

Managerial Statistics

Lecture Introduction

Instructor Maxim Massenkoff

The world is full of quantitative claims

In America, mass incarceration has caused more crime than it's prevented



The murder rate is up

NEW YORK CITY

NYC Murders Up 50% for Month of July

NYPD data shows 244 recorded shootings in the first seven months of 2020, up from 88 the year before

Published August 3, 2020 • Updated on August 3, 2020 at 5:27 pm



Unemployment is higher than ever

Unemployment Claims Are 'Stubbornly High' as Layoffs Persist

New filings again exceeded one million last week, and an extra \$300 in jobless pay may not show up before mid-September in most states.



Caffeine keeps you sharp

This Video Shows The Science Behind Caffeine's Productivity-Enhancing Effects

Drake Baer May 23, 2014, 10:03 AM

Humans love caffeine.

It's the world's most popular psychoactive drug, with a full 90% of Americans consuming it on a daily basis, be it through coffee, tea, or soda.



The world is full of quantitative claims

With a background in probability, data and statistics, you'll be able to

1. Ask: *how do we know?*
2. Come to your own conclusions and convey them accurately
3. Generate new evidence for guiding important decisions
4. Reason about uncertain outcomes

My goal: present the concepts, but also show when they matter

Introduction



- ▶ Instructor: Maxim Massenkoff
- ▶ Can call me Maxim
- ▶ Received PhD in Economics from UC Berkeley in 2020
- ▶ Previously: Federal Reserve Board, Harvard psychology department, genome assembly at the Broad Institute

What gets me excited about statistics

- ▶ I'm drawn to statistics by questions big and small

Big questions

Why did the murder rate **double** starting in the mid-1960s? Why did it halve in the 1990s? What the heck happened in 2020?

The U.S. Murder Rate, 1960 to 2020

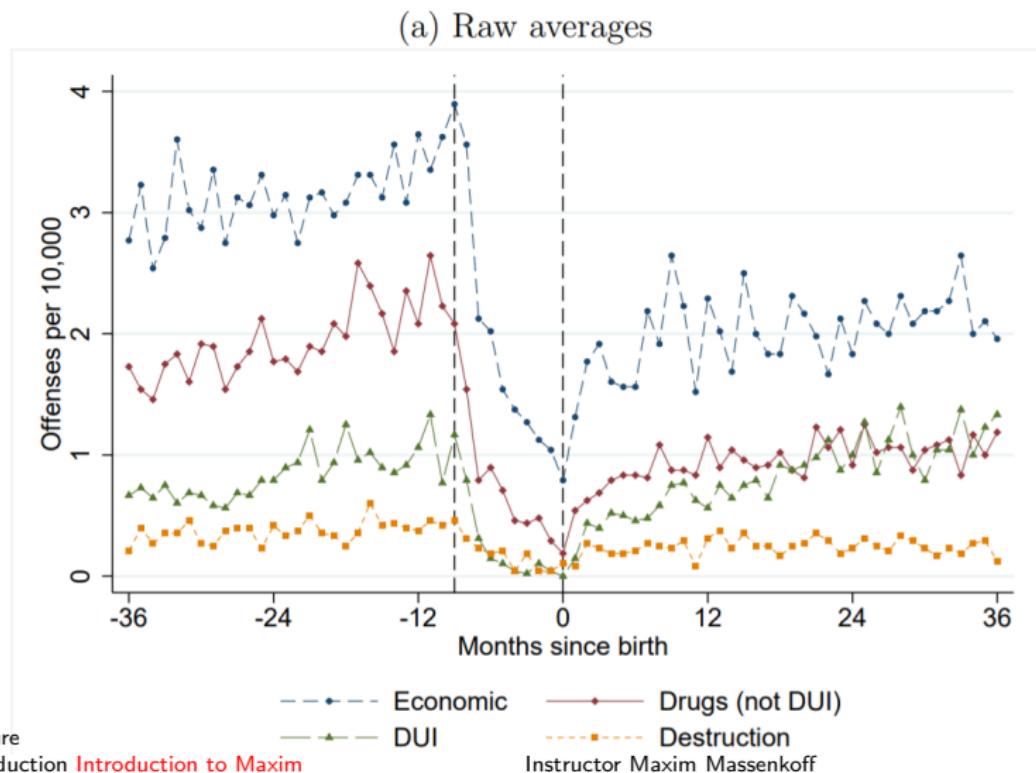
Murders per 100,000 people.



Big questions

How do people change when they become parents?

