

How to Improve Presidential Elections

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 - Trump got Republican nomination by winning in 36 states
 - defeated Hillary Clinton in general election
- But in first 17 primaries he won, anti-Trump vote bigger than pro-Trump vote
- Same thing in general election
 - even in Florida, Michigan, North Carolina, Pennsylvania, and Wisconsin (all of which Trump won) anti-Trump vote exceeded pro-Trump vote

no contradiction

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- in primaries

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 - Trump got less than 50% vote in each first 17 victories

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 - given Trump's extreme views, might well have been defeated had there been just *one* mainstream rival
 - in March 8 poll, *both* Cruz and Rubio would have easily beaten Trump in two-candidate contest
 - voting-splitting among Rubio, Cruz, Kasich and others ensured Trump's nomination

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 - so vote-splitting between Clinton and Stein allowed Trump to win.

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 - voting-splitting between Gore and Nader handed election to Bush

Final example: 1992 U.S. Presidential election

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- Republican primaries and general elections use *plurality rule* (first-past-the-post) as election method
 - each voter votes for one candidate and winner is candidate with most votes, even if doesn't get majority
- plurality rule vulnerable to vote-splitting
 - two or more similar candidates split the vote, allowing a very different candidate to win

Is there a better way to elect presidents?

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- Answer: yes

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- Gore would probably have defeated Bush (Junior) in Florida head-to-head, but this not reflected in outcome
- Bush (Senior) might have defeated Bill Clinton in two-way match-up, but we don't know

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 Kasich or Kasich
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- What should we do with these rankings?

“True” Majority Rule/Condorcet’s method (per Marquis de Condorcet)

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- voters submit rankings
- elect candidate who (according to rankings) would beat each of the others in head-to-head contest

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40%

Trump

Kasich

Rubio

35%

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25%

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- contrast with *plurality winner*
 - Trump is plurality winner
 - anti-Trump vote split between Rubio and Kasich
 - if either of Rubio or Kasich drop out, other beats Trump

48.7%

Bush

Gore

Nader

48.3%

Gore

Bush

Nader

3%

Nader

Gore

Bush

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Bush

Gore

Nader

48.3%

Gore

Bush

Nader

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Nader

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Bush

- Gore defeats Bush ($48.3\% + 3\% = 51.3\%$)

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- but Bush is plurality winner

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- but Bush is plurality winner
 - as he was in Florida

- Once voters submit *rankings*, many systems besides true majority rule become possible

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- Why limit ourselves to majority rule?

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- if some candidate gets majority of first-place votes, elected
- otherwise, look at 2 candidates getting most first-place votes
- whichever candidate preferred by majority is elected

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Kasich

Rubio

35%

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25%

Kasich

Rubio

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- no candidate gets majority of first-place votes

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Rubio

Trump

- no candidate gets majority of first-place votes
- so Trump faces Rubio

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25%

Kasich

Rubio

Trump

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 - majority prefer Rubio (35% + 25%)
 - so Rubio elected in runoff
- saw earlier that majority rule elects Kasich

Which method – runoff voting or majority rule – is better?

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- Way to answer question: which method does better job of satisfying basic requirements (principles) that any good voting rule should satisfy

Consensus principle/Pareto principle

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- if everyone agrees candidate A better than B, B won't be elected

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Neutrality

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- electoral rules should treat all candidates equally
- Both true majority and runoff voting satisfy neutrality

“No vote splitting” Principle

(Independence of Irrelevant Candidates)

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 - but still beats B majority if C not running
- But runoff voting violates IIC

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Trump

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Kasich

Rubio

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Trump

- saw that in 3-way race, *Rubio* wins
- but notice that if Trump doesn't run, *Kasich* wins

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- saw that in 3-way race, *Rubio* wins
- but notice that if Trump doesn't run, *Kasich* wins
- so runoff voting violates “no vote splitting” principle (IIC)

So far, true majority rule fares better than runoff voting

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- both satisfy consensus, anonymity, and neutrality
- but only majority rule satisfies IIC

