

# Electoral Reform and Fragmented Polarization

## **New Evidence from Taiwan Legislative Roll Calls**

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- **Motivation & Puzzle:**

How legislators respond to an electoral reform (from **SNTV** to **SMDs**) and adjust their positions with respect to the parties.

- **Theoretical Exception:**

**SNTV-MMD** → Divergence **MMM-SMDs** → Converge

- **Data and Method:**

Taiwan's legislative **roll calls** covering the period of the reform + **Bayesian IRT model** for measuring **ideal point estimation**

- **Major Finding:**

- Empirical evidence shows the reform **significantly fragmented** legislator positions in relation to both co-partisans and members from the rival party.
- The effect of the reform **diminishes** over time.

- How electoral systems **shape** legislative preference is key to understand the theoretical development of party politics and party competition in the real world.
- Previous studies have proposed a number of potential reasons that explain why legislators position themselves differently under **different electoral systems** (e.g., Catalinac 2017) or under specific electoral rules in mixed member systems (e.g., Batto 2012; Jun and Hix 2010; Rich 2014).
- Recent decades have seen reforms of electoral systems in East Asian democracies such as Japan, South Korea, Thailand, and Taiwan, transitioning from **SNTV to SMDs**.
- Besides the case studies from Japan, other countries, such as **Taiwan**, could be used to test these effects.

- **Election Manifesto:**

- For example, Catalinac (2016) finds that Liberal Democratic Party candidates in SMDs **adopted new electoral strategies** by providing programmatic policy benefits such as national security among other candidates affiliated with LDP party, reducing promise of pork barrel goods and intra-party competition.
- In many parliaments, such as those in the UK, Germany, and Japan, **roll call votes exhibit little variation**. For example, studies in Japan often use election manifestos as a data source.

- **Legislative Roll Call:**

- However, the situation may vary in places like Taiwan, indicating that the patterns of roll call votes could be different.

## Single Non-Transferable Vote (SNTV):

- strategic motives for coalition-building (e.g, Cox, Rosenbluth and Thies, 1999), increasing candidates to **seek personal votes** (e.g, Carey and Shugart, 1995)
- **encourages factionalism** and **nurtures money politics** (e.g, Shugart and Wattenberg, 2001, p.38)
- legislators' positioning diverge against copatisans (Catalinac, 2016)

## Single Member District (SMD):

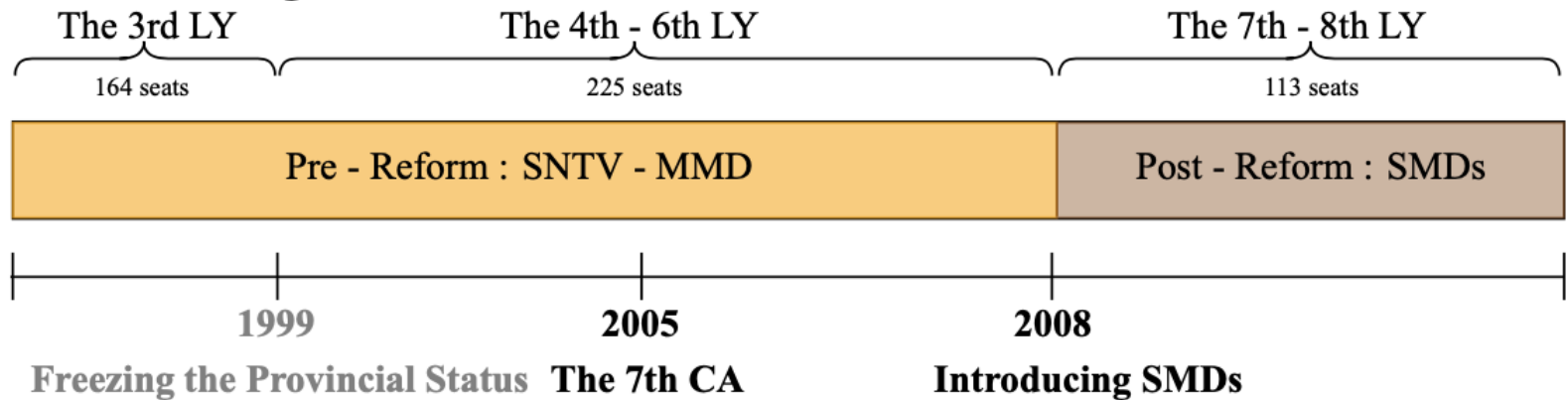
- the combination of plurality rule and a single vote per voter, has the potential to **diminish intraparty competition** by restricting the district magnitude to 1 (Barceló and Muraoka, 2018).
- where both mainstream parties **converge** with their copartisans (Cox, 1990; Adams, 1996; Catalinac, 2016; Downs, 1990).
- voters may make strategic voting on party labels (Aldrich 2011), legislators sharing similar ideological preferences often form alliances, leveraging party labels to obtain electoral support (Riker 1982).

