Single Member District Proportional Representation
SMDPR

Abstract

Developed in and for Canada, single member district proportional representation (SMDPR) is suitable for any country, especially a federation.

SMDPR is a local party-list electoral system similar to both Canada's current single member plurality (SMP) and Sweden's party-list electoral systems; it preserves current Canadian district structure and political function, single member representation as the only form of representation, and can work with Canada's SMP ballot. It promises to measurably outperform all electoral system types in major world use.

Centered on voice expression, an appreciation of local representation's importance for government stability, attention to applicable Canadian jurisprudence, and the interplay between allocation and matching divisions (defined herein), SMDPR is based on conceptual and purposive definitions of democracy and electoral system.

Context

Of the three contemporary theories of democracy, this paper lives in the garden of *aggregative democracy* as opposed to *deliberative democracy* and *radical democracy* [1]. However, the distinction is perhaps somewhat arch as deliberation, dissent, and antagonism respect no boundaries.

A review of the literature [2], [3] reveals the presence of a peculiar inversion of Euclidean thought. Instead of postulating democracy and developing a theory therefrom using logical implication, much effort has been expended on analysis of characteristics and indices of systems seemingly arbitrarily accepted as *prima facie* democratic. For instances: assuming checks and balances in the US presidential system are somehow definitional of democracy, eliding economic output with democratic content, equating elected leaders with the existence of democracy, etc.

Dahl's minimalist approach [4] conceptualizes democracy around "contestation" and "inclusion", both of which are non-discriminative. All human interaction is a balance of competition and cooperation [5], so it is little wonder Dahl's ideal democracy possesses high degrees of both.

Such approaches appear to have been abandoned since Dahl, with conceptual definitions of democracy becoming viewed as at risk of "definitional gerrymandering", its extreme of

authoritarian regimes claiming democratic state status a manifestation of Collier and Adcock's "epistemological anarchism" [6].

Joseph Schumpeter's [7] minimalism idea for democracy suggests people are too far removed from the substance of issues to make informed decisions. This is more an indictment of information flow than of a form of government, but it does get to the heart of democracy—the people.

From a Canadian jurisprudence perspective, *The Constitution Act* of 1982 and its *Charter of Rights and Freedoms* formally established the right to vote for every citizen as a democratic right [8]. Supreme Court of Canada cases, concerning parity arguments in riding redistributions, established effective representation as the purpose of the right to vote, further clarified as the right to a "voice in the deliberations of government" by someone with whom the voter identifies [9], [10], [11], [12].

Historically, modern democracy arguably evolved from English parliamentary roots, which concerned balance of power between Crown (King and/or Queen), Lords (dukes, earls, barons, bishops, etc.), and Commons (mayors, business, trades, lower church prelates, etc.) [13]. In the seventeenth century European worldview came into direct, intimate, and consequential contact with millennia of North American Indigenous democratic tradition. Slowly, the Commons became the dominant parliamentary power or voice, especially after industrialization and with advent of increased longevity, universal public education, cheap media, and the power of public opinion in the latter half of the nineteenth and first decades of the twentieth centuries. Democratic theory, institutions, and structures evolved contemporaneously.

All of which left scholars discussing how to analyze democracy into and following the latter half of the twentieth century.

Having skipped the step of establishing an agreed-upon postulate, multiple indices (Democracy-Dictatorship, Policy IV, Freedom House, etc.) of assumed democratic content have been created in an effort to either dichotomously discriminate between countries as democratic or autocratic, or place countries on a continuous scale from democracy to autocracy. Useful as these indices may be, lack of predicate courts confirmation of observer bias.

Indices are not measures. Changing the indicators of an index changes the latent variable being indexed, whereas changing the indicators of a measure has no effect on the latent variable. In other words, correlation (index) is not causation (measure) [14], [15]. Inference is weaker with indices than with measures.

Both history and jurisprudence aver that democracy is about voice, which provides the missing postulate for democracy. Concentrating on voice, a legislative empowerment measure (LEM) and an accountable local representation measure (ALRM) can be constructed [16].

LEM measures voice expression in a legislature, democratic or not; ALRM measures the accountability of local representation, which perhaps not surprisingly has a great deal to do with government stability. Both measures range between 0 and 1, but each may be loosely stated as an

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implied percentage, e.g., Canada's SMP system has an LEM of 12 in that it provides voice to 12 percent of citizens.

This paper uses a conceptual approach to democracy to present an electoral system designed by the author to meet Canadian needs, achieving much more than that in the process. Perhaps most important to hold in mind while designing a new electoral system is the goal to be realized. In the case of creating SMDPR it was to correct in a meaningful way the lack of voice-for-voters in Canada's SMP electoral system.

Definitions and Concepts

We begin by defining democracy conceptually and purposively as a system of government in which all exercisable power or voice is reserved to equal and independent citizens.

Representative democracy is defined as a democracy in which the power or voice of citizens is transferred fairly and faithfully to equal and independent representatives through means of an electoral system.

Voice writes laws binding on all, while free speech commands no audience; neither voice nor free speech can survive without the other.

Based on Canadian jurisprudence, a ballot becomes a vote if and only if it provides the voter with a voice in the deliberations of government by a representative with whom the voter identifies; voice and vote are thus largely interchangeable.

The purposes of an electoral system are somewhat mutually antagonistic: to provide voice, and to promote strong governance.

The democratic contract is that the minority will accept majority rule provided that rule is not oppressive; repression of minority voice through lack of representation is particularly oppressive and destructive.

A district or division (the words are used interchangeably) is a group of citizens, usually but not always geographically based, who have an electoral role to play. Divisions have many names, dependent on the country and the circumstances, e.g., riding, ward, borough, comté, constituency, prefecture, seat, overhang seats, levelling seats, etc.

