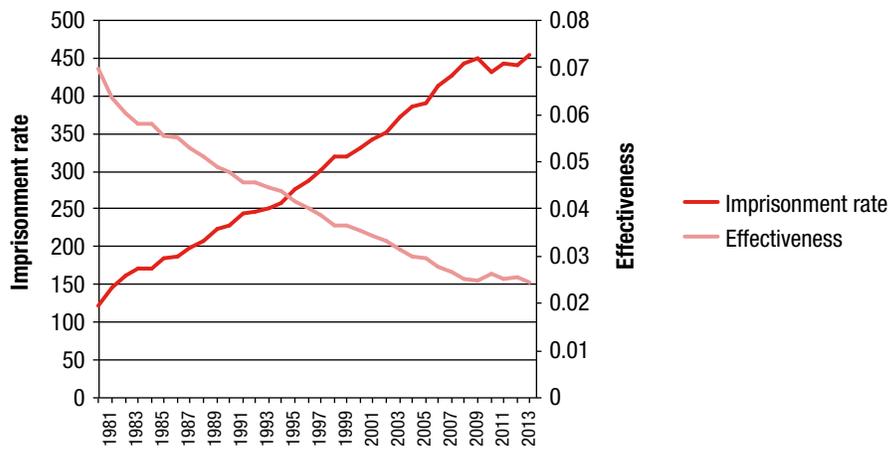
Iowa
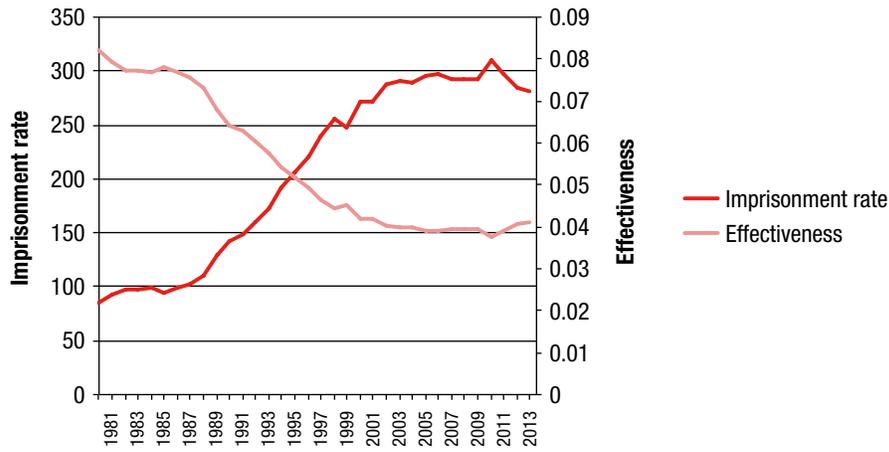
Kansas
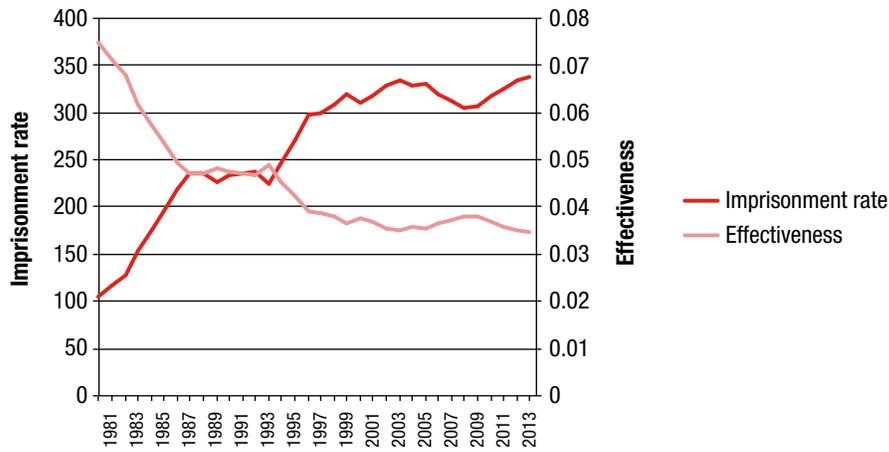
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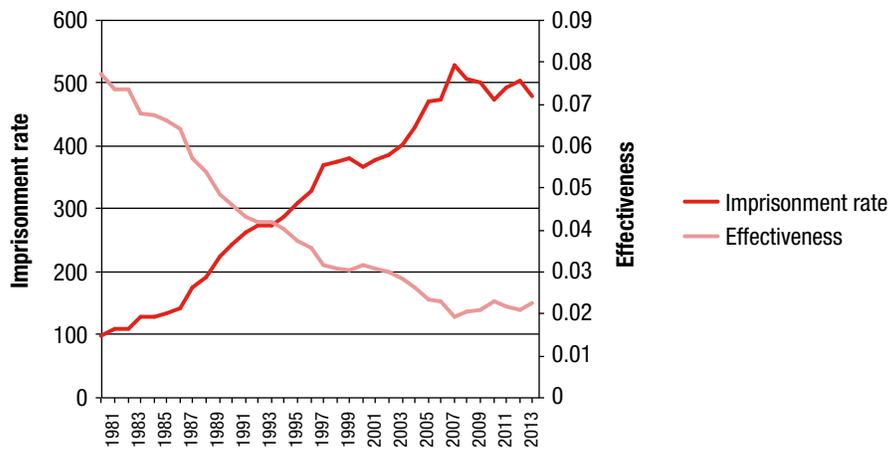
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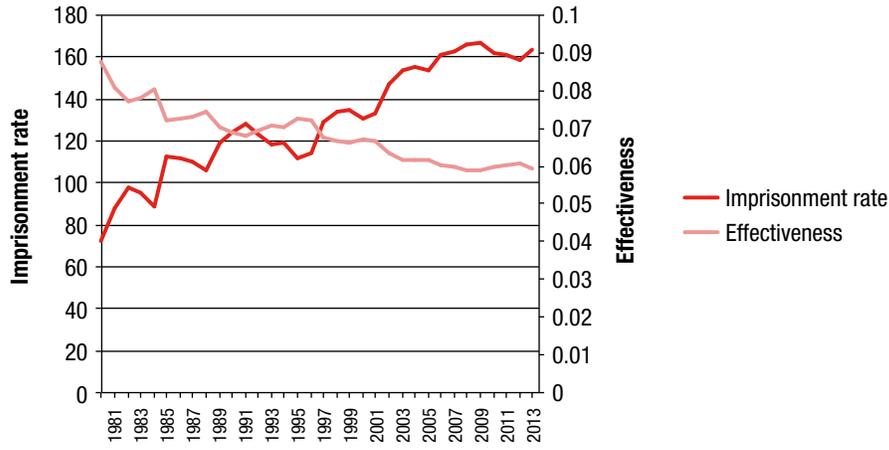
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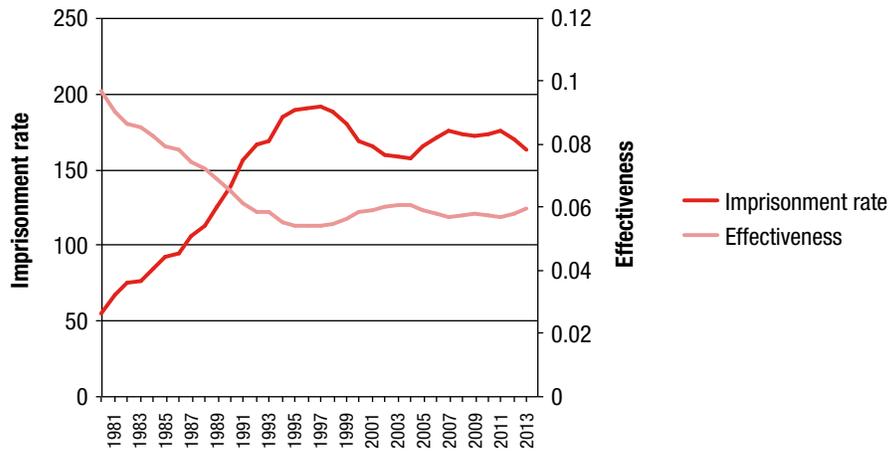
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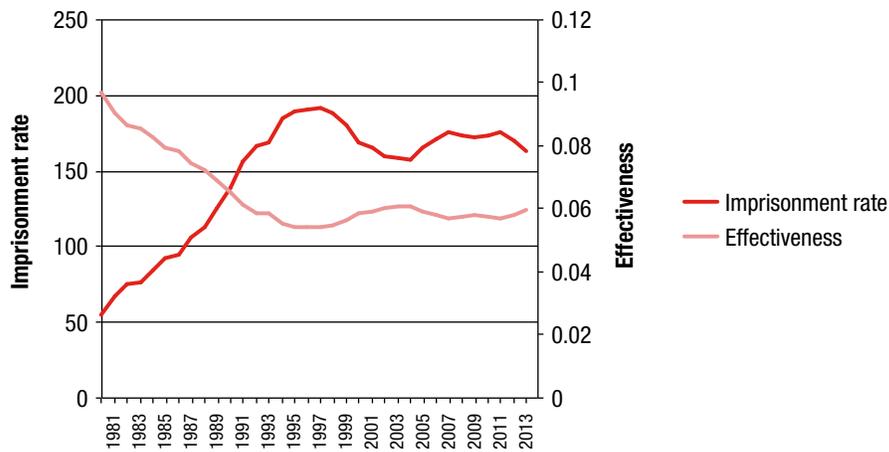
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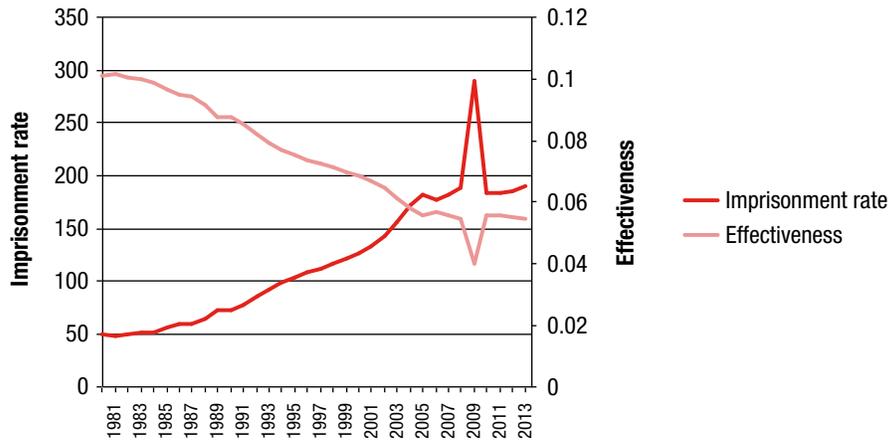
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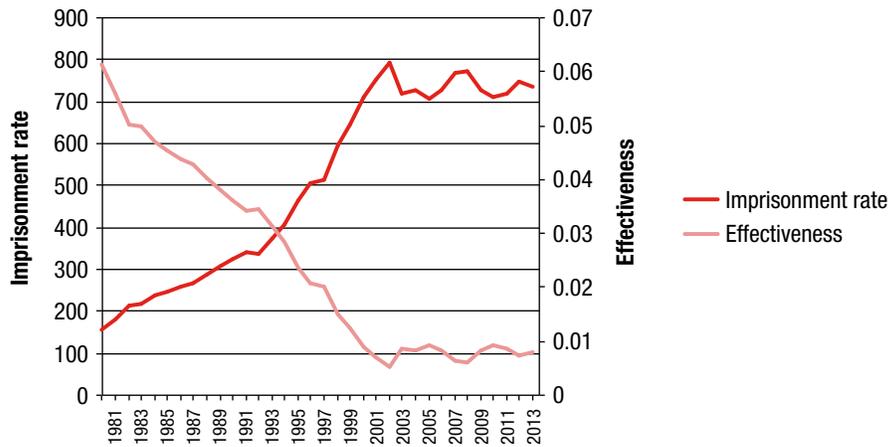
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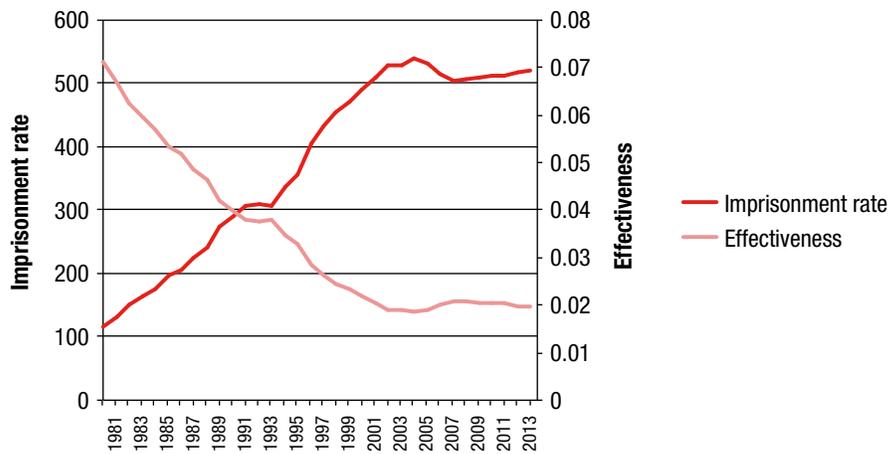
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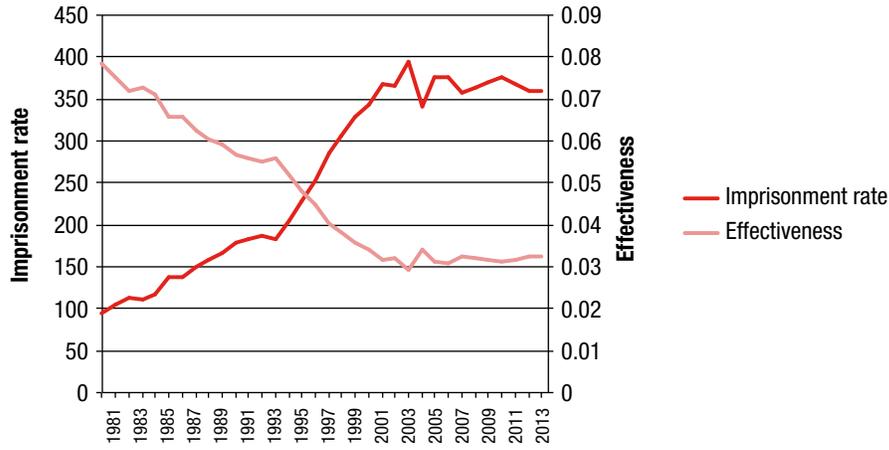
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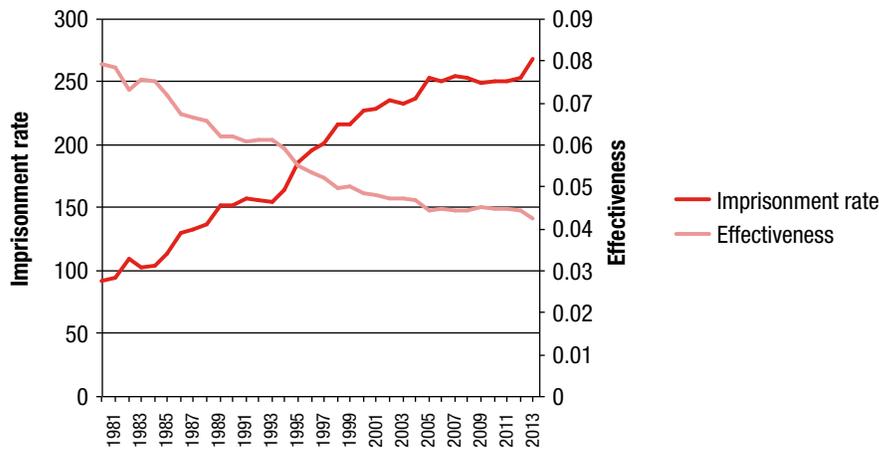
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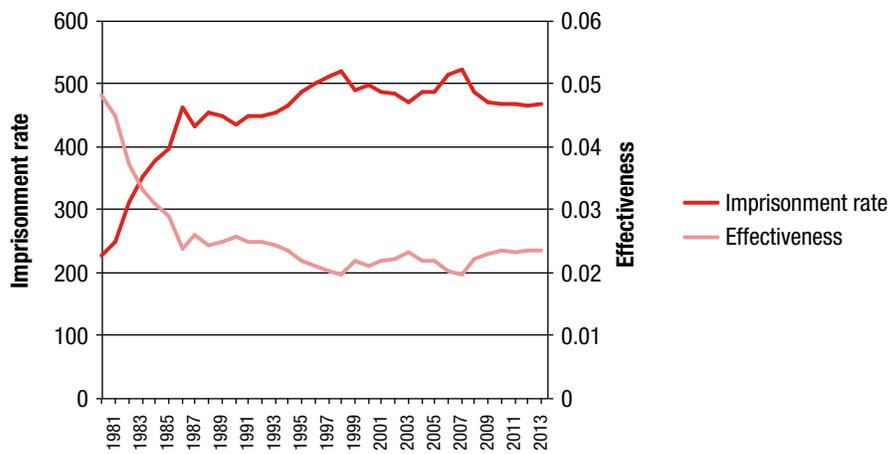
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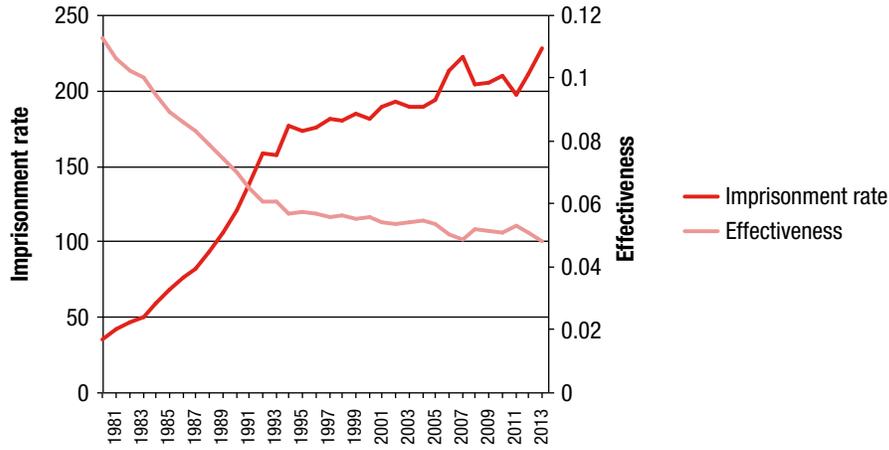
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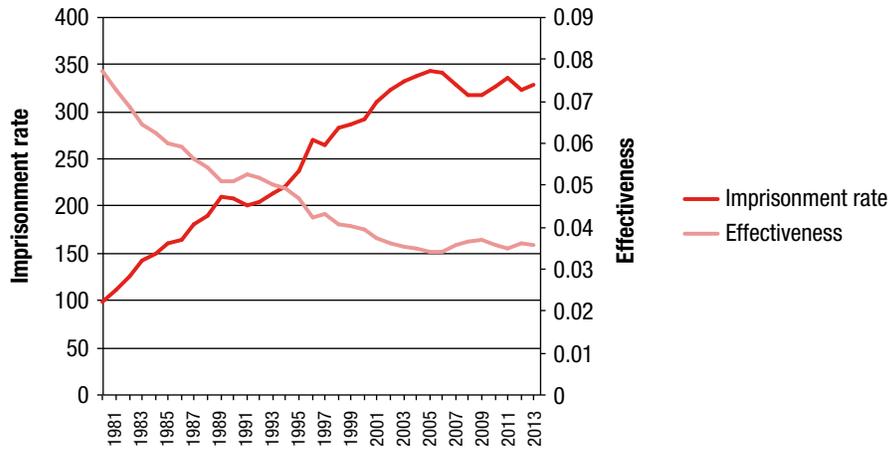
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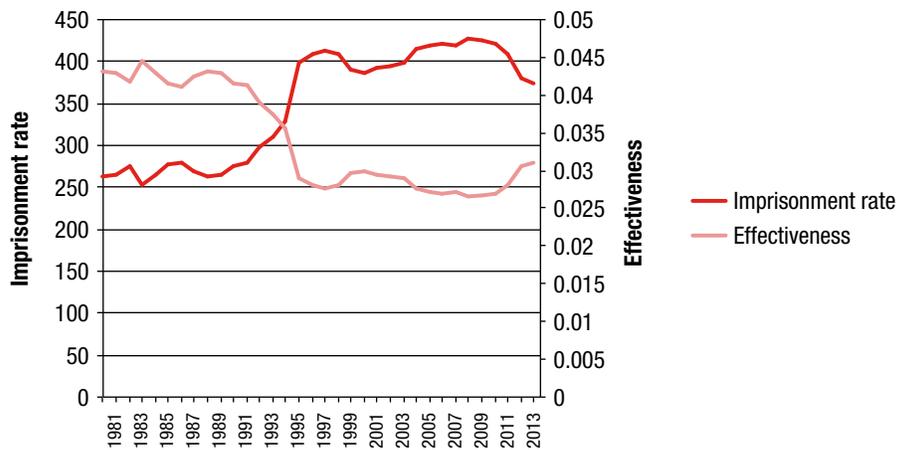
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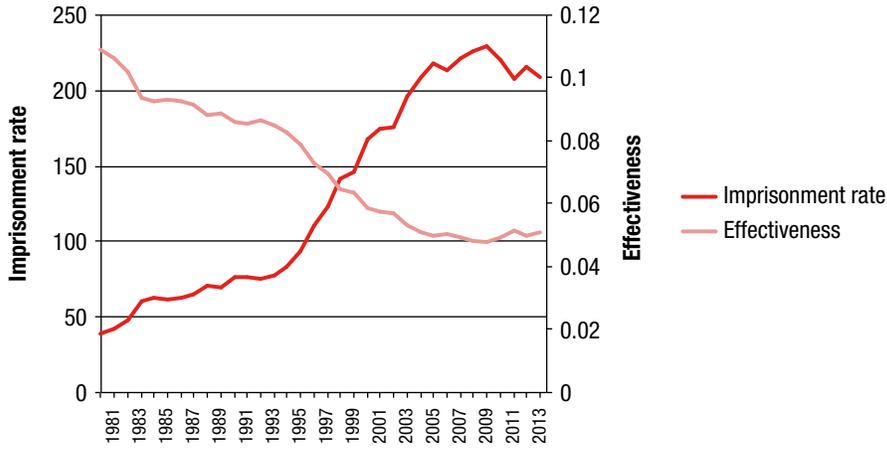
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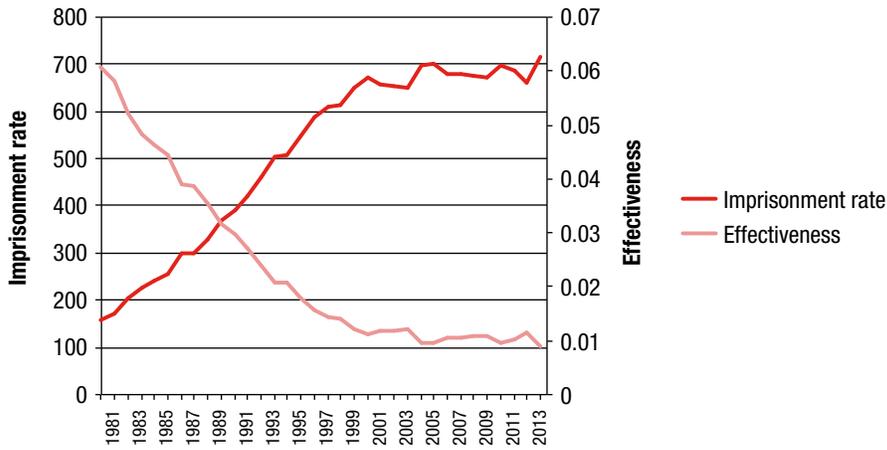
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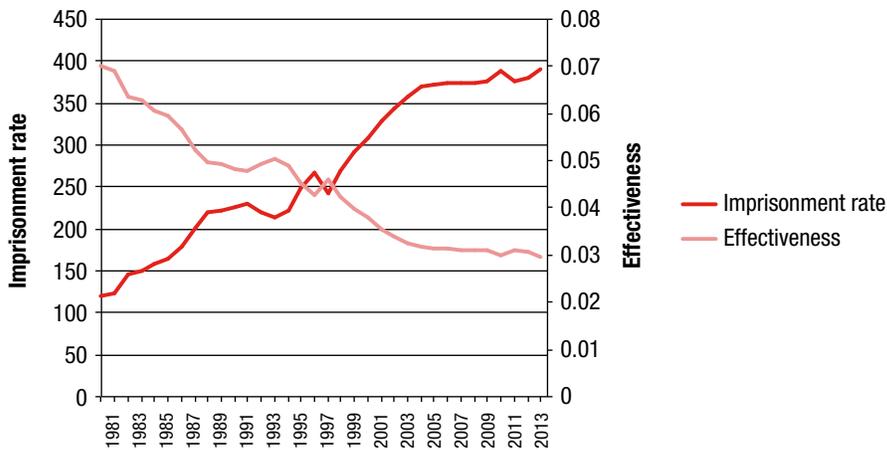
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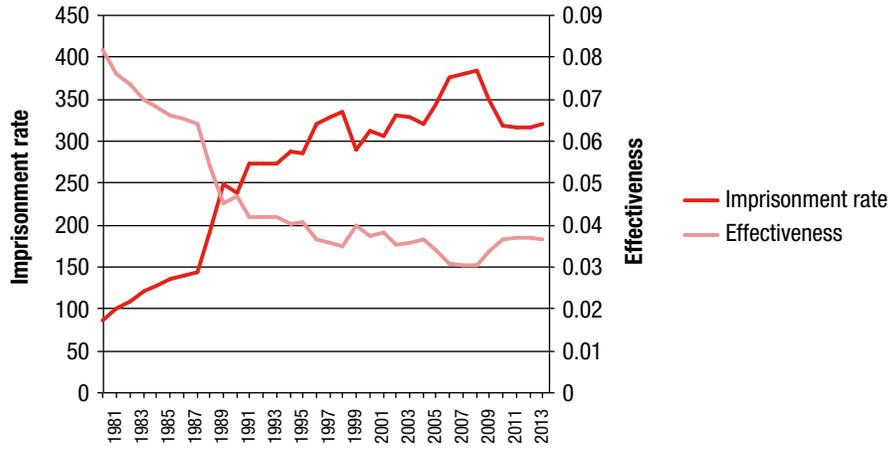
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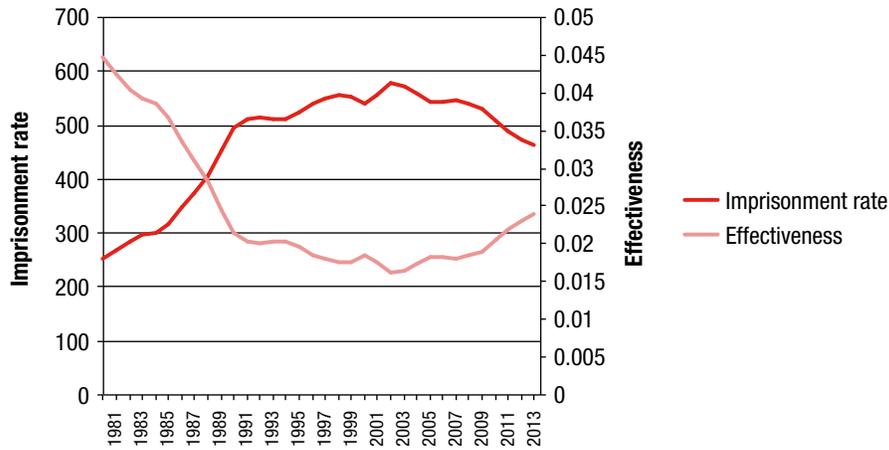
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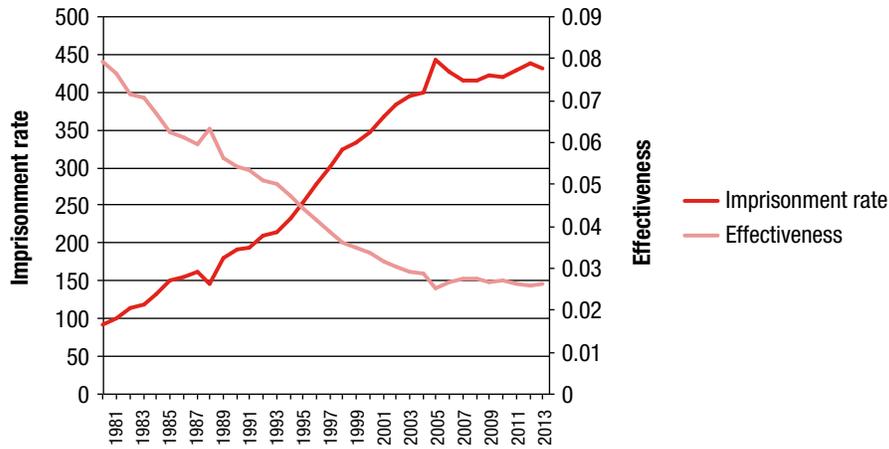
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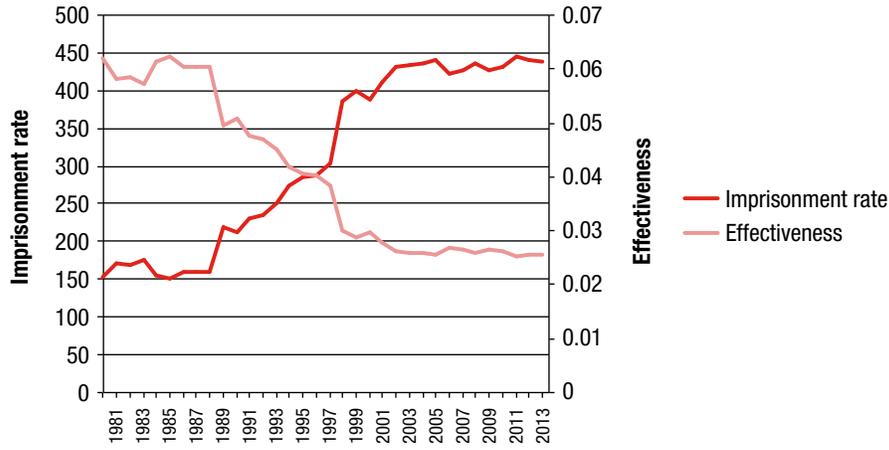
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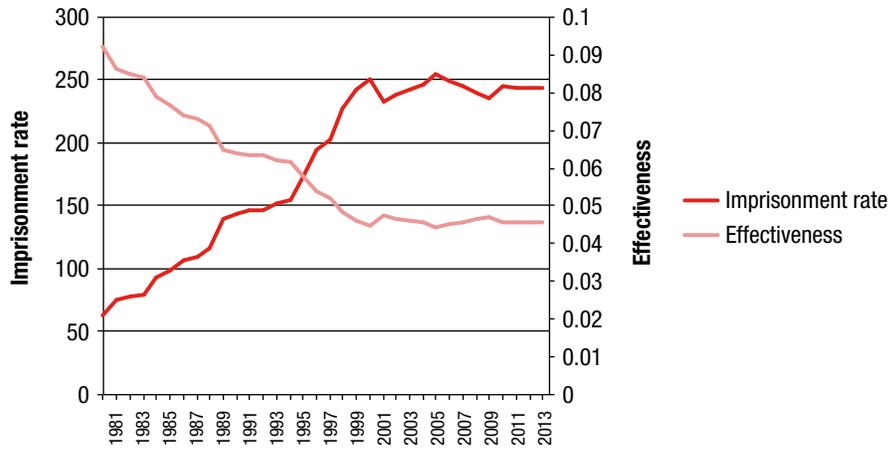
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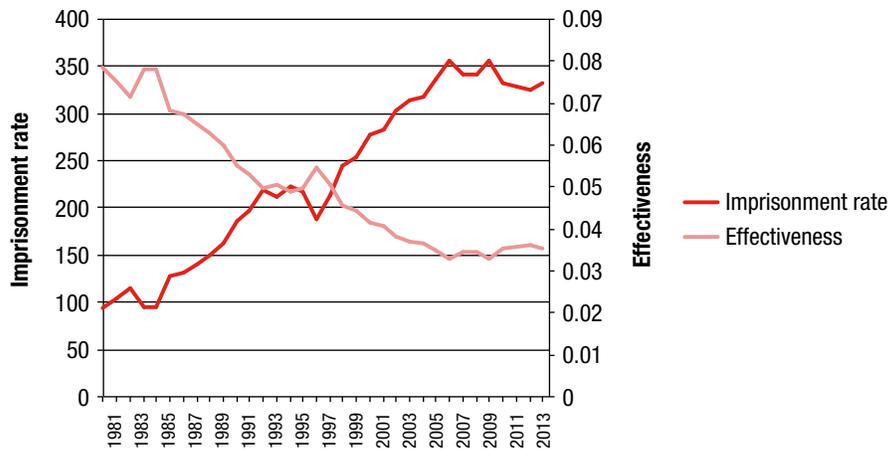
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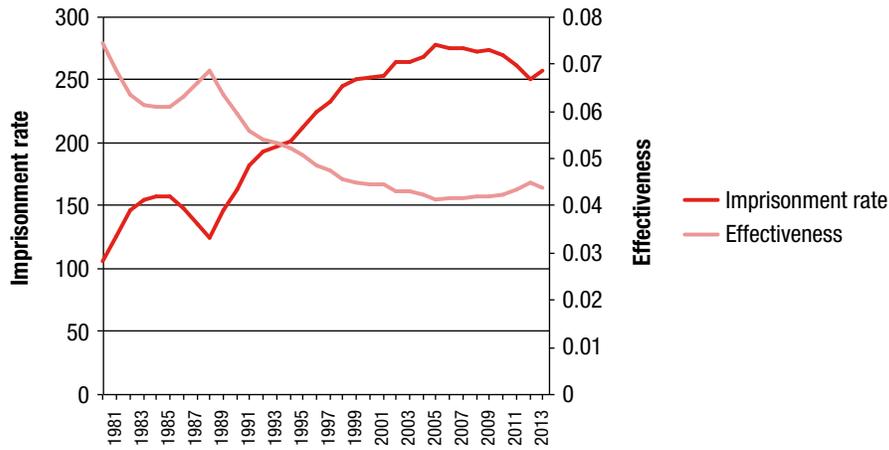
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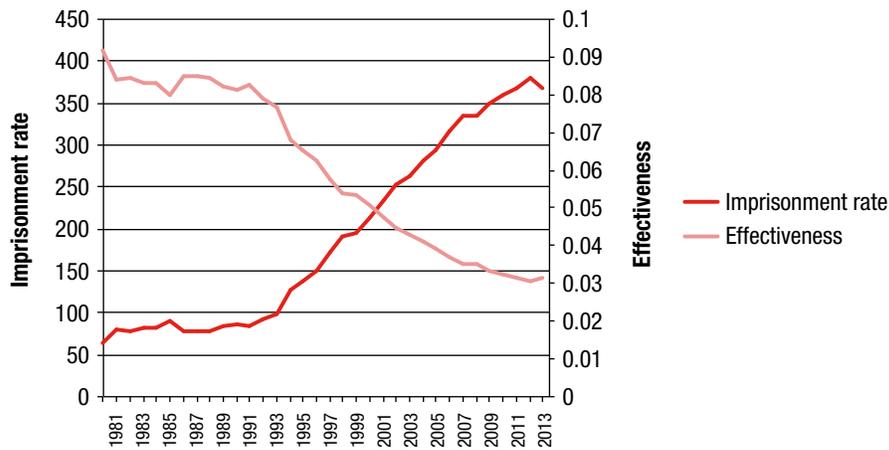
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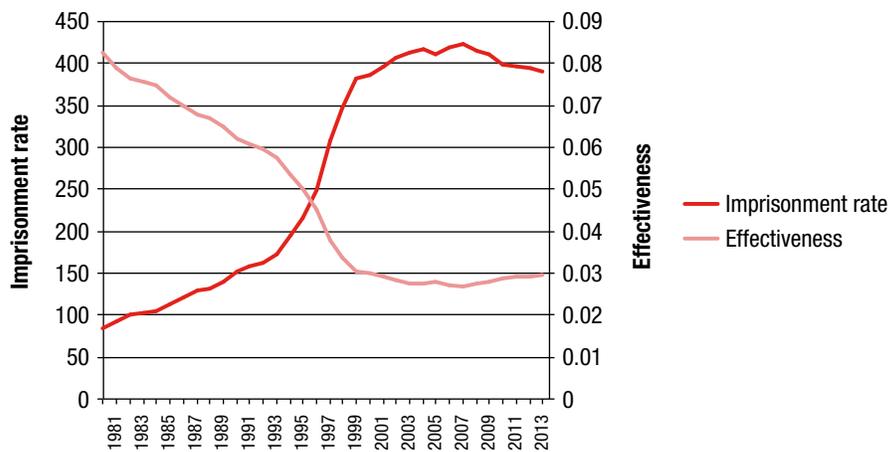
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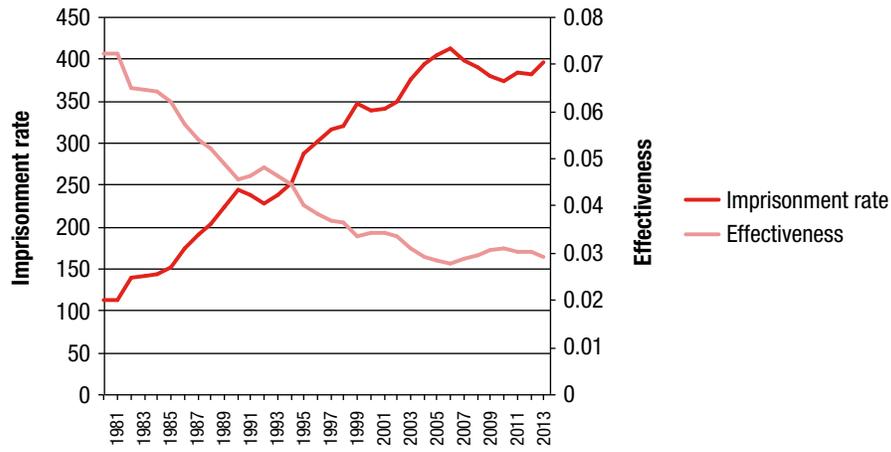
APPENDIX B: EXPANDED METHODOLOGY, DATA SOURCES & RESULTS TABLES

