Norman Schofield · Gonzalo Caballero · Daniel Kselman *Editors*

**Advances in Political Economy**

Institutions, Modelling and Empirical Analysis

This book presents latest research in the field of Political Economy, dealing with the integration of economics and politics and the way institutions affect social decisions. The focus is on innovative topics such as an institutional analysis based on case studies; the influence of activists on political decisions; new techniques for analyzing elections, involving game theory and empirical methods.

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each of the parameters of interest. Similarly, allowing the Gibbs sampler to run this long reduces the effects of the inherent autocorrelation that occurs in the sampler.

The results of the VCL are shown in Table 4. We show the VCL estimates of the parameter values and the corresponding 95 percent credible intervals. In this example, we use the Liberal Party as the base group, thus their valence is always restricted at 0. For the model, we report $\beta$ and the aggregate valences first. We then report the regional effect for each party. While the sociodemographic random effect values may be of substantive interest sometimes, they are included simply as controls in this case, thus we do not report these values. We also report the deviance information criterion (DIC), which is a hierarchical model analogue to AIC or BIC. When the posterior distribution is assumed to be multivariate normal (as it is in this case), the DIC functions as a measure of model quality rewarding a model with a small number of parameters, but penalizing a model that does not fit the data well. The DIC can be seen as a measure of the log-likelihood of the posterior density. Lower values of DIC are preferred.

From this model, we can see a number of things. First, as would have been predicted before running the model, the Liberal Party is the highest valence party in Canada outside of Quebec. However, the Conservative Party is almost equivalent in valence level. By simply adding the aggregate valence to the Non-Quebec regional random effect, we can see that the two are almost equivalent in valence outside of Quebec. However, this model shows that the BQ is, in fact, the highest valence party in Canada. This makes sense, given that of the people that could actually vote for the party, nearly 50 percent of them did. This exemplifies one of the strengths of this model, which is that it accurately specifies this party as the highest valence party, even though it is only available to around 25 percent of the electorate. Thus, if we view parties as entities that look down and see a uniform electorate of members without specific regional affiliation or sociodemographic groups, then they would estimate that BQ is the highest valence party.

Outside of Quebec, as mentioned before, the Conservative Party and the Liberal Party are the highest valence parties, with almost equivalent valence. The NDP is of somewhat lower valence as the party simply does not have the same presence as its larger Liberal counterpart. However, its valence and positioning in the preference space of Canada allows it to be a significant competitor outside of Quebec. The lowest valence party outside of Quebec is the Green Party, which makes plenty of sense as it is was (and is still) more of a one-issue dimension party and fails to have mass appeal to the electorate.

Inside Quebec, BQ is the highest valence party, with an even larger valence than that estimated by the aggregate valence measure. The Liberal Party also has a strong presence in Quebec; however, given that BQ and the Liberal Party are in similar areas of the preference space, they compete for many of the same voters and BQ simply has a stronger presence in Quebec. The Conservative Party is of somewhat lower valence within Quebec, as it fails to draw voters that instead choose to vote for BQ. The lowest valence party in Quebec is also the Green Party.

Recall that we are interested in finding where the parties will locate in the policy space in order to maximize their vote share. Because the outcome of the election



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**Table 4** 2004 Canada VCL model given sociodemographics (LPC base)

| | NDP | | Conservatives | | Greens | | BQ | |
|---|---|---|---|---|---|---|---|---|
| $\beta$ | | | | 0.2598 (0.2234, 0.2976) | | | | |
| $\lambda_j$ | −0.5883 (−1.678, 0.4625) | | −0.0864 (−1.057, 1.107) | | −1.826 (−3.446, 0.2405) | | 0.4525 (−0.9229, 2.322) | |
| | NQ | Q | NQ | Q | NQ | Q | NQ | Q |
| $\mu_{rj}$ | 0.0341 (−1.014, 1.127) | −0.6085 (−1.778, 0.4704) | 0.0655 (−1.135, 1.04) | −0.1827 (−1.465, 0.8110) | −0.4038 (−2.493, 1.217) | −0.4915 (−2.720, 1.062) | – – | 0.1797 (−1.67, 1.565) |
| DIC | | | | 2029.291 | | | | |

depends on these vote shares, we assume that parties use polls and other information at their disposal to form an idea of the anticipated election outcome and then use this information to find their most preferred position taking into account their estimates of where other parties will locate.