An allocation division is a division or divisions, usually geographic, in which seats are allocated to political parties. A matching division is a division in which seats are matched to candidates.

Legislative seats are allotted; usually by the constitution but occasionally by the electoral system itself. Once allotted, they are both allocated to political parties and matched to candidates by the electoral system.

The natural quotient is the number of electors in an average matching division divided by the average number of its representatives. Quotient and threshold are virtually interchangeable.

Ballots universally split into three types: essential, surplus, and losing; losing and surplus have no effect on the outcome of an election and are referred to as ineffective; essential ballots are referred to as effective. These concepts are called ballot split by type.

Supporting data can be found at [17].

SMDPR

In Canada, districts are called ridings, representatives are called members of Parliament (MPs), and the legislature is called the House.

SMDPR was designed to scrupulously comply with Canadian constitutional and jurisprudence principles, and to keep unchanged as much as possible Canada's current SMP system, including no change to the size of the House, maintenance of single-member districts with only one type of representative, no change to district structure or function, and the same ballot use.

Allocation Divisions

Multiple voices require multiple representatives in representative democracy. If there is only one accountable representative per riding, then voice-for-ballot must be obtained from a group of such ridings. Since the purpose of a group is to allocate seats in proportion to partisan ballots polled, they will be called allocation divisions, a concept that travels well across all electoral system types.

Canadian allocation division size is set at 10 to 15 ridings where constitutionally possible and as shown in Table 1. Choosing a size of 10 establishes a threshold of 10 percent.

Allocation division size is a choice driven by constitution, historical consideration of numbers of political parties appropriate to a given population size and Government stability, allowing appropriate opportunity for regional parties and independents, and minimizing the number of losing pluralities (see below for greater clarity concerning losing pluralities).[1] The setting of allocation division size is consequential, with wide and subtle consequences.

As population grows so should the number of matching divisions under Canadian constitutional formula, and so too should the number of allocation divisions, although more slowly. If stability of government becomes an issue, the size of allocation divisions can be raised or lowered as appropriate; this of course should not be at the discretion of political parties.

Due to lack of resources, no effort has been made here to ensure parity between sub-provincial

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[1] Analysis of losing pluralities was carried out on data from a North Rhein-Westphalia election, where an SMP ballot is used with expectations of a proportional outcome.

allocation divisions; however, because of their size, maintaining parity between allocation divisions is a simpler matter than maintaining parity between SMP districts.

Division (Ridings)		
Newfoundland & Labrador (7)	Eastern Greater Toronto (13)	Saskatchewan (14)
Prince Edward Island (4)	Northern Ontario (10)	Rural Alberta (13)
Nova Scotia (11)	Central Ontario (12)	Calgary (10)
New Brunswick (10)	Inner Toronto (12)	Edmonton (11)
Northern Quebec & Gaspe (11)	Western Greater Toronto (11)	Rural BC (12)
Montreal/Laval South (11)	Southern Ontario (13)	Inner Vancouver (11)
Montreal/Laval North (11)	Western Ontario (11)	Outer Vancouver (10)
Southwestern Quebec (14)	Southwest Ontario (13)	Vancouver Island/Coastal (9)
Southeastern Quebec (10)	Eastern Ontario (13)	Yukon (1)
Quebec City (10)	Outer Toronto (13)	NWT (1)
Southern Quebec (11)	Manitoba (14)	Nunavut (1)

Table 1: SMDPR Allocation Divisions

Each SMP riding is both an allocation and a matching division but is only a matching division under SMDPR. The ridings themselves do not change in structure or electoral function. Figure 1 shows how an allocation division works in principle.
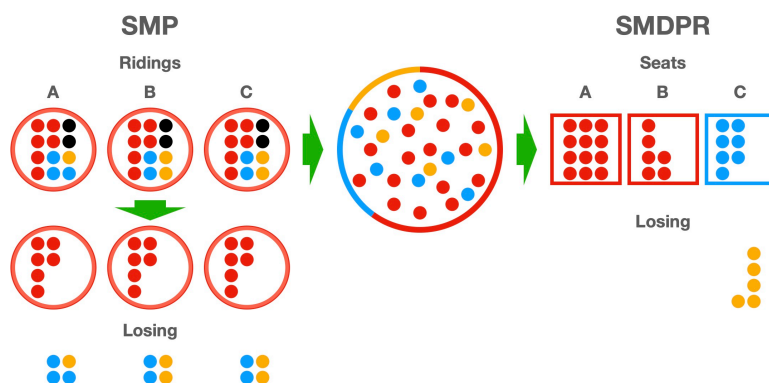

Figure 1: Allocation Division Function

Seats within an allocation division are allocated to parties based upon proportional aggregate count within the allocation division, thus providing effective representation to almost all voters, even in an allocation division of three matching divisions.

Allocation and Matching Detail

Each allocation division will have an average riding size or natural quotient since there is one representative per riding. Within the allocation division, each quotient of ballots polled is the

threshold for a seat allocation; any seats not allocated based on a full quotient are allocated based on fractional quotients, largest fractions first. Full quotients reflect higher proportionality as compared to fractional ones. Note that all seats are thus allocated.

The method for seat allocation just described is called "highest remainder" and is perhaps easiest to understand, but is only one of many, all of which can be accommodated under SMDPR. D'Hondt is the constitutionally preferred choice since it minimizes losing vote count and maximizes essential vote count [18], however, the effect is marginal so for ease of calculation highest remainder was used in supporting data. Israel uses a variation of D'Hondt that permits functional association of political parties, but this is perhaps better achieved through the natural quotient of matching division structure.