Appendix B provides the data sources and regression analysis explanation for the state-level analysis in Part I and the city-level analysis in Part II. It discusses the data used and the regression used for each Part.

I.   STATE-LEVEL ANALYSIS

This section explains the methodology for Part I of the report.

The regressions were run using the software program Stata, using a population averaged panel data regression with fixed effects. The data structure for the state-level analysis is a panel dataset. Panel data are comprised of repeated observations (one per year, in this case) for a set of entities (the 50 states and D.C.). The panel data structure is desirable because it allows us to observe variation over time (from 1980 to 2013) and across states. The state-level dataset contains over 1,600 yearly observations over 34 years (1980-2013) for a wide range of crime-relevant variables. In total, the dataset has over 115,000 entries. The analysis examined the effects of these variables on the crime decline as a whole, as well as on violent crime and property crime specifically. Variables related to criminal justice policy (e.g. incarceration, police numbers, executions) were lagged one year as noted below. (Lagging allows us to consider the effect of a variable in year zero on crime in year one. For example, it would allow us to see the effect of increased police officers in 1979 on crime in 1980. This helps mitigate any "simultaneity effect." For example, it would help us isolate the effect of increased police officers on crime from the effect of crime on increased police officers.) Although the regression analysis includes the 1980s, the discussion in this report considers only the 1990s and 2000s decades. It also separated out effects by decade: 1990 to 1999 ("the 1990s") and 2000 to 2013 ("the 2000s") to expose more nuanced effects given the different demographic, economic, and policy trends in each decade.

The authors set out to examine the effect of the most popular theories on the crime decline. Thirteen were identified: incarceration, police numbers, use of capital punishment, decline of crack use, right-to-carry gun laws, unemployment, income, inflation, consumer confidence, legalization of abortion, decreased lead in gasoline, alcohol consumption, and the aging population. However, as noted below, data in the form needed to be included in the regression (state-by-state for all the years from 1980 to 2013) could not be secured for all the variables. Therefore, the state-panel regression included the following variables: lagged log of incarceration (yearend jurisdictional imprisonment population per capita), lagged log of incarceration squared, lagged executions, lagged log of police employment per capita, percent unemployment, median income, beer consumption per capita, right-to-carry law, percent of the population that was black, age distribution (percent of that population that was aged 15-19, 20-24, and 25-30), and state and year "fixed effects" (which account for extraneous factors). As noted below, data were collected from a wide variety of sources. Most of the sources were federal government departments' websites.

This section explains the caveats present for each variable and data source.

A.   Data Sources

Data on Crime

The crime data can be included as total crime, violent crime, property crime, or any specific crime reported in the FBI's Uniform Crime Reports (UCR), such as homicide or burglary.

This report uses crime data from the UCR and primarily considers the overall crime rate, as well as homicide, violent crime, and property crime rates.[385] The UCR was established in 1929 and collects information on the number of reported crimes from state and local law authorities to construct a count of crime nationwide. It is the main source for nationwide crime statistics. The UCR's two primary measures of crime are calculated from seven Part I offenses in two categories — "violent crime" and "property crime." Primary data at both city and state levels was used to analyze the effect on crime, as recorded by the UCR.

The UCR's violent crime definition includes murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault.[386] These crimes are defined as:

- *Murder and Non-negligent Manslaughter.* Includes murder and non-negligent manslaughter. It does not include traffic fatalities or justifiable homicides, which are defined as "(1) the killing of a felon by a law enforcement officer in the line of duty; or (2) the killing of a felon, during the commission of a felony, by a private citizen."
- *Forcible Rape.* Until 2013, forcible rape was defined as "the carnal knowledge of a female forcibly and against her will." The revised definition now redirects the focus to consent and includes assaults on men and transgender individuals, defining rape as "[p]enetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim." Statutory rape is not included.
- *Robbery.* "The taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear."
- *Aggravated assault.* An "unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury…(and) usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm."

