



PROPORTIONAL REPRESENTATION IN PRACTICE

An International Comparison of Ballots and Voting Rules

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Executive Summary

The BC NDP and Green party caucuses have signalled that they are committed to having the upcoming referendum on electoral reform be a choice between the current electoral system (first-past-the-post or FPTP) and proportional representation (PR). Given that PR systems can vary widely in practice, this paper examines the institutional characteristics of three systems that are potential replacements for the simple plurality or FPTP system: Party List Proportional, Mixed Member Proportional (MMP), and Single Transferable Vote (STV). There are undeniable strengths in all three systems, but all are found wanting given the political realities in British Columbia. This paper argues that replacing BC's current FPTP electoral system will require both trade-offs and an understanding of the impact that such changes will have on the way votes are counted.

The Party List Proportional system is commonly used in most European democracies. In these systems, candidates run in ridings that have more than one member. There are two types of Party List system. The first is the Closed Party List system in which the electorate votes for their preferred political party. The second is the Open Party List system in which the electorate votes for their preferred candidate and their preferred political party. There can be many differences between these sub-systems stemming from their different seat allocation formulae, district sizes, and vote thresholds. Advocates for reform point out that the Party List Proportional system increases the likelihood of women and minorities being elected. However, critics note that this system, especially the Closed Party List system, weakens the link between the MP and the constituency.

Germany, New Zealand, and Mexico, among other countries, use the Mixed Member Proportional electoral system. Its main feature is that it combines a plurality or majority system with proportionality. In this system, the electorate votes twice on the same ballot. The first vote, the party vote, is to select the political party. The second vote, the electorate vote, is the plurality or majority vote by which voters choose the candidate they wish to fill the seat. In most cases, FPTP is the selection method for the electorate vote. The advantages of MMP include: reducing wasted votes, providing more choices when voting, reducing the dominance of larger

parties, helping smaller parties grow, and preserving the link between the MP and the electorate. However, by providing more choice, fringe parties tend to be given more power, which increases the likelihood of minority or coalition governments, increasing the possibility of collusion between parties to impede opponents, and potentially creating large and complex ballots.

The Australian Senate, Malta, the Republic of Ireland, and Northern Ireland all use the Single Transferable Vote electoral system. Its main feature is that it enables voters to choose candidates from different parties, but also candidates from the same party. Because it allows voters to choose between parties and between candidates, it preserves the link between the MP and the electorate, helps independent candidates get elected, reduces the number of wasted ballots, and provides incentives to parties to provide a balanced team of candidates, which may help promote women and minority groups. However, because of the complexity of the electoral formulae, it tends to take a greater amount of time to determine winners with this system, it is prone to “donkey voting” whereby voters simply rank candidates in the order they appear on the ballot, and often leads to large and complex ballot papers.

Any replacement of BC’s current FPTP electoral system will require trade-offs, an understanding of the impact that such changes will have on the way votes are counted, and what impact the new system may have on the legislature and the party system.

Introduction

The British Columbia government has set out the ballot question for the upcoming referendum on electoral reform (British Columbia, 2018). It will consist of a two-part ballot. The first part will ask a straightforward question:

“Which system should British Columbia use for provincial elections?”

Voters will choose one of the following:

- The current First Past the Post voting system
- A proportional representation voting system

If a majority selects a change to the voting system, then the second question will be used to develop the alternate electoral system. The second question ask:

“If British Columbia adopts a proportional representation voting system, which of the following voting systems do you prefer?”

Voters will rank or select one or more of the following:

- Dual Member Proportional (DMP)
- Mixed Member Proportional (MMP)
- Rural-Urban Proportional (RUP)

Of the three options provided, only MMP has been used in practice. This is problematic as voters will have no understanding or appreciation of how these systems will work in British Columbia.

A jurisdiction’s choice of electoral system has a profound impact on the number of parties, electoral disproportionality, party extremism, and policy choices (Golder, 2005). This paper reviews and examines each of these elements and explains how they operate in practice internationally. It will proceed by first examining the types of electoral systems, and then reviewing the way in which countries around the world cast ballots, count votes, and allocate seats in those systems. Although we cannot tell readers how the rural-urban PR, or DMP would work in British Columbia, we can give readers a sense of the complexity and options found in other PR systems. This exercise should give readers some guidance as there are elements of all these systems in the proposed referendum question.

Electoral Systems

How citizens vote in a democratic country, province, state, or even city, influences how governments are selected and how those governments operate. As the *IDEA Handbook on Electoral System Design* notes, the electoral system is “the easiest political institution to manipulate, for good or for bad” (Reynolds, Reilly, and Ellis, 2008: 5). Some also believe that electoral systems are crucial to democratic rule by ensuring that the government remains responsive and accountable to its citizens (Bormann and Golder, 2013).

Electoral systems are complex and multifaceted, and few countries share identical systems. Indeed, there are many components to jurisdiction’s electoral system, including: the electoral formula, which determines how votes are translated into seats; the electoral threshold, or the minimum proportion of votes needed to be awarded a seat; and district magnitude, which is the number of seats in each electoral district. Table 1 below lists most of the countries referred to in this paper and the various components of their electoral systems that are discussed in more detail below.

Table 1: Current Electoral System Characteristics for Lower Houses or Unicameral Legislatures, OECD Countries

Country	Electoral Formula	Party List	Formal Vote Threshold (%)	Total Number of MPs	Number of Single Member District MPs	Number of List District MPs	Total Number of Multi-Member Districts for Lists
PLURALITY AND MAJORITARIAN							
Australia	Alternative Vote	N/A	N/A	150	150	0	0
Canada	First-past-the-post	N/A	N/A	338	338	0	0
France	Two-Round Majoritarian	N/A	N/A	577	577	0	0
United Kingdom	First-past-the-post	N/A	N/A	650	650	0	0
United States	First-past-the-post	N/A	N/A	450	450	0	0
MIXED							
Germany	Mixed-Member Proportional	Closed	5%	622	299	323	16
Hungary	Mixed-Member Proportional	Closed	5%	199	106	93	1
Japan	Parallel Plurality-PR	Open	N/A	465	289	176	11
New Zealand	Mixed-Member Proportional	Closed	5%	120	70	50	1
PROPORTIONAL REPRESENTATION							
Austria	List PR	Closed	4%	183	0	183	9
Belgium	List PR	Open	5%	150	0	150	11
Czech Republic	List PR	Open	5%	200	0	200	14
Denmark	List PR	Open	2%	179	0	179	10
Estonia	List PR	Open	5%	101	0	101	12
Finland	List PR	Open	None	200	1	199	14
Greece	List PR	Open	3%	300	8	292	49
Iceland	List PR	Closed	5%	63	0	63	6 or 7
Ireland	Single Transferable Vote	—	—	158	0	158	40
Israel	List PR	Closed	3.25%	120	0	120	1
Italy	List PR	Open	3%	630	9	621	21
Luxembourg	List PR	Open	None	60	0	60	4
Netherlands	List PR	Closed	0.67%	150	0	150	18
Norway	List PR	Open	4%	169	0	169	19
Poland	List PR	Open	5%	460	0	460	41
Portugal	List PR	Closed	None	230	0	230	22
Slovakia	List PR	Closed	5%	150	0	150	1
Slovenia	List PR	Open	4%	90	0	90	8
Spain	List PR	Closed	3%	350	2	348	50
Sweden	List PR	Closed	4%	349	0	349	30
Switzerland	List PR	Open	None	200	5	195	21

