

The Economics of Crime: An Overview

Economics of Crime

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Outline for Today

1. Key points in Marie (2014)
2. Overview of Becker model of crime
3. Non-data points from Dills, Miron, and Summers (2010)
4. Crime trends in US
5. Popular crime topics studied by economists





Next week

- Intro to Measuring the Effect of Police on Crime
- Measuring the Effect of Police on Crime - Jigsaw Activity
 - To make the in-class activities more smooth, I will assign the readings and groups to students randomly
 - I assigned the readings to students randomly on Canvas
 - I also assigned task groups randomly
- Measuring the effect of economic circumstances on crime

Readings

- Jigsaw Activity: Readings on Canvas
- Yang (2017)
- Palmer, Phillips, Sullivan (2019)

The Contribution of Economist to the Study of Crime



Key points in Marie (2014)

1. A normative framework for evaluating crime policy.
2. The application of sophisticated quantitative methods to analyze the causes of crime and the effects of crime-control measures in this framework.
3. The conception of criminal behavior as individual choice, influenced by perceived consequences.
4. The aggregation of individual choices into a systems framework for understanding crime rates and patterns.

Economists focus on policy

Among the social sciences, economics tends to be best suited for addressing issues relevant to policy design. The economic model presumes that observed behaviour is not the inevitable result of underlying social conditions, but rather results from individual choices influenced by perceived consequences. If government policy can change those consequences, then behaviour change will follow.

Economists focus on policy

- We went over one method in which economists try to infer causality of an intervention on an outcome---Million Dollar Plants.
- Economics can better focus on policy by studying causality.
- What is the effect of some factor (e.g., economic opportunity, police spending) on crime?
- The idea to go beyond just noticing correlations or associations, which, up until recently was more-so what those in sociology and psychology had done.

Economics can help answer these questions in two ways

1. Economic (mathematical) models

- The model comes up with predictions as to causal effects.
- Pros: the conclusions are irrefutable if the model is correct.
- Cons: the model could be incorrect (e.g., oversimplified)

2. Empirical methods (econometrics, data)

- Uses data and actual policy events.
- Either uses a randomized control trial or uses another methodology (e.g., difference-in-differences) to estimate a causal effect.

Empirical methods (econometrics, data)

- Sometimes uses **field experiments** (e.g., doing the randomization yourself, e.g., randomizing extra police presence)
- Often leverages so-called “**natural experiments**” (a.k.a. quasi-experiments)
- The idea behind a **natural experiment** is that there is something close to randomization happening without researcher intervention.
- E.g., studying the impacts of a welfare program on criminal activity, by leveraging the fact that funding was only available for people depending on what day and what time of day they called into the hotline (Palmer, Phillips, and Sullivan, 2019, which we cover later)
- E.g., you can argue that a policy or event was random, like in Tella and Schargrodsy (2004) who found that a random terrorist event led to an increase in policy presence, and they leverage that to do a DiD (you will see more about this paper later)

Empirical methods (econometrics, data)

- Pro: Observes real-life data and policy changes. The research is more “externally valid” compared to using models (e.g., models may not characterize actual behavior, which is complex).
- Pro: Since this approach often has economists estimating the causal effects of actual policies or events, it’s easier to comment on those events.
- Con: using real-life data is complicated, and it’s often difficult to control for all factors (although this is a difficulty with models, too)
- Con: The causal estimation strategy (e.g., DiD) requires assumptions that may not hold. E.g., the parallel trends assumption might not hold.

Economics focuses on policy

- Given that both mathematical models and empirical (statistical) methods have pros and cons, it's ideal to use both if possible.
- There has been more growth in empirical, data-driven research over models, likely due to:
 1. The increase in available data.
 2. Improvements in causal estimation techniques and statistical software.
 3. Stronger emphasis on studying actual events and actual human behavior.

Cost-benefit analysis

- The economic approach to studying crime also brings with it cost-benefit analysis, which balances the cost and benefits of policy actions.
- E.g., balance the benefits of reducing crime with the costs of reducing it.
- Cost-benefit analysis is frequently used by government to guide policy.
- Concepts like marginal costs come into play with cost-benefit analysis:

“The optimal amount of crime is unlikely to be zero, since at some point the marginal costs of additional prevention will exceed the marginal benefit of an additional reduction in crime.” (p. 8)

The Rational Criminal Model



The Rational Criminal by DALL-E



The “Rational Criminal” Model

- A popular economic model of crime.
- Models choice between criminal vs non-criminal activity.
- Explains how criminal activity can be related to individual economic opportunities and to income inequality.
 - A simplified “rational criminal” model is presented in the textbook and in these slides.
 - Chapter 10.1 to 10.2.2 (up to page 214), and 10.3.4 (page 220)
- This model is not supposed to explain all criminal behavior, but rather I am summarizing a simple version of this model so you have a sense of the types of models that economists often construct to explore how factors such as economic opportunity affect criminal behavior.

The Simple Model

- Based on the work by Gary Becker and Edward Glaeser.
- Focuses on the occupational choice: criminal vs non-criminal.
- Suppose a city has \bar{n} residents; where $n = 1, 2, 3, \dots, \bar{n}$.
- Each resident can earn some income level from legitimate employment (non-criminal).
- For ease of exposition, we will sort people by increasing income.
- So if y is income, then Person 1 has the lowest income, and Person \bar{n} has the highest income.

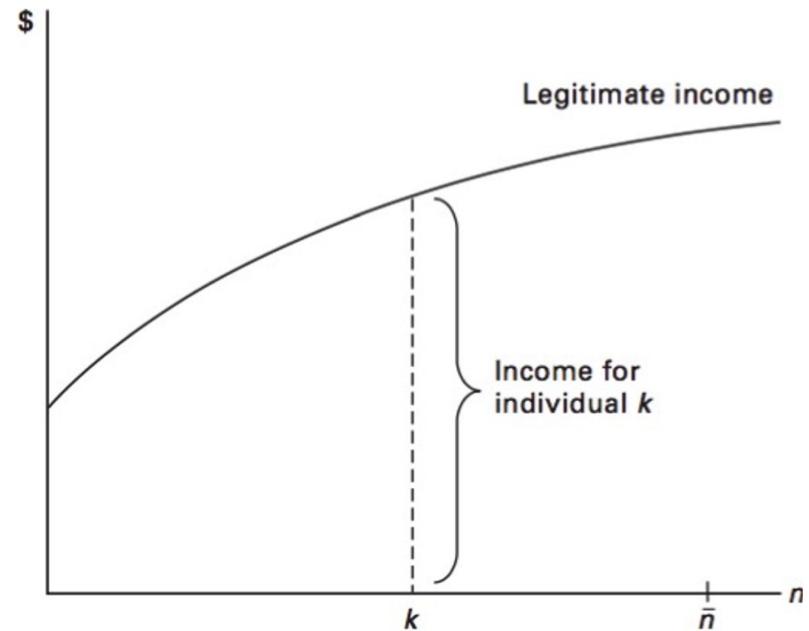
$$y_1 < y_2 < \dots < y_k < \dots < y_n$$

Income for Each Individual

- So if y is income, then Person 1 has the lowest income, and Person \bar{n} has the highest income.

$$y_1 < y_2 < \dots < y_k < \dots < y_n$$

- Called the legitimate-income curve.
- The value at $n = k$ gives the legitimate income for individual k .



