Politics & Policy

Let's Raffle Off Congressional Seats

New York lost its 27th Congress member after the latest U.S. census. A dose of randomness could have given it a fairer chance to hold on.

By Ariel Procaccia
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Give or take a few ... *Photographer: Andrew Harrer/Bloomberg*

Measured by the 2020 U.S. census, New York State deserves 26.56 seats in the House of Representatives. But it's getting 26 for the next 10 years. Somehow, it doesn't seem fair.

The difficulty, at its core, is mathematical.

The process by which the 435 House seats are allocated, known as apportionment, is complicated because it's impossible to precisely give each state its proportional share of the seats. On April 1, 2020, the Census Bureau announced last week, the total U.S. population was 331,108,434 and the population of New York was 20,215,751, which is 6.105% of the total. So New York is entitled to 6.105% of 435 seats, which gives the aforementioned 26.56 seats. The reapportionment formula now in effect translates that extra 0.56 to zero.

There's a better solution. By using a lottery, it would be possible to give each state a mathematically fair chance of winning an extra seat that's equal to its fractional entitlement. New York would have a 56% chance of keeping its 27th seat, whereas Colorado (whose 2020 entitlement is 7.60) would have a 60% chance of gaining a new eighth seat.

There's nothing inevitable about the existing apportionment system and its inability to account for fractions. Indeed, there's been a vigorous debate about Congressional apportionment that dates back to the 18th century. The first matchup, in 1790, was between methods proposed by Alexander Hamilton and Thomas Jefferson, with George Washington in Jefferson's corner (never mind Jefferson's melodious complaint in the Broadway show that Hamilton "got Washington in his pocket"). In subsequent decades, several different apportionment methods were adopted by Congress, with partisan bickering erupting every time some state stood to lose seats based on the latest census results. It wasn't until 1941 that Congress finally settled on a particular formula, the Method of Equal Proportions, which has been used for every decennial apportionment since.

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This procedure aims to equalize, as much as possible, the number of residents different states require to obtain a seat. Specifically, it divides the 435 seats in a way that minimizes the relative difference between the number of residents per seat. For example, if one state has 300,000 residents and three seats, and another has 190,000 residents and two seats, then the former state requires 100,000 residents per seat whereas the latter needs only 95,000; the relative difference is 5%.

But the Method of Equal Proportions isn't necessarily as fair as it sounds. It's somewhat biased toward less populous states: the fractional entitlements they require to be rounded up are smaller than those needed by more populous states. This mathematical fact notwithstanding, the state of Montana – hardly a population behemoth – sued the government in 1991, claiming that the Method of Equal Proportions disadvantaged it when it lost one of its two House seats following the 1990 census. The case was argued before the U.S. District Court in Montana, which (in its unbiased wisdom) ruled in favor of Montana, only to be unanimously reversed by the Supreme Court.

Other (unsuccessful) lawsuits, such as those brought by Massachusetts after the 1990 census and by Utah after the 2000 census, have claimed that small errors in apportionment population counts led to a loss of seats. It wouldn't be surprising to see New York suing this time around: it was 89 residents short of keeping its 27th seat, the narrowest margin in modern U.S. history.

Randomized apportionment methods, by contrast, would be immune to these problems: Claims of inequity would be moot because the lottery would precisely realize each state's entitlement, and a small counting mistake would change a state's chance of winning an extra seat by a negligible amount. New York might have lost its seat anyway, but at least it would have had a reasonable chance to keep it.

That isn't to say that randomized apportionment methods wouldn't have their own potential issues. Perhaps the main shortcoming would be transparency: Most citizens would probably struggle to grasp the notion of randomness, making it more difficult to understand and trust the outcome. This limitation would be compounded by the complexity of the methods themselves, which must overcome technical subtleties to achieve permissible outcomes. Nevertheless, an elegant randomized method proposed by the mathematician Geoffrey Grimmett in 2004 is eminently practicable. And a proposal in the works by Paul Gölz, Dominik Peters and myself leverages modern algorithmic techniques to generate lotteries that could achieve even more robust fairness guarantees, at the cost of being more mysterious.

But the pursuit of fairness in apportionment has always been intertwined with somewhat inaccessible mathematics. As Representative J. Bayard Clark dismissively said in 1941, "The House

would not want to let some mathematical formula result in an inequity or an injustice." To stave off the next few centuries of acrimony about apportionment, it might be time to take a chance on randomized methods.

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