Voting System Reform Recommendations

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Abstract:

This brief contains a novel PR recommendation with simpler, well-studied fallbacks of single-winner *Approval* or *Score Voting*. These recommendations are from experts in the field of electoral reform and aim to be mathematically-sound while cognizant of the limitations on public support, complexity, and tradeoffs between PR and single-winner systems. It aims to give a tunable taxonomy of the various choices to help guide your difficult decision - wherever the support should lie between PR and single-winner. It also strongly disparages the options of Instant Runoff Voting (IRV) and similar ranked methods and the continuation of FPTP (even with multiple election rounds).

Brief Summary on Other Issues:

Online Voting:

We're not there yet. Soon. There are promising security developments in the realm of crytocurrencies that may enable provably-secure, verifiable, secret, anonymous, decentralized online voting ("secret, anonymous" is the hard part - if you don't mind enabling vote-buying there are plenty of systems available), but they're still being developed. In the meantime, perhaps the best (and most developed) way to enable interactive online democratic participation is to enable message boards using [LiquidFeedback](#) software - a well-established political discussion system using Liquid Democracy (delegative vote support) to build a network of political support. Once onling decisions can be binding (once the technology is secure enough), delegative voting is likely the best way to implement Direct Democracy, but for non-binding public polling & discussion you won't get a better (and more modern) ready-to-implement solution (that's already used by political parties) than LiquidFeedback.

Rural-Urban Proportional Representation:

It's good. STV and MMP have obvious flaws to them - this alleviates them. An open-party list PR system using *Approval* or *Score Voting* that enabled independent candidates and optimizes proportionality would be best (as suggested in this brief) but if there's support for Rural-Urban - it's more than good enough.

Recommendations:

The following text is taken from [New Electoral Systems for Canada](#) by Warren D. Smith, co-founder of the Center of Election Science, and shaped to fit the word count limitations. Please see the full document and links for further details.

Single-Winner [Score voting](#) to elect MPs within ridings:

a. Each vote consists of a numerical score within some range (most simply 0 to 9) for each candidate. Voters may also indicate "X" or "NO OPINION" if they wish to not express any opinion about that candidate. Such votes don't affect that candidate's average.

b. The candidate with the highest average score wins.

> Some people worry a little-known candidate could organize a band of fanatics to all give him 9s, while the other voters would all rate him "no opinion" causing Hitler to win. This actually is not a concern because it is an empirical fact that about twice as many voters "play it safe" by giving unknowns 0s than give them "no opinion." But if this actually had been a problem, then we could solve it by pre-agreeing that each candidate is to be awarded T fake votes using score S (for some pre-agreed values of S and T such as S=2 and T=1500) before the election begins. The highest average based on *both* the real and fake votes, wins. This is fair since S and T are the same for every candidate.

This is a very [simple](#) and easy change for Canada. Surveys [suggest](#) it would (if put to Canada's voters via a referendum) be enacted right now by about 60-40. Meanwhile every other voting-system reform Canada tried to enact by referendum was more complicated and [failed massively](#) by votes of 64-36 (Prince Edward Island 2005), 63-37 (Ontario 2007), and 61-39 (British Columbia 2009).

This system would not be proportional. It would simply be a better single-winner system. It would satisfy cloneproofness, monotonicity, participation, favorite-safety, [NESD](#) strategic-voting property (hopefully avoiding a 2-party-domination trap), and would reduce the importance of money. It's precinct-countable. It has little or no pro-extremist or pro-centrist bias. It's highly [expressive](#), but at the same time allows voters who wish intentionally *not* to express an opinion about one or more candidates, to do so in a non-distortionary manner. It has been heavily tested by [honeybees](#), over hundreds of trillions of elections and tens of millions of years. It also has performed excellently in computer simulation quantitative Bayesian Regret ([BR](#)) testing, which indicates the improvement got

by adopting it would be comparable to, or exceed, the improvement got by inventing democracy in the first place. That is, BR with score voting should be about 5 times better than with FPTP voting, which in turn is about 2 times better than "random winner" (a crude model of non-democracy). Score formed the basis of government in ancient Sparta and renaissance Venice, both of which lasted longer than any modern democracy, despite apparently-tougher challenges and worse circumstances.

I repeat. The improvement got by adopting score would be comparable to, or exceed, the improvement got by inventing democracy in the first place.

Simpler Alternative: Approval voting to elect MPs within ridings.

This is a simpler but cruder version of score voting in which a voter can only give one of *two* allowed scores to each candidate: "thumbs up" (1) and "thumbs down" (0); no intermediate scores are permitted. (Also called "approval" and "disapproval.") The candidate with the greatest approve/disapprove ratio wins their riding.

