Jefferson's and Adams's Methods

Lecture 21
Sections 4.3 - 4.4

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Outline

Jefferson's Method

Definition (Jefferson's Method)

By Jefferson's method, instead of the standard divisor, we use a modified divisor and recalculate the lower quotas until they add up to M.

This could result in a positive surplus (too few seats apportioned) or a negative surplus (too many seats apportioned).

- As long as the surplus is *positive*, we try a *smaller* modified divisor.
- As long as the surplus is *negative*, we try a *larger* modified divisor.

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- Jefferson's method involves repeated guesses until we find a number that works.

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- This could get ugly.

Example

Example (Example)

- Apply Jefferson's method to the three states A, B, and C, with populations 3 million, 6 million, and 7 million and 50 seats to be apportioned.
- We found SD $= 320000$ and $q_1 = 9.375$, $q_2 = 18.75$, and $q_3 = 21.875$.
- The lower quotas are 9, 18, and 21, which add up to 48.
- The surplus is $50 - 48 = 2$.
- Should the modified divisor be larger or smaller than 320000?
- Find one that works.

Example – VA, NY, and OH

Example

- The populations of VA, NY, and OH are 8,001,024; 11,536,504; and 19,378,102 people, respectively.
- The total number of seats apportioned to those states is 55.
- Use Jefferson's method to determine how many seats each state should get.

Outline

Adams's Method

Definition (Adams's Method)

Adams's method is very similar to Jefferson's method, except that Adams begins by giving every state its upper quota, which necessarily leads to too many seats apportioned. Then we use a modified divisor that is larger than the standard divisor to reduce the upper quotas. We continue to modify the divisor until the modified upper quotas add up to M.

- John Quincy Adams proposed this method in 1822, but it was never used by Congress.
- Adams's method, like Jefferson's method, involves repeated guesses until we find a divisor that works.

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- This, too, could get ugly.

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- Use Adams's method to apportion 55 seats.

Outline

Assignment

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- Chapter 4: Exercises 21, 23, 24, 27, 31, 32, 33, 34.