Figure 1: Monthly arrest rate around first birth, All first-time mothers

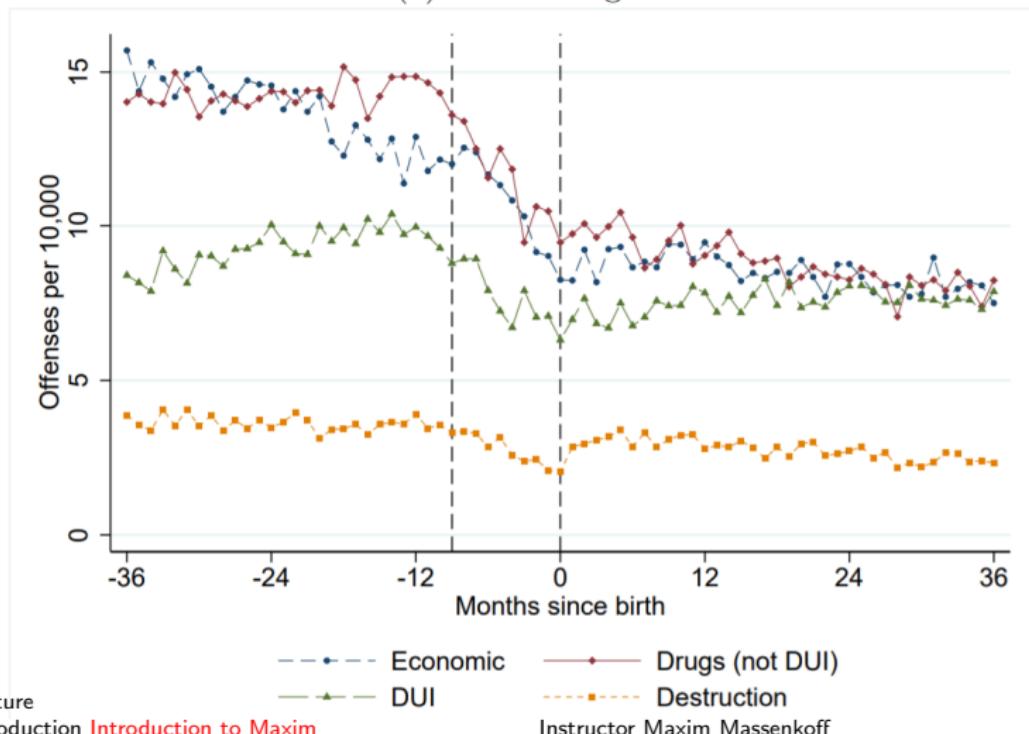


Big questions

How do people change when they become parents?

Figure 2: Monthly arrest rate around childbirth, All first-time fathers

(a) Raw averages

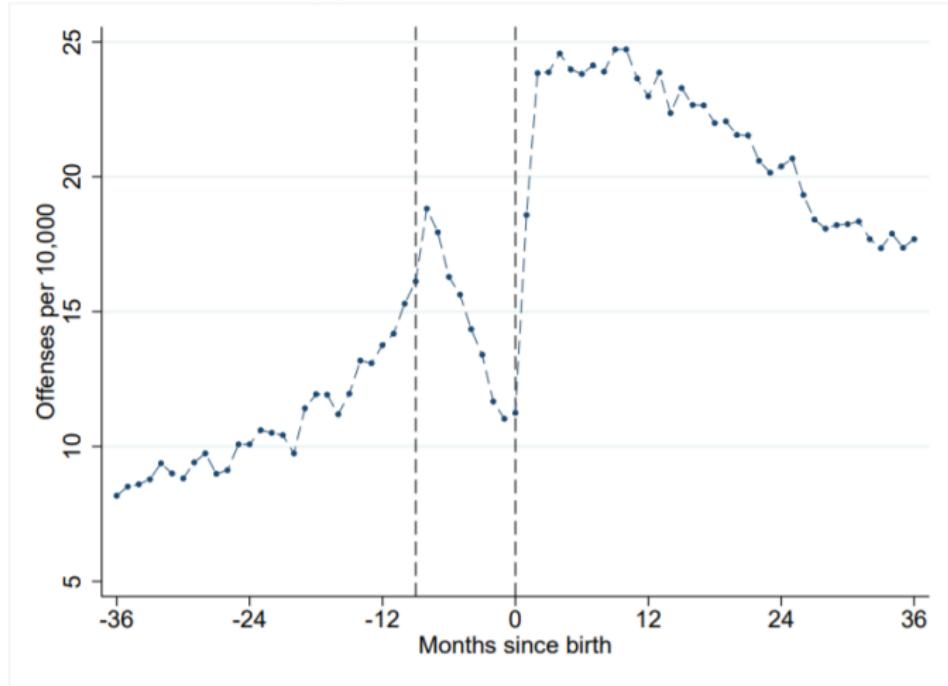


Big questions

How do people change when they become parents?