The UCR's property crimes include burglary, larceny-theft, and motor vehicle theft. These crimes are defined as:

- *Burglary.* Defined as breaking or entering: the unlawful entry (or attempt to forcibly enter) a structure "to commit a felony or a theft."
- *Larceny-theft.* The unlawful attempt (successful or not) to take, carry, lead, or ride away of property from the "possession or constructive possession" of another, such as bicycle thefts, shoplifting, pickpocketing, anything not taken by force, violence, fraud, embezzlement, or forgery.
- *Motor vehicle theft.* The theft or attempted theft of a motor vehicle, defined as self-propelled and runs on land surface and not on rails.

This report, therefore, does not consider rates of various other crimes, such as drug use offenses or white-collar crimes.

As with any data collection system, there are recognized shortcomings of the UCR. For instance, the UCR relies on police departments to self-report their crime statistics monthly.[387] Rape, for example, is highly underreported in the UCR because it depends in part on victims to report the crime's occurrence. Other crimes are also underreported and therefore underrepresented in UCR statistics. The definitions in the UCR can also create under-collection of crime data. The previous federal definition of rape might also have caused the crime to be underreported as it narrows the instances that are classified as rape.[388] The UCR also does not include crimes reported to the federal government, immigration offenses, crimes committed in prisons on prisoners, or killings by police officers.[389] Some have also argued that law enforcement can manipulate UCR statistics.[390]

The National Crime Victimization Survey (NCVS), started in 1973, is an alternative form of crime data that can be useful, specifically for research about sexual assault, because it takes information directly from constituents and can capture more than just what was reported to the police.[391] The NCVS collects information on the number of crimes by surveying households, thereby indirectly estimating crime occurrence. It collects information on slightly different categories of crime than the UCR (for example, the NCVS does not collect data on homicide). Although the NCVS may be more effective in capturing crimes less likely to be reported to police, it too suffers from accuracy challenges as it is based on a survey of a sample of households.

NCVS is national survey and does not include state-by-state data. It therefore could not be included in the authors' state-by-state regression. Further, because the UCR is the current best cited source of national crime statistics — as well as the source on which the crime decline is based — the authors used the UCR data, recognizing that it does not perfectly capture crime.

Data on Incarceration

The data for incarceration is based on the yearend state jurisdictional imprisonment population per capita collected from the U.S. Department of Justice's Bureau of Justice Statistics (BJS) via the National Prisoner Statistics reports.[392] Data for yearend jurisdictional population per state resident population was included from 1980 to 2013 and lagged one year in the regression analysis. That is, the regression examines incarceration in one year and the crime rate the following year. This also helps mitigate any "simultaneity effect" — meaning it helps isolate the effect of incarceration on crime from the effect of crime on incarceration. This data set includes *all adult state prisoners* held in public or private prisons and jails (some state prisoners are held in local jails). It does not include the general pretrial jail population, federal population, juvenile population, or people in immigration detention. Notable, data for imprisonment in the District of Columbia was not available after 2000, when BJS began classifying D.C. prisoners as federal prisoners.[393]

Other sources of federal prison and local jail were not available in the format needed for a state level regression including data on all years from 1980 to 2013. Federal prisoners can be held in facilities in states different from the ones in which they were convicted; yearly state-by-state data on federal

prisoners from 1980 to 2013 broken down by state of origin of prisoners is not available.[394] Local jail data are not available on a state-by-state basis for all the years either. The Annual Survey of Jails (ASJ) conducted by BJS collects data from a nationally representative sample of local jails, but does not include data for 1983, 1988, 1993, 1999, or 2005. Further, the ASJ is a sample survey and is not comprehensive for all states. The Census of Jails conducted by BJS was conducted only in 1972, 1978, 1983, 1988, 1993, 1999, 2002, 2005, and 2006.[395]

For that reason, the authors used state imprisonment data (the number of state prisoners incarcerated in public or private state prisons or local jails) as a proxy for the incarceration variable.[396] As noted in Part I, the use of this data set is in line with other empirical analyses of the effect of incarceration on crime.

The exclusion of federal, jail, and juvenile data does not affect the core findings of this report. If those data were included, the rate of incarceration would be even higher than that in the authors' regression. A higher incarceration rate would show more dramatic diminishing returns on crime reduction. For this reason, the empirical findings of this report are in fact conservative compared to what accounting for all types of incarceration would produce.

Data on Number of Police Officers

Data on police officer employment were collected from the Justice Expenditure and Employment Series from BJS and the UCR.[397] The data include the number of sworn officers per resident population for the 50 states and the District of Columbia. It does not include civilian employees of police departments. The UCR contains the number of sworn officers until 2006. Data for sworn officers from 2006 to 2013 were then collected from the Justice Expenditure and Employment Series.

The data spanned from 1980 to 2013 and was lagged one year in the regression analysis. That is, the regression examines number of sworn officers in one year and the crime rate the following year. This is to mitigate any "simultaneity effect" — meaning it helps isolate the effect of police numbers on crime from the effect of crime on police numbers (in response to crime police departments usually hire more officers). Data for 1991 were unavailable; therefore, the means of the data for 1990 and 1992 were used as a proxy for 1991. Data for 1987, 1988, and 1989 was also unavailable; therefore the weighted averages of data for 1986 and 1990 were used for those years.

Looking at all sworn officers may not fully capture police presence in a neighborhood. The data set does not differentiate between sworn officers working the beat and those with administrative positions. Sworn officers could also work in administration, investigations, technical support, jail operations, or court operations.[398] Therefore, the data does not necessarily capture changes in police presence if positions shift but the number of sworn officers does not change. It also does not capture whether police presence is concentrated within states or localities.

Data on Use of Death Penalty

Data on the number of executions for the 50 states and the District of Columbia were received from BJS as part of the Capital Punishment Series.[399] Data for number of executions in each state was included from 1980 to 2013 and lagged one year in the regression analysis. That is, the regression examines executions in one year and the crime rate the following year.

The number of executions varies widely from the number of people sentenced to death in that year. In 2013, there were over 3,000 people on death row and only 39 executions. That same year there were 77 new death sentences. The 39 executions in 2013 were carried out in only nine states, and three-fourths of the executions occurred in only three states, Texas, Oklahoma, and Florida. [400]

Data on Enactment of Right-to-Carry Laws

Data for right-to-carry gun laws was included from 1980 to 2013 for each of the 50 states and the District of Columbia. It was included in what is referred to as a "dummy variable:" for each year the state had laws on the books, the variable was one; if there was no right-to-carry law in effect, it was zero. This information was gathered from a variety of sources. The authors reviewed categorization and analyses of concealed carry laws by the National Rifle Association and the Law Center to Prevent Gun Violence, and then assessed state legislative websites and investigated news articles about pending or passed legislation to determine whether states fell under restrictive or lenient categories.[401]

Laws also vary in their permissiveness or severity by state. Right-to-carry laws can fall under two broad categories: "shall issue" and "may issue." "Shall issue" laws are more lenient with the requirements for receiving a concealed carry permit. "May issue" laws are more restrictive; they require that the individual receiving the permit have a legitimate reason for needing it. Most states over the past few decades have shifted towards enacting lenient right-to-carry laws rather than restrictive ones.[402]

To account for both these categories, this report constructs two variables:

- The "any right-to-carry law" variable captures all states with laws that give *any* individuals the right to carry, whether to a select few (i.e. restrictive laws or "may issue laws") or to many people (i.e. lenient laws or "shall issue laws"). It includes states that allow concealed carry permits for *at least some* (thus possibly even more than just "some") members of the population. In other words, it is states that have a "shall issue" law, which allows permits for almost any gun owner, *and* states that have a "may issue" law, which allows permits for only some. The states that have no right-to-carry laws at all would take the value of zero in the construction of this variable.
- The "lenient right-to-carry law" variable includes only states with lenient laws that make it especially easy to carry a gun. It includes only states that allow just about anyone to receive a permit, i.e. the states with a "shall issue" law. Any state that had no right-to-carry law or had a "may issue" law would take the value of zero in this variable.

These variables attempt to describe some of the variation in how different right-to-carry laws can affect crime although certainly cannot account for all caveats of individual laws. The analysis in this report

cannot account for individual variations in each state. The authors ran both variables through the regression and achieved essentially the same results.

Data on Alcohol Consumption

Data on alcohol consumption were collected from the National Institute on Alcohol Abuse and Alcoholism at the National Institutes of Health.[403]

This report used beer consumption to measure the effect of alcohol consumption on crime.

The amount of beer sold was chosen as the data source for alcohol consumption for several reasons. It is the most common form of alcohol consumption and generally tracks trends in overall alcohol consumption. It is also a common method through which social scientists examine this variable; using the same measure allows for comparison of results. Scholars have also found connections between beer consumption in particular and crime.[404] Furthermore, trends in total alcohol consumption did not vary greatly from trends in beer consumption only.

Beer consumption was measured in gallons of ethanol consumed annually per capita, for each of the 50 states and the District of Columbia, from 1980 to 2012. The number of gallons of ethanol in the form of beer sold in each state was reported from the states by the Alcohol Epidemiologic Data System at the National Institute on Alcohol Abuse and Alcoholism and from the beverage industry.[405] Per capita alcohol consumption in gallons of ethanol for each state was then calculated using U.S. Census data and intercensal estimates (for years between censuses) for the population ages 14 and up. The effect of alcohol consumption is calculated holding fixed the other control variables in the regression, including age, so each variable's effect on crime is isolated.

Data for 2013 were not available at the time of publication. Given the relative stability of beer consumption over the past several years, the authors used 2012 data a proxy for 2013 data. The authors projected alcohol data for 2013 in order to run their regression on the 2013 data for all other variables. This decision was vetted by empirical experts. Given the relative stability of alcohol consumption, it is unlikely this estimation affected this report's findings.

Data on Aging Population

Data regarding age distribution were collected from the U.S. Census. These data can be accessed through the U.S. Census Bureau for 1980 to 1990 and from the Missouri Census Data Center from 1991-2013.[406] The U.S. Census Bureau collects population data every ten years. Additionally, it uses statistically methods to estimate populations in non-census years.

To include the effect of age distribution, age was included as three control variables, each representing the percent of the resident population that was between the ages of 15 to 19, 20 to 24, and 25 to 30. Data for percent of the resident population in each age group in each of the 50 states and the District of Columbia was included from 1980 to 2013 in the regression analysis.

Data on Income

Nominal per capita income data were collected from the Bureau of Economic Analysis and accessed via the Federal Reserve Economic Data.[407] Data included in the regression analysis for income was the median annual income per capita, for each of the 50 states and the District of Columbia, from 1980 to 2013.

Data on Unemployment

State unemployment rates were collected from the Bureau of Labor Statistics and accessed via the Federal Reserve Economic Data.[408] Data for the percent of the residential population that was unemployed and looking for work, in each year, 1980 to 2013, for each of the 50 states and the District of Columbia, were included in the regression analysis.

Unemployment is defined as individuals who currently do not have a job but are actively seeking one. This means that it does not include individuals without jobs, but that are *not* looking for one. Therefore, the actual number of individuals without jobs is higher than the unemployment rate suggests.

Data on Race

Data on race were collected from the U.S. Census Bureau.[409] The control variable included in the regression analysis was the percent of the residential population that identified as black, in each year, for each of the 50 states and the District of Columbia, from 1980 to 2013.

Attempt to Secure Data for Other Variables

Data for the following variables was not available on an annual basis for all states from 1980 to 2013 and therefore could not be run through the state-level multivariable regression. The authors therefore relied on the body of past research to provide a summary of the effect of each variable on crime.

- **Inflation**. The authors could not secure state-by-state data for any years for inflation from the U.S. Bureau of Labor Statistics. Data for inflation is generally calculated as the percentage change in the Consumer Price Index (CPI), as collected by the Bureau of Labor Statistics. The data are available annually at a national level for the period studied but not at an individual state level. The data are grouped into regions (northeast, south, west, and midwest) but still cannot be run through a state-by-state level regression.[410]
- **Consumer Confidence.** The authors could not secure state-by-state data for any years for consumer confidence. Consumer confidence is a measure conducted from surveys of individuals about how they feel about the state of the American economy. A higher number signals more confidence. In contrast to other economic variables, it measures the psychological and sociological perceptions of the health of the economy — which could be a greater predictor of how the economy affects individual propensity to commit crimes than the actual health of the economy. The Consumer Sentiment Index is collected by Thomson Reuters and the University of Michigan. Like inflation, data on consumer confidence are available annually but not at the

state-level, and is available for the same four regions of the U.S.[411] It therefore could not be included in the authors' state-level regression.

- **Waning Crack Use.** The authors could not secure state-by-state data for any years for crack cocaine use. The National Survey on Drug Use and Health (NSDUH) conducts an annual survey which collects data starting in 1990. Data from 1979, 1982, 1985, 1998, and 1990 to 2001 is available from the National Household Survey on Drug Abuse (NHSDA), and data from 2002 to 2012 is available from NSDUH directly. . Because crack cocaine only became prevalent in the mid-1980s, data did not start to be collected until crack use was well underway.[412] Due to the lack of state-by-state data and the missing years, this variable could not be included in the authors' regression.

- **Decrease of Lead in Gasoline.** The authors could not secure state-by-state data for any years for lead in gasoline. The U.S. Environmental Protection Agency collects this data on a national level. Jessica Reyes used an original dataset to conduct her study, and the authors could not recover this data from her. Data on lead in the air are available as a national average back to 1980 but not at the state-level.[413] This variable therefore could not be included in the authors' regression.

- **Legalization of Abortion.** The authors could not secure state-by-state data for seventeen years for legal incidents of abortion. The Guttmacher Institute collects data on the number and rate of abortions by state and has data since 1978. However, due to the costly nature of collecting the data, surveys of the number of abortions are done sporadically and are not available for every year from 1980 to 2013.[414] Specifically, data is missing for 1983, 1986, 1989, 1990, 1993, 1994, 1995, 1997, 1998, 2001, 2002, 2003, 2006, 2009, 2010, and 2011, for abortion. Because so many years of data were missing, the authors could not include this variable in their regression.

Data Not Included

It is impossible to include all possible theoretical contributors to the crime decline as the potential variables could be infinite. The authors chose 13 theories that were commonly cited in existing research and media reports to run in the state-level panel. Some factors such as technology, sentence lengths, other forms of policing, other criminal justice policies, or other social factors could also have contributed to the crime decline. Notably, technological advances in surveillance likely affected rates of burglary, robbery, and motor vehicle theft.[415]

B.   This Report's State-Level Regression Model

The original empirical results presented in this report were found using regression analyses. Regressions are a set of mathematical tools for estimating the relationships between or among variables. In this case, the authors are interested in the relationship between crime and the variables thought to affect crime.

To begin a regression analysis, the authors specify a regression model, or a hypothesized relationship among the variables of interest. In this case, the model hypothesizes that crime is a function of incarceration, unemployment, capital punishment, and so on. Mathematically, a very simple relationship of that kind looks like the following equation:

Eq. 1 $CRIME = a \times INCARCERATION + b \times UNEMPLOYMENT + c \times CAPITAL\ PUNISHMENT + \ldots + error$

The numbers of interest are *a, b, c,* etc. These numbers represent how a change in one variable is associated with a change in crime. The dataset includes data from 1980 to 2013 for the variables CRIME, INCARCERATION, UNEMPLOYMENT, etc., and the mathematical methods of regression allow us to estimate the numbers *a*, *b*, *c*, and so on. Number *a*, the coefficient for incarceration, is an estimate for how a change in incarceration would be associated with change in crime, accounting for other variables. The same is true for number *b*, the coefficient for unemployment, and so on. There is also always an error term included in the model, as there will always be some variation in data that cannot be accounted for. However, with a correctly specified relationship, the regression will produce the best estimate for each variable's effect on crime.

The authors primarily aimed to isolate the effect of incarceration on crime. They therefore included additional control variables in their regression to account for and isolate other factors that could have affected crime. For this reason, they used a multi-variable regression.

Incarceration Elasticity

Elasticity is the percent change in one variable divided by the percent change in another. The authors calculated the changes in incarceration and crime in each decade. Using each study's finding for incarceration's effect on crime (the elasticity estimate), the authors estimated the percent of the crime decline attributable to the increase in incarceration in each decade. The authors found the percent change in incarceration and multiplied it by the elasticity estimate to get the estimate for the percent change in crime. Then the authors divided the estimated percent change in crime by the real change in crime to get the percent of the crime decline attributable to incarceration. The authors start with the elasticity estimate from the regression analysis and end with the percent of the change in crime attributable to the change in incarceration over a certain period of time. The percent attributable to incarceration changes can be calculated at the national level, for the effect of total state imprisonment, or for the effect in a specific state, using state imprisonment data specific to that state. The process is as follows:

Eq. 2 $Estimated\ ELASTICITY \times \%\ \Delta\ INCARCERATION = Estimated\ \%\ \Delta\ CRIME$

$$\text{Eq. 3} \quad \frac{\textit{Estimated \% } \Delta \textit{ CRIME}}{\textit{Real \% } \Delta \textit{ CRIME}} = \textit{\% of } \Delta \textit{ CRIME attributable to } \Delta \textit{ INCARCERATION}$$

The data for crime and incarceration are included in the regressions as the logarithm of their per capita values. This serves to both mitigate the effect of any outlying observations, and to allow the estimates to be interpreted as elasticities. Including the logarithmic values allows the estimated number *a* to be interpreted as an elasticity. Including the variables in per capita form allows the authors to ignore issues that might arise from changes in population. The model also controls for potential unobserved differences between states, and between years (fixed effects). Furthermore, the data for incarceration are included one year "lagged." In other words, the authors regressed the crime rate in 2012 on the incarceration rate in 2011, and so on. This is for two main reasons. First, it is because the incarceration data are provided as the *yearend* jurisdictional population. And second, it may mitigate, to some degree, any simultaneity between crime and incarceration.

Simultaneity is a potentially important consideration. A simultaneity effect occurs when changes in variable X cause changes in variable Y *and* changes in variable Y cause changes in variable X. That could conceivably be the case for incarceration and crime. Incarceration could decrease crime through deterrence, incapacitation or rehabilitation. Through what sociologists refer to as the criminogenic "feedback effect" of prison, incarceration could also increase crime. Changes in crime could also be seen to cause changes in incarceration; if there are more offenders, there will be more people arrested and more people imprisoned. This simultaneity problem can create challenges in a regression analysis. The effect of incarceration on crime captured by the elasticity estimate necessarily includes both effects, that of incarceration on crime and that of crime on incarceration. For this reason, it can be hard to tell by exactly how much increased imprisonment could be affecting crime. If the effect of crime on incarceration is zero — i.e. no simultaneity — the estimate represents one effect, that of incarceration on crime. There is evidence in the existing research that suggests that the simultaneity is not a major issue for the two main variables of interest.[416] In the absence of simultaneity, the results can be interpreted as causal, meaning that elasticity estimate reflects only the effect of incarceration on crime, not vice versa. Therefore, the authors conclude that the regression estimate can be interpreted largely as a causal effect of incarceration on crime.

There are other ways to address simultaneity. One is through a controlled experiment. However, with something like incarceration, this is not feasible. Another is through natural experiments or instrumental variable techniques. A good instrumental variable is correlated with the explanatory variables, but not with the error term. However, good instruments are difficult to construct, and even then the results can be highly dependent on the instrument chosen. For instance, Levitt's 1996 paper uses prison overcrowding legislation as an instrument (it is plausibly correlated with prison populations and plausibly uncorrelated with crime) and finds a large downward effect of incarceration on crime.[417] But Geert Dhondt's 2012 study uses cocaine and marijuana mandatory minimum sentencing as an instrument and actually finds an upward effect of increased incarceration on crime.[418] The authors recognize the potential issue of simultaneity but due to the complications invoked by instrumental variables did not apply that technique to their analysis.

Accounting for Diminishing Returns

Liedka and coauthors introduced an innovation to the simple linear analysis model to complicate the relationship between incarceration and crime.[419] The authors built on Liedka and coauthors' model using the description in the text of their study, tweaking the model to include an analysis and discussion of a series of other crime-affecting variables, specifically police numbers, use of death penalty, enactment of right to carry laws, and alcohol consumption. The authors also updated the analysis with thirteen years of more recent data in this report. The simple linear model illustrated in Equation 1 allows us to estimate only one, constant relationship between incarceration and crime. However, for the reasons outlined in Part I, this report found, as others argue, that the relationship between incarceration and crime has changed dramatically as the level of incarceration increased so greatly. A simple way to incorporate this possibility is to add another incarceration term to the model, such as the following:

$$Eq.\ 4 \qquad CRIME = a_1 \times INCARCERATION + a_2 \times INCARCERATION^2 +$$
$$b \times UNEMPLOYMENT + c \times CAPITAL\ PUNISHMENT + \ldots + error$$

By adding a term for incarceration-squared, the model allows the relationship between crime and incarceration to vary with the *level* of incarceration. The analysis estimates the numbers and , the latter of which will be a function of the level of incarceration. The authors also ran regressions with a variety of other specifications, with various different incarceration terms, and in each case the findings are very similar: the returns to incarceration in the form of reduced crime decrease significantly in the level of incarceration. This is the important departure from most models in existing research. For simplicity and consistency, the results in this report are from a quadratic model like the one above. There are other ways to incorporate nonlinearity, including nonparametric and spline regressions. These models can also uncover incarceration's diminishing returns.