This enjoys all the same properties as score voting using finer scales, but: it's less accurate, less expressive, about twice as bad Bayesian regret-wise (still way better than FPTP), and empirically less favorable for small parties, hence more likely to fall into a 2-party domination trap. Approval was the voting system most-approved by the participants at the Du Baffy voting procedures workshop held in Normandy France in 2010. (With FPTP the worst).

Both approval and score are simple changes that would be clear large improvements over Canada's present system.

Some alternative single-winner-in-riding suggestions that have been made in Canadian media, but which I *disparage*, are to use IRV (instant runoff) voting (which employs a rank-ordering ballot), or to use two-round plurality (the second round, held at a later date, is a "runoff" between the two top finishers from the first round). Two-round systems force Canadians to vote twice, which is more expensive and annoying. IRV fails precinct-countability, monotonicity, participation, NESD, favorite-safety, and is pro-extremist biased; and it has a less-expressive-than-score ballot which takes voters longer to fill out than either score or approval ballots, does not permit voters to express "no opinion" about a candidate (at least not without doing so in an inherently massively distortionary way) and causes greater voter error rates than even FPTP.

PR systems all necessarily are more complicated than, and more of a change for Canada than, and also currently less well-understood than, single-winner systems can be. But if you are willing to accept that greater complexity and risk,

then you can enjoy the (probably real) benefits of proportionality. Further, the proposals we shall outline below have better simplicity and/or quality than all previous PR-system designs. Indeed, the systems below will be designed to be hopefully-clear improvements over Germany & New Zealand and over Ireland.

Score Voting Proportional Representation:

(Score voting to elect MPs within ridings, followed by harmonic-voting-based "top-up" stage to restore proportionality within regions)

Divide Canada into "ridings" and "regions," where each region consists of 13 ridings. Each riding elects a single local MP using Score Voting. Each region elects 5 top-up MPs chosen (by exhaustive consideration of all possible choices) so that its total set of 18 MPs – that is, the 13 local plus 5 top-up MPs – maximizes the harmonic quality measure:

$$Q = \sum_{1 \leq v \leq V} \sum_{1 \leq j \leq W} (j^{th} \text{ greatest } S_{v,c} \text{ among winning } c) / (j-\tfrac{1}{2})$$

Here V is the number of voters, C is the number of candidates, W the number of winners (0<W<C; for us W=18), and $S_{v,c}$ is the score given to candidate c by voter v on her ballot.

The magical point of this quality formula is that maximizing Q guarantees proportional representation, and in about the simplest conceivable manner.

(Worried that formula seems a bit complicated? Well, when you think about it, *any* PR method needs some formula somewhere, and this is pretty nearly as simple a formula as anybody could hope for. So you really could not ask for anything much simpler.)

As far as each voter is concerned, she simply provides a score (on an 0-9 numerical scale, if M=9) for each candidate in her riding, i.e. each ballot is no more and no less complex than scheme I(A).

The number of seats in parliament would need to be a multiple of 18; as of year 2015 it currently is 308 seats while the nearest number divisible by 18 is 306=18×17. The total parliament then would consist of 13/18=72.2% local MPs and 5/18=27.8% top-up MPs, which (based on historical data) should be enough top-ups to achieve proportionality in at least 50% of elections. The other 50% (or less) of the time, the parliament still would exhibit some disproportionality, albeit much reduced versus the present system.

Why the "magic numbers" 5+13=18? I actually suspect (5,13) is optimum, i.e. any other integer pair (x,y) is worse. First of all, we could not make x bigger than 5 (maybe 6 or 7 if you went to a superduper computer, but I prefer to avoid that; even my circa 2005 desktop with single core definitely could handle 5,13 by brute force exhaustive search), because that makes the computation too heavy.

(For example, using harmonic voting at nationwide scale would be computationally infeasible.) Now, staying with x=5, if we went to y>13 then the percentage of top-ups would be too small, and the parliament would fail to reach proportionality too often. I also think y<12 is a bad idea since then there would be too large a percentage of top-up MPs; it is best to keep them riding-based as much as possible to maximize quality while keeping proportionality ok. The choice between y=12 and y=13 is somewhat debatable. If we used 12 we'd get a bit higher top-up fraction allowing more disproportionality to be topped-away; but would sacrifice small parties somewhat – a party has to get 1/(x+y+1) of the votes, roughly speaking, to be assured seats. I considered the latter the greater price for Canada to pay, so I went with y=13, assuring any party with >1/19≈5.26% support will get proportional seats (such as the Greens in 2008; and often less support would suffice due to "Sainte-Lague small-number effects," e.g. often 3% support would suffice).

