Lecture 4: Histograms

February 9, 2026

Course Administration

1. Tutorial 3 quiz

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2. Will return Tutorial 2 quiz at end of class
3. Policy brief proposal comments posted – alert me if you don't see them
4. Reminder: Fully composed chart due class after holiday **Feb. 23**
   - if there is something you want to do, but can't figure out how
   - write it in words accompanying the graph
   - I want to be sure you know what to do
   - we can work on how to do it
   - look at the grading sheet for complete graph elements

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5. Anything else lingering?

General Policy Brief Proposal Feedback

Good work and interesting topics.

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Successful proposals

- have a point to make and a story to tell
- clearly set out the ≥ 2 data sources you're using
- explain how you're planning on aggregating data
- give a sense of having some thoughts about the graphics you'd like to do or the points you'd like to make
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In the best final work, graphics drive narrative

Looking Forward to the Final Product

- Final product needs 8 to 10 graphics
- Graphics with some basic descriptives often set the stage
- May be helpful to think about summary statistics before correlations
- With new data, good practice for you to match published summary stats
- As relevant, consider adding in decennial census/acs data to add demographics
  - Use nhgis.org for geographic census data
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- Next deadline: Lecture 5, one fully composed chart

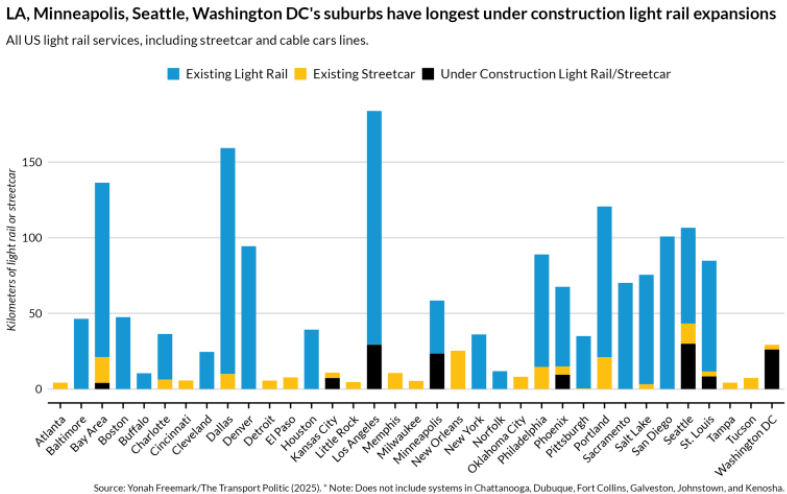
Next Week's Good Bad and Ugly

Find a histogram. Post by Wednesday noon. Post the link on the google sheet.

Finder	Commenter
Kibin	Chase
Tosha	Otsile

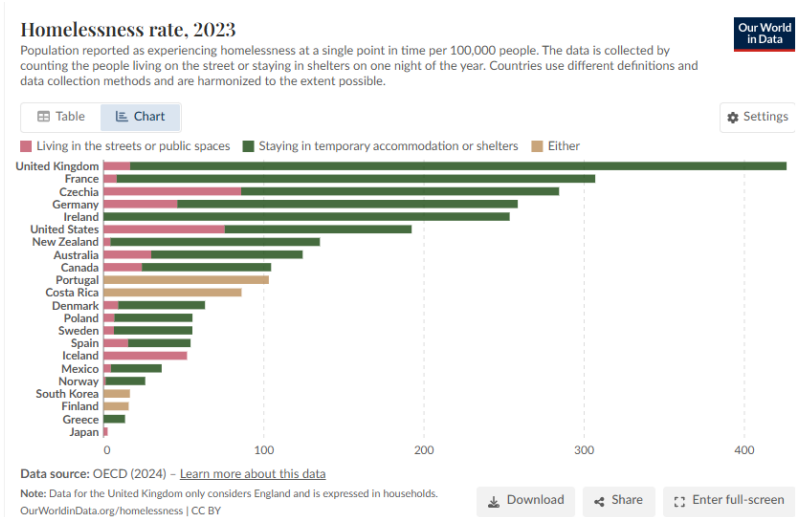
Next week is a holiday.