Also included in the regression are "fixed effects." Essentially, fixed effects are variables indicating that the data are from some given state and from some given year. Fixed effects incorporate differences by state and year, such as variations in percent urban population and other variables. They are commonly included in panel data studies such as these to account for unobserved differences between states and years. Following the work of Liedka et al. and others, this report uses a first-order autoregressive (AR(1)) error structure. Significance and confidence intervals reported are calculated according to robust standard errors. These technical features of the model improve the accuracy of the estimates, and allow the authors to correctly state in which results they are confident, statistically speaking.

Once the analysis produces estimates of the relationships between the various variables and crime, the authors then go back to the actual data, and estimate how actual changes in incarceration, say, affected crime. This is how the percentages of the crime decline attributed to the various factors are calculated.

II.   CITY-LEVEL ANALYSIS

The authors also ran a separate city-level regression analysis presented in Part II, using a city-level panel dataset and examining variables in the 50 most populous U.S. cities.

Policing is typically implemented at the local police department level rather than statewide. Using state-level data for an analysis may swamp any interesting variation observed at the city level. The analysis for this section is quite similar to the above, with some important differences.

A.   Data Sources

The city-level dataset contains over 13,000 monthly observations over 23 years (from 1990 to 2012). In total the dataset contains over 198,000 entries. Having datasets this large allows the authors to obtain precise estimates of the effects of variables on crime. In addition, this dataset exhibits substantial variation, both over time and across states, in the implementation of CompStat and crime, allowing the authors to better identify and isolate the relationship between the two.

The city-panel regression on crime included the following variables: CompStat (as a dummy variable (see explanation below)); lagged log of sworn police officers per capita; and city, month, and year fixed effects. The authors chose to examine the 50 most populous cities, which they identified through 2012 census estimates.[420]

Data on Crime

The regression used FBI Uniform Crime Reports data for monthly reported crimes in each city from 1990 to 2012. The authors collected this data from the UCR's Crime Statistics Management Group.[421] City-level monthly data for 2013 was not available at time of publication. As explained above, despite its shortcomings the UCR is the most widely used national statistical tool on crime.

Data on CompStat

As explained in Part II, the authors chose to use the CompStat program as an empirical case study of the effectiveness of one type of policing tool.

The authors determined whether and when a city had CompStat through a wide variety of sources including police department information, city websites, and newspaper articles. This information was then confirmed by two methods. Phone calls were placed to each police department to confirm the information. National law enforcement experts then reviewed the data for accuracy.

A "dummy variable" was constructed to indicate the implementation of CompStat. The variable takes the value 0 for all months before a city implements CompStat and then takes the value 1 in the month CompStat began and for all months after. If a city does not have a CompStat program at all, the value is 0 for all months from 1990 to 2012.

Of the 50 most populous cities, 42 cities were included in the regression. 39 cities implemented CompStat. 3 cities did not implement CompStat. (Notably, two cities — Seattle, Wash. and Detroit, Mich. — introduced CompStat after 2012 and are therefore included as not using CompStat during the regression period as it only runs through 2012.)

Eight cities were not included because certain elements needed to be included in a monthly regression from 1980 to 2012 were absent. In five cities, (El Paso, Tex., Sacramento, Calif., San Jose, Calif., Jacksonville, Fl., and Miami, Fl.), CompStat was implemented but the authors were unable to identify an exact month of implementation. In two cities (Indianapolis, Ind. and Albuquerque, N.M.), police departments implemented and then terminated a CompStat program within a few years, and the termination month was unknown. In one city (Long Beach, Calif.) there was conflicting evidence as to whether a CompStat program was in place. After multiple calls to police departments, the authors were unable to verify necessary information in these cities.

Data on Numbers of Police

The number of sworn police officers for each city was also included in the regression. The count of officers is annual as of October 31st each year and is available through the UCR's "Crime in the United States" publication for the years 1990 to 2012.[422] However, since the data are collected annually as October 31st to October 31st, data for January to October 1990 is the number of officers as of October 31, 1989. For years prior to 1995, the Crime in the United States publication is not available online and the authors collected this data via email from the UCR's Crime Statistics Management Group.[423]

Number of police officers is included in the regression to control for their effects as opposed to the effect of CompStat.

B.   This Report's City-Level Regression

Similar to before, the regression model for the city-level analysis is as follows:

$$CRIME=a \times COMPSTAT + b \times POLICE\_NUMBERS + error$$

This is a type of interrupted time series approach.[424] Also, like in the state-level analysis, the authors include month, year, and city fixed effects in the regression, to control for unobserved differences over time and between cities. Crime and police numbers are included in their logged per capita forms. Observations are weighted by the city's average population over the time period.

The authors then use panel data regression techniques very similar to the state-level analysis to determine whether or not the introduction of a CompStat program affected future crime. An AR(1) error structure is not used here, as it is above.

C.   Tables of Economic Findings

The results tables below present the results of the regression analyses discussed above and throughout this report. The results of the regression of incarceration and 12 other variables on crime are included in Tables 7 and 8. The results of the regression of CompStat on crime are included in Table 9.

Table 7: Regressions on ln(Crime)

	(1) "M&M"	(2) Baseline	(3) Quadratic
ln(Incarceration)	-0.053 (0.031)	-0.049 (0.033)	-0.235 (0.159)
ln(Incarceration)^2			0.017 (0.014)
Police		0.012 (0.018)	0.012 (0.018)
Executions		4.7e-8 (3.7e-7)	1.2e-8 (3.7e-7)
Unemployment		0.002 (0.003)	0.002 (0.002)
Income		-1e-5 (3.4e-6)	1e-5 (3.4e-6)
Beer consumption		0.096 (0.026)	0.097 (0.031)
Right-to-carry		0.004 (0.010)	0.004 (0.010)
% black		-1.052 (0.540)	-0.983 (0.541)
% age 15-19	1.5e-5 (0.099)	7.5e-6 (9.7e-6)	8.5e-6 (1e-5)
% age 20-24	2.3e-5 (1e-5)	2.4e-5 (1e-5)	2.3e-5 (1e-5)
% age 25-29	1.8e-5 (4.8e-6)	2e-5 (4.9e-6)	1.9e-5 (4.7e-6)

Clustered robust standard errors in parentheses

State and year fixed effects included in all columns

Column 1 recreates a similar analysis to Marvell and Moody, including some controls for the age distribution. Column 2, the "baseline model," includes a wider set of controls. And column 3 includes those controls plus the quadratic incarceration term.

Table 8: Elasticity estimates for various crime types

	(1) P.C.	(2) Burg.	(3) Larc.	(4) M.V.T.	(5) V.C.	(6) A.A.	(7) Rape	(8) Hom.	(9) Rob.
ln(Inc)	-0.275 (0.167)	-0.234 (0.257)	-0.200 (0.153)	-0.893 (0.282)	0.186 (0.288)	-0.214 (0.394)	1.825 (0.310)	0.151 (0.473)	0.100 (0.283)
ln(Inc)^2	0.020 (0.015)	0.014 (0.022)	0.015 (0.013)	0.069 (0.026)	-0.017 (0.025)	0.024 (0.033)	-0.160 (0.028)	-0.010 (0.046)	-0.018 (0.024)

Clustered robust standard errors in parentheses

State and year fixed effects included in all columns

The columns are regressions of the log of, in order, property crime, burglary, larceny/theft, motor vehicle theft, violent crime, aggravated assault, forcible rape, homicide, and robbery, of the log of incarceration and the log of incarceration squared. Each regression also includes fixed effects and the controls from the baseline model above, but they are omitted from the table for brevity.

Table 9: Regressions of CompStat on ln(Crime)

	(1) Total Crime	(1) V.C.	(2) P.C.	(3) Homicide
CompStat	-0.111** (0.046)	-0.127 (0.080)	-0.112*** (0.040)	-0.128* (0.066)
ln(Police)	-0.453 (0.289)	-0.297 (0.324)	-0.487* (0.286)	-0.437 (0.405)

Clustered robust standard errors in parentheses

City, month, and year fixed effects included in all columns

$*p<0.1$, $**p<0.05$, $***p<0.01$

The columns are regressions of the log of, in order, total crime, violent crime, property crime, and homicide, on CompStat and the log of police. Each regression also includes fixed effects but they are omitted from the table for brevity.

ENDNOTES

1   E. Anne Carson, Bureau of Justice Statistics, Prisoners in 2013 3 tbl.2 (2014), *available at* http://1.usa.gov/1uDNndG; *see also* Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correctional Populations in the United States, 2012 2 tbl.1 (2013), *available at* http://1.usa.gov/1dMdUh2.

2   Bruce Western & Becky Pettit, PEW Charitable Trusts, Collateral Costs: Incarceration's Effect on Economic Mobility 4 (2010), *available at* http://bit.ly/1Bi2v2N. In FY 2010 total federal and state criminal justice system spending was $260,533,129,000. This number is the sum of judicial and legal costs ($56.1 billion), police protection costs ($124.2 billion), and corrections costs ($80.24 billion). *See* Tracey Kyckelhahn & Tara Martin, Bureau of Justice Statistics, Justice Expenditure and Employment Extracts, 2010 — Preliminary (2013), *available at* http://1.usa.gov/1JdzdFW.

3   The incarceration rate increased from 176 prisoners per 100,000 U.S. residents in 1970 to 920 per 100,000 in 2012, or 5.23 times the 1970 rate. *See* Chet Bowie, Bureau of Justice Statistics, Prisoners 1925-81 2 tbl.1 (1982), *available at* http://www.bjs.gov/content/pub/pdf/p2581.pdf; *see also* James J. Stephan, Bureau of Justice Statistics, The 1983 Jail Census 1 tbl.1 (1984), *available at* http://www.bjs.gov/content/pub/pdf/83jc.pdf; Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correctional Populations in the United States, 2012 2 tbl.1 (2013), *available at* http://www.bjs.gov/content/pub/pdf/cpus12.pdf.

4   Marc Mauer, *Addressing Racial Disparities in Incarceration*, 91 Prison J. 87S, 88S (2011).

5   *See* Tracey Kyckelhahn, Bureau of Justice Statistics, Justice Expenditure and Employment Extracts, 2011 — Preliminary (2014), *available at* http://www.bjs.gov/index.cfm?ty=pbdetail&iid=5050 (showing FY 2010 state and federal corrections expenditure was $80,678,186,000); *see also* U.S. Dep't of Educ., Educ. Dep't Budget History Table: FY 1980 – FY 2014 President's Budget, http://www2.ed.gov/about/overview/budget/history/index.html.

6   *See, e.g.*, Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 177-178 (2004) (explaining that "[t]he theory linking increased imprisonment to reduced crime works through two channels… incapacitation… [and] deterrence").

7   In the twenty years from its peak in 1991, the violent crime rate has fallen from an annual 759 crimes per 100,000 people to 387 crimes per 100,000 people. Property crime has fallen from 5140 to 2905 crimes per 100,000 people. *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2012).

8   Some cities continue to struggle with crime problems. For example, cities with high and increasing violent crime rates in 2012 include: Flint City, Mich.; Oakland, Calif.; Memphis, Tenn.; and Stockton, Calif. *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm.

9   Regressions are a set of mathematical tools for estimating the relationships between or among variables. For more on regressions, see Jeffrey Wooldridge, Introductory Econometrics: A Modern Approach (2012).

10   The findings summarized in this table are explained throughout the report, with data cited in endnotes and Appendix B.

11   Steven Raphael & Michael Stoll, The Hamilton Project, A New Approach to Reducing Incarceration While Maintaining Low Rates of Crime 11-13 (2004), *available at* http://brook.gs/1GCaXjb.

12   Nat'l Research Council, The Growth in of Incarceration in the United States: Exploring Causes and Consequences 155 (Jeremy Travis et al. eds., 2014).

13   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2013); *see also* Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps (providing incarcerations rate of state or federal sentenced prisoners from 1978 to 2013).

14   The findings summarized in this table are explained in Part I, with data cited in footnotes and Appendix B.

15   For more on broken windows, see George L. Kelling & James Q. Wilson, *Broken Windows: The Police and Neighborhood Safety*, The Atlantic, March 1, 1982, *available at* http://theatln.tc/1Bi2HPx. For more on hot spots policing, see John E. Eck et al., Nat'l Inst. Justice, Mapping Crime: Understanding Hot Spots 2 (2005), *available at* http://discovery.ucl.ac.uk/11291/1/11291.pdf. For a definition of stop and frisk, see *Stop and Frisk*, Legal Info. Inst., http://www.law.cornell.edu/wex/stop_and_frisk.

16   The findings summarized in this table are explained in Part II, with data cited in footnotes and Appendix B.

17   *See* Bureau of Justice Statistics & Police Exec. Research Forum, CompStat: Its Origins, Evolution, and Future in Law Enforcement Agencies 3 (2013), *available at* http://bit.ly/1CUHqLv.

18   Notes on file with authors.

19   2013 data were not available for alcohol consumption at time of publication and therefore a projection was used. *See* Appendix B for further explanation.

20   *See, e.g.*, Michael D. Maltz, Bureau of Justice Statistics, Bridging Gaps in Police Crime Data 4 (1999), *available at* http://bjs.gov/content/pub/pdf/bgpcdes.pdf ("The voluntary nature of the UCR, of course, affects the accuracy and completeness of the data").

21   In 1970, 357,292 people were incarcerated. Chet Bowie, Bureau of Justice Statistics, Prisoners 1925-81 2 tbl.1 (1982), *available at* http://www.bjs.gov/content/pub/pdf/p2581.pdf; James J. Stephan, Bureau of Justice Statistics, The 1983 Jail Census 1 tbl. 1 (1984), *available at* http://www.bjs.gov/content/pub/pdf/83jc.pdf. In comparison, there were 2,306,383 people incarcerated in 2012, representing 920 per 100,000 U.S. adult residents. Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correctional Populations in the United States, 2012 2 & tbl.1 (2013), *available at* http://www.bjs.gov/content/pub/pdf/cpus12.pdf; Todd D. Minton, Bureau of Justice Statistics, Jail Inmates at Midyear 2012 - Statistical Tables 1 (2013), *available at* http://1.usa.gov/1JdzSHH.

22   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm. *See also* Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps.

23   Steven Raphael & Michael Stoll, The Hamilton Project, A New Approach to Reducing Incarceration While Maintaining Low Rates of Crime 9 (2004), *available at* http://brook.gs/1E6xzGl (emphasis added).

24   *See generally* Raymond V. Liedka, et al., *The Crime-Control Effect of Incarceration: Does Scale Matter?*, 5 Criminology & Pub. Pol'y 245 (2006).

25   *See, e.g.*, Robert Hall & Marc Lieberman Macroeconomics: Principles and Applications 204 (2012).

26   Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 178-179 (2004).

27   Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 179 (2004).

28   James Austin & Tony Fabelo, JFA Inst., The Diminishing Returns of Increased Incarceration: A Blueprint to Improve Public Safety and Reduce Costs 8-10 (2004), *available at* http://bit.ly/1CUHRp3.

29   Ryan S. King, et al., The Sentencing Project, Incarceration and Crime: A Complex Relationship 8 (2005), *available at* http://www.sentencingproject.org/doc/publications/inc_iandc_complex.pdf.

30   John J. Donohue, *Assessing the Relative Benefits of Incarceration: The Overall Change over the Previous Decades and the Benefits on the Margin, in* Do Prisons Make Us Safer? The Benefits and Costs of the Prison Boom 269, 303 (Steven Raphael & Michael Stoll eds., 2009).

31   Nat'l Research Council, The Growth in of Incarceration in the United States: Exploring Causes and Consequences 155 (Jeremy Travis et al. eds., 2014).

32   Steve Aos & Elizabeth Drake, Wash. State Inst. for Public Pol'y, Prison, Police, and Programs: Evidence-based Options that Reduce Crime and Save Money 3 (2013), *available at* http://1.usa.gov/1JdAdKo.

33   Steven Raphael & Michael Stoll, The Hamilton Project, A New Approach to Reducing Incarceration While Maintaining Low Rates of Crime 9-13 (2014), *available at* http://brook.gs/1E6xzGl.

34   Because jail data for 2013 were unavailable at time of publication, total incarceration cannot be calculated for 2013. There-fore, 2012 is used as the most recent total number. In 1983, there were 419, 346 people in prison population and 223,551 people in jail, and there United States population was 233,791,994. That is a rate of 1 in 364. *See* Stephanie Minor-Harp-er, Bureau of Justice Statistics, State and Federal Prisoners, 1925-85 2 tbl.1 (1986), *available at* http://1.usa.gov/1Cj7Vfn (providing 1983 prisoner data); James J. Stephan, Bureau of Justice Statistics, The 1983 Jail Census 1 tbl.1 (1984), *available at* http://www.bjs.gov/content/pub/pdf/83jc.pdf (providing 1983 jail data); U.S. Census Bureau, Historical National Population Estimates: July 1, 1900 to July 1, 1999 (2000), http://1.usa.gov/15g1gp5 (providing total U.S. population). *Compare with* Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correc-tional Populations in the United States, 2012 2 tbl.1, *available at* http://www.bjs.gov/content/pub/pdf/cpus12.pdf (providing 2012 incarceration rate as 1 in 108).

35   The authors calculated Marvell and Moody's estimated percent of crime reduction attributable to incarceration based on their elasticity estimate of -0.159. Thomas B. Marvell & Carlisle E. Moody, *Prison Population Growth and Crime Reduction*, 10 J. Quantitative Criminology 109, 131 tbl.IV (1994). For more information on this calculation, see Appendix B.

36   The authors estimate this percentage based upon the elasticity estimates presented in Defina and Arvanites' study. *See* Robert H. DeFina & Thomas M. Arvanites, *The Weak Effect of Imprisonment on Crime: 1971-1998*, 83 Soc. Sci. Q. 635, 647 tbl.2 (2002). For more information on this calculation, see Appendix B.

37   The authors calculated Levitt's estimated percent of crime reduction attributable to incarceration based on his violent and property crime elasticity estimates. *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 178-179 (2004). For more information on this calculation, see Appendix B.

38   Bruce Western, Punishment and Inequality in America 161 (2006).

39   Western called this effect a "feedback effect." *Id.* M. Keith Chen & Jesse M. Shapiro, *Do Harsher Prison Conditions Reduce Recidivism? A Discontinuity-Based Approach*, 9 Am. L. & Econ. Rev. 1, 21 (2007); *see also* Steven Raphael & Rudolf Winter-Ebmer, *Identifying the Effect of Unemployment on Crime,* 44 J. L. & Econ. 259, 271 tbl.2 (2001).

40   Eric Baumer, *An Empirical Assessment of the Contemporary Crime Trends Puzzle: A Modest Step toward a More Compre-hensive Research Agenda*, Understanding Crime Trends: Workshop Report 127, 164 tbl.5-4 (Arthur Goldberger & Richard Rosenfeld eds., 2008).

41   William Spelman, *Jobs or Jails? The Crime Drop in Texas*, J. Pol. Anal. & Man., 24 (2005) 133, 158-62 ("Although this is considerably higher than nationwide estimates (for example, Spelman. 2000). It is not as unreasonable as it may appear. Texas's prison buildup was massive: 100,000 more prisoners, 5,000 more jail inmates, at an estimated direct cost of $1.5 billion per year for Texas taxpayers. The increase was much larger, on both a percentage and an absolute basis, than the prison expansion of any other state. It was Texas's principal response to the crime problem….And, of course, these findings may not apply to any state other than Texas").

42   *See, e.g.,* John J. Donohue, *Assessing the Relative Benefits of Incarceration: The Overall Change over the Previous Decades and the Benefits on the Margin, in* Do Prisons Make Us Safer? The Benefits and Costs of the Prison Boom 269, 280 (Steven Raphael & Michael Stoll eds., 2009) (Study is based on Texas counties, raising issues of external validity. Texas prison expansion was massive, even in comparison to a large national average").

43   The authors estimated the percentage of the violent and property crime drops based on Becsi's estimated police convict and residual convict coefficients. Zsolt Becsi, *Economics and Crime in the States*, 84 Econ. Rev. 38, 50 tbl.5 (1999). For more information on this calculation, see Appendix B.

44   The authors estimated the percent of the crime decline attributable to incarceration from Raphael and Winter-Ebmer's logged prisoner coefficient. Steven Raphael & Rudolf Winter-Ebmer, *Identifying the Effect of Unemployment on Crime,* 44 J. Law & Econ. 259, 271 tbl.2 (2001). For more information on this calculation, see Appendix B.

45   *See generally* Raymond V. Liedka, Anne M. Piehl, & Bert Useem, *The Crime-Control Effect of Incarceration: Does Scale Matter?*, 5 Criminology & Pub. Pol'y 245 (2006).

46   Nat'l Research Council, The Growth in of Incarceration in the United States: Exploring Causes and Con-sequences 147 (Jeremy Travis et al. eds., 2014). *See also* Steven Raphael & Michael Stoll, The Hamilton Project, A New Approach to Reducing Incarceration While Maintaining Low Rates of Crime 9-13 (2014), *available at* http://www.brookings.edu/research/papers/2014/05/01-reduce-incarceration-maintain-low-crime-rates-raphael-stoll.

47   Magnus Lofstrom & Steven Raphael, Pub. Pol'y Inst. of Cal., Incarceration and Crime: Evidence from California's Realignment Sentencing Reform 19 (2013), *available at* http://bit.ly/1Bi3xM3.

