Household political signs and vote share Oct 31 2022

List of supplemental materials

Appendix A – Evidence of statistical heterogeneity for aggregated model/dataset
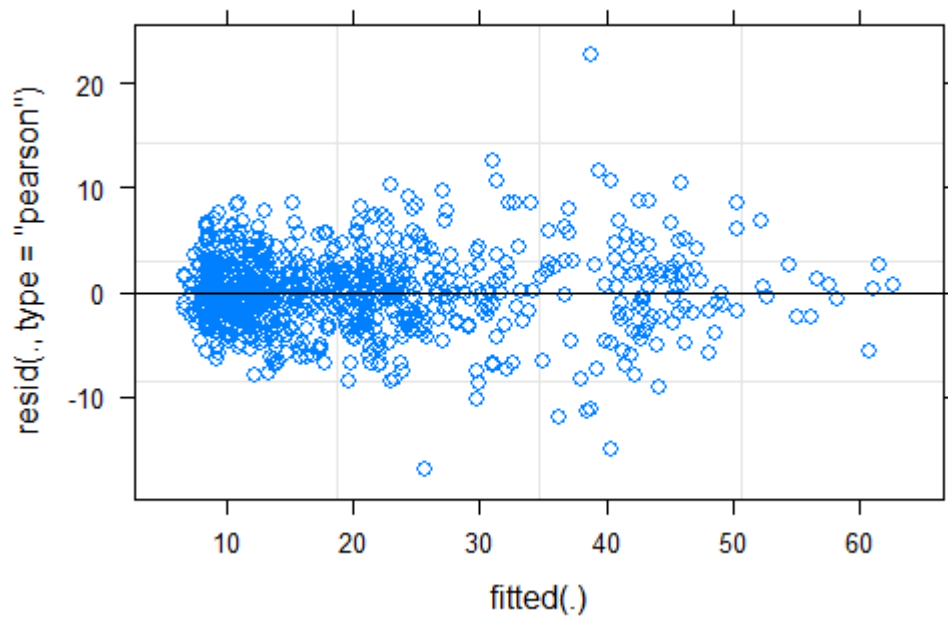

Figure 1. Plot of residuals vs fitted for aggregate model, $N = 785$
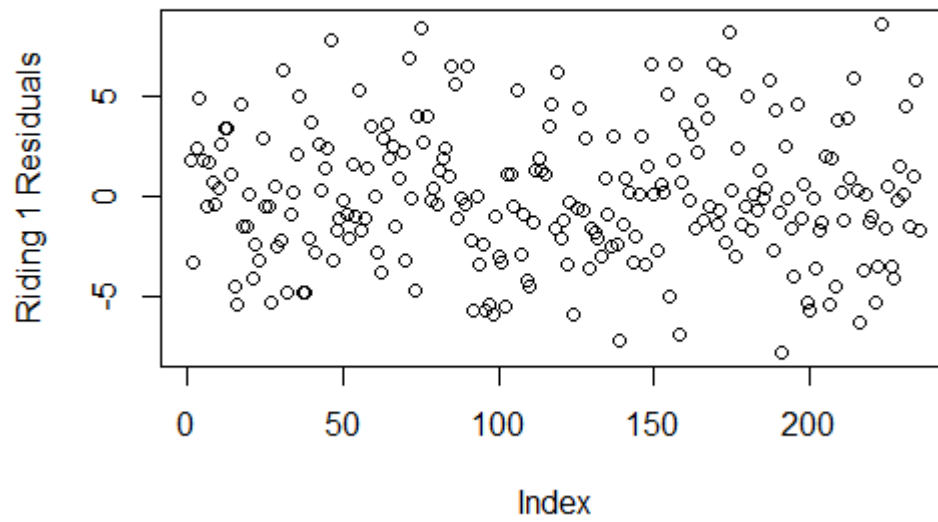
Figure 2. Electoral District 1 multilevel model (MLM) homoscedasticity

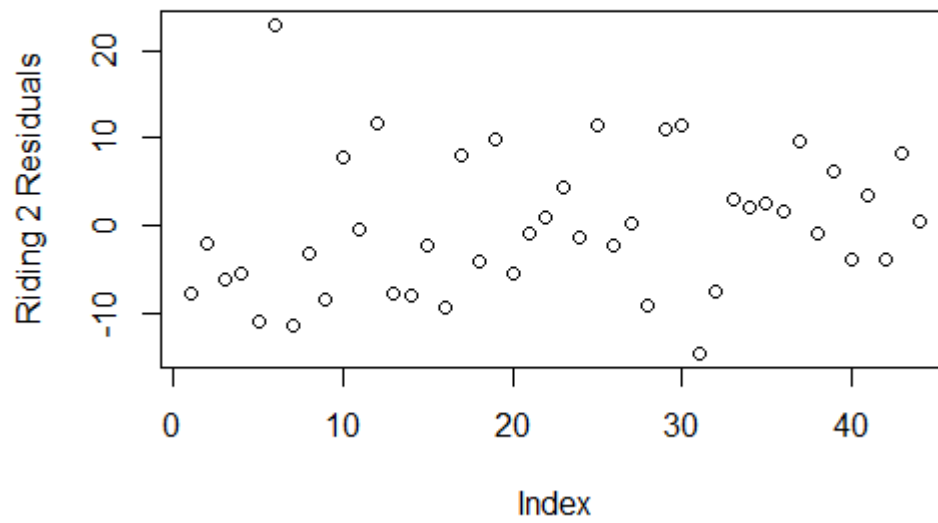**Figure 3.** Electoral District 2 multilevel model (MLM) homoscedasticity