## Expectation:

- The transition from SNTV to SMDs reduced the degree of inter party competition between mainstream parties.
- Shifting from the SNTV system to SMDs has led to unify legislators within the same party.

# Case: Taiwan's Electoral Reform

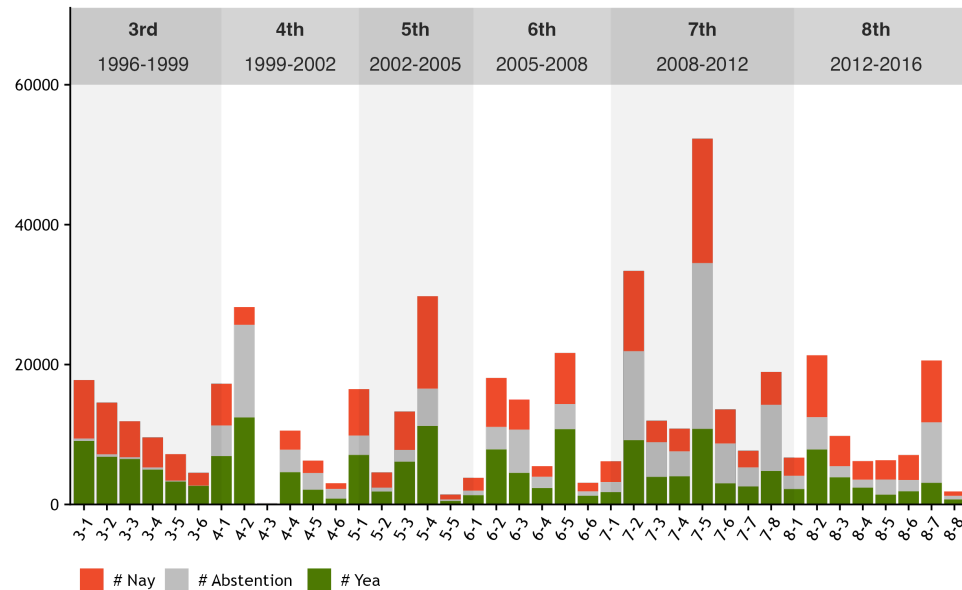
**Figure 1: A Timeline of Taiwan's Electoral Reform Process**