Notes:

In Finland one member is elected by a simple majority for the province of Åland.

In Greece there are eight single-member constituencies.

There are nine single member seats in Italy (one for Valle d'Aosta and eight for Trentino-Alto Adige).

There are two single member seats in Spain for the North African regions of Ceuta and Melilla.

Sources: Inter-Parliamentary Union (2018); Lijphart, 2012.

Plurality and Majoritarian Systems

Canada's federal and provincial electoral systems are part of the plurality and majoritarian family of electoral systems. These electoral systems tend to produce majority governments whether or not a party receives a majority of the votes. The focus of these systems is to produce an effective working government by allowing the party that wins the most electoral seats to carry out its platform with few impediments. One consequence of such majority governments is that they are often held more accountable than coalition governments because the public is able to judge the government's policy record clearly (Norris, 1997).

Within this family of systems, British Columbia and Canada use an electoral formula known as First-Past-the-Post (FPTP), or single member plurality (SMP), which works as follows in BC. The province is divided into single-member districts organized by population and region of which there were 87 as of the last election. On election day, voters go to the polls and vote for their preferred candidate to represent their constituency. The candidate who receives the largest share (or plurality) of votes in the constituency is elected to the legislature, and the party that has the most seats (often a majority) in the legislature governs. One key benefit of a plurality system is that determining the outcome is simple and straightforward. The candidate with the most votes wins. When regimes value proportionality over clarity of outcome, they have to devise specific and often complex rules to determine the outcome of an election.

Electoral reform advocates often argue that FPTP isn't democratic. They make this claim by insisting that all the seats are won by a simple plurality (i.e., treating them as a group) rather than a majority (a collection of individual seat winners from the ridings). They do this by calculating the overall popular vote and comparing that to the number of seats won by the government. This direct comparison of overall popular vote and seat allocation ignores a fundamental element of Canada's electoral system: regional representation. It is often the case that in each riding the winner is the person who receives a majority, not simply a plurality, of votes. In a two-party system, the winner is most likely the party that receives more than 50 percent of the vote. However, when the party system has more

than two effective parties, as is the case currently in BC, it becomes more difficult to win with a majority than a plurality. Yet even in a two-plus party system, it is the case that more seats are won by a majority than by a plurality. Indeed, in both the BC elections of 2013 and 2017, a majority of seats were won with majorities—54 percent of seats in 2013 and 53 percent in 2017. This finding emphasizes the fact that the FPTP formula does not invariably distort popular support. As we will see below, PR systems often do not have this kind of result and end up distorting regional support in the guise of proportionality.

For regimes other than FPTP, a primary objective following the election is calculating the majority that will determine who receives the seat in each constituency. Within the majoritarian family, a variety of different electoral formula and different mechanisms are used to try to ensure that the winning candidate in a constituency achieves a majority of the votes. Two such formulae are France's two-round system and the Alternative Vote system that Australia uses to elect members to its lower house. Elections under these two systems are similar to elections using FPTP rules in that they all use single-member districts. The difference is in the way votes are translated into seats. Under France's two-round system, if no candidate receives a majority of votes in the initial round of voting, a second election is held among the candidates that attained a vote share equal to a certain percentage of registered voters. The candidate with the most votes in the second round wins the seat. By allowing voters to cast a subsequent vote, France achieves a higher degree of consensus around the eventual winner. However, the fact remains that the second round now includes voters' second and first choices. Other regimes that rank candidates include Malta, the Republic of Ireland, Northern Ireland, and Tasmania, though each adjusts the voting system slightly.

Australia's Alternative Vote system requires voters to rank their preferences among all the candidates in their constituency. If no candidate receives a majority of the first preference votes, then the candidate with the fewest votes is dropped and that person's votes are redistributed based on the second or subsequent preferences of their voters. The process is repeated until one candidate achieves a majority.

The Australian Senate uses STV, a system in which voters select individual candidates from party lists. However, the structure of the ballot is slightly different than those used in other STV systems. Australian voters for the Senate are given two options. The first option is the same as with other STV electoral systems: voters select candidates from party lists, as is illustrated in the bottom half of the ballot in figure 1. However, if they wish, voters can bypass the ranking of individuals and instead simply vote for their preferred party, as illustrated in the top half of figure 1. This

Figure 1: Australian Senate STV Ballot

The ballot paper is titled "SENATE BALLOT PAPER" and features the Australian coat of arms. It instructs voters: "You may vote in one of two ways".

either (Party Voting): A row of six boxes, each labeled "PARTY" below it.

or (Above-the-line Voting): A grid of boxes. The first five columns are labeled "PARTY" and the last column is labeled "UNGROUPED". Each box is labeled "CANDIDATE NAME PARTY" or "CANDIDATE NAME" to its right. The "UNGROUPED" column has three boxes, while the "PARTY" columns have two boxes each. The Australian Electoral Commission (AEC) logo is in the bottom left corner.

Source: Australian Electoral Commission: http://results.aec.gov.au/12246/images/icons/icon_senateballot-paper.gif.

second option is referred to as “above-the-line voting” or “ticket voting.” The rationale for this option is to make voting easier. In 1983, the Senate ballot for the riding of New South Wales had 62 candidates. This led to numerous mistakes in sequential voting¹ on the ballots, which increased the number of invalid votes. Above-the-line voting was introduced a year later through reforms in the Commonwealth Electoral Act. Above-the-line voting has become so popular that more than 95 percent of Australians use this option (Bennett and Lundie, 2007; Australian Electoral Commission, 2017; Australian Electoral Commission, 2016a; Sawyer, 2005; Raue, 2016, April 18).