Various degrees of encouragement toward national unity are possible here. For instance, winning on a fractional quotient can be restricted to parties that win a full quotient, effectively excluding small parties from power and voice. At a higher level of coercion, only full quotients might be seated. Both of these options arbitrarily restrict voice and must therefore be rejected as unconstitutional for Canada but might be temporarily useful for countries struggling with a large multiplicity of political parties.

Note however that seat allocation based on fractional quotients fundamentally generates voice where voice is in fact lacking; at the very least it introduces a potential hierarchy of representatives. On the other hand, fractional seat allocation ensures anyone can win at the margins, which has beneficial effects on citizens engagement as well as the professionalism and tenor of politics.

There are no surplus ballots with SMDPR, as with list systems in general. This is so because fractional-quotient ballots always face off against each other, some one of which will win, and the others lose.

Ties of all sorts are settled using a random number secretly determined before the election. The simplest way to implement this idea is perhaps by assigning a unique ID number to each candidate; then consistently order candidate IDs in a predetermined way (highest to lowest, or the reverse; it doesn't matter), and index the winner using the random number.

Allocation of seats is the only function imagined here for allocation divisions, despite arguments for or against possible additional parliamentary status.

Matching of one and only one candidate to allocated party seats within the allocation division is based solely upon ranked local candidate performance within each matching division. Maintenance of existing electoral structure and function is again emphasized.

Figure 2 shows again the above simple SMDPR election with three ridings, shown as circles containing dots and labelled A, B, and C, forming an allocation division. Each riding circle is coloured according to which party won a local plurality; all three Liberal here. Each circle has 12 dots representing electors, each coloured by partisan preference as shown in the legend.
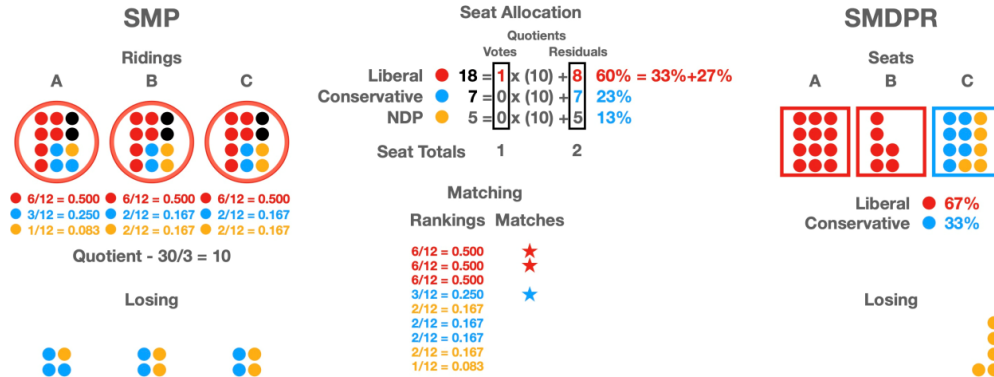
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Figure 2: Allocation and Matching

The thirty ballots cast (6 electors were non-participants) were distributed 10 to a riding, making the quotient 10, i.e., 10 = 30/3.

Seat allocation is therefore based on a quotient of 10, used as shown beside each party name in the legend, e.g., the Liberal's total of 18 ballots in the allocation division gives them one full quotient of 10 with 8 ballots residual, i.e., 18 = 1 x (10) + 8. The Liberals are allocated 1 seat based on a full quotient and 1 seat based on highest residual, shown in red. The Conservatives are allocated 1 seat based on second highest residual, shown in blue, making up the three-seat total for the allocation division.

Each candidate is ranked as shown under the circle representing their riding, each rank a tally of their local votes divided by the number of electors in the riding. Number of electors is used to reduce the number of gameable variables.

A descending-order ranked list of all candidates in the allocation division is constructed with ties settled, as shown to the right of the ridings in Figure 2. Seats are matched to candidates from top of list down, subject to a) party allocation of seats and b) one, and only one, representative per riding.

In the example shown the two highest ranking Liberal candidates match the 2 seats allocated to Liberals. The next candidate in the list whose party has an allocated seat available is the highest-ranking Conservative, who matches that seat, exhausting seat allocation for the allocation division.

Note that, even with a three-riding allocation division, losing ballots are less than half under SMDPR, raising the accountability of local representations.

Note also that to win, a candidate must a) belong to a party allocated seats, b) outrank sufficient same-party candidates to match the riding, and c) poll more ballots than anyone else in their riding who meets requirements a) and b). Again, higher accountability of local representation should be expected with SMDPR than with SMP.

Circles are used to represent SMP seats in Figure 2, which elect an MP in isolation based on the plurality rule; the MP for voice and the MP for advocacy is always the same person. Squares are used to signify that SMDPR seats are won and represented by a team of MPs. The MP for voice will be somewhere in the allocation division; the MP for advocacy remains local.

Each SMDPR voter's ballot is used twice. Once to elect a local representative and once to give voice to the voter in Parliament. The local count of the ballot stays local, while the voter's voice goes to wherever in the division it will have the greatest chance of being expressed in the deliberations of government; voice being constitutionally and practically more important than who is local MP.

Two consequences of matching are particularly important:

- If a party does not run a candidate in each riding it may be unable to match an allocated seat. The seat can be easily re-matched proportionally, but the point is that being able to match an allocation is a powerful incentive for parties to run candidates in every riding within an allocation division, which has beneficial effects on national unity

- A party may run out of allocated seats before it matches all its plurality winners, which is what happened with the third-ranked Liberal candidate above. This event is called an overhang, i.e., when a party would win more seats by plurality that allocated proportionally.

Overhangs

Since the treatment of overhangs under SMDPR is the principal source of criticism, they deserve special consideration. Figure 3 demonstrates a more realistic overhang situation.

