

Online Appendix

Divide and Conquer: Presidents, Parliaments, and Political Polarization during Electoral Campaigns

Proof of Proposition 1: Consider the strategy profile that is described as any presidential candidate $i \in \{1, \dots, k\}$ discloses her signal if and only if the signal equals to ω_i . Fix any voter $l \in [0,1]$. Let $M \subseteq \Omega$ be the set of messages sent by presidential candidates during the election campaign. If $\omega_l \in M$, the voter l does not change her opinion if

$$\gamma_{0l} \alpha \left(\frac{1-\alpha}{k-1} \right)^{|M|-1} \left(1 - \frac{1-\alpha}{k-1} \right)^{k-|M|} > \gamma_{0l} d^{\frac{k-1}{2}|\omega_l-\omega_i|} \alpha \left(\frac{1-\alpha}{k-1} \right)^{|M|-1} \left(1 - \frac{1-\alpha}{k-1} \right)^{k-|M|},$$

which implies that the posterior probability that the state is ω_i is always lower than the posterior probability that the state is ω_l . Similarly, the voter changes her opinion when $\omega_l \notin M$ if

$$\begin{aligned} \gamma_{0l} d^{\frac{k-1}{2}|\omega_l-\omega_i|} \alpha \left(\frac{1-\alpha}{k-1} \right)^{|M|-1} \left(1 - \frac{1-\alpha}{k-1} \right)^{k-|M|} &\geq \gamma_{0l} (1-\alpha) \left(\frac{1-\alpha}{k-1} \right)^{|M|} \left(1 - \frac{1-\alpha}{k-1} \right)^{k-|M|} \Leftrightarrow \\ d^{\frac{k-1}{2}|\omega_l-\omega_i|} &\geq \frac{(1-\alpha)^2}{\alpha(k-2+\alpha)}. \end{aligned}$$

Note that $d^{\frac{k-1}{2}|\omega_l-\omega_i|}$ can only take values in $\{d, d^2, \dots, d^{k-1}\}$. Furthermore, the threshold $\frac{(1-\alpha)^2}{\alpha(k-2+\alpha)}$

is a decreasing function of α since its derivative is $\frac{-2\alpha(k-2+\alpha)-(1-\alpha)^2(k-2+2\alpha)}{\alpha^2(k-2+\alpha)^2} < 0$,

and it converges to 0 as $\alpha \rightarrow 1$. Therefore, there exists a sequence of thresholds as described in

the hypothesis such that $\alpha_r \leq \alpha < \alpha_{r+1} \Leftrightarrow d^r \geq \frac{(1-\alpha)^2}{\alpha(k-2+\alpha)} > d^{r+1}$.

In particular, as long as $\frac{(1-\alpha)^2}{\alpha(k-2+\alpha)} \leq d$, there is a presidential candidate that can win the election with positive probability by disclosing her signal when the signal is consistent with the policy of her party. Therefore, the posterior distribution of opinions and hence the posterior polarization distribution π_p is different from the π_0 . Finally, it is straightforward to see from the calculation above that no candidate can increase her vote share by disclosing her signal when the signal is not consistent with the policy of her party. Q.E.D.

Proof of Proposition 2: When $e = 1$, the initial polarization is 1. In this case, with positive probability a positive share of voters change their opinion. And, whenever they do, they move from one of the extreme opinions to another one that is closer to the opposite extreme opinion,

which will reduce polarization. Hence, the expected polarization is lower. Since the expected polarization is continuous in e , for values of e close enough to 1, the expected polarization will also be lower. Now, when α is close enough to 1, for any state of the world the probability that only the candidate whose policy is consistent with the true state receives the favorable signal while others do not receive their favorable signal is given as $\alpha \left(1 - \frac{1-\alpha}{k-1}\right)^{k-1}$ and converges to 1 as α converges to 1. In this case, since $\alpha_{k-1} < \alpha$, all voters change their opinion to the same one, which results in zero posterior polarization. Q.E.D.

Numerical calculation for the case where voters are fully responsive. Figure A1 below illustrates the case for when $\alpha_{k-1} \leq \alpha$, so that the voters are fully responsive to election campaigns. That is, whenever a voter observes informative campaigns and all of the messages sent by the candidates are different from her prior opinion, she changes her opinion to the message that is closest to her prior opinion. In contrast to the previous case with $\alpha_1 \leq \alpha < \alpha_2$, whenever there is a single informative campaign all posterior opinions converge to the message of the informative campaign. Then the posterior polarization is 0 as there is no posterior disagreement among the voters. However, when there are two or three informative campaigns, full or near full posterior polarization is still possible when the messages sent during the election campaign are far enough from each other. Therefore, the posterior polarization is still higher than the initial polarization when the initial polarization is lower even though the expected posterior polarization when $\alpha_{k-1} \leq \alpha$, is lower than the one when $\alpha_1 \leq \alpha < \alpha_2$.