The alternative vote (AV), or ranked ballot, is the system that most Canadian political parties use to elect their leaders. Prime Minister Trudeau has remarked that this is a system he had favoured for Canada (Kupfer, 2017). While this system works for internal leadership contests, the values of the parties in those elections are different than the values

¹ In sequential voting, voters follow a sequence of steps to determine which candidates will be eliminated and which retained for an opportunity to be considered again in the next round of voting. This voting method enables voters to reduce the field of candidates until one is selected. This method is used in the presidential primary system in the United States (Barbera and Gerber, 2017: 211; Ciciora, 2015).

that Canadians might have for government. For a political party, the goal of a leadership race is twofold: to select a leader and to emerge from the contest unified. The AV, or ranked ballot, is designed for the efficiency of vote counting, but more importantly, to give the appearance that the leader not only has the most votes, but is supported by the majority of party members. For Canadian political parties, leadership races held under AV rules enable party members to rank candidates on a ballot. If their first choice is eliminated before a winner is selected, their second and subsequent choices are counted until a winner emerges. The NDP uses the raw vote count to select the leader. The Liberal and Conservative parties do not use a one vote, one person system. To ensure regional appeal, these parties weigh each riding equally, giving them 100 points. (If a riding has fewer than 100 members, then that riding has points allocated according to the actual vote.) In the case of the Liberal leadership race in 2013, Justin Trudeau was victorious in the first round, which makes it appear that the system is effective and straightforward. However, this is not always the case in practice. For example, the 2017 Conservative Party leadership race went to 13 rounds to give Andrew Scheer the victory on the final ballot with a mere 50.95 percent of the points. Until the final round, second place finisher Maxime Bernier was leading in each round. More recently, at the provincial level in March 2018, the Ontario Progressive Conservative party went to three ballots to give Doug Ford the victory with 50.62 percent of the points. Ironically, in this contest, he lost both the popular vote and the number of constituencies but won on points because of the way in which the ridings were weighted. Because of this discrepancy, no announcement of the winner was made at the convention. Convention attendees were sent home and the winner was announced seven hours after the start of the convention in a hastily convened news conference. While AV systems give the appearance of simplicity and transparency, the way in which the formulae are used to declare a winner can vary and be confusing.

Australia, which uses the STV electoral system for its Senate, is not the only jurisdiction to take a different approach to that voting system. The Tasmanian system, also referred to as the Hare-Clark system, emphasizes candidates over parties. Unlike Malta, the Republic of Ireland, and Northern Ireland, the Tasmanian system is unique in demanding that voters rank at least five candidates. The rationale for the selection of at least five candidates is because the districts elect five representatives. The Tasmanian system also differs from the Australian Senate system because it does not allow above-the-line voting. In addition, the ballot in Tasmania organizes the votes according to political parties, as illustrated in figure 2 (Tasmanian Electoral Commission, 2018; ABC News, 2006, February 2; Green, 2014, January 17; Revolv, undated – b; Raue, 2016, April 18; Tas-

manian Parliamentary Library, 2015; Proportional Representation Society of Australia, 2017; Newman, 2006; Inglis, 2018, February 9).

Figure 2: Tasmanian House of Assembly STV Ballot

ROTATION No. 3 — FRANKLIN — ORDINARY — JOB No. 52081

Tasmania—Electoral Act 2004 PS
BALLOT PAPER

House of Assembly Division of FRANKLIN
 Election of 5 Members

Number the boxes from 1 to 18 in order of your choice

SOCIALIST ALLIANCE	LIBERAL PARTY	TASMANIAN GREENS	AUSTRALIAN LABOR PARTY	Ungrouped
<input type="checkbox"/> HOLLOWAY Matthew Patrick	<input type="checkbox"/> BASTONE Sue	<input type="checkbox"/> RICKARDS Mark	<input type="checkbox"/> HULME Daniel	<input type="checkbox"/> JAMES Richard
	<input type="checkbox"/> ALLIE Steve	<input type="checkbox"/> MacDONALD Jana	<input type="checkbox"/> BUTLER Ross	<input type="checkbox"/> HALL Ian
	<input type="checkbox"/> SCOTT Tony	<input type="checkbox"/> McKIM Nick	<input type="checkbox"/> GIDDINGS Lara	
	<input type="checkbox"/> GOODWIN Vanessa	<input type="checkbox"/> ANDERSON Mike	<input type="checkbox"/> LENNON Paul	
	<input type="checkbox"/> HODGMAN Will	<input type="checkbox"/> VELNAAR Gerard	<input type="checkbox"/> WRIEDT Paula	

YOUR VOTE WILL NOT COUNT UNLESS YOU NUMBER AT LEAST 5 BOXES

Source: Bennett and Lundie, 2007.

Proportional Representation

Despite the fact that its Citizens Assembly on Electoral Reform had recommended an STV system for the province, the current BC government has specifically stated that the referendum on electoral reform will determine whether the province should switch to a form of proportional representation (PR). The argument in favour of PR is that the legislature more closely resembles the composition of society as a whole. One notable concern about this electoral system is that it allows single issue parties to emerge, such as “left-leaning” green parties, or “right-leaning” anti-immigration parties (Mudde, 1999). In addition, PR systems create significantly more political parties than do the other electoral systems and as a result, the legislature is fractured into more segments. In order to limit the number of parties elected, countries employ electoral formulae to translate votes into seats.

European countries use electoral formulae widely. There are a number of inter-country differences with respect to how PR is used. In contrast to plurality or majoritarian systems, PR systems intend to more closely align overall votes with seats, giving smaller or minority parties a greater chance of winning seats. Within the PR electoral family, the main differences among systems revolve around the use of open versus closed lists for candidates, the size of electoral districts, the threshold for parties to attain seats, and the formulae for converting votes to seats (Norris, 2004). Party thresholds, the formulae used to convert votes into seats, and party lists will be discussed in more detail below.

