

## Could the Brexit crisis be fixed by a new method of voting?

### Resume

This article argues that one reason for the Brexit crisis is the traditional binary voting system which counts votes of different meanings as if they were the same. In the 2016 referendum, for example, “remain” had more or less a clear meaning but different voters understood “leave” in different ways. Similarly in the parliamentary vote of January 15, the 432 MPs who voted against Theresa May’s deal meant different things by their “no” with, it’s estimated, a third wanting a “second referendum”, a third a “better deal”, and a third “no deal”.

As researchers of the electoral process, we have a simple solution to the impasse. We propose that a second referendum – or a new vote in the House of Commons – be based on a new method of voting, one we’ve called majority judgement.

In majority judgement, voters (or MPs) would vote on a number of well-defined “leave” and “remain” alternatives and would be asked to grade each alternative according to a scale of grades from “Terrible” to “Excellent.” The alternative with the highest majority-grade wins.

Why would this method fix the Brexit crisis? To prove our claim, first we explain some notions from social choice theory (such as the Condorcet and Arrow paradoxes). Then, based on a plausible estimate of current British public opinion, we contrast how the current binary voting system has gone wrong with how majority judgement could provide a winning solution. Finally, we use existing data from Pew Research surveys to show how majority judgement would have worked in the 2016 US Presidential Elections.

For our article in The Conversation US on majority judgement and the 2016 election please see:

<https://theconversation.com/trump-and-clinton-victorious-proof-that-us-voting-system-doesnt-work-58752>

And our article in The Conversation France on majority judgement and the 2017 election, please see:

<https://theconversation.com/pour-eviter-un-nouveau-21-avril-instaurons-le-jugement-majoritaire-58178>

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## Could the Brexit crisis be fixed by a new method of voting?

The 23rd of June 2016, in a historical referendum, UK voters were asked to choose between two options: “leave the EU” or “remain in the EU”. Unexpectedly, 52% (of the 72% of registered voters) chose to leave. But have they the same understandings about the conditions of the divorce?

The 15th January 2019, two thirds of the House of Commons rejected May’s deal (432 against, 202 for). This massive defeat is the worst since the 1920s of a UK government. What are the consequences? Perhaps the biggest crisis after WW2, and the final agreement with the EU will depend more on who plays best the political game than what voters really want.

One source of the crisis is the voting system which sums votes with different meanings and counts them as if they were the same. While “remain” has almost a clear meaning, “leave” is more unclear and has different understanding for different voters. Similarly, among the 432 MPs who voted against May’s deal, probably a third wants a “second referendum”, a third a “better deal”, and a third “no deal” (meaning a “hard Brexit”).

A simple and democratic solution to the crisis is by allowing the voters (or the MPs) to better express themselves and changing the voting system. To appreciate this obscure statement, let us see what the theory of voting teaches us.

### Condorcet solution to Brexit

Social choice theory was invented just before the French revolution by the famous mathematician, philosopher, and member of the academy of sciences, the marquis de Condorcet (1743-1794) and reinvented later by the economist and Nobel prize winner Kenneth Arrow (1921-2017).

**Let us now reimagine the Brexit history** and suppose that May’s “deal” had been known already in June 2016 and had been proposed to the voters together with two other options “no deal” and “remain”. **Suppose also that voters are asked to rank all the alternatives** from best to worse, as prescribed by the classical theory of Condorcet and Arrow.

A plausible *preference profile* in June 2016 could have been:

48%	30%	11%	11%
1st “remain”	1st “no deal”	1st “deal”	1st “deal”
2nd “deal”	2nd “deal”	2nd “no deal”	2nd “remain”
3rd “no deal”	3rd “remain”	3rd “remain”	3rd “no deal”

**Table 1:** a plausible preference profile where voters vote using Arrow & Condorcet’s ballot

The first column means that 48% of voters prefer “remain” over “deal” and “deal” over “no deal”, which is to say that they rank “remain” as their 1st best, “deal” as their 2nd and “no deal” as their 3rd.

As a consequence, because  $30\%+11\%+11\%=52\%$  of voters prefer either “deal” or “no deal” to “remain”, “leave” wins against “remain” in a referendum by 52%, hence the example is compatible with the 2016 results.