				Votes			
	LPC	% LPC	CPC	% CPC	GPC	% GPC	Totals
Riding							
1	48	48%	26	26%	26	26%	100
2	48	48%	28	28%	24	24%	100
3	26	26%	51	51%	23	23%	100
4	32	32%	48	48%	20	20%	100
5	46	46%	47	47%	7	7%	100
Totals	200	40%	200	40%	100	20%	500

Figure 3: Overhang Example

The Conservative Party of Canada (CPC) should win three seats under the plurality rule. The CPC and the Liberal Party of Canada (LPC) polled equal numbers of ballots yet get different numbers of seats by plurality; a fatal feature of SMP. The Green Party of Canada (GPC) polled twenty percent of the ballots in a five-riding division, enough to be guaranteed a seat under SMDPR, but gets no seat under SMP; another fatal feature of SMP. Seat allocation by the

plurality rule would create an extra or overhang seat for the CPC, i.e., one more than would be allocated proportionally.

Overhangs can be addressed in one of three ways:

1. The overhang can be allowed to stand by adding overhang seats to the legislature, albeit at some expense to proportionality; New Zealand does this under its MMPR system

2. The disproportionality introduced by letting overhang seats stand can be addressed by creating levelling seats for parties. This is done under Germany's MMPR system, its supreme court having ruled the disproportionality of New Zealand's MMPR system unconstitutional in Germany

3. The overhang may be handled by letting pluralities lose as in Sweden's party-list proportional system

In both the first and second options, the same ballots would effectively be used to elect two or more MPs, degrading constitutionally-mandated effective representation by creating voice where there is none.

Both MMPR systems have MPs representing a riding on their own and those either sharing that responsibility or not having riding responsibilities; either could lead to a structural hierarchy of MPs, which could again affect parity of voice. The House, would also have to enlarge, potentially by hundreds in the case of German levelling seats; this would run afoul of those sections of the Canadian Costitution allotting seats by province.

If the House is not enlarged, as under the Law Commission's (2004) MMPR idea, then ridings would be fifty percent larger than current size; effective representation (voice) and accountable local representation (stability) would suffer.

Overhangs under SMDPR must be addressed with losing pluralities in Canada because seats are allotted by province under the Canadian Constitution; there is no provision to create seats by electoral system. Amending the Canadian Constitution would be mishegoss from a political perspective.

Losing Pluralities

Losing pluralities are a strength not a weakness of SMDPR, one that provides high effective representation. Reduced effective representation from the plurality rule is unconstitutional; there is nothing unconstitutional about losing pluralities, the plurality rule being at best embedded in Canada's current electoral system.

Pluralities always winning persists in Canada because it benefits the ruling Liberal and Conservative parties. Their 150-plus-year hegemony of forming Government is directly attributable to SMP functioning to disproportionately benefit ruling minorities, often

accompanied with scandal, in return for pandering to or intimidating targeted voters instead of fairly representing all voters.

Political parties prefer the plurality rule for easier access to majority power; but as emphasized in [19], "The aggregation of political preferences is not to be elevated to constitutional status nor does [Section] 3 protect values or objectives embedded in our current electoral system."

Logically, the alternative to pluralities always being the focus is pluralities sometimes being ignored. Every system other than SMP ignores pluralities one way or another, SMDPR the least of all because pluralities lose only when voice would otherwise be compromised; a winning SMP majority or plurality will correltate with an SMDPR win in over 80 percent of ridings.

Losing pluralities jangle because SMP doesn't have them and so Canadians aren't used to them, but pluralities always winning is the reason SMP is unconstitutional. Pluralities always winning is focused on political parties in agonarchy;[2] pluralities sometimes losing allows focus on voters in democracy. Agonarchy has no constitutional status whereas democracy does.

Understanding the functions of an MP can help with accepting the logic of losing pluralities, and in refuting counter arguments.

As noted in [10], "…elected representatives function in two roles -- legislative and what has been termed the [ombudsperson] role."

A voter casts a secret ballot in private in the expectation a partisan candidate will give voice to the voter's democratic will in the House. If that doesn't happen the voter can act by voting differently in the next election. This legislative role of an MP is purely partisan and inherently non-local.

As an ombudsperson or advocate, an MP openly meets with a constituent face-to-face, learns of their problem with Government, and does what is possible to address the problem. A smart MP will never ask how the constituent voted in the last election, because that's secret and asking could cause the voter to not vote for the MP in the next election. This advocacy role of an MP is exclusively non-partisan and inherently local.

When MPs indignantly avow that they represent their constituents equally and that partisanship plays no part, it is advocacy of which they are speaking. They do not, and cannot, provide legislative voice for all constituents equally, unless everyone in the riding voted for the MP.

Losing pluralities are about voice not advocacy; advocacy is about local representation not voice. By ignoring some pluralities SMDPR separates voice from local representation, making both stronger in consequence.

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[2] An agonarchy is an arena of conflict for spectacle within which winning and losing is decided by an arbitrary rule.

Two-Choice-Four-Option Ballot

One way to highlight the separation between voice and local representation in the mind of the voter is through a two-choice-four-option ballot as shown in Figure 4.

Local Candidates		Division Parties	
[X]	Suzie Queue (Liberal)	[X]	Liberal
[ ]	John Eh (Conservative)	[ ]	Conservative
[ ]	Les W. E. Forget (Green)	[X]	Green
[X]	Aki Kenosha (N.D.P.)	[ ]	N.D.P.
[ ]	Sam Champlain (B.Q.)	[ ]	B.Q.
[ ]	A. D. Hoc (Independent)	[ ]	Rhinoceros
[ ]	None of the Above	[ ]	None of the Above

Figure 4: Two Choice Four Option Ballot

This ballot continues to list local candidates with party affiliation in parenthesis as with an SMP ballot, and as shown on the left in Figure 4, but adds a bare list of all parties running candidates in the allocation division, as shown on the right. Thus, the dual purpose of 'vote' is emphasized: to elect a local advocate, and to provide voice.

