

Chapter 7

Elections in Canada, the Netherlands and Belgium

7.1 Introduction

This chapter continues with the effort to provide a unified model of the electoral process in order to account for a number of general empirical observations about the effects of political institutions. As Duverger (1954) and Riker (1953) have observed, there appears to be a relationship between the electoral rule in place, and the number of political parties in the polity. A highly majoritarian (or plurality) system tends to result in just two parties, while an electoral system based on proportional representation (PR) tends to give a fragmented political structure.¹ Many authors have also argued that there is a relationship between fragmentation and the durability of government (Taylor and Hermann 1971; Warwick 1979). Other authors have argued that these differing constitutional rules profoundly affect the nature of the policy process (Bawn and Rosenbluth 2005; Persson and Tabellini 1999, 2003), and determine whether parties tend to diverge or cluster near the electoral origin.²

It is possible that the degree of political fragmentation is a direct consequence of the details of the electoral rule, and the opportunities these provide for strategic voting in the electorate. However, the formal spatial electoral model has not, in our view, been able to offer a plausible account of this relationship. Indeed, as discussed in Chap. 5, the extensive literature on formal “deterministic” or “stochastic” vote models tend to suggest that all parties should adopt vote maximizing positions at the center of the electoral distribution.³ Such models assume an underlying symmetry in the motivations and dispositions of party leaders, and as a result they are unable to account for the extreme heterogeneity of political configurations observed by Benoit and Laver (2006), for example, in their analysis of party positions in European polities.

¹See Chap. 3.

²Dow (2001, 2011), Ezrow (2010, 2011).

³See Downs (1957), Riker and Ordeshook (1973), McKelvey and Patty (2006).

Here we consider a stochastic model of the 2004 election in Canada, and use the formal results to examine electoral equilibria for the parties. We estimate the vote margins of the low valence parties, the Greens and the New Democrat parties, and show that their vote margins are essentially negative. This implies that the various equilibria cannot be stable attractors. We argue that the leaders of the parties have no incentive to move to the equilibrium positions. We also suggest that the activists for each party provide inducements to the party to remain close to the partisan constituency position. We can then use the difference between the equilibrium positions and the partisan constituency positions as an estimate of the activist influence.

In essence, the empirical convergence coefficient for any model is a convenient measure of the electoral incentive of a small, or low valence, party to move from its estimated position to the LNE of the model. More generally, we can interpret the convergence coefficient as a measure of the centrifugal tendency exerted on parties pulling them away from the electoral mean. The estimated positions of the parties, based on the partisan constituencies of the parties, allows us to draw some inferences about the influence of activist groups in this polity.

We then compare this analysis with some observations about coalition behavior in the Netherlands and Belgium, in order obtain an estimate of the different incentives for activist groups in these three countries..

7.2 Elections in Canada

In recent history, Canadians have consistently elected more than three parties to the Federal legislature.⁴ In the current parliament, the four major parties are the Liberal Party of Canada (LPC), the Conservative Party of Canada (CP), the New Democratic Party (NDP) and the separatist Bloc Québécois (BQ). The Green Party of Canada (GPC) is a relatively new party whose support has been steadily rising over the last few years. However, since only the first-past-the-post candidate in each riding gets elected to the legislature, the Green candidates have not obtained sufficient support to win a seat in the House of Commons. Other parties, with fewer votes, have also been unable to obtain seats in Parliament.

For the last 25 years, the two major parties have fought each other to form the government. Table 7.1 gives the last four election results in Canada, while Table 7.2 give the results by province for 2004. As the Tables show, neither of these parties have been able to attain a majority in recent elections. Because the issue of Québec is so important in the last two decades of Canadian electoral history, we provide a brief sketch of political history in Canada.

⁴This section on Canada is written in collaboration with JeeSeon Jeon and Ugur Ozdemir.

Table 7.1 Canadian elections

Party ^a	2000			2004			2006			2008		
	Vote %	Seat	Seat %	Vote %	Seat	Seat %	Vote %	Seat	Seat %	Vote %	Seat	Seat %
AP	25.5	66	21.9									
PC	12.2	12	4.0									
CP				29.63	99	32.14	36.3	124	40.26	37.65	143	46.42
LPC	40.8	172	57.1	36.73	135	43.83	30.2	103	33.44	26.26	77	25.00
BQ	10.7	38	12.6	12.39	54	17.53	10.5	51	16.56	9.98	49	15.90
NDP	8.5	13	4.3	15.68	19	6.16	17.5	29	9.41	18.18	37	12.01
GPC	0.8			4.29	0	0	4.5	0	0	6.78	0	0.00
Ind				0.48	1	0.32	0.5	1	0.32	0.5	2	0.65
Total ^b	98.5	301	100	99.2	308	100	99.5	308	100	99.35	308	100

^a AP = Alliance, PC = Progressive Conservative, CP = Conservative, LPC = Liberal, BQ = Bloc Québécois, NDP = New Democratic Party, GPC = Green Party, Ind = independent

^b Other parties are not reported so total may not add to 100%

7.2.1 A Brief Political History

Back in 1983, Brian Mulroney, from Quebec, became the leader of the Progressive Conservative Party, and was able to build a grand coalition that included socially conservative populists from the West, Quebec nationalists, and fiscal conservatives from Ontario and the Maritime provinces (Prince Edward Island, Nova Scotia and New Brunswick).

Pierre Trudeau resigned as Prime Minister in early 1984, and John Turner, elected Liberal leader in the 1984 convention, succeeded Trudeau as Prime Minister and called an election for September 4, 1984.

The 1984 election marked a turning point in Canadian politics. Mulroney's highly successful campaign gave the Progressive Conservative Party their largest majority government (by total number of seats) in Canadian history.⁵ This was the last time a ruling party won more than 50% of the popular vote in Canada. The Liberals suffered their worst defeat (at the time) for a Federal governing party,⁶ mainly because they lost their century long stronghold on Québec politics.⁷ The Progressive Conservatives landslide, winning 211 seats, left the Liberals with 40 seats, the fewest in the party's history. In particular, the Liberals won only 17 seats in Québec, only four of which were outside Montreal. Eleven members of Turner's Cabinet were defeated.

⁵The Progressive Conservatives won 211 seats, three more than their previous record of 208 in 1958. They won a majority of seats in every province and territory, emerging as a truly national party for the first time since 1958.

⁶The Liberals vote share fell from 44% in 1980 to 28% in 1984.

⁷From its inception, Québec had been a stronghold of Liberal support for almost a century. In 1984, Québec supported Mulroney as he promised to get a new deal for Québec.

Table 7.2 Provincial votes (%) and seats in the 2004 Canadian election

Region	Western provinces									
	BC		AB		SK		MB		ON	
Provinces ^a										
Party ^b	Vote	Seats	Vote	Seats	Vote	Seats	Vote	Seats	Vote	Seats
CP	36.3	22	61.7	26	41.8	13	39.1	7	31.5	24
LPC	28.6	8	22.0	2	27.2	1	33.2	3	44.7	75
BQ										
NDP	26.6	5	9.5		23.4		23.5	4	18.1	7
GPC	6.3		6.1		2.7		2.7		4.4	
Ind	0.3	1			4.6				0.3	
Total ^c	98.1	36	99.3	28	99.7	14	98.5	14	99.0	106
Region	Atlantic provinces									
Provinces ^a	QC		NB		NS		PEI		NL	
Party ^b	Vote	Seats	Vote	Seats	Vote	Seats	Vote	Seats	Vote	Seats
CP	8.8		31.1	2	28.0	3	30.7	0	32.3	2
LPC	33.9	21	44.6	7	39.7	6	52.5	4	48.0	5
BQ	48.9	54								
NDP	4.6		20.6	1	28.4	2	12.5		17.5	
GPC	3.2		3.4		3.3		4.2		1.6	
Ind	0.1		0.2		0.1				0.6	
Total ^c	99.4	75	99.9	10	99.5	11	99.9	4	100	7

^a BC = British Columbia, AB = Alberta, SK = Saskatchewan, MB = Manitoba, ON = Ontario, QC = Québec, NB = New Brunswick, NS = Nova Scotia, PEI = Prince Edward Island, NL = Newfoundland and Labrador

^b AP = Alliance, CP = Conservatives, LPC = Liberals, BQ = Bloc Québécois, NDP = New Democratic, GPC = Greens, Ind = independent

^c Three seats go to the Territories

However, westerners were angry with Mulroney's government mainly because they believed that he favoured Québec, that his government lacked fiscal responsibility, and that he had failed to support institutional reform – specifically their wishes to have an elected Senate. In order to have a voice at the Federal level, Preston Manning joined discontented Western interest groups to create the Reform Party of Canada in May of 1987. Manning was the only leader of the Reform Party during its existence, 1987–2000.

By 1987, the constitutional battles between Ottawa and Québec has subsided. Mulroney's close relationship with US President Reagan helped draft the Canada-US free-trade agreement (FTA) under which all tariffs between the two countries would be eliminated by 1998. On October 4, 1988, Canada and the United States signed the FTA that was to be ratified by both countries.

The Liberals and the NDP opposed the FTA arguing that the agreement would mean the abandonment of Canada's political sovereignty to the United States and that if implemented would effectively make Canada the "51st state" of the United States. The two parties were also concerned about how Canada's social programs

and other trade agreements such as the Auto Pact would be affected by the FTA. The legislation to implement the agreement was delayed in the Senate, which had a Liberal Party majority.

Mulroney called for an election in November 21, 1988, the main issue being the Free trade Agreement. Infighting among the Liberals and vote splitting on the left of the political spectrum between the NDP and Liberals contributed to a second Progressive Conservative government with only 169 seats (and 43% of the popular vote), a loss of 42 seats. The Liberals kept their role as the Official Opposition and more than doubled their representation to 83 seats. These results were however a disappointment for Turner, who had expected a majority Liberal government. In June 1990, he officially resigned as leader of the Liberals. Even though the NDP increased its seat share it finished a distant third with only 43 seats.