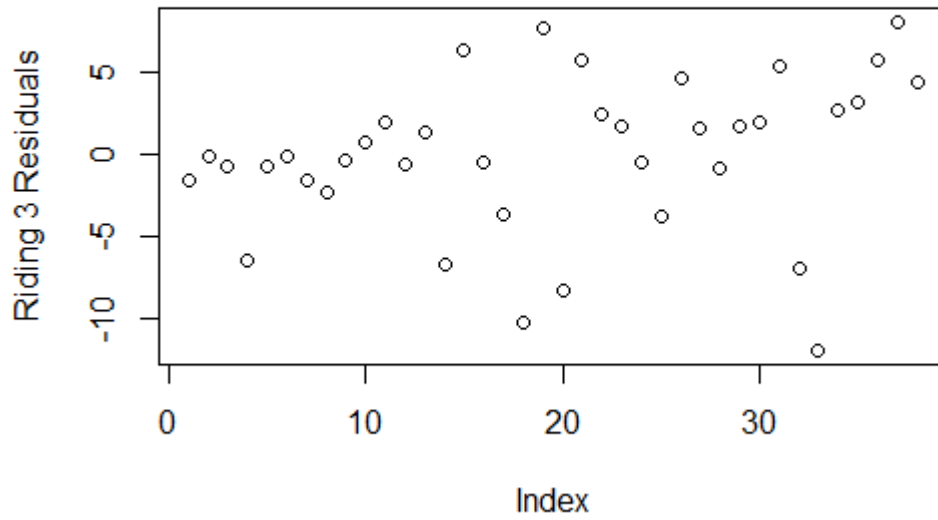**Figure 4.** Electoral District 3 multilevel model (MLM) homoscedasticity
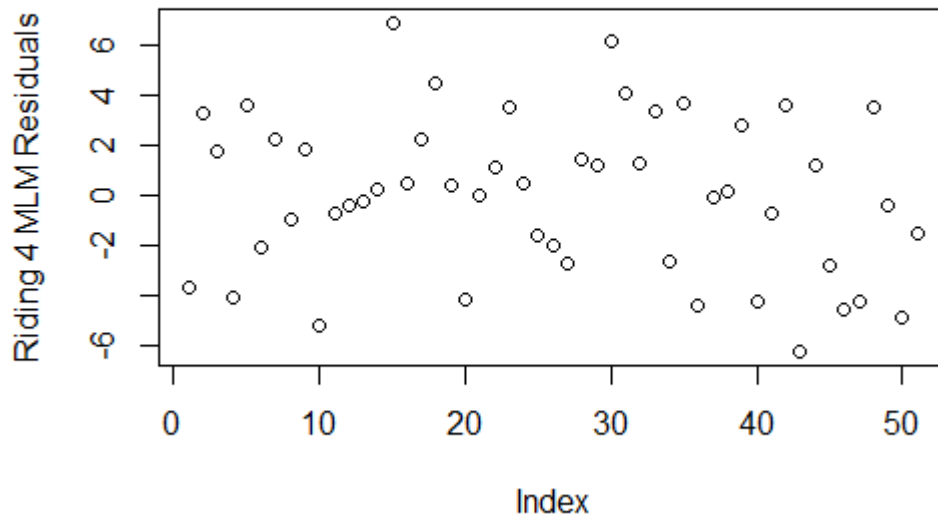
Figure 5. Electoral District 4 multilevel model (MLM) homoscedasticity
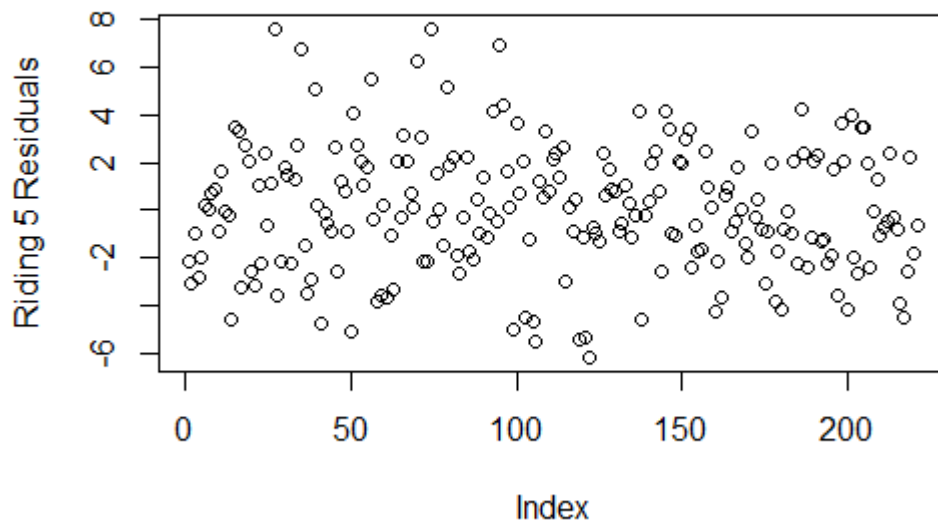
Figure 6. Electoral District 5 multilevel model (MLM) homoscedasticity
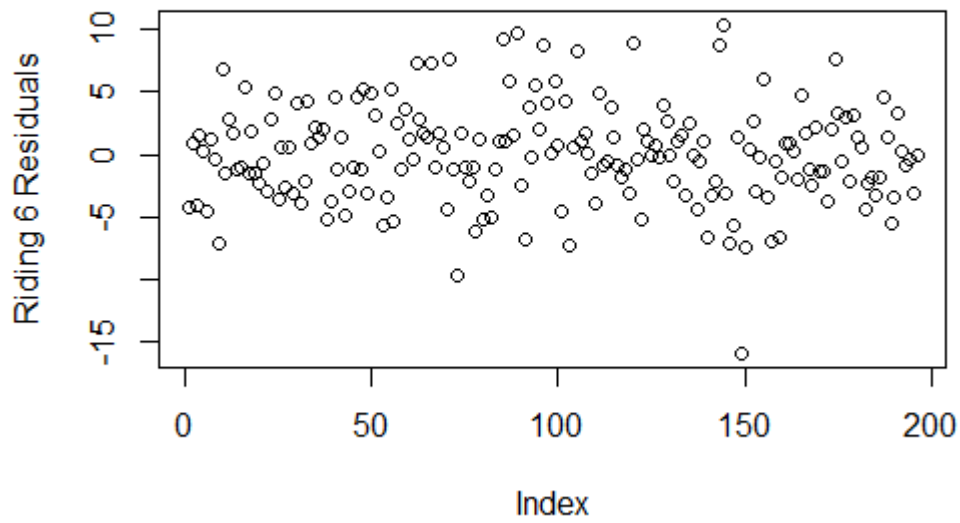
Figure 7. Electoral District 6 multilevel model (MLM) homoscedasticity