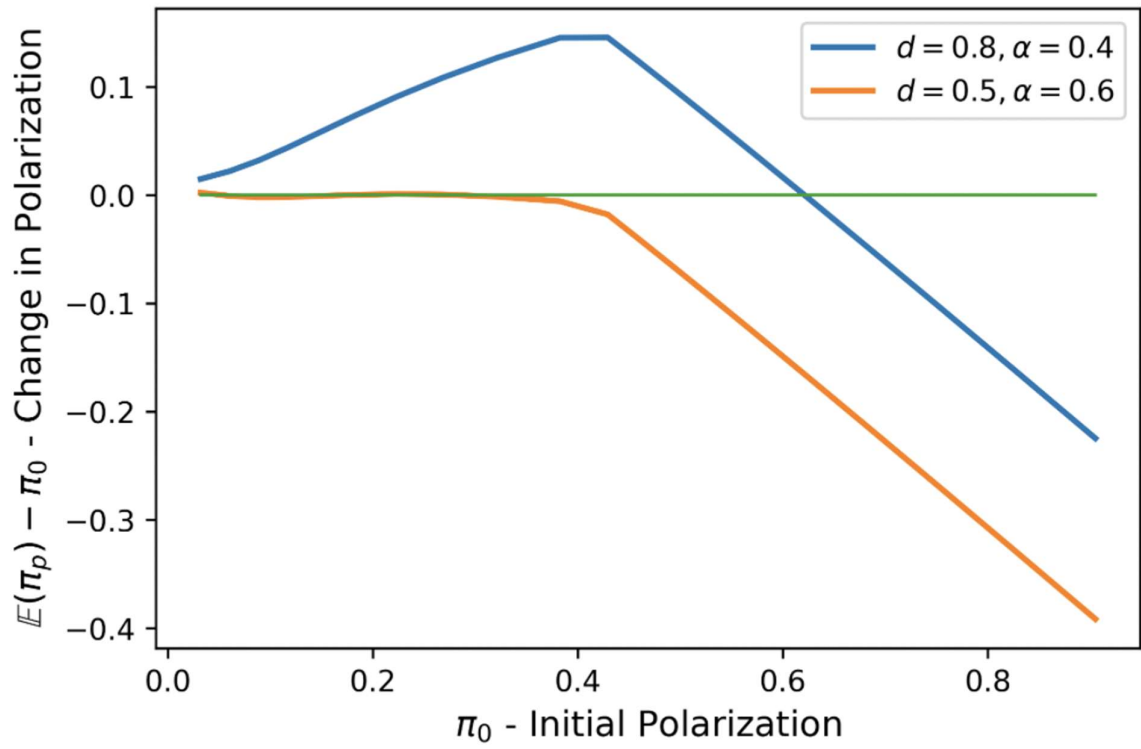


Figure A1 Expected change in polarization after a presidential election when voters' responsiveness is high (of degree 3)

Robustness Checks for Empirical Analysis

For robustness checks, in our empirical models we include additional control variables. First, we account for the level of political repression and censorship to make sure that variation in mass socio-political polarization is not driven by the differences in the political regime characteristics rather than the type of elections.

We proxy the level of political repression with Political Civil Liberties Index from Varieties of Democracy Dataset (V-Dem). The measure represents an answer to the question “To what extent are political liberties respected?” The index reflects freedom of association and expression to the extent that they are free from government repression. To account for the level of censorship, we make use of two indicators from the Varieties of Democracy Dataset (V-Dem). Government censorship effort measure represents an answer to the following question «Does the government directly or indirectly attempt to censor the print or broadcast media?» Internet censorship effort indicator is an answer to the question whether “the government attempts to censor information (text, audio, or visuals) on the Internet”.

The results for testing Hypothesis 1 are presented in Table A1. The dependent variable takes the value of 1 if polarization is unchanged (stable) and 0 if we observe change in polarization level in the election year. Across all model specifications, the coefficients for the variable of interest – type of elections – remain robust. All else equal, presidential elections are more likely to change the posterior level of polarization in a country at a significant level with higher probability than parliamentary elections.