Criminal Activity – Overview

- The alternative to legitimate income is criminal activity.
- Individuals can instead steal from others.
- Four variables go into calculating the benefits/costs of criminal activity:
 1. Value of loot (called L);
 2. Probability of apprehension by police (called a);
 3. Cost of Jail Time (called J and J is positive as it gets subtracted);
 4. Stigma cost to being a criminal (called e).

Criminal Activity – Set Up

- The amount per period that individuals can steal is L (L for “loot”).
- The value of L is linked to the incomes of rich individuals.
- Criminals can be apprehended by police and lose their loot. Let the variable a be the probability of apprehension. So $0 < a < 1$.
 - 0 = never apprehended, 1 = always apprehended
- Apprehension also imposes the cost of a jail term. Let this be J .
- There is a stigma cost that criminals face regardless of if they are apprehended. This is e .

Criminal Activity - Value

1. If apprehended, the criminal has a benefit equal to $-J - e$
2. If they are not apprehended, the criminal has a benefit equal to $L - e$.
 - Case (1) happens with probability a , so Case (2) happens with probability $1 - a$.
 - The expected value of the benefit (weighted average between both cases) is:
 - Probability of Case 2 *Benefit of Case 2 + Probability of Case 1 Benefit of Case 1*

$$\begin{aligned}\text{Expected Value} &= \underbrace{(1-a)L}_{\text{Value of crime if not caught}} - \underbrace{(1-a)e}_{\text{Stigma cost if not caught}} + \underbrace{a(-J - e)}_{\text{Cost if jail and stigma if caught}} \\ &= (1-a)L - e + ae - aJ - ae\end{aligned}$$

$$\text{Expected Value} = (1-a)L - aJ - e$$

Criminal Activity - Value

- Criminal income = $y_{crime} = (1-a)L - aJ - e$
- If we assume that these variables (L, J, a, e) are the same for everyone then criminal income is the same for everyone, regardless of their level of legitimate income.
- So the criminal income is a flat line at the value:

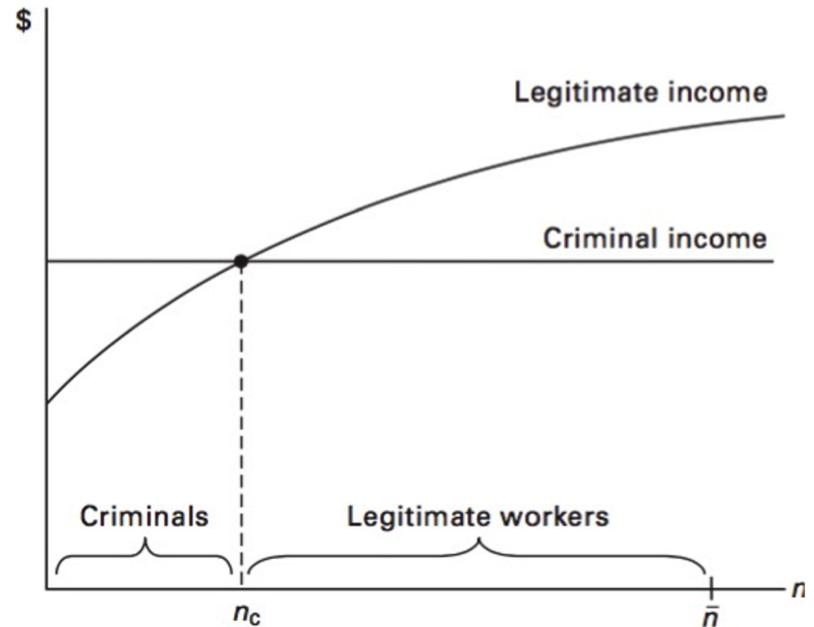
$$Y = y_{crime} = (1-a)L - aJ - e$$

Adding Criminal Income

- The criminal income curve is a flat line at the value:

$$Y = y_{crime} = (1-a)L - aJ - e$$

- Criminal and legitimate income is equal where $y_{crime} = y_c$ (intersection point).
- Individuals c to \bar{n} have $y_{crime} \leq y$. These individuals choose to be legitimate workers.
- Individuals 1 to c have $y_{crime} \geq y$ These individuals choose to be criminals.



City Characteristics and Crime

-Changing in exogenous variables will predict changes in crime rates.

$$y_{crime} = (1-a)L - aJ - e$$

- So changes to L (loot value), J (jail cost), a (probability of apprehension), and e (social stigma) will affect criminal income.
- If y_{crime} increases (decreases), the line shifts up (down) and more individuals switch from legitimate income to crime (crime to legitimate income).
- Increasing L leads to an increase in y_{crime} . Better “loot” encourages crime.
- Increasing J leads to a decrease in y_{crime} . So harsher punishments deter crime.
- Increasing a leads to a decrease in y_{crime} . More police deters crime.
- Increasing e leads to a decrease in y_{crime} . More social stigma to criminal activity deters crime.

City Characteristics and Crime

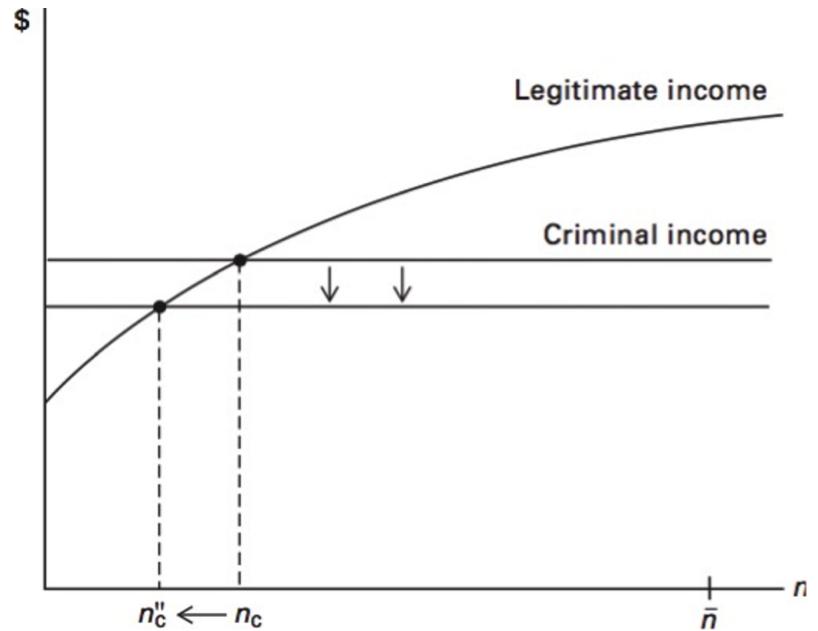
- Increase in J (jail cost), a (probability of apprehension), e (social stigma)

or

- Decrease in L (loot value)
- Leads to a decrease in criminal income.