During his second term, in 1989, Mulroney proposed the implementation of a national sales tax, the Goods and Services Tax (GST), that was to be introduced in 1991. The GST replaced the Manufacturers' Sales Tax (MST). Polls showed that as many as 80% of Canadians opposed the tax.

The 1990 worldwide recession greatly affected the government's finances. Mulroney's tax increases coupled with the budget problems due to the recession alienated his western conservative base. In addition, Mulroney's policies were introduced as the Bank of Canada increased interest rates to stifle inflation. Both of these policies deepened the Canadian recession. Throughout Mulroney's second term, budget deficits increased to record levels, reaching \$42 billion Canadian in his last year of office. The national debt grew to almost 100% of GDP. As the Canadian dollar weakened so did Canada's international credit rating.

At the 1990 Liberal convention, Jean Chrétien won the Liberal leadership on the first-ballot. During 1991 and 1992, Mulroney negotiated the Charlottetown Accord, which proposed extensive changes to the constitution, including recognition of Québec as a distinct society. The agreement was defeated in a national referendum in October 1992. After the failure of Meech Lake Accord, Québec Tories led by Lucien Bouchard severed their connections with the Progressive Conservative Party and in conjunction with some Québec Liberals formed a new party, the *Bloc Québécois*, a pro-sovereign party focused on independence for Québec.

By early 1993, it was clear that Mulroney had become one of the most unpopular prime ministers in Canadian history. In addition, it was widely believed that the Liberals under Jean Chrétien would win a landslide if Mulroney remained leader of the Tories. By February, his popularity had fallen so much that he saw no other choice than to resign as party leader, being replaced as Prime Minister by Defence Minister Kim Campbell on June 25, 1993. Prime Minister Campbell had less than 3 months to prepare for the October 25 election.

The uncertainty on the constitutional future of Canada after the failure of the Meech Lake and Charlottetown Accords brought about big changes at the October 25, 1993 election. First, the Liberals gained an overwhelming majority, winning 177 seats. Second, this election marked the beginning of the end of the Progressive Conservatives Party. It not only lost its majority but was almost wiped out, winning only two seats in parliament. Third, two newly formed parties gained

representation: the separatist Bloc Québécois became the Official Opposition (with 54 seats) under the leadership of Lucien Bouchard, and the western-based protest Reform Party (with 52 seats). This marked the beginning of a fractured opposition along regional lines. Fourth, the Liberals lost the support of Québec as Chrétien was one of only four Québec Liberals elected outside Montreal. Québécois never forgave Chrétien for refusing to endorse the Meech Lake Accord. Chrétien's popularity in his home province never recovered after the Liberal leadership debate.

Chrétien used his extensive knowledge of the Canadian parliamentary system, to set up a highly centralized government with a priority of dealing with the debt left by the Trudeau and the Mulroney governments. His finance minister, Paul Martin, made deep cuts at the federal level and cut transfers to the provinces. These cuts allowed the government to eliminate the \$42 billion deficit, to deliver five consecutive budget surpluses, to pay down the \$36 billion in debt, and to deliver \$100 billion in cumulative tax cuts over 5 years. The cuts affected the operations and mandates of most federal departments and forced the provinces to cut service delivery mainly in the health care sector.

The acrimony generated by the debate over Québec's distinct society brought the separatist Parti Québécois back into power in Québec in 1994. During the campaign over the referendum scheduled for October 30, 1995, Chrétien promised to reform the federal system to address Québec's long-standing concerns. A record 94% of registered voters voted in the referendum with the "No" side winning by a very slim margin of 50.56%.

The referendum generated two major controversies. The Sovereignists complained that the Federalists had violated Québec's electoral spending limits. The Federalist accused the Parti Québécois scrutineers of having discarded many 'no' ballots. Later reviews substantiated both allegations, but there were no consequences to those who had taken part.

To recognize Québec's French language, its unique culture and the use of the civil law in the province's legal system, on 8 November 1995, Chrétien tabled a bill in the House of Commons recognizing Québec as a distinct society within Canada. The bill was passed less than a month after the referendum.

The promises made by Chrétien only translated into limited reforms. This included a federal law requiring the approval of certain regions (including Québec) to amend the constitution. Chrétien's efforts concentrated instead on his "Plan B" which consisted on increasing support for federalism in Québec. The idea was to convince separatist Québécois that their sovereignty aspirations would be coupled with both economic and legal consequences.

Chrétien's popularity soared making him the most popular prime minister of the last half-century. To take advantage of his popularity and the continued division of the conservative vote, Chrétien called an early election in the spring of 1997.

However, the Progressive Conservatives had a popular new leader in Jean Charest and the New Democrats' Alexa McDonough led her party to a breakthrough in Atlantic Canada, where the Liberals had won all but one seat in 1993. In 1997, the Liberals lost all but a handful of seats in Atlantic Canada and Western Canada, but

managed to retain a bare majority government due to their continued dominance of Ontario.

For the 2000 election, Chrétien ran on his record. He emphasized that his party (1) had not only ended the era of large fiscal deficits, it was now delivering budget surpluses; (2) had substantially reduced federal spending by among other things reducing the size of the civil service as well as privatizing several crown corporations; (3) had passed new environmental regulations; and (4) had increased spending in social programs in 1998.

Chrétien won a third consecutive majority government. Not since Sir Wilfrid Laurier has a Canadian Prime minister won three consecutive majority government. The Liberals won more seats than in the 1997 election obtaining nearly as many as in the 1993 election mostly due to the Liberals' significant gains in Québec. The Liberals won 172 out of 301 seats with 42% of the vote. The Alliance Party became the Official Opposition winning 22% of the seats with 25% of the vote; electing two members from Ontario and the remaining 64 seats from Western Canada. In spite of their poor showing in Ontario, Alliance—relative to its predecessor the Reform Party – increased its seats from 60 in 1997 to 66. The other three parties, the Bloc Québécois, the New Democratic Party and the Progressive Conservatives all lost seats. Relative to the 1997 election, the Bloc lost six seats and the NDP one. The Bloc dropped from 44 seats in 1997 to 38, despite getting a larger vote share than in 1997.⁸ The Bloc managed to win more seats than the Liberals in Québec. The PCs came in third obtaining 12% of the vote, falling from 20 in 1997 to 12 seats, enough to maintain their Official Party Status. Even though PC support came mainly from the Maritime provinces, their leader Joe Clark won one of only three Alberta seats not in the hands of the Alliance Party. The Green Party did not gain representation in the Commons but rose in popularity relative to the 1997 election.

Chrétien's electoral victory brought the Liberals back to their 1993 levels in the Commons. This strengthened Chrétien's political power and he chose to stay on as leader ignoring the rising discontent with his leadership within his party, specially from Finance minister Martin's camp. In the meantime, Martin made greater inroads at taking over the party machinery and became more open in his campaign to replace Chrétien as Liberal leader. This further deteriorated the relationship between Chrétien and Martin.

The election results also showed that the Liberals' attacks on Day greatly affected the fate of the Progressive Conservatives and NDP candidates. The widely held belief was that many PC and NDP supporters fearing Day's extreme policy positions *voted strategically* for the Liberals to prevent an Alliance victory.

In spite of Chrétien's past successes and his electoral popularity, he was replaced by his long time rival, Paul Martin, as party leader, at the Liberal convention on November 14, 2003. Martin was sworn as prime minister on December 12, 2003.

⁸This was mainly the result of the Liberals winning in several major Québec cities (Montreal, Quebec City and Hull/Gatineau) where forced mergers had taken place leading to electoral rezoning.

This contest within the Liberal Party gave Alliance and Progressive Conservatives hope of winning the next election. After long deliberations, on 15 October 2003, the new PC leader Peter MacKay and Alliance leader Stephen Harper announced their merger agreement. Ratification by the two parties led to the creation of the new *Conservative Party (CP)* on December 7, 2003. Some prominent PC members refused to join the new party. Harper became the new CP leader on March 20, 2004.

On February 10, 2004, the Sponsorship scandal over Québec independence erupted. The Liberals' ratings plummeted, specially in Québec, but were still above those of the new CP. In May 2004, the governing Ontario Liberal party reneged on their campaign promise not to raise taxes. This hurt the Federal Liberals as Ontarians had been their major support base in the 1993, 1997 and 2000 elections. On May 22, Martin was forced to call an election for June 28, 2004, forcing him to face Harper, the new leader of the new Conservative Party.

7.2.2 The Election of 2004

During the 2004 electoral campaign, pre-election polls showed the Liberals and Conservatives neck-in-neck. By mid-campaign the CP was slightly ahead of the Liberals. While some argued that the election was too close to call, others thought that a minority CP government was possible. The Conservatives, however, made two major mistakes. They accused Prime Minister Martin of being soft on child pornography. Ralph Kline, the PC premier of Alberta, announced that his government was considering a two-tier health care system. The Liberals and many Canadians reacted strongly against both issues. The Liberals' campaign portrayed Harper as an extreme right-wing Conservative and encouraged NDP-supporters to vote strategically.

The Liberals (LPC) under Martin won a plurality in the 2004 election with 135 (44%) seats out of 308, down 37 from the 2000 election becoming the first minority government since 1979. Martin's government was informally supported by the NDP. Relative to the 2000 election, the Liberals lost votes in Ontario and Québec. They won 75 out of 106 Ontario seats in 2004 (down from 100 out of 103 in 2000) and won 21 out of 75 Québec seats in 2004 (down from 36 out of 75 in 2000). Even though they held onto the 14 seats they had in the Western provinces since 2000, the distribution changed, with a gain in British Columbia and a loss in Manitoba.⁹

The Conservatives won the second largest number of seats, winning more seats (99) than the combined seats of its two predecessors in 2000 (Alliance 66 and PC 12). Its vote share (29.63%) was, however, lower than that of its predecessors combined (Alliance 25.5% and PC 12.2%). Their support remained concentrated in Western Canada and in spite of making some progress in Ontario, gaining 24 seats,

⁹See Table 7.2.