The results for testing Hypothesis 2 are presented in Table A3 and they largely lend support to our second hypothesis. The dependent variable takes the value of 1 when there is an increase in polarization level during the election year. All else equal, if the initial polarization in a country is low (high), presidential campaigns increase (decrease) the posterior level of polarization. The interaction term between type of elections and the initial level of polarization loses its significance only in Models 4-5, where we control for Internet censorship. We believe

that the reason could be a sizable drop in the number of observations due to data availability.

Further, to ensure that the effect of presidential elections on polarization is not confounded by the fact that authoritarian regimes are more likely to choose presidential form of government than democratic regimes, we conduct the analysis for both hypotheses using only democratic countries. Our measure of political regime - a revised combined polity score from a Polity5 project - takes on values from -10 (most autocratic) to 10 (most democratic). We consider a country democratic if its score is equal to or greater than 6 - a threshold that is recommended by the authors of the index (Marshall & Jaggers, 2016.). To make sure that the choice of a threshold does not drive our results, we use different cutoff points for the democratic regime.

The results for Hypothesis 1 and Hypothesis 2 are presented in Table A2 and Table A4, respectively, and they corroborate our initial findings. The coefficients for the type of elections variable in Table A2 and the interaction term between type of elections and the initial level of polarization in Table A4 remain statistically significant.

Lastly, we test our second hypothesis using the raw measure of political polarization to ensure that our results are robust to different transformations of the dependent variable. In the main text we transform the dependent variable – political polarization – so that it reflects only positive change in polarization from between election year (t) and the preceding year (t-1) , because we are interested in the change in polarization level after electoral campaigns take place, which is guided by the theoretical model.

Table A5 presents the results with the dependent variable being level of polarization, rather than change in polarization. The results remain robust to all model specifications in the Table.

Table A1. The effect of election type on the level of polarization

	Dependent Variable: Stable Polarization					
	(1)	(2)	(3)	(4)	(5)	(6)
Type of Election	-0.525*** [0.099]	-0.512*** [0.098]	-0.572*** [0.098]	-0.569*** [0.097]	-0.436*** [0.131]	-0.455*** [0.131]
Initial Polarization Level	-0.453*** [0.043]	-0.454*** [0.043]	-0.427*** [0.046]	-0.419*** [0.046]	-0.378*** [0.053]	-0.372*** [0.053]
GDP per capita	0.055 [0.068]	0.040 [0.067]	0.057 [0.070]	0.035 [0.069]	0.059 [0.086]	-0.040 [0.079]
Socio-Economic Equality	-0.676** [0.266]	-0.675** [0.264]	-0.782*** [0.265]	-0.880*** [0.262]	-1.071*** [0.353]	-1.022*** [0.348]
Effective Number of Parliamentary Parties	-0.013 [0.009]	-0.012 [0.008]	-0.016* [0.009]	-0.011 [0.008]	-0.028* [0.017]	0.001 [0.013]
Polity IV Democracy Score	-0.003 [0.019]		-0.054*** [0.014]		-0.054** [0.023]	
Political Civil Liberties Index	-1.633*** [0.402]	-1.661*** [0.239]				
Government Censorship of Media			-0.053 [0.054]	-0.177*** [0.042]		
Government Censorship of Internet					0.028 [0.091]	-0.083 [0.073]
Constant	2.529*** [0.532]	2.658*** [0.501]	1.737*** [0.527]	1.785*** [0.518]	1.626*** [0.631]	2.149*** [0.604]
Observations	3,097	3,154	3,097	3,154	1,665	1,712

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2. The effect of election type on the level of polarization *only in democracies*

	Dependent Variable: Stable Polarization			
	(1) Polity Score > 4	(2) Polity Score > 5	(3) Polity Score > 6	(4) Polity Score>7
Type of Election	-0.588*** [0.109]	-0.628*** [0.112]	-0.582*** [0.119]	-0.567*** [0.128]
Initial Polarization Level	-0.436*** [0.045]	-0.428*** [0.047]	-0.481*** [0.052]	-0.475*** [0.056]
GDP per capita	0.059 [0.073]	0.067 [0.077]	0.050 [0.086]	-0.014 [0.093]
Socio-Economic Equality	-1.210*** [0.303]	-1.093*** [0.321]	-0.766** [0.324]	-0.386 [0.368]
Effective Number of Parliamentary Parties	-0.017 [0.011]	-0.015 [0.012]	-0.005 [0.015]	-0.003 [0.015]
Constant	1.463*** [0.558]	1.319** [0.590]	1.105 [0.686]	1.450** [0.729]
Observations	2,566	2,428	2,197	1,993

