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Eric Maskin: Should an alternative voting system be used?

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Key concepts: First Past the Post System; Majority Vote System; Proportional Representation; Rank-Choice Voting; Dasgupta-Maskin majority domination theory; Condorcet Method; Approval Voting.

On May 5, 2011, the UK voted on the “alternative vote referendum.” Should an alternative voting system be used? Unsurprisingly, the No won by 67.9%, and the current voting system, First Past the Post (FPTP), which has been in place since the 19th century, remained. But is it the fairest voting system according to voting preferences?

Eric Maskin, who won the Nobel Prize in 2007 for his work on mechanism design theory and how alternative voting systems can lead to more representative and socially desirable outcomes, highlights the limitations of the FPTP and other used voting systems and proposes alternative voting systems that are robust, fair, and representatives of voters’ true preferences.

Assume there are two candidates A and B, an individual i would be able to rank these candidates according to their own preferences, for example, assuming you are individual i, you may prefer A to B, B to A or being indifferent between both candidates. These preferences will also be consistent (transitivity). To better explain the concept of transitivity in this case we will increase the number of candidates you can choose from. Assume you have to vote between candidates A, B, and C. If you prefer candidate A to B and you are indifferent between candidate B and C, then if your preferences are consistent, you will prefer candidate A to C (there is transitivity in your consumer preferences). When it comes to elections, each agent expresses their individual preferences, voting for their preferred candidate, and then preferences are aggregated into their social preference. Then, if, for example,

candidate A wins means that a majority prefers candidate A, and we can say that A is socially preferred.

Let’s come back to the assumption of having 3 candidates: A, B, and C. If, in the ballots, people just vote for the preferred candidate, let’s say A, we are not considering the voter’s full ranking of preferences. Does this then give us a fair outcome representative of social preferences? In this case study, we are going to look at what Maskin proposes and analyse whether the current voting systems most used represent voters’ preferences.

Majority Rule system:

In simple terms, if we have two candidates, A and B, each voter casts their vote for their preferred candidate, and the candidate who receives more than half the votes (i.e., more than 50%) wins – single-winner elections. This is the same idea as for referendums with two options. Now, assume we have three candidates: A, B, and C, again if one candidate receives more than 50% of the votes, that candidate will be considered the single winner of the election however, in this situation, we could have the situation in which no candidate receives more than 50% of the votes, for example, assume candidate A received 35% of the votes, candidate B received 32% of the votes, and candidate C received 33% of the votes. In this case, no single candidate has achieved a simple majority, and we find that different methods can be used to resolve this.

If no candidate achieves a simple majority, a runoff election may be held between the two top candidates; in the example above, this would be candidates A and C, and the candidate who receives the majority of votes would win. Some examples of countries which use this system are France for their presidential and legislative elections use a two-round system where a runoff election is held if no candidate wins an absolute majority (more than 50% of the votes) in the first round. Brazil also uses the runoff election system for their presidential elections.

A variation of the majority rule is the relative majority system; the FPTP system in the UK uses a plurality/relative majority system where the candidate with the most votes in each constituency wins, so using the example above, if a constituency has candidate A (35% of the votes), B (32% of the votes), and C (33% of the votes),

candidate A is the winner as they have received the majority of the votes. Other examples of countries which use the FPTP system are the United States for some of their elections; these are their Federal, State, and Local elections. Germany uses a mixed-member proportional system, where candidates can cast two votes, one for a candidate in their constituency, using the FPTP system, and one for a party list, using the proportional representation, which we will explain below. India uses the FPTP system to elect members of the lower house of parliament. Canada uses the FPTP system for electing members to the House of Commons and provincial legislatures.

Proportional Representation (PR):

This type of electoral system ensures that the number of seats a party receives in a legislature is proportional to the number of votes it receives in an election, i.e. parties receive a number of seats in proportion to the number of votes they receive. For example, assume there are three parties, X, Y, and Z. A country is voting for the parliament chamber, and party X receives 35% of the votes; it should get approximately 35% of the seats in the parliament. It could be that voters vote for a party, and then the party decides the order of candidates within a party who will take the seats (closed list) or that voters can express their preferences for specific candidates within the party list (open list). South Africa, Spain, Israel, and Portugal are some examples of countries which use the PR system closed list, so people vote for a party, and seats in their different chambers are distributed proportionally. Sweden, Finland, Brazil (Chamber of Deputies), Chile and Peru are examples of countries which use the PR system open lists, so in these countries, people vote for the political party, but voters influence which candidates from a party are elected to the legislature. For example, in Sweden, voters vote for a party and can also indicate their preferred candidate within that party. Seats then are allocated proportionally to parties based on their share of the vote, and candidates are elected based on the number of individual votes they receive.