48   *Id,* at 3. *See also Brown v. Plata*, 131 S. Ct. 1910 (2011).

49   Magnus Lofstrom & Steven Raphael, Public Pol'y Inst. of Cal., Incarceration and Crime: Evidence from California's Realignment Sentencing Reform 15 (2013), *available at* http://bit.ly/1Bi3xM3.

50   Ben Vollaard, *Preventing Crime through Selective Incapacitation*, 123 Econ. J. 262, 279 (2013). The Netherlands has an incarceration rate of 75 per 100,000 residents and a total incarcerated population of 12,638 people, whereas the United States has an incarceration rate of 707 per 100,000 residents. World Prison Brief, Int'l Ctr. for Prison Studies, Neth., *available at* http://www.prisonstudies.org/country/netherlands; World Prison Brief, Int'l Ctr. for Prison Studies, U.S., *available at* http://www.prisonstudies.org/country/united-states-america.

51   This is based on the authors' regression. Please see Appendix B. *See also UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2013); Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps (providing incarceration data from 1978 to 2013).

52   This figure is based on the results of the regression summarized in Table 2. Please see Appendix B for methodology.

53   This is based on the authors' regression. Please see Appendix B. *UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2013); Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps.

54   *See* Darrell K. Gilliard, Bureau of Justice Statistics, Prisoners in 1992 7 (1993), *available at* http://1.usa.gov/15g20dQ.

55   In 2011, 47 percent of state prisoners were incarcerated for nonviolent offenses. *See* E. Ann Carson & Daniela Golinelli, Bureau of Justice Statistics, Prisoners in 2012 - Advance Counts 10 tbl.9 (2013), *available at* http://1.usa.gov/1mTXJSK.

56   *See* E. Ann Carson & William J. Sabol, Bureau of Justice Statistics, Prisoners in 2011 1 (2012), *available at* http://1.usa.gov/1skvYqK (showing that, in 2011, nearly half (48%) of federal inmates were convicted of drug offenses and more than a third (35%) were convicted of public-order crimes); Todd D. Minton, Bureau of Justice Statistics, Jail Inmates at Midyear 2012 - Statistical Tables 1 (2013), *available at* http://www.bjs.gov/content/pub/pdf/jim12st.pdf ("At midyear 2012, about 6 in 10 inmates were not convicted, but were in jail awaiting court action on a current charge—a rate unchanged since 2005").

57   Jose A. Canela-Cacho et al., *Relationship Between The Offending Frequency (λ) Of Imprisoned And Free Offenders*, 35 Criminology 133, 153 (1997).

58   *See, e.g.*, Bruce Western, Punishment and Inequality in America 161 (2006).

59   *See* Lynne M. Vieraitis et al., *The Criminogenic Effects of Imprisonment: Evidence from State Panel Data, 1974–2002*, 6 Criminology & Pub. Pol'y 589, 593 (2007) ("Young, first-time offenders may be at particular risk as they are exposed to more experienced inmates who can influence their lifestyle and help solidify their criminal identities").

60   *See id*.

61   *See generally, e.g.*, Devah Pager, Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration (2007); Devah Pager, *The Mark of a Criminal Record*, 108 Am. J. Soc'y 937 (2003).

62   Cassia Spohn & David Holleran, *The Effect of Imprisonment on Recidivism Rates of Felony Offenders: A Focus on Drug Offenders*, 40 Criminology 329, 347 fig.1 (2002).

63   *See* Christopher T. Lowenkamp et al., The Arnold Foundation, The Hidden Costs of Pretrial Detention 4 (2013), *available at* http://www.arnoldfoundation.org/sites/default/files/pdf/LJAF_Report_hidden-costs_FNL.pdf.

64   Christy Visher et al., Urban Inst., Life After Prison: Tracking the Experiences of Male Prisoners Returning to Chicago, Cleveland, and Houston 4 (2010), *available at* http://urbn.is/1ySLXk4.

65   *See, e.g.*, Richard B. Freeman, *The Labor Market*, *in* Crime 171, 177-78 (J.Q. Wilson and Joan Petersilia eds., 1995) ("[I]ncreased propensity for crime is a rational response to increased job market incentives to commit crime").

66   M. Keith Chen & Jesse M. Shapiro, *Do Harsher Prison Conditions Reduce Recidivism? A Discontinuity-Based Approach*, 9 Am. L. & Econ. Rev. 1, 21 (2007).

67   *See, e.g.*, Francesco Drago et al., *Prison Conditions and Recidivism*, 13 Am. L. & Econ. Rev. 103, 127 (2011) (examining the impact of prison conditions on former prisoners' future criminal behavior in Italy).

68   *See* Steven R. Shapiro, Human Rights Violations in the United States: A Report on U.S. Compliance With the International Covenant on Civil and Political Rights 102 (1993).

69   M. Keith Chen & Jesse M. Shapiro, *Do Harsher Prison Conditions Reduce Recidivism? A Discontinuity-Based Approach*, 9 Am. L. & Econ. Rev. 1, 21 (2007); Maureen L. O'Keefe & Marissa J. Schnell, *Offenders With Mental Illness in the Correctional System*, *in* Mental Health Issues in the Criminal Justice System 81 (2007). *See also* Children's Law Center, Falling Through the Cracks: A New Look at Ohio Youth in the Adult Criminal Justice System 2 (2012), *available at* http://www.prisonpolicy.org/scans/FallingThroughTheCracks.pdf (pointing to increased risk of physical and sexual assault, suicide, limited access to educational services, and increased isolation as reasons for "increased recidivism and collateral consequences for youth housed in these facilities").

70   *See, e.g.*, David S. Lee & Justin McCrary, *The Deterrence Effect of Prison: Dynamic Theory and Evidence* 34 (Ctr. for European Pol'y Studies, Working Paper No. 189, 2009) ("[A]n increase in sentences from 1 to 5 years can hardly be an effective deterrent for an individual who dramatically discounts his welfare even 6 months ahead").

71   *See* Nat'l Research Council, The Growth in of Incarceration in the United States: Exploring Causes and Consequences 90 (Jeremy Travis, Bruce Western, & Steve Redburn eds., 2014) (citing National Research Council, 1978a, 1993, 2012a).

72   *See, e.g.*, Brian Forst, *Prosecution and Sentencing*, *in* Crime 376, 369-85 (J.Q. Wilson and Joan Petersilia eds., 1995).

73   Todd R. Clear & Natasha A. Frost, The Punishment Imperative: The Rise and Failure of Mass Incarceration in America 5 (2013).

74   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm; Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps.

75   *Id.*

76   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm; Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps.

77   Editorial Board, *California's Continuing Prison Crisis*, N.Y. Times, Aug. 10, 2013, at SR10, http://nyti.ms/1ySM67b.

78   *Brown v. Plata*, 131 S. Ct. 1910, 1923 (2011).

79   A.B. 109, 2011 Assemb. (Cal. 2011) (approved by Governor April 4, 2011), *available at* http://bit.ly/1zYunrp.

80   Lisa T. Quan et al., Stanford Criminal Justice Ctr., Reallocation of Responsibility: Changes to the Correctional System in California Post-Realignment 5 (2014), *available at* http://stanford.io/1CGeeY9.

81   *See* Magnus Lofstrom et al., Pub. Pol'y Inst. of Cal., Evaluating the Effects of California's Corrections Realignment on Public Safety 5–6 (2012), *available at* http://www.ppic.org/content/pubs/report/R_812MLR.pdf.

82   E. Anne Carson, Bureau of Justice Statistics, Prisoners in 2013 12 (2014), *available at* http://1.usa.gov/1uDNndG.

83   Legislative Analyst's Office, Proposition 47 (2014), *available at* http://www.lao.ca.gov/ballot/2014/prop-47-110414.pdf.

84   "Essentially" or "effectively" zero means not statistically significantly different from zero.

85   The authors calculate the effect of incarceration on crime using the UCR crime data and CSAT state imprisonment data. The graph shows the trend in state imprisonment in California and the decreasing ability of increasing imprisonment to reduce crime. The authors calculated the changes in state imprisonment and crime using UCR and BJS, and the elasticity estimate from this report's regression analysis. The authors found the percent change in state imprisonment and multiplied it by the elasticity estimate to get the estimate for the percent change in crime. Then the authors divided the estimated percent change in crime by the real change in crime to get the percent of the crime decline attributable to state imprisonment. For a complete explanation, see Appendix B. *See also UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2013); Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://1.usa.gov/1L3tTqA (providing imprisonment data from 1978 to 2013). All other graphs in this section and in Appendix A were created in the same manner. For further explanation please see Appendix B.

86   *Florida: Overview of Correctional System*, Nat'l Inst. of Corr., http://nicic.gov/statestats/?st=FL.

87   E. Anne Carson, Bureau of Justice Statistics, Prisoners in 2013 3 tbl.2 (2014), *available at* http://1.usa.gov
      /1uDNndG.

88   *Quick Facts*, Fla. Dep't of Corr., http://www.dc.state.fl.us/oth/Quickfacts.html; *see* Fla. Stat. § 994.275 (2013).

89   *See* Fla. Stat. § 775.084(4) (2013) (habitual offenders legislation); Fla. Stat. § 775.087 (2013) (mandatory min-
      imum penalties for firearm related convictions); *see also* Pew Ctr. on the States, Time Served: The High Cost,
      Low Return of Longer Prison Terms 26 (2012), *available at* http://bit.ly/186bN8k (providing context for Florida's
      increasing prison population).

90   Amy Keller, *Crime and Punishment: Changes at Florida Department of Corrections*, Fla. Trend (Aug. 12, 2013), http://
      bit.ly/186bNVV (noting that smart justice reform is happening in some states, but in Florida "reform is happening in
      fits and starts").

91   *See* Sascha Cordner, *Could Major Prison Reforms Become a Reality in Florida Next Year?,* WFSU (Aug. 23, 2013),
      http://news.wfsu.org/post/could-major-prison-reforms-become-reality-florida-next-year; *see also* H.B. 177, H. 2012
      (Fla. 2012) (vetoed by Governor, May 9, 2013), *available at* http://www.flsenate.gov/Session/Bill/2012/177.

92   S.B. 360, S. 2014 (Fla. 2014), *available at* http://www.flsenate.gov/Session/Bill/2014/0360; H.B. 99, H. 2014 (Fla.
      2014) (approved by Governor on June 20, 2014), *available at* http://bit.ly/1yJR7gz (increasing from 4 to 14 grams
      the minimum weight threshold for trafficking in oxycodone and hydrocodone under the drug trafficking statute).

93   Linda Mills, Collins Ctr. for Pub. Pol'y, "Smart Justice": Findings and Recommendations for Florida
      Criminal Justice Reform 9 (2010), *available at* http://bit.ly/1Jn8hSq.

94   Linda Mills, Collins Ctr. for Pub. Pol'y, "Smart Justice": Findings and Recommendations for Florida
      Criminal Justice Reform 10 (2010), *available at* http://bit.ly/1Jn8hSq.

95   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

96   *State Prison Population in Illinois*, Prison Pol'y Initiative, http://www.prisonpolicy.org/graphs/incsize/IL.html.

97   *Crime Reduction Act*, Ill. Dep't of Corr., http://www2.illinois.gov/idoc/Pages/CrimeReductionAct.aspx; *see also* Il-
      linois Crime Reduction Act of 2009, Pub. Act 096-0761 (signed into law Aug. 25, 2009), *available at* http://bit.
      ly/1Jn8KnE.

98   *Id.*; *see also* Adult Redeploy Illinois Oversight Board, 2013 Annual Report to the Governor and General
      Assembly on the Implementation and Projected Impact of Adult Redeploy Illinois 1 (2014), *available at* http://
      bit.ly/1uyOQ7X (reporting that the program diverted 1,376 non-violent offenders from prison since its inception in
      January 2011, resulting in over $27.2 million in correctional cost savings); *see also* Press Release, Ill. Gov't. News Network,
      Governor Quinn Announces $7 Million to Divert Non-Violent Offenders from Prison to Community Programs (Dec.
      29, 2013), *available at* http://1.usa.gov/1uyOUof.

99   H.B. 4442, 98th Gen. Assemb. (Ill. 2014) (extending repeal date of 625 Ill. Comp. Stat. § 5/11-212 (2014)).

100   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

101   Louisiana's incarceration rate is 1341 per 100,000 or 1 in 75 people. The U.S. incarceration rate is 1 in 140. *States of
      Incarceration: The Global Context*, Prison Pol'y Initiative, www.prisonpolicy.org/global.

102   Cindy Chang, *Louisiana Is the World's Prison Capital*, Times–Picayune (May 29, 2012), http://bit.ly/MyEhMB.

103   *How Louisiana Became the World's "Prison Capital,"* Nat'l Public Radio (June 5, 2012), http://n.pr/1AUibX3. Lou-
      isiana houses more than half of its prison population in local jails. E. Anne Carson, Bureau of Justice Statistics,
      Prisoners in 2013 13 (2014), *available at* http://www.bjs.gov/content/pub/pdf/p13.pdf.

104   *Justice Reinvestment Initiative: Louisiana*, Vera Inst. for Justice, http://bit.ly/1AUih15.

105   H.B. 791, 51st Leg., Reg. Sess. (La. 2014).

106   S.B. 87, 40th Leg., Reg. Sess. (La. 20142014).

107   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

108   Md. Dep't of Pub. Safety and Corr. Servs., http://www.dpscs.state.md.us/aboutdpscs/; *Maryland Advisory Com-
      mittee to the United States Commission on Civil Rights* (statement of Tracy Velázquez, Justice Policy Institute) (June 5,
      2012), *available at* http://bit.ly/186cuP5.

109   The 2013 General Fund Budget included $1.1 billion for Department of Public Safety and Correctional Services, or 10.2 times more than the $108 million allotted to the Department of Education. *JPI "Maryland Month" Series: Prisons in Maryland*, Justice Policy Inst. (Oct. 1, 2014), http://bit.ly/1CUQCjd.

110   Maryland's operational prison capacity is 23,016. Paul Guerino et al., Bureau of Justice Statistics, Prisoners in 2010 34 tbl.23 (2011), *available at* http://bjs.gov/content/pub/pdf/p10.pdf. Since 2010, Maryland's prison population has decreased slightly. *Compare* Paul Guerino et al., Bureau of Justice Statistics, Prisoners in 2010 17 tbl.4 (2011), *available at* http://bjs.gov/content/pub/pdf/p10.pdf (showing Maryland prisoner count at 22,275 in 2010) *with* E. Anne Carson, Bureau of Justice Statistics, Prisoners in 2013 3 tbl. 2 (2014), *available at* http://1.usa.gov/1uDNndG (showing Maryland's prison population declined to 21,335 prisoners).

111   For example, the Maryland government passed an act in 2012 that created the Earned Compliance Credit, "a 20–day reduction from the period of active supervision," for each month of good behavior. Earned Compliance Credit and Reinvestment Act of 2012, Md. Corr. Servs. § 6-117 (2012), *available at* http://mlis.state.md.us/2012rs/chapters_noln/Ch_564_sb0691E.pdf; *see also* Criminal Law – Possession of Marijuana – Civil Offense Act of 2014 (codified as amended in scattered sections of Md. Crim. Law, Md. Crim. Proc., & Md. Cts. & Jud. Proc.), *available at* http://1.usa.gov/1Jnb4ew.

112   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

113   *New Jersey: Overview of Correctional System*, Nat'l Inst. of Corr., http://nicic.gov/statestats/?st=NJ.

114   *See New Jersey's Failed Drug Policies*, Drug Pol'y Alliance, http://www.drugpolicy.org/departments-and-state-offices/new-jersey/new-jerseys-failed-drug-policies.

115   *See* A.B. No. 2762, 213th Leg., (N.J. 2008) (proposing amendment to N.J.S.A. 2C:35-7 which sets a mandatory minimum imprisonment term); *see also* A.B. No. 471, 216th Leg., (N.J. 2014) (proposing amendment to N.J.S.A. 2C:35-14 to permit expungement and redirect some offenders to drug court under a special probation statute)*; see also Governor Christie and Former Governor McGreevey Unite for Prison Reform*, CBS N.Y. (May 8, 2013, 3:04 PM), http://newyork.cbslocal.com/2013/05/08/gov-christie-and-former-gov-mcgreevey-unite-for-prison-reform/.

116   Bureau of Justice Statistics, Corrections Statistical Analysis Tool – Prisoners, http://www.bjs.gov/index.cfm?ty=nps.

117   *See* Sen. Con. Res. 128, 216th Leg., (N.J. 2014) (proposing amendment to state constitution that limits money bail system); *see also* S.B. 946, 216th Leg., Reg. Sess. (N.J. 2014) (limiting pretrial detention for defendants). The package of measures seeks to ensure that those behind bars are those who pose a greater danger to society, not the ones who cannot afford to pay bail. It implements various reforms including: non-monetary release options for low-risk individuals; a system under which pretrial release decisions are based on risk rather than resources; the use of risk assessments for defendants enabling courts to make individualized determinations of what conditions of release are appropriate; and the establishment of a pretrial services unit within the court system that will provide appropriate levels of monitoring and counseling for those awaiting trial.

118   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

119   *Compare* Allen J. Beck & Paige M. Harrison, Bureau of Justice Statistics, Prisoners in 2000 3 (2001), *available at* http://www.bjs.gov/content/pub/pdf/p00.pdf (showing 72,899 prisoners incarcerated in New York state in 1999) *with* E. Ann Carson, Bureau of Justice Statistics, Prisoners in 2013 3 tbl.2 (2014), *available at* http://1.usa.gov/1uDNndG (showing 53,550 prisoners incarcerated in New York state in 2012).

120   *New York: Overview of Correctional System*, Nat'l Inst. of Corr., http://nicic.gov/statestats/?st=NY.

121   *See generally* N.Y. Penal Law § 220.

122   *Drug Law Changes*, N.Y. State Div. of Crim. Justice Servs., http://www.criminaljustice.ny.gov/drug-law-reform/.

123   N.Y. Crim. Proc. Art. 216; *see also, e.g.,* Robert Maccarone, Shared Services Alternatives to Incarceration Summary 2010 1 (2011), *available at* http://on.ny.gov/1yxIlC6 (describing New York's mental health diversion programs).

124   James Austin & Michael Jacobson, Brennan Ctr. For Justice & Vera Inst. of Justice, How New York City Reduced Mass Incarceration: A Model for Change? 7 (2013), *available at* http://bit.ly/1L3vkp2 (concluding that a decrease in felony arrests in New York City contributed to a decrease in state imprisonment).

125   *Id.*

126   Stipulation and Order of Settlement, *Hurrell-Harring v. State of New York,* No. 8866-07(N.Y. App. Div. Oct. 21, 2014).

127   For further information, see explanation provided in the citation for Figure 8 and Appendix B.

128   Ohio incarcerated 25,849 prisoners in 1989, and by 2011, the state housed 50,857 prisoners. David J. Diroll, Ohio Criminal Sentencing Comm'n, Prison Crowding: The Long View, With Suggestions: 2011 Monitoring Report 6 (2011), *available at* http://1.usa.gov/1zzMVS2. The Ohio Sentencing Commission attributes this increase to inmates staying longer in prisons than before, rather than crime rates or increased intake of offenders. *Id.* at 5.

129   H.B. 86, 129th Gen. Assemb. (Ohio 2011). *See also* Ryan Carpe, *Ohio House Bill 86: 2 Years Later*, Daily Advoc., June 20, 2013, *available at* http://csgjusticecenter.org/jr/ohio/media-clips/ohio-house-bill-86-2-years-later (describing the bill's effect).

130   *See* Council of State Gov'ts Justice Ctr., Justice Reinvestment in Ohio: How Ohio Is Reducing Corrections Costs and Recidivism 1 (2013), *available at* http://bit.ly/1ySVDuX.

131   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

132   Pa. Dep't of Corr., Recidivism Report 2013 1 (2013), *available at* http://bit.ly/1zzN8oh.

133   *See* Uniform Crime Reports, Crime in the United States tbl.1, 5 (2013) http://1.usa.gov/1xBy9am; E. Anne Carson, Bureau of Justice Statistics, Prisoners in 2013 7 tbl.6 (2014), *available at* http://www.bjs.gov/content/pub/pdf/p13.pdf.

134   Criminal Justice Reform Act of 2012, S.B. 100, 196th Sess. (PA 2012), *available at* http://bit.ly/1ySW9sT; *see Justice Reinvestment: Criminal Justice Reform Act Signed into Law*, Pa. Dep't of Corr., http://bit.ly/1yxJ1Hq.

135   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

136   Marc Levin, Tex. Pub. Pol'y Found., Adult Corrections Reform: Lower Crime, Lower Costs 1 (2011), *available at* http://www.rightoncrime.com/wp-content/uploads/2011/09/Texas-Model-Adult.pdf (citing Marc Levin, Tex. Pub. Pol'y Found., Texas Criminal Justice Reform: Lower Crime, Lower Cost 1-2 (2010), *available at* http://www.texaspolicy.com/sites/default/files/documents/2010-01-PP04-justicereinvestment-ml.pdf).

137   *The Justice System*, Texas Politics, http://texaspolitics.laits.utexas.edu/3_printable.html#10.

138   Marc Levin, Tex. Pub. Pol'y Found., Adult Corrections Reform: Lower Crime, Lower Costs 1 (2011), *available at* http://www.rightoncrime.com/wp-content/uploads/2011/09/Texas-Model-Adult.pdf.