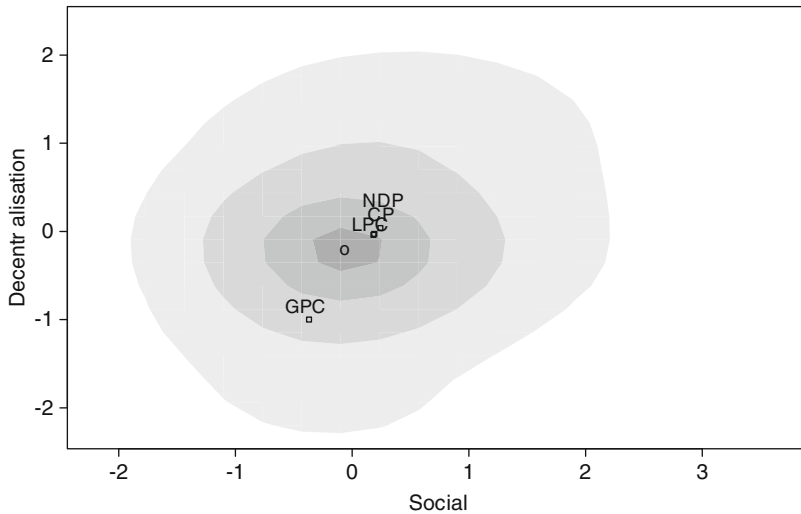


Fig. 7.1 The electoral distribution in Canada without Québec in 2004, with party positions estimated by voter means

they failed to make in roads in Québec and the Atlantic Provinces. It is clear from Table 7.1 that although Canada has a plurality electoral system, in the sense that the major parties are electorally advantaged, it is not as majoritarian as the United States.

We used a survey obtained by Blais et al. (2006).¹⁰ Because the Bloc Québécois (BQ) only contested the election in Quebec, we divided the sample into those who were in Canada outside Quebec, and those in Quebec. Table 7.5, in Appendix 1 to this chapter, gives the voting data for 2004 in these two regions, while Table 7.6 gives the sample vote shares for the two regions. Tables 7.7, 7.8, in Appendix 1, give details of the two-dimensional factor analysis, giving two policy dimensions, one a socio-economic dimension and one defined by decentralization. We adopted the notion of *partisan constituencies*, as used in Chap. 6, and estimated party positions by taking the average of the positions of those voters who chose each of the five parties in Canada. For the Bloc Québécois we used the average of voter positions in Québec. Figures 7.1 and 7.2 show the electoral distributions in Canada without Québec and in Canada for 2004, together with estimates of the party positions.¹¹

The descriptive statistics for the regions and the parties are given in Tables 7.9, 7.10 and 7.11.

¹⁰The survey data are available at <http://ces-ec.mcgill.ca/surveys.html>.

¹¹The social dimension is represented as the x-axis and the decentralization dimension is represented as the y-axis. The electoral distributions in these figures are smoothed. We use CP for the Conservative Party, LPC for the Liberal Party, NDP for the new Democrat Party, GPC for the Greens, and BQ for the Bloc Québécois.

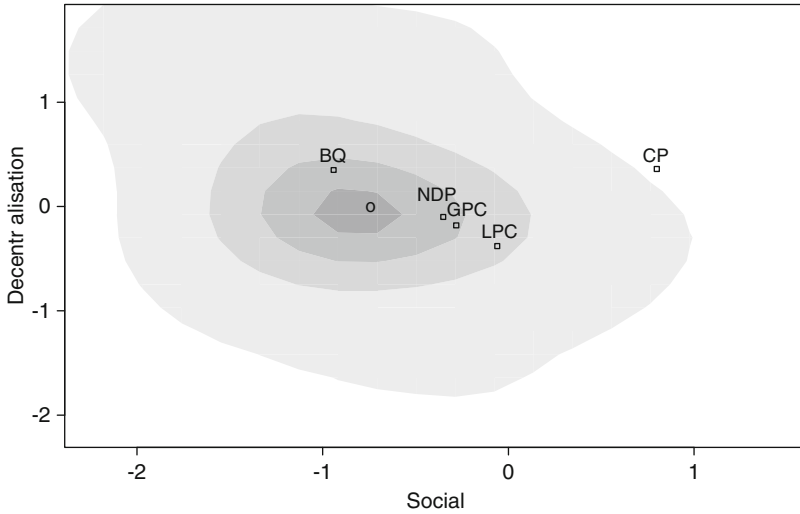


Fig. 7.2 The electoral distribution in Québec in 2004, with party positions estimated by voter means

Table 7.12 gives the pure spatial, sociodemographic and joint models outside Quebec, while Table 7.13 gives the three models for Quebec.¹² Tables 7.14 and 7.15 compare the log likelihoods of the various models.

For 2004 the estimated party positions are given by the vector

$$\mathbf{z}^* = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} & \text{BQ} \\ x\text{-axis} & -0.35 & -0.27 & -0.06 & 0.8 & -0.94 \\ y\text{-axis} & -0.10 & -0.18 & -0.38 & 0.36 & 0.34 \end{bmatrix}.$$

Appendix 2 to this chapter gives the details of the computations of equilibria in the two regions, and shows that the convergence coefficient for the model in Canada without Québec was $c^{C/Q} = 2.55$, with a 95% bounds of [2.01, 3.07]. The theory then implies that the joint mean cannot be an LNE.

By simulation, the equilibrium of the pure spatial model outside Québec was found to be:

$$\mathbf{z}_s^{C/Q} = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} \\ \text{Social} & 0.50 & -0.36 & 0.24 & 0.23 \\ \text{Decent} & 0.30 & -1.29 & -0.02 & -0.03 \end{bmatrix}.$$

However, since this sample mean outside Québec was $\mathbf{z}_0^{C/Q} = (0.264, -0.02)$, after renormalization we obtain

¹²In these tables we include the Akaike (AIC) and Bayesian (BIC) Information Criteria. Lower values indicate better model performance.

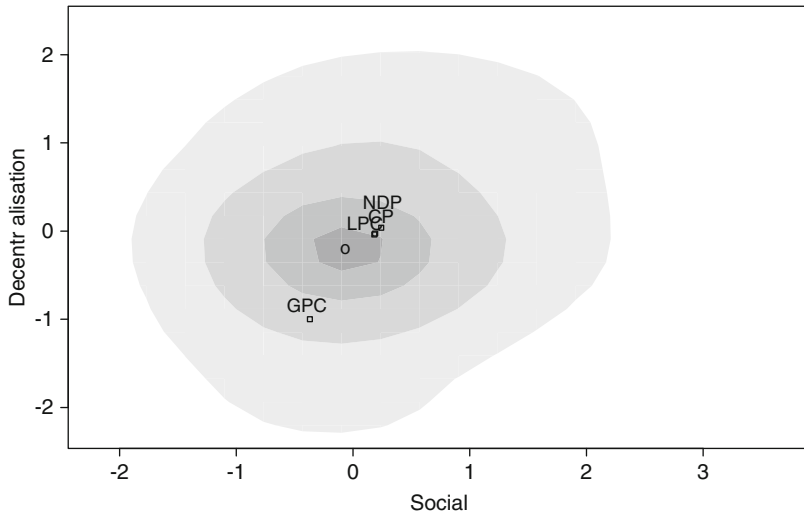


Fig. 7.3 A simulated equilibrium in Canada without Québec, starting from the estimated party positions

$$\mathbf{z}_{os}^{C/Q} = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} \\ \text{Social} & 0.236 & -0.624 & -0.024 & -0.034 \\ \text{Decent} & 0.32 & -1.27 & 0 & 0.01 \end{bmatrix}.$$

These estimated equilibrium positions outside Québec are shown in Fig. 7.3. Note that the estimated equilibrium $\mathbf{z}_s^{C/Q}$ and the joint electoral mean, $\mathbf{z}_0^{C/Q}$, are quite different, as shown by the vector $\mathbf{z}_{os}^{C/Q}$.

Notice that the high valence parties, CP and LPC are located close to the electoral mean. Appendix 2 shows that the major eigenvector of the Hessian of the Green party’s vote share function at the joint electoral mean was (1.0, 1.22). Theory suggests that the positions of the low valence parties, the GPC and the NDP, given by $\mathbf{z}_{os}^{C/Q}$ will be approximately aligned with this eigenvector. This can be seen to be the case.

Since the electoral model is stochastic it involves a degree of risk. As in Chap. 6, we define the *vote margin* of a party to be the difference between the low vote share (at the 95% level) given by the LNE and the sample vote share. If the vote margins of the low valence parties are positive then this is an indication of their incentive to move their policy positions to the equilibrium. Again, we say a LNE is a *stable attractor* if the vote margins of the small parties are positive. We now show that none of the LNE in these models are stable attractors.

The predicted vote shares at the joint mean, $\mathbf{z}_0^{C/Q}$, are computed in the Appendix and shown to be:

$$(\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC})^{C/Q} = (0.36, 0.368, 0.23, 0.042).$$

The vote shares of these four parties at the equilibrium $\mathbf{z}_s^{C/Q}$ were determined by simulation to be

$$(\rho_{CP}^*, \rho_{LPC}^*, \rho_{NDP}^*, \rho_{GPC}^*)^{C/Q} = (0.35, 0.36, 0.23, 0.06).$$

These compare with the sample vote shares outside Québec of

$$(s_{CP}, s_{LPC}, s_{NDP}, s_{GPC})^{C/Q} = (0.372, 0.371, 0.216, 0.041),$$

as shown in Table 7.6. The four way actual vote shares outside Québec were

$$(v_{CP}, v_{LPC}, v_{NDP}, v_{GPC})^{C/Q} = (0.373, 0.382, 0.196, 0.049)$$

as shown in Table 7.5.

