

2012 MMC Problems

Problem 1: Electoral College Dropout

Every four years the Electoral College (EC) elects the U.S. President. In all but two states (Nebraska and Maine) the vote cast by each Elector is expected to be consistent with the winner of the plurality vote of the state they represent. A direct result of this “winner-takes-all” approach to allocating EC votes is that presidential candidates often focus campaign resources on states where the vote is predicted to be close (commonly referred to as a “battleground” state). However, the “winner-takes-all” method also comes under frequent attack as being in conflict with the “one person, one vote” ideal and consequently alternative EC allocation methods are frequently proposed.

In an attempt to “award the state’s votes according to how they are cast”, the Iowa state legislature is considering adopting the proportionality method for allocating EC votes. A budget-minded group of the state legislators has contacted your team in order to help them determine if this is a good idea for the state economy.

In particular they want to know how the proposed change will effect Presidential campaign spending in Iowa in this (and future) elections given the following scenarios.

- Iowa is the only state to make the change
- Iowa and other states (not necessarily all) change to the proportionality method.
- Iowa chooses not to make the change while other states (not necessarily all) do.

Problem 2: Manifest Density

During the last housing boom, rural America saw large portions of formerly agricultural land sold for commercial and residential development. Intuitively, one might expect this to have a negative effect on the nation’s ability to produce food, and it raises an important question. How much land can the United States realistically develop for residential, commercial, or industrial purposes without seriously limiting its ability to feed its people?

- Based on current land use trends, when does your team forecast there will be no more land for growth?
- When does your team forecast that development will prohibit the United States from producing enough food to feed its people?
- Is there an optimal balance between agricultural and non-agricultural land use for the United States? Based on current land use trends, when will this balance be achieved (or surpassed)?