Sawyer on Chase's Graph



From Yonah Freemark's blog, *The Transport Public*

Kibin on Samantha's Graph



From Our World in Data, link.

How is AI Helpful in Coding?

Using AI Helpfully

- Which AI(s) are you using?
- What problems has it solved for you?
- What problems did it not solve, or solved wrong?
- What do you think it should be able to do for you but has not?

Histograms

Thinking About Histograms

1. What is a histogram and why use one?
2. Most basic histogram
3. Histogram history
4. Histogram variations

1. What are histograms and why should you use them?

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What are non-graphical ways of describing the distribution of a continuous variable?

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2. shares

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2. shares
   - share of commuters by jurisdiction

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  - How many people at each part of the income distribution?
  - How much of an outlier is Caitlin Clark?
  - How much variation is there in prices for airline tickets?
  - My work: distribution of condo prices vs other residential prices

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But beware! Histograms are harder to explain than bars.

2. Most Basic Histogram

Notionally, to Create a Histogram

- Take a variable
- Make bins by value
- Count the number of observations in each bin
- Plot bars with that number

Notionally, to Create a Histogram

Imaginary Income Data

Person	Income
A	4
B	11
C	12
D	3
E	0

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Binned Dataset

Bin	No.
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1-5	2
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Graph this one!

Key Features of Histograms

- Looks like a bar chart
- But! unlike a bar chart, histogram bars touch, to indicate continuity
- Give me more examples of when a histogram would be useful

3. Histogram History

The Histogram Inventor

Karl Pearson (1857-1936) as a young man

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A big thinker

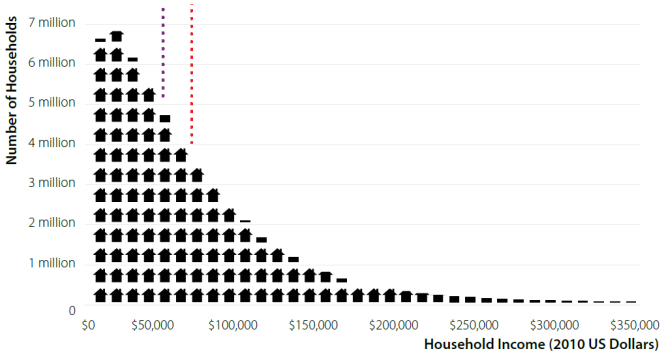
- father of mathematical statistics
- publishes first histogram, 1895
- fervent eugenicist
- early suffragist
- turned down knighthood due to socialist beliefs

4. Histogram Variations

Histogram Variations

1. The classic: touching bars
2. The modified classic: bars with colors by category
3. Make bars into lines: frequency polygon
4. Smooth further: density distribution