One or two equal and un-ranked options from each list allows greater nuance of voice while avoiding a technicality called 'Arrow's paradox' [20]; it also preserves the security of an easily counted paper ballot. Opting for one candidate would count as two ballots for the candidate and two for the party in parenthesis, thus preserving the current user interface. Formal choice of parties regionally takes precedence over parenthetic choice. Choice of only a party infers no choice of local candidate, thus allowing feedback about the candidate a party runs.

Each voter effectively gets 4 ballots in 1; two go to whatever local candidates they like, and two go to support whatever political parties they prefer.

Note that each independent would be implicitly considered as a 'party of one' for allocation purposes but would only poll votes in their own riding.

Inclusion of a 'None of the Above' is part of a mandatory ballot. This category of party or candidate would be reported but would not affect allocation or matching.

As previously mentioned, pluralities are only ignored under SMDPR when voice would be degraded, about 18 percent using Canada's 2015 federal election data with a two-choice-four-option ballot. For comparison, Ireland's STV system ignored 37 percent of pluralities in 2016; the Law Commission's (2004) MMPR system would ignore the plurality rule for 33 percent of representatives.[3]

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[3] See [17] for data.

Since the principal objection to losing pluralities is that people like to see the most popular candidate elected, local popularity (essential plus surplus ballot split) is also an indicator of the losing-pluralities effect.

In testing, again using Canada's 2015 federal election results, SMDPR's losing pluralities alone reduced local popularity by only 3 percentage points below SMP's 48 percent; adding a two-choice-four-option ballot increased local popularity to 60 percent, 12 percentage points over SMP. For comparison, the Law Commission's (2004) MMPR system would reduce local popularity by 16 percentage points below SMP to 32 percent. Under SMP, voters get the local candidate they voted for 5 times out of 10; SMDPR makes that 6 time out of 10.

Additionally, losing pluralities tend to happen in ridings that are evenly split between multiple partisan voices and/or have low voter turnout. Both situations are self-correcting.

In the final analysis, criticizing SMDPR over losing pluralities is dog-whistling for political resistance to change away from a system that benefits special interests.

SMDPR Features

Accepting SMDPR's naked Swedish-style losing pluralities has beneficial collateral effects:

- **Performance**

  95 percent of SMDPR ballots cast would get a voice in the deliberations of government and provide accountable local representation, instead of SMP's 30 percent; popularity would be 60 instead of 50 percent

- **Visible Minority Representation**

  Because SMDPR provides exceptional voice through highly efficient vote count, all minorities would have a fair chance of electing one of their own, provided parties choose minority candidates.

  Additionally, since parity is not an issue within allocation divisions, ridings can be crafted to allow large but sparsely distributed visible minority groups to be represented by one of their own.

  For example, the Canadian province Nova Scotia has 51 provincial ridings and about 740,000 electors, for a polling quotient of about 14,000. There are about 24,000 Mi'kmaq voters in NS, which should guarantee at least one seat filled by a Mi'kmaq candidate but usually doesn't under SMP.

  Assuming 5 allocation divisions in a Nova Scotia provincial election, it would be possible to create a riding that encompasses only concentrations of Mi'kmaq voters, without affecting parity within the division. This would ensure that each political party would

practically have to choose a Mi'kmaq candidate in that riding.

Other indigenous might win seats in other ridings of course, but SMDPR allows sufficiently large visible minorities to be virtually guaranteed representation by one of their own, while virtually forcing parties open to visible minorities

- **Preventing Regionalization**

With 10 matching divisions *per* most allocation divisions, a federal party that polls an aggregate10 percent of the ballots will elect at least one representative. Smaller allocation divisions have higher quotients, while larger have lower.

Thus, federal parties are unlikely to become regionalized; the Executive of Government can be representative of all regions of the country.

Smaller parties can still elect candidates fairly on fractional quotients, but they will be lacking guaranteed seat allocation.

From the opposite perspective, even if a party manages to sweep a matching division of 10 ridings it gains less than 3 percent of House seats, effectively preventing regionalization of the House

- **Professional politics**

Winning and losing candidates are equally responsible for a party's electoral success; all candidates are also self-ranked by their raw local performance. The result is empowered candidates both within their own party and, for elected candidates, within the House.

Because all ballots are highly efficient and seats can be allocated based on a fractional quotient, there are no safe or sacrificial ridings; anyone can be elected to any riding. Parties can therefore attract the highest quality of candidate in every riding, making standing for election more attractive.

Representatives elected with few votes locally are especially important for party growth, providing an opportunity for the party to change hearts and minds; their riding being the *de facto* active forefront of the party growth opportunity. Losing candidates are also on the front line of party growth opportunities, continuing their party value between elections and ensuring the most electable candidates run again.

- **Engagement and Politics Tenor**

With its absence, gaming the plurality rule is not an option. Wedge issues, push polls, attack ads, robo-calls, kamikaze candidates to split the vote: the usual tactics for moving the 1 or 2 percent of the electorate deciding a win don't work well, or at all.

This leaves arguing a platform as the best way to attract votes, which affords the best

opportunity for civil debate, encouraging debaters over debasers. Politics can become engaging, thus encouraging wider participation.

Nothing can or should prevent radicals from having their say, but the system shouldn't give minorities power to suppress the majority

- **Independents**

  Practically, independents will not be guaranteed a seat under SMDPR because it is extremely difficult to poll a quotient in one riding. Independents can still be fairly elected on a fractional quotient of course.

