1 17th National Assembly Election

Table 1: 17th Election: Comparison of Actual vs. Simulated Vote Shares

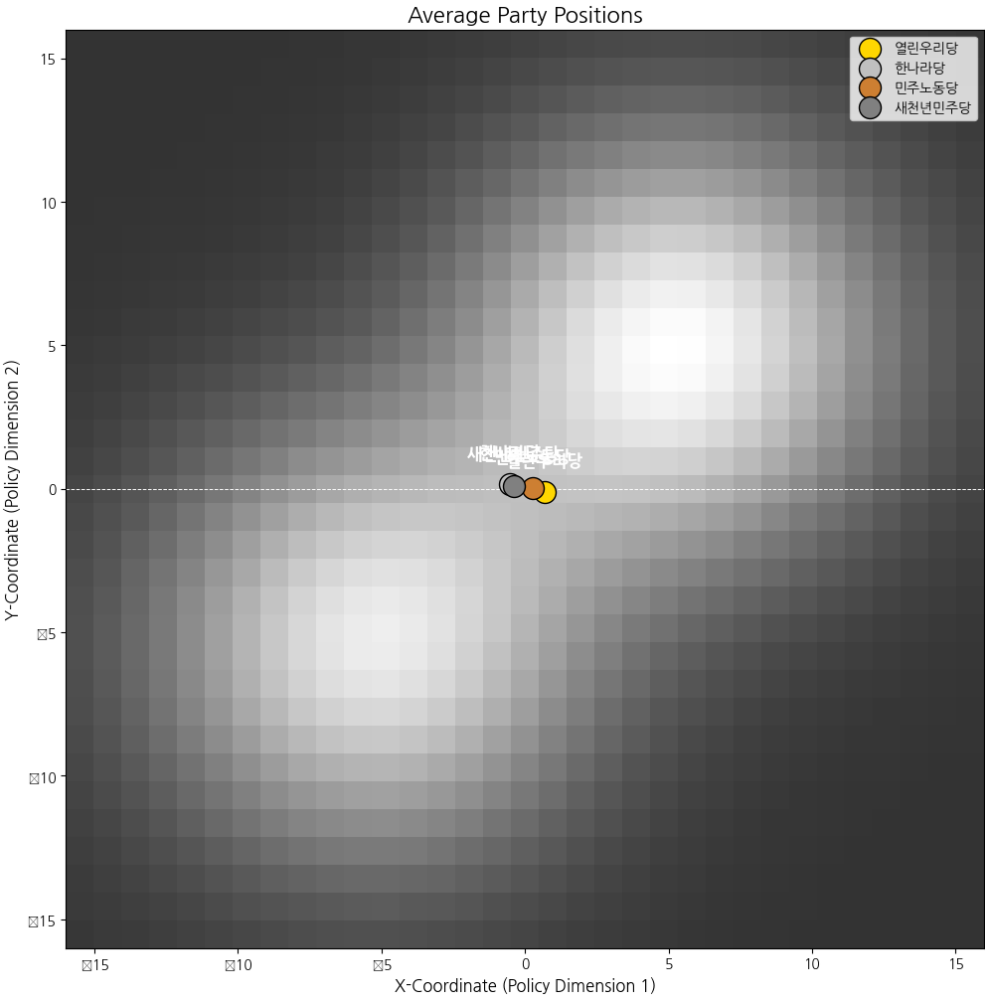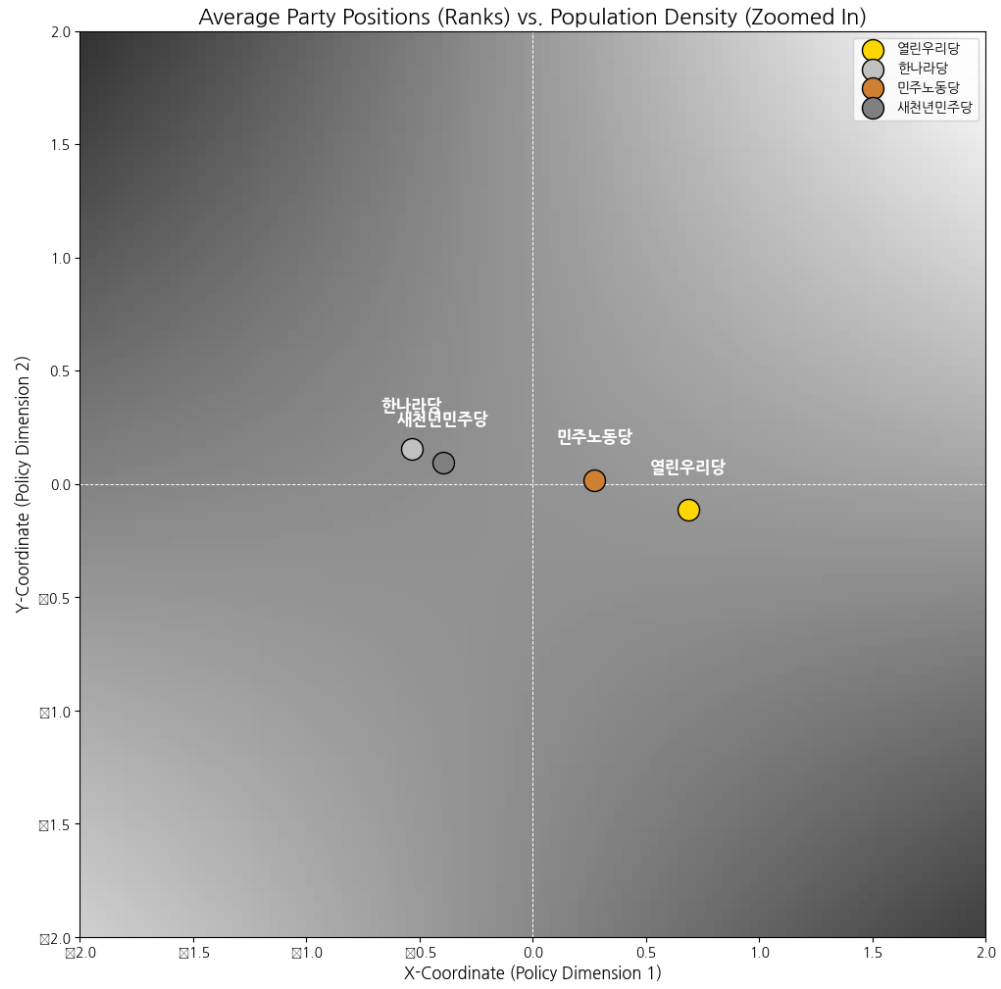| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
열린우리당	38.27	40.77 (1.53)	2.50	0.56 (0.37)	0.41 (0.05)	-0.65 (0.71)	60.77 (17.36)	(0.69, -0.12)	H(30.7), P(21.9), E(18.3)
한나라당	35.77	36.63 (2.40)	0.86	0.54 (0.36)	0.38 (0.06)	-0.76 (0.74)	56.20 (18.88)	(-0.53, 0.16)	A(27.0), H(19.7), P(19.0)
민주노동당	13.03	14.99 (2.38)	1.96	0.65 (0.36)	0.22 (0.07)	-0.80 (0.96)	45.80 (19.31)	(0.27, 0.02)	S(24.1), P(22.6), H(20.4)
새천년민주당	7.09	7.60 (1.94)	0.51	0.72 (0.33)	0.16 (0.06)	-0.63 (0.99)	37.59 (16.08)	(-0.39, 0.09)	S(30.7), P(21.2), A(19.7)