From Table 1, a majority, namely,  $48\%+11\%+11\%=70\%$ , prefers “deal” to “no deal” and a majority of  $48\%+11\%=59\%$  prefers “remain” to “no deal”. Thus, “no deal” is the worse option according to Condorcet. The best option according to Condorcet would be (May’s) “deal” because a majority, namely  $48\%+11\%+11\%=70\%$  prefer “deal” over “no deal”, and a (narrow) majority of 52% prefer “deal” over “remain”.

But, if May’s “deal” of 585 pages was the best option, why was it rejected by two thirds of the parliament and why do polls show that voters were not really enthusiastic about it? Something goes wrong in our analysis.

In fact, Condorcet’s method, while better than a binary voting system, does not allow voters to fully express themselves because ranking the candidate does not take into account the degree of supports (see Table 2). Moreover, it may well happen that no option can win against all other options by a majority (the famous Condorcet’s paradox). Perhaps this is what’s happening in the House of Commons now?

**Majority judgment solution to Brexit**

Majority judgment (MJ) is a new voting method, designed to permit voters to better express themselves and to avoid the Condorcet paradox (among others). To explain how it works in the Brexit context, **let us continue the illustration** with the same example, but now voters are not asked to rank the candidate but to answer the following question:

*In the interest of the United Kingdom, I judge in conscience that each of the following options (“remain in EU”, “May’s deal” and “no deal”) would be:*

*Great, Good, Average, Poor, Terrible.*

A plausible *opinion profile* of voters could be:

30%	18%	22%	8%	11%	5%	6%
“remain” <i>Great</i>	“remain” <i>Good</i>	“no deal” <i>Great</i>	“no deal” <i>Good</i>	“deal” <i>Good</i>	“deal” <i>Great</i>	“deal” <i>Good</i>
“deal” <i>Poor</i>	“deal” <i>Average</i>	“deal” <i>Poor</i>	“deal” <i>Average</i>	“no deal” <i>Average</i>	“remain” <i>Average</i>	“remain” <i>Average</i>
“no deal” <i>Terrible</i>	“no deal” <i>Terrible</i>	“remain” <i>Terrible</i>	“remain” <i>Terrible</i>	“remain” <i>Poor</i>	“no deal” <i>Terrible</i>	“no deal” <i>Poor</i>

**Table 2:** a plausible opinion profile with majority judgment’s ballot.

The opinion profile of Table 2 is compatible with the preference profile of table 1 because in the first and second column of Table 2 there are 30%+18%=48% of voters, all prefer “remain”, over “deal”, over “no deal”, but they do not have the same enthusiasm for “remain” or for “deal”.

We can see now why “leave” may have different meanings (columns 3-7 in table 2) and why even “remainers” may have different feelings about the different options (columns 1 and 2 of table 2) even if they have the same preferences (column of table 1).

This new information may change the best option as will be seen now. To see why, first, one can compute from the opinion profile of Table 2 what all voters think about each option separately. This is called the *merit profile* (Table 3).

	<i>Great</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>	<i>Terrible</i>
Remain	30%	18%	11%	11%	30%
Deal	5%	17%	26%	47%	5%
No deal	22%	8%	11%	6%	53%

**Table 3:** the merit profile, computed from the opinion profile in Table 2.

Options are ranked by their **majority-grades**, higher is better. The majority-grade of “remain” is *Average* because a majority of 30+18+11=59% judges it *Average* or better, and a majority of 11+11+30=62% judges it *Average* or worse. In the both calculations, we started from each end of the spectrum and add percentages until a majority of voters’ opinions are included. The majority grade of “deal” is *poor* and of “no deal” is *Terrible*.

Hence, “remain” is the best option in this example according to majority judgement. Perhaps it was truly the best decision in the referendum of June 2016, who knows? In real life, voters opinions are even much more complex than in Table 2, but the analysis is enough, we hope, to show that abandoning a binary voting system and replacing it with majority judgment, the crisis may be easily solved.

Ranking by the majority grade allows to counter potential strategic manipulations and exaggerations. For example, if voters who judge “deal” *average* or above exaggerate to *great* the majority-grade of “deal” does not change and still *poor* and if the 11% of voters who grade “remain” *poor* exaggerate to *terrible*, majority-grade if “remain” still *average*. The other democratic qualities of majority judgment are best illustrated in the US presidential election context where we have real data.