Appendix B – Basic scatterplots for each ED and aggregated dataset
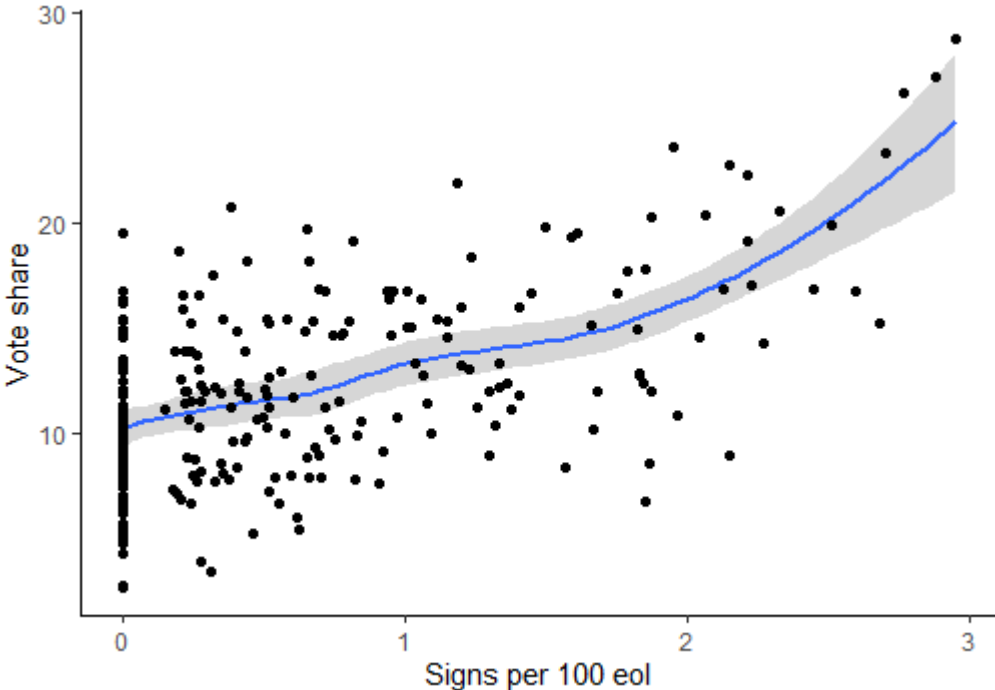
Figure 8. Scatterplot for Electoral District 1
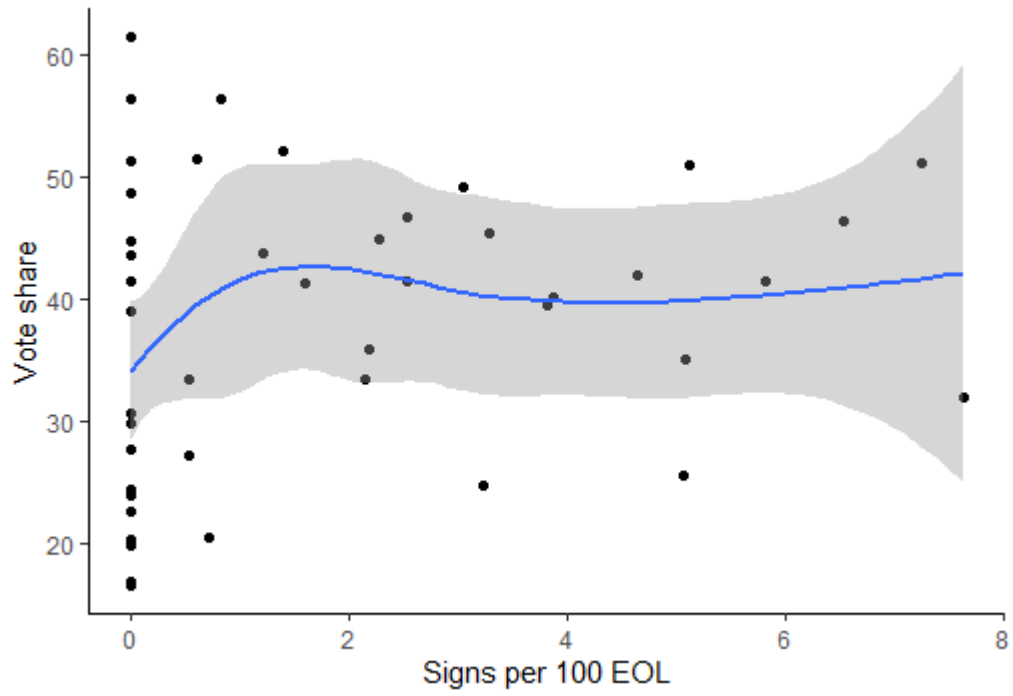
Figure 9. Scatterplot for Electoral District 2
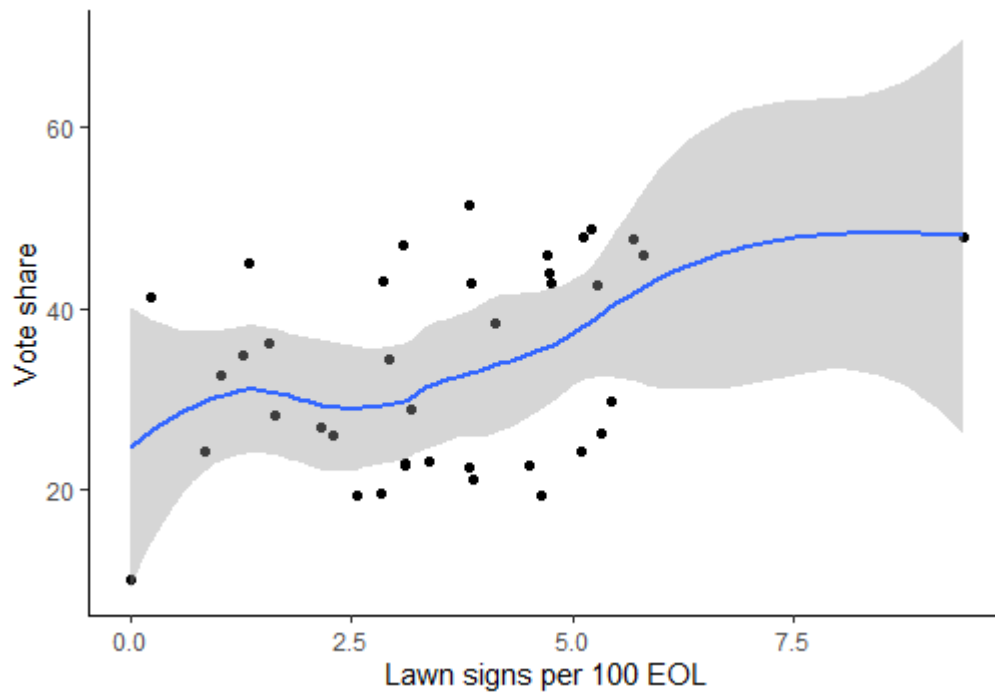