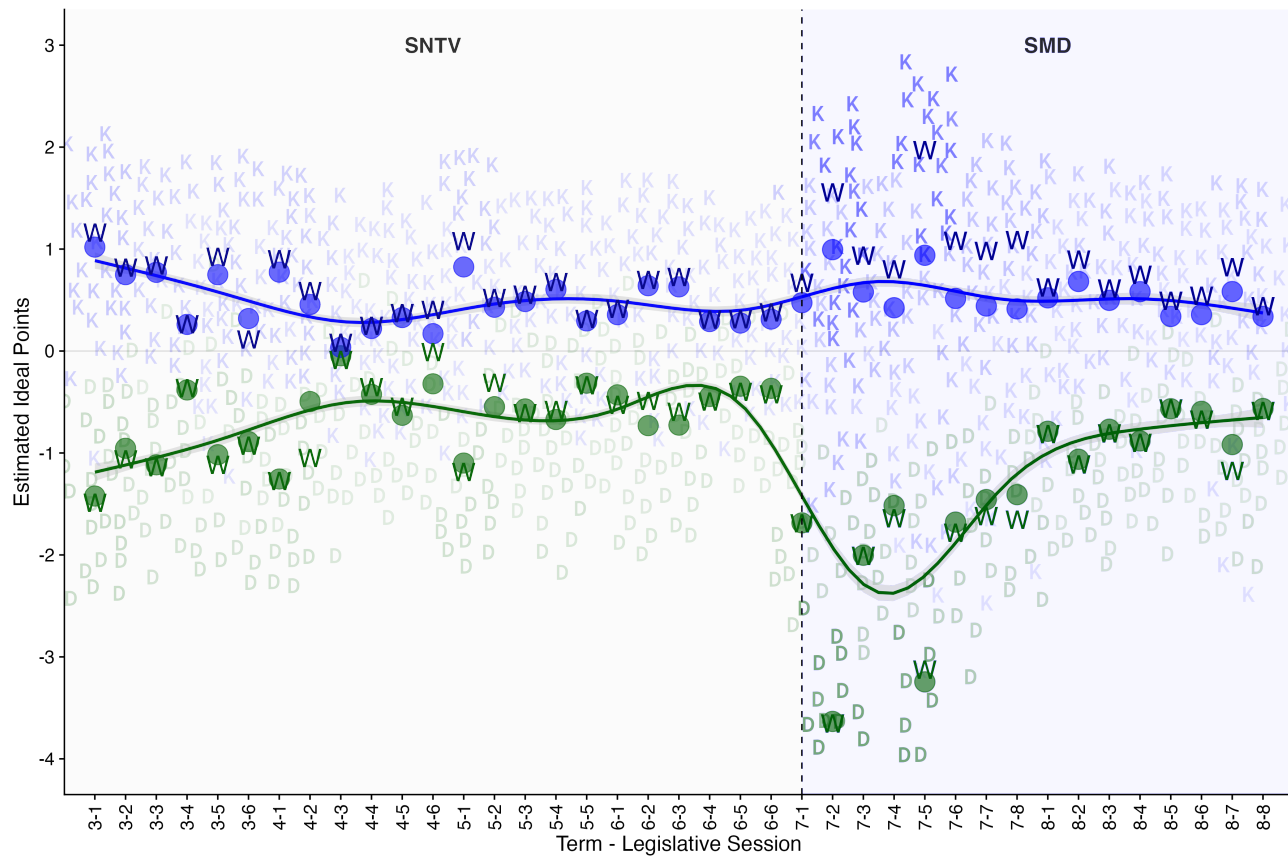


- First, we estimate individual legislator's ideological positions from sessional roll call votes continuously covering **ex-ante and ex-post periods of the reform**.
- Estimating legislators' positions from 1992 to 2015 using a sessional frequency 39-item response theory (IRT) ideal point model, with recursively updated individual priors at each session.
- Then, **inter- and intra-party distance of ideological positions** are constructed from the estimated positions.
- Finally, econometric regressions are introduced to empirically examine the above two hypotheses and find noticeable shifts in ideological positions after the reform.

- Our dataset contains 39 legislative sessions from 1996 to 2016 and captures the changes in legislative composition before and after institutional shifts, including a range of vote items from **323** to **1,223** and a reduction in the number of seats from **240** to **160**.
- Dealing with exceptionally long and wide datasets: EM-based ideal point estimation.