$$Y = y_{crime} = (1-a)L - aJ - e$$

- Line shifts down
- (A decrease in J, a, e or an increase in L leads to an increase in criminal income and line shifts up)



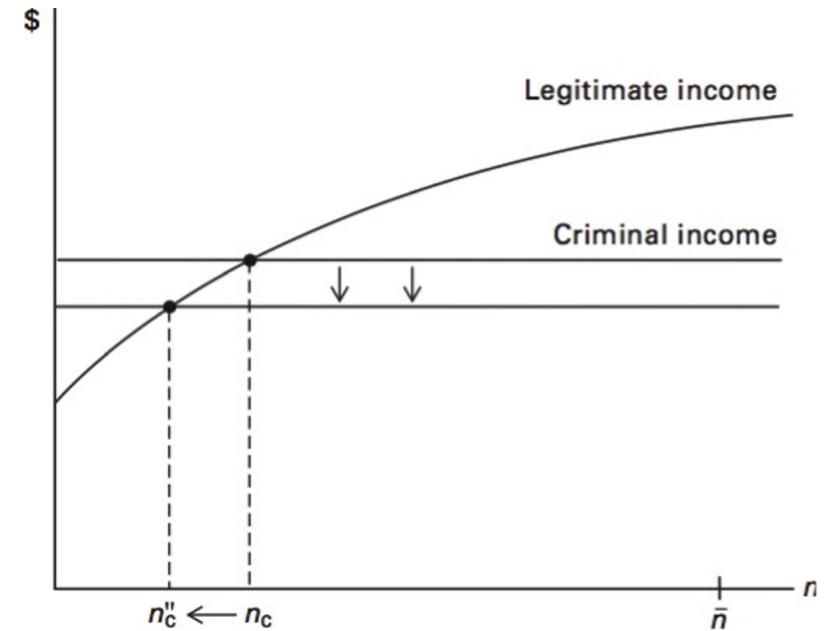
City Characteristics and Crime

- Increase in J (jail cost), a (probability of apprehension), e (social stigma)

or

- Decrease in L (loot value)
- Leads to a decrease in the number of individuals who chose criminal income (those from n_c to n''_c) convert from criminal to legitimate income.

$$Y = y_{crime} = (1-a)L - aJ - e$$



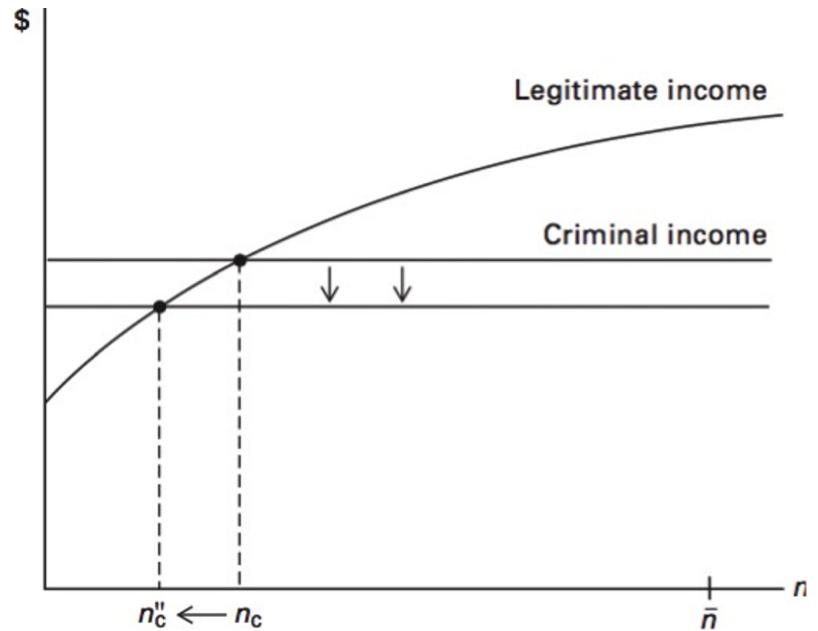
- Or, comparing two cities, in the one with the higher value of y_{crime} , n_c to n''_c are

City Characteristics and Crime

- Increase in J (jail cost), a (probability of apprehension), e (social stigma)

or

- Decrease in L (loot value)
- Or, comparing two cities, in the one with the higher value of y_{crime} , n_c to n''_c are criminals, but in the city with the lower value of y_{crime} they earn legitimate income instead.



The Economy and Criminal Behavior

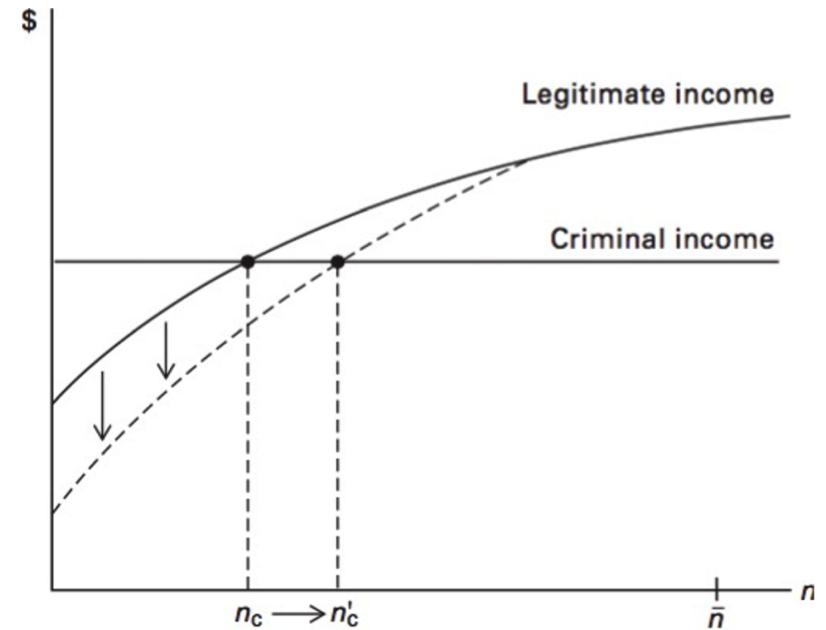
The economy could affect criminal behavior.