Figure 10. Scatterplot for Electoral District 3
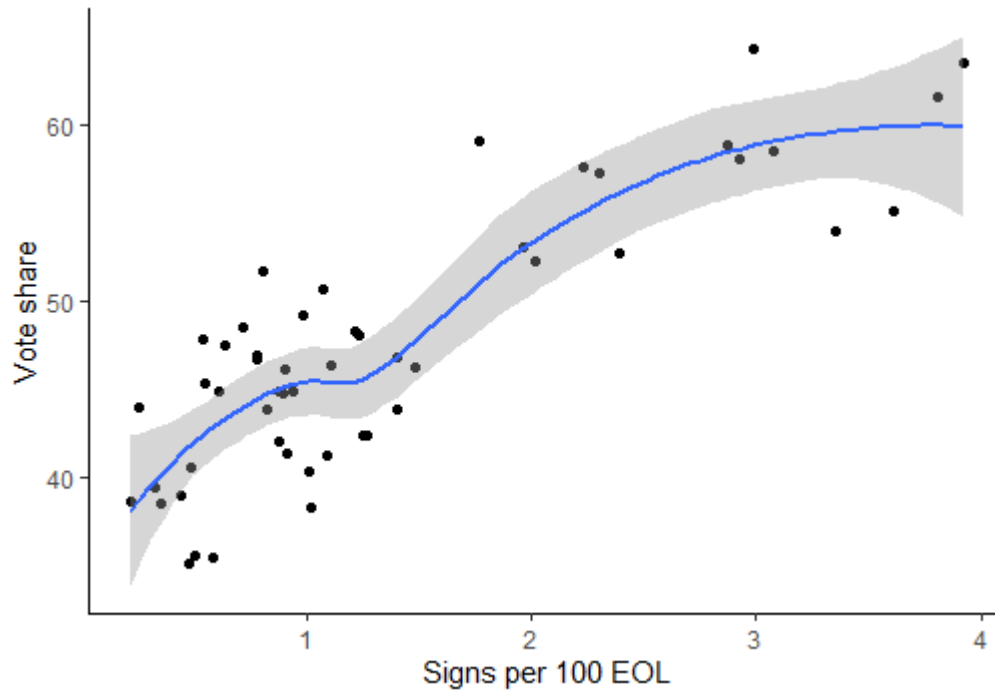
Figure 11. Scatterplot for Electoral District 4
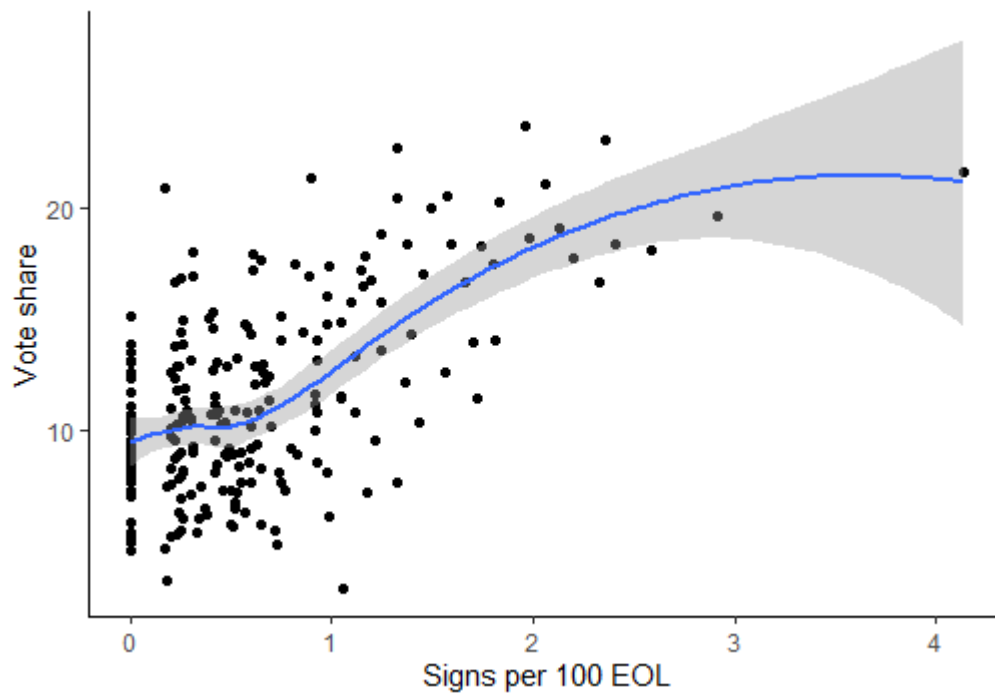
Figure 12. Scatterplot for Electoral District 5
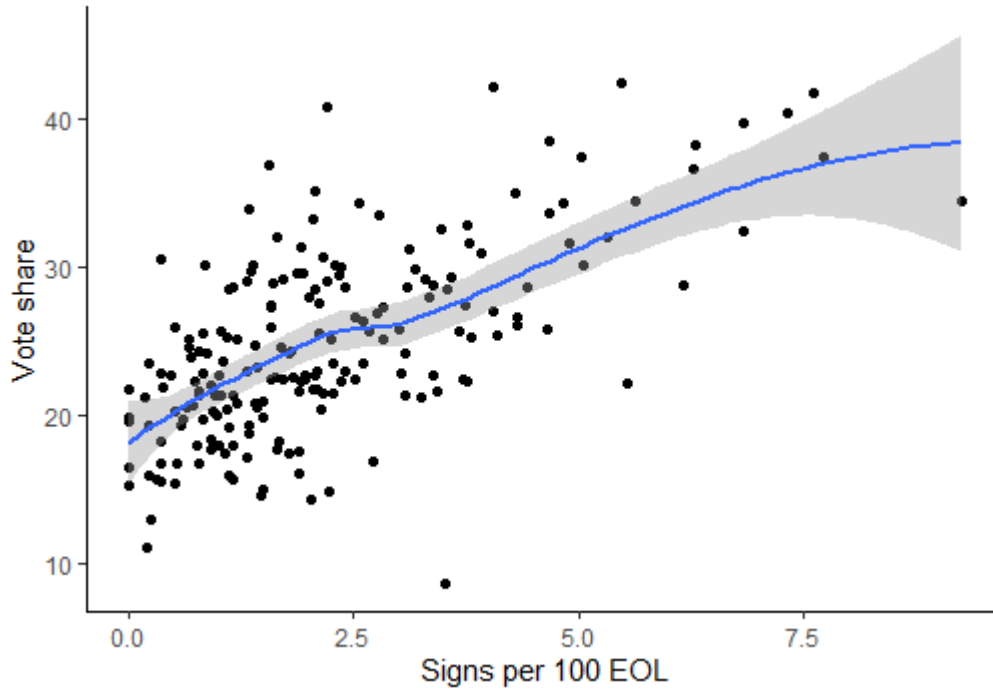
Figure 13. Scatterplot for Electoral District 6