  There are several ways to encourage independents, but fair chance of election on a fractional quotient is enough. Any other choice disfavors federal party cohesion, encourages balkanization of the legislature, and opens the door to political gaming of the system

- **By-Elections**

  Traditional by-elections under the plurality rule would have to yield to the constitutional demand for effective vote.

  The simplest way is for an alternate to be nominated from the party of the candidate whose absence initiated a by-election. This follows the fact that voice representation is more constitutionally important than the face of local advocacy, and the practical fact that two-thirds of voters don't know who their MP is anyway.[4]

  An independent-triggered by-election can be filled by a simple re-calculation of results, omitting votes for the independent candidate. This would determine which party or other independent fills the seat, either with a former candidate or a new party nominee

- **Team Representation**

  All party candidates in an allocation division act as a team to elect as many of their number as possible. They do compete for party position to be matched to a seat, but not from the same voter pool. Each vote improves the party's chance of having another quotient to guarantee a seat.

  Voice is non-local, advocacy is local. Still, there will be times when a voter has a partisan issue that rises above local party politics but has a local MP not of their partisan preference, or a local MP not of their minority identity. SMDPR divisional MPs will naturally field issues from other ridings, acting as part of their party's team or as a 'one of their own' representative for a visible minority

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[4] The Samara Centre for Democracy, Canada; survey result.

- **Workloads**

  Since ridings within an allocation division need not have parity, MP's workloads can differ greatly in detail but still average out.

  For instance, a rural representative will typically have a large, sparsely populated area to cover, whereas an urban one will typically have a larger number of constituents spread over a small area. Work/travel loads even out.

  Rural and urban ridings can be suitably 'paired' in an SMDPR allocation division. "Rural people are accustomed to going to an urban center for goods and services.

  Representatives in small ridings, created to allow representation of a visible minority by one of their own, will have less local work, but more work arising from elsewhere in the allocation division, or indeed provincially in large provinces. The work they do for non-local constituents is work the constituent's representative is relieved from doing. Again, things even out.

- **Voice Expression and Natural Thresholds**

  The greater the number of allocation divisions the higher the possible voice expression, to the extreme that direct democracy—voting as one of one—provides the greatest possible voice expression, whereas national allocation systems, such as Israel's, provide the worst—voting as one of over 4 million.

  On the other extreme, too many allocation divisions can make governance virtually impossible.

  Allocation/matching division structure provides the mechanics of imposing thresholds in unbiased ways that unite instead of dividing.

  Consider a country of 4 million voters with one allocation and matching division of 100 seats. The threshold for election to a seat is 40,000 votes or 1 percent of all voters. With10 matching divisions in each of 10 allocation divisions, the threshold for having a voice in the deliberations of government remains the same at 40,000, but now must be achieved in an allocation division of 400,000, i.e., a threshold of 10 percent instead of 1 percent. The effect is to ensure authority to act is based on a wide distribution of democratic power, even though voice remains 1 in 40,000.

  An enclave of voters will retain its power under the change, but a widely distributed group of the same size gains power, without additional voice.

  Adding that effect up over allocation divisions and elections results in more of a national consensus and a resulting concentration of political parties. A system that used to support up to 40 parties dotting the country, a dozen of which are seated in the legislature, will now just manage 10 covering the country, perhaps 3 or 4 of which are seated.

Allocation and matching divisions allow unbiased implementation of restrictions on number of political parties; the only limitation imposed on a party being democratic popularity

- **Political Parties**

  One of the consequences of division of opinion within a country is the proliferation of political parties through which citizens can express voice.

  The more parties the greater the voice expression, to the extreme of maximum voice expression in direct democracy, where each citizen is their own 'party'. Political parties are a way to focus democratic voice-expression on governing, on exercising power; the fewer the political parties the more stable is governance, to the extreme of all the people freely, fairly, and democratically voicing a will to be governed by the same party.

  Stable governance demands a limit on number of parties seating representatives. However, restricting the proliferation of political parties can reflect bias, which is particularly dangerous if the limit is imposed by the majority party over the will of the minority, thus destroying the democratic contract. Local structure through matching divisions imposes an unbiased threshold on parties.

- **Structure**

  Matching divisions are usually contained within allocation divisions but can be independent; New Zealand's MMPR system establishes an ephemeral allocation division that occasionally arises from the handling of overhangs, with no fixed geographic association.

- **Proven Concept**

  SMDPR is not untried. It is the Swedish system repeated in 33 allocation divisions, and with a single representative *per* matching division, so has been around for decades and is proven effective. It can be measurably asserted as good as, or far better than, the 11 electoral system types measured here

Ballot split by type, LEM, and ALRM are universal measures based on voice, the core conceptual feature of legislative democracy.

Comparing SMDPR

Figure 5 compares ballot split by type across the 11 different electoral systems, each essayed at the end of the paper.
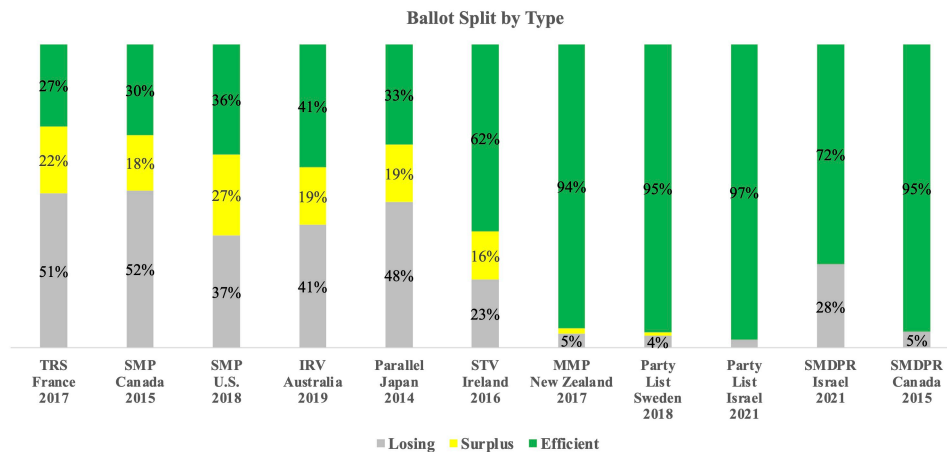
Figure 5: Vote Split by Type Compared with SMDPR

SMDPR's 95 percent efficient ballot in Canada is one of the highest, besting SMP by three-fold and fifty percent better than STV. SMDPR in Israel has a higher percentage of losing votes than in Canada because Israel has no local electoral structure; under SMDPR structure and expectations, Israel should have 95 precent effective ballots as well.