1. The Classic: Mulbrandon's Income Histogram



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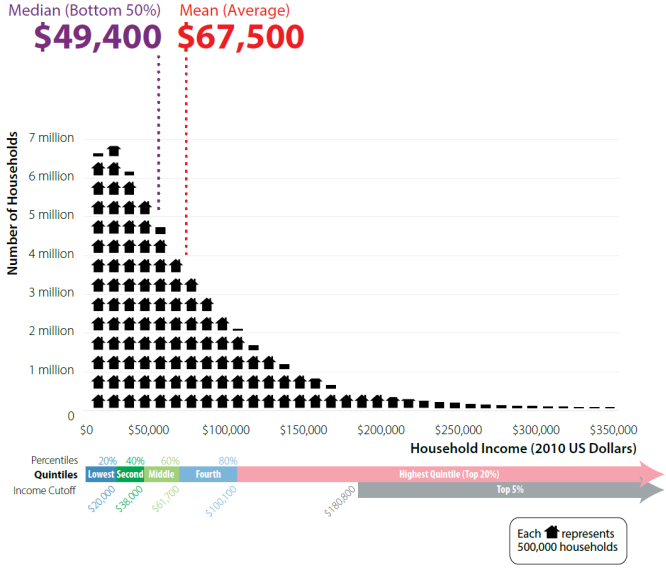
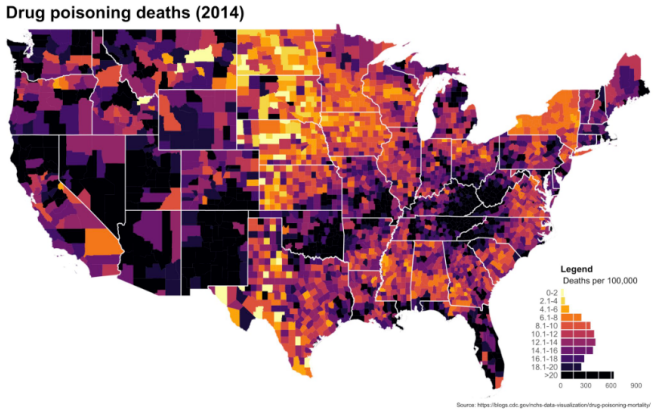
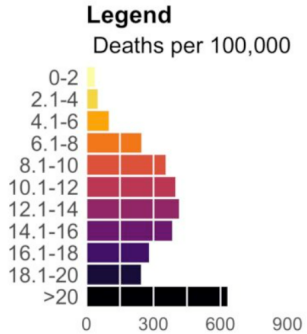


As a Map Legend



From https://mathewkiang.com/2017/01/16/using-histogram-legend-choropleths/

Legend, Now Visible



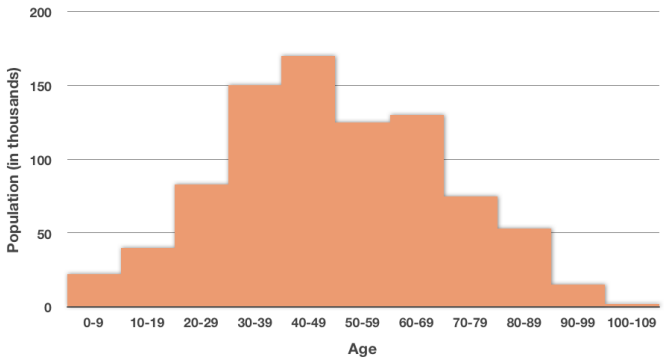
With code on how to do this! From Matthew Kiang's website

2. The Modified Classic: Colored in Bars

Missing a good example – you'll do this in the tutorial

3. Make Bars into Lines: Frequency Polygon

Basic Histogram: Age Distribution



Thank you Krista King math

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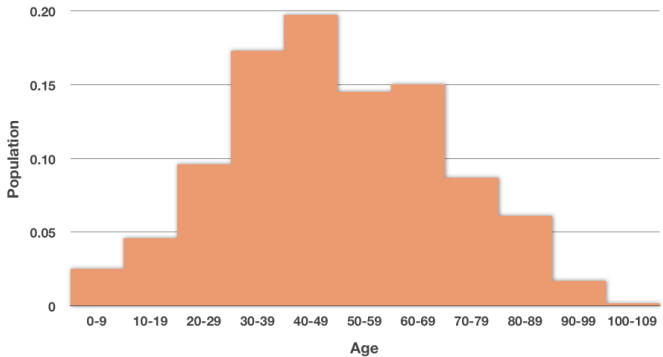
Basic Histogram: Age Distribution – The Same?