In general, in PR electoral systems, voters select party lists in multi-member districts. A multi-member district is one in which the constituency, or riding, has more than one representative. To choose candidates, voters select their preferred choices from a list. In these PR systems, lists can either be open (in which voters choose both their preferred political party and their preferred candidates on the list) or closed (in which voters can only select a party; the party chooses the candidates on the list). In either the open or closed list system, the order in which candidates appear on the list determines which candidates get elected. As a simple example, in a district with 10 seats, if a party receives 40 percent of the vote, the first

four candidates on the list will be elected. Of the 20 countries in this study that use list PR, 12 use open lists and eight use closed lists. On the one hand, closed lists make the voting process easy and reduce complicated ballot papers, but on the other, it is party elites rather than voters who decide who will govern. Moreover, in this system, the public's ability to select specific candidates that may better reflect their regional interests is lost.

District magnitude is another variable that varies widely between PR electoral systems. For example, in Israeli elections for the 120 seats in the Knesset, the entire country is considered to be one district, whereas elections for the 350 seats in the Spanish Congress of Deputies are contested among 50 districts. While the introduction of multi-member electoral districts is central to PR, their use can result in two potential problems. First, large multi-member ridings can give rise to large ballot papers, which can cause confusion among voters. Second, large multi-member ridings can lead to a diminishing link between voters and elected officials (Miljan and Jackson, forthcoming; UK Engage, 2013, June 18; Harewood, 2002, August 31; Electoral Knowledge Network, undated – a). Regional representation plays an important role in the link between voters and elected officials. In many of the international cases where PR is used, the land masses are small, so regional differences may not be very important for the electorate. However, in Canada, and even just in British Columbia, there are significant regional differences as a result of population density, proximity to large urban centres, and even geography itself. Regional representation is one cornerstone of Canadian democracy that might be sacrificed in a PR system composed of large multi-member districts.

In combination, these different components of PR systems can produce quite different outcomes in terms of the overall proportionality of the system, the number of parties represented in the legislature, and the number of minor parties that receive seats, among other issues.

Another electoral system that sometimes falls under the PR family is the semi-proportional Single Transferable Vote (STV) system. As mentioned above, this system sees the jurisdiction divided up into multi-member districts of about four or five representatives. Parties then put forward as many candidates as they feel can win seats in the district. Voters then rank order their preferences for candidates. The total number of votes is then divided by the number of seats in the district, which produces a quota that candidates must attain in order to be elected. After the first preferences are counted, if seats remain unfilled, the candidate with the lowest number of votes is eliminated and his or her second preferences are then redistributed. This process continues until all seats are filled.

Vote thresholds in PR electoral systems

As briefly explained earlier, a key element differentiating PR and plurality or majoritarian electoral systems is the use of formal vote thresholds. These thresholds typically refer to a certain percentage of votes that a party must receive in a district to attain a seat in that district. The use of thresholds in PR systems stems from the presence of multi-member districts, which, depending on the size of the district, could make it relatively easier for parties with only minimal support to attain seats in the legislature. Indeed, vote thresholds are often intended to prevent extremist parties from having a voice in the legislature (Spiegel Online, 2013, September 19). While the exact threshold varies by jurisdiction, most jurisdictions that use PR electoral systems employ some formal vote threshold.

There is no generally accepted or consistent policy across countries regarding thresholds. However, of the countries that use vote thresholds in our sample of countries from table 1, vote thresholds range from 0.67 percent in the Netherlands to 5.0 percent in several countries including Belgium, the Czech Republic, Estonia, Iceland, Poland, and Slovakia. It's worth noting that some countries such as Greece, Luxembourg, Portugal, and Switzerland have no formal vote thresholds, which means that a representative can be elected with a very small share of the vote total. Some countries, such as Denmark and Brazil, use relatively more complex vote threshold requirements than others.

For example, in Denmark, parties do not receive any constituency seats unless they win a compensatory seat,² win two percent of the countrywide vote, or gain the equivalency of the Hare quota in two of the three regions.³ In Brazil, parties must receive at least five percent of the countrywide vote spread among at least a third of the states. Within those states, a party must receive at least two percent of the vote. Given the wide range of vote thresholds employed, should British Columbia shift to PR, it is not clear what—or even if—a vote threshold would be used.

2 There are 175 seats in the Danish parliament. Of those, 40 are compensatory seats (*tillægsmandat*), which are distributed among three electoral regions: Metropolitan Copenhagen (along with Frederiksberg), the Islands, and Jutland. These three electoral regions are subdivided into 17 multi-member constituencies, which is where the remaining 135 seats are from. These seats are called constituency seats (*kredsmandater*) (Gallagher and Mitchell, 2005).

3 The Hare quota will be explained below.

Seat allocation formulae

PR systems also use a seat allocation formula to ensure that the distribution of seats closely reflects how the electorate voted. As previously mentioned, different countries use various formulae to calculate the vote. The first such formula is the Droop quota. Created by an English lawyer named Henry Richmond Droop in 1868, the Droop quota is calculated by dividing the number of votes by the number of seats plus one. Most STV systems use the Droop quota to determine the seat allocation (Revolvy, undated – a). In these jurisdictions, voters do not have to rank all the candidates. They can choose to rank as few as one candidate or as many as they like (United Kingdom, Parliament, 2017). This is important because requiring voters to rank each candidate can lead to an increase in spoiled ballots. For example, the ballots for the Australian House of Representatives require that voters rank every candidate from their most preferred to their least preferred. Failure to do so results in a spoiled ballot. In the 2013 House of Representatives election, ballots with incomplete rankings made up almost half (47.5 percent) of the 58.6 percent of the ballots that were assumed to have been spoiled unintentionally (Australian Electoral Commission, 2016b).⁴ In the 2015 Canadian general election, only 0.7 percent of ballots were spoiled (Miljan, 2016).

The Droop quota works by first determining the total number of first preference votes for all candidates. Once this is completed, any candidate who receives a number of first preference votes that is greater than or equal to the predetermined quota is elected. If there are still seats to fill, then additional counts are required. In these additional counts, the extra votes (votes that are above the quota) for the candidates who have been elected in the first count are redistributed according to the voters' second preferences. This process continues until all the seats are filled. After any count, if there are no candidates with enough votes equal to or greater than the quota, the candidate with the lowest number of votes is eliminated. The votes of that candidate are then redistributed in the next round to candidates who are ranked higher in preference (Gallagher, 1992; Electoral Commission New Zealand, 2015; Electoral Knowledge Network, undated – c; Revolvy, undated – a; Accurate Democracy, 2017; Citizens' Assembly on Electoral Reform, 2003).