# Ideal Point Estimation



- **Interparty Distance**

We operationalize **the interparty distance** as the general ideological differences between individual legislators and the whip of the opposing party, measured across each legislative session.

$$\text{interdistance}_{it} = |\text{position}_{it} - \bar{\text{whip}}_{it}|,$$

- **Intraparty Distance**

the general ideological differences between individual legislators and the whip from her party

$$\text{intradistance}_{it} = |\text{position}_{it} - \text{whip}_{it}|.$$

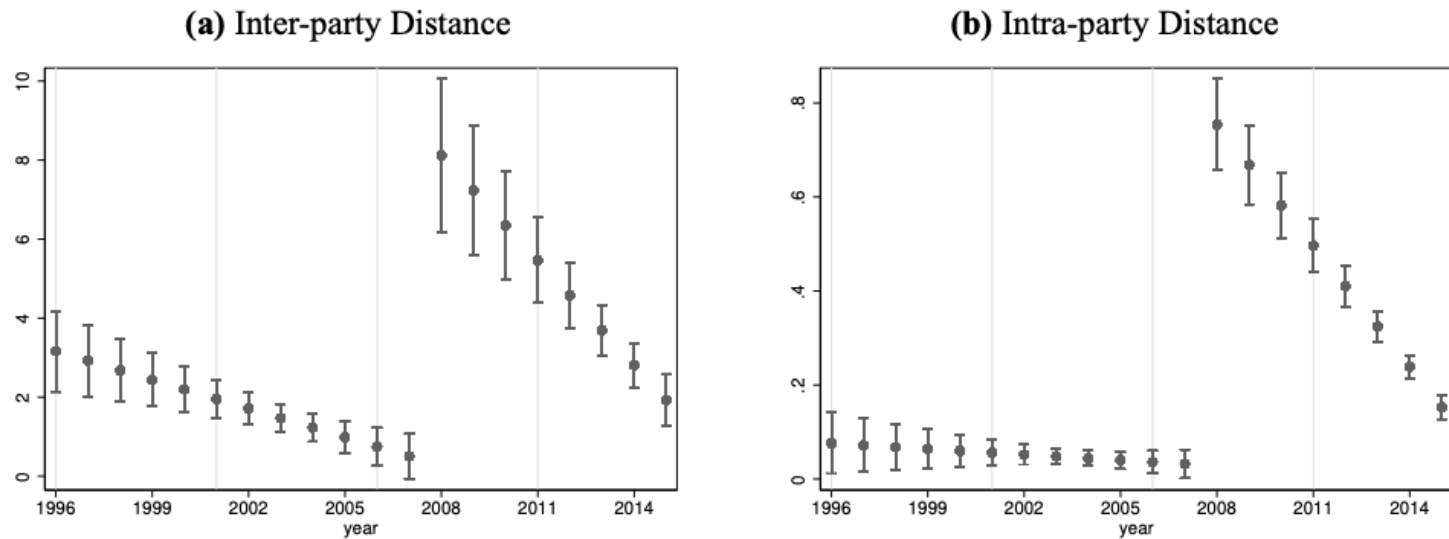
To construct a regression model that examines whether the marginal effect of time on **inter- and intra-party** distance varies between pre- and post-implementation periods of electoral reform in Taiwan.