Consider two cases:

1. Income changes for the disadvantaged population (those with lower values for legitimate income);
2. Income changes for the advantaged population (those with higher values for legitimate income).

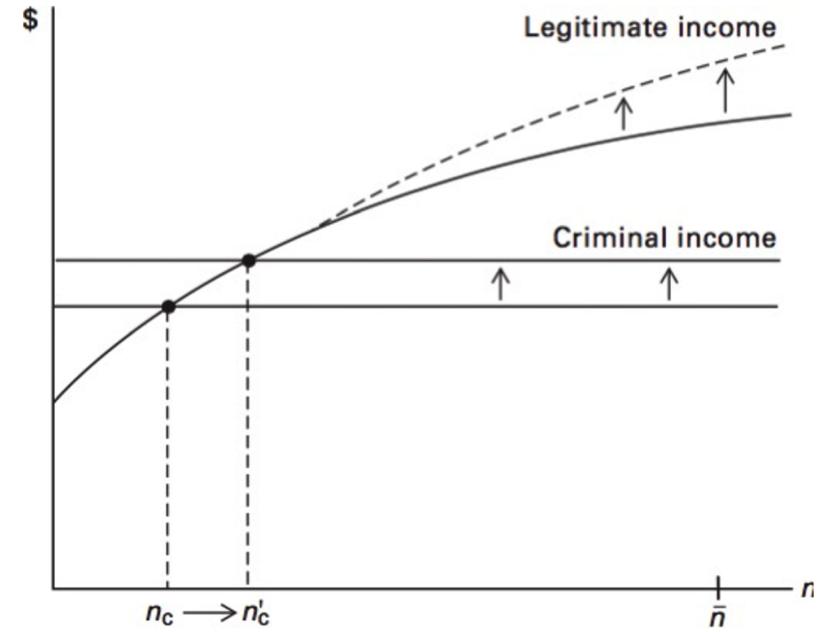
Income Decrease for the Disadvantaged

- If increase for the disadvantaged decreases, the legitimate-income curve gets steeper.
- This curve intersects the criminal income line at higher value of n .
- More individuals rely on criminal rather than legitimate income.
- Effect is the opposite for an income increase.



Income Increase for the Disadvantaged

- Suppose income increases for the advantaged.
- These individuals were not engaging in criminal activity anyways, and this does not change.
- BUT the loot value is linked to the incomes of advantaged individuals.
- So this income increase causes L to increase.



What do Economists Know About Crime?



Key points in: Dills, Angela K., Jeffrey A. Miron, and Garrett Summers. 2010

Abstract: In this paper we evaluate what economists have learned [since about 2010] about the determinants of crime. We base our evaluation on two kinds of evidence: an examination of aggregate data over long time periods and across countries, and a critical review of the literature. We argue that economists know little about the empirically relevant determinants of crime. Even hypotheses that find some support in U.S. data for recent decades are inconsistent with data over longer horizons or across countries. This conclusion applies both to policy variables like arrest rates or capital punishment and to less conventional factors such as abortion or gun laws.

The hypothesis that drug prohibition generates violence, however, is generally consistent with the long times-series and cross-country facts. This analysis is also consistent with a broader perspective in which government policies that affect the nature and amount of dispute resolution play an important role in determining violence.

Overview of Economics Research

- Economists have devoted significant effort to determining to what extent the Becker model or crime (“rational criminal” model, from earlier) is empirical valid, and to what extent factors like policing, income levels, etc., affect crime rates.
- Much research examines deterrence – which factors could reduce crime. This literature focuses especially on arrest and incarceration rates, policing levels, and punishments like longer sentences or the death penalty.
- Other research done by economists studies the causal effects of crime related laws. I.e., can they isolate the actual effect of a law, beyond just a correlation?
- Much of this work uses a difference-in-differences approach – comparing areas/people affected by a law change or event (e.g., change in state gun laws) to unaffected control group(s), before and after the law change or event.

Examples of This Work on the Causal Effect of Laws

1. Controversial and notable work on how abortion legalization affects crime rates.
2. Numerous studies on changes in gun laws, often at the state level.
 - E.g., increased or decreased barriers to gun access or public holding, gun bans, and related legislation like “stand your ground” laws.
3. Effects of lead exposure on crime (lots of work also in public health on lead).
4. Drug laws and drug prohibition.
 - E.g., lots of recent work on state legalization of marijuana and how it affects numerous outcomes, ranging from crime to health.

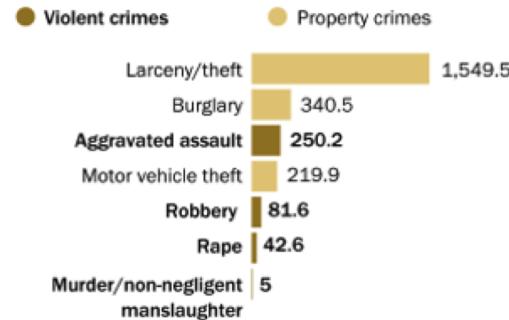
Stylized Facts about Crime in the US (from Pew)



Most Common Crime and Crime Trends in the US

Theft is most common property crime, assault is most common violent crime

U.S. crime rates per 100,000 people, by offense type, in 2019



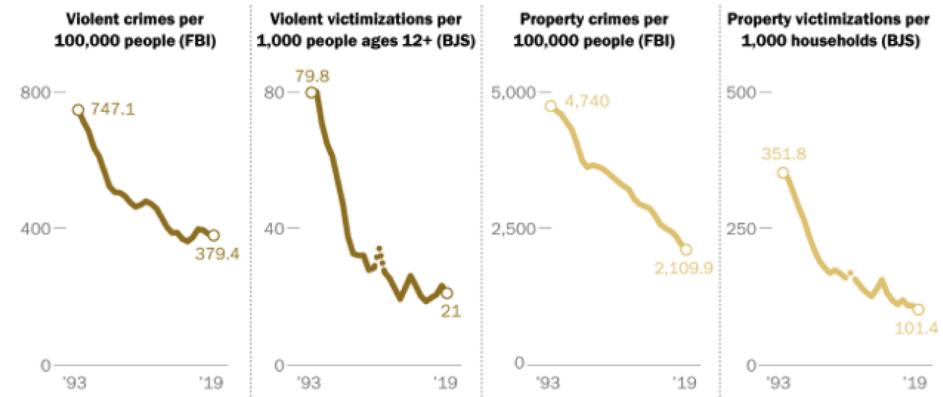
Note: FBI figures for arson are not included because of data limitations.

Source: Federal Bureau of Investigation (FBI).

