

# Some candidates for reforming elections

Eric Maskin presents some general election results



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**W**ith this year's general election in the United Kingdom and presidential and congressional elections in the United States, now is a good time to re-examine the system our two most stable democracies use to elect politicians: first-past-the-post voting (also called plurality rule). As we will review, this voting method has sometimes produced highly undemocratic outcomes in both countries. But I will discuss recent work showing that significant improvements to first-past-the-post can be found.

### **1. First-past-the-post voting**

Suppose that there are several candidates to fill a particular office. Under first-past-the-post, each voter votes for one of them, and the candidate with the most votes wins.

This is a sensible voting system when there are only two candidates; the winner will be supported by a majority. But it can lead to truly undemocratic outcomes when there are more than two (as, in practice, there usually are).

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## 2. Arrow's Theorem

In discussing voting improvement, we must first contend with Arrow's Impossibility Theorem (Arrow 1951), which establishes that there is no voting system satisfying five natural and attractive conditions. I will state three of these in forms stronger than Arrow imposed himself because the more demanding versions are satisfied by nearly every voting method used in practice or studied in theory, and it's hard to imagine a satisfactory voting method violating any of them: *anonymity* (voters should be treated equally), *neutrality* (candidates should be treated equally), and *positive responsiveness* (if the vote shifts in favour of candidate  $x$  over  $y$ , the election outcome should not shift in favour of  $y$  over  $x$ ). A fourth condition, *unrestricted domain* (there should be a clear-cut winner regardless of the votes) is also unobjectionable.

By contrast, *independence of irrelevant alternatives* (if candidate  $x$  beats  $y$  in situation A, then  $x$  should also beat  $y$  in situation B where each voter's preference between  $x$  and  $y$  is the same as her preference in A) is satisfied by almost *no* voting method. Nevertheless, there is a compelling rationale behind independence, namely, it rules out vote-splitting as in the 1983 general election. For example, consider Table 1, depicting voters' preferences in a constituency with four groups of voters (in the first group, for instance, voters have preferences Conservative > Alli-

in which the Conservative Party won 61% of the seats in Parliament but only 42% of the vote. This seemingly paradoxical result arose because opposition to the Conservatives from the political left and centre was split between the Labour Party and the Liberal Party/Social Democratic Party Alliance. In the constituency of Dulwich, for example, the Conservative candidate got slightly more than 40% of the vote, the Labour candidate got 36% and the Alliance candidate got 22%. So although support for his opposition

was nearly 60%, the Conservative candidate prevailed under first-past-the-post voting.

There have been many similar perversities in American elections. For example, in the 2000 presidential election, third-party candidate Ralph Nader split off nearly 100,000 votes from Democrat Al Gore in Florida (the pivotal state), allowing Republican George W. Bush to win there – and thus the presidency. Yet, Gore would have easily prevailed in a head-to-head contest in Florida against Bush.

Table 1

41%	6%	17%	36%
Conservative Alliance Labour	Alliance Conservative Labour	Alliance Labour Conservative	Labour Alliance Conservative

Table 2

41%	32%	17%	10%
Conservative Alliance Labour	Alliance Conservative Labour	Alliance Labour Conservative	Labour Alliance Conservative

Table 3

41%	32%	17%	10%
Conservative Labour Alliance	Alliance Conservative Labour	Alliance Labour Conservative	Labour Alliance Conservative

ance > Labour). Notice that under first past the post, Conservative wins (since 41% is bigger than 23% or 36%). But from a democratic perspective, this is the “wrong” outcome, since 53% of voters prefer Labour to Conservative and 59% prefer Alliance to Conservative; it’s only (see Table 1) because Alliance and Labour split the centre / left vote that Conservative wins.

To see that independence prevents such a perverse outcome, consider Table 2, the same as Table 1, except that the second group of voters has expanded and the fourth group has shrunk. Notice that in Table 2, Alliance should “obviously” beat Conservative from a democratic perspective: she is ranked first by 49% of voters and second by 51%, whereas, for Conservative, (see Table 2) the corresponding figures are 41% and 32%. But independence implies that since Alliance beats Conservative in Table 2, she should do so in Table 1 as well, as each voter’s ranking of these two candidates is the same in both tables. Thus, vote-splitting cannot occur.