Figure 1: 17th Election

Figure 2: 17th Election (Zoomed)

2 18th National Assembly Election

Table 2: 18th Election: Comparison of Actual vs. Simulated Vote Shares

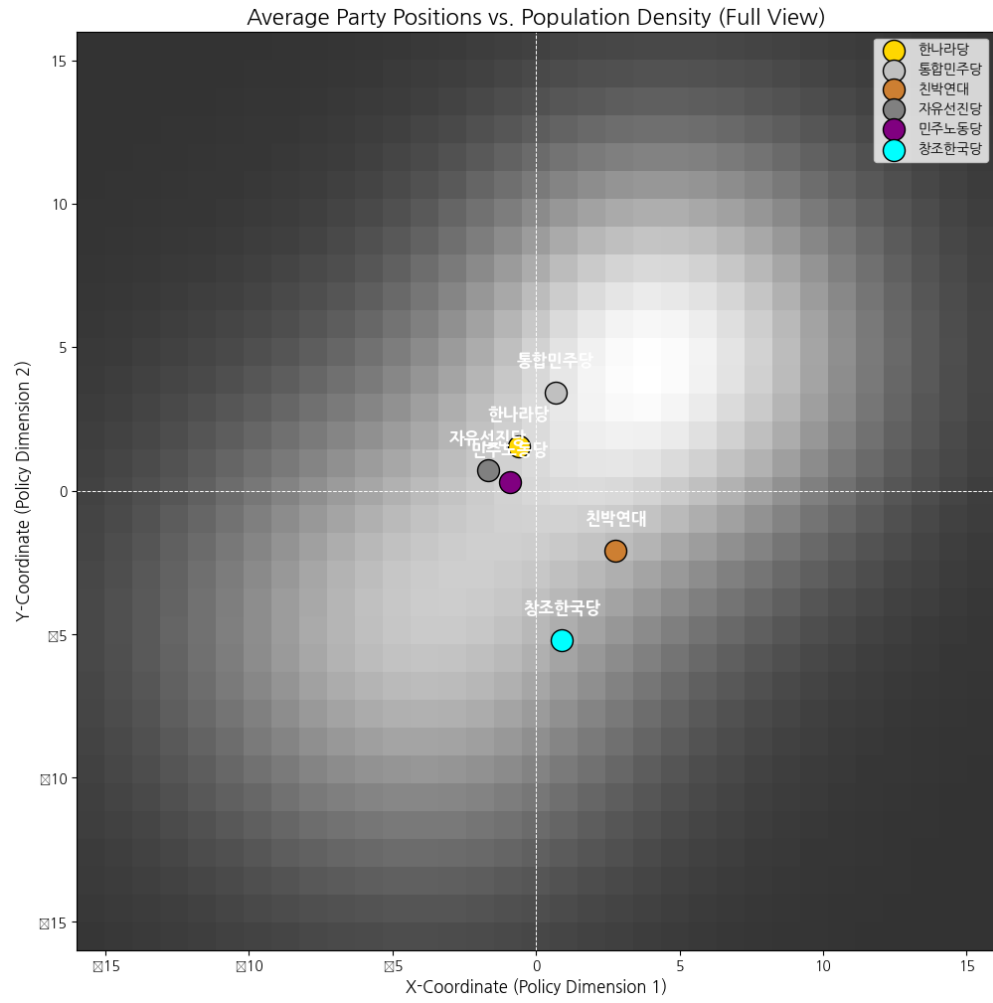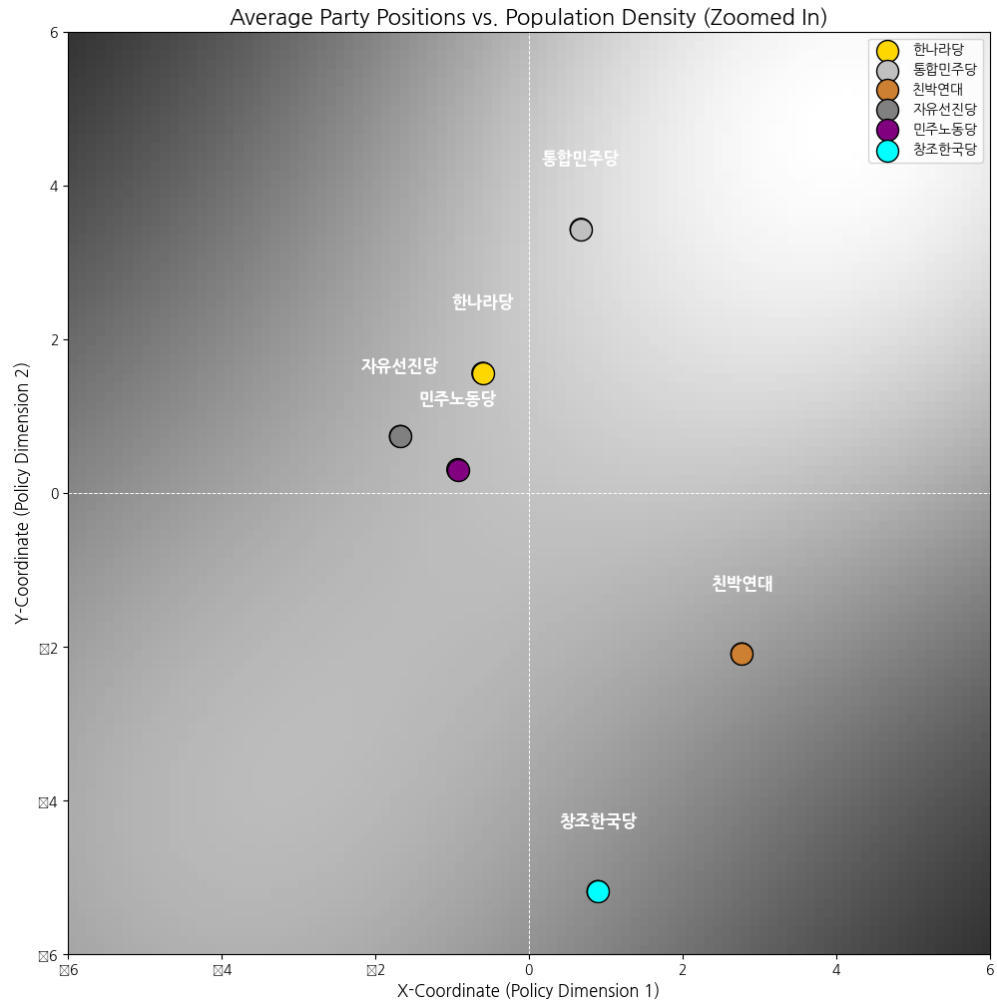| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
한나라당	37.48	37.84 (3.21)	0.36	0.58 (0.29)	0.39 (0.07)	-0.59 (0.63)	69.44 (11.02)	(-0.60, 1.56)	H(33.3), E(22.2), A(22.2)
통합민주당	25.18	26.98 (2.32)	1.80	0.58 (0.25)	0.26 (0.06)	-0.98 (0.88)	72.22 (8.33)	(0.68, 3.43)	E(22.2), P(22.2), H(22.2)
친박연대	13.18	15.89 (2.04)	2.71	0.71 (0.25)	0.19 (0.02)	-0.70 (0.83)	47.22 (23.20)	(2.77, -2.10)	H(55.6), P(22.2), E(11.1), A(11.1)
자유선진당	6.85	9.92 (1.55)	3.07	0.71 (0.32)	0.13 (0.02)	-1.05 (0.89)	44.44 (16.67)	(-1.67, 0.73)	A(44.4), S(44.4), E(11.1)
민주노동당	5.68	6.40 (1.95)	0.72	0.40 (0.37)	0.12 (0.05)	-0.50 (0.92)	47.22 (19.54)	(-0.92, 0.30)	E(44.4), H(22.2), A(11.1)
창조한국당	3.81	2.96 (1.87)	0.85	0.67 (0.39)	0.09 (0.04)	-0.76 (1.13)	36.11 (18.16)	(0.90, -5.19)	S(33.3), P(22.2), H(22.2), A(22.2)