139   Council of State Gov'ts Justice Ctr., Justice Reinvestment in Texas: Assessing the Impact of the 2007 Justice Reinvestment Initiative 3 (2009), *available at* http://www.ncsl.org/portals/1/Documents/cj/texas.pdf. (citing Tex. Dep't of Criminal Justice, Legislative Appropriations Request, Fiscal Years 2008-2009 (2007)).

140   Marc Levin, Tex. Pub. Pol'y Found., Adult Corrections Reform: Lower Crime, Lower Costs 1 (2011), *available at* http://www.rightoncrime.com/wp-content/uploads/2011/09/Texas-Model-Adult.pdf.

141   *State Initiatives: Texas*, Right on Crime, http://www.rightoncrime.com/reform-in-action/state-initiatives/texas.

142   H.B. 1205, 82d Leg. (Tex. 2011); H.B. 2649, 82d Leg. (Tex. 2011); Lauren-Brooke Eisen & Juliene James, Vera Inst. of Justice, Reallocating Justice Resources: A Review of 2011 State Sentencing Trends 26 (2012) www.vera.org/sites/default/files/resources/downloads/reallocating-justice-resources.pdf (surveying Texas house bills on earned credit programs).

143   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

144   *Crime*, Va. Performs, http://vaperforms.virginia.gov/indicators/publicsafety/crime.php.

145   Justice Pol'y Inst., Virginia's Justice System: Expensive, Ineffective and Unfair 7 (2013), *available at* http://bit.ly/1wqrJ9O.

146   Editorial, *Prison Reform Overdue*, Daily Press, Sept. 26, 2011, *available at* http://articles.dailypress.com/2011-09-26/news/dp-edit-prison-editorial-0925-20110926_1_prison-reform-prison-population-prison-time.

147   Va. Code Ann. § 17.1-805 (2013); *see also* Justice Pol'y Inst., Virginia's Justice System: Expensive, Ineffective and Unfair 3, 7 (2013), *available at* http://bit.ly/1wqrJ9O.

148   *See* Justice Pol'y Inst., Billion Dollar Divide: Virginia's Sentencing, Corrections and Criminal Justice Challenge 5 (2014), *available at* http://www.justicepolicy.org/uploads/justicepolicy/documents/billiondollardivide.pdf.

149   *See* Justice Pol'y Inst., Billion Dollar Divide: Virginia's Sentencing, Corrections and Criminal Justice Challenge 3 (2014), *available at* http://www.justicepolicy.org/uploads/justicepolicy/documents/billiondollardivide. pdf. The Justice Policy Institute report outlines the causes and consequences of Virginia's criminal justice policies, and where reform is lacking. It also identifies some successful policies: "the use of the voluntary sentencing guidelines, the ongoing study of how the guidelines are being used and the Virginia Criminal Sentencing Commission report to the stakeholders and lawmakers on sentencing policy have ameliorated some of the impact of statutory sentencing changes. Improvements in community corrections and the adoption of evidenced-based practices in community supervision hold promise." *Id.* at 6.

150   Sam Levine, *Terry McAuliffe Weighs In On Weed*, Huffington Post, Aug. 28, 2014 at 12:42 PM, http://huff. to/1y3EZBI.

151   For more information, see explanation provided in the citation for Figure 8 and Appendix B.

152   John E. Eck & Edward R. Maguire, *Have Changes in Policing Reduced Violent Crime?: An Assessment of the Evidence*, *in* The Crime Drop in America 207, 208 (Alfred Blumstein & Joel Wallman eds., 2000) (emphasis added).

153   The changes in police numbers for the 1990s and 2000s were calculated using the total police employment count for the United States from the Brennan Center's dataset, using both UCR and BJS data. *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm; *see also* Bureau of Justice Statistics, Justice Expenditure and Employment Data Extracts, *available at* http://www.bjs.gov/index.cfm?ty=tp&tid=161.

154   FBI, Uniform Crime Reports, *available at* http://www.fbi.gov/about-us/cjis/ucr/ucr-publications (providing data from 1980 to 2013); *see also* Bureau of Justice Statistics, Justice Expenditure and Employment Data Extracts, *available at* http://www.bjs.gov/index.cfm?ty=tp&tid=161. For more information, see Appendix B.

155   U.S. Dep't of Justice, Violent Crime Control and Law Enforcement Act of 1994: Fact Sheet (1994), *available at* https://www.ncjrs.gov/txtfiles/billfs.txt ("Competitive grant program (COPS Program) to put 100,000 police officers on the streets in community policing programs. $1.3 billion available in 1995. $7.5 billion authorized in 1996-2000").

156   *Id.* (establishing competitive grant program to improve law enforcement training and information systems); U.S. Gov't Accountability Office, GAO-13-521, Community Policing Hiring Grants 1 (1998) (since 1994, COPS "has awarded roughly $14 billion in grants to law enforcement agencies to support the advancement of community policing"); Office of Cmty. Oriented Policing Servs., U.S. Dep't of Justice, The Impact of the Economic Downturn on American Police Agencies iv, 9 (2011), *available at* http://1.usa.gov/1ClIAl5 (illustrating the "steady increase in law enforcement personnel, both sworn and civilian, between 1986 and 2008").

157   Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 176-177, 184, tbl.5 (2004) (with high certainty of the estimated impact, increases in the police population brought down property crime by 8 percent and violent crime and homicide by 12 percent); *see also* Steven D. Levitt, *Using Electoral Cycles in Police Hiring to Estimate The Effect of Police on Crime 1997*, 83(2) 87 Am. Econ. Rev. 270, 270 (1997).

158   Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 177, 184 (2004).

159   Hope Corman & H. Naci Mocan, *A Time-Series Analysis of Crime, Deterrence, and Drug Abuse in New York City*, 90 Am. Econ. Rev. 584, 595 (2000).

160   Kovandzic and Sloan report an average elasticity of crime with respect to police numbers -0.45 of -0.14, meaning "a 10 percent increase in police levels lowered crime rates by 1.4 percent over time." Tomislav V. Kovandzic & John J. Sloan, *Police Levels and Crime Rates Revisited: A County-Level Analysis From Florida (1980–1998)*, 30 J. Crim. Just. 65, 73 (2002).

161   Franklin E. Zimring, The City that Became Safe: New York's Lessons for Urban Crime and Its Control 113, fig.5.5 (2011).

162   Levitt finds a larger, significant effect of police numbers on crime likely because he directly addresses the simultaneity of the relationship between police and crime: policing hiring may increase in response to growing crime, but at the same time crime may fall in response to increased police hiring. He addresses this relationship using the econometric technique of instrumental variables. As a result of his innovative treatment, the authors turn to his results to draw some conclusion about the true relationship between police numbers and crime. *See* Steven D. Levitt, *Using Electoral Cycles in Police Hiring to Estimate The Effect of Police on Crime 1997*, 83(2) 87 Am. Econ. Rev. 270, 270 (1997).

163   Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 177, 184 (2004); *see also* Steven D. Levitt, *Using Electoral Cycles in Police Hiring to Estimate The Effect of Police on Crime 1997*, 87 Am. Econ. Rev. 270, 270 (1997).

164   *See, e.g.*, Isaac Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 Am. Econ. Rev. 397, 397 (1975); Lawrence Katz, Steven D. Levitt & Ellen Shustorovich, *Prison Conditions, Capital Punishment, and Deterrence*, 5 Am. L. & Econ. Rev. 318, 318 (2003).

165   *See, e.g.*, Isaac Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 Am. Econ. Rev. 397, 397 (1975).

166   *See, e.g.*, Joseph Lentol et al., The Death Penalty in New York 5 (2005), *available at* http://assembly.state.ny.us/comm/Codes/20050403/deathpenalty.pdf (noting that Jeffrey Fagan's extensive analysis of death penalty deterrence studies indicated "no reliance evidence that the death penalty has deterred murder in New York").

167   Tracy L. Snell, Bureau of Justice Statistics, Capital Punishment, 2011 – Statistical Tables 14 tbl.10 (2013), *available at* http://www.bjs.gov/content/pub/pdf/cp11st.pdf.

168   Isaac Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 Am. Econ. Rev. 397, 414 (1975) (using data set from 1935 to 1969 in the United States).

169   N. H. Mocan & R. K. Gittings, *Getting Off Death Row: Commuted Sentences and the Deterrent Effect of Capital Punishment*, 46 J. L. & Econ. 453, 474 (2003) (using data set from 1977 to 1997 in the United States).

170   *The Death Penalty Deters Crime and Saves Lives, Before the Subcomm. on the Constitution, Civil Rights, and Property Rights of the S. Comm. on the Judiciary*, 110th Cong. (2007) (statement of David B. Muhlhausen, Research Fellow, Heritage Foundation), *available at* http://herit.ag/1z1EPQm; *see also* Hashem Dezhbakhsh et al., *Does Capital Punishment Have a Deterrent Effect? New Evidence from Post-moratorium Panel*, 5 Am. L. & Econ. Rev. 344, 369 (2003).

171   Lawrence Katz, Steven D. Levitt & Ellen Shustorovich, *Prison Conditions, Capital Punishment, and Deterrence*, 5 Am. L. & Econ. Rev. 318, 318 (2003).

172   *Id.*

173   *See generally, e.g.*, Lawrence Katz, Steven D. Levitt & Ellen Shustorovich, *Prison Conditions, Capital Punishment, and Deterrence*, 5 Am. L. & Econ. Rev. 318, 318 (2003).

174   John J. Donohue & Justin J. Wolfers, *Uses and Abuses of Empirical Evidence in the Death Penalty Debate*, 58 Stan. L. Rev. 791, 793-94 (2005).

175   *Id.*

176   *See* Tracy L. Snell, Bureau of Justice Statistics, Prisoners Executed Under Civil Authority in the United States, by Year, Region, and Jurisdiction, 1977-2013 (2013), *available at* http://1.usa.gov/1Ex9CoW.

177   *See UCR Data Online*, Uniform Crime Reports, Crime in the United States by Volume and Rate per 100,000 Inhabitants, 1994–2013,tbl.1, http://1.usa.gov/1BE7VGm (showing 14,196 reported instances of murder and non-negligent manslaughter in 2013).

178   *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 175-76 (2004) (stating that "given the rarity with which executions are carried out in this country and the long delays in doing so, a rational criminal should not be deterred by the threat of execution").

179   *See* Bureau of Justice Statistics, Executions, http://www.bjs.gov/index.cfm?ty=tp&tid=182.

180   For more on data sources and methodology, see Appendix B.
        See Jim Cleary & Emily Shapiro, Minn. H.R. Research Dep't., *The Effects of "Shall Issue" Concealed-Carry Licens-ing Laws: A Literature Review* (1999), *available at* http://www.house.leg.state.mn.us/hrd/pubs/concarry.pdf. For more information on the methodology and data sources for this variable, see Appendix B. The regression analysis does not include laws permitting the carrying of concealed weapons *without* a permit.

181   *See* 2013 Ark. Acts. 746 (2013) (codified as amended at Ark. Code Ann. § 5-73-120).

182   Mass. Gen. Laws Ann. ch. 140 § 131.

183   J. R. Lott, Jr. & D. B. Mustard, *Crime, Deterrence, and Right-to-Carry Concealed Handguns*, 26 J. Legal Stud. 1, 62-64 (1997).

184   John R. Lott, Jr., More Guns, Less Crime: Understanding Crime and Gun Control Laws (2010).

185   Michael Waldman, The Second Amendment: A Biography 162 (2014).

186   *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 175 (2004) (noting that crimes were already declining before concealed carry law were passed, that robbery rates were not affected as predicted, and that adding additional laws into the analysis caused Lott's causation finding to disappear).

187   *See* Nat'l Research Council, Firearms And Violence: A Critical Review 120-121 (2004) ("We conclude that, in light of (a) the sensitivity of the empirical results to seemingly minor changes in model specification, (b) a lack of robustness of the results to the inclusion of more recent years of data (during which there are many more law changes than in the earlier period), and (c) the imprecision of some results, it is impossible to draw strong conclusions from the existing research on the causal impact of these should be laws").

188   *See, e.g.,* Michael Siegel et al., *The Relationship Between Gun Ownership and Firearm Homicide Rates in the United States, 1981-2010*, 103 Am. J. Pub. Health 2098, 2098 (2013) (". . . for each percentage point increase in gun own-ership, the firearm homicide rate increased by 0.9%").

189   *See* Mark Duggan, *More Guns, More Crime*, 109 J. Political Economy 1086, 1088 (2001) (finding gun ownership and homicide are significantly positively related, but does not have the same correlation with nongun homicide rates).

190   Ian Ayres & John Donohue, *Shooting Down the 'More Guns, Less Crime' Hypothesis*, 55 Stan. L. Rev. 1193, 1214 (2003).

191   Ian Ayres & John Donohue, *More Guns, Less Crime Fails Again: The Latest Evidence from 1977-2006,* 6 Econ. J. Watch 218, 229 (2009) (finding right to carry laws increase aggravated assault and are consistent with higher rates of murder and robbery).

192   Michael Siegel et al., *The Relationship Between Gun Ownership and Firearm Homicide Rates in the United States, 1981-2010*, 103 Am. J. Pub. Health 2098, 2098 (2013).

193   For more information, see Appendix B.

194   Raphael and Winter-Ebmer theorize that more unemployment might reduce crime, because of changing "exposure of possible victims to potential offenders." When more people are working and out rather than at home, there are more encounters with potential offenders, and therefore more crime. *See* Steven Raphael & Rudolf Winter-Ebmer, *Identify-ing the Effect of Unemployment on Crime*, 44 J. Law & Econ. 259, 262 (2001).

195   Bureau of Labor Statistics, Databases, Tables & Calculators by Subject, Labor Force Statistics from the Current Population Survey, http://data.bls.gov/timeseries/LNS14000000.

196   *See, e.g.*, Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 170-71 (2004) (concluding that unemployment bears a "statistically significant but substantively small relationship" with property crime).

197   Shawn Bushway & Peter Reuter, *Labor Markets and Crime, in* Crime: Public Policies for Crime Control 220 (2004); Richard Freeman, *The Economics of Crime, in* Handbook of Labor Economics 3529 (1999).

198   Steven D. Levitt, *Alternative Strategies for Identifying the Link Between Unemployment and Crime*, 17 J. Quantitative Criminology 377, 384 (2001).

199   Steven Raphael & Rudolf Winter-Ebmer, *Identifying the Effect of Unemployment on Crime*, 44 J. L. & Econ. 259, 280-81 (2001).

200   *See Regional and State Employment and Unemployment*, Federal Reserve Bank of Saint Louis, http://research. stlouisfed.org/fred2/release?rid=112&soid=22 (providing per capita data for each state based upon data from U.S. Department of Commerce).

201   *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six That Do Not*, 18 J. Econ. Persp. 163, 170 (2004).

202   *Regional and State Employment and Unemployment*, Federal Reserve Bank of Saint Louis, http://bit.ly/1Exa0Uz (providing data from the U.S. Bureau of Economic Analysis).

203   Steven D. Levitt, *The Changing Relationship between Income and Crime Victimization*, 5 FRBNY Economic Pol'y Rev. 87, 95-96 (1999).

204   E. Britt Patterson, *Poverty, Income Inequality, and Community Crime Rates*, 29 Criminology 755, 769 (1991).

205   *See* John R. Hipp, Spreading the Wealth: The Effect of the Distribution of Income and Race/Ethnicity Across Households and Neighborhoods on City Crime Trajectories 1-6 (2010), http://1.usa.gov/1ClJHkT.

206   Masanori Hashimoto, *The Minimum Wage Law and Youth Crimes: Time-Series Evidence*, 30 J. Law Econ. 443, 444 (1987).

207   *See generally* David Neumark and William L. Wascher, *Minimum Wages and Employment,* 3 Foundations and Trends® in Microeconomics 1-182 (2007) (providing overview of literature on the effects of minimum wage on employment).

208   *See State Per Capita Personal Income*, Federal Reserve Bank of Saint Louis, http://bit.ly/1Exa0Uz (providing data from the U.S. Bureau of Economic Analysis).

209   U.S. Census Bureau, Historical Income Tables: Households: Tbl. H-3, http://1.usa.gov/1k5MPqJ.

210   Miguel Llanos, *Crime in Decline, But Why? Low Inflation among Theories*, NBC News (Sept. 20, 2011), *available at* http://nbcnews.to/1wqskrW.

211   *See* Alan Seals & John Nunley, *The Effects Of Inflation And Demographic Change On Property Crime: A Structural Time Series Approach*, Department Of Economics And Finance Working Paper Series 16 (2007), *available at* http:// bit.ly/186ejeJ.

212   *See* Bureau of Labor Statistics, Consumer Price Index, http://www.bls.gov/cpi/.

213   Richard Rosenfeld, Address at John Jay Symposium on Justice and Prosperity (Feb. 10, 2014).

214   *See* Richard Rosenfeld & Robert Fornango, *The Impact of Economic Conditions on Robbery and Property Crime: The Role of Consumer Sentiment,* 45 Crim. 735, 769 (2007).

215   *See Surveys of Consumers*, Univ. Mich., http://www.sca.isr.umich.edu/data-archive/mine.php (providing annual, regional data through the Consumer Sentiment Index).

216   Richard Rosenfeld & Robert Fornango, *The Impact of Economic Conditions on Robbery and Property Crime: The Role of Consumer Sentiment,* 45 Crim. 735, 756 tbl.5 (2007).

217   *Id.* (estimating that increases in consumer sentiment were responsible for 33 percent of the drop in burglary, 48 percent of the drop in larceny and 28 percent of the drop in motor vehicle theft).

218   *Id.* at 740.

219   *Id.* at 740.

220   Improved private precautions through technological advances likely played a role in the sharp decline in auto theft. *See* Philip Cook & Jens Ludwig, *Economical Crime Control, in* Controlling Crime: Strategies and Tradeoffs 1, 4 (Philip J. Cook et al. eds., 2011), *available at* http://www.nber.org/chapters/c12077.pdf; *see also* Ian Ayers & Steven D. Levitt, *Measuring Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack*, 113 Q. J. Econ. 43 (1998), *available at* http://qje.oxfordjournals.org/content/113/1/43.short.

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222 *See, e.g.*, Hope Corman & Naci H. Mocan, *Alcohol Consumption, Deterrence, and Crime in New York City* 3 (Nat'l Bureau of Econ. Research, Working Paper No. 18731, 2013), *available at* http://www.nber.org/papers/w18731 (finding that "an increase in alcohol consumption has a positive impact on assaults, rapes and grand larcenies, but alcohol has no impact on murders, robberies, burglaries and motor-vehicle thefts" based on study conducted between 1983 and 2002 in New York City); Sandra Lapham, *Screening and Brief Intervention in the Criminal Justice System*, 28 Alcohol Research & Health 85, 85 (2005) (recognizing the "large proportions of offenders in the criminal justice system [that] have alcohol-related problems" and suggesting screening offenders for alcoholism "to prevent recidivism"); Nat'l P'ship on Alcohol Misuse and Crime, http://www.alcoholandcrime.org/.

223 *See* Robin A. LaVallee et al.,Nat'l Inst. on Alcohol Abuse & Alcoholism, Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1977–2012, fig.3 (2014), *available at* http://1.usa.gov/1CjfEKj.

224 *See generally* Sara Markowitz, *An Economic Analysis of Alcohol, Drugs, and Violent Crime in the National Crime Victimization Survey* (Nat'l Bureau of Econ. Research, Working Paper No. 7982, 2000), *available at* http://bit.ly/1xEDoTX; Susan Martin, *The Links Between Alcohol, Crime, and the Criminal Justice System: Explanations, Evidence, and Interventions*, 10 Am. J. Addictions 136 (2001).

225 *Issues, Alcohol and Crime,* Nat'l P'ship on Alcohol Misuse and Crime, http://bit.ly/15gfPsF.

226 Traci L. Toomey et al., *The Association between Density of Alcohol Establishments and Violent Crime within Urban Neighborhoods*, 36 Alcoholism: Clinical and Experimental Research 1468, 1468 (2012).

227 *See* Robin A. LaVallee et al., U.S Dep't of Health and Human Serv., Public Health Serv., Nat'l Inst. of Health, Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1977–2012, fig.3 (2014), *available at* http://pubs.niaaa.nih.gov/publications/surveillance98/CONS12.htm.

228 Given the relative stability of beer consumption over the past several years, the authors used 2012 data as a proxy for 2013 data. The authors projected alcohol data for 2013 in order to run their regression on the 2013 data for all other variables. This decision was vetted by empirical experts. For further explanation, see Appendix B.

229 *See* Sara Markowitz, *An Economic Analysis of Alcohol, Drugs, and Violent Crime in the National Crime Victimization Survey* (Nat'l Bureau of Econ. Research, Working Paper No. 7982, 2000), 2, *available at* http://bit.ly/1xEDoTX.

230 *See, eg.,* Steven D. Levitt, *Alternative Strategies for Identifying the Link Between Unemployment and Crime*, 17 J. Quantitative Criminology 377, 379 (2001).