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U.S. violent and property crime rates have plunged since 1990s, regardless of data source

Trends in U.S. violent and property crime, 1993-2019



Note: FBI figures include reported crimes only. Bureau of Justice Statistics (BJS) figures include unreported and reported crimes. 2006 BJS estimates are not comparable to those in other years due to methodological changes.

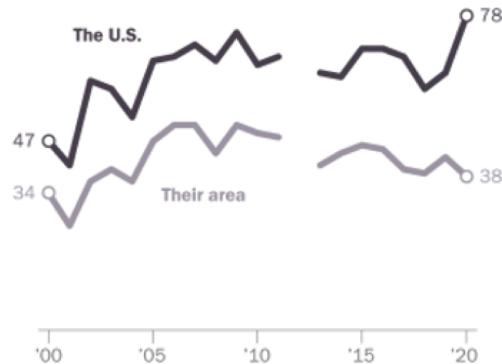
Source: U.S. Bureau of Justice Statistics (BJS), Federal Bureau of Investigation (FBI).

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Perceived Crime and Reported Crime

Americans tend to believe crime is up nationally, less so locally

% of U.S. adults who say there is more crime in ___ than there was a year ago



Note: Data not available for 2012.

Source: Gallup.

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Fewer than half of crimes in the U.S. are reported, and fewer than half of reported crimes are solved

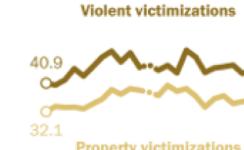
% of crimes ...

Reported to police (BJS)

Reported to and cleared by police (FBI)

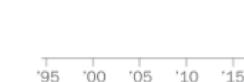
Violent victimizations

Property victimizations



Violent crimes

Property crimes



Note: BJS and FBI crime definitions differ for some offenses. 2006 BJS estimates are not comparable with other years due to methodological changes. FBI figures reflect percentage of crimes cleared through arrest or "exceptional means," including cases in which a suspect dies or a victim declines to cooperate with a prosecution.

Source: U.S. Bureau of Justice Statistics (BJS), Federal Bureau of Investigation (FBI).

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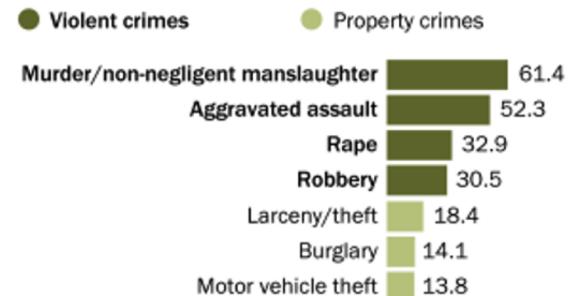
Reported and Cleared Crime

Auto thefts most likely to be reported, murders most likely to be solved

% of U.S. crimes reported to police in 2019 (BJS)



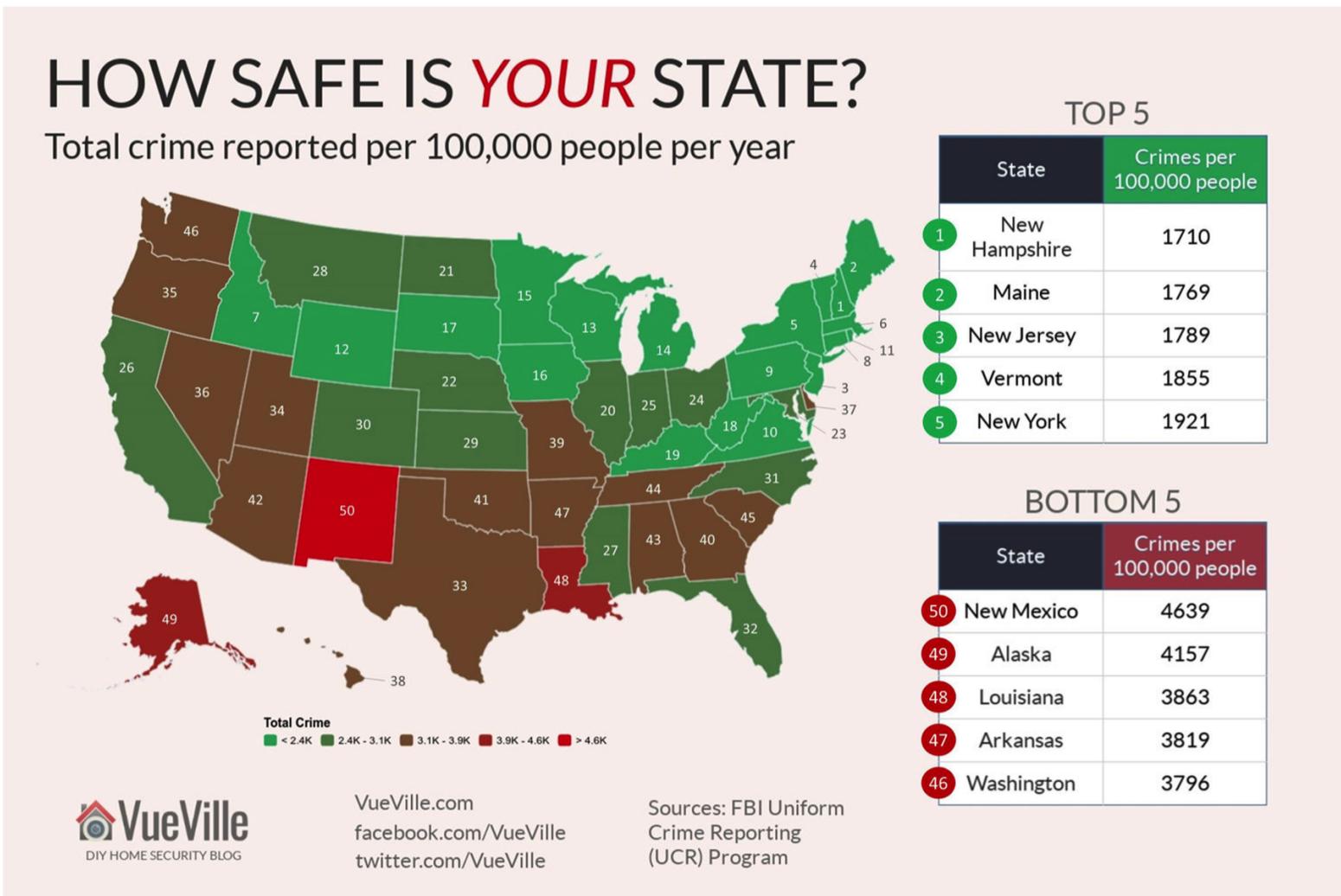
% of reported U.S. crimes cleared by police in 2019 (FBI)



Note: BJS and FBI crime definitions differ for some offenses. FBI figures reflect percentage of crimes cleared through arrest or "exceptional means," including cases in which a suspect dies or a victim declines to cooperate with a prosecution. FBI figures for arson are not included because of data limitations.
Source: U.S. Bureau of Justice Statistics (BJS), Federal Bureau of Investigation (FBI).