- **Predicting the Impact on Interparty Distances:**

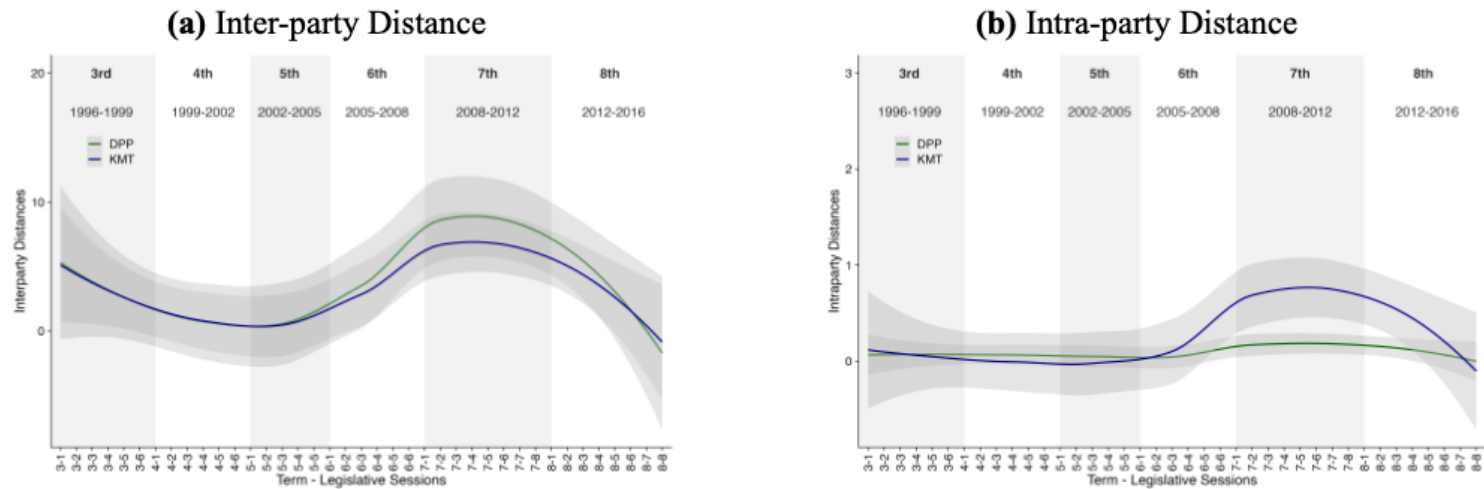
$$\text{interdistance}_{it} = \alpha_0 + \alpha_1 \text{electoralreform}_t + \alpha_2 \text{year}_t + \alpha_3 (\text{year}_t \times \text{electoralreform}_t) + \mathbf{C}_{it} + \epsilon_{it}^1$$

- **Predicting the Impact on Intraparty Distances:**

$$\text{intradistance}_{it} = \beta_0 + \beta_1 \text{electoralreform}_t + \beta_2 \text{year}_t + \beta_3 (\text{year}_t \times \text{electoralreform}_t) + \tilde{\mathbf{C}}_{it} + \mathbf{e}_{it}$$



**Figure 3:** Fitted Values of Inter- and Intra- party Distances between the KMT and the DPP with 95% Confidence Intervals



**Figure 4:** Evolution of Intra- and Inter- Party Positions across Legislative Sessions

- SMDs did not immediately improve interparty conflicts compared to the SNTV
- instead, the reform temporarily increases disagreements between mainstream parties, leading to a short-term escalation of both intra- and inter-party conflicts.
- The effect of the reform exhibits significant heterogeneity between the KMT and the DPP.
- This effect was particularly detrimental to members of the Kuomintang (KMT), as compared to members of the Democratic Progress Party (DPP).
- After six years, disagreements between the mainstream parties gradually converged and returned to their pre-reform level.



- OLS Regression Predicting the Impact of Electoral Reform ([Table 1](#) | [Table 2](#))
- Robustness Estimation Using Separate Samples ([Table F.5](#) | [Table F.6](#))
- Evaluating the Heterogeneity in Voting Records ([Table G.7](#) | [Table G.8](#))
- Robustness Assessment of the Effect of a Reform using Panel Data: Evidence from the 6th to 7th Term Observations ([Table H.9](#))
- Robustness Assessment of the Reform's Effect at the Session Level using GMM ([Table I.10](#))

Thank You

**Table 1:** OLS Regression Predicting the Impact of Electoral Reform on Interparty Distances

<b>Dependent variable:</b> Interparty Distances between Mainstream Parties		
	<b>Column 1</b>	<b>Column 2 (+ controls)</b>
<b>electoral reform</b>	16.219*** (0.747)	15.291*** (0.867)
<b>year</b>	-0.242*** (0.008)	-0.238*** (0.010)
<b>year × electoral reform</b>	-0.643*** (0.040)	-0.599*** (0.046)
<b>marginal winning shares</b>		0.026 (0.202)
<b>large districts</b>		-0.182 (0.078)
<b>medium districts</b>		0.020 (0.085)
<b>intercept</b>	3.405*** (0.071)	3.697*** (0.252)
<b>legislator attributes</b>		✓
<b>party dummies</b>		✓
<b>district fixed effects</b>		✓
<b>No. of observations</b>	5663	4170
<b>Adjusted <math>R^2</math></b>	0.28	0.27
<b>Prob &gt; F</b>	0.00	0.00

Robust standard errors are reported in parentheses. Asterisk indicates significant level: \*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$ .