Figure 3: 18th Election

Figure 4: 18th Election (Zoomed)

3   19th National Assembly Election

Table 3: 19th Election: Comparison of Actual vs. Simulated Vote Shares

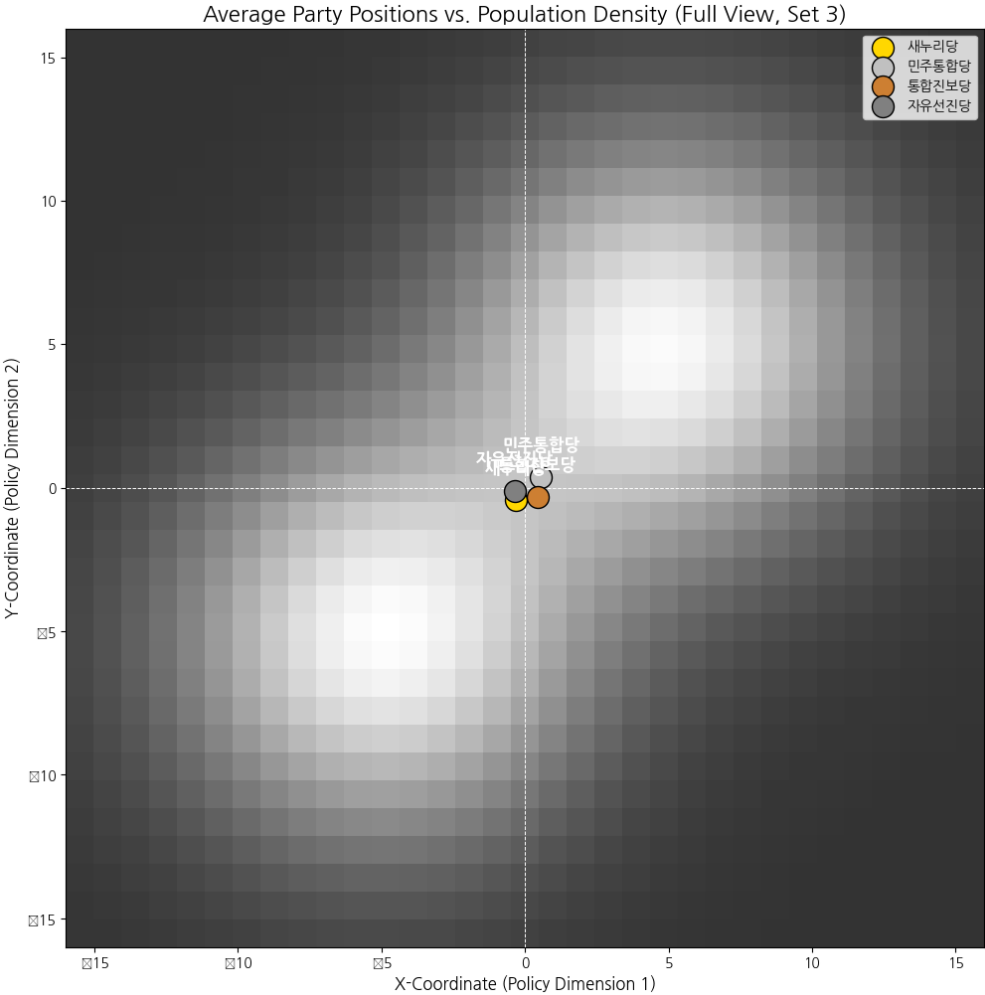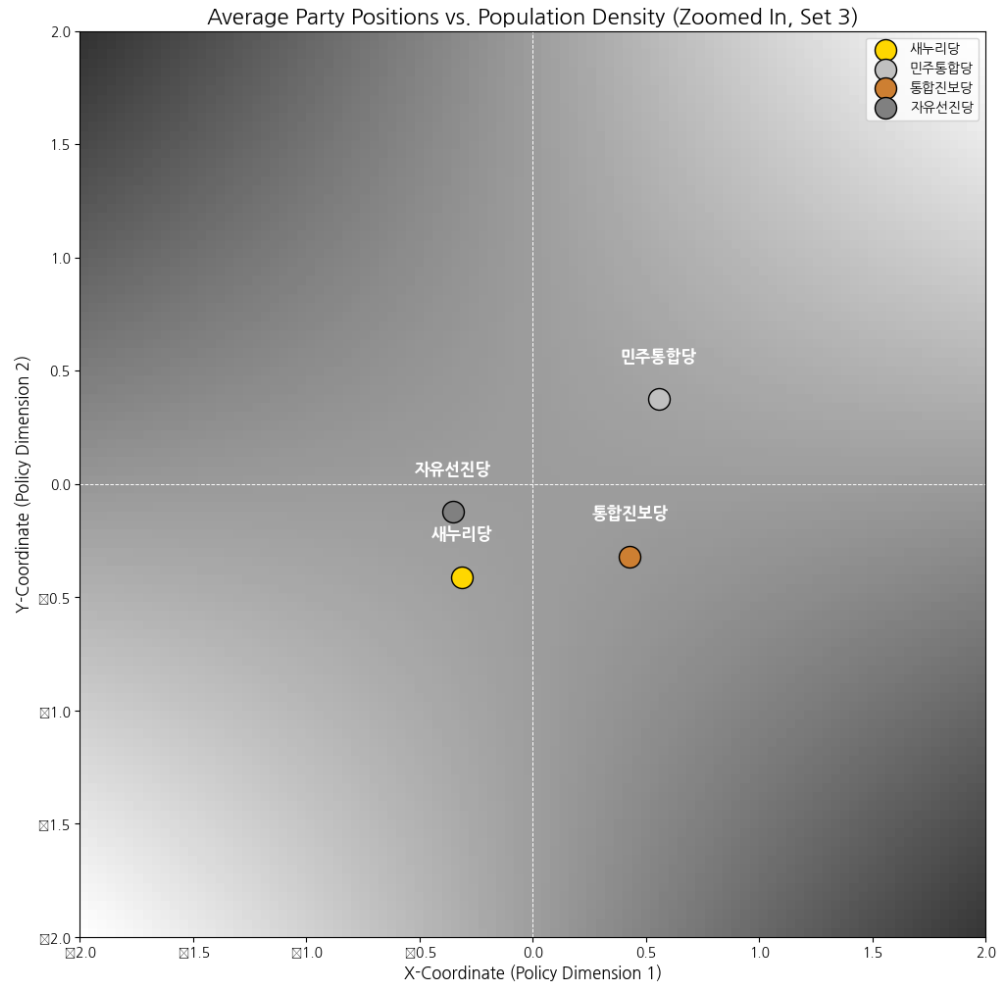| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
새누리당	42.80	44.25 (2.13)	1.45	0.58 (0.37)	0.44 (0.06)	-0.59 (0.59)	65.31 (15.41)	(-0.31, -0.41)	H(25.6), E(23.3), A(20.2)
민주통합당	36.45	37.73 (2.37)	1.28	0.53 (0.38)	0.39 (0.06)	-0.62 (0.69)	61.43 (17.68)	(0.56, 0.37)	A(26.4), E(24.0), P(18.6)
통합진보당	10.30	12.79 (1.77)	2.49	0.62 (0.35)	0.18 (0.05)	-0.73 (0.85)	42.64 (19.11)	(0.43, -0.32)	E(23.3), S(20.9), A/H(20.2)
자유선진당	3.23	5.23 (2.19)	2.00	0.72 (0.36)	0.13 (0.07)	-0.74 (1.07)	36.24 (16.52)	(-0.35, -0.12)	S(36.4), P(19.4), A(17.8)

Figure 5: 19th Election

Figure 6: 19th Election (Zoomed)