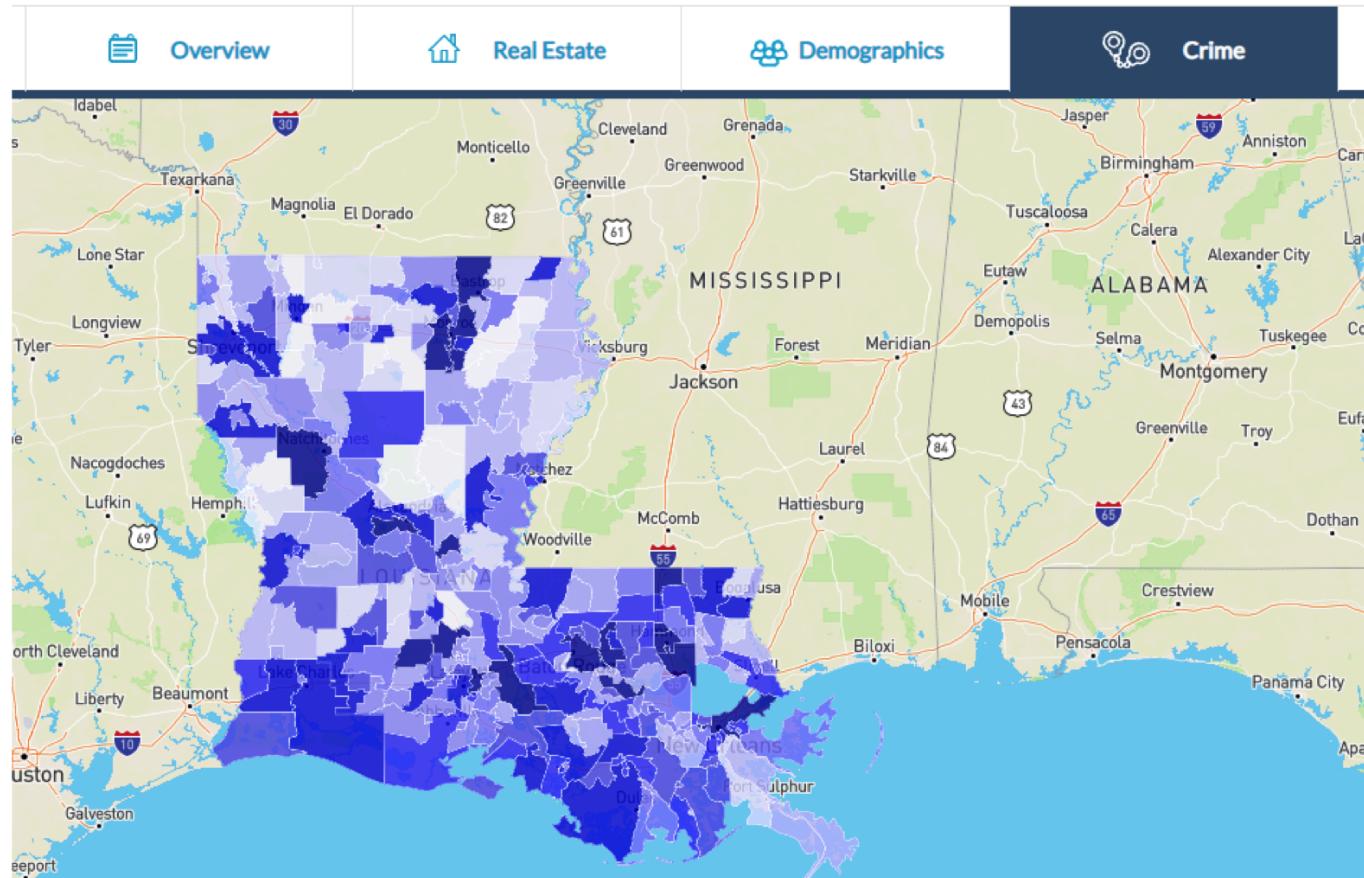
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Crime Rates by State