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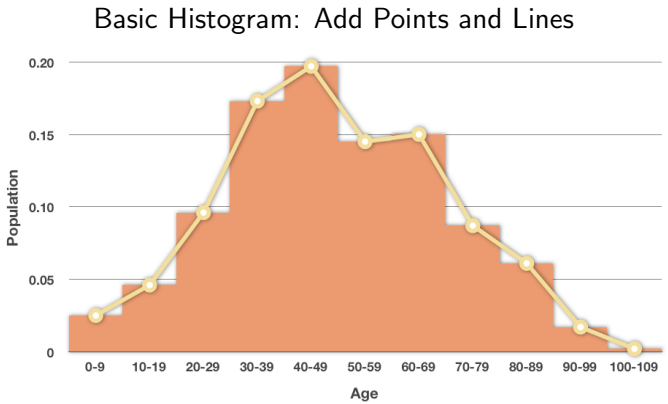

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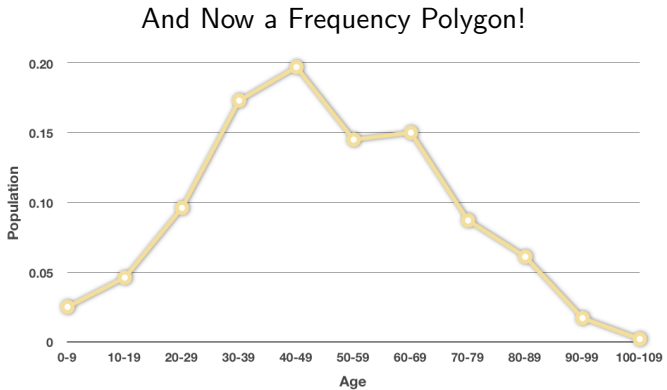

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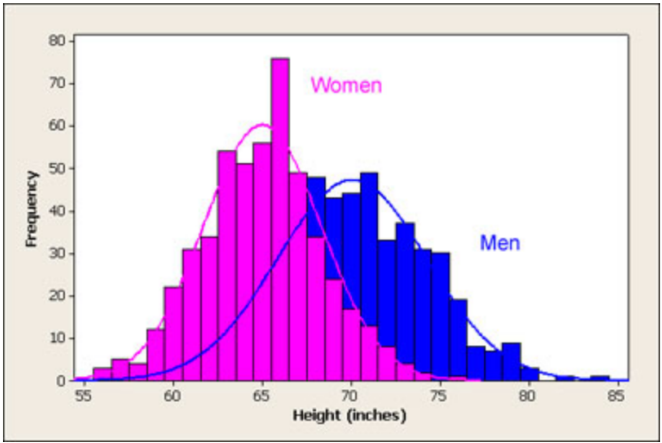
4. Density Curves: Smoothed Histograms

- Imagine many very thin bars
- This yields a curve
- Sometimes it is more helpful to draw the curve

Height: Note the Curves

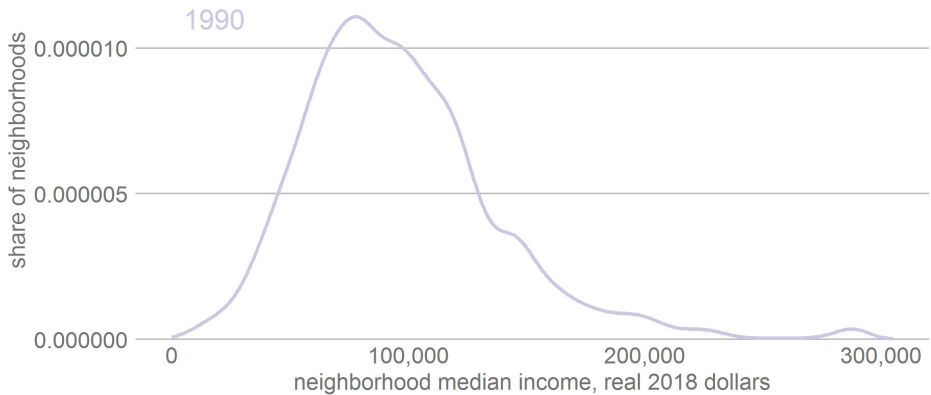


What can you learn about men's versus women's height?