4 20th National Assembly Election

Table 4: 20th Election: Comparison of Actual vs. Simulated Vote Shares

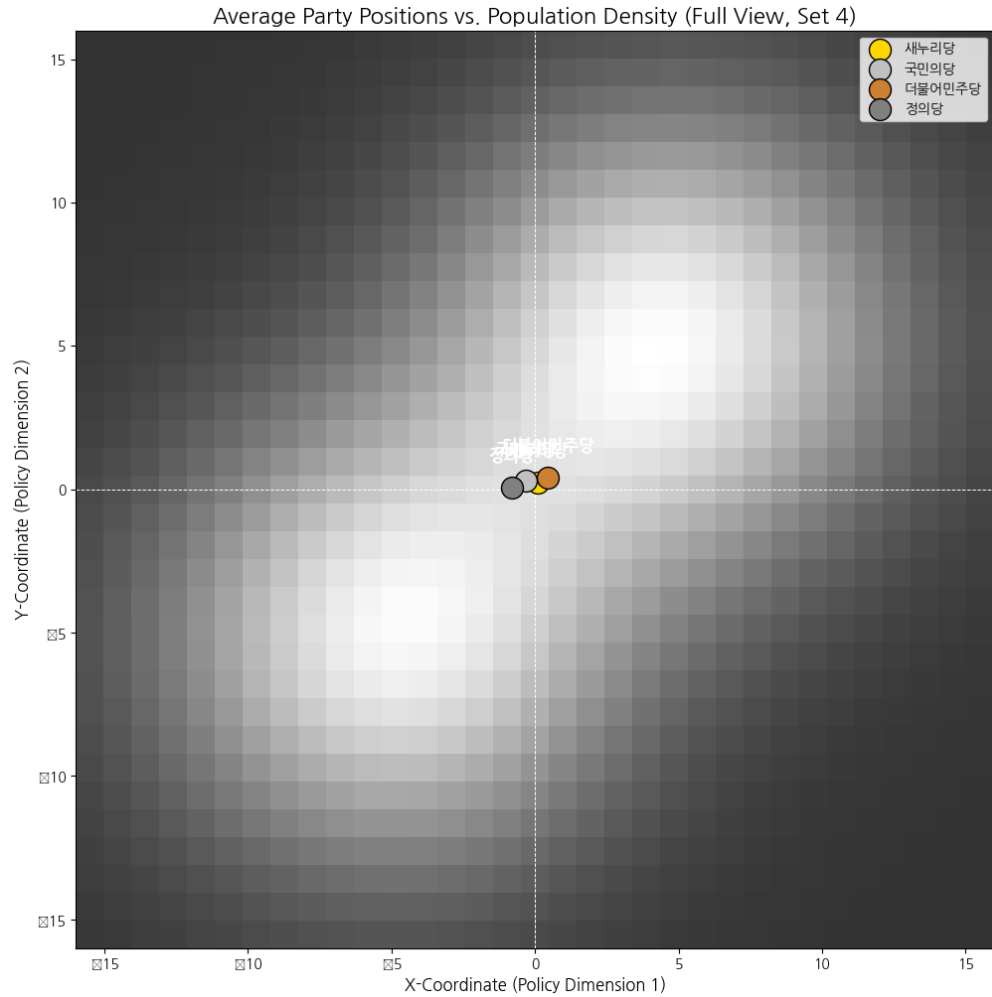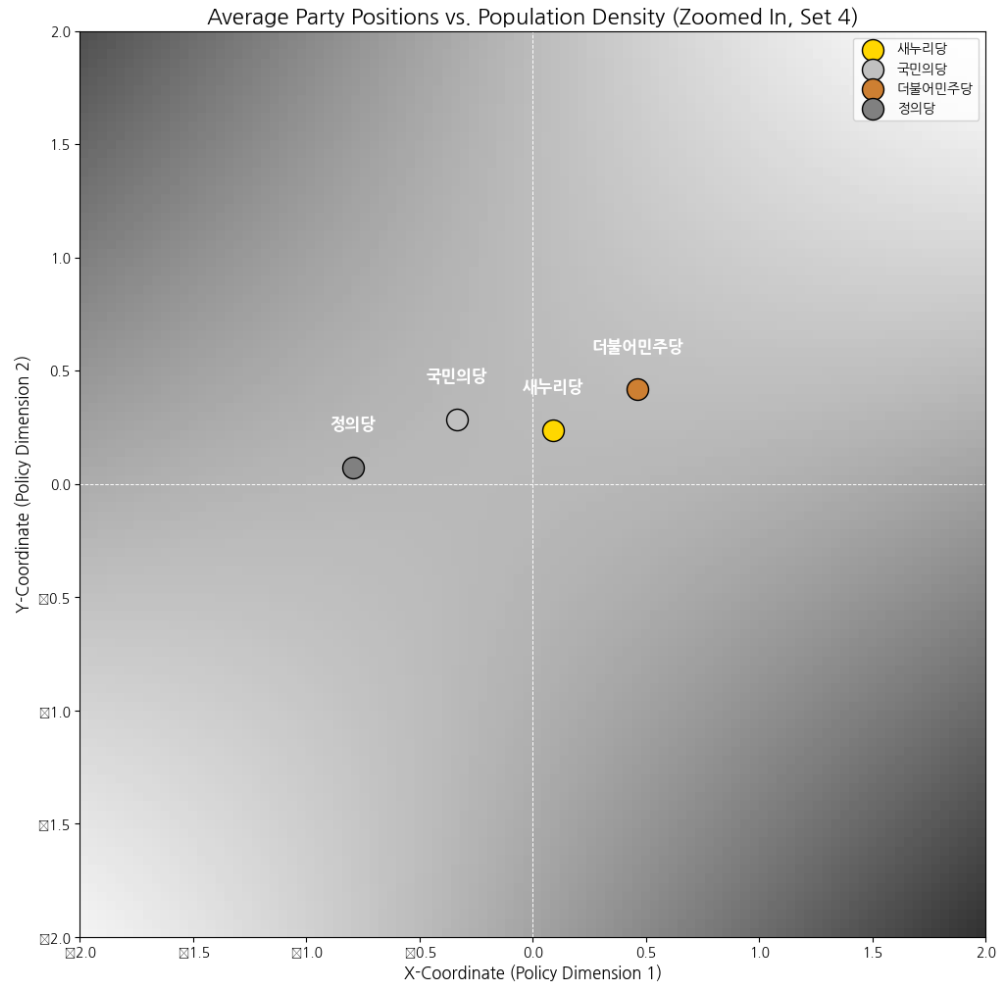| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
새누리당	33.50	33.89 (2.72)	0.39	0.54 (0.36)	0.35 (0.05)	-0.69 (0.83)	59.98 (18.05)	(0.09, 0.24)	E(25.0), A(22.6), H(20.7)
국민의당	26.74	28.74 (2.31)	2.00	0.56 (0.36)	0.31 (0.05)	-0.65 (0.71)	57.69 (19.53)	(-0.33, 0.29)	A(25.5), E(24.0)
더불어민주당	25.54	25.22 (2.44)	0.32	0.59 (0.37)	0.28 (0.05)	-0.81 (0.88)	53.85 (20.05)	(0.46, 0.42)	P(22.1), S(22.1), H(20.7)
정의당	7.23	10.45 (2.64)	3.22	0.67 (0.35)	0.16 (0.05)	-0.68 (0.89)	42.91 (19.37)	(-0.79, 0.07)	H(25.0), S(21.6), A(19.2)