The lower 95% bound on $\rho_{GPC}^{*C/Q}$ was estimated to be 0.043, and the lower vote margin was therefore just 0.02. For the NDP, the low estimate of $\rho_{NDP}^{*C/Q} = 0.165$ is below that of its sample vote share of 0.216. We thus infer that the GPC has some incentive to locate at the equilibrium position given by $\mathbf{z}_s^{C/Q}$, but the NDP has no such incentive. By our definition, this LNE is not a stable attractor.

We also found a second LNE, as shown in Fig. 7.4:

$$\mathbf{z}_{os}^{C/Q} = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} \\ \text{Social} & 0.20 & 1.007 & -0.117 & -0.13 \\ \text{Decent} & -0.13 & 0.84 & -0.04 & -0.05 \end{bmatrix}$$

with similar vote shares to the above.

In Québec, the theoretical analysis showed that the convergence coefficient $c^Q = 1.00$, but with 95% bounds on c^Q of [0.45, 1.60]. Simulation verified that the equilibrium was one with all parties at the electoral mean, namely $(-0.75, 0.05)$. Using this model the predicted vote shares at the joint mean are:

$$\rho^Q = (\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC}, \rho_{BQ})^Q = (0.16, 0.25, 0.08, 0.03, 0.48).$$

The sample vote shares in Québec are

$$(s_{CP}, s_{LPC}, s_{NDP}, s_{GPC}, s_{BQ})^Q = (0.094, 0.244, 0.083, 0.028, 0.55)$$

and the actual vote shares are

$$(v_{CP}, v_{LPC}, v_{NDP}, v_{GPC}, v_{BQ})^Q = (0.088, 0.339, 0.046, 0.032, 0.489)$$

The lower 95% bound on ρ_{GPC} and ρ_{NDP} were found to be 0.01 and 0.05, respectively, both of which are below the sample shares. Since these vote margins are negative, we again find that, according to the pure spatial model, neither the

GPC nor the NDP in Québec have any incentive to move from there constituency positions in order to increase vote share. By our definition, this equilibrium is not a stable attractor.

Tables 7.12 and 7.13, model (2), give the pure sociodemographic (SD) model for Canada outside Québec and for Québec. The only sociodemographic characteristic that has any significant effect outside Québec is education. In Québec only age for the BQ and the NDP is significant, and only at the 0.05 level. (The coefficients on age are almost the same for all parties).

The results for the joint model in Tables 7.12 and 7.13 (model 3) show that the β -coefficient is similar to that in the pure spatial model. Age has a similar but weak effect to that in the sociodemographic model. The Bloc’s valence is positive in this model and the only one significantly different from zero and thus significantly different from that of the Liberals and the other parties. The log-likelihood tests given in Tables 7.13 and 7.15. show that the joint models improve upon the pure spatial and sociodemographic models both in Canada outside Québec and inside Québec.

Although the *joint* models give better predictions of voter choice, there is almost no impact on the equilibria of the models. To see this, the equilibrium positions outside Québec for the spatial sociodemographic model, as obtained by simulation are:

$$\mathbf{z}_{ss}^{C/Q} = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} \\ \text{Social} & 0.49 & -0.34 & 0.22 & 0.25 \\ \text{Decent} & 0.33 & -1.24 & -0.07 & -0.01 \end{bmatrix}$$

while the predicted vote shares of these four parties at the equilibrium are estimated to be

$$(\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC})_{ss}^{C/Q} = (0.35, 0.37, 0.23, 0.05).$$

Again this LNE cannot be a stable attractor See Figures 7.3 and 7.4 for two estimated LNE.

In Québec the joint equilibrium is only slightly perturbed from the joint mean:

$$\mathbf{z}_{ss}^Q = \begin{bmatrix} \text{Party} & \text{NDP} & \text{GPC} & \text{LPC} & \text{CP} & \text{BQ} \\ \text{Social} & -0.74 & -0.50 & -0.78 & -0.72 & -0.75 \\ \text{Decent} & 0.06 & -0.05 & 0.02 & 0.14 & 0.06 \end{bmatrix}.$$

The estimated vote shares are:

$$(\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC}, \rho_{BQ})_{ss}^Q = (0.17, 0.25, 0.08, 0.03, 0.47).$$

The estimated vote margins again suggest that the leaders of the two low valence parties have no incentive to move to the equilibrium positions.

We can also use the difference between the equilibrium positions and the partisan constituency positions as an estimate of the centrifugal tendency pulling the parties away from the equilibria.

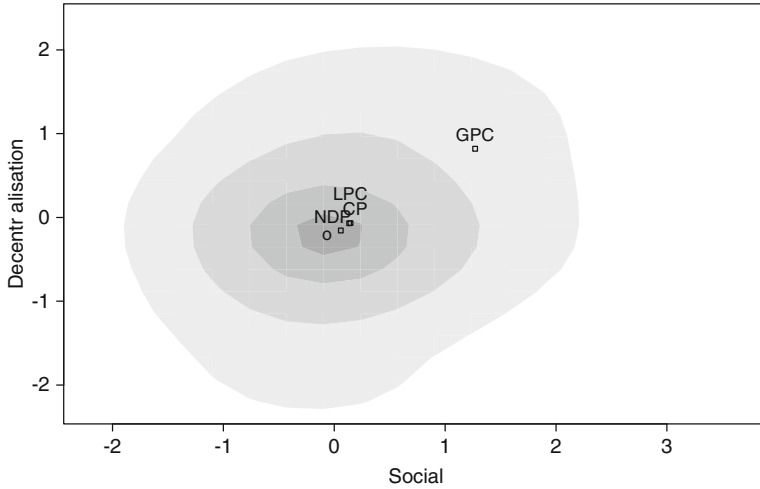


Fig. 7.4 A second simulated equilibrium in Canada without Québec, starting from the electoral origin

Comparing the estimated positions with the equilibrium positions (taking the equilibrium position for BQ to be the one in Québec) gives the following:

$$\mathbf{z}^* = \begin{bmatrix} \textit{Party} & \textit{NDP} & \textit{GPC} & \textit{LPC} & \textit{CP} & \textit{BQ} \\ \textit{Social} & -0.35 & -0.27 & -0.06 & 0.8 & -0.94 \\ \textit{Decent} & -0.10 & -0.18 & -0.38 & 0.36 & 0.34 \end{bmatrix},$$

$$\mathbf{z}_{ss}^C = \begin{bmatrix} \textit{Party} & \textit{NDP} & \textit{GPC} & \textit{LPC} & \textit{CP} & \textit{BQ} \\ \textit{Social} & 0.49 & -0.34 & 0.22 & 0.25 & -0.75 \\ \textit{Decent} & 0.33 & -1.24 & -0.07 & -0.01 & 0.06 \end{bmatrix},$$

so

$$[\mathbf{z}^* - \mathbf{z}_{ss}^C] \simeq \begin{bmatrix} \textit{Party} & \textit{NDP} & \textit{GPC} & \textit{LPC} & \textit{CP} & \textit{BQ} \\ \textit{x-axis} & -1.84 & 0.07 & -0.26 & 0.55 & -0.19 \\ \textit{y-axis} & -0.43 & 1.06 & -0.31 & 0.37 & 0.28 \end{bmatrix}.$$

The magnitudes in $\mathbf{z}^* - \mathbf{z}_{ss}^C$ indicate in which directions parties are pulled away from the equilibrium positions towards those favored by the party supporters. The NDP is pulled towards a position involving an increase in social policies and less decentralization (as is expected of a social democratic party). The BQ and the CP are pulled towards more decentralization. This is to expected of a separatist party, the BQ. Moreover, the main base of support of the CP is Alberta where it gains over 60% of the vote,¹³ and the voters want more control over their natural resources.

¹³See Table 7.2.

7.2.3 *Elections After 2004*

In 2004, economic growth was strong, with consumer spending growing at 4.8% and exports at 6.3%,¹⁴ so economic differences were not profound. Nonetheless, scandals over corruption and sponsorship forced an election on January 23, 2006. The Conservative Party won a plurality of seats (40.5%) or 124 out of 308, with 36.3% of the votes. Stephen Harper of the Conservative Party became the 22nd Prime Minister of Canada, leading a minority government with the (informal) support of the Bloc Québécois. However, this support proved quite unpopular among the BQ activists in Quebec, and the BQ began to oppose the Conservatives on issues such as the environmental and the military role in Afghanistan.

Stéphane Dion had become leader of the Liberals before the election, after a close fought leadership fight. Unwilling to force the country to a new election, he also provided support to the Conservatives in the House of Commons. However, in the election of October 2008, the Conservatives increased the seats they controlled to 143 (46% of the total) with a slight increase of the vote share to 37.6%, while the Liberals dropped to 77 seats from 103.¹⁵ This led to a minority Conservative government, and shortly after, to the resignation of Dion. On December 10, Michael Ignatieff was formally declared the interim leader in a caucus meeting, and his position was ratified at the party's May 2009 convention.

The government changes between 2004 and 2006 can be illustrated by the legislative hearts in Figs. 7.5 and 7.6 after these two elections. We can see the nature of bargaining over coalition government by joining the median lines between pairs of parties that pivot between majority coalitions after the election. When these medians do not intersect, then they bound a compact, star shaped set known as the "heart."¹⁶ These medians can be associated with various possible winning coalitions, and Schofield (1999) has suggested that coalition outcomes will lie within the heart.

For example, Fig. 7.5 shows the heart after the 2004 election, using the estimates of partisan constituency positions. As the figure indicates, the LPC formally required the Bloc to secure a majority, while the CP together with the NDP and BQ constituted a majority. The LPC and NDP minority government seemed a reasonable compromise because of the proximity of the two parties. In 2006, as Fig. 7.6 indicates, the increase in the number of seats controlled by the CP meant that it could form a government with the support of the Bloc. In 2008, the NDP increased its representation to 37 seats, sufficient to be able to join in a majority coalition with the LPC and BQ.

¹⁴(<http://www.fin.gc.ca/econbr/ecbr04-07-eng.asp>).