From http://www.usablestats.com/lessons/normal

INCOME

Incomes Have Grown, But the Middle Class Has Hollowed Out



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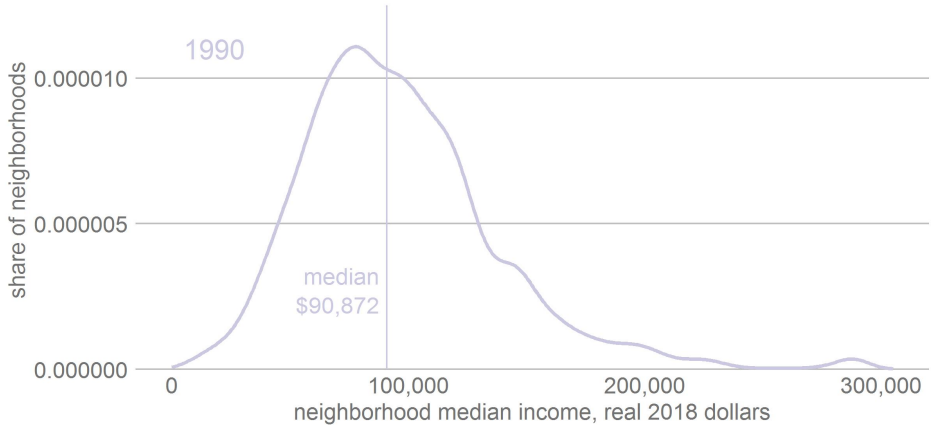

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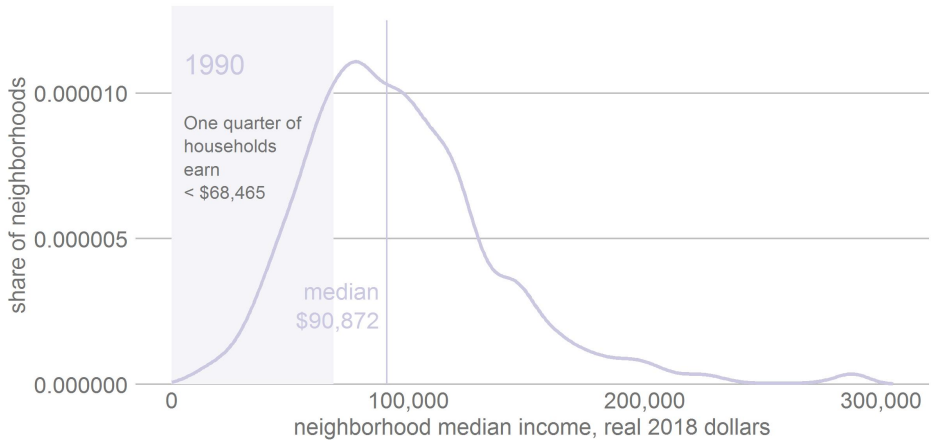

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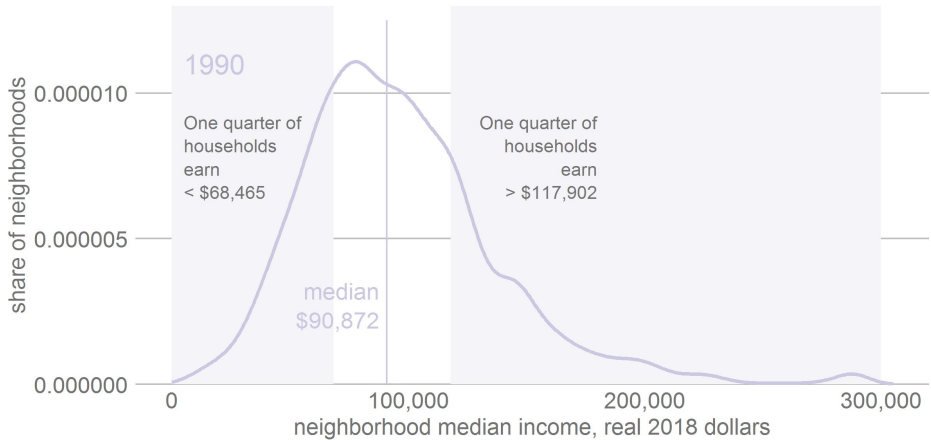