Basic scatterplots for aggregated dataset
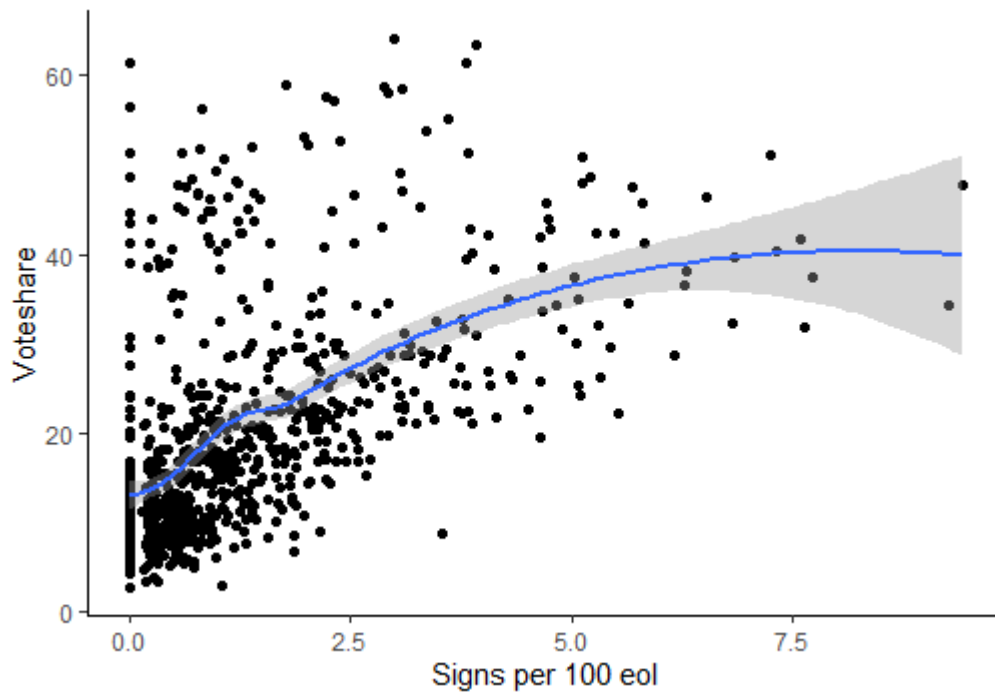
Figure 14. Scatterplot for aggregate dataset, with pooled line of best fit
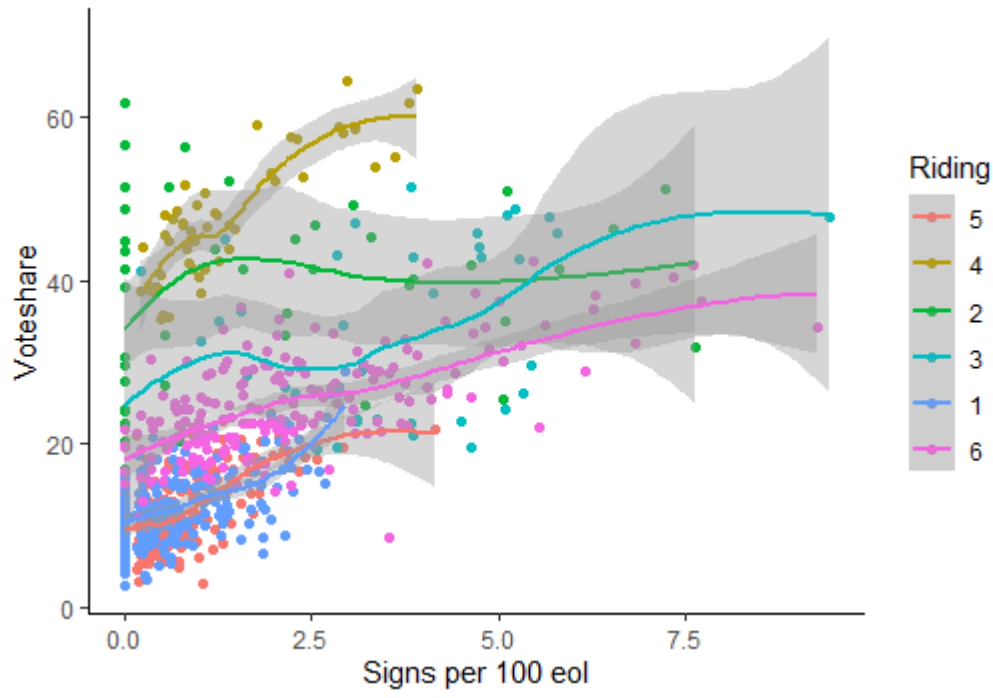
Figure 15. Scatterplot for aggregate dataset, with group-level lines of best fit