The second seat allocation formula is called the Hare quota. It is similar to the Droop quota, but simply takes the number of votes and divides them by the number of seats (Accurate Democracy, 2017). Although both

⁴ In the 2013 Australian election, 5.9 percent of votes were considered to be invalid in House of Representatives voting (Australian Electoral Commission, 2016b).

the Droop and Hare quotas are similar, they differ in how they favour parties. Because the Droop quota is smaller than the Hare quota, it tends to benefit larger parties that receive more votes (Gallagher, 1992, Harewood, 2002, August 31). The Hare quota thus increases the presence of smaller parties in the legislature because it treats both large and small parties the same (Lijphart, 1990).

The two remaining seat allocation formulae are the ones most often used in PR systems. The Sainte-Laguë and d'Hondt formulae are described as a "highest averages method." In this method, each party competes for a seat in sequence, as in an auction. The bid for a seat that a party puts forward is composed of the original number of votes it has received and how many seats it has won. Each time a party wins a seat, its bid is reduced because it is divided by progressively larger numbers, called divisors. To illustrate how this method works, consider an example provided by Michael Gallagher (1992).

In an election, Party A receives 60,000 votes, Party B receives 28,000 votes, and Party C receives 12,000 votes. In the first round of bidding, Party A has the best bid of 60,000, so it receives the first seat. After it receives the first seat, its number of votes is reduced by dividing by a divisor, which would be 3 because it is the second round of bidding. In the second round, Party A has a bid of 20,000 seats ($60,000 \div 3 = 20,000$), compared to Party B which has the best bid of 28,000. This means that Party B receives the second seat. However, Party B's number of votes is reduced by dividing by the divisor, which is again 3. This continues until all the seats are filled (Gallagher, 1992).

The difference between the Sainte-Laguë and d'Hondt formulae is the divisors. Divisors are used to reduce a bid (Gallagher, 1992). The Sainte-Laguë formula uses odd numbers as its divisors and the d'Hondt formula uses even numbers (Revolvy, undated – c; d; Gallagher, 1991; 1992; Electoral Commission New Zealand, 2017a; Poptcheva, 2016). Mathematically, the more rapidly the divisors increase, the more rapidly the bids decrease. This means that when using the Sainte-Laguë formula, the bids decrease faster, which causes the bids of the larger parties to decrease to around the level of the smaller parties faster (Gallagher, 1992). Not only does the Sainte-Laguë formula help smaller parties achieve seats, but it can also achieve a seat allocation that more proportional to votes than the d'Hondt formula.⁵

⁵ In one study, researchers found that applying the two formulas to the Southwest electoral region in the 2009 British general election yielded very different results (McLean and Johnston, 2009). In that election, the Conservative Party received 468,742 votes, the Labour Party 118,716 votes, the Liberal Democrats 266,253 votes, the Greens 144,179 votes, the UK Independence Party 341,845 votes, and the

How these formulae would have affected BC's electoral system can be seen in the BC–STV model that the Citizens' Assembly recommended. In the proposed 2004 BC–STV model, the number of ridings would have been reduced from 85 to 20. Every riding would have had multiple representatives. Some ridings would have had as few as two representatives elected, but in ridings with higher population densities, there could have been as many as seven representatives. Critics of this system were concerned about a loss of regional representation and accountability of those elected.

Party lists

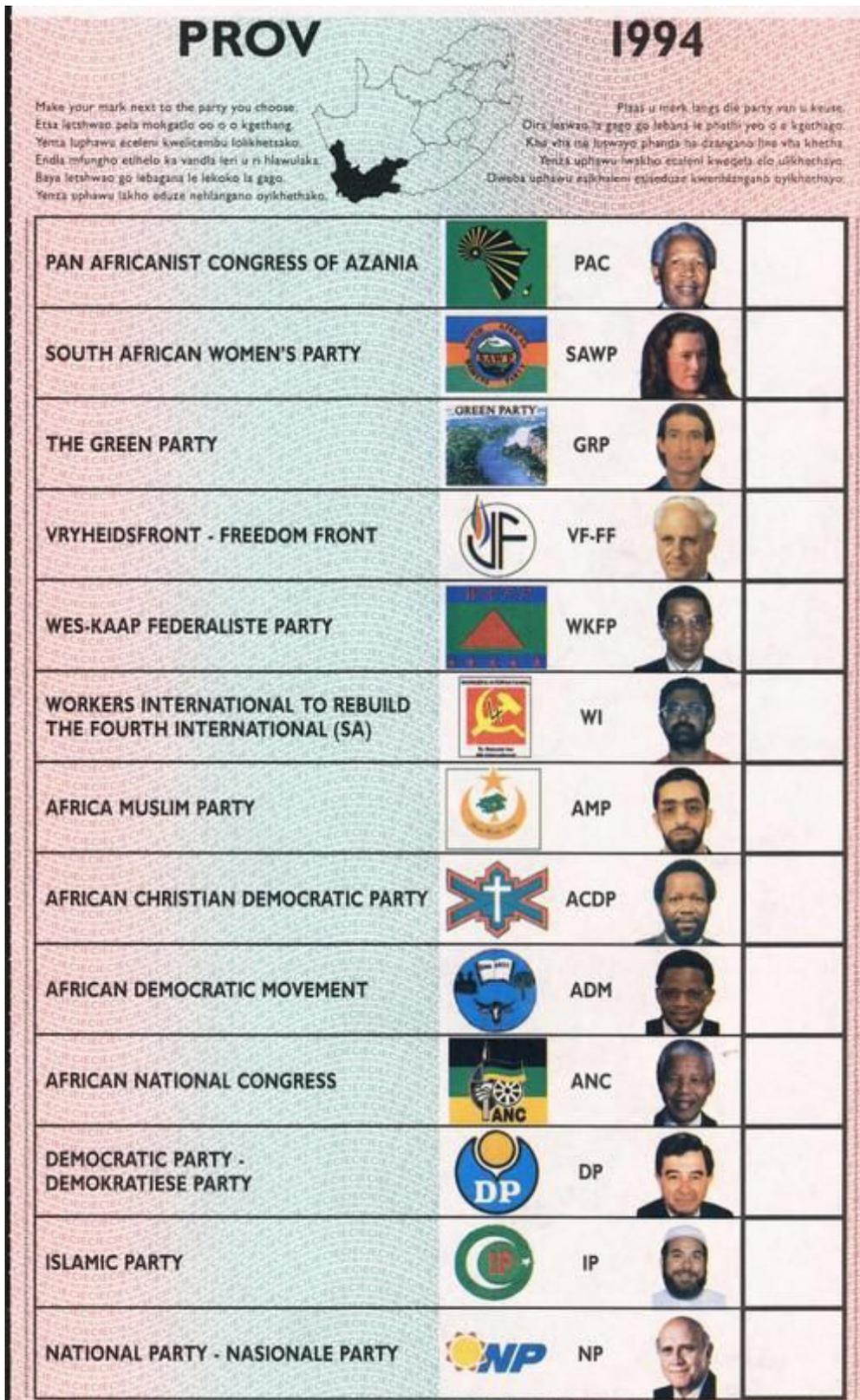
Party lists are another key component of PR electoral systems that can also differ within such systems. In a PR electoral system, candidates are chosen based on their position on a party-created list (Electoral Knowledge Network, undated – a). Depending on the type of party list used, voters can select either their preferred party (a closed list system), or their preferred party and their preferred candidates within that party (an open list system).