But majority rule has a flaw:

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- there may not always be a candidate that beats all the others

35%

33%

32%

Trump

Rubio

Kasich

Rubio

Kasich

Trump

Kasich

Trump

Rubio

35%

33%

32%

Trump

Rubio

Kasich

Rubio

Kasich

Trump

Kasich

Trump

Rubio

Rubio beats Kasich (68% to 32%)

35%

33%

32%

Trump

Rubio

Kasich

Rubio

Kasich

Trump

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Trump

Rubio

Rubio beats Kasich (68% to 32%)

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35%

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But Kasich beats Trump! (65% to 35%)

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- this is called a *Condorcet cycle*

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- this is called a *Condorcet cycle*
- majority rule violates *decisiveness principle*, which requires that a winner always exists

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Rubio beats Kasich (68% to 32%)

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- this is called a *Condorcet cycle*
- majority rule violates *decisiveness principle*, which requires that a winner always exists
- runoff voting satisfies decisiveness

- So true majority rule satisfies
 - consensus
 - anonymity
 - neutrality
 - IIC

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 - IIC
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Does any voting method satisfy all five principles?

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consensus

anonymity

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Answer: No

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Answer: No

- Implied by Arrow's Impossibility Theorem

But Arrow's theorem too negative

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- insists electoral method must work for *any* rankings by voters

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- insists electoral method must work for *any* rankings by voters
- but some rankings may be quite unlikely

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Kasich	or	Rubio	or	Kasich	or	Rubio
Rubio		Kasich		Trump		Trump

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Kasich	or	Rubio	or	Kasich	or	Rubio
Rubio		Kasich		Trump		Trump

– but not

Rubio		Kasich
Trump	or	Trump
Kasich		Rubio

- this sort of polarization may be bad for Republican party

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- but very good for majority rule
- if most voters polarized, then the majority rule *is* decisive (no Condorcet cycles)

- Define a voting method to *work well* for restricted class of rankings if it satisfies consensus, anonymity, neutrality, IIC, and decisiveness when voters' rankings drawn from that class

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(e.g. true majority rule works well for the class of polarized rankings)

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- if a voting method works well for some particular class of rankings, then true majority rule also works well for that class
- furthermore, there exists some class of rankings for which true majority rule works well but other voting method does not
- thus, true majority rule works well *more often* than any other method

- Thus there is precise sense in which true majority rule is best

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- true majority rule not always decisive

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 - then need tie breaker

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 - but Bloomberg and Sanders choose *not* to run
 - afraid of taking votes away from Clinton and handing election to Trump - - vote splitting again

Majority Rule could help in another way

- In general election, many voters reviled Trump
 - but couldn't bring themselves to vote for Hillary Clinton
 - so either didn't vote or voted for third-party candidates with no chance of winning
- many of them might have voted for Michael Bloomberg (moderates or conservatives) or Bernie Sanders (millennials) had they been on ballot
 - but Bloomberg and Sanders choose *not* to run
 - afraid of taking votes away from Clinton and handing election to Trump - - vote splitting again
 - public left with 2 deeply disliked candidates

42%

Trump
Bloomberg
Clinton

40%

Clinton
Bloomberg
Trump

18%

Bloomberg
Clinton-Trump

42%

Trump

Bloomberg

Clinton

40%

Clinton

Bloomberg

Trump

18%

Bloomberg

Clinton-Trump

- Bloomberg beats Trump (60% to 40%)

<u>42%</u>	<u>40%</u>	<u>18%</u>
Trump	Clinton	Bloomberg
Bloomberg	Bloomberg	Clinton-Trump
Clinton	Trump	

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- Bloomberg beats Clinton (58% to 42%)

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- Bloomberg beats Clinton (58% to 42%)
- Bloomberg is majority winner
- Trump is plurality winner

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- State of Maine has adopted ranked choice for governor, U.S. Senate, and U.S. House of Representatives
- so there's reason for optimism that presidential elections will improve