Figure 7: 20th Election

Figure 8: 20th Election (Zoomed)

5 21st National Assembly Election

Table 5: 21st Election: Comparison of Actual vs. Simulated Vote Shares

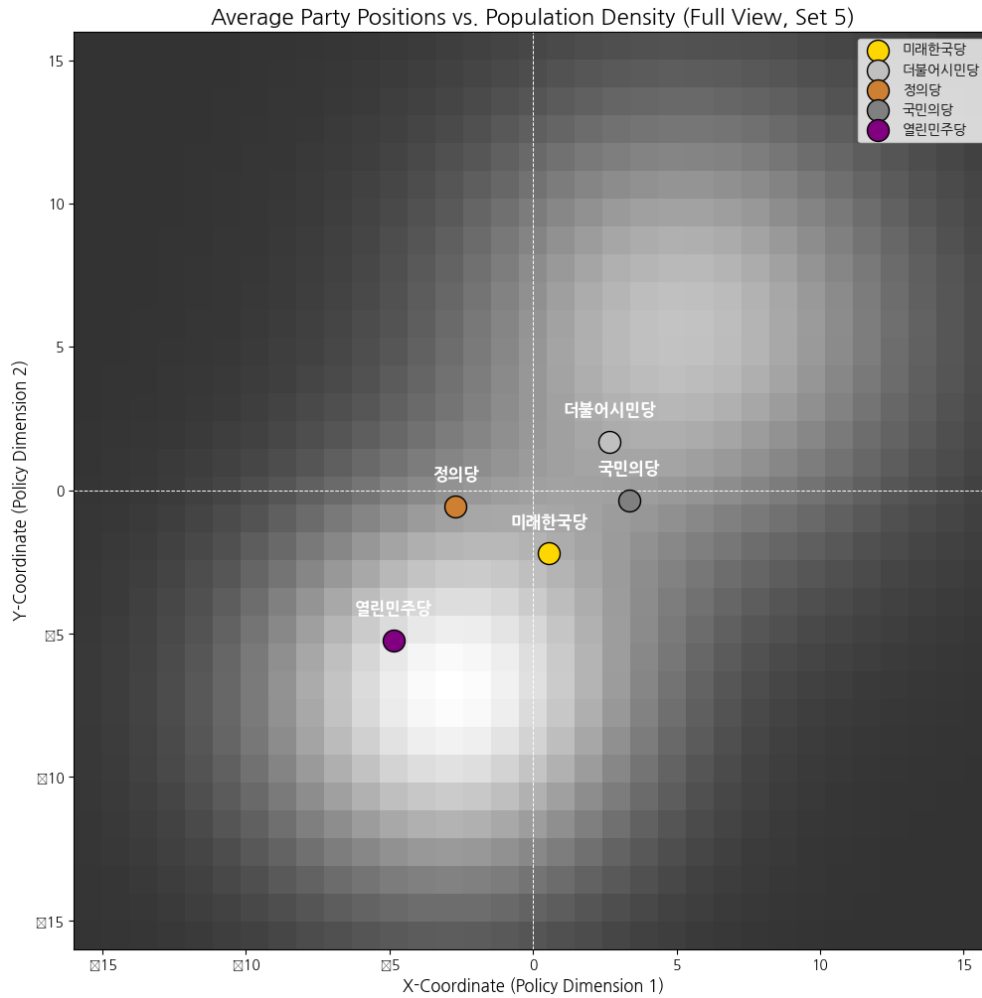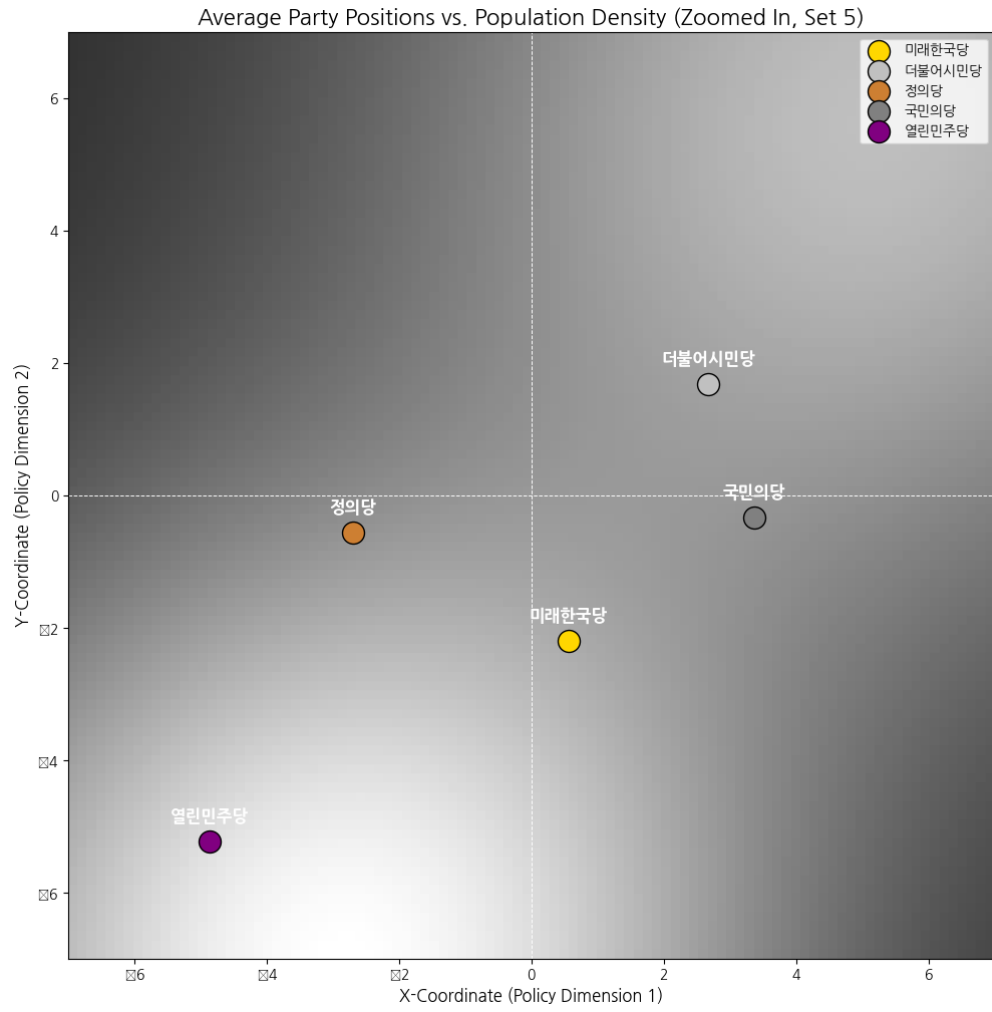| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
미래한국당	33.84	37.03 (1.00)	3.19	0.51 (0.43)	0.38 (0.02)	-0.53 (0.62)	63.89 (18.16)	(0.56, -2.20)	H(44.4), P(33.3), A(22.2)
더불어시민당	33.35	34.54 (2.10)	1.19	0.49 (0.33)	0.36 (0.04)	-0.60 (0.54)	66.67 (17.68)	(2.68, 1.67)	E(33.3), P(33.3)
정의당	9.67	12.51 (1.47)	2.84	0.42 (0.45)	0.16 (0.02)	-0.72 (1.12)	41.67 (21.65)	(-2.69, -0.57)	H(33.3), S(22.2), E(22.2)
국민의당	6.79	8.98 (1.31)	2.19	0.91 (0.18)	0.11 (0.03)	-0.76 (1.09)	36.11 (22.05)	(3.37, -0.34)	S(44.4), P(22.2), E(11.1)
열린민주당	5.42	6.95 (1.81)	1.53	0.53 (0.41)	0.11 (0.03)	-1.35 (1.36)	33.33 (12.50)	(-4.86, -5.24)	P(33.3), S(33.3), H(11.1)

