Lab 5: Comparing Electoral Votes

In the 2000 and 2016 US presidential elections, there were disparities between the popular vote winner (that is, the presidential candidate who received more individual votes) and the electoral vote (EV) winner (that is, the candidate who "won the electoral college" and therefore the presidency). This has also happened at other times in history, but these are the two that are fairly recent. Today, we'll figure out just what the EC *is, why* we use it, and explore the consequences of using this system.

In case you're unsure as to what the "Electoral College" is, check out this video!

Now, the EC is a huge, contentious thing. People have been arguing that we should (or shouldn't) have it for decades, maybe even since its inception. We won't come to any final conclusion here today. What we **will** do, however, is to get into the math of the EC, and see how unit fractions play a large part in it.

Back to Google (or your memory!).

- 1. (1 point) How many electoral votes does Oregon have?
- 2. (1 point) Why does it have that many? Be specific the number of votes are tied to numbers of certain elected officials; tell me about these people!

A bit more Googling:

- 3. (1 point) What's the population of Oregon? Try to find the most recent one you can.
- 4. **(2 points)** Create a fraction ("rate") where the numerator is the population of Oregon, and the denominator is the number of electoral votes Oregon has. Make sure to include units (i.e., "people" and "electoral votes") in your fraction.
- 5. (2 points) Now create a unit fraction by changing that fraction to one that has a denominator of "1 electoral vote". Go ahead and round that numerator to the nearest hundred thousand people (that way, we'll all get close to the same number, even if we get populations that are a little different).

Now we'll explore further with some computer technology to assist us. Open up the spreadsheet for today!

Make sure you're looking at the "EV + Pop" tab (look at the bottom of the screen for the tab names). Answer the following questions to start.

- 6. **(1 point)** Notice that the states (plus the District of Columbia) are in the column marked with a letter "A" above it. What's given in the column marked with a letter "B" above it?
- 7. (1 point) What's given in the column marked with a letter "C" above it?

Let's explore that column "D" now (the "unit fraction" column). After we do, answer the following questions (*watching <u>this</u>* <u>video</u> might help you understand it more!).

8. (1 point) Which state has the *least* number of people per electoral vote (EV)?

9. (1 point) Which state has the *greatest* number of people per EV?

Now that we have unit fractions with common denominators ("1 electoral vote") for each state, we can do some math. For each of the following, supply a multiplier (like "twice", "three times", "one half", "two thirds", etc.) to complete the statements.

- 10. (1 point) Oregon has about ______ as many people per EV than Rhode Island (the smallest state by land size).
- 11. (1 point) Oregon has about ______ as many people per EV than Alaska (the largest state by land size).
- 12. (1 point) Oregon has about ______ as many people per EV than Wyoming (the least populous state).
- 13. (1 point) Oregon has ______ as many people per EV than California (the most populous state). Note: it's a fraction less than 1!

14. **(4 points)** One criticism of the EC is that EV's are "worth" different amounts, depending on which state you're in (your math above supports that). Write one or two sentences about why that would matter in the grand scheme of a democratic election (*this video might help*!).

Now, remember the point of the EV vote distribution (in the <u>Framers' own ideas</u>):

Choice of the president should reflect the "sense of the people" at a particular time, not the dictates of a faction in a "preestablished body" such as Congress or the State legislatures, and independent of the influence of "foreign powers". The choice would be made decisively with a "full and fair expression of the public will" but also maintaining "as little opportunity as possible to tumult and disorder".

As we just saw, that's not *exactly* what happens. It definitely is a "full" expression, but "fair?" If certain votes are worth more than others, depending on which state you live in....well, that doesn't seem very fair!

Let's look at this a different way...remember your answers to 1 and 2? Let's revisit those!

Now, each state has 2 Senators. Why, you might ask? Because the Framers knew that each state needed to have an equal voice in the more senior of the two Houses of Congress; by giving each state 2 Senators, that's accomplished. And, it's a great idea! That way a state like Wyoming can't get "pushed around" by a state like California.

Now what do I mean, "pushed around?" Welp, I mean because of the population differences! You see, the other chamber of Congress (The House of Representatives) is composed of folks that can vary in number, depending on the sdtate's population. In the Framers' own words:

"Representatives...shall be apportioned among the several States which may be included within this Union, according to their respective Numbers..."

