APPENDIX[1]

I. The partisan type of simulations

For what follows, $G1$ stands for the party's gains among rival party identifiers, $G2$ for the party's gains among independents and $G3$ for the party's gains among his 'own partisans'.

Challenger's gains among rival party identifiers ($G1$)

To run the *partisan* model, the inequality $-(x_i - x_\lambda)^2 > -(x_i - x_\theta)^2 + b$ is solved for x_i

$$x_i \begin{cases} > \dfrac{x_\lambda^2 - x_\theta^2 + b}{2(x_\lambda - x_\theta)}, \forall x_\lambda > x_\theta \\ \\ < \dfrac{x_\lambda^2 - x_\theta^2 + b}{2(x_\lambda - x_\theta)}, \forall x_\lambda < x_\theta \end{cases}$$

Since partisan attachment is assigned a fixed value of one, the previous relationship can be written as

$$x_i \begin{cases} > \dfrac{x_\lambda^2 - x_\theta^2 + 1}{2(x_\lambda - x_\theta)}, \forall x_\lambda > x_\theta \\ \\ < \dfrac{x_\lambda^2 - x_\theta^2 + 1}{2(x_\lambda - x_\theta)}, \forall x_\lambda < x_\theta \end{cases} \qquad (*)$$

where x_λ represents the position of the 'challenger' and x_θ the fixed position of the rival party. When λ occupies the same position as θ ($x_\lambda = x_\theta$), there is no gain as (*) has no meaning. In cases where the 'challenger' occupies a position to the left of the fixed position of the rival party, $x_\lambda \langle x_\theta$, the 'challenger's' gains (G_1) are found to the left of position x_i. When the 'challenger'

[1] For questions please contact: Achillefs.Papageorgiou@uta.fi

occupies a position to the right of the fixed position of the rival party, $x_\lambda \rangle x_\theta$, the 'challenger's' gains (G_1) are found to the right of position x_i.

Thus, in terms of the 'challenger's' gains[2]:

1. If $x_\lambda < x_\theta$, $\max G_1 = \langle -0.45, x_i \rangle$
2. If $x_\lambda > x_\theta$, $\max G_1 = \langle x_i, 10.45 \rangle$ and
3. If $x_\lambda = x_\theta$, $G_1 \notin \Re$

Challenger's gains among independents (G_2)

If the 'challenger' presents a position to the right of the rival party, the 'challenger's' maximum gain among Independents is found upon adding all voters found between the cut-point of the 'challenger's' and the rival's position and 10.45. Position 10.45 represents the last of the 37 voters assigned to position 10. Succinctly:

1. If $x_\lambda > x_\theta$, $\max G_2 = \left\langle \frac{x_\lambda + x_\theta}{2}, 10.45 \right\rangle$

If the 'challenger' articulates a position to the left of the rival party, the 'challenger's' maximum gains can be calculated by adding all votes found in the interval between 0.45 and the cut-point. Here position -0.45 represents the first of the 37 voters assigned to position zero. Hence:

2. If $x_\lambda < x_\theta$, $\max G_2 = \left\langle -0.45, \frac{x_\lambda + x_\theta}{2} \right\rangle$

---

[2] The positions $0.45, 10.45$ and the like were generated as follows: Each position was assumed to represent a set of 37 voters that were distributed in the interval: $x_i - 0.45, x_i - 0.425, x_i - 0.4, x_i - 0.375, \ldots, x_i + 0.375, x_i + 0.4, x_i + 0.425, x_i + 0.45$, where x_i was the position of the voter on the left and right dimension (See footnote 18 in the manuscript for more details). For positions of the form $x + 0.5$, with $x \in N \cap [0,10]$, I have taken the average number of ballots assigned to points $x + 0.45, x + 0.55$. The furthest approximation made in the simulations was 0.02 increments away from the points found in the matrix. However, as the matrix consisted of 407 points more than half of the positions of the simulations were found in it.

When the ‘challenger’ is squeezed by rivals, his gains are found between the two cut- points defined by the challenger’s position and the first rival party on the left and right respectively. Algebraically:

3. If $x_\theta < x_\lambda < x'_\theta$ or $x'_\theta < x_\lambda < x_\theta$ then $G_2 = \left\langle \frac{x_\lambda + x_\theta}{2}, \frac{x_\lambda + x'_\theta}{2} \right\rangle$

Challenger’s gains among own partisans (G_3)

To compute the ‘challenger’s’ gains among his partisans, we follow *Remark 1* according to which:

Remark 1 [R1]
Assuming that there is no abstention, the percentage of the “challenger’s’ identifiers, voting actually for the ‘challenger’ (λ) will be those not defecting to the rivals (Θ).

with $\Theta = \{\theta, \theta_1, \theta_{2,} ..., \theta_7\}$, where $\theta, \theta_1, \theta_{2,} ..., \theta_7$ are the seven Finnish rival parties.

When rival parties are all placed to the left of the ‘challenger’ one needs to find the position for which the ‘challenger’ suffers the greatest loss. Then, from [R1] and (*) it follows that all ‘challenger’s’ partisans found to the right of this position vote for the ‘challenger’. In terms of distance (d) the foregoing can be given by the following relationship:

1. If $x_\lambda > x_\Theta$ $\forall x_i$ s.t $d(x_i, x_\lambda) = min\{d(t, x_\lambda) \forall t\}$ then $G_3 = \langle x_i, 10.45 \rangle$

When rival parties are placed to the right of the ‘challenger’, then from [R1] and (*) it follows that the ‘challenger’s’ own partisans who actually vote for the ‘challenger’ are those found to the left of the position for which the ‘challenger’ suffers the greatest loss over a rival party. In terms of distance (d):

2. If $x_\lambda < x'_\Theta$ $\forall x'_i$ s.t. $d(x'_i, x_\lambda) = min\{d(t, x_\lambda) \forall t\}$ then $G_3 = \langle -0.45, x'_i \rangle$

When some rival parties are found to the left and some others to the right of the ‘challenger’s’ position, then from [R1] and (*) it follows that: The ‘challenger’s’ gain among his ‘own partisans’ can be found by adding all partisans placed between the left and right position for which ‘the challenger suffers the greatest loss in partisans.

3. If $x_{\Theta} < x_{\lambda} < x'_{\Theta}$ then $G_3 = \langle x_i, x'_i \rangle$

The ‘challenger’s’ total vote share at each position is given by summing up the relevant gains among the three types of voters or:

$$G_{TOTAL} = G_1 + G_2 + G_3 .$$

I. The apartisan type of simulations

In the *apartisan* type of simulations we have $b = 0$. A voter who presents a position at x_i will vote for λ instead of θ if the utility differential of λ over θ is positive, or:

$$U_i(\lambda) > U_i(\theta) \Rightarrow -(x_i - x_\lambda)^2 > -(x_i - x_\theta)^2 + 0 ,$$

and solving for x_i when $x_\lambda > x_\theta$,

$$x_i > \frac{x_\lambda^2 - x_\theta^2}{2(x_\lambda - x_\theta)} \Rightarrow x_i > \frac{(x_\lambda - x_\theta)(x_\lambda + x_\theta)}{2(x_\lambda - x_\theta)} \Rightarrow x_i > \frac{1}{2}(x_\lambda + x_\theta)$$

Similarly when $x_\lambda < x_\theta$,

$$x_i < \frac{1}{2}(x_\lambda + x_\theta)$$