

## The ideal apportionment method should:

- Stay within the quota
- Avoid the population paradox
- Avoid the Alabama paradox
- Avoid the new states paradox
- Avoid systematic bias toward large or small states

## Why does the population paradox occur?

Review the Problem 2 from the February 1 handout.

1. What is the percentage growth of the nation overall from 2010 to 2020?
2. What is the growth rate of State A (a large state)?  
What is State A's quota in 2010? in 2020?
3. What is the growth rate of State C (a small state)?  
What is State C's quota in 2010? in 2020?
4. What is the proportional change in State A's quota? in State C's quota?
5. What is the absolute change in State A's quota? in State C's quota?
6. Compare your answers to #4 and #5.

## Paradoxes

- The divisor methods are the *only* methods that avoid the Population paradox
- All divisor methods avoid the Alabama paradox
- All divisor methods avoid the New States paradox

## Claim

- Webster's Method is the only unbiased divisor method

## Staying within the quota

- There is no method that avoids the population paradox and stays within the quota.

TABLE 10.3. The Chance of Violating Quota in the U.S.

	<i>Adams</i>	<i>Dean</i>	<i>Hill</i>	<i>Webster</i>	<i>Jefferson</i>
Expected number per 1,000 problems	1,000	15.40	2.86	.61	1,000

NOTE: These estimates assume fifty states and a fixed apportionment of 435 seats (the 1970 U.S. apportionment). All populations that produce this apportionment using a fixed divisor were assumed to be equally likely, and the number of instances was counted in which some state violated quota by Monte Carlo simulation.

# Apportionment in 1920s

**1920** argument c. Hill's vs. Webster's and small/large state bias

## **1929 Law**

The president will send to the Congress the results of the census and the apportionment of the 435 members of the House based on:

- The method used in the preceding apportionment
- Webster's method
- Hill's method

If Congress does not apportion itself, then apportionment is based on the method last used.

## Current Situation

- In 1930, Hill's and Webster's methods agreed
- In 1940, Hill's method gave an extra seat to the Democrats
- Hill's used since