¹⁵See Blais et al. (2006) for a detailed discussion of the changes in voter perception of Harper.

¹⁶More precisely, the heart is the set in the policy space which is bounded by all the median lines through pairs of parties. A median line is a line through the positions, $\{x, y\}$ of two parties such that a majority of the seats are controlled by the coalitions on either side of the line and including the parties at x and y . If all median lines intersect then this intersection defines the core.

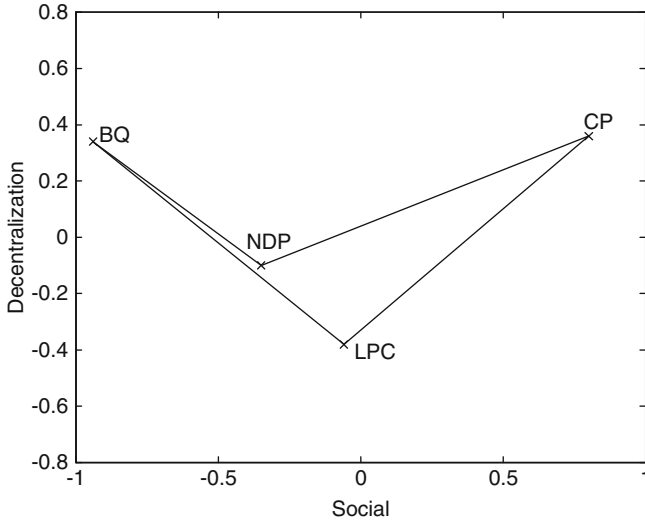


Fig. 7.5 The heart in Canada in 2004

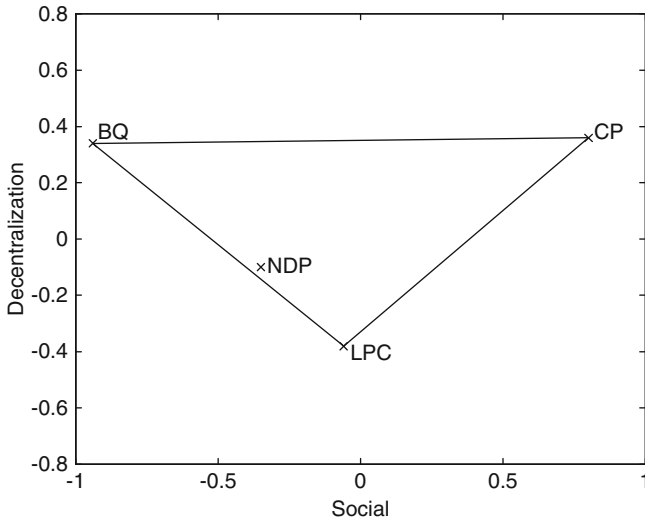


Fig. 7.6 The heart in Canada in 2006

Notice that regional preferences, over issues such as Québec in Canada, allows small parties, such as the Bloc Québécois, to survive. Plurality rule, of the Westminster variety, means that the New Democratic Party, with 250,000 votes (17%) obtained only 9% of the seats, while the Green Party of Canada, with over 660,000 votes (or 4.5%) could gain no seats. This regionalism, or differential valences in different Provinces may be the fundamental reason why no party has

been able to obtain a majority in past elections. In the surprise election of May 2011 however, the CP won 39.6% of the vote and a majority of 167 seats (54%) out of 308. Over time we might expect election results to become more complex, reflecting changes in the political configuration.

In the next two section we examine the hearts in two much more fragmented polities, the Netherlands and Belgium.

7.3 Elections in the Netherlands in 2003 and 2006

We now consider an election in the Dutch Parliament after the elections of 2003 and 2006. Table 7.3 show the vote shares and party strengths in these elections, while Fig. 7.7 shows the heart, based on the party strengths and positions in 2006, as estimated by Shikano and Linhart (2007). The coalition government of {CDA, VVD, D'66} had broken up on 29 June 2006 over the so-called “Ayaan Hirsi Ali affair” when the D'66 pulled out of the coalition, leading to a minority caretaker government of the right wing parties {CDA, VVD} with only 72 seats, out of 150, installed on 7 July.

After the election in November 2006, a coalition {CDA, PvdA, CU}, with 80 seats, was formed on 7 February 2007, under the leadership of Christian Democrat Jan Peter Balkenende. Although this coalition might seem fairly unusual, being a combination of parties with a religious basis and the Labor party, it is compatible with the notion of the heart.

As Shikano and Linhart (2007) note, with 10 parties there are over 500 possible winning coalitions. While the heart does not give a precise prediction of which coalition will form, it provides clues over the complex bargaining calculations that

Table 7.3 Votes and seats in the Dutch Parliament 2003 and 2006

Party	2003			2006		
	Vote%	Seats	Seat%	Vote%	Seats	Seat%
Christian Union (CU)	2.1	3	2.0	4.0	6	4.0
Christian Appeal (CDA)	28.6	44	29.3	26.5	41	27.3
Green Party (GL)	5.1	8	8.7	4.6	7	4.7
Labor (PvdA)	27.3	42	28.0	21.2	33	21.3
Labor for Animals (PvdD)				1.8	2	1.3
Left Liberals (D'66)	4.1	6	4.0	2.0	3	2.0
Liberals (VVD)	17.9	28	1	14.7	22	14.7
Lijst Pim Fortuyn	5.7	8	5.3			
Party for Freedom (PVV)				5.9	9	6.0
Protestant Party (SGP)	1.6	2	1.3			
Reformed Party (SGP)				1.6	2	1.3
Socialists (SP)	6.3	9	6.0	16.6	25	17.3
Other	1.0			1.0		
Total	100	150	100	100	150	100

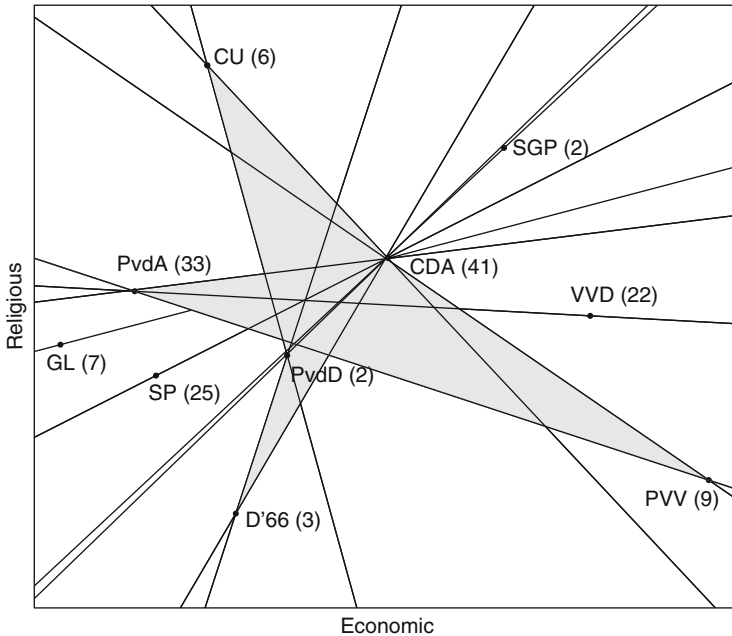


Fig. 7.7 Party positions in the Netherlands in 2006

policy-motivated party leaders are faced with when attempting to form majority coalitions in polities based on proportional representation (PR). In particular, because of the conflict that the affair generated between the VVD and D'66, the {CDA, PvdA, CU} coalition is one of the few possible viable coalitions. Even so, it took over 6 months of negotiation before the coalition parties could agree. The coalition fell apart on February 20, 2010, after the Labor Party demanded that the government reject NATO's request to extend its military mission in Afghanistan.

We now discuss a possible reason why there are so many parties in a polity such as the Netherlands, with an electoral system based on proportional representation. First note that the configuration of the four parties {PvdA, D'66, CDA, VVD} is similar in 1977 and 2006. Moreover, the positions of these four parties were estimated for 1977 using means of party activists. We hypothesize that each of the ten parties in Fig. 7.7 is located close to the preferred positions of a coalition of party activists. The theoretical question is: why do these activist groups not coalesce into a smaller number of groups, thus reducing the number of parties in the polity. Figure 7.7 suggests why coalescence is irrational. Even a small party like the Christian Union is located on the boundary of the heart. The coalition theory of the heart, proposed by Schofield (1999 2007b), and defined earlier in this chapter, suggests that this party can therefore assign some probability that it may join the governing coalition, and influence policy to its advantage. Thus the activist group supporting the CU may expect some gain from the political game.

Obviously under a strong majoritarian system, such as the United States, the small parties would gain no representation, unless they were geographically

concentrated, and this aspect of the electoral process would force them to coalesce. We now briefly consider the even more fragmented polity of Belgium.

7.4 Elections in Belgium

Belgium is confounded by the split between French and Flemish speaking regions, and by the consequent extreme fragmentation of its polity.

The parties in 2003 included the Christian Democratic and Flemish Party (CD&V) with 21 seats and the Reformist Movement (MR) with 24 seats. The liberal party, the Volksunie, split into a nationalist wing (VLD) and a more federalist component, the Flemish Block (VB). The green parties (including Ecolo) only won four seats. The other small parties were the New Flemish Alliance (N-VA) with one seat and the Humanistic Democratic Center (CDH) with 8, and the National Front (FN). The Flemish Socialist Party (SP) formed an alliance with a faction, Spirit (Sp), and together they won 23 seats. Assuming that the Socialist Party (PS) and the alliance, SPSP, were at distinct positions gives the heart for 2003, as shown in Fig. 7.8. This illustrates the complex coalition possibilities as a result of the high degree of fragmentation.