Figure 9: Domestic violence

(a) Arrests around birth



Parenting

Have a new baby in the home. Lots of questions!

What is the causal effect of:

- ▶ C-sections
- ▶ Breastfeeding
- ▶ Sleep training
- ▶ ...

Pregnancy nausea: "I started acupuncture at 14 weeks and it was a game changer for me" but wouldn't it have gotten better anyway? (example courtesy of my wife)

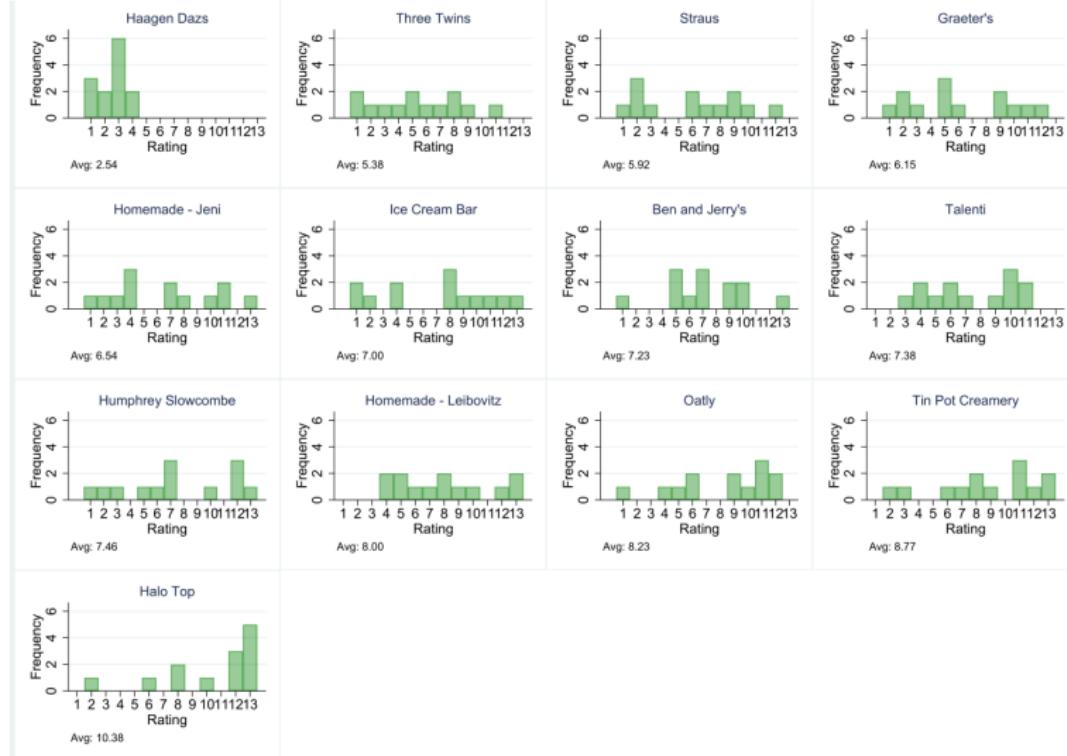
Small questions



- ▶ Should you stretch before working out?
- ▶ Conventional wisdom was to always stretch before—but randomized controlled trials show no benefits! [source](#)

Small questions

What's the best vanilla ice cream?



Example

Is prison killing people?

New data: State prisons are increasingly deadly places

New data from the Bureau of Justice Statistics shows that state prisons are seeing alarming rises in suicide, homicide, and drug and alcohol-related deaths.

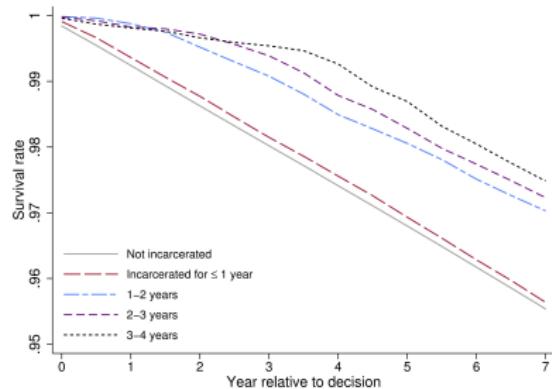
by Leah Wang and Wendy Sawyer, June 8, 2021

The latest data from the Bureau of Justice Statistics (BJS) on mortality in state and federal prisons is a reminder that prisons are in fact “death-making institutions,” in the words of activist Mariame Kaba. The new data is from 2018,

Example

Is prison killing people?