The original system is the closed party list system in which voters select their preferred political party. This method is used in South Africa, for example, where voters select either the picture of the leader, or the party name (see figure 3) (Norris, 1997; FairVote, 2017a; b). The candidates are then elected based on their position on a list, which is determined by the party. This means that more power resides with the party elite, which draws up the list, than with the party membership (Norris, 1997; Gallagher and Mitchell, 2005). Jurisdictions included in this study that use the closed party list system include Austria, Iceland, Israel, Netherlands, Portugal, Slovakia, Spain, and Sweden.

In the open party list system, voters express their preference not just for the political party of their choice, but also for the candidates within their preferred political party. Denmark, for example, uses an open party list system (see figure 4, a picture of a ballot from that country's 2001 election). Unlike closed party list systems, open party list systems give voters more say over which candidates get elected because the order of candidates on an open party list is determined through a combination

British National Party 60,899 votes. When they applied the Sainte-Laguë formula, the researchers found that all parties except the British National Party won seats. However, when they applied the d'Hondt formula, only the Conservative Party, the Liberal Democrats, and the UK Independence Party won seats (McLean and Johnston, 2009). This means that the Sainte-Laguë formula more proportionally represented how people voted. It also demonstrates that the different formula for calculating the results can lead to profoundly different outcomes.

Figure 3: South African Closed List Ballot



of electorate choice and party choice (Norris, 1997; Reilly, 2016; King, 2000; FairVote, 2017a; b; Institute for Democracy and Electoral Assistance [IDEA], 2005.). Other states that use open party list systems in our sample of countries include Belgium, Czech Republic, Estonia, Finland, Greece, Italy Luxembourg, Norway, Poland, Slovenia, and Switzerland. It is worth noting that the choice of an electoral system does not determine which seat allocation formula a state can use.

Figure 4: Denmark's Open Party List Ballot Paper

Sønderjyllands Amts 3. opstillingskreds Folketingsvalget 2001	
Sæt x til højre for en listebetegnelse (et partinavn) eller et kandidatnavn. Sæt kun ét kryds på stemmesedlen.	
A. Socialdemokratiet	O. Dansk Folkeparti
Frode Sørensen	Søren Krarup
Inger Bierbaum	Kelli Kristiansen
Dorte Dinesen	Jørn Larsen
P. Qvist Jørgensen	Jytte Lauridsen
Eva Roth	Theis Mathiasen
Lise von Seelen	Niels Oluf Michaelsen Petersen
Søren Ebbesen Skov	Lars Rydhard
B. Det Radikale Venstre	Q. Kristeligt Folkeparti
Nicolas Lund-Larsen	Michael Lund Markussen
Per Kleis Bonnelycke	Vibeke Christensen
Bente Dahl	Bjarke Friis
Inger Harms	Knud Erik Hansen
Bjarke Larsen	Henning Holm
Henrik Larsen	V. Venstre, Danmarks Liberale Parti
C. Det Konservative Folkeparti	Bjørn Scherbarth
Kaj Ikast	Sven Buhrkall
Martin Andresen	Peter Christensen
Bent P. Have	Allan Emilussen
Jens M. Henriksen	Gunnar Hattesen
Bente Lassen	Helga Moos
Lars Munk	Hans Chr. Schmidt
Klaus Rehkopff	Z. Fremskridtspartiet
D. Centrum-Demokraterne	Ole Jensen
Henning Nielsen	Heine Andresen
Henning Borchert-Jørgensen	Henning Brandt
Helmuth Carstens	Carl Hahn
Flemming Hübschmann	Margit Petersen
Holger Madsen	Preben Ravn
Peter Berthel Nissen	Jens Willatzen
Kai Paulsen	Ø. Enhedslisten - De Rød-Gronne
F. Socialistisk Folkeparti	Baltser Andersen
Bjarne Eliassen	Svend Brandt
Bent Iversen	Signe Færch
Jesper Petersen	Jette Hedegaard
Kirstine Rask Lauridsen	Egon Laugesen
Jørn Ulrik Larsen	Niels-Erik Aaes
Jørgen Jørgensen	
Mathias Gotthardsen	
O. Dansk Folkeparti	
Søren Krarup	
Kelli Kristiansen	

Source: Gallagher and Mitchell (2005): 459.

Mixed electoral systems

The second referendum question will allow voters to rank three of the following electoral systems:

- Mixed Member Proportional (MMP)
- Dual Member Proportional (DMP), and
- Rural-Urban PR

Of these, MMP is the only one that has been used internationally.

Dual Member Proportional (DMP)

The DMP system proposed by British Columbia Attorney General David Eby will require the redrawing of electoral boundaries. Urban ridings will be combined so that there are two representatives for each riding. For rural ridings, the boundaries might not be changed, and in those ridings only one legislator would be selected. It is unclear from the recommendations what the total will be for the number of representatives selected, though Eby recommends an upper limit of 95 representatives. Nonetheless, the key feature of this system is that each dual-member constituency will elect two representatives. In this system, political parties are able to nominate up to two candidates per electoral district. The order of the representatives would be determined by the political party. Voters would select a pair of candidates in a single vote. The seats are allocated in such a way that the overall result is proportional to the overall provincial vote. This is done in a series of steps. For those who win with a majority in their riding, that number of seats is subtracted from the total seat count. The remaining seats are those for which no one person (or party) has enough votes to win an outright majority. Those seats are then allocated according to the provincial popular vote. Eby argues that this system is highly proportional to the provincial results. However, the design of the system means that rural areas are disadvantaged twice. First, they will have fewer representatives, and second, because of their smaller population sizes, their perspective will have less weight in a proportional system.