Categorical linear regression tables

The associative regression analyses below are for broad approximation only and not to be interpreted unless using a great deal of caution. These analyses are "flat", that is, they do not account for the non-independence of the polls nor the heteroscedasticity demonstrated by some of the variables.

Table 1

*Regression results using vote share as the criterion and electoral district as a predictor*

Predictor	b	b 95% CI [LL, UL]	beta	beta 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	r	Fit
(Intercept)	16.24**	[14.43, 18.05]						
Electoral district	1.01**	[0.58, 1.44]	0.16	[0.09, 0.23]	.03	[.01, .05]	.16**	
								$R^2 =$ .027** 95% CI[.01,.05]

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively. * indicates $p < .05$. ** indicates $p < .01$.

Table 2

Regression results using vote share as the criterion and year as a predictor

Predictor	b	b 95% CI [LL, UL]	beta	beta 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	r	Fit
(Intercept)	-2913.22**	[-3882.93, -1943.51]						
Year	1.45**	[0.97, 1.93]	0.21	[0.14, 0.28]	.04	[.02, .07]	.21**	

$R^2 =$
.043**
95%
CI[.02,.07]

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively. * indicates $p < .05$. ** indicates $p < .01$.

Table 3

Regression results using vote share as the criterion and electoral level as a predictor

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	15.84**	[15.18, 16.50]			
Electoral level	24.55**	[22.95, 26.15]	.54	[.49, .57]	
					$R^2 = .536**$ 95% CI[.49,.57]

Note. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively. * indicates p < .05. ** indicates p < .01.

Table 4

Regression results using vote share as the criterion and province as the predictor

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	35.95**	[33.49, 38.41]			
Province	-17.81**	[-20.41, -15.21]	.19	[.14, .23]	
					$R^2 = .188**$ 95% CI[.14,.23]

Note. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents

unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
* indicates p < .05. ** indicates p < .01.

Table 5

Regression results using vote share as the criterion and riding as the predictor

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	21.04**	[20.07, 22.00]			
Riding A	-8.66**	[-10.34, -6.99]	.09	[.06, .13]	
Riding B	14.92**	[12.41, 17.43]	.12	[.09, .16]	
					R^2 = .282**
					95% CI[.23,.33]

Note. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
* indicates p < .05. ** indicates p < .01.

Table 6
Model comparison of the above as potential explanatory models

Predictor/model	df	AIC	R2
Electoral district	7	5112.417	0.7536
Year	5	5580.449	0.5516
Electoral level	3	5606.539	0.5353
Province	3	6046.070	0.1865
Riding	4	5950.966	0.2803

Exploratory grouping-level intraclass coeffecient (ICC) analyses

Neighbourhood as the sole group-level predictor for the multilevel model
AIC = 5942.357
BIC = 5956.354
ICC = 0.4977237

Riding as the sole group-level predictor for the multilevel model
AIC = 5961.949
BIC = 5975.946
ICC = 0.5527897

Year as the sole group-level predictor for the multilevel model

AIC = 5598.055
BIC = 5612.052
ICC = 0.7933872

Province as the sole group-level predictor for the multilevel model
AIC = 6052.238
BIC = 6066.235
ICC = 0.5503762

Electoral Level as the sole group-level predictor for the multilevel model
AIC = 5614.877
BIC = 5628.874
ICC = 0.8034488

Appendix D – Multilevel Regression Tables

Multilevel regression tables were produced using sjPlot (Lüdecke, 2021).

Table 7

Electoral District 1 multilevel regression results for effect of signs per 100 EOL on vote share for linear-only model, cubic model, and presence/absence model

	Vote share (linear)					Vote share (cubic)					Vote share (treatment)				
	B	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*
(Intercept)	11.23 ***	9.50 to 12.96	12.74	4.81	< .001	10.13 ***	7.43 to 12.83	7.36	21.65	< .001	11.22 ***	9.10 to 13.33	10.39	5.49	< .001
Signs per 100 EOL	3.00 ***	2.40 to 3.60	9.79	231.27	< .001	8.56 *	1.80 to 15.31	2.48	161.08	.014					
signsper^2						-6.44 *	-12.01 to -0.88	-2.27	160.97	.025					
signsper^3						1.80 **	0.50 to 3.09	2.72	160.85	.007					
signs present											2.97 ***	1.89 to 4.04	5.40	230.21	< .001
Random Effects															
σ^2	11.38					10.41					14.25				
τ_{00}	3.29 nbhd					3.57 nbhd					4.64 nbhd				
ICC	0.22					0.26					0.25				
N	5 nbhd					5 nbhd					5 nbhd				
Obs.	235					168					235				
Margin.R^2 / Condit.R^2	0.25 / 0.42					0.26 / 0.45					0.087 / 0.31				