**How majority judgement would have worked in the 2016 US Presidential Elections?**

During the 2016 primaries in the US, the Pew Research Center [which defines itself as a nonpartisan fact tank that informs the public about the issues, attitudes and trends shaping America and the world] asked in a poll 1787 voters to answer the following question:

Regardless of who you currently support, I'd like to know what kind of president you think each of the following would be if elected in November 2016... [D]o you think (he/she) would be a Great, Good, Average, Poor, or Terrible president.

The merit profile was:

	<i>Great</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>	<i>Terrible</i>
John Kasich	5%	28%	39%	13%	15%
Bernie Sanders	10%	26%	26%	15%	23%
Ted Cruz	7%	22%	31%	17%	23%
Hillary Clinton	11%	22%	20%	16%	31%
Donald Trump	10%	16%	12%	15%	47%

**Table 4:** US election, Pew Research Center, Poll of 1787 voters, 17-27 of March, 2016

Hillary Clinton -- with a majority-grade of “*average*” -- would have been ranked by majority judgment above Donald Trump, who would obtain the majority-grade “*poor*”. One can easily compute that Kasich, Sanders, and Cruz have also the majority-grade *Average*. To determine the MJ ranking among the four, **two more calculations** are necessary. The rule, inspired by ranking methods in sports such as in diving, is the logical consequence of avoiding the paradoxes and best combating strategic manipulations.

The first **calculation** looks at the percentage of voters who grade a candidate higher than his or her majority-grade, the second at the percentage who grade the candidate lower than his or her majority-grade. This delivers a number called the “gauge.” In Kasich’s case,  $5\%+28\%=33\%$  evaluated him higher than *average* and  $13\%+7\%+9\%=29\%$  rated him below *average*. Because the larger share is on the positive side, Kasich’s gauge is +33%.

For Sanders, the gauge is -39%, for Cruz -40%, and for Clinton -47%. A candidate is ranked above another by MJ when his or her majority-grade is better or, if both have the same majority-grade, according to their gauges. Thus, Trump and Clinton are the last ranked.

Why they won their respective primaries? Probably because partisan voters choose the best candidate according to them, but who may not be the best candidate for all the country.

Why the US started and continue to use this costly primary system? Because otherwise the vote would split among several candidates of the same party and so the party will lose the election. This is an instance of the Arrow paradox where the presence or absence of a losing candidate can change the winner. For example, George Bush lost in 1992 against Bill Clinton mainly because of the presence of Ross Perot (now republican) who obtained 18.9%. Similarly, if Ralph Nader was not a candidate in Florida in 2002, presumably Albert Gore

would have won the electoral votes of Florida and so the US presidential election against George W. Bush.

Majority judgment is designed to avoid the Arrow paradox, because voters of the left (or the right) can give a good evaluation to all candidates of their party and there is no risk that the votes will split, or that the presence or absence of a minor candidate will change the winner.

Pew Research Center asked the same question several times, with Clinton and Trump as the only candidates until the election took place in November 2016. Their merit profiles were surprisingly stable and close (up to 2%) to that in table 4, despite the emerging scandals and the news stories. Hence, during all the campaign, Clinton was judged better than Trump.

But why Trump won against Clinton? Because many “swing voters” were asked to choose between two candidates who they judged *poor* or *terrible*. Most of the voters will prefer to abstain, or to vote blank, or to decide on the last news they heard, or to vote for Trump because it is the unique way to reject of the system. A small number of voters protesting as above is sufficient to reverse the outcome. Actually, the margin between Trump and Clinton in Michigan was 0.2%, in Wisconsin 0.8% and in Pennsylvania 0.7%. A Clinton victory in those states suffices to switch the election outcome to a Clinton’s victory!

Note however that changing the voting method will impact the electoral campaign, and affect which candidates will decide to participate. But, given our several experimental and real use data, we are confident that majority judgment is not only the best method in **theory** to avoid Arrow and Condorcet paradoxes and to resist strategic manipulations, but it also works well in **practice** to reach a consensus.

**In conclusion:** To solve the Brexit crisis, Theresa May can organize a second referendum (or a second House of Commons vote) with majority judgment where voters (or MPs) are offered several **well-defined** Brexit and remain alternatives and the option rated the best by a majority wins.

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