### 3. Borda voting

Yet, independence is overkill: it also rules out taking the intensity

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of voters’ preferences into account. Consider Table 3, the same as Table 2 except that, for the first group of voters, Labour and Alliance have switched places. If, as previously argued, Alliance should beat Conservative in Table 2, independence implies that Alliance should also beat Conservative in Table 3. But this ignores the fact that, in Table 3, the first group of voters rank Conservative *two* (see Table 3) places above Alliance, suggesting that the intensity of their preference for Conservative over Alliance is stronger than in Table 2. Plausibly, the Conservative should now win.

Accordingly, in Maskin (2024), I propose modifying the independ-

ence condition so that if candidate  $x$  beats  $y$  in situation A, then  $x$  should also beat  $y$  in situation B where each voter’s preference between  $x$  and  $y$  is the same as her preference in A *as long as* she ranks the same number of candidates *between*  $x$  and  $y$  in both situations. Moreover, I show that the unique voting system satisfying unrestricted domain, anonymity, neutrality, positive responsiveness, and modified independence (together with a weak consistency condition) is Borda voting (Borda 1781), in which each voter ranks the candidates and (if there are  $m$  candidates) a candidate gets  $m-1$  points every time she’s ranked first,  $m-2$  every time she’s ranked second, and so on. The winner is the candidate with the most points.

Note that Borda voting resolves the vote-splitting problem in Table 1: it elects Alliance, the “correct” winner. Moreover, Borda also takes voters’ intensities into account: in Table 3 it elects Conservative, the “plausible” winner in that example.

Yet, although attractive, Borda voting has a flaw: it is vulnerable to strategic voting. In Table 2, for example, the first group of voters can get Conservative elected by submitting the false ranking Conservative > Labour > Alliance, thereby replicating Table 3.

### 4. Condorcet voting

Accordingly, let’s now examine Condorcet voting (Condorcet 1785), in which each voter ranks the candidates and the winner is the one whom a majority prefer to each rival. Now, theoretically, a Condorcet winner doesn’t always exist. In Table 3, Labour beats Alliance (51% to 49%), Conservative beats Labour, but Alliance beats Conservative. Yet, voters in the first group have quite implausible preferences, since if they rank right-wing candidate Conservative first, centrist candidate Alliance would be a much more natural second-place choice than Labour. Indeed, if we assume that preferences conform to ideology in this way – and Maskin

and Robinette (2024) provide evidence that this is a good empirical assumption for US elections where ranking data are available – there will always be a Condorcet winner (Black 1948).

Just as Borda voting resolves vote-splitting, so does Condorcet voting. Indeed, Condorcet voting is one of the few methods that satisfies full-blown independence, implying, unfortunately, that it can't take account of preference intensity.

However, Condorcet voting *can* be made immune to strategic voting. This is not entirely straightforward: as previously noted, when the first group of voters in Table 2 submit the false ranking Conservative > Labour > Alliance, there is no Condorcet winner. So, if the “tie” is broken using, say, Borda voting, this strategic manipulation *will* pay off for the group by electing Conservative.

However, we can get around this problem by introducing the concept of diversity score: a candidate's *diversity score* is the number of different ways she is ranked first (in Table 2, Alliance's diversity score is 2, whereas Conservative's and Labour's scores are 1 each). In effect, this is a measure of the breadth of support for the candidate. Now, consider the following voting system: (A) voters rank the candidates; (B) if some candidate has a majority of first-place votes, she is elected; (C) if there is no such candidate, the one with the lowest diversity score is dropped; (D) a tie for lowest diversity score is broken by dropping the candidate with the fewest first-place votes; (E) the process continues until some candidate has a majority. Notice that under this system, Conservative supporters cannot get their

candidate elected by ranking Alliance third: if some of them do this, they will succeed in raising Conservative's diversity score to 2. But since that means that Labour is dropped (with a score of only 1), Alliance now attains a majority of first-place votes. Maskin and Robinette (2024) show that this argument generalizes, so that when true preferences are ideological, the diversity-score system always elects the Condorcet winner and is immune to strategic voting. Indeed, it is the only voting system that is so immune.

Thus, if capturing voter intensity is a primary concern, Borda voting is the right improvement on first-past-the-post. But if strategic voting is the greater worry, then Condorcet voting (as implemented in the preceding paragraph) is optimal.

## References and further reading

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