	AIC	1255.66	886.80	1307.58

AIC	1255.66	886.80	1307.58
BIC	1269.50	905.55	1321.42

*p < .05   **p < .01   ***p < .001

Table 8

Electoral District 2 multilevel regression results for effect of signs per 100 EOL on vote share for linear model and presence/absence model

	Vote share (linear-only)					Vote share (treatment)				
	B	CI	t	df	p	B	CI	t	df	p
(Intercept)	38.04 ***	31.83 to 44.25	12.01	13.85	**< .001**	36.46 ***	29.96 to 42.97	10.99	19.01	**< .001**
Signs per 100 EOL	-0.20	-1.76 to 1.35	-0.26	41.70	.800					
Signs present						2.21	-4.41 to 8.83	0.65	40.82	.517
Random Effects										
σ^2	77.63					79.38				
τ_{00}	74.74 $_{nbhd}$					65.05 $_{nbhd}$				
ICC	0.49					0.45				
N	12 $_{nbhd}$					12 $_{nbhd}$				
Obs.	44					44				
Marginal R^2 / Conditional R^2	0.001 / 0.49					0.008 / 0.45				
AIC	334.51					331.27				
BIC	341.65					338.40				

*p < .05   **p < .01   ***p < .001

Table 9

Electoral District 3 multilevel regression results for effect of signs per 100 EOL on vote share for linear, log and quadratic models

	Vote Share (linear-only)					Vote share (linear-only, *n* = 37)					Vote share (log)					Vote share (quadratic)				
	B	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*
(Intercept)	30.10 ***	22.85 to 37.36	8.13	26.29	< .001	31.64 ***	24.14 to 39.14	8.27	27.60	< .001	31.80 ***	24.32 to 39.28	8.33	27.00	< .001	33.36 ***	23.00 to 43.71	6.31	33.44	< .001
Signs per 100 EOL	1.36	-0.01 to 2.72	1.95	29.82	.060	0.97	-0.48 to 2.42	1.31	29.22	.199	2.18	-0.57 to 4.93	1.55	24.49	.133	0.03	-4.06 to 4.13	0.02	28.68	.988
log(signsper)											-4.07	-11.96 to 3.83	-1.01	27.40	.321					
signsper^2																0.10	-0.32 to 0.52	0.48	25.98	.632

Random Effects

σ^2	32.39	31.52	31.84	32.60
τ_{00}	83.80 nbhd	82.32 nbhd	80.22 nbhd	81.90 nbhd
ICC	0.72	0.72	0.72	0.72
N	13 nbhd	13 nbhd	13 nbhd	13 nbhd
Obs.	38	37	37	37
Margin. R^2 / Condit. R^2	0.053 / 0.74	0.026 / 0.73	0.032 / 0.72	0.025 / 0.72
AIC	268.01	260.48	256.84	263.50
BIC	274.56	266.92	264.89	271.55

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 10

Electoral District 4 multilevel regression results for effect of signs per 100 EOL on vote share for linear, log and quadratic model

	Vote share (linear)					Vote share (log)					Vote share (quadratic)				
	B	CI	t	df	p	B	CI	t	df	p	B	CI	t	df	p
(Intercept)	39.57 ***	37.42 to 41.72	36.06	28.41	< .001	41.81 **	37.58 to 46.05	19.36	47.98	< .001	37.52 ***	33.77 to 41.27	19.61	36.02	< .001
Signs per 100 EOL	5.91 ***	4.75 to 7.06	9.99	47.34	< .001	4.14 *	1.05 to 7.24	2.62	46.36	.012	8.97 ***	4.02 to 13.92	3.55	43.09	.001
log(signsper)						2.70	-1.75 to 7.15	1.19	47.86	.240					
signsper^2											-0.76	-1.97 to 0.46	-1.22	46.08	.228

Random Effects

σ^2	12.29					12.05					12.78				
τ_{00}	4.79 nbhd					5.00 nbhd					3.77 nbhd				
ICC	0.28					0.29					0.23				
N	21 nbhd					21 nbhd					21 nbhd				
Obs.	51					51					51				
Margin. R² / Condit. R²	0.67 / 0.76					0.68 / 0.77					0.691 / 0.76				
AIC	290.28					287.39					289.98				
BIC	298.00					297.05					299.64				

*p < .05   **p < .01   ***p < .001*

Table 11

Electoral District 5 multilevel regression results for effect of signs per 100 EOL on vote share for linear, linear (n = 184), log, and quadratic models

	Vote share (linear, N = 221)					Vote share (linear, n = 184)					Vote share (log)					Vote share (quadratic)				
	B	CI	t	df	p	B	CI	t	df	p	B	CI	t	df	p	B	CI	t	df	p
(Intercept)	10.26 ***	9.01 to 11.51	16.08	26.66	< .001	10.38 ***	9.00 to 11.76	14.74	30.73	< .001	10.08 ***	7.56 to 12.61	7.82	148.52	< .001	10.04 ***	8.50 to 11.58	12.80	45.33	< .001
Signs per 100 EOL	2.97 ***	2.26 to 3.68	8.24	216.49	< .001	2.83 ***	2.03 to 3.63	6.91	178.11	< .001	3.06 **	1.23 to 4.89	3.27	167.52	.001	3.69 ***	1.83 to 5.56	3.88	168.84	< .001
log(signsper)											-0.21	-1.73 to 1.31	-0.27	166.02	.787					
signsper^2																-0.32	-0.93 to 0.30	-1.00	165.11	.316