# OLS: The Impact of Electoral Reform

**Table 2:** OLS Regression Predicting the Impact of Electoral Reform on Interparty Distance

<b>Dependent variable:</b> Intraparty Distances				
	<b>All parties</b>		<b>Major parties</b>	
	<b>Column 1</b>	<b>Column 2 (+ controls)</b>	<b>Column 3</b>	<b>Column 4 (+ controls)</b>
<b>electoral reform</b>	1.791*** (0.255)	2.375*** (0.336)	1.823*** (0.263)	2.464*** (0.349)
<b>year</b>	-0.004*** (0.001)	-0.003** (0.002)	-0.003*** (0.001)	-0.004** (0.002)
<b>year × electoral reform</b>	-0.082*** (0.013)	-0.114*** (0.017)	-0.083*** (0.013)	-0.117*** (0.018)
<b>marginal winning shares</b>		0.043 (0.072)		0.041 (0.084)
<b>large districts</b>		0.024** (0.012)		0.035** (0.014)
<b>medium districts</b>		0.008 (0.010)		0.014 (0.012)
<b>intercept</b>	0.080*** (0.006)	-0.125* (0.073)	0.078*** (0.009)	-0.142* (0.083)
<b>legislator attributes</b>		✓		✓
<b>party dummies</b>		✓		✓
<b>district fixed effects</b>		✓		✓
<b>No. of observations</b>	6736	4969	5663	4170
<b>Adjusted R<sup>2</sup></b>	0.04	0.05	0.04	0.05
<b>Prob &gt; F</b>	0.00	0.00	0.00	0.00

Robust standard errors are reported in parentheses. Asterisk indicates significant level: \*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$ .

**Table F.5:** OLS Regression Predicting the Impact of Electoral Reform on Interparty Distance

<b>Dependent variable:</b> Interparty Distance		
	<b>DPP</b> <b>Column 1</b>	<b>KMT</b> <b>Column 2</b>
electoral reform	23.000*** (2.916)	13.132*** (0.859)
year	-0.205*** (0.015)	-0.263*** (0.012)
year × electoral reform	-1.045*** (0.153)	-0.460*** (0.047)
marginal winning shares	0.017 (0.281)	0.250 (0.136)
intercept	3.222*** (0.395)	3.268*** (0.316)
legislator attributes	✓	✓
district fixed effects	✓	✓
No. of observations	1623	2547
Adjusted R <sup>2</sup>	0.28	0.27
Prob > F	0.00	0.00

Robust standard errors are reported in parentheses. Asterisk indicates significant level: \*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$ .

**Table F.6:** OLS Regression Predicting the Impact of Electoral Reform on Intraparty Distance

<b>Dependent variable:</b> Intraparty Distance		
	<b>DPP</b> <b>Column 1</b>	<b>KMT</b> <b>Column 2</b>
electoral reform	0.816** (0.323)	2.675*** (0.411)
year	-0.007** (0.003)	-0.005** (0.002)
year × electoral reform	-0.037** (0.017)	-0.123*** (0.021)
marginal winning shares	0.046 (0.069)	0.018 (0.136)
intercept	0.066 (0.070)	-0.081 (0.124)
legislator attributes	✓	✓
district fixed effects	✓	✓
No. of observations	1623	2547
Adjusted R <sup>2</sup>	0.03	0.05
Prob > F	0.01	0.00

Robust standard errors are reported in parentheses. Asterisk indicates significant level: \*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$ .