Table 7.4 shows the election results in the election of 10 June 2007. The CD&V, under Yves Leterme, formed an alliance with the N-VA and won 30 seats (out of 150), becoming the largest party in the Parliament. After a month of negotiation, King Albert II asked Yves Leterme, to be *formateur* of a coalition government. Leterme found this impossible, and resigned from the task on 23 August. Belgium was without a government for 6 months. Eventually, Guy Verhofstadt, of the VLD, was able to put together a transitional government. This was approved by Parliament

Table 7.4 Votes and seats in the Belgium Parliament 2007 and 2010

Party	2007			2010		
	Vote%	Seats	Seat%	Vote%	Seats	Seat%
New Flemish Alliance (N-VA)	18.5	30*	20	17.4	27	18
Christian Democrat (CD&V)				10.8	17	11
Socialist Party (PS)	10.9	20	13	13.7	26	17
Socialist Party (Flemish) (SP)	10.3	14	9	9.2	13	9
Reformist Movement (MR)	12.5	23	15	9.3	18	12
Flemish Liberals and Dem (VLD)	11.8	18	12	8.6	13	9
Flemish Bloc (VB)	12.0	17	11	7.8	12	8
Humanist Center (CDH)	6.1	10	7	5.5	9	6
Ecolo	5.1	8	5	4.8	8	5
Green (G)	4.0	4	3	4.4	5	3
List Dedecker (LD)	4.0	5	3	2.3	1	–
Others	5.0	1	–	6.0	1	–
Total		150	100	100	150	100

*Coalition of CD&V and N-VA

on 23 December, and lasted until March 20, 2008. Leterme was then sworn in as Prime Minister, leading a coalition of CD&V (with the N-VA), together with the VLD, and the francophone MR, PS and CDH. A financial scandal forced Leterme, along with his government, to resign on 19 December 2008. Herman Van Rompuy of the CD&V was then appointed as Prime Minister. However, in November 2009, Van Rompuy was selected to become the first President of the European Council, and Leterme once again become Prime Minister. In April 2010, the VLD left the coalition because of failure to resolve the constitutional crisis involving Dutch-speaking Flanders and francophone Wallonia. The result of the June 2010 election was somewhat similar to the one in 2007, except that the CD&V and N-VA contested the election as separate parties, with the N-VA, under Bart de Wever, winning in Flanders. As of June 2011, no government has been able to form. The hearts for 2007 and 2010 are similar to that of 2003, and suggest why it is very difficult to form a government coalition.

7.5 Concluding Remarks

A standard way of estimating political fragmentation is in terms of the *effective number of party vote strength* (*env*) or *effective number of party seat strength* (*ens*).¹⁷ The fragmentation in votes and seats is captured by the fact that in the Netherlands in 1977 both *env* and *ens* were equal to 4.2 but had increased to 8.3 in 2006. In Belgium in 2010 the *env* and *ens* were about 10.0.

For Canada we have computed the convergence coefficient to lie in the range [1.26, 2.04] in 2004. However, the Canadian electoral system benefits the high valence parties, such as the Conservative and Liberal Parties, over smaller parties such as New Democratic Party and Green Party. On the other hand, the pure spatial model indicated that Bloc Québécois had very high valence in Quebec, and this high valence allowed it to obtain a significant share of the seats in that province, gaining a much higher share of the seats than its vote share warranted. Between the elections of 2004 and 2008, the *env* for all of Canada increased from 4.0 to 4.1, while the *ens* increased from about 3.1 in 2004 to 3.4 in 2006 and 3.5 in 2008. Since the *ens* and *env* were much lower in Canada than in the Netherlands and Belgium, we conjecture that the proportional electoral systems of the Netherlands and Belgium facilitates interest group fragmentation (see Figures 7.7 and 7.8).

Even though the valence model indicates that the parties should converge towards the electoral mean in Britain, activists appear to pull the parties apart. We conjecture that the tendency towards activist group coalescence in Canada is weaker than in the strongly majoritarian electoral systems of the United States and the United Kingdom, but stronger than in the proportional electoral systems of the Netherlands

¹⁷As in Chap. 3, fragmentation can be identified with the *effective number* (Laakso and Taagepera 1979). That is, let H_v (the Herfindahl index) be the sum of the squares of the relative vote shares and $env = H_v^{-1}$ be the *effective number of party vote strength*. In the same way we can define *ens* as the effective number of party seat strength using shares of seats.

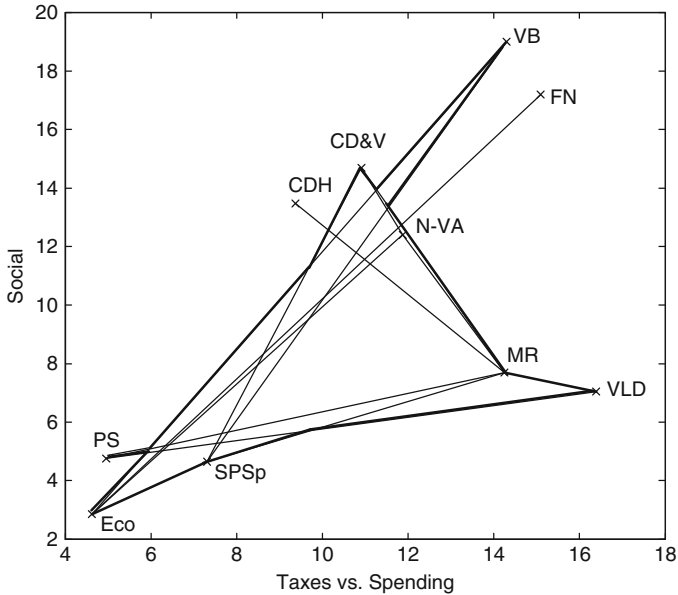


Fig. 7.8 The heart in Belgium in 2003

and Belgium, and much stronger than in the highly fragmented, proportional polities of Poland, Israel and Turkey, which we examine in Chaps. 8 and 10, respectively.

This argument suggests that inferences made by Riker (1980, 1982a, 1986) on the degree of political instability depends on the influence that activist groups can exert in polities with different electoral systems. We discuss this further in the concluding remarks to Chap. 10.

Appendix 1: Tables for Canada

Table 7.5 Votes and percentages by region in the 2004 Canadian election

Party ¹	Canada		Canada w/o Québec		Québec	
	Vote	% Vote	Vote	% Vote	Vote	% Vote
CP	4,013,491	29.66	3,711,952	36.78	301,539	8.77
LPC	4,967,361	36.71	3,801,716	37.67	1,165,645	33.90
BQ	1,680,109	12.42			1,680,109	48.87
NDP	2,117,794	15.65	1,959,367	19.41	158,427	4.61
GPC	580,845	4.29	472,185	4.68	108,660	3.16
All other parties	171,654	1.27	147,779	1.46	23,875	0.69
Total	13,531,254	100.00	10,092,999	100.00	3,438,255	100.00

¹CP = Conservatives, LP = Liberals, BQ = Bloc Québécois, NDP = New Democratic, GPC = Green Party

Table 7.6 2004 Sample vote shares

Party ¹	Canada		Canada w/o Québec		Québec	
	Votes	%	Votes	%	Votes	%
CP	262	31.26	245	37.23	17	9.44
LPC	288	34.37	244	37.08	44	24.44
BQ	99	11.81			99	55.00
NDP	157	18.74	142	21.58	15	8.33
GPC	32	3.82	27	4.10	5	2.78
Total	838	100.00	658	100.00	180	100.00

¹CP = Conservative, LP = Liberal, BQ = Bloc Québécois, NDP = New Democratic Party, GPC = Green Party

Table 7.7 Weighting coefficients for Canada

Components	Social
How much do you think should be done to reduce the gap between the rich and the poor ?(1 = much more, 5 = much less)	0.318
How much do you think should be done for women? (1 = much more, 5 = much less)	0.334
How much do you think should be done for quebec? (1 = much more, 5 = much less)	0.313
Only the police and the military should be allowed to have guns. (1 = strongly agree, 7 = strongly disagree)	0.204
As you may know, Canada decided not to participate in the war against Iraq. Do you think this is a good decision (1 = good decision, 5 = bad decision)	0.244
In politics people sometimes talk of left and right. Where would you place yours. (0 = left, 10 = right)	0.292

Table 7.8 Weighting coefficients for Canada

Components	Decentralization
The welfare state makes people less willing to look after themselves. (1 = strongly agree, 4 = strongly disagree)	-0.063
The government should: 1 = see to it that everyone has a decent standard of living, 2 = leave people to get ahead on their own	0.149
If people can't find work in the region where they live, they should move to where the jobs are ? (1 = strongly agree, 7 = strongly disagree)	0.389
How much do you think should be done for quebec? (1 = much more, 5 = much less)	0.050
In general, which government looks after your interests better, the federal government or the provincial government? (1 = federal government, 3 = provincial government)	0.882

Table 7.9 Descriptive statistics by region

Variable	Canada (<i>n</i> = 838)				
	Mean	Median	SD	Min	Max
Social	0.046	-0.061	1.027	-2.303	3.779
Decentralization	-0.004	-0.09	1.013	-2.359	2.441
Age	50.187	50	15.797	18	89
Female	0.505	1	0.500	0	1
Education	7.154	7	2.101	1	11
	Canada outside Québec (<i>n</i> = 658)				
Social	0.264	0.167	0.985	-2.303	3.779
Decentralization	-0.020	-0.214	1.036	-2.359	2.441
Age	50.606	50	15.505	19	89
Female	0.505	1	0.500	0	1
Education	7.128	7	2.099	1	11
	Québec (<i>n</i> = 180)				
Social	-0.750	-0.762	0.745	-2.302	1.521
Decentralization	0.052	0.014	0.927	-2.220	1.845
Age	48.656	48	16.779	18	84
Female	0.506	1	0.501	0	1
Education	7.250	7	2.114	2	11