231 *See* Steven D. Levitt, *The Limited Role of Changing Age Structure in Explaining Aggregate Crime Rates*, 37 Criminology 581, 583 (1999) (crime offending age peaks between about 15-24, then declines thereafter); Patsy Klaus & Callie Marie Rennison, Bureau of Justice Statistics, Age Patterns in Violent Victimization, 1976–2000 1 (2002), *available at* http://www.bjs.gov/content/pub/pdf/apvv00.pdf (showing victimization rates similarly high for age groups between 12 to 24).

232 *See State Population Estimates and Demographic Components of Change: 1980 to 1990, by Single Year of Age and Sex*, U.S. Census Bureau, http://www.census.gov/popest/data/state/asrh/1980s/80s_st_age_sex.html; *New Population Estimates with Demographic Detail Available*, Mo. Census Data Ctr., http://mcdc.missouri.edu/ (providing data from 1990 to 2013). The U.S. Census Bureau collects population data every ten years. Additionally, it uses statistically methods to estimate populations in non-census years.

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235 *See generally* Travis Hirschi & Michael Gottfredson, *Commentary: Testing the General Theory of Crime*, 30 J. Research Crime & Delinquency 47 (1993).

236 *See* Charles R. Tittle et al., *Gender, Age, and Crime/Deviance: A Challenge to Self-Control Theory*, 40 J. Research Crime & Delinquency 426, 443 (2003).

237 *See* Steven D. Levitt, *The Limited Role of Changing Age Structure in Explaining Aggregate Crime Rates*, 37 Criminology 581, 592 (1999).

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241   *See generally* Walter R. Gove, *The Effect of Age and Gender on Deviant Behavior: A Biopsychosocial Perspective*, *in* Gender and the Life Course 115, 116 (1985).

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243   For further explanation, see Appendix B.

244   *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 179 (2004) (attributing the receding crack epidemic to one of the four main causes for the crime drop in the 1990s); *see also* Roland G. Fryer et al., *Measuring the Impact of Crack Cocaine*, (Nat'l Bureau of Econ. Research, Working Paper No. 11318, 2005), *available at* http://www.nber.org/papers/w11318 (estimating a positive and statistically significant effect of crack on crime).

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254   *See* Edith Fairman Cooper, The Emergence of Crack Cocaine Abuse 39 (2002) (explaining that crack cocaine data collection started in 1988). To access these surveys, see *Browse and Download Data*, Substance Abuse and Mental Health Data Archive (SAMHDA), http://www.icpsr.umich.edu/icpsrweb/SAMHDA/download. (located under "National Survey on Drug Use and Health (NSDUH) series" in the National Household Survey on Drug Abuse and National Survey on Drug Use and Health).

255   *See* John J. Donohue & Steven D. Levitt, *The Impact of Legalized Abortion on Crime*, 116 Q. J. Econ. 379, 386–389 (2001).

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273   For more on broken windows, see George L. Kelling & James Q. Wilson, *Broken Windows: The Police and Neighborhood Safety*, The Atlantic, March 1, 1982, *available at* http://theatln.tc/1Bi2HPx. For more on hot spots policing, see John E. Eck et al., Nat'l Inst. Justice, Mapping Crime: Understanding Hot Spots 2 (2005), *available at* http://discovery.ucl.ac.uk/11291/1/11291.pdf. For a definition of stop and frisk, *see Stop and Frisk*, Legal Info. Inst., http://www.law.cornell.edu/wex/stop_and_frisk.

274   Several police departments that use CompStat define the tool as "Computer Statistics" or "Comparative Statistics." Both are commonly accepted as the full title of this program. *See* David Thomas, Professionalism in Policing: An Introduction 146 (2010).

275   *See What is CompStat?, Implementing and Institutionalizing CompStat in Maryland*, U. Md., http://bit.ly/1zzQebK.

276   Bureau of Justice Assistance & Police Exec. Research Forum, CompStat: Its Origins, Evolution, and Future in Law Enforcement Agencies 36 (2013), *available at* http://bit.ly/15gh0Z4 (providing data collected in 2011).

277   Jeff Godown, *The CompStat Process: Four Principles for Managing Crime Reduction*, Police Chief, http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display&article_id=1859&issue_id=82009; *see also* Phyllis McDonald, Managing Police Operations: Implementing the NYPD Crime Control Model Using COMPSTAT (2001).

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281   *See* James J. Willis et al., The Police Found., CompStat and Organizational Change in the Lowell Police Department v (2004), *available at* http://bit.ly/1AUomuk; *see also* James Willis et al., CompStat in Practice: An In-Depth Analysis of Three Cities 5 (2003), *available at* http://www.policefoundation.org/content/compstat-practice-depth-analysis-three-cities.

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284   Frank Main, *Number of Gang Shootings in Chicago Taking Steep Dive: McCarthy*, Chicago Sun-Times, (March 18, 2014), http://www.suntimes.com/news/metro/26293413-418/number-of-gang-shootings-in-chicago-taking-steep-dive.html.

285   For example, retired NYPD police captain and criminal justice professor John Eterno described Compstat as part of the "police performance culture," where police "disregard basic rights, ignore victims, mandate quotas and manipulate numbers." John Eterno, Op-Ed, *Policing by the Numbers*, N.Y. Times, June 17, 2012, *available at* http://nyti.ms/1ClP0Rn. Eterno asserted that such practices are necessary for command to "beat last year's figures," but it does not make for efficient policing. *Id. See also* John A. Eterno & Eli B. Silverman, The Crime Numbers Game: Management by Manipulation (Advances in Police Theory and Practice) (2012).

286   David Bernstein & Noah Isackson, *The Truth About Chicago's Crime Rates*, Chicago Mag. (Apr. 7, 2014, 9:36 AM), www.chicagomag.com/Chicago-Magazine/May-2014/Chicago-crime-rates/.

287   John A. Eterno & Eli B. Silverman *The NYPD's Compstat: Compare Statistics or Compose Statistics?* 12 Int'l J. Police Sci. & Mgmt. 3 (2010), *available at* http://nylawyer.nylj.com/adgifs/decisions/011311eterno_silverman.pdf; Val Van Brocklin, *Fudge Factor: Cooking the Books on Crime Stats*, PoliceOne.com (June 20, 2012), http://bit.ly/1BM19ju ("In 2010, more than half of 309 retired NYPD officers admitted to fudging crime stats in a survey conducted by two academicians from Molloy and John Jay Colleges").

288   Jeff Godown, *COMPSTAT and Crime Reduction,* L.A. Police Dep't (Jan. 11, 2007), http://bit.ly/186fr1V.

289   For an explanation of how these data were collected, see Appendix B.

290   Michael R. Gottfredson & Travis Hirschi, A General Theory of Crime *270 (1990).*

291   David H. Bayley, Police for the Future 3 (1994).

292   Levitt concludes that for the case of New York City, new policing tactics instituted during Rudy Guiliani's mayoral administration in 1993 did not have a large effect on the drop in crime. He notes that crime rates for New York began falling in 1990 and therefore the crime drop in the early years of the 1990s could not have been explained by policing tactics enacted later. Levitt also claims that decreases in the crime rate that do correspond in time with the implementation of different policing tactics could actually be explained by the increase in the number of police officers that tend to occur simultaneously. Additionally, he argues that given that police tactics can vary widely by department, changes in tactics are hard to credit with widespread crime declines. *See* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not*, 18 J. Econ. Persp. 163, 172 (2004).

293   *See generally* Daniel S. Nagin, *Deterrence: A Review of the Evidence by a Criminologist for Economists*, 90 Ann. Rev. Econ. 83 (2013) (citing Lawrence Sherman et al., *Hot Spots of Predatory Crime: Routine Activities and the Criminology of Place*, 27 Criminology 27 (1989)).

294   *See generally* Lawrence W. Sherman & David Weisburd, *General Deterrent Effects of Police Patrol in Crime "Hot Spots": A Randomized, Controlled Trial*, 12 Just. Q. 625 (1995).

295   Nat'l Research Council, Fairness and Effectiveness in Policing: The Evidence 167 (Wesley Skogan & Kathleen Frydl eds., 2004).

296 *See* Anthony A. Braga, *Hot Spots Policing and Crime Prevention: A Systematic Review of Randomized Controlled Trials*, 1 J. Experimental Criminology 317 (2005); *see also* Anthony A. Braga, Campbell Systematic Reviews, The Effects of Hot Spots Policing on Crime 13 (2007), *available at* http://bit.ly/1xEFi76; *see also* Lawrence W. Sherman et al., Nat'l Inst. Justice, The Kansas City Gun Experiment 684 (1995), *available at* https://www.ncjrs.gov/pdffiles/kang.pdf (Kansas City findings); *see also* Lawrence W. Sherman & David Weisburd, *General Deterrent Effects of Police Patrol in Crime "Hot Spots": A Randomized, Controlled Trial*, 12 Just. Q. 625, 643 (1995) (Minneapolis findings).

297 *See generally* Anthony Braga, Cmty. Oriented Policing Servs., Police Enforcement Strategies to Prevent Crime in Hot Spot Areas 18-20 tbl.2 (2008), *available at* http://1.usa.gov/1sQigO1.

298 U.S. Dep't of Justice, Cmty. Oriented Policing Servs., Community Policing Defined 3 (2008), *available at* http://www.cops.usdoj.gov/pdf/vets-to-cops/e030917193-CP-Defined.pdf.

299 *See* Nat'l Research Council, Fairness and Effectiveness in Policing: The Evidence 233–34 (Wesley Skogan & Kathleen Frydl eds., 2004).

300 *See generally* Lawrence W. Sherman, *Policing for Crime Prevention*, *in* Evidence-Based Crime Prevention 295 (Lawrence W. Sherman et al. eds., 2002); Nat'l Research Council, Fairness and Effectiveness in Policing: The Evidence 232–35 (Wesley Skogan & Kathleen Frydl eds., 2004).

301 Nat'l Research Council, Fairness and Effectiveness in Policing: The Evidence 234 (Wesley Skogan & Kathleen Frydl eds., 2004).

302 Charis E. Kubrin et al., *Proactive Policing and Robbery Rates Across U.S. Cities,* 48 Criminology 57, 83 (2010).

303 *See* U.S. Dep't of Justice, Cmty. Oriented Policing Servs., Community Policing Defined 10 (2008), *available at* http://www.cops.usdoj.gov/pdf/vets-to-cops/e030917193-CP-Defined.pdf; *see also* U.S. Dep't of Justice, Cmty. Relations Serv., Principles of Good Policing: Avoiding Violence Between Police and Citizens 42 (2003), *available at* http://www.justice.gov/archive/crs/pubs/principlesofgoodpolicingfinal092003.pdf.

304 David F. Greenberg, *Studying New York City's Crime Decline: Methodological Issues*, 31 Just. Q. 154, 164 (2014).

305 Richard Rosenfeld et al., *Did Ceasefire, CompStat, and Exile Reduce Homicide?*, 4 Criminology & Pub. Pol'y 419, 435 (2005).

306 Hyunseok Jang et al., *An Evaluation of CompStat's Effect on Crime: The Fort Worth Experience*, 13 Police Q. 387, 399, 406-07 (2010).

307 *See* Lorraine Mazerolle et al., *The Impact of COMPSTAT on Reported Crime in Queensland*, 30 Policing: An Int'l J. of Police Strategies & Mgmt. 237, 244 (2007).

308 *See generally* Bureau of Justice Assistance & Police Exec. Research Forum, CompStat: Its Origins, Evolution, and Future in Law Enforcement Agencies (2013), *available at* http://bit.ly/15gh0Z4; *see also* David N. Kelley & Sharon L. McCarthy, The Report of the Crime Reporting Review Committee to Commissioner Raymond W. Kelly Concerning CompStat Auditing (2013), *available at* http://on.nyc.gov/1GCsEyS.

309 *See generally* David Weisburd et al., *Reforming to Preserve: CompStat and Strategic Problem Solving in American Policing*, 2 Criminology & Pub. Pol'y 421 (2002); *see also* David Weisburd et al., CompStat and Organizational Change: A National Assessment (2008), *available at* https://www.ncjrs.gov/pdffiles1/nij/grants/222322.pdf; William F. Walsh, *CompStat: An Analysis of an Emerging Police Managerial Paradigm*, 24 Policing: An Int'l J. of Police Strategies and Mgmt. 347 (2001); David Weisburd et al., Police Found., The Growth of CompStat in American Policing(2004), *available at* http://www.policefoundation.org/content/growth-compstat-american-policing.

310 *See* Bureau of Justice Assistance & Police Exec. Research Forum, CompStat: Its Origins, Evolution, and Future in Law Enforcement Agencies vii (2013), *available at* http://bit.ly/15gh0Z4.

311 Jeff Godown, *The CompStat Process: Four Principles for Managing Crime Reduction*, Police Chief, Dec. 2014, http://bit.ly/15vPx6k.

312 Michael Daly, *His Finest Moments Nice Surprise for City*, N.Y. Daily News (Apr. 2, 1996, 12:00 AM), http://nydn.us/1CUXvRm.

313 Dennis C. Smith & William J. Bratton, *Performance Management in New York City: CompStat and the Revolution in Police Management*, *in* Quicker, Better, Cheaper? Managing Performance in American Government 453, 459 (Dall W. Forsythe ed., 2001).

314   *See* David Weisburd et al., *Reforming to Preserve: CompStat and Strategic Problem Solving in American Policing*, 2 Criminology & Pub. Pol'y 421, 426 (2002); *see also* Michael Beer, Organization Change and Development: A Systems View (1980).

315   Letter from police official, New York Police Dep't, to Lauren-Brooke Eisen, Counsel, Brennan Center for Justice at NYU School of Law (July 10, 2014) (on file with authors).

316   *See* David Weisburd et al., Police Found., The Growth of CompStat in American Policing 11 (2004), *available at* http://www.policefoundation.org/content/growth-compstat-american-policing (demonstrating that over 60 percent of CompStat departments observed meetings with the NYPD).

317   *See* Habib Ozdemir, *CompStat: Strategic Police Management for Effective Crime Deterrence in New York City* 25 (International Police Executive Symposium, Working Paper No. 30, 2011) (reporting a 64.5 decrease in reported offenses in New York City from 1994 to 2009 as compared to nationwide decrease of 19.4 percent); *UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2012) (providing data from 2009 to 2012 for updated Brennan Center calculation).

318   Franklin Zimring, The City That Became Safe: New York's Lessons for Urban Crime and Its Control 143 (2011); *see also* Heather MacDonald, *It's the Cops, Stupid!*, New Republic, Feb. 2, 2012, *available at* http://bit.ly/1uyUNlA (recognizing that New York City has experienced a "radical transformation" since the early 1990s).

319   Franklin Zimring, The City That Became Safe: New York's Lessons for Urban Crime and Its Control 120 (2011).

320   *Id.* at 136; Franklin E. Zimring, *How to Stop Urban Crime Without Jail Time: What Cities Can Learn From NYC's Safest Decade,* Wall St. J., Jan. 28, 2012, http://on.wsj.com/1yxOxtz.

321   *See generally* David F. Greenberg, *Studying New York City's Crime Decline: Methodological Issues*, 31 Just. Q. 154 (2014) (finding "no indication . . . that CompStat had any non-trivial effect on violent or property crime rates in New York.").

322   *See, e.g.*, Heather MacDonald, Op-Ed, *Fighting Crime Where the Criminals Are*, N.Y. Times, June 26, 2010, at A19 (commending CompStat and defending racially discriminatory effect of stop-and-frisk practices simultaneously); Chris Smith, *What's Eating the NYPD?*, N.Y. Mag., Apr. 8, 2012, http://nymag.com/news/features/nypd-2012-4/#.

323   *See, e.g.*, Kristen Gwynne, *New Stop-and-Frisk Data: NYPD's Controversial Policing Tactic is On The Rise And Still Racist*, AlterNet (May 9, 2012, 1:12 PM), http://bit.ly/1L3ynO1.

324   *See* Ailsa Chang, *NYPD Orders Commanders to Review Stop and Frisk Activity*, WNYC News (May 9, 2012), http://bit.ly/1Bibn8p.

325   This decline in the use of strop-and-frisk originally began in the last few years under Commissioner Ray Kelly. *See* Pervaiz Shallwani, *NYPD Stop-and-Frisks Decrease by 60% in Single Year*, Wall St. J., Jan. 16, 2014, http://on.wsj.com/1m8Y4xn.

326   Henry Goldman, *NYC to Issue Tickets for Small Amounts of Pot in Lieu of Arrest*, Bloomberg, Nov. 10, 2014 http://bloom.bg/1unQ14F.

327   Joseph Goldstein & J. David Goodman, *Bratton Still Sees Challenges in a New York He Made Safer*, N.Y. Times, June 16, 2014, A1.

328   *See generally* David Weisburd et al., *Reforming to Preserve: CompStat and Strategic Problem Solving in American Policing*, 2 Criminology & Pub. Pol'y 421 (2002); *see also* David Weisburd et al., CompStat and Organizational Change: A National Assessment (2008), *available at* https://www.ncjrs.gov/pdffiles1/nij/grants/222322.pdf; William F. Walsh, *CompStat: An Analysis of an Emerging Police Managerial Paradigm*, 24 Policing: An Int'l J. of Police Strategies and Mgmt. 347 (2001); David Weisburd et al., Police Found., The Growth of CompStat in American Policing (2004), *available at* http://www.policefoundation.org/content/growth-compstat-american-policing.

329   *See* James Willis et al., CompStat in Practice: An In-Depth Analysis of Three Cities 3 (2003), *available at* http://www.policefoundation.org/content/compstat-practice-depth-analysis-three-cities; *see also* Eli Silverman, NYPD Battles Crime (1999); Phyllis McDonald, Managing Police Operations: Implementing the NYPD Crime Control Model Using COMPSTAT (2001); Vincent E. Henry, The CompStat Paradigm: Management Accountability in Policing, Business and the Public Sector (2d ed. 2003).

330   The 50 most populous cities were identified through data from the Census Bureau. *See Annual Estimates of the Residential Population for Incorporated Places over 50,000*, U.S. Census Bureau, http://1.usa.gov/1bkh0D4.

331   E-mail from Sergeant Joseph Redner, New York Police Department to Veronica Clark (Apr. 5, 2014) (confirmed CompStat in use and implemented in April 1994).

332   Tel. Interview with Sergeant Kendale Adams, Indianapolis Police Department (July 8, 2014) (confirmed no CompStat currently, but Indianapolis used an adaption for a short time called Indianapolis Management Accountability Program (IMAP)). *See* Thomas B. Rector, Where Guns Go to Kill: An Experiment of Illegal Gun Activity in Indianapolis, Indiana 50 (2010), *available at* http://bit.ly/1BM2c2I; *see also* Edmund McGarrell, *IPD's Innovative Efforts to Stop Crime,* Sagamore Inst., Nov. 6, 1996, *available at* http://www.sagamoreinstitute.org/library-article/ipds-innovative-efforts-to-stop-crime/.

333   Tel. Interview with Officer Tara Mabon, Memphis Police Department (confirmed CompStat in use and implemented in September 1997). See Phil Campbell, *Memphis Police Director Walter Winfrey Faces the Toughest Challenge of His Life—Pleasing His Boss,* Memphis Flyer, Nov. 13, 1997, *available at* http://bit.ly/1JnlRW6; s*ee also Police History,* City of Memphis, http://bit.ly/1Cjhpac.

334   E-mail from Officer Paul Pacillas, El Paso Police Department, to Julia Bowling (Apr. 3, 2014) (confirmed a CompStat program called Strategic Analysis of Crime (SAC) in use and implemented in 1997). *See* Larry T. Hoover, *CompStat as a Strategy: A Texas Perspective: Part I—Conceptual Framework, 11* Telemasp Bulletin 2 (2004), *available at* http://bit.ly/1yJXm48.

335   E-mail from Jennifer White, Deputy Chief, Arlington Police Department, to Veronica Clark (Oct. 24, 2013, 16:23 EST) (confirmed CompStat in use and implemented in November 1997).

336   E-mail from Patrick Baldwin, Director of Crime Analysis, Las Vegas Metropolitan Police Department to Julia Bowling (Apr. 21, 2014, 16:24 EST) (confirmed CompStat in use and implemented in November 1997).

337   Minneapolis, Minn. began using CODEFOR, modeled after CompStat, in January 1998. See Katherine Kersten, *Crackdown on Little Offenses Can Help Prevent the Big Ones,* Ctr. of the Am. Experiment, Feb. 28, 2001, *available at* http://bit.ly/1y3L2WX.

338   E-mail from Chief Steve Conrad, Louisville Metro Police Department, to Lauren-Brooke Eisen (Apr. 2, 2014) (confirmed CompStat in use and implemented in March 1998). *See* Louisville Metro Criminal Justice Commission, Meeting Summary 2 (Feb. 18, 2010), *available at* http://bit.ly/1zzS3FE.

339   E-mail from Officer Jillian Russell, Philadelphia Police Department, to Veronica Clark (Apr. 14, 2014, 12:15 EST) (confirmed CompStat in use and implemented in March 1998). See Howard Goodman, *CompStat: New Weapon for Police the Intense Weekly Meetings Zero in on Phila. Crime Statistics—And How to Thwart Criminals,* Philadelphia Inquirer, Dec. 11, 1998, *available at* http://bit.ly/1JnmFu6.