Other variations of PR are Single Transferable Vote (STV) and Mixed Member Proportional (MMP). STV is used in countries such as Ireland for parliamentary elections or Australia for their Senate. Voters rank candidates on the ballot in order of preference. For example, assuming there are three candidates, A, B, and C

(candidates could belong to different parties), a voter will then rank the candidates according to their individual preferences; for example, assume the first choice of a given candidate is A, the second choice is C, and the third choice is B. Once all the voters cast their votes, to be elected, a candidate must reach a specific threshold, also known as a quota[1]. The quota is a formula that takes into account the total number of valid votes cast and the number of seats to be filled. During the count, all first votes are initially counted; if a candidate reaches or exceeds the quota, they are immediately elected, and the surplus votes for that candidate (i.e. the surplus votes when a candidate received more votes than necessary to meet the quota) are transferred to other candidates based on the voters’ subsequent preferences. The surplus votes are proportionally distributed to the following preferred candidates, and so each vote continues to count until all seats are filled. Suppose no candidate does meet the quota after the initial count. In that case, the candidate with the fewer votes is eliminated, and the votes for the eliminated candidate are transferred to the voters following preferred candidates. Seats are allocated to candidates who reach the quota through first preferences or transfers from elected candidates’ surplus votes.

For example, assume there are three candidates, A, B, and C, in a constituency where there are 1,000 voters. A common way to determine the quota is using the following formula:

$$Quota = \frac{Total\ Valid\ Votes}{Number\ of\ Seats + 1} + 1$$

Where the total valid votes are the total number of valid votes cast in the constituency (in this case, 1,000). Number of seats is the number of seats to be filled in the constituency (i.e. if there are 2 number of seats to be filled, this number will be 2). In this case, the Quota will be:

$$Quota = \frac{1{,}000}{2 + 1} + 1 = 334$$

[1] See for example how the STV quota works for Ireland: file://nask.man.ac.uk/home$/Downloads/111110_03f591cc-6312-4b21-8193-d4150169480e.pdf

If the result of the fraction, before adding 1, its not a whole number, such as in this case which is 333.33 then that number will be rounded down before adding the 1, so in this case 333.33 will be rounded down to 333 and then we add the 1.

Assuming everyone votes, the initial counting round of the votes reveals that Candidate A receives 580 first-preference votes, Candidate B received 180 first-preference votes, and Candidate C received 240 preference votes.

Candidate A has 580 votes, which is more than the quota; candidate A will be automatically elected. There is a surplus of votes, 580 – 334 = 246. This surplus is redistributed in proportion to the next preferences indicated in the ballots. There maybe some further conditions applied for the redistribution depending on the country, but to simplify, suppose 200 of Candidate A’s ballots have Candidate B as the second preference, and 380 have Candidate C as the second preference. The votes are distributed accordingly:

$$Candidate\ B\ receives = \frac{200}{580} * 246 = 84.82\ \approx 84$$

$$Candidate\ C\ received = \frac{380}{580} * 246 = 161.17 \approx 161$$

Candidate B will now have 264 votes and candidate C 401 votes. Candidate C is not elected as it exceeds the quota, and candidate B is eliminated. Assume that after redistribution, no candidate meets the quota, so the candidate with fewer votes is eliminated, and the votes of the eliminated candidate are redistributed proportionally.

MMP is a hybrid electoral system used in countries such as Germany and New Zealand. It combines elements of the PR and FPTP systems. Voters have two votes in their ballot: in the first vote, they cast their vote for a candidate running in their single-member constituency, and in the second vote, they cast their vote for a political party or a party list at the regional or national level. In the first vote (constituency vote), the candidate with the most votes wins. In the second vote (party vote), the vote determines the overall proportional make-up of the legislature. Constituency seats are filled based on the FPTP principles, and list seats are allocated to political parties to ensure that the overall representation in the legislature reflects their share of the national or regional party vote. Suppose a party wins 20%

of the party vote but only 10% of the constituency seats. They will be allocated additional list seats to reach their proportional representation.

Dasgupta-Maskin majority domination theory[2]:

Dasgupta and Maskin argue that a true majority rule system works well and represents social preferences more often than the other systems. Assume we have 4 parties: A, B, C, and D, and voters rank their parties according to their preferences. Following Dasgupta-Maskin example, assume that for a given population the aggregated preferences of the voters are the following:

Percentage of voters	13%	40%	40%	7%
First option	C	B	A	A
Second option	B	A	D	C
Third option	A	C	B	B
Fourth option	D	D	C	D

Looking at the pairs of preferences:

B vs A: column one shows that 13% of the voters prefer B to A + column two shows that 40% of the voters prefer B to A = 53%. B wins

B vs C: 40% + 40% = 80%. B wins

B vs D: 13% + 40% + 7% = 60%. B wins

B is the true majority winner. Now assume these votes represent a UK general election where A=Conservatives, B=Labour, C=Liberal Democrats, and D=UK Reform, following the FPTP system established in the UK, Conservatives get 47% of the votes, Labour get 40%, and the Liberal Democrats get 13% of the votes so the conservatives win. The FPTP system can lead to outcomes where the elected government does not reflect the preferences of the majority of voters. In fact, in the 2019 UK election, the conservative party won a majority of seats (56.2%), which allowed them to form a government despite having 43.6% of the popular vote. Furthermore, the FPTP also leads to strategic voting, i.e. if in a constituency, votes

[2] See Maskin’s novel prize lecture: https://www.nobelprize.org/uploads/2018/06/maskin_lecture.pdf

are close for candidates A and B and, even if your main preference is C if you have a strong sentiment against, for example, B, then it is likely that a voter you will switch their vote to A, this can distort true preferences and lead to outcomes that do not reflect social preferences. The probability of A or B winning should not depend on whether C stands out under a true Majority Rule system.