One possibility is that all parties will locate at their respective electoral means, meaning that $\mathbf{z}^*$ is as follows:

$$\mathbf{z}^* = \begin{bmatrix} & Lib. & Con. & NDP & Grn. & BQU \\ S & 0 & 0 & 0 & 0 & -1.11 \\ D & 0 & 0 & 0 & 0 & -0.08 \end{bmatrix}$$

Notice that this means that BQ will not locate at the same position as the other parties as it only runs in Quebec, so its regional mean is at the mean of voters in Quebec. Given this vector of party positions and the information about the voter ideal points, we can calculate the Hessian of the vote function for each party as well as the convergence coefficient, $c(\mathbf{z}^*)$ for each party. For the Hessians, we are interested in the eigenvalues associated with the Hessians for each party; if they are both negative, then the Hessian is negative definite and the party location is at a local maximum. Given $\mathbf{z}^*$, if any of the Hessians are not negative definite, then one of the parties will not choose to locate at this position in equilibrium. Similarly, we can check the convergence coefficients to see if they meet the necessary condition for convergence. Given that any of these conditions fail, the party for which they fail will choose to move elsewhere in the policy space at equilibrium and. Given that the Green Party is the lowest valence party in both regions, as well as at the aggregate level, we can assume that if a party is going to move, it will be the Green Party. We now examine the Hessians and $c(\mathbf{z}^*)$ for each party.

$$\mathcal{H}_{Lib} = \begin{bmatrix} -0.0365 & -0.0004 \\ -0.0004 & -0.0705 \end{bmatrix}; \quad \mathcal{H}_{NDP} = \begin{bmatrix} 0.0021 & 0.0012 \\ 0.0012 & -0.0362 \end{bmatrix}$$

$$\mathcal{H}_{Con} = \begin{bmatrix} -0.0326 & -0.0002 \\ -0.0002 & -0.0676 \end{bmatrix}; \quad \mathcal{H}_{GPC} = \begin{bmatrix} 0.0085 & 0.0085 \\ 0.0085 & -0.0091 \end{bmatrix}$$

$$\mathcal{H}_{BQ} = \begin{bmatrix} -0.1194 & 0.0034 \\ 0.0034 & -0.1286 \end{bmatrix}$$

$$eigen(\mathcal{H}|z^*) = \begin{bmatrix} & Lib. & NDP & Con. & Grn. & BQ \\ Eigen1 & -0.0365 & 0.0021 & -0.0326 & 0.0085 & -0.1183 \\ Eigen2 & -0.0705 & -0.0361 & -0.0676 & -0.0092 & -0.1297 \end{bmatrix}$$

$$c_j(\mathbf{z}^*) = \begin{bmatrix} & Lib. & NDP & Con. & Grn. & BQ \\ c(\mathbf{z}^*) & 1.031 & 1.518 & 1.071 & 1.945 & -0.5921 \end{bmatrix}$$

From the Hessian's and their corresponding eigenvalues, we can see that two parties will diverge from the vector of electoral means. The NDP and the Green Party both have positive eigenvalues, meaning that $\mathbf{z}^*$ is not a vote maximizing position for them and, thus, not a LNE. It is interesting to note that both of these parties $\mathbf{z}^*$ is a saddle point. Thus, when they choose a better position, it will still be on the mean of the decentralization axis as the second eigenvalue represents that axis.

We can also utilize the test of convergence coefficients to assess convergence to the vector of interest. Here, we see that all of the convergence coefficients, except for BQ's, are greater than one but less than $w$ (which in this case is 2),[4] thus we need to check the largest one to see if it indicates convergence to the mean vector. The largest convergence coefficient belongs to the Green Party and examination of the constituent portions of its $c(\mathbf{z}^*)$ shows:

$$c_{GPC}\big(\mathbf{z}^*\big) = 1.379 + 0.5657$$

where 1.379 corresponds to the social axis. This means that the Green Party is not maximizing its vote share at the mean social position. These values indicate that the Green Party is also located at a saddle point when given the mean vector, just as the Hessian test did.

However, taken as they are, we do not know if these two tests actually match the vote maximizing tendencies of the parties. Thus, in order to give validity to the proposed tests, we need to use optimization methods to show that the vote maximizing positions for parties are not located on the mean vector. In a Gibbs sampling style of optimizer, we create an optimization method in which each party optimizes its vote share given the positions of the other parties. If we do this for each party in rotation beginning at some arbitrary starting values, the parties should eventually converge on the equilibrium set of positions where no party can do any better by moving given the positions of the other party. This method is necessary given that each party can potentially be optimizing over a different portion of the electorate. In this case, while the other four parties are attempting to optimize their respective vote shares over all of Canada, BQ is only trying to optimize its vote share among those voters in Quebec. Thus, this style of optimizer is necessary for finding the optimizing positions in Canada.