Figure 9: 21st Election

Figure 10: 21st Election (Zoomed)

6 22nd National Assembly Election

Table 6: 22nd Election: Comparison of Actual vs. Simulated Vote Shares

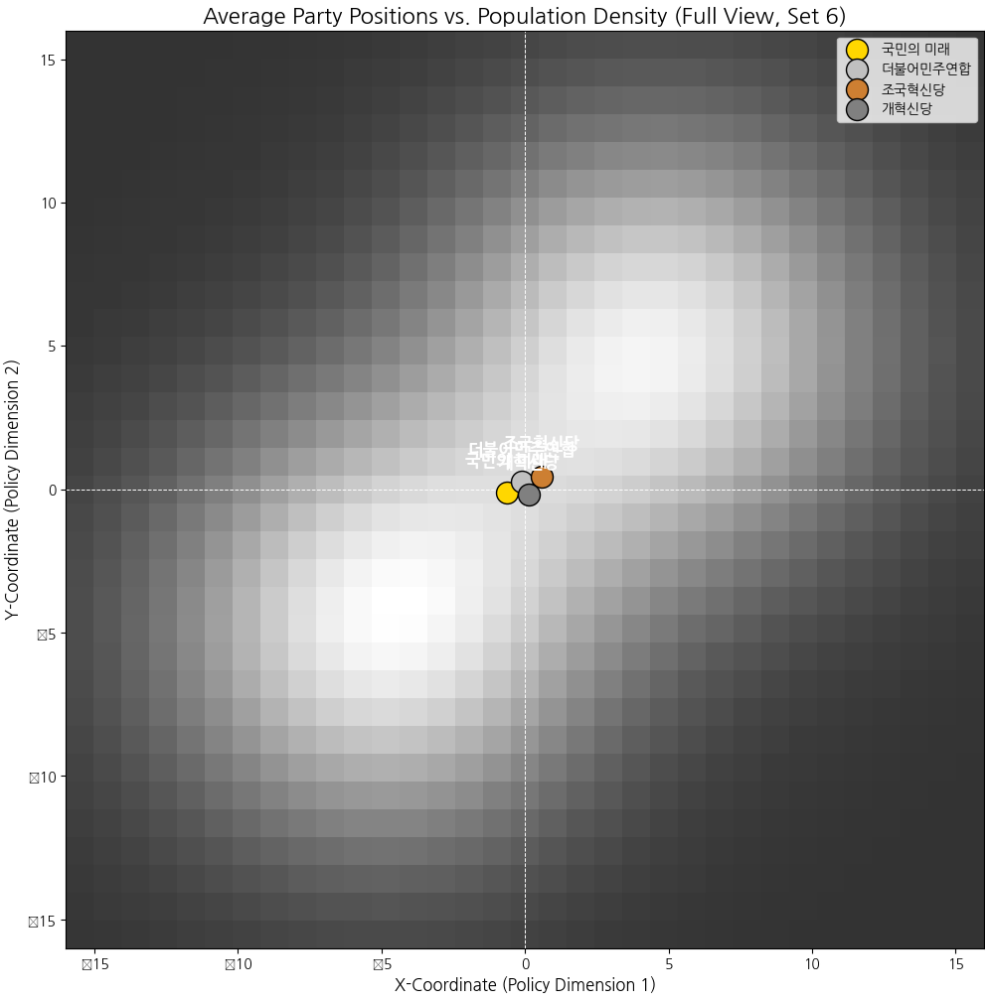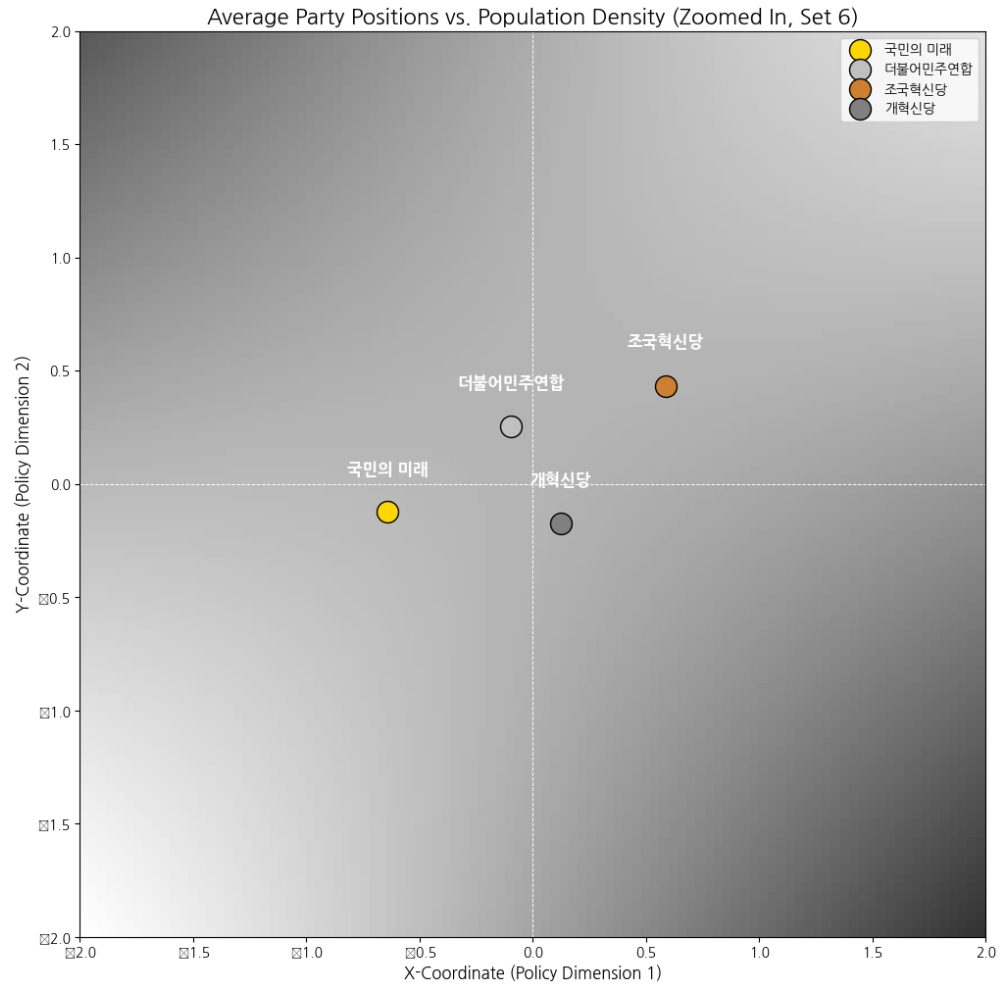| Party	Actual Vote Share	Simulation (SD)	Difference	ϕ	Fitness	Ideal Loss	Valence	Coord (x,y)	Main Species
국민의미래	36.67	39.18 (2.09)	2.51	0.49 (0.38)	0.40 (0.05)	-0.60 (0.80)	60.48 (17.78)	(-0.64, -0.12)	A(26.6), H(20.2), E(19.4)
더불어민주연합	26.69	29.69 (1.47)	3.00	0.61 (0.34)	0.32 (0.05)	-0.71 (0.70)	57.86 (19.22)	(-0.10, 0.26)	E(29.0), H(23.4)
조국혁신당	24.25	24.84 (2.46)	0.59	0.59 (0.38)	0.27 (0.05)	-0.94 (0.96)	50.81 (20.40)	(0.59, 0.43)	S(27.4), E(24.2)
개혁신당	3.61	6.29 (1.99)	2.68	0.78 (0.32)	0.11 (0.05)	-0.84 (1.07)	38.10 (17.60)	(0.12, -0.17)	S(39.5), A(20.2), P(20.2)