Table 7.10 Descriptive statistics by Party

Variable	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max
	Liberals (LPC)					Conservatives (CP)				
	Canada (<i>n</i> = 288)					Canada (<i>n</i> = 262)				
Social	-0.056	-0.110	0.781	-2.047	2.372	0.803	0.723	1.034	-1.554	3.779
Decen	-0.379	-0.358	1.036	-2.359	2.15	0.355	0.155	0.912	-2.167	2.441
Age	53.146	53	15.204	18	86	50.401	50	16.016	21	89
Female	0.524	1	0.5	0	1	0.458	0	0.499	0	1
Educ	7.326	8	2.116	2	11	6.863	7	2.078	1	11
	Canada outside Québec (<i>n</i> = 244)					Canada outside Québec (<i>n</i> = 245)				
Social	0.007	-0.006	0.772	-2.047	2.372	0.883	0.829	1.000	-1.555	3.779
Decen	-0.344	-0.358	1.067	-2.359	2.150	0.385	0.176	0.925	-2.167	2.441
Age	52.799	53	14.483	19	86	50.612	50	15.856	21	89
Female	0.512	1	0.501	0	1	0.461	0	0.5	0	1
Educ	7.385	8	2.071	3	11	6.804	7	2.079	1	11
	Québec (<i>n</i> = 44)					Québec (<i>n</i> = 17)				
Social	-0.404	-0.536	0.747	-1.555	-1.521	-0.347	-0.589	0.839	-1.554	1.456
Decen	-0.574	-0.351	0.822	-2.179	1.075	-0.080	-0.025	0.548	-0.85	0.992
Age	55.068	56	18.788	18	84	47.353	44	18.425	22	78
Female	0.591	1	0.497	0	1	0.412	0	0.507	0	1
Educ	7	7	2.353	2	11	7.706	9	1.961	4	11
	New Democratic Party (NDP)					Greens (GPC)				
	Canada (<i>n</i> = 157)					Canada (<i>n</i> = 32)				
Social	-0.345	-0.374	0.756	-2.303	2.396	-0.274	-0.323	0.786	-1.747	1.398
Decen	-0.102	-0.114	1.005	-2.236	2.232	-0.176	-0.276	0.789	-2.220	1.769
Age	47.490	46	15.804	20	88	44.940	43	14.203	20	75
Female	0.561	1	0.498	0	1	0.438	0	0.504	0	1
Educ	7.261	7	2.088	2	11	7.063	7	2.094	4	10
	Canada outside Québec (<i>n</i> = 142)					Canada outside Québec (<i>n</i> = 27)				
Social	-0.282	-0.307	0.736	-2.303	2.396	-0.164	-0.293	0.768	-1.641	1.398
Decen	-0.136	-0.214	0.995	-2.236	2.232	-0.158	-0.276	0.652	-2.126	1.629
Age	47.979	47.5	16.308	20	88	44.556	43	13.846	20	75
Female	0.57	1	0.497	0	1	0.481	0	0.509	0	1
Educ	7.268	7	2.127	2	11	7	7	2.094	4	10
	Québec (<i>n</i> = 15)					Québec (<i>n</i> = 5)				
Social	-0.940	-0.718	0.706	-2.303	-0.037	-0.865	-0.462	0.664	-1.747	-0.294
Decen	0.229	0.135	1.074	-1.846	1.728	-0.273	-0.365	1.429	-2.220	1.769
Age	42.867	43	8.911	27	57	47	44	17.635	27	74
Female	0.467	0	0.516	0	1	0.200	0	0.447	0	1
Educ	7.2	7	1.74	5	10	7.4	8	2.302	5	10

Table 7.11 Descriptive statistics for the Bloc Québécois ($n = 99$)

	Mean	Median	SD	Min	Max
Social	-0.938	-1.056	0.664	-2.133	1.284
Decentra	0.343	0.094	0.838	-1.777	1.845
Age	46.99	47	15.908	19	82
Female	0.505	1	0.503	0	1
Education	7.283	7	2.095	2	11

Table 7.12 2004 Canada outside Québec MNL Models, baseline LPC

Party	Var	Spatial (1) $\mathbb{M}(\lambda, \beta)$	Socio (2) $\mathbb{M}(\theta)$	Spatial + Socio.(3) $\mathbb{M}(\lambda, \theta, \beta)$
		Est. (t-stat)	Est. (t-stat)	Est. (t-stat)
	β	0.68*** (11.16)		0.69*** (11.02)
CP	λ_{CP}	-0.04 (0.40)	2.05*** (3.86)	1.52** (2.60)
	Age		-0.02* (2.49)	-0.01 (1.73)
	Gender (F)		-0.24 (1.28)	0.15 (0.71)
	Educ		-0.16*** (3.55)	-0.15** (2.89)
NDP	λ_{NDP}	-0.51*** (4.82)	0.98 (1.58)	1.21* (1.97)
	Age		-0.02** (3.09)	-0.02** (3.18)
	Gender (F)		0.19 (0.87)	0.09 (0.40)
	Educ		-0.07 (1.26)	-0.08 (1.55)
GPC	λ_{GPC}	-2.18*** (10.74)	1.14 (1.00)	1.19 (1.06)
	Age		-0.04** (2.92)	-0.04** (2.92)
	Gender (F)		-0.20 (0.49)	-0.25 (0.61)
	Educ		-0.17 (1.58)	-0.17 (1.61)
n		658	658	658
LL		-697	-772	-684
AIC		1403	1559	1385
BIC		1426	1590	1420

Table 7.13 2004 Canada only Québec MNL models, baseline LPC

Party	Var	Spatial (1) $\mathbb{M}(\lambda, \beta)$	Socio. (2) $\mathbb{M}(\theta)$	Spatial+Socio (3) $\mathbb{M}(\lambda, \theta, \beta)$
		Est. (t-stat)	Est. (t-stat)	Est. (t-stat)
	β	0.38*** (3.90)		0.39*** (3.90)
CP	λ_{CP}	-0.45 (1.50)	-0.25 (0.17)	-0.04 (0.02)
	Age		-0.03 (1.48)	-0.03 (1.47)
	Gender(f)		-0.76 (1.30)	-0.45 (0.75)
	Educ		0.15 (0.99)	0.16 (1.07)
BQ	λ_{BQ}	0.63*** (3.31)	2.25* (2.36)	2.25* (2.33)
	Age		-0.03* (2.54)	-0.03* (2.42)
	Gender(f)		-0.37 (0.98)	-0.59 (1.52)
	Educ		0.03 (0.39)	0.02 (0.18)
NDP	λ_{NDP}	-1.17*** (3.92)	1.45 (0.94)	1.36 (0.89)
	Age		-0.05* (2.36)	-0.04* (2.30)
	Gender(f)		-0.55 (0.89)	-0.62 (1.01)
	Educ		0.00 (0.00)	-0.01 (0.05)
GPC	λ_{GPC}	-2.25*** (4.77)	-0.50 (0.20)	-0.56 (0.23)
	Age		-0.03 (0.98)	-0.03 (0.95)
	Gender (F)		-1.78 (1.53)	-1.83 (1.57)
	Educ		0.07 (0.31)	0.06 (0.27)
n		180	180	180
LL		-207	-209	-200
AIC		428	434	419
BIC		447	460	448

Table 7.14 Comparison of Log Likelihood for Canada outside Québec 2004

M ₁	M ₂		
	Spatial	Socio-Demographic.	Joint ^a
Spatial	na	75	-13
Socio-Dem.	-75	na	-88
Joint ^a	13	88	na

^aJoint = spatial model with sociodemographics

Table 7.15 Comparison of Log Likelihood for Québec 2004

M ₁	M ₂		
	Spatial	Socio-Dememographic	Joint ^a
Spatial	na	1	-7
Socio-Dem.	-1	na	-9
Joint ^a	7	9	na

^aJoint = spatial model with sociodemographics

Appendix 2: Computations for Canada

Pure Spatial Models

For 2004 the electoral covariance matrix for Canada is:

$$\nabla_0^C = \begin{bmatrix} 1.05 & 0.133 \\ 0.133 & 1.02 \end{bmatrix}.$$

The “total” variance is $\sigma^2 \equiv \sigma_1^2 + \sigma_2^2 = 2.07$ with an *electoral standard deviation (esd)* of $\sigma = 1.44$. The *principal electoral component* of ∇_0 is given by the eigenvector (1.0, 0.94) with variance 1.17, while the minor eigenvector is (-0.94, 1.0), with variance 0.90. Because the variances on the two axes were very similar, we did not run the spatial model with separate β -coefficients.

However, the matrices are different in Canada without Québec and in Québec, as in

$$\nabla_0^{C/Q} = \begin{bmatrix} 0.97 & 0.25 \\ 0.25 & 1.07 \end{bmatrix}$$

outside Québec, with $n = 658$, and

$$\nabla_0^Q = \begin{bmatrix} 0.56 & -0.26 \\ -0.26 & 0.86 \end{bmatrix}$$

for Québec, with $n = 180$.

The “total” variances are $\sigma_{C/Q}^2 \equiv \sigma_1^2 + \sigma_2^2 = 2.04$ with an esd $\sigma_C = 1.42$ and $\sigma_Q^2 = 1.42$ with $\sigma_Q = 1.19$.

The principal electoral component of $\nabla_0^{C/Q}$ is given by the eigenvector (1.0, 1.12), with variance 1.26, while the minor eigenvector is (-1.12, 1.0), with variance 0.78. This is slightly different from ∇_0^C .

The different orientations of the electoral distributions can be seen from a comparison of Figs. 7.1 and 7.2.

Since these are very different, we expect the convergence coefficients to be different.