Figure 3 shows the vote optimizing positions for each party in Canada, which are as follows:

$$z^*_{opt} = \begin{array}{cc} & \begin{array}{ccccc} \textit{Lib.} & \textit{Con.} & \textit{NDP} & \textit{Grn.} & \textit{BQ} \end{array} \\ \begin{array}{c} S \\ D \end{array} & \begin{bmatrix} 0.0524 & 0.0649 & 1.099 & 2.337 & -1.069 \\ -0.0259 & -0.0264 & 0.0266 & 0.2281 & -0.1290 \end{bmatrix} \end{array}$$

Fortunately for our measures, the vote optimizing positions echo what we were told by the convergence coefficients: the NDP and the Green Party have incentive to move away from the electoral mean while the other parties want to stay there. Given that these two parties are of relatively low valence, their relocation has little effect on the maximizing positions for the largest three parties. However, in accordance with

[4] It is interesting to note that the convergence coefficient need not be positive, as is the case with $c_{BQ}(z^*)$. This simple indicates a particularly strong desire to stay in the given position. A negative convergence coefficient indicates a quickly changing local maximum, meaning that a small departure from this position would result in a large decrease in vote share.

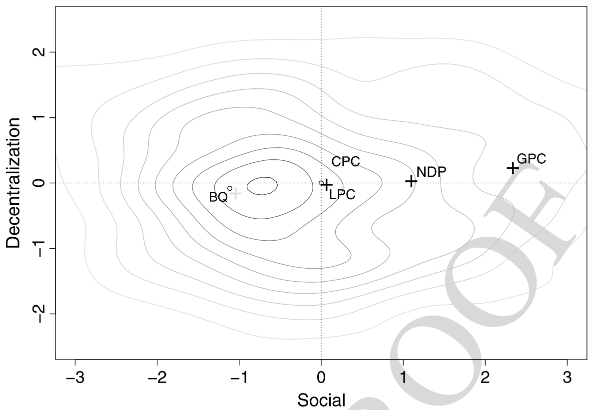


**Fig. 3** Vote maximizing positions in Canada 2004

**Table 5** Vote shares given various $z^*$s

| | Current | Mean | Optimal |
|---|---|---|---|
| LPC | 36.71 | 33.42 | 33.43 |
| CPC | 29.66 | 33.34 | 33.29 |
| NDP | 15.65 | 17.89 | 16.96 |
| GPC | 4.29 | 3.55 | 3.80 |
| BQ | 12.42 | 11.79 | 12.52 |

the equilibrium theory of proposed by Schofield (2007), the parties locate along the same axis, with distances away from their electoral means proportional to their respective perceived valence differences.

This begs the question, though, how much better can the parties do at these positions than they did at their current positions? Table 5 shows the vote shares in the sample for each party at their current positions, at the electoral mean, and at the vote maximizing positions determined by the optimization routine. These vote shares are predicted using the actual valences from each region (i.e. the aggregate valences plus the regional random effects).

This table strengthens our notion that the vector of means is not a LNE as the Green Party, the BQ, and the Liberals all do better when the Green Party and the NDP locate away from the mean. As the Green Party is one of the parties that is dissatisfied with the electoral mean, it can choose to move to a more extreme position and do better. The NDP is forced to adapt and do worse than it would if the parties all located at their respective electoral means.

## 5 Conclusion

In this paper, we proposed a method for examining the vote maximizing positions of parties in electoral systems with parties that do not run in every region. When parties do not run in every region, different voters have different party bundles at the polls and existing theories of valence and empirical methods for estimating valence are no longer appropriate. We proposed a more generalized notion of the convergence coefficient which is able to handle any generalized vector of party positions and tell us whether or not these positions are a local Nash equilibrium for the given electoral system. We also proposed a new method for estimating the parameters necessary to utilize the convergence coefficient that does not rely on the IIA assumption. Though methods of doing so already exist, the sheer amount of information gained from the Varying Choice Set Logit makes it the ideal model to run when examining voting tendencies within complex electorates that have clear hierarchical structures.