Rural-Urban PR

The Rural-Urban PR system recommended by Eby uses two types of voting system: the STV system in urban and semi-urban areas; and MMP in rural areas. Some districts would be voting under a List PR system, while others would go with the existing FPTP.

In this system, there would be a varying number of representatives per constituency, with some having only two representatives, while others could have up to seven.

How We Vote notes that voters will not know key details of any of the recommended systems until after the vote. Key details of the electoral systems, such as whether the province will use closed or open lists, the order of candidates on a list, the methods for filling single-member districts, the ratio of FPTP to the List PR seats, the number and configuration of regions, and the number of list seats in each region, would have to be determined by the legislature after the referendum (Eby: 71).

Mixed electoral systems use both PR and majoritarian electoral rules to translate votes into seats. It is often the case in these types of electoral systems that a certain proportion of seats in the legislature will be awarded using plurality electoral rules, while the remaining proportion will be awarded using PR (see table 2).

Table 2: The Allocation of Seats in the Legislatures of Germany, Bolivia, New Zealand, and Mexico

Legislature	Number of Seats in Legislature	Number of Seats Allocated by Electorate Vote	Number of Seats Allocated by Party Vote
German Bundestag	598	299	299
Bolivian Chamber of Deputies	130	77 (of which 7 are Indigenous or Campesino seats)	53
The New Zealand House of Representatives	120	71 (of which 7 are Māori seats)	49
Mexican Chamber of Deputies	500	300	200

Source: Compiled by the authors from The Electoral Knowledge Network, undated – b; Instituto Nacional Electoral, 2018; Political Database of the Americas, 2010; Freedom House, 2016; ElectionGuide, 2014, October 12; 2017; *Financial Times*, 2017, September 25; The Economist, 2017, October 24; New Zealand Parliament, 2017a.

Examples from elsewhere

New Zealand

For an example of these types of elections, consider how New Zealand’s mixed electoral system allocates seats for the House of Representatives. New Zealand’s electoral system, known as Mixed-Member Proportional (MMP), asks electors to cast two votes: one for an individual to represent

Figure 5: MMP New Zealand Ballot Paper

30001

YOU HAVE 2 VOTES 30001

PARTY VOTE

Explanation
This vote decides the share of seats which each of the parties listed below will have in Parliament. Vote by putting a tick in the circle immediately after the party you choose.

Vote for only one party

	BUSINESS PARTY	<input type="radio"/>
	UNION PARTY	<input type="radio"/>
	SOCIAL DEMOCRAT PARTY	<input type="radio"/>
	HERITAGE PARTY	<input type="radio"/>
	WORKER'S LEAGUE	<input type="radio"/>
	ENVIRONMENTAL PROTECTION PARTY	<input type="radio"/>
	LIBERTY PARTY	<input type="radio"/>
	FREE TRADE PARTY	<input type="radio"/>
	FREEDOM PARTY	<input type="radio"/>
	CHATHAM ISLANDS PARTY	<input type="radio"/>
	KOTAHITANGA PARTY	<input type="radio"/>
	NZ FABIEN PARTY	<input type="radio"/>
	NZ SOCIALIST PARTY	<input type="radio"/>
	TRANSUBSTANTIATION PARTY	<input type="radio"/>

OFFICIAL MARK

ELECTORATE VOTE

Explanation
This vote decides the candidate who will be elected Member of Parliament for the AORAKI ELECTORATE. Vote by putting a tick in the circle immediately before the candidate you choose.

Vote for only one candidate

<input type="radio"/>	BROWN, John	
<input type="radio"/>	EGGERS, Fiona	
<input type="radio"/>	HENKEL, Graeme	
<input type="radio"/>	JOHNS, Wayne	
<input type="radio"/>	LADD, Karen	
<input type="radio"/>	McINNES, Mevia	
<input type="radio"/>	PERO, Jonathan	
<input type="radio"/>	STARR, Ruth	
<input type="radio"/>	WEISS, Mike	

SAMPLE

Final Directions

1. If you spoil this ballot paper, return it to the officer who issued it and apply for a new ballot paper.
2. After voting, fold this ballot paper so that its contents cannot be seen and place it in the ballot box.
3. You must not take this ballot paper out of the polling place.

Source: Electoral Commission New Zealand (2017b).

their constituency (the electoral vote) and one for a party list (the party vote). After the single-member seats are allocated, the party list votes are used to compensate for the disproportionality of the single member plurality (SMP) elections. Thus, as Norris (2004) explains, if a party receives 10 percent of the list vote but does not receive any of the single-member seats, that party is awarded list seats until their number of seats is equivalent to 10 percent of the legislature. In New Zealand, 70 seats are filled through SMP elections, while the remaining 50 seats are filled through multi-member PR. In some cases, the number of seats in the New Zealand House of Representatives can be increased because of “overhang” seats (Green, 2017; Electoral Commission of New Zealand, 2018; n.d.a; b). Overhang seats occur when a party receives more seats through the electorate vote than they would otherwise be allocated through the party vote. More specifically, an MP gains an overhang seat when he or she get more votes in their riding than their party gets at the national level. For example, if a party is entitled to six seats based on the party vote, but wins seven constituencies, then the seventh seat is called an overhang seat (Electoral Commission New Zealand, undated – a). Figure 5 provides an example of New Zealand’s ballot.