Although Maskin, in general, advocates for representative systems instead of FPTP, he also critiques PR systems as they increase the fragmentation of political parties, which can lead to a lack of clear majorities, making it more difficult to form stable governments. It can give a platform for more extreme parties to be formed, destabilising the political landscape. These last two points can also lead to more coalitions, and so it becomes difficult to make specific parties accountable for the government actions. PR systems are also more complex than FPTP systems to understand, and this complexity can lead to voter confusion.

Makin explains different alternatives that better capture the majority preferences:

Ranked-choice voting (Instant runoff—IRV): Voters rank candidates in order of preference. All first-choice votes are counted. If a candidate receives more than 50% of the votes, they win. If no candidate has a majority, the candidate with the fewest first-choice votes is eliminated. The eliminated candidate's votes are then redistributed to the remaining candidates based on that candidate's voters' raking preferences. Votes are again counted, and this process will continue until one candidate has more than 50% of the votes.

Assume we have 4 candidates: A, B, C, and D. There are 40 voters which, aggregating their preferences, ranked as follows:

Total number of voters (percentage)	14 (35%)	10 (25%)	10 (25%)	6 (15%)
First option	A	B	C	D
Second option	B	C	D	C
Third option	C	A	A	B
Fourth option	D	D	B	A

In the initial count, A gets 14 votes, B gets 10 votes, C gets 10 votes, and D gets 6 votes. No candidate has a majority (in this case, 20 votes). Thus, the candidate with the fewest votes, D, is eliminated. D’s candidates' votes are redistributed based on the next voters' preference, which in this case is C.

Now, A gets 14 votes, B gets 10 votes, and C gets 16 votes. Still, no candidate has a majority; now, B has the fewest votes; it's eliminated, and the 10 votes are redistributed to their preferred candidate for those voters, in this case, C. Now, A gets 14 votes, and C gets 26 votes. C has more than 50% of the votes, and so C wins the election.

Condorcet method: The candidate who wins a head-to-head comparison against each of the other candidates wins. Voters rank all the candidates in order of preference. Each candidate is compared head-to-head with every other candidate. For each comparison, the number of votes that prefer one candidate is counted. The candidate who wins the pairwise comparisons wins.

Assume we have 4 candidates: A, B, C, and D. There are 40 voters which, aggregating their preferences, ranked as follows:

Total number of voters (percentage)	14 (35%)	10 (25%)	10 (25%)	6 (15%)
First option	A	B	C	D
Second option	B	C	D	C
Third option	C	A	A	B
Fourth option	D	D	B	A

We compare each pair of candidates:

A vs B: A is preferred against B by 14 + 10 = 24 voters. B is preferred against A by 10 + 6 = 16 voters. A wins

A vs C: A is preferred against C by 14 voters. C is preferred against A by 10 + 10 + 6 = 26 voters. C wins.

A vs D: A is preferred against D by 14 + 10 = 24 voters. D is preferred against A by 10 + 6 = 16 voters. A wins.

B vs C: B is preferred against C by 14 + 10 = 24 voters. C is preferred against B by 10 + 6 = 16 voters. B wins.

B vs D: B is preferred against D by 14 + 10 = 24 voters. D is preferred against B by 10 + 6 = 16 voters. B wins.

C vs D: C is preferred against D by 14 + 10 + 10 = 34 voters. D is preferred against C by 6 voters. C wins.

A wins against B and D. C wins against A, B, and D. B wins against D. D doesn’t win any of the comparisons. C wins every other candidate in head-to-head match-ups. Therefore, C is the condorcet winner.

Approval voting: Voters can vote for as many candidates as they like, and so voters can express support for multiple candidates without ranking them, i.e. each vote is counted equally. For example, assume we have for candidates: A, B, C, and D, and there are 5 voters.

Voter 1: approves A and B

Voter 2: approves A and C

Voter 3: approves B and D

Voter 4: approves A, B, and C

Voter 5: approves A and D

Counting all the votes:

Candidate A:

Voters approving: 1, 2, 4, 5

Total approvals: 4

Candidate B:

Voters approving: 1, 3, 4

Total approvals: 3

Candidate C:

Voters approving: 2, 4

Total approvals: 2

Candidate D:

Voters approving: 3, 5

Total approvals: 2

Candidate A wins as it has the highest number of approvals.

However, as Maskin points out, ranked-choice voting is a step forward, but the majority rule should be the next step after that. In fact, we can see occasions where the true majority rule satisfies consensus, anonymity, and neutrality, while ranked-choice voting does not.

Suggested activity:

Discuss the benefits of the IRV, Condorcet, and Approval systems compared to the FPTP and PR systems. Do you think the IRV, Condorcet, and Approval systems have any limitations?