Using these methods, we examined the 2004 Canadian elections. Using the new empirical methods, we found that even though it only ran in Quebec, a region that makes up around 25 percent of Canada's population, the Bloc Quebecois was the highest valence party in Canada in the 2004 elections. Using these empirical findings, we found that parties were not able to maximize their respective vote shares by locating at the joint electoral mean, which included BQ locating at the mean of voters in Quebec and not at the join electoral mean. Rather, the lower valence parties were able to maximize vote shares by taking more extreme positions within the policy space. This finding is in direct contrast of widely accepted theories that political actors can always maximize their vote shares by taking positions at the electoral center.

Given the accurate outcomes of these methods, there are a number of more complex situations in which these methods can be used. First, this type of model is not limited to the two region case and can be applied to cases where there are numerous "party bundles" which arise in a nation's electorate. A region, in this case, is equivalent to a party bundle; thus, a region can be a combination of many regions (the case when a party runs in two out of three regions, for example). Similarly, in further uses of this model, it is possible to examine equilibria where parties have perfect information about each of the voters, meaning that parties know each voter's region, sociodemographic group, and ideal point. Given this information, new equilibria can be computed and differences can be examined. This further demonstrates the general nature of the new definition of the convergence coefficient and its ability to handle an even wider variety of electorate types than previously.



## Appendix

This appendix gives the algorithm for the Gibbs sampling.

```
model{

for(i in 1:N) {
for(k in 1:K) {
v[i,k] <- alpha[k] + beta[1]*(d[(N*(k-1))+i]-d[i]) +
```

```
m[region[i],k] + ed[region[i], education[i], k] +
ag[region[i],education[i],age[i],k]

expv[i,k] <- exp(v[i,k])
pv[i,k] <- expv[i,k]/sum(expv[i,1:K])
vote[i]  ~ dcat(pv[i, 1:K])
}}

beta[1] ~ dnorm(0,taub[1])I(-5,5)

alpha[1] <- 0
alpha[2] ~ dnorm(0,taua[2])
alpha[3] ~ dnorm(0,taua[3])
alpha[4] ~ dnorm(0,taua[4])
alpha[5] ~ dnorm(0,taua[5])

m[1,1] <- 0
m[1,2] ~ dnorm(0,taum[1,2])
m[1,3] ~ dnorm(0,taum[1,3])
m[1,4] ~ dnorm(0,taum[1,4])
m[1,5] <- -100000
m[2,1] <- 0
m[2,2] ~ dnorm(0,taum[2,2])
m[2,3] ~ dnorm(0,taum[2,3])
m[2,4] ~ dnorm(0,taum[2,4])
m[2,5] ~ dnorm(0,taum[2,5])

taub[1] ~ dgamma(.1,.1)I(.1,10)
taua[2] ~ dgamma(.1,.1)I(.1,10)
taua[3] ~ dgamma(.1,.1)I(.1,10)
taua[4] ~ dgamma(.1,.1)I(.1,10)
taua[5] ~ dgamma(.1,.1)I(.1,10)
taum[1,2]~dgamma(.1,.1)I(.1,10)
taum[1,3]~dgamma(.1,.1)I(.1,10)
taum[1,4]~dgamma(.1,.1)I(.1,10)
taum[2,2]~dgamma(.1,.1)I(.1,10)
taum[2,3]~dgamma(.1,.1)I(.1,10)
taum[2,4]~dgamma(.1,.1)I(.1,10)
taum[2,5]~dgamma(.1,.1)I(.1,10)

for(f in 1:e){
ed[1,f,5] <- -10000
}

for(f in 1:e){
for(z in 1:4){
ed[1,f,z] ~ dnorm(0,taued[1,f,z])
taued[1,f,z] ~ dgamma(.01,.01)I(.01,10)
}}
```

```
for(f in 1:e){
for(z in 1:5){
ed[2,f,z] ~ dnorm(0,taued[2,f,z])
taued[2,f,z] ~ dgamma(.01,.01)I(.01,10)
}}

for(f in 1:e){
for(w in 1:a){
ag[1,f,w,5] <- -10000
}}

for(f in 1:e){
for(z in 1:4){
for(w in 1:a){
ag[1,f,w,z] ~ dnorm(0,tauag[1,f,w,z])
tauag[1,f,w,z] ~ dgamma(.01,.01)I(.01,10)
}}}

for(f in 1:e){
for(z in 1:5){
for(w in 1:a){
ag[2,f,w,z] ~ dnorm(0,tauag[2,f,w,z])
tauag[2,f,w,z] ~ dgamma(.01,.01)I(.01,10)
}}}

for(f in 1:e){
for(z in 1:4){
for(w in 1:a){
tot[1,f,w,z] <- alpha[z] + m[1,z] + ed[1,f,z] + ag[1,f,w,z]
}}}

for(f in 1:e){
for(z in 1:5){
for(w in 1:a){
tot[2,f,w,z] <- alpha[z] + m[2,z] + ed[2,f,z] + ag[2,f,w,z]
}}}
}
```