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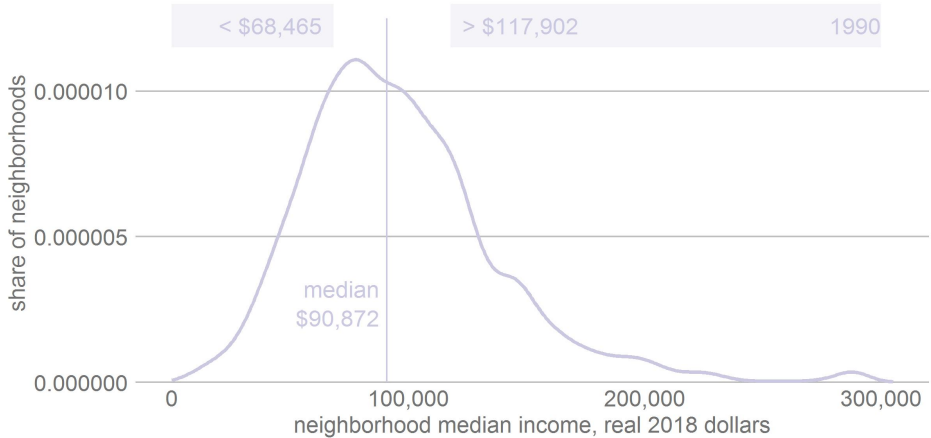

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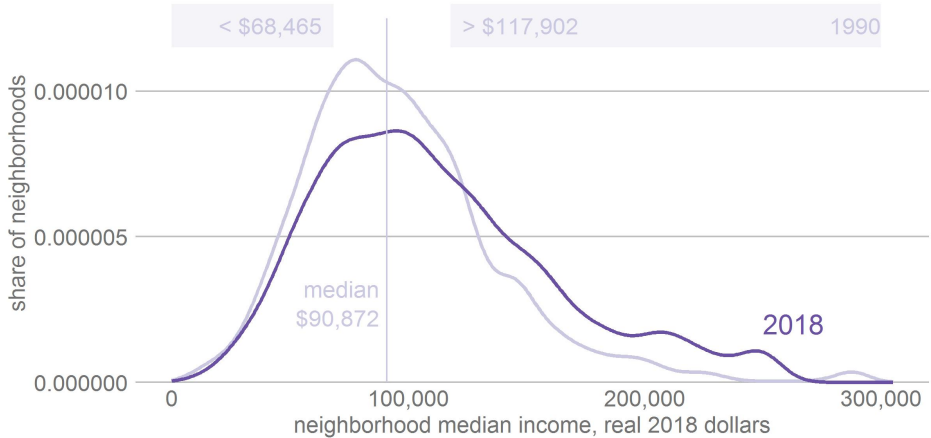

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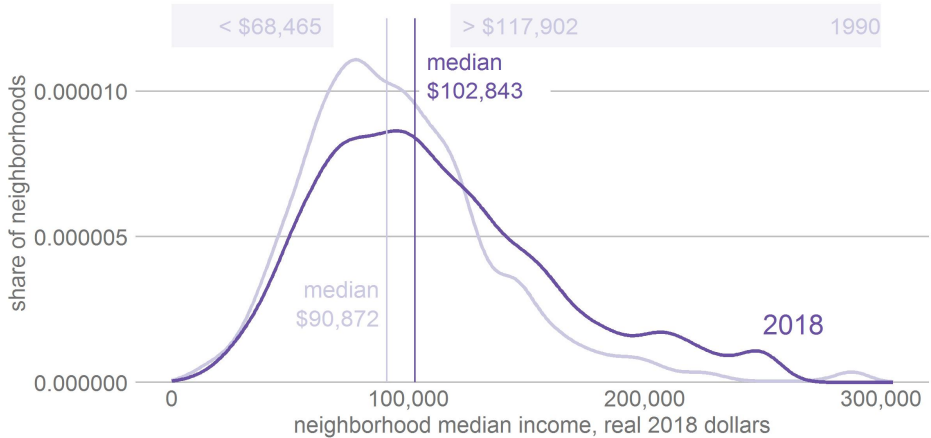