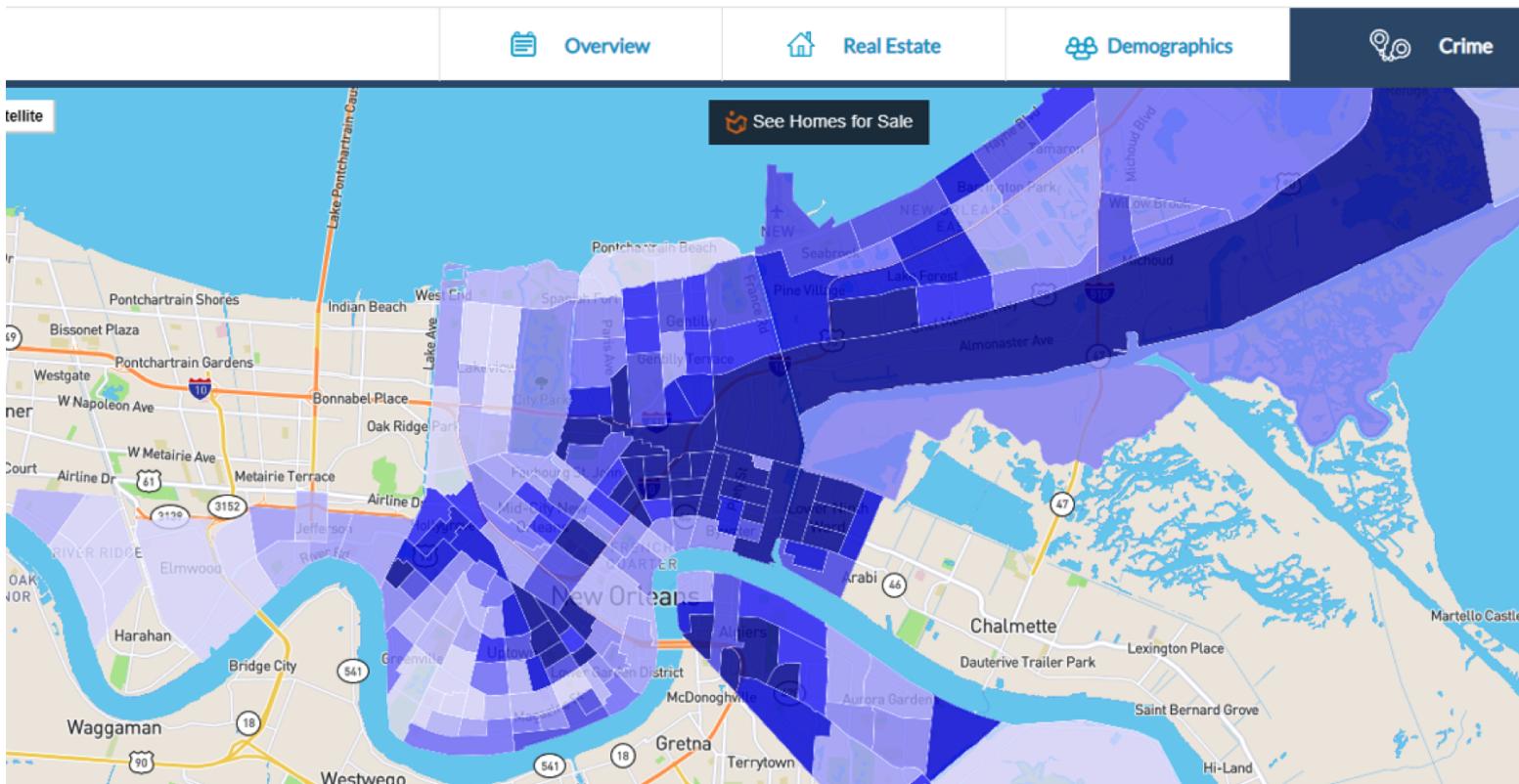
Crime Rate in Louisiana

LOUISIANA CRIME



Crime Rate in New Orleans

NEW ORLEANS, LA CRIME RATES



Crime Index by Country

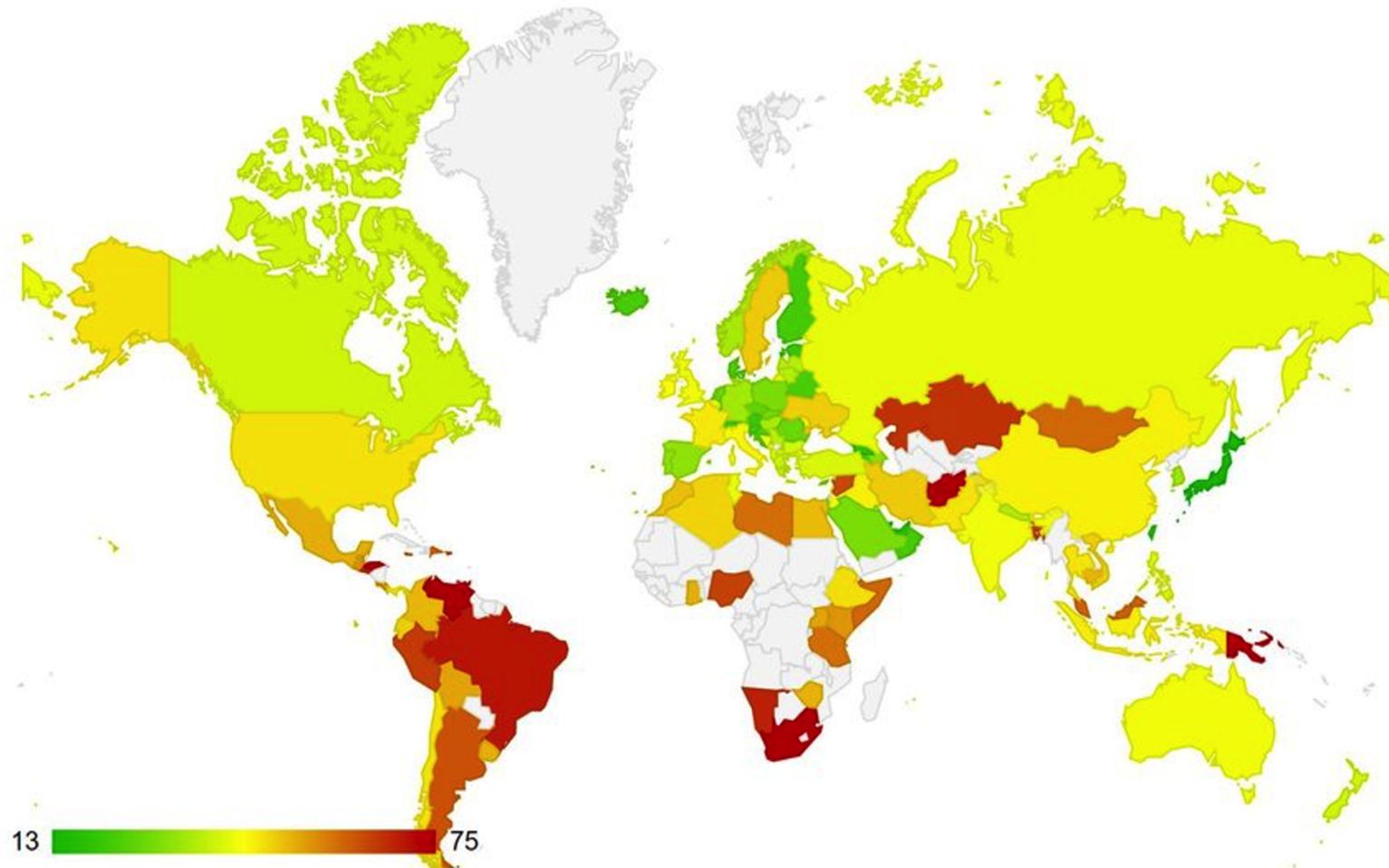


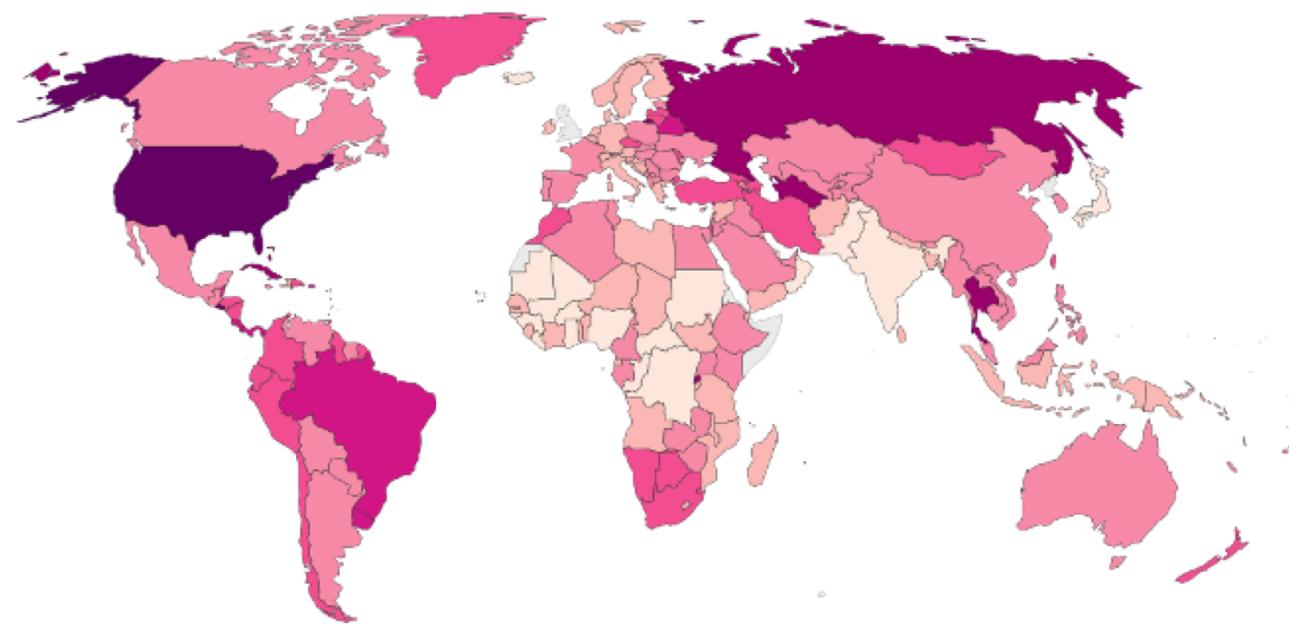
Chart: Crime Index

Prison Population by Country

Prison population rate: prisoners per 100,000

Shown is data for 2018 or the latest available data before 2018.

Our World
in Data



Source: World Prison Brief (2018)

Overview of Economics Research – Past Dills, Miron, and Summers (2010)



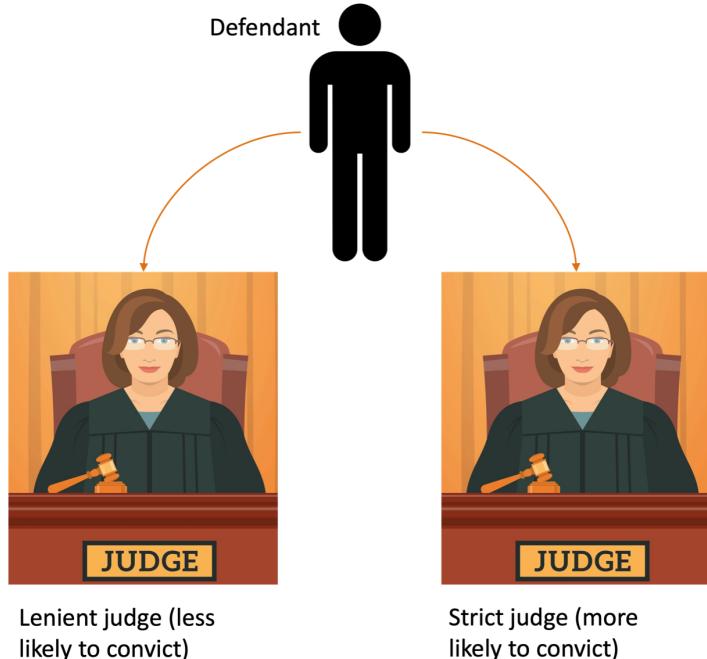
There has been a lot of research on crime since Mirone, Dills, and Summers (2010)

- There has been much work on measuring racial bias in policing and criminal justice in various contexts. We will see this come up in the next briefing note on racial bias, and in some other content later in the course.
- There has also been better access to data since 2010. For example:
 1. Crystal Yang, whose paper we will discuss later, leverages detailed sentencing data to study how economic circumstances affect recidivism (reoffending). (Yang, 2017)
 2. Teams of economists have used administrative data (government-held data) in counties such as Norway that matches criminal justice records with other data like tax and program use data. They use this data and a “judge fixed effects” approach (discussed briefly in next slide, and later on in the course in more detail) to see how incarceration affects future criminal behavior. (Bhuller et al., 2020)