Random Effects

σ^2	7.71	7.87	7.92	7.86
τ_{00}	6.78 nbhd	7.66 nbhd	7.61 nbhd	7.73 nbhd
ICC	0.47	0.49	0.49	0.50
N	23 nbhd	23 nbhd	23 nbhd	23 nbhd
Obs.	221	184	184	184
Margin. R^2 / Condit. R^2	0.19 / 0.57	0.16 / 0.58	0.16 / 0.57	0.16 / 0.58
AIC	1131.50	952.73	953.33	954.20
BIC	1145.09	965.59	969.41	970.28

*p < .05   **p < .01   ***p < .001*

Table 12

Electoral District 5 multilevel regression results for presence/absence model

	Vote share (treatment)				
	B	*CI*	*t*	*df*	*p*
(Intercept)	10.60 ***	8.84 to 12.35	11.84	45.72	**< .001**
Signs present	1.95 **	0.78 to 3.12	3.27	203.52	**.001**
Random Effects					
σ^2	9.38				
$\tau_{00\ nbhd}$	10.89				
ICC	0.54				
N $_{nbhd}$	23				
Observations	221				
Marginal R^2 / Conditional R^2	0.026 / 0.55				
AIC	1178.83				
BIC	1192.43				

* p < .05   ** p < .01   *** p < .001

Table 13

Electoral District 6 multilevel regression results for effect of signs per 100 EOL on vote share for linear, linear (n = 191) and log models

	Vote share (linear)					Vote share (linear, *n* = 191)					Vote share (log)				
	B	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*
(Intercept)	21.14 ***	19.35 to 22.93	23.12	33.38	< .001	21.44 ***	19.57 to 23.31	22.49	34.06	< .001	22.31 ***	20.27 to 24.35	21.41	42.35	< .001
Signs per 100 EOL	1.91 ***	1.49 to 2.32	9.01	194.00	< .001	1.82 ***	1.39 to 2.25	8.28	189.00	< .001	0.98 *	0.12 to 1.85	2.24	183.07	.026
log(signsper)											1.92 *	0.17 to 3.67	2.15	175.31	.033

Random Effects

σ^2	17.06				17.13		16.65
τ_{00}	10.37 nbhd				11.14 nbhd		12.04 nbhd
ICC	0.38				0.39		0.42
N	23 nbhd				23 nbhd		23 nbhd
Obs.	196				191		191
Margin.R^2 / Condit.R^2	0.28 / 0.55				0.25 / 0.54		0.25 / 0.57
AIC	1156.82				1129.82		1125.69
	1169.93				1142.83		1141.96

* p < .05   ** p < .01   *** p < .001

Table 14

Aggregated multilevel regression results for 4-level model with random intercepts, random slopes in riding, and presence/absence models

	Vote share (random intercepts)					Vote share (random slope in ED)					Vote share (treatment)				
	B	CI	t	df	p	B	CI	t	df	p	B	CI	t	df	p
(Intercept)	24.80	6.66 to 42.95	2.68	1.70	.137	25.02	2.29 to 47.75	2.16	0.87	.305	24.60	3.35 to 45.86	2.27	1.46	.196
Signs per 100 EOL	1.79 ***	1.50 to 2.07	12.24	767.01	< **.001**	1.72	0.10 to 3.34	2.08	1.95	.175					
Signs present											2.46 ***	1.53 to 3.39	5.19	735.48	< **.001**

Random Effects

σ^2	17.06	16.08	19.59
τ_{00}	39.01 nbhd	44.58 nbhd	46.95 nbhd
	91.59 year	46.68 year	78.74 year
	30.15 electoral.district	30.23 electoral.district	44.16 electoral.district
	102.24 electoral.level	221.86 electoral.level	162.18 electoral.level
τ_{11}		1.96 electoral.district.signsper	
ρ_{01}		-0.02 electoral.district	
ICC	0.94	0.96	0.94
N	53 nbhd	53 nbhd	53 nbhd
	3 electoral.district	3 electoral.district	3 electoral.district
	4 year	4 year	4 year
	2 electoral.level	2 electoral.level	2 electoral.level

Obs.	785	785	785
Margin.R^2 / Condit. R^2	0.025 / 0.94	0.018 / 0.96	0.002 / 0.94
AIC	4647.13	4619.18	4755.17
BIC	4679.79	4661.17	4787.83

*p < .05   ** p < .01   *** p < .001*

Table 15

Aggregated multilevel regression results for 4-level model for linear, log, and quadratic models

	Vote share (linear)					Vote share (log)					Vote share (quadratic)				
	B	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*	*B*	*CI*	*t*	*df*	*p*
(Intercept)	24.66	6.20 to 43.12	2.62	1.58	.152	25.70	7.33 to 44.06	2.74	1.54	.147	23.89	5.71 to 42.06	2.58	1.59	.155
Signs per 100 EOL	1.67 ***	1.36 to 1.97	10.77	636.23	**< .001**	1.00 ***	0.51 to 1.49	3.99	621.46	**< .001**	2.68 ***	2.01 to 3.34	7.90	613.53	**< .001**
log(signsper)						1.29 ***	0.54 to 2.05	3.36	603.79	**.001**					
signsper^2											-0.16 ***	-0.25 to -0.07	-3.35	610.07	**.001**

Random Effects

	Vote share (linear)	Vote share (log)	Vote share (quadratic)
σ^2	16.10	15.82	15.83
τ_{00}	31.61 nbhd	32.10 nbhd	31.90 nbhd
	85.49 year	81.39 year	84.25 year
	31.79 electoral.district	30.33 electoral.district	29.93 electoral.district
	110.48 electoral.level	111.53 electoral.level	106.80 electoral.level
ICC	0.94	0.94	0.94
N	51 nbhd	51 nbhd	51 nbhd
	3 electoral.district	3 electoral.district	3 electoral.district
	4 year	4 year	4 year
	2 electoral.level	2 electoral.level	2 electoral.level
Obs.	657	657	657
Marg. R^2 / Condit. R^2	0.022 / 0.94	0.025 / 0.94	0.026 / 0.94

AIC	3864.19	3855.10	3859.33
BIC	3895.60	3891.00	3895.23

*p < .05   **p < .01   ***p < .001