Also, I should remark that many believe proportionality within regions is actually *better* than nationwide (even though, naively, this sacrifices some PR accuracy). Why? Well, there are psychological speculations, which probably contain truth, about the benefits of regional identity/responsibility... but also, fully objectively, there is the **"rain problem."** That is, suppose the Liberals live mainly in the East. And it rains in the East on election day, depressing turnout there. Result: Canada suffers an unhealthy liberal-deficit purely because of random weather! But with regional proportionality, not nationwide, regional rain becomes irrelevant.

Conclusion:

 Score Voting would be the simplest change for the greatest improvement and avoid the complexities of a PR system. (Approval Voting would be even simpler, though less effective). Rural-Urban is the best of the proposed PR systems (vs STV and MMP) but a Score Voting PR system mathematically optimizing proportionality as recommended above would be ideal.

Sidebar (Strategy Warnings to All Parties):

As a cynical voter who finds it hard to believe politicians (and thus electoral reform committee members) won't just greedily vote what's best for their party, I'd like to illuminate the current strategic field regarding electoral choices as a matter of record, and to try to dissuade any such transparent committee member from barring a consensus or rational group decision in favor of a voting system that will favor their party. As such, I have three warnings to the committee:

1. **A vote to keep FPTP is a vote for a system that greatly distorts the Conservative Party's power (in particular) by splitting the left/progressive vote.** (And to a lesser extent, it distorts Liberal power by giving a greater majority and blocking third party growth due to strategic voting). This bias is obvious, even to the general public - which is why I believe even the Conservative Party is publicly tentatively in favor of electoral reform.

2. **A pre-referendum is a subtle death sentence to reform.** The Conservative Party instead has shown their support for a referendum before any reform - which sounds very good (letting Canadians decide their change) and is possibly even the best moral/legal/constitutional choice (should you try and recommend a biased/corrupt system). However, historically referendums have been used as launching points for media campaigns of misinformation, over-complication and scare tactics about the new system - especially from wealthy pockets with interest in the outcome and influence of the media – which have succeeded in deterring voters from change. Informing the public sufficiently to intelligently decide on a new system is a very high bar to set - especially with a time limit as we are led to believe we're under with Trudeau's promise for a new system before the next election. All this comes together to make a binding referendum likely the best chance to squash reform - assuming your committee doesn't back down - and it's likely why the Conservatives and their corporate media allies have pushed so hard for one.

   As such, if there is no way to justify the change without a referendum (fair enough - it would be quite a problem if governments could just do that at any time, or if the Liberals used this to control future elections), at least make it a **guaranteed referendum after 2-3 elections** with the new system, as suggested by other parties, giving people time to adjust to the

new system or to research further reform.

3. **Ranked Voting is not enough, and is very biased to the Liberals.** This time I plead to the Conservative party committee members in particular (because I expect the Green, NDP and Bloc to already be aiming for PR): accepting a "compromise" single-winner solution of ranked choice voting is a trap. At least with IRV (the official ranked-choice suggestion on your literature, and Trudeau's publicly-favored choice), you would be replacing FPTP with a system that still greatly distorts power - but this time instead benefits the "center" party substantially. As the far left and far right war, the "compromise" solution gets much more likely to win under IRV. IRV is deeply flawed for [mathematical reasons](#) – and exhibits strong bias. You're far better off just ensuring the committee picks a solid, fair PR solution that doesn't distort any party's support, or going with a better single-winner compromise like Score *Voting* or Approval *Voting* (as suggested in this brief).

Final Words:
I hope this cynical party-greed view isn't relevant, but even if it is - I believe that the requirements for majority on the committee should align your interests to pick a non-biased system (so not IRV, or the continued use of FPTP) such as PR or *Approval voting*. I do make one final appeal to you as individual politicians though - ones with a great responsibility in your hands and a chance to win gratitude and (politically lucrative) recognition as leaders for decades to come. Please vote as rational individuals and choose a system that enables future politicians to run on platforms that represent their own best ideals - regardless of perceived strategic support. You do not have to eternally hitch your posts to parties that conglomerate a vast swath of voters into one little package that appeals to necessary corporate & media supporters. Support a system that gives the individual politician the power to lead the way he wants to when given the public's support. Pick a PR system that gives proportional support to third parties. Or, barring that, go for a simple and easy system that still enables balanced voting such as *Approval* or *Score voting*. Thank you for your dedicated service, and your time.