Outside Québec

Outside Québec the coefficients from the model $\mathbb{M}^{C/Q}(\lambda, \beta)$ are given in Table 7.6 (model (1) as

$$\begin{aligned}\lambda_{NDP}^{C/Q} &= -0.51, \lambda_{CP}^{C/Q} = -0.04, \lambda_{GPC}^{C/Q} = -2.18, \lambda_{LPC}^{C/Q} \equiv 0.0 \\ \beta^{C/Q} &= 0.68.\end{aligned}$$

Notice that the β -coefficient and the Green party and NDP valences are significantly non zero (at the 0.001 level).¹⁸ The probability, ρ_{GPC} , that a voter chooses the lowest valence party (the Greens), when all parties are at the joint electoral mean, as given by the model $\mathbb{M}^{C/Q}(\lambda, \beta)$ is:

$$\rho_{GPC}^{C/Q} = \frac{\exp[\lambda_{GPC}^{C/Q}]}{\sum_{k=1}^4 \exp[\lambda_j^{C/Q}]} = \frac{e^{-2.18}}{e^{-2.18} + e^{-0.51} + e^{-0.04} + e^0} \simeq 0.042$$

Thus

$$2\beta^{C/Q}(1 - 2\rho_{GPC}^{C/Q}) = 2 \times 0.68 \times 0.92 = 1.25.$$

The Hessian, or characteristic matrix for the GPC, is given by

$$C_{GPC}^{C/Q} = (1.25) \begin{bmatrix} 0.97 & 0.25 \\ 0.25 & 1.07 \end{bmatrix} - I = \begin{bmatrix} -0.21 & 0.31 \\ 0.31 & -0.34 \end{bmatrix}$$

$$\text{and } c^{C/Q} = 1.25 \times 2.04 = 2.55.$$

The trace is positive (+0.55) and determinant is negative (-0.015), so we have a saddlepoint. The eigenvector with the positive eigenvalue (+0.59) is (1.0, 1.22), while the negative eigenvalue (-0.04) has eigenvector (1.0, -0.82).

¹⁸Clarke, Kornberg et al. (2009) obtained comparable AIC values for a sociodemographic model of this election.

Since the standard error in $\lambda_{GPC}^{C/Q}$ is 0.20, the 95% bounds on $\lambda_{GPC}^{C/Q}$ are $[-2.57, -1.79]$ and the 95% bounds on $\rho_{GPC}^{C/Q}$ are $[0.03, 0.06]$, approximately $\pm 28\%$.

In the same way, the standard error on $\beta^{C/Q}$ is 0.06, the 95% bounds on $\beta^{C/Q}$ are $[0.56, 0.80]$, and we can estimate very conservative 95% bounds on $c^{C/Q}$ as given by

$$\begin{aligned} & \{2 \times 0.56 \times (1 - (2 \times 0.060)), 2 \times 0.80 \times (1 - (2 \times 0.03))\} \times 2.04 \\ & = [0.99, 1.50] \times 2.04 = [2.01, 3.07]. \end{aligned}$$

Thus the bounds on $C_{GPC}^{C/Q}$ are

$$\begin{aligned} & \begin{bmatrix} 0.96 & 0.25 \\ 0.25 & 1.06 \end{bmatrix} - I, \begin{bmatrix} 1.46 & 0.38 \\ 0.38 & 1.61 \end{bmatrix} - I \\ \text{or} & \begin{bmatrix} -0.04 & 0.25 \\ 0.25 & 0.06 \end{bmatrix}, \begin{bmatrix} 0.46 & 0.38 \\ 0.38 & 0.61 \end{bmatrix}. \end{aligned}$$

Both traces are positive, while the first determinant is negative (-0.06), and the second is positive ($+0.14$), so the low estimate of c still gives a saddle, while the high estimate gives a minimum. We can assert, with probability greater than 95%, that the joint electoral mean is not an equilibrium. The predicted vote shares at the joint mean were:

$$\rho^{C/Q} = (\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC})^{C/Q} = (0.36, 0.368, 0.23, 0.042)$$

with a low 95% estimate for $\rho_{GPC}^{C/Q}$ of 0.03.

The vote shares of these four parties at the equilibrium $\mathbf{z}_s^{C/Q}$ were determined by simulation to be

$$\rho_s^{*C/Q} = (\rho_{CP}^*, \rho_{LPC}^*, \rho_{NDP}^*, \rho_{GPC}^*)_s^{C/Q} = (0.35, 0.36, 0.23, 0.06)$$

which lies within the 95% error bounds of the predictions. However, because of the stochastic nature of the model, the lower 95% bound on $\rho_{GPC}^{*C/Q}$ was approximately 0.043.

This compares with the sample vote shares, given in Table 7.6 of

$$(s_{CP}, s_{LPC}, s_{NDP}, s_{GPC})^{C/Q} = (0.372, 0.371, 0.216, 0.041)$$

and with the actual vote shares outside Québec of

$$(v_{CP}, v_{LPC}, v_{NDP}, v_{GPC})^{C/Q} = (0.368, 0.377, 0.194, 0.047).$$

Using the central estimate of $\rho_{GPC}^{*C/Q} = 0.06$ for GPC we find that the vote margin for the GPC is

$$\rho_{GPC}^{*C/Q} - s_{GPC}^{C/Q} = 0.06 - 0.041 = 0.019,$$

whereas the low estimate of 0.043 gives a smaller vote margin of 0.002. For the NDP, the low estimate of $\rho_{NDP}^{*C/Q} = 0.165$ is below that of its sample vote share of 0.216. By our definition, this LNE is not a stable attractor. In particular, the NDP has no strong incentive to move to the LNE.

In Québec

In Québec the coefficients from the model $\mathbb{M}^Q(\lambda, \beta)$ are

$$\begin{aligned} \lambda_{BQ}^Q &= 0.63, \lambda_{NDP}^Q = -1.17, \lambda_{CP}^Q = -0.45, \lambda_{GPC}^Q = -2.25, \\ \lambda_{LPC}^Q &\equiv 0, \beta^Q = 0.38. \end{aligned}$$

Again, the β -coefficient and the valence estimates for the BQ and NDP are significantly non zero. The probability, ρ_{GPC}^Q , that a voter chooses the lowest valence party (the Greens, GPC), when all parties are at the joint electoral mean, is given by the model $\mathbb{M}^Q(\lambda, \beta)$ as

$$\begin{aligned} \rho_{GPC}^Q &= \frac{\exp[\lambda_{GPC}^Q]}{\sum_{k=1}^4 \exp[\lambda_j^Q]} = \frac{e^{-2.25}}{e^{-2.25} + e^{-1.17} + e^{-0.45} + e^{0.63} + e^0} \\ &\simeq 0.03 \end{aligned}$$

$$\text{Thus } 2\beta^Q(1 - 2\rho_{GPC}^Q) = 2 \times 0.63 \times 0.95 = 0.71,$$

$$C_{GPC}^Q = (0.71) \begin{bmatrix} 0.55 & -0.25 \\ -0.25 & 0.86 \end{bmatrix} - I = \begin{bmatrix} -0.60 & -0.18 \\ -0.18 & -0.38 \end{bmatrix},$$

$$\text{so } c^Q = 0.8 \times 1.42 = 1.00.$$

In this case the trace is negative and the determinant is positive (0.20), and we have a local maximum. Both eigenvectors have negative eigenvalues. Using this model we find

$$\rho^Q = (\rho_{CP}, \rho_{LPC}, \rho_{NDP}, \rho_{GPC}, \rho_{BQ})^Q = (0.16, 0.25, 0.08, 0.03, 0.48).$$

Simulation of the model for Québec verified that the equilibrium was one with all parties at the electoral mean, namely $(-0.75, 0.05)$. The vote shares of these five parties at the equilibrium were predicted to be identical to ρ^Q and according to the

simulation these were: the sample vote shares in Québec are given in Table 7.5 and were

$$(s_{CP}, s_{LPC}, s_{NDP}, s_{GPC}, s_{BQ})^Q = (0.094, 0.245, 0.083, 0.028, 0.55)$$

and the actual vote shares were

$$(v_{CP}, v_{LPC}, v_{NDP}, v_{GPC}, v_{BQ})^Q = (0.088, 0.339, 0.046, 0.032, 0.489)$$

The standard error of λ_{GPC}^Q is 0.47, so the 95% bounds on λ_{GPC}^Q are given by

$$-2.25 \pm (1.97) \cdot (0.47) = [-3.18, -1.32].$$

Accordingly, the 95% bounds on ρ_{GPC}^Q are [0.01, 0.06], or $\pm 66\%$.

Since the standard error of β^Q is 0.10, the 95% bounds are [0.18, 0.58]. We can estimate very conservative bounds on c^Q to be given by

$$\begin{aligned} & [2 \times 0.18 \times (1 - 2 \cdot 0.06), 2 \times 0.58 \times (1 - 2 \cdot 0.01)] \times 1.41 \\ & = [0.32, 1.14] \times 1.41 = [0.45, 1.60]. \end{aligned}$$

Thus the bounds on C_{GPC}^Q are

$$\begin{aligned} & \begin{bmatrix} 0.17 & -0.08 \\ -0.08 & 0.27 \end{bmatrix} - I, \quad \begin{bmatrix} 0.63 & -0.29 \\ -0.29 & 0.98 \end{bmatrix} - I \\ & \text{or} \quad \begin{bmatrix} -0.83 & -0.08 \\ -0.08 & -0.73 \end{bmatrix}, \quad \begin{bmatrix} -0.37 & -0.29 \\ -0.29 & -0.02 \end{bmatrix}. \end{aligned}$$

Both traces are negative ($-1.56, -0.39$), while the first determinant is positive (0.60), and the second is negative (-0.08), so the low estimate of c gives a local maximum, while the high estimate gives a saddle point. In the second case, the eigenvector with the positive eigenvalue (0.14) is $(1, -1.78)$, while the negative eigenvalue (-0.53) has eigenvector $(1, 0.56)$.

Letting $\rho_{GPC}^{*Q} = 0.01$ be the lower 95% bound, we see that the vote margin for the GPC in Québec is $\rho_{GPC}^{*Q} - s_{GPC}^Q = 0.01 - 0.028 < 0$. Similarly the lower 95% bound on ρ_{NDP} was approximately $0.05 < s_{NDP}^Q = 0.083$. Again, by our definition, this LNE is not a stable attractor.

This estimation suggests that neither of the small parties have an incentive to move from their partisan constituency positions to the LNE.