# Controlling for Heterogeneity Effects

**Table G.7:** Analyzing the Impact of Electoral Reform on Interparty Distance Using OLS Regression: Controlling for Yearly Heterogeneity Effects)

<b>Dependent variable:</b> Inter-party Distance		
	<b>Columns 1</b>	<b>Columns 2</b> (+ Controls)
electoral reform	6.18*** (0.818)	6.401*** (0.968)
year	-0.361*** (0.010)	-0.355*** (0.012)
year× electoral reform	-0.147*** (0.042)	-0.158*** (0.050)
intercept	5.050*** (0.120)	5.598*** (0.246)
1997	✓	✓
1998	✓	✓
1999	✓	✓
2000	✓	✓
2001	✓	✓
2002	✓	✓
2003	✓	✓
2004	✓	✓
2005	✓	✓
2006	✓	✓
2005	✓	✓
2009	✓	✓
2010	✓	✓
2011	✓	✓
2012	✓	✓
2013	✓	✓
legislator attributes		✓
party dummies		✓
district fixed effects		✓
No. of Observations	5663	4170
Adjusted R <sup>2</sup>	0.53	0.51
Prob > F	0.00	0.00

Robust standard errors are reported in parentheses.  
Asterisk indicates significant level: \*: p < 0.10; \*\*: p < 0.05; \*\*\*: p < 0.01.

# Controlling for Heterogeneity Effects

**Table G.8:** Analyzing the Impact of Electoral Reform on Intraparty Distance Using OLS Regression: Controlling for Yearly Heterogeneity Effects)

<b>Dependent variable:</b> Inter-party Distance		
	<b>Columns 1</b>	<b>Columns 2</b> (+ Controls)
electoral reform	1.696* (0.956)	1.747* (0.968)
year	-0.005*** (0.002)	-0.002 (0.002)
year × electoral reform	-0.080* (0.048)	-0.084* (0.049)
intercept	0.082*** (0.019)	-0.080* (0.036)
1997	✓	✓
1998	✓	✓
1999	✓	✓
2000	✓	✓
2001	✓	✓
2002	✓	✓
2003	✓	✓
2004	✓	✓
2005	✓	✓
2006	✓	✓
2007	✓	✓
2008	✓	✓
2009	✓	✓
2010	✓	✓
2011	✓	✓
2012	✓	✓
2013	✓	✓
legislator attributes		✓
party dummies		✓
district fixed effects		✓
No. of Observations	6,736	6,665
Adjusted R <sup>2</sup>	0.11	0.12
Prob > F	0.00	0.00

Robust standard errors are reported in parentheses.

Asterisk indicates significant level: \*:  $p < 0.10$ ; \*\*:

$p < 0.05$ ; \*\*\*:  $p < 0.01$ .



**Table H.9:** The Effect of Electoral Reform on Re-elected Legislators from 6th Term (SNTV) to 7th Term (SMD)

	Inter-party Distance		Intra-party Distance	
	Column 1	Column 2 (+lag year)	Column 3	Column 4 (+lag year)
electoral reform	8.884*** (0.502)	10.100*** (0.619)	0.674*** (0.097)	0.516*** (0.104)
Inter-party Distance <sub>-1</sub>		-0.153*** (0.035)		
Intra-party Distance <sub>-1</sub>				0.251*** (0.033)
Constant	1.003*** (0.338)	1.309*** (0.387)	0.020 (0.064)	0.017 (0.071)
Observations	922	835	1040	949
Adjusted $R^2$	0.198	0.187	0.042	0.011

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table I.10:** Robustness Assessment of the Effect of the Reform at the Session Level using GMM

	<b>Intraparty Distance Column 1</b>	<b>Interparty Distance Column 2</b>
Intra-party Distance <sub>-1</sub>	0.464*** (0.031)	
Inter-party Distance <sub>-1</sub>		0.150*** (0.013)
electoral reform	2.792*** (0.890)	17.154*** (0.753)
time	-0.003 (0.004)	-0.097*** (0.005)
electoral reform × time	-0.077*** (0.027)	-0.375*** (0.019)
Constant	0.064 (0.055)	2.633*** (0.087)
Observations	6000	5065

Robust standard errors in parentheses. Time: the LY session

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$