What I'd like to de next is examine how the EVs that stand for the Representatives are allocated, and look at a more equitable way of doing that. Start by clicking over to the tab marked "EV (proportional) + Pop".

Since each state has two, and those two aren't proportional, then we can take those out (for now!) and look at which ones remain; the remaining ones will (*should*!) be proportional! Let's see! In the column headed "C", we want to place the number of "representative-only" EVs (for example, Oregon would only have 5 "rep only" EVs, since we have two senators and 5 reps).

Let's make Sheets do the hard work for us. In cell C3, you want to subtract Alabama's two senators from their 9 EVs. So

click in cell **C3** and type **=B3-2**, then **Enter**. Then grab the bottom right corner of that cell (you'll know your cursor is in the right place when it changes from an arrow to a black cross) and drag it all the way down to the bottom of the column. That will copy your formula into all the cells in Column C!

One quick (weird) fix: Washington, DC doesn't *have* senators, so you need to manually go back into Cell **C11** and change that number back to a "3".

15. (**1 point**) OK! Click on the header of Column B, and change the little dropdown near the bottom right corner of Sheets until it shows you the "Sum" (you did this in your turtle lab). What's that sum?

That number represents the total number of electoral votes up for grabs in every presidential election. Now, in Column C, we took out 2 senators each from 50 states, so it stands to reason that there are 438 EVs there – go and check!

Great! Now, the votes in Column C should me more proportional to the states' populations (at last, that's what the Constitution *said* they should be!). But here's the part that gets me...

Check out Wyoming's population: about 600,000. It's the least - populous state. Now check out Delaware (my home state!) and *its* population: about 1,000,000.

¹ It also says some *other* stuff that I won't talk about here because 1) it's not relevant to our discussion, and 2) it's pretty culturally awful.

Please notice that Wyoming gets one "senator-less" EV; Delaware does, too! But hang on! If the EVs are to be distributed *proportionally*, and Wyoming gets 1, then Delaware should get *more* than 1!

Hang on, now – that seems...off! Proportional means proportional! And 1 does not equal 1.6!

So, one method I've thought of (over the years) to fix this is using *fractional* Electoral Votes². Ready to do some Sheets coding? Hell yeah you are!

- In Cell E3, Type **=D3/sum(D:D)**. You can get the "D3" and the "D:D" by clicking on them if you like!
- Copy that formula all the way to the "Wyoming" cell in E53.

16. (2 points) What are the numbers in those Column E cells telling you about each state in their row?

Ready for a little more coding? Hells yeah!

- In Cell F3, type **=E3*438**.
- Copy that formula all the way to the "Wyoming" cell in **F53.**

17. (2 points) What are the numbers in those Column F cells telling you about each state in their row?

OK – we gotta put the Senators' votes back in, yeah? Let's do that now!

- In Cell G3, type **=F3+2**.
- Copy that formula all the way to the "Wyoming" cell in **G53**.

(real quick: Change the formula in Cell G11 to **=F11**. Silly DC and its "no Senators"³)

So column G now has the EVs for each state so that

- They still sum to 538
- They still have "equal weighting" from senators (to protect the small states from being pushed around) and
- They have perfect proportional representation from the House (to ensure equity in voting per person)!

Let's take a look at how this changed the EV landscape! You may have noticed that, after you dragged your column G formula down, column H populated (in color!). What that column is showing is how the EVs chanagdd for wach state under this new "prpotional EV" rule.

- If a given cell is green, it means the stat in that row would pick up that many additional EVs;
- If a given cell is **red**, it means that state would *lose* that many EVs.

18. (1 point) Which state would pick up the most EVs under this plan?

19. (1 point) Which state would lose the most? Don't count DC, as it isn't a state!

So, how do we know this is "better"? Well, that's where Constitutional law scholars will disagree. ③ But I would argue that it's closer to what the Framers intended with the EC. If we have time later, we'll explore what would happen if we didn't limit the number of EVs to equal the number of senators and representatives!

(not suggesting we have more senators and representatives, mind you. 3)

² I can't imagine this will ever be implemented, as Congress really doesn't appear to truly *understand* math.

³ Among so many other things that are weird about it.