Figure 2: Survival rates by sentence length



This figure displays Kaplan-Meier estimates of the survival rate split by sentence length groups, in each half-year relative to decision. The data consist of seven years following sentencing for each defendant.

Norris et al (2021) The effect of incarceration on mortality: “Mortality risk **halves** during the period of incarceration, with **large declines in murders, overdoses, and natural causes of death**. However, there is no detectable effect on post-release mortality risk, meaning that incarceration increases longevity.”

Syllabus notes

- ▶ Lectures during class time
- ▶ Some demonstrations of homework problems (and Excel) and group exercises
- ▶ Class participation matters for grade
- ▶ Emails count: email feedback or questions anytime

Books

- ▶ *Introductory Business Statistics*: the core text, with almost every important definition. Edited specifically for this class
- ▶ *OpenIntro Statistics*: an alternative geared towards data science; better for some subjects (note: 2nd edition)
- ▶ *Naked Statistics*: Optional. Plain English introduction, excellent examples. Past students have loved this book in particular.

Lectures

- ▶ Please ask questions as soon as they come up
- ▶ Often many people are wondering the same thing!

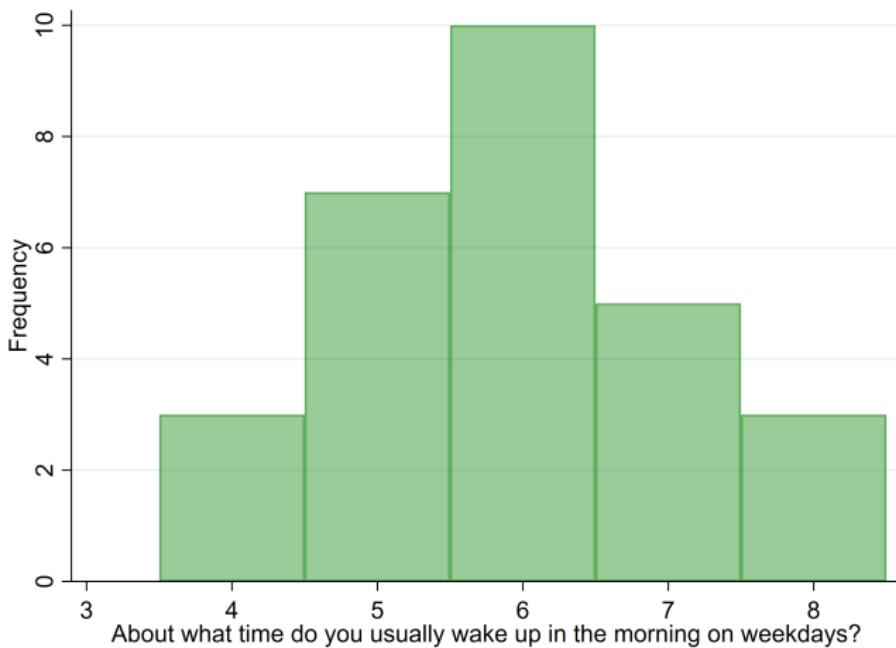
What about you?

- ▶ In preparation for this class, I sent out a survey
- ▶ Thank you for taking the time to provide your responses

What about you?

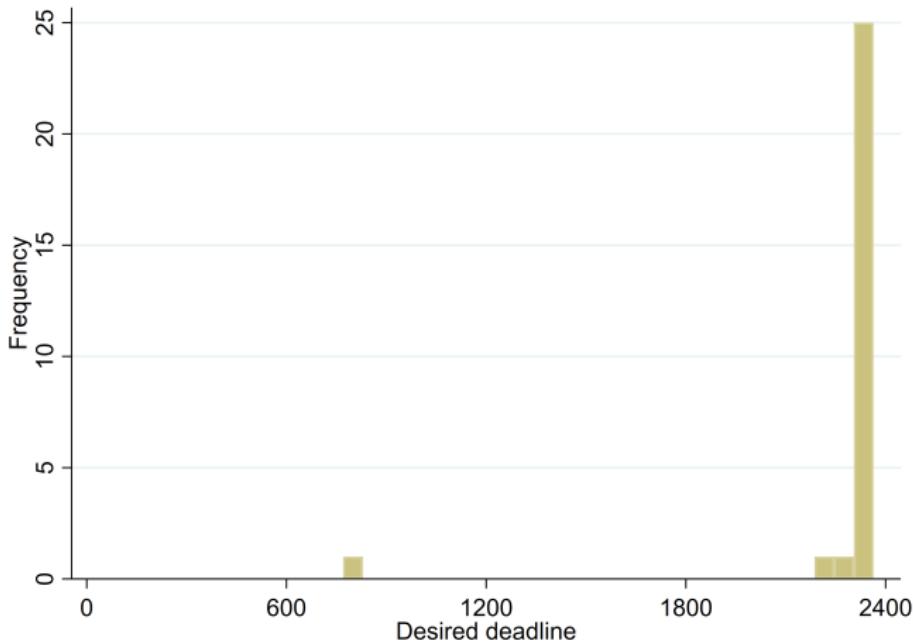
- ▶ 28 respondents
- ▶ Most (64%) have taken a course in statistics or probability
- ▶ Most can write down the formula for a mean (did not depend on stats course!)
- ▶ Most respondents (75%) use caffeine

