Appendix:
The Majority-Party Disadvantage: Revising Theories of Legislative Organization*

November 18, 2016

Appendix

Intended for Online Publication Only

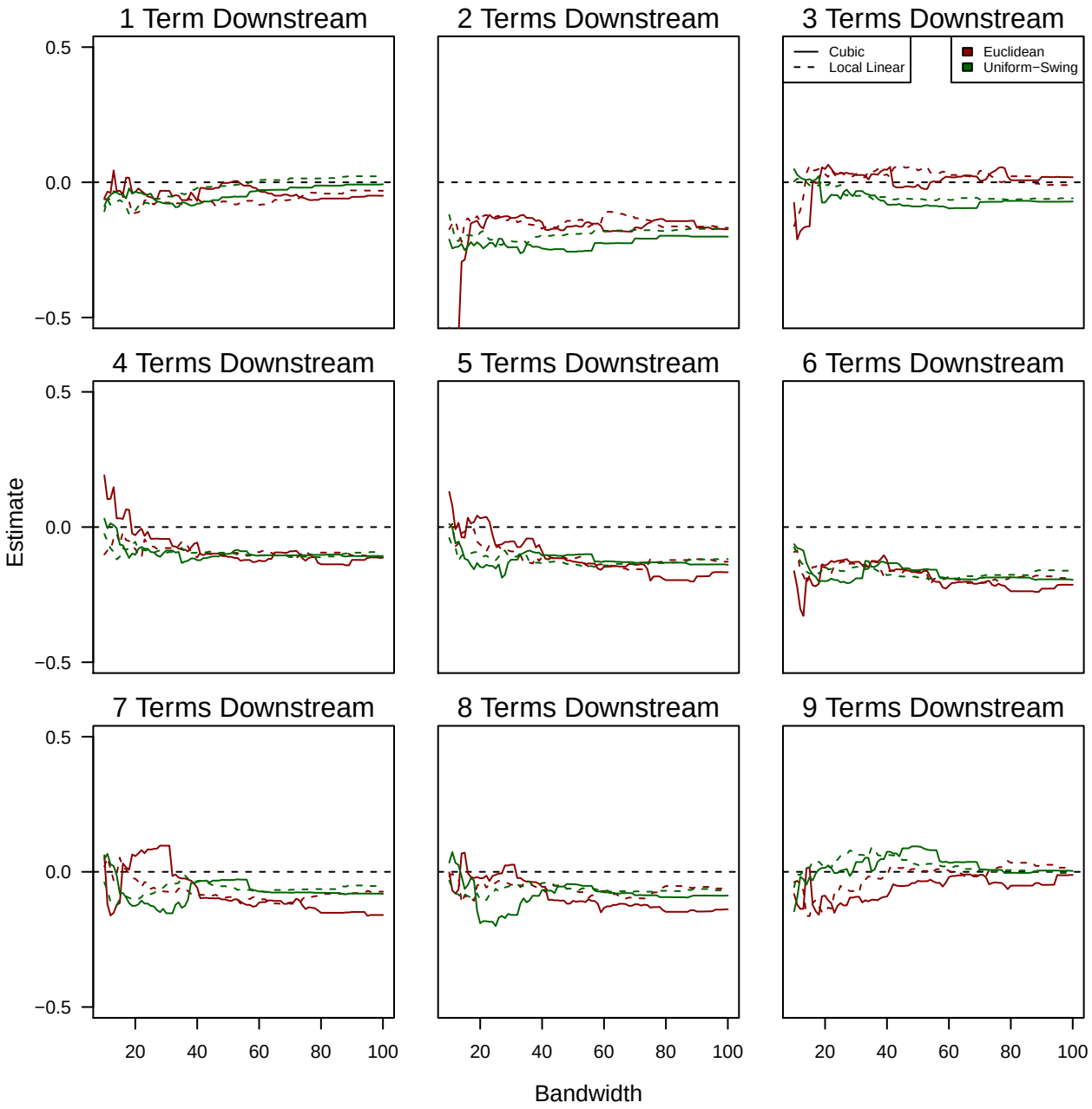
Estimate Across Bandwidths and Specifications

In this subsection, we re-estimate equation 1 in a variety of ways to ensure that our findings aren't driven by our selection of bandwidth, specification, or distance metric. Rather than use the optimal bandwidth and local kernel estimation from Calonico, Cattaneo, and Titiunik (2014), here we use OLS using either a local linear specification or a global cubic polynomial of the distance variable across a large range of possible bandwidths, and we also re-estimate the results across these choices using the uniform-swing measure of distance (recall from Table 1) that this was the other distance metric that performed well.