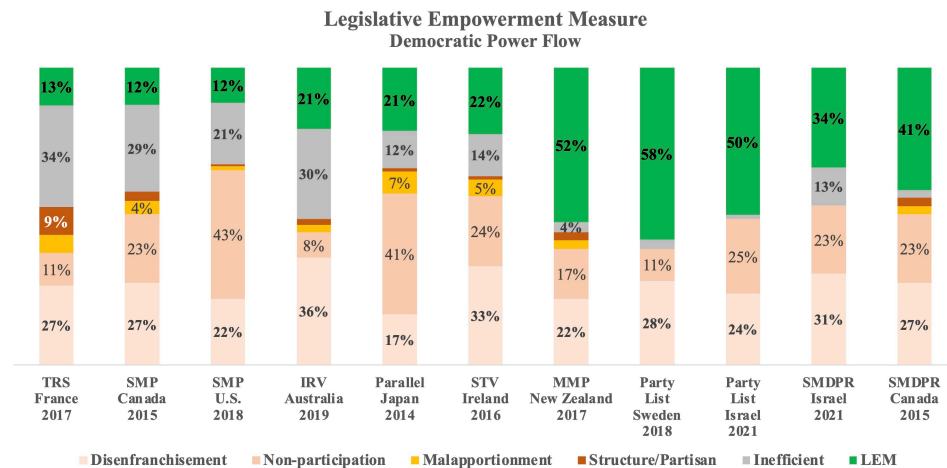Figure 6 shows LEM for the same 11 electoral system types.

Figure 6: Legislative Empowerment Measure Comparison with SMDPR

SMDPR's LEM value in Figure 6 is based on data from an SMP system in which voters had no expectation of proportional results; it would be expected to be in the low 60s with better turnout from proportionality expectations and/or mandatory voting.

Israel's LEM under SMDPR is also depressed because of current lack of local structure. To emphasize the importance of local structure, note that both Israel and Sweden have comparable population and electorate sizes; both have a national party-list electoral system. The only significant difference is that Sweden had 29 matching divisions and Israel has 1. (See below for further comment.)
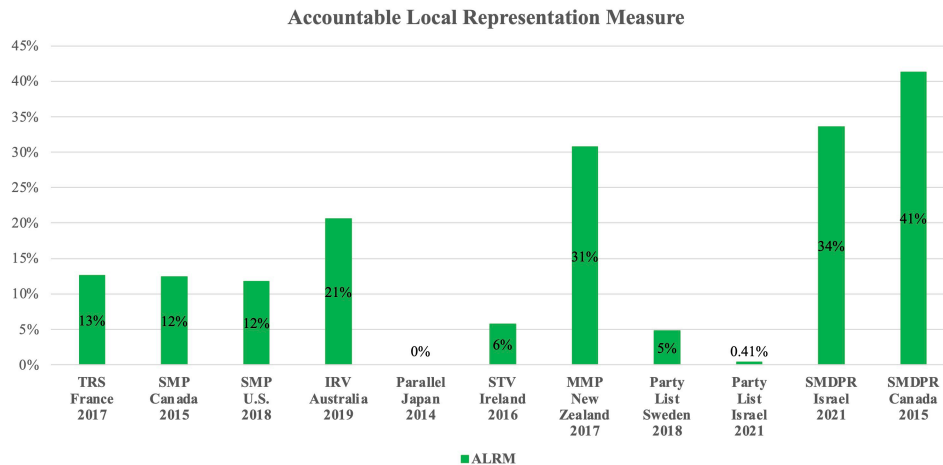
Accountable Local Representation Measure

Figure 7: Local Representation Measure

Figure 7 shows accountable local representation for the same 11 systems.

SMDPR's expected ALRM of over 60 would dominate; three-times IRV's second best, five-fold better than SMP and MMPR, and ten-fold better than STV.

Local Representation and Governance Stability

Since at least Henry II's 1188 England, local representation has been crucial to establishing national power. Historically, that fact was presaged by Alfred of Wessex's 878 unification of the country in defending against the Danes. But when he wanted to tax communities instead of his liege Lords three hundred years later, Henry was constrained to accept representatives of the towns and villages, representatives who would see to it that he was accountable for spending tax money on its intended purpose. This Saracen tax was wildly successful for Henry and arguably began the rise of the Commons in parliamentary structure, which eventually set the stage for parliamentary democracy [13].

The underlying principle of local representation is that great power in a nation is stable if based on great presence in the nation; before authority has the democratic power to act successfully it must reflect widely accepted mores. People agreed with Henry's crusade, so he got his tax, immoral as the whole purpose may seem today.

The relevant point is that accountable local representation serves as a natural threshold for authority to act, a threshold to be met in the interests of country unity. All representative systems have thresholds due to the aggregation of voice inherent in representative democracy. Allocation and matching divisions provide the mechanics for creating thresholds in ways that can unite instead of dividing.