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# Spatial Model of Elections in Turkey: Tracing Changes in the Party System in the 2000s

**Norman Schofield and Betul Demirkaya**

## 1 Introduction

During the first decade of the 21st century, electoral politics in Turkey underwent significant changes in terms of both the number and the ideological positions of political parties. The 1990s were marked by a historically high degree of fragmentation with the effective number of parties rising to 4.3 in 1995 elections and 4.8 in 1999 elections (Ozbudun 2000; Kalaycioglu 2008). This was partly due to a decrease in the vote share of the center-right and center-left parties and a concurrent rise in the vote share of the nationalist and Islamist parties. The 1999 elections resulted in a parliament with five parties, each with seat shares ranging between 15 % and 25 %.[1] A coalition government was formed by the center-left Democratic Left Party (DSP), the Nationalist Action Party (MHP) and the center-right Motherland Party (ANAP). The 2001 financial crisis was followed by an early election in 2002, in which none of the parties from the previous parliament were able to pass the electoral threshold.[2] The new parliament was formed by the members of the Justice and Development Party (AKP)—a new conservative party founded by the former members of Islamist parties—and the Republican People's Party (CHP)—

[1] See Tables 1 and 2 for vote and seat shares of parties in the last four elections.

[2] According to the electoral law of 1983, a political party needs to win at least 10 % of the national vote in order to win seats in the parliament.

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**Table 1** Vote shares (%)—1999–2011. Source: www.ysk.gov.tr; www.resmigazete.gov.tr

| Party name | | Vote shares | | | |
|---|---|---|---|---|---|
| | | 1999 | 2002 | 2007 | 2011 |
| Justice and Development Party | AKP | – | 34.28 | 46.58 | 49.80 |
| Republican People's Party | CHP | 8.71 | 19.39 | 20.88 | 25.98 |
| Nationalist Action Party | MHP | 17.98 | 8.36 | 14.27 | 13.02 |
| Felicity Party | SP[a] | – | 2.49 | 2.34 | 1.26 |
| Virtue Party | FP | 15.41 | – | – | – |
| Democrat Party | DP | | – | 5.42[b] | 0.65 |
| Democratic Left Party | DSP | 22.19 | 1.22 | –[c] | 0.25 |
| True Path Party | DYP | 12.01 | 9.54 | – | 0.15 |
| Motherland Party | ANAP | 13.22 | 5.13 | –[d] | – |
| Genc Party | GP | – | 7.25 | 3.04 | – |
| People's Democracy Party | HADEP | 4.75 | – | – | |
| Democratic People Party | DEHAP[e] | – | 6.22 | – | – |
| Independents | | 0.87 | 1.00 | 5.24[f] | 6.59[g] |
| Others | | 4.86 | 5.13 | 2.25 | 2.29 |
| Total | | 100.00 | 100.00 | 100.00 | 100.00 |
| Turnout | | 87.09 | 79.14 | 84.25 | 83.16 |

[a] Felicity Party is the successor to Virtue Party, which was banned by the Constitutional Court
[b] DYP changed its name to Democrat Party in a failed attempt to merge with ANAP
[c] The candidates of DSP entered the elections in the CHP lists
[d] ANAP withdrew from elections and asked their supporters to vote for DP
[e] Democratic People Party is the successor to People's Democracy Party, which was banned by the Constitutional Court
[f] Majority of independent candidates are supported by Democratic Society Party (DTP), which is the successor to DEHAP
[g] Majority of independent candidates are supported by Democratic Society Party (DTP), which is the successor to DEHAP



a party with a strong emphasis on a secularist agenda. In the 2007 elections, AKP consolidated their power by receiving 46.6 % of the votes while CHP increased their share of the vote by only 1.5 percentage points to 20.9 %. In addition, the Nationalist Action Party (MHP) and independent candidates supported by the pro-Kurdish Democratic Society Party (DTP) were able to win seats in the 2007 elections.

The changes in electoral politics brought about several important questions: What are the main issues that shape political debate? How can we describe the position of AKP and other parties on issues that are relevant for voters? How can we explain the voters' preferences in this new electoral landscape? The characterization of political parties and voters along a left-right continuum has been widely-used and helpful in making comparisons across political systems. However, the reduction of political views to a single dimension may conceal the diversity of issues that may