Figure 1 plots the resulting coefficient estimates. As we see, the estimates are relatively stable across bandwidths, specifications, and the choice of the distance metric. For example, as the second plot in the first row shows, no matter what bandwidth, specification, or distance metric we use, we always find a negative coefficient—i.e., a majority-party disadvantage—two terms after assignment.

*For comments the authors thank Gary Cox, Anthony Fowler, Maxwell Palmer, David Rohde, Jim Snyder, and Tristan Zajonc. A previous version of this paper was presented at the 2014 Midwest Political Science Association Conference. All remaining errors are the authors' own.

Figure 1 – MRD Estimates Across Bandwidths and Specifications.



Relaxing Sample Restriction

In this subsection, we re-estimate equation 1 for $k = 1, \ldots, 10$ but without restricting the sample for each regression to be that for which we have data at $k = 10$. Thus the sample changes (and shrinks) with each increase in k. Because we lose comparability across years in this setup, we do not prefer this specification; however, it is useful to make sure that the results are not driven by our choice to restrict the sample.

In this setup, we see some evidence for a short-term majority-party advantage, although it is inconsistent across the MRD and the difference-in-differences. We continue to see a pronounced downstream disadvantage, but it occurs several more terms down the line.

Table 1 – Effects of Majority-Party Status on Downstream Electoral Outcomes. Here we remove the sample restriction, allowing the sample to vary with k. We continue to see a pronounced downstream disadvantage.

Terms Downstream	MRD	Diff-in-Diff	Diff-in-Diff w/ Trends
$k = 1$	0.13 [-0.08, 0.33] $N = 370$	0.43 [0.34, 0.53] $N = 688$	0.29 [0.19, 0.39] $N = 688$
$k = 2$	-0.05 [-0.24, 0.15] $N = 351$	0.22 [0.11, 0.34] $N = 670$	0.03 [-0.08, 0.13] $N = 670$
$k = 3$	-0.01 [-0.20, 0.19] $N = 356$	0.15 [0.05, 0.24] $N = 633$	-0.04 [-0.11, 0.03] $N = 633$
$k = 4$	-0.03 [-0.21, 0.16] $N = 380$	0.01 [-0.10, 0.12] $N = 594$	-0.17 [-0.24, -0.10] $N = 594$
$k = 5$	-0.01 [-0.22, 0.20] $N = 354$	-0.07 [-0.22, 0.08] $N = 555$	-0.20 [-0.33, -0.07] $N = 555$
$k = 6$	-0.19 [-0.42, 0.05] $N = 276$	-0.14 [-0.28, 0.01] $N = 517$	-0.24 [-0.37, -0.10] $N = 517$
$k = 7$	-0.22 [-0.48, 0.03] $N = 243$	-0.14 [-0.25, -0.02] $N = 479$	-0.19 [-0.32, -0.06] $N = 479$
$k = 8$	-0.15 [-0.43, 0.13] $N = 233$	-0.12 [-0.27, 0.03] $N = 442$	-0.12 [-0.28, 0.03] $N = 442$
$k = 9$	0.06 [-0.18, 0.31] $N = 248$	-0.05 [-0.23, 0.13] $N = 404$	-0.03 [-0.19, 0.14] $N = 404$
$k = 10$	0.15 [-0.15, 0.46] $N = 191$	0.07 [-0.09, 0.22] $N = 366$	0.07 [-0.05, 0.20] $N = 366$

MRD estimates use Calonico, Cattaneo, and Titiunik (2014) optimal bandwidth implemented with rdrobust in Stata. 95% confidence intervals in brackets; Difference-in-differences standard errors clustered by state.