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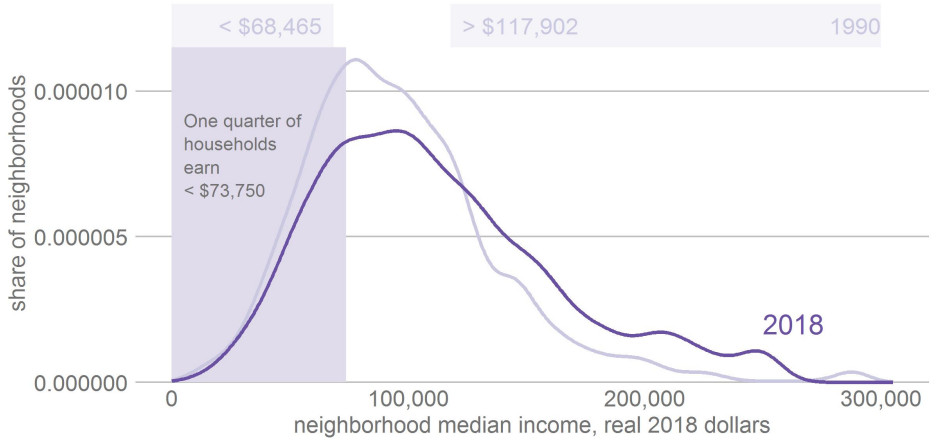

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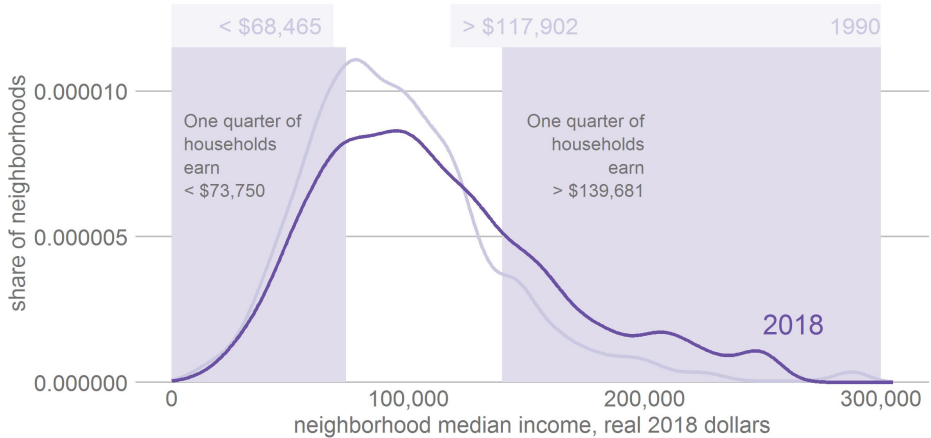

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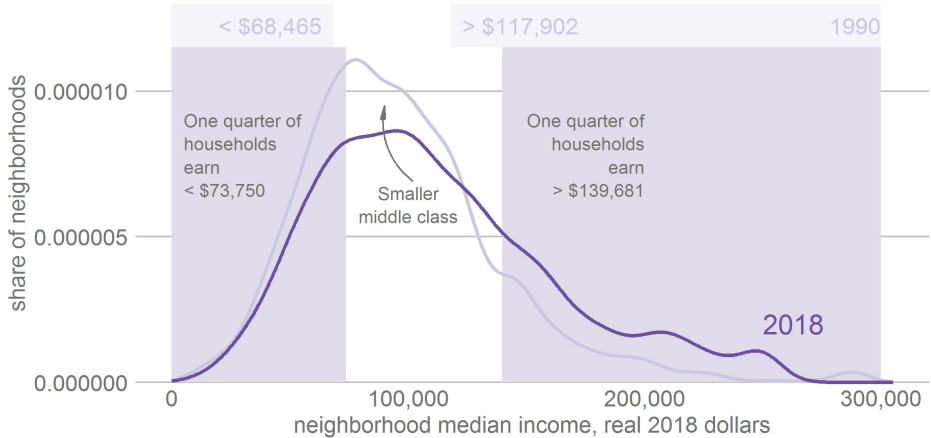