Early risers



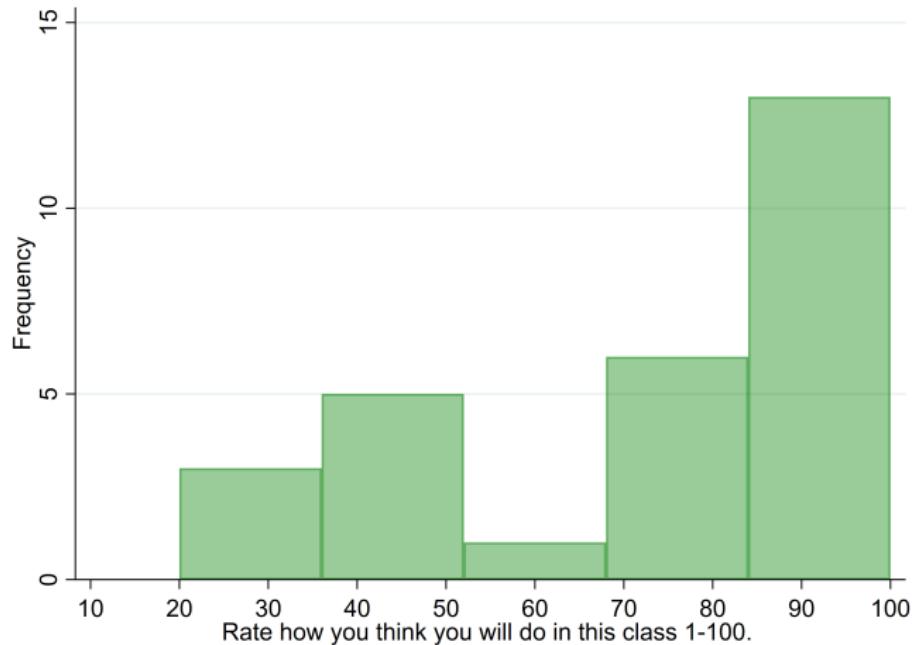
Late submitters

You like your coffee early and your homework late



Smarter than average

50 percent of you will perform better than 80 percent of your classmates

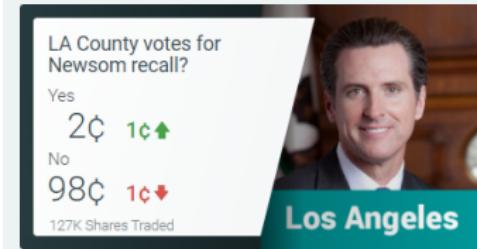
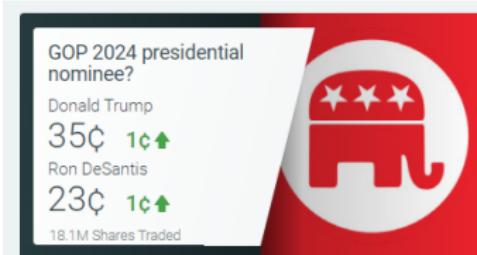


Median: 80

Survey data: What could I be missing?

- ▶ The class survey was *optional*
- ▶ Does this pose any potential problems?
- ▶ Let's open up the discussion

Predictions



Predictions

- ▶ Will JLO and Ben Affleck separate before the end of the quarter?
- ▶ Will Taylor Swift and Travis Kelce announce their relationship status?
- ▶ Will the government shut down?
- ▶ How many times will it rain in Monterey this quarter?
- ▶ Will the UAW strike last through thanksgiving?

Underrated foods

- ▶ Spinach
- ▶ Beets
- ▶ Costco pizza
- ▶ Honey
- ▶ Frozen peas and eating them frozen.
- ▶ fried potatoes with bacon and onions
- ▶ Brussels sprouts. Also Okra. Probably more so Okra since more restaurants are serving roasted brussel sprouts as apps.

Thanks. Now some Basic Concepts...