Germany

In the German Bundestag, there are 709 seats, of which 598 are statutory or fixed. Overhang and balance seats increase the number of seats in the legislature from 598 to 709. Of the statutory seats, half (299) are allocated based on the electorate vote. The remaining seats go to MPs that win by the party vote. Similar to New Zealand, in some cases overhang seats can be added to the Bundestag. However, unlike in New Zealand, “balance seats” can also be added to the Bundestag (Deutscher Bundestag, 2013; Institute for Democracy and Electoral Assistance [IDEA], 2005). The issue with “overhang” seats became apparent with Angela Merkel’s Christian Democratic Party in 2009. That year, the Christian Democratic Party won so many electorate votes that there were not enough party votes to create a legislature that was an accurate representation of the way people voted. This created 24 “overhang” seats in the Bundestag. These “overhang” seats resulted in a disproportional legislature that favoured the Christian Democratic Party. In 2012, the Bundesverfassungsgericht, the Federal Constitutional Court in Germany, declared that overhang seats are unconstitutional because of the potential for a party with more second votes (party votes) to gain fewer seats than another party with fewer second votes, and vice versa. The court also stated that it is unconstitutional to have an unlimited number of overhang seats because it infringes on the equal opportunity

for political parties to gain seats in the legislature and equality of votes. To correct this, in 2013 the court amended the Federal Electoral Act to create “balance” seats. These “balance” seats simply compensate for any disproportionality that may arise from overhang seats. In the last general election in 2017, 111 seats were added to the Bundestag. Of those 111, 46 were overhang seats and 65 were balance seats (Kirschbaum, 2009, September 23; Germany, Federal Returning Officer, 2017; Franklin, 2013, May 3; Dick, 2013, August 19; European Parliamentary Research Service Blog, 2013; Spiegel Online, 2013, September 19; Staudenmaier, 2017, September 24; Inter-Parliamentary Union, 2018, March 16; The Economist, 2017).

Mexico

In Mexico, the Chamber of Deputies has 500 seats. Of those, 300 are awarded to MPs who win by the electorate vote. The remaining 200 seats are awarded to MPs who win by the party vote (table 2). One feature of Mexico’s Chamber of Deputies that sets it apart from legislatures in other MMP systems is that it has a fixed number of seats, which prevents overhang seats being allocated (Barnes, Lithwick, and Virgint, 2016; Tribunal Electoral de Poder Judicial de la Federación, 2014; Instituto Nacional Electoral, 2018; Institute for Democracy and Electoral Assistance [IDEA], 2005; ElectionGuide, 2015, June 7). Some argue that “overhang” seats enable the seats in the legislature to be distributed proportionally. Consequently, having a fixed number of seats may result in a legislature that is not as proportional as legislatures that do have these seats (Scoop, 2008, October 22; Thomas, 2011).

Mexico uses the Hare quota to allocate seats based on the party vote (ElectionGuide, 2015, June 7; Tribunal Electoral de Poder Judicial de la Federación, 2014; Institute for Democracy and Electoral Assistance [IDEA], 2005; Revolvly, undated – b). For a party to be considered in Mexico, it must meet the threshold of at least three percent of the countrywide vote (Tribunal Electoral de Poder Judicial de la Federación, 2014). As a consequence, the use of the Hare quota means that in Mexico there is greater proportionality (compared to countries that use the Droop quota) and smaller parties have a better chance of gaining seats in the legislature because both large and small parties are treated the same (Lijphart, 1990).

Conclusion

In this paper's review of the various types of PR systems and their uses around the world, it has become clear that there are many nuances among the different PR systems that affect the outcome of elections and the party system that results. Campaign slogans that argue for proportionality may aim for high ideals of democracy, but the slogans understate the complexity of crafting a new electoral system. If the forthcoming referendum on electoral reform in British Columbia supports a move to PR, much public input and debate will be needed to determine what kind of proportional system would benefit the province. As such, reform of the electoral system will need to include an assessment of the voting formula because some calculations favour large parties, while others favour smaller parties. In addition, those who design the system will have to take into consideration whether voters will be focusing on the parties or the representatives. Before BC voters can indicate with any certainty that they favour PR, they first need to know what specific type of PR will be implemented, including the type of formula used, and they need to know if any redistricting will occur.

Like most electoral systems, the PR electoral systems discussed in this paper have advantages and disadvantages. Regimes that use the single transferrable vote as their voting system value the public being able to choose between parties and between candidates in those parties. In this system, it can be easier for independent candidates to get elected. STV has been shown to help promote women and minority group candidates. One disadvantage of this system is that the process of counting the votes takes longer than in other systems, which means that the results are not likely to be declared on the night of the election as they can be with FPTP. Further, STV systems are prone to "donkey voting." In other words, voters will simply rank candidates in the order they appear on the ballot, which does not make for informed voting decisions. They do this because in large constituencies the ballot papers can become very long, which can lead to confusion among the electorate and can also discourage voting (UK Engage, 2013b).

Proponents of PR argue that this system increases the likelihood that both women and minority groups are elected because parties benefit from providing balanced lists that appeal to a wide range of voters. However, PR

also tends to weaken the link between the MP and the constituents. This is especially the case with closed party list systems. The electorate may feel that they have no opportunity to determine which specific MP is going to represent them, and thus the accountability of the elected official is reduced (Institute for Democracy and Electoral Assistance [IDEA], 2005; UK Engage, 2013a).

Mixed member proportional is praised because voters believe that it is a system in which fewer votes are wasted. Because smaller parties have a better chance of being elected, the public can express its distaste for the incumbent government by choosing fringe parties. (In turn, in MMP, some smaller parties are allowed to be represented in the legislature.) MMP also allows the public to vote for both an individual candidate and the party of their choice. As a result, this system often reduces the dominance of one or two larger parties in the legislature. Unlike the closed party list system, MMP retains the link between the electorate and the MP. However, in cases where smaller parties have a better chance of electoral victory, some of those parties can be extremist—either on the left or on the right.

These systems often result in minority governments, which means that sometimes the smaller parties have a disproportionate impact on how the resulting government is constructed. Because minority or coalition governments are so frequent in PR electoral systems, government itself can often be unstable. Similar to STV, PR systems can sometimes create lead to long, complicated ballots, which can discourage the electorate (Thomas, 2016).

To replace British Columbia's electoral system will require trade-offs and a clear understanding of the impact that such changes will have on the way in which the votes are tallied, and what impact that might have on the legislature, the party system, and the province's political culture. The interaction of all the factors involved in changing the electoral system makes it exceedingly difficult to anticipate the likely consequences of such a change. Nonetheless, a subsequent essay in this series, *The Impact of Proportional Representation on British Columbia's Legislature and Voters*, will examine what effects a shift to PR would have for British Columbia.

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Acknowledgments

The authors thank the unidentified reviewers for their helpful comments. Any remaining errors or oversights are the sole responsibility of the authors. As the researchers have worked independently, the views and conclusions expressed in this paper do not necessarily reflect those of the Board of Directors of the Fraser Institute, the staff, or supporters.

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Date of issue

July 2018

ISBN

978-0-88975-501-7

Citation

Miljan, Lydia, and Geoffrey Alchin (2018). *Proportional Representation in Practice: An International Comparison of Ballots and Voting Rules*. Fraser Institute. <<http://www.fraserinstitute.org>>.

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