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A3. The effect of elections under high initial polarization

	Dependent Variable: Increasing Polarization				
	(1)	(2)	(3)	(4)	(5)
High Initial Polarization Dummy	0.328*** [0.065]	0.317*** [0.065]	0.277*** [0.070]	0.199** [0.080]	0.180** [0.080]
Presidential Election Dummy	0.372*** [0.128]	0.367*** [0.128]	0.403*** [0.127]	0.315* [0.166]	0.347** [0.165]
Presidential Election * High Initial Polarization	-0.234*** [0.082]	-0.216*** [0.083]	-0.220*** [0.082]	-0.140 [0.100]	-0.111 [0.100]
GDP per capita	0.123 [0.088]	0.134 [0.088]	0.148* [0.090]	0.131 [0.106]	0.217** [0.100]
Socio-economic Equality	0.055 [0.325]	0.033 [0.325]	0.092 [0.324]	0.231 [0.404]	0.152 [0.401]
Effective Number of Parliamentary Parties	0.014 [0.010]	0.008 [0.010]	0.017* [0.010]	0.021 [0.019]	-0.003 [0.016]
Polity IV Democracy Score	-0.007 [0.023]		0.040** [0.017]	0.043 [0.026]	
Political Civil Liberties Index	0.970** [0.474]	0.837*** [0.275]			
Government Censorship of Media			-0.076 [0.069]		
Government Censorship of Internet				-0.274*** [0.104]	-0.188** [0.081]
Constant	-3.948*** [0.691]	-3.953*** [0.673]	-3.696*** [0.706]	-3.217*** [0.804]	-3.683*** [0.782]
Observations	3,097	3,154	3,097	1,665	1,712

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A4. The effect of elections under high initial polarization *only in democracies*

	Dependent Variable: Increasing Polarization			
	Polity Score > 4 (1)	Polity Score > 5 (2)	Polity Score > 6 (3)	Polity Score>7 (4)
High Initial Polarization Dummy	0.382*** [0.072]	0.373*** [0.074]	0.423*** [0.078]	0.418*** [0.083]
Presidential Election Dummy	0.287* [0.148]	0.265* [0.160]	0.129 [0.175]	0.191 [0.196]
Presidential Election * High Initial Polarization	-0.297*** [0.099]	-0.310*** [0.104]	-0.355*** [0.113]	-0.275** [0.126]
GDP per capita	0.166* [0.097]	0.165 [0.103]	0.243** [0.121]	0.334** [0.130]
Socio-economic Equality	0.226 [0.365]	0.135 [0.383]	-0.287 [0.388]	-0.672 [0.445]
Effective Number of Parliamentary Parties	0.003 [0.013]	-0.007 [0.014]	-0.010 [0.015]	-0.016 [0.016]
Constant	-3.591*** [0.766]	-3.493*** [0.821]	-3.838*** [0.998]	-4.416*** [1.075]
Observations	2,566	2,428	2,197	1,993

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A5. The effect of elections under high initial polarization

	Dependent Variable: Level of Polarization				
	(1)	(2)	(3)	(4)	(5)
High Initial Polarization Dummy	0.987***	0.988***	0.983***	0.980***	0.976***
	[0.004]	[0.005]	[0.005]	[0.006]	[0.006]
Presidential Election Dummy	0.004	-0.001	-0.005	-0.004	-0.002
	[0.012]	[0.014]	[0.014]	[0.015]	[0.015]
Presidential Election * High Initial Polarization	-0.022**	-0.023**	-0.021**	-0.019*	-0.019*
	[0.009]	[0.010]	[0.010]	[0.010]	[0.010]
GDP per capita		-0.005	0.011	0.008	0.011
		[0.005]	[0.007]	[0.007]	[0.008]
Socio-economic Equality			-0.092***	-0.096***	-0.085**
			[0.031]	[0.034]	[0.035]
Effective Number of Parliamentary Parties				0.001	0.002*
				[0.001]	[0.001]
Polity IV Democracy Score					-0.003***
					[0.001]
Constant	-0.004	0.035	-0.045	-0.020	-0.037
	[0.006]	[0.045]	[0.052]	[0.052]	[0.055]
Observations	3,683	3,275	3,275	3,154	3,097
R-squared	0.953	0.951	0.951	0.952	0.952

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1