

**The Mechanical and Psychological Effects of Electoral Systems:
A Quasi-Experimental Study**

André Blais, Université de Montréal (andre.blais@umontreal.ca)

Romain Lachat, Pompeu Fabra University (mail@romain-lachat.ch)

Airo Hino, Tokyo Metropolitan University (hino@tmu.ac.jp)

Pascal Doray Demers, Université de Montréal (pascal.doray-demers@umontreal.ca)

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Decomposing electoral system effects: An example

This appendix provides a detailed example of our methodology to decompose the three effects of the electoral system. The example is based on a single constituency in one election, that is, the 1971 election in the canton of Aargau in Switzerland.

Table 1 presents the data from which we start: the parties' vote shares and number of seats in the National Council (NC, lower house) and Council of States (CoS, upper house). Nine parties were running for the NC election, but only five of them presented a candidate for the election to the CoS (the fifth candidate, in the category 'Others', was from a regional party).

The distribution of seats in the NC election is fairly proportional, given the relatively large size of that constituency ($M=14$). The effective number of parliamentary parties (ENPP) in that canton's deputation was equal to 5.4. In the CoS, in contrast, ENPP is equal to 2, as there are only two seats which are occupied by different parties.

Table A1. Vote and seat distribution in the National Council and Council of States elections for the canton of Aargau in 1971.

Party	National Council		Council of States	
	Vote share	Seats	Vote share	Seats
FDP	15.9	3	30.9	1
CVP	20.0	3	32.9	1
SPS	23.9	3	20.9	0
SVP	12.5	2	-	-
LdU	9.4	2	8.2	0
EVP	3.8	0	-	-
REP	5.8	1	-	-
SD	3.4	0	-	-
Others	5.2	0	7.1	0
Total	100%	14	100%	2
ENPP	-	5.44	-	2.00

The difference between these two values of ENPP corresponds to the total effect of the electoral system, which is to reduce the ENPP by 3.44:

$$\text{Total effect} = \text{ENPP}_{\text{nonpr}} - \text{ENPP}_{\text{pr}} = 2.00 - 5.44 = -3.44.$$

As explained in the paper, this total effect can be decomposed into three *successive* effects. These effects can already be perceived in Table A1:

- The psychological effect on parties in the non PR electoral system of the CoS election leads to a reduction in the number of parties, compared to the NC election;
- The psychological effect on voters affects the distribution of votes. In the CoS elections, the FDP and the CVP have a much higher vote share than in the NC election. The CVP's candidate is an incumbent, and the FDP hold the other seat in the previous legislative term, but is presenting a new candidate this time. The SPS, on the other, hand, receives a lower share of votes than in the PR election of the NC.
- The mechanical effect, finally, relates to the transformation of votes into seats. It means that the share of seats correspond more closely to the vote shares in the PR election of the NC than in the non PR election of the CoS.

To disentangle these three effects, we start by the end of the sequence. Each of the effects is expressed as a change in the ENPP. For the mechanical effect, we take the vote shares expressed in the CoS election and distribute them with the same voting system as in the NC election (i.e., PR with a district magnitude of 14).

Table A2. Estimation of the mechanical and total psychological effects for the canton of Aargau in 1971.

Party	Vote share in non PR election...	...distributed with non PR Rule	... distributed with PR rule (Simulation 1)	Seats in PR election
FDP	30.9	1	4	3
CVP	32.9	1	5	3
SPS	20.9	0	3	3
SVP	-	-	-	2
LdU	8.2	0	1	2
EVP	-	-	-	0
REP	-	-	-	1
SD	-	-	-	0
Others	7.1	0	1	0
Total	100%	2	14	14
ENPP		2.00	3.77	5.44

As Table A2 shows, this simulation results in an ENPP of 3.77. The difference between this and the ENPP in the CoS corresponds to the mechanical effect of the electoral system (i.e., of using a non PR electoral system rather than PR):

$$\text{Mechanical effect} = \text{ENPP}_{\text{nonpr}} - \text{ENPP}_{\text{sim1}} = 2.00 - 3.77 = -1.77.$$

At the same time, simulation 1 allows one to estimate the *total* psychological effect, by comparing it with the ENPP in the NC:

$$\text{Total psychological effect} = \text{ENPP}_{\text{sim1}} - \text{ENPP}_{\text{pr}} = 3.77 - 5.44 = -1.67.$$

In other words, the behavior of parties (smaller number of candidates) and voters (concentration on the front-runners) has, in combination, reduced the ENPP by 1.67. In

addition, the electoral rules used in the non PR election have further reduced the ENPP by 1.77.

Next, we decompose the psychological effect into its two components. Again, we start by the end of this sequence, that is, by looking at the effect on voters (which takes place after parties have decided to run or not in the non PR election). Voters should respond to the strategic incentives by deserting candidates that are not viable in the non PR election. We estimate the size of this strategic voting by comparing two predictions of the regression model presented in Table 2 of the article: the predicted vote shares when voters respond to the candidates' viability (Simulation 2) and the predicted vote shares when they ignore these factors (Simulation 3). These predicted vote shares are then transformed into seats using the PR rule and district magnitude, in order to compute the corresponding ENPP (Table A3). The difference in the ENPP when voters respond or not to the strategic incentives is our estimate of the strategic effect on voters, which is to reduce the number of parties by 0.41:

$$\text{Psychological effect (voters)} = \text{ENPP}_{\text{sim2}} - \text{ENPP}_{\text{sim3}} = 4.26 - 4.67 = -0.41.$$

The psychological effect on parties, finally, can be computed by subtracting the psychological effect on voters from the total psychological effect. It corresponds to a reduction of 1.26 parties.

$$\begin{aligned} \text{Psychological effect (parties)} &= (\text{ENPP}_{\text{sim1}} - \text{ENPP}_{\text{pr}}) - (\text{ENPP}_{\text{sim2}} - \text{ENPP}_{\text{sim3}}) = \\ &= (3.77 - 5.44) - (4.26 - 4.67) = \\ &= -1.67 - (-0.41) = -1.26 \end{aligned}$$

Table A3. Estimation of the psychological effects on voters and parties for the canton of Aargau in 1971.

Party	Predicted election results with strategic voting (Simulation 2)		Predicted election results w/o strategic voting (Simulation 3)	
	Vote shares	Seats	Vote shares	Seats
FDP	29.0	3	24.2	3
CVP	31.8	4	27.0	3
SPS	19.8	4	21.2	4
SVP	-		-	
LdU	11.9	2	15.9	2
EVP	-		-	
REP	-		-	
SD	-		-	
Others	7.5	1	11.7	2
Total	100%	14	100%	14
ENPP		4.26		4.67