Figure 11: 22nd Election

Figure 12: 22nd Election (Zoomed)

Table 7: Summary of Key Parameters Across Elections (17–22)

Metric	17th	18th	19th	20th	21st	22nd
Voter Misery	0.4662 (0.1240)	0.3355 (0.0439)	0.4265 (0.1045)	0.4302 (0.0975)	0.3285 (0.0372)	0.4283 (0.0966)
Mean Eccentricity	0.8829 (0.2172)	0.8849 (0.1781)	0.8631 (0.2048)	0.8577 (0.1916)	0.8717 (0.2050)	0.9045 (0.2195)
Mean Policy Loss	-0.7117 (0.3692)	-0.7644 (0.2552)	-0.6692 (0.3646)	-0.7080 (0.3562)	-0.7906 (0.3809)	-0.7739 (0.4074)
Mean Policy Shift	0.6010 (1.4478)	1.8976 (2.8426)	0.7376 (1.4155)	1.0545 (1.9728)	0.3889 (0.6969)	0.3216 (1.0222)
Param X Mean 1	5.4966 (2.9857)	4.6189 (2.8006)	5.0342 (2.7425)	4.7727 (2.9465)	5.3633 (2.3462)	4.6627 (2.8591)
Param Y Mean 1	5.2082 (2.9581)	5.4500 (3.0799)	5.1888 (2.9776)	5.4915 (2.8340)	5.8967 (2.4272)	5.1206 (2.7082)
Param SD 1	5.2829 (1.2456)	5.2667 (1.2334)	5.2019 (1.2632)	5.7539 (1.3641)	5.7800 (1.3795)	5.5832 (1.4839)
Param X Mean 2	-5.4046 (2.7653)	-4.1856 (3.4229)	-5.1023 (2.7948)	-5.0786 (2.6509)	-3.0122 (2.6895)	-5.0929 (2.8566)
Param Y Mean 2	-5.4368 (2.9232)	-4.8011 (3.3040)	-5.3495 (2.9329)	-5.2561 (2.8721)	-7.3367 (1.7250)	-4.8038 (2.9886)
Param SD 2	5.5137 (1.3110)	6.0544 (1.0687)	5.1530 (1.2547)	5.8010 (1.3673)	4.8956 (1.2119)	5.4499 (1.4253)
Valence Lambda	0.4912 (0.1606)	0.5000 (0.1414)	0.5295 (0.1583)	0.4510 (0.1526)	0.4333 (0.1000)	0.5081 (0.1560)
Campaign Ticks	211.68 (81.41)	200.00 (70.71)	200.00 (82.92)	207.69 (80.09)	122.22 (44.10)	189.52 (81.47)