Judge Fixed Effects

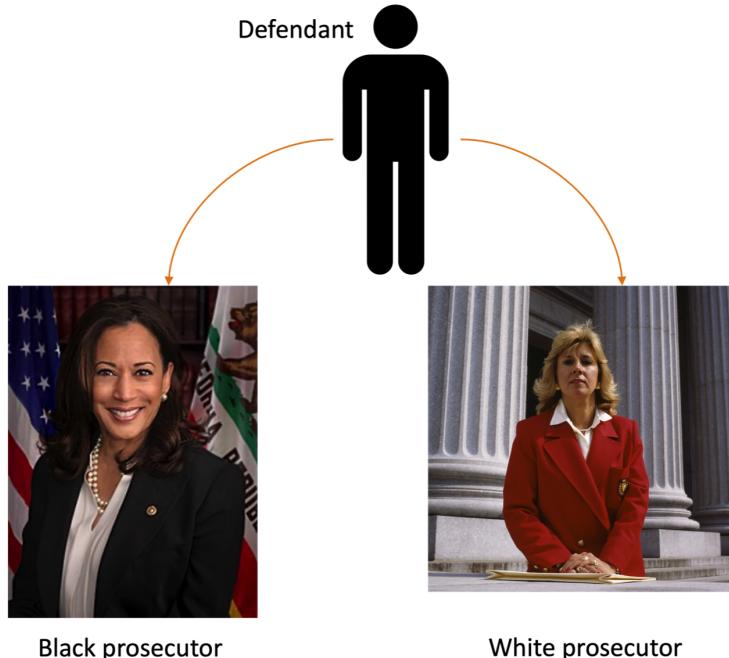
- The other “hot” area of research by economists right now uses an approach called “judge fixed effects”.
- While we will get into this in more detail, here is a quick summary.
- The idea is to leverage the fact that many cases or situations in policing or criminal justice have random or conditional random assignment of judges/prosecutors/police to cases or incidents.
- Sometimes judges are randomized to cases, leading to key characteristics such as strictness or race, to be randomized to cases.
- Or maybe it’s police officers (white vs. black) being randomly assigned to incidents involving white or black individuals.
- The idea is to exploit this “natural” randomization to see if it affects an outcome. This is usually better than difference-in-differences in getting us closer to a randomized control trial’s ability to estimate causal effects.

Quasi-Experimental Approaches: Judges



- This quasi-random assignment of cases to judges creates quasi-random variation that can be used to study the causal effect of a conviction (or other judicial decision) on causal outcomes (Bhuller et al., 2020; Eren and Mocan, 2021)

Quasi-Experimental Approaches: Prosecutors



- Or random assignment to a judge/prosecutor of a particular race, to defendants, to study racial bias (Sloan, 2020)