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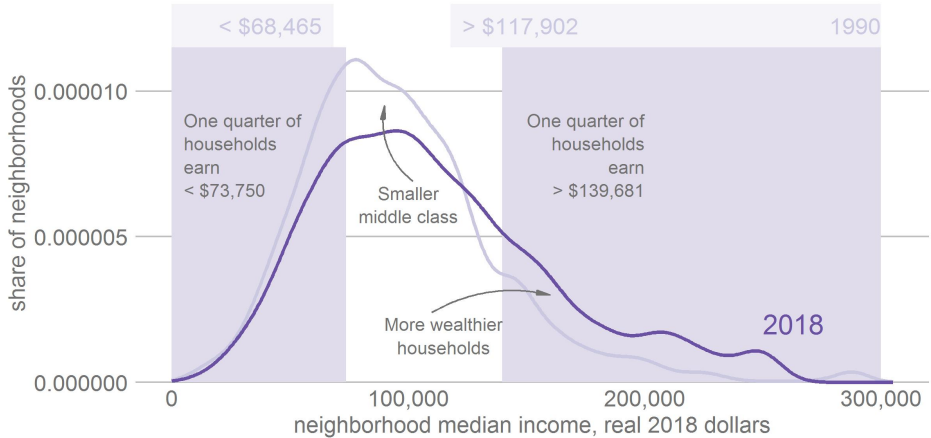
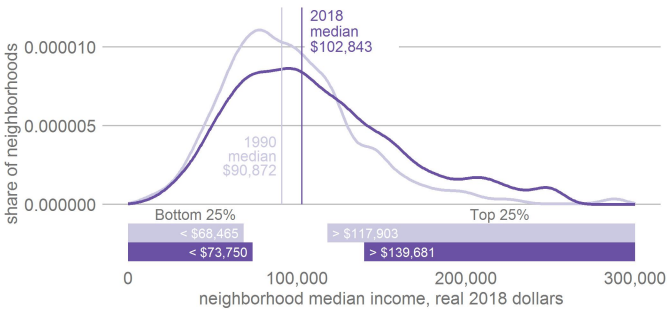
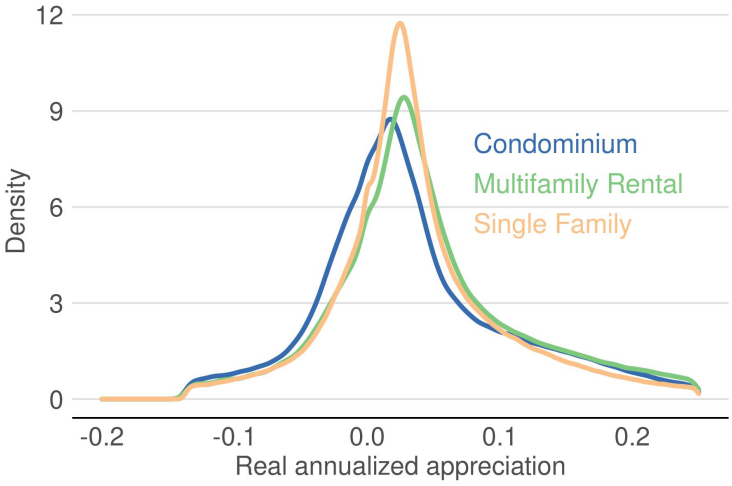


Income Distribution in the DC Metro Area Over Time



- print version
- was never satisfied with y axis
- light purple probably too light
- goal was to show 25th and 75th percentiles
- and change therein

Comparison of Price Appreciation at Distribution Tails



Goal: compare distribution of price appreciation by type

R Histograms

Next Class: Maps

- Happy Presidents Day next week
- See you week after next week
- Be ready for quiz on Tutorial 4
- Turn in fully composed chart assignment via link in assignment
- Manson, *Mapping and Society*, Chapter 7