340   San Diego expanded its ARJIS for crime mapping to make it comparable to CompStat in April 1999. *See* Martin J. Zaworski, *Automated Information Sharing: Does It Help Law Enforcement Officers Work Better?,* Nat'l Inst. Justice, http://www.nij.gov/journals/253/pages/automated.aspx; A.B. 1568, Assemb. Comm. on Public Safety (May 11, 1999), *available at* http://bit.ly/186gjne.

341   Tel. Interview with Michelle Gigante, Officer, Sacramento Police Department (July 5, 2014) (confirmed CompStat implementation in 1998 or 1999, month and exact year unknown). *See* City of Sacramento City Council, Police Department Update 2011 3 (2011), *available at* http://bit.ly/1JdNXom.

342   E-mail from T.J. Wilham, Smart Policing Division Manager, Albuquerque Police Department, to Julia Bowling (July 2, 2014, 17:56 EST) (confirmed no CompStat currently, implementation sometime under Chief Gavin, between 1998 and 2001, but terminated in 2005. Conflicting information stated that CompStat was implemented under the current chief; in a PERF publication Police Chief Ray Schultz explained that Albuquerque does use a CompStat program and that the program's first full year of use was 2009. *See* Police Exec. Research Forum, *Police Leaders at PERF/BJA Meeting Discuss CompStat: Best Practices and Future Outlook,* 25 Subject to Debate 5 (2011), *available at* http://bit.ly/1yJXLUb.

343   Baltimore implemented CitiStat in June 2000. *See* Teresita Perez & Reece Rushing, Ctr. for American Progress, The CitiStat Model: How Data-Driven Government Can Increase Efficiency & Effectiveness 3 (2007), *available at* http://ampr.gs/15CPBSj; *see also* Noah Weiss, *Government by Numbers: How Citistat's Hard Data and Straight Talk Saved Baltimore,* Stan. Soc. Innovation Rev. 68 (2007), *available at* http://stanford.io/1yxQ1nM.

344   Raleigh implemented CompStat in 2001. *See* Deborah Lamm Weisel, North Carolina State Univ., Residential Speeding in Raleigh, North Carolina 14 (2004), *available at* http://bit.ly/1BM37Ap.

345   Tucson implemented a CompStat program called Targeted Operational Planning (TOP) in May 2002. E-mail from Katherine Moon, Police Crime Analyst, Research and Analysis Unit, Tucson Police Department, to Veronica Clark (confirmed TOP in use and implementation in May 2002). *See* Tucson Police Dep't Ann. Rep. 40 (2011), *available at* http://www.tucsonaz.gov/files/police/2011_tpd_annual_report.pdf.

346   E-mail from Michael Hoskins, Major, Oklahoma City Police Department, to Veronica Clark (Nov. 14, 2013, 11:54 EST) (confirmed a CompStat program called Comstat in use and implemented in July 2002). *See* City of Oklahoma City Fiscal Year 2003–2004 Proposed Budget D-126 (2003), *available at* http://bit.ly/1wqtNyL. Specifically, the program began in July 2002, according to Major Michael Hoskins at the Oklahoma City Police Department.

347   Atlanta implemented a CompStat program called Command Operations Briefing to Revitalize Atlanta (COBRA), in July 2002. *See* Atlanta Police Found., Four Years Later: A Status Review of the Atlanta Police Department's Implementation of the Linder Plan of Action 21 (2008), *available at* http://bit.ly/1yNYsKH; *see also* Press Release, City of Atlanta, Chief Turner Joins Mayor Cities Chiefs Association In Honoring Former Atlanta Police Chief Richard Pennington (Jan. 14, 2013), *available at* http://www.atlantaga.gov/index.aspx?page=672&recordid=1603.

348   E-mail from Sergeant Craig Buzbee, Fort Worth Police Department, to Veronica Clark (Apr. 15, 2014, 4:34 EST) (confirmed CompStat in use and implemented in 2002). S*ee Program Profile: CompStat (Forth Worth, Texas),* Crime Solutions, Nat'l Inst. Justice, http://www.crimesolutions.gov/ProgramDetails.aspx?ID=87.

349   E-mail from Commander Andrew Smith at the Los Angeles Police Department to Veronica Clark (confirmed CompStat in use, implemented in 1998, and updated to more closely resemble traditional a CompStat program, like New York's, by William Bratton in October 2002). *See* Walt Schick, *CompStat in the Los Angeles Police Department,* Police Chief, January 2004, http://bit.ly/1y3M3OH.

350   Omaha implemented CompStat in July 2003. *See* Tristan Bonn, Public Safety Auditor's Report 21 (2003), *available at* http://omahapoliceauditor.files.wordpress.com/2012/06/psa-2003-3q-report-final.pdf.

351   Tel. Interview with Ellen Washburn, Sergeant, San Jose Police Department, (July 2, 2014) and Lieutenant Anthony Mata, San Jose Police Department, (July 8, 2014) (confirmed no CompStat and implemented IMPACT in the 2004, which was revamped into RCITI (pronounced "Our City") in 2013). *See* Resume, Robert Davis 27 (2011), *available at* http://www.azcentral.com/ic/community/pdf/Redacted.Davis.pdf; *see also* Memorandum from Robert L. Davis, Chief of Police, City of San Jose to Hon. Mayor & City Council 4 (Sept. 11, 2007), *available at* http://bit.ly/1CGpV11.

352   Nashville implemented CompStat on March 5, 2004. *See* Nashville Police Dep't Ann. Rep. 4, 12 (2004), *available at* http://bit.ly/1GCvVyg.

353   E-mail from Steve Beedle, Crime Analyst, Portland Police Bureau to Veronica Clark (Apr. 11, 2014, 19:00 EST) (confirmed a CompStat program called Comstat in use and implemented in March 2004). *See* Portland Police Bureau, Renewing Our Community Policing Vision 2 (2004), *available at* http://bit.ly/1uyWPSx.

354   E-mail from Dennis Hebert, Captain, City of Virginia Beach Police, to Veronica Clark (Oct. 24, 2013, 10:44 EST) (confirmed CompStat in use and implemented in July 2004). *See Police Chief Jim A. Cervera,* City of Virginia Beach, http://www.vbgov.com/government/departments/city-manager/form-of-government/pages/police.aspx.

355   Dallas implemented CompStat in September 2004. *See* Dallas Police Dep't, Dallas Police Department Management and Efficiency Study, Update and Progress 19 (2005), *available at* http://bit.ly/1y3MIzU.

356   Kansas City, Mo. implemented a CompStat program called Comprehensive Strategic Team Accountability Review (CSTAR), in March 2005. *See* Jonas H. Baughman & Joel M. Caplan, Rutgers Ctr. on Public Security RTM Insights 3 n.4 (2010), *available at* http://www.rutgerscps.org/docs/KCPD_RTMinAction_Brief.pdf; *see also* Dep't Memorandum No. 05–28, Kansas City Police Dep't, CSTAR (Comprehensive Strategic Team Accountability Review) (Dec. 1, 2005), *available at* http://bit.ly/1JnoTts.

357   Tel. Interview by Veronica Clark with Cleveland Police Department representative (Oct. 16, 2013) (confirmed a CompStat program called CrimeView in use and implemented in October 2005). *See* Press Release, The Omega Group, City of Cleveland Implements CrimeView (Oct. 14, 2005), *available at* http://bit.ly/186hbrZ.

358   Columbus implemented a CompStat program, modeled after Baltimore's CitiStat program in January 2006. S*ee Columbus, Ohio Organizational Snapshot: Columbus*Stat,* Gov't Finance Officers Assoc., *available at* http://bit.ly/1BM4DT3.

359 Denver adapted their Command Operation Review and Evaluation (Core) program to resemble the CompStat structure in February 2006. *See* Alec Magnet, *Denver Tackles Crime, New York Style,* City J., 2007, *available at* http://bit.ly/1yJZ7Oz.

360 Fresno implemented a CompStat program called Crime View in May 2006. *See Crime View Maps and Reports, Fresno Police Department,* City of Fresno, http://bit.ly/1CV0JEE; *see also* Fresno Police Dep't Ann. Rep. 14 (2006), *available at* http://bit.ly/186hm6P.

361 E-mail from Sergeant Anthony Landato, Mesa Police Department, to Veronica Clark (Apr. 14, 2014, 16:50 EST) (confirmed CompStat in use and implemented in August 2006). *PARC Interview,* Police Assessment Resource Center, March 2009, http://bit.ly/186hnHV.

362 Washington, DC implemented a CompStat program, called CapStat, now DC Stat, in January 2007. *See* Mitch Wander, *Release the CapStat Results,* Greater Greater Washington, Dec. 22, 2010, *available at* http://bit.ly/1BM593x; s*ee also Revision to Crime Data Summary Information,* Crime Incidents (ASAP), http://map.data.dc.gov/About_Crimes.html.

363 Tel. Interview by Veronica Clark with Boston Police Department representative (confirmed CompStat in use and implemented in February 2007). *See* Boston Police Dep't Ann. Rep. 19 (2007), *available at* http://bit.ly/15CPTbZ.

364 Austin implemented CompStat in March 2008. *See* Jason Dusterhoft, Highway Enforcement Command, Austin Police Department 9 (2011), *available at* http://bit.ly/15vQD1J; s*ee also 2011 Traffic Safety Conference: Program,* Texas A&M Transp. Inst., http://bit.ly/15vQFqy.

365 E-mail from Paul Paskoff, Director, Research & Planning Division, Charlotte-Mecklenburg Police Department, to Julia Bowling and Lauren-Brooke Eisen (Apr. 3, 2014, 10:58 EST) (confirmed CompStat in use and implemented in April 2008). *See* Charlotte Mecklenburg Police Dep't Ann. Rep. 26 (2007), *available at* http://bit.ly/1CjkJCm.

366 Milwaukee implemented CompStat in July 2008. *See* Mike Nichols, Wis. Police Res. Inst., Why Milwaukee's Police Are More Effective Than Their Teachers (2011), *available at* http://bit.ly/1GCzg0g.

367 Oakland implemented CompStat in January 2009. *See* City of Oakland Agenda Rep. 1 (2009), *available at* http://clerkwebsvr1.oaklandnet.com/attachments/21028.pdf.

368 E-mail from Officer Leland Ashley, Tulsa Police Department, to Veronica Clark (Apr. 14, 2014, 10:07 EST) (confirmed CompStat in use and implemented in March 2009). *See* Margaret Stokes & Chris Howell, *Tulsa Police Begin CompStat, News on 6* (Mar. 24, 2009, 4:45 PM), *available at* http://www.newson6.com/Global/story.asp?s=10063615&clienttype=printable.

369 San Francisco implemented CompStat in October 2009. *See* Alex Emslie*, CompStat vs. Community Policing,* San Francisco Bay Guardian, June 22, 2010, *available at* http://bit.ly/15CQeeG.

370 E-mail from Molly Miles, Colorado Springs Police Department to Veronica Clark (Apr. 11, 2014, 7:59 EST) (confirmed CompStat program implemented in past and stopped in 2011). *See* Police Exec. Found.*, Police Leaders at PERF/BJA Meeting Discuss CompStat: Best Practices and Future Outlook, 25* Subject to Debate 7–8 (2011), *available at* http://www.policeforum.org/assets/docs/Subject_to_Debate/Debate2011/debate_2011_marapr.pdf (CompStat implemented in December 2010).

371 Tel. Interview with Chicago Police Department representative Timothy Jordan (Dec 17, 2014) (confirmed that before Garry McCarthy took over, the crime mapping and accountability program in place in Chicago was not called CompStat and did not embody the system in New York and other cities. He confirmed that with McCarthy's CompStat, Chicago police began looking at more granular data, in shorter intervals, at more regular meetings, as well as modifying the organizational structure). Chicago implemented CompStat around July 2011. *See* Whet Moser*, Meet Garry McCarthy, Chicago's New Top Cop,* Chicago Mag., May 2, 2011, *available at* http://chi.mg/1CjkV4p; s*ee also* Bureau of Justice Assistance & Police Exec. Research Forum, CompStat: Its Origins, Evolution, and Future in Law Enforcement Agencies 12 (2013), *available at* http://bit.ly/15gh0Z4.

372 San Antonio implemented a CompStat program called StrIDE in October 2011. *See* Jazmine Ull*oa, SAPD Looks to Maintain E. Side Progress,* My San Antonio, Oct. 19, 2011, *available at* http://bit.ly/15gpf7z; s*ee also* San Antonio 24/7: Providing Services/Measuring Results, Fiscal Year 2012 3rd Quarter Results 6 (2012), *available at* http://bit.ly/1GCzGUv.

373   E-mail from Officer Jennifer Moreno, Detroit Police Department to Veronica Clark (Apr. 11, 2014, 15:54 EST) (confirming CompStat in use and implemented in July 2013). The Midtown neighborhood of the city established a CompStat program in 2009, but the full implementation of the program to the rest of the city was ongoing as of 2013. See *CUS Urban Safety Program helps facilitate Midtown COMPSTAT,* Wayne St. U. Ctr. for Urban Stud., Nov. 12, 2009, *available at* http://bit.ly/1CV3MMU; *see also* City Of Detroit, Restructuring Plan: Mayor's Implementation Progress Report 25 (2013), *available at* http://bit.ly/1Cm0Meu.

374   Tel. Interview with Seattle Police Department representative (July 7, 2014) (confirmed SeaStat in use and implemented in 2014). *See* Seattle Police Dep't, *SeaStat: What Is It? And How Are Police Using It to Disrupt Crime Trends?,* Sept. 17, 2014, *available at* http://bit.ly/1CjjrqT.

375   Jacksonville has a CompStat program, called Crime Reduction by Intervention & Management of Enforcement Strategies (CRIMES), but the date of implementation is unknown. *See* John H. Rutherford, Jacksonville Journey Steering Committee Briefing 63 (2008), *available at* http://bit.ly/1uyXDXD.

376   Tel. Interview with public information officers (confirmed CompStat in use, implementation date unknown). *See CompStat Support,* Miami Police Dep't, http://www.miami-police.org/CompStat_support.html.

377   Tel. Interview with Lieutenant Dan East, Public Information Officer, Wichita Police Department (July 7, 2014) (confirmed no CompStat ever used, and confirmed use of community policing beginning in the 1990s). *See* Stan Finger*, Wichita Police Bureaus Add Analysts to Look for Crime Trends,* Wichita Eagle, Feb. 19, 2012, *available at* http://bit. ly/1BicXax.

378   Tel. Interview with Keith Smith, Public Information Officer, Houston Police Department (July 7, 2014) (confirmed no CompStat ever used, and confirmed use of Real Time Crime Information Center beginning in 2008).

379   Phoenix does not have CompStat, but currently uses a Geographic Information System called ArcView to map crimes. A City Council Policy Agenda Report from 2013 mentions a plan to implement a CompStat program in the near future. The department confirmed that CompStat is very new in the department and is not yet fully implemented. *See Crime Statistics and Maps,* Phoenix Police Dep't, http://phoenix.gov/police/crista1.html; *see also* Policy Agenda from David Cavazos, City Manager, Phoenix to Mario Paniagua, Budget & Research Director 107 (Feb. 12, 2013), *available at* http://phoenix.gov/webcms/groups/internet/@inter/@dept/@budget/documents/web_content/d_051145.pdf.

380   There was conflicting evidence of CompStat usage in Long Beach. Long Beach was not included in the regression analysis due to the conflicting evidence. Compare Telephone Interview with Eric Cregeen, Sergeant and Public Information Officer, Long Beach Police Department (July 3, 2014) (confirmed Long Beach never had a CompStat program in place), *with* Ed Brock*, Cities Find New Uses for Crime Fighting Tool,* Am. City & Cnty., Nov. 1, 2006, *available at* http://americancityandcounty.com/publicsafety/government_cit*ies_find_new* (LBPD Crime Analyst stated that CompStat had been in use in Long Beach for three years).

381   *See* footnotes for 331-380; *see also* FBI, Uniform Crime Reports as prepared by the National Archive of Criminal Justice Data, http://www.ucrdatatool.gov (providing monthly city-level crime statistics from 1960 to 2012).

382   Data for sworn police officers 1989-1994 were sent from the UCR Program's Crime Statistics Management Group to Veronica Clark, on file with authors. Data for 1995-2012 are available online at the FBI's UCR website. *UCR Publications, Uniform Crime Reports*, Fed. Bureau of Investigation, http://1.usa.gov/1q6CZ84 (The data are accessed through the Law Enforcement Personnel section or the Police Employee Data section and found in Table 78).

383   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm (providing crime statistics from 1960 to 2013). For more information on how authors calculated date of CompStat implementation and numbers of police, see Appendix B.

384   *See Corrections Statistical Analysis Tool (CSAT)—Prisoners,* Bureau of Justice Statistics, http://1.usa.gov/1L3tTqA; *UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm.

385   *UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm.

386   *UCR Offense Definitions*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/offenses.cfm.

387   "*See Data Quality Guidelines*, FBI, http://www.fbi.gov/about-us/cjis/ucr/data-quality-guidelines-new.

388   *See* Erica Goode, *Rape Definition Too Narrow in Federal Statistics, Critics Say*, N.Y. Times, Sept. 28, 2011, *available at* http://www.nytimes.com/2011/09/29/us/federal-rules-on-rape-statistics-criticized.html?pagewanted=all&_r=0; *UCR Program Changes Definition of Rape*, FBI, http://1.usa.gov/1L3zPQu.

389   *See UCR Data Online*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/index.cfm.

390   *See, e.g.,* David Bernstein & Noah Isackson, *The Truth About Chicago's Crime Rates*, Chicago Mag., Apr. 7, 2014, www.chicagomag.com/Chicago-Magazine/May-2014/Chicago-crime-rates/.

391   For a more detailed description of NCVS and comparison of the NCVS and UCR, see *The Nation's Two Crime Measures*, Uniform Crime Reporting Statistics, http://www.ucrdatatool.gov/twomeasures.cfm.

392   *Corrections Statistical Analysis Tool (CSAT)—Prisoners*, Bureau of Justice Statistics, http://1.usa.gov/1L3tTqA.

393   *See* Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correctional Populations in the United States, 2012 2 (2013), *available at* http://www.bjs.gov/content/pub/pdf/cpus12.pdf.

394   Tel. Interview with Tom Zelenock, Bureau of Justice Statistics Project Manager, National Archive of Criminal Justice Data, (May 30, 2014).

395   *See Annual Survey of Jails*, Bureau of Justice Statistics, www.bjs.gov/index.cfm?ty=dcdetail&iid=261; *see also Census of Jails*, Bureau of Justice Statistics, http://www.bjs.gov/index.cfm?ty=dcdetail&iid=254.

396   *See, e.g.*, Lauren E. Glaze & Erinn J. Herberman, Bureau of Justice Statistics, Correctional Populations in the United States, 2012 2 (2013), *available at* http://www.bjs.gov/content/pub/pdf/cpus12.pdf.

397   *UCR Publications*, Uniform Crime Reports, Fed. Bureau of Investigation, http://1.usa.gov/1q6CZ84; *see also Justice Expenditures and Employment Data*, Bureau of Justice Statistics, http://1.usa.gov/1y3L8xN.

398   *See* Matthew J. Hickman & Brian A. Reaves, Bureau of Justice Statistics, Local Police Departments, 2003 2 ex.1 (2006), *available at* http://www.bjs.gov/content/pub/pdf/lpd03.pdf.

399   *See Executions*, Bureau of Justice Statistics, http://www.bjs.gov/index.cfm?ty=tp&tid=182.

400   *See* Death Penalty Info. Ctr., Death Penalty in 2013: Year End Report (2014), *available at* http://bit.ly/1eqNrIb.

401   *See* Nat'l Rifle Assoc., Inst. for Legislative Action, State Laws, http://www.nraila.org/gun-laws/state-laws.aspx; Law Ctr. to Prevent Gun Violence, Concealed Weapons Permitting Policy Summary, August 28, 2013, http://smartgunlaws.org/concealed-weapons-permitting-policy-summary.

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404   *See* Sara Markowitz, *An Economic Analysis of Alcohol, Drugs, and Violent Crime in the National Crime Victimization Survey* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 7982, 2000), *available at* http://bit.ly/1xEDoTX.

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406   *See State Population Estimates and Demographic Components of Change: 1980 to 1990, by Single Year of Age and Sex*, U.S. Census Bureau, http://www.census.gov/popest/data/state/asrh/1980s/80s_st_age_sex.html; *New Population Estimates with Demographic Detail Available*, Mo. Census Data Ctr., http://mcdc.missouri.edu/ (providing data from 1990 to 2013).

407   *State Per Capita Personal Income*, Econ. Research, Fed. Reserve Bank of St. Louis, http://bit.ly/1yT2uEA.

408   *Regional and State Employment and Unemployment*, Econ. Research, Fed. Reserve Bank of St. Louis, http://bit.ly/1Exa0Uz.

409   Population ranking of U.S. cities in 2012 is available at *Population Estimates*, U.S. Census, http://1.usa.gov/15vPyXW.

410   *See Consumer Price Index*, Bureau of Labor Statistics, U.S. Dep't of Labor, http://www.bls.gov/cpi/.

411   *See Announcements*, Surveys of Consumers, Univ. Mich., http://www.sca.isr.umich.edu/.

412   *See Browse and Download Data*, Substance Abuse and Mental Health Data Archive (SAMHDA), http://bit.ly/1unPCiC.

413   *See National Trends in Lead Levels*, U.S. Envtl. Prot. Agency, http://www.epa.gov/airtrends/lead.html.

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