Importantly, there is no prejudice in the sort of threshold inherent in allocation/matching division structure; it is free of bias against religion, caste, race, ethnicity, colour, gender, sexual orientation, etc.

Populations need reason to come together, instead of dividing. Political parties need incentive to unite the country over shared principles rather than drive wedges deeper in search of power. Local representation can provide the necessary incentive. The presence of many matching divisions places emphasis on national parties able to run candidates in each matching division and for each seat—encouraging parties to unite, increasing efficient ballots, and raising voice expression as measured by LEM.

To illustrate, consider Israel and Sweden. Both Israel and Sweden have party-list systems; Israel had a population of 9 million in 2021, Sweden's was 10 million in 2018; Israel's electorate was 6.6 million, Sweden's was 7.3 million; Israel had 120 seats, Sweden had 349. Each has one national allocation division.

Israel had 49 political parties, of which 13 were seated; Sweden had 10, of which 8 were seated. Israel's voice expression (LEM) was 45 percent in 2021, while Sweden's was 58 percent in 2018. Israel's accountability of local representation (ALRM) was 0.08 percent, while Sweden's was more or less equivalent at 0.29 percent, both virtually non-existent.

Israel had one matching division; Sweden had 29. Non-participation was 11 percent in Sweden and 23 percent in Israel.

The takeaway is that the difference in voice expression between Israel and Sweden arises largely because of turnout. As parliamentary evolution has demonstrated for a thousand years, local structure provides an important sense of belonging to a nation, and of participating in the nation's legislative business. Local electoral structure is historically proven effective; it is now also comparably and measurably shown to be so.

SMDPR's local structure should provide Israel with an LEM of 60 percent, an ALRM of 40, and a more governable political reality with fewer political parties. Opposition to this will come mostly from political parties.

Summary comments

SMDPR provides a tool to manipulate stability of governance, something it turns out is partially reflected by ALRM, a measure originally designed to distinguish between electoral systems on the basis of local voice accountability.

The decision of how many allocation divisions there should be, and how big they are, is subtle, delicate, and seriously consequential; a constitutional decision that cannot be left to political parties alone.

Immediate implementation of SMDPR in Canada is appropriate based on it being a pressing and

substantial need and on the inadequacy of alternatives such as SMP, STV, and MMPR.

SMDPR is described in further detail, in conjunction with Demeny voting and Constituency Assemblies as codification of public opinion, in *Democratic Voice: A Brief* [21]; the means for achieving such electoral reform through a permanent Electoral Reform Commission is also detailed there.

Balancing allocation/matching divisions structure with and stability/durability of governance begs ongoing research. Designing a measure predictive of stability is a challenge. Note that it is possible to create a single value representing national stability, composed of any number of indices and measures, in an unbiased way, by using simple vector algebra. Normalize each index/measure to the interval [0,1]; make each a component of a vector; use historical data to orthogonalize components as independent; finally, equalize the components of the resulting vector using its norm. The equalized component value is a canonical, unbiased representation of the set of indices/measures.

Electoral Systems

Following is a thumbnail sketch of each of the systems used for comparison to SMDPR.

France: Two Round System (TRS)

France has a two-round system of voting to fill a legislature of 577 seats, each seating a representative chosen by majority on the first or second round; a second round between the top two candidates in the first round is triggered in ridings having a plurality less than a majority on the first round.

The two rounds together form an allocation division; each seat is a matching division.

Canada: Single Member Plurality (SMP)

Canada has a single member plurality (SMP) system with 338 seats/constituencies, each with one representative, in a federation of 13 unequal Provinces and Territories.

Each constituency is an allocation division as well as a matching division.

United States House

The United States House uses SMP to fill 435 seats/constituencies, each with one representative, in a federation of 50 unequal states. Although its House is elected by SMP rules as in Canada, there is a presidential veto in the US; this affects voice of, but not in, the legislature.

Each constituency is an allocation division as well as a matching division.

Australia: Instant Run-off Vote (IRV)

Australia has an instant run-off vote (IRV) system with 151 seats/constituencies, each with a single representative, in a federation of 8 unequal States.

Each constituency is an allocation division as well as a matching division.

Japan: Parallel

Japan has a parallel system with 295 SMP seats/constituencies, plus an additional 11 blocks with 180 seats decided by D'Hondt list proportional.

Each constituency is an allocation division as well as a matching division: the list/block system forms a second allocation division, with the blocks as 11 matching divisions. The average number of representatives per block division is 16.

Ireland: Single Transferrable Vote (STV)

Ireland has a single transferable vote (STV) system with 40 constituencies and 157 seats.

There is one national allocation division: each constituency is a matching division.

New Zealand: Mixed Member Proportional (MMP)

New Zealand has a mixed member proportional (MMP) system with 71 seats/constituencies and a list division deciding 49 seats using Sainte-Laguë applied to all 120 seats.

The constituencies are matching divisions only, with a single national allocation division; overhangs are allowed to stand, possibly allotting, allocating, and matching seats by electoral system.

Sweden: List

Sweden has a national party-list system, using a modified Sainte-Laguë method, to fill 349 legislative seats in 29 constituencies.

The constituencies are matching divisions only, with a single national allocation division, overhang being handle by losing pluralities.

Israel: Party-List

Israel has a party-list system, using a variant of D'Hondt called the Hagenbach-Bischoff system, to fill 120 legislative seats with no local structure.

There is one national allocation divisions, which also serves as the single national matching division.

Canada: SMDPR

SMDPR is a local party-list system based on multiple allocation and matching divisions. In Canada, it would fill 338 matching divisions in 33 allocation divisions of 10 to 15 matching division each.

Israel: SMDPR

In Israel, SMDPR would fill 120 matching divisions in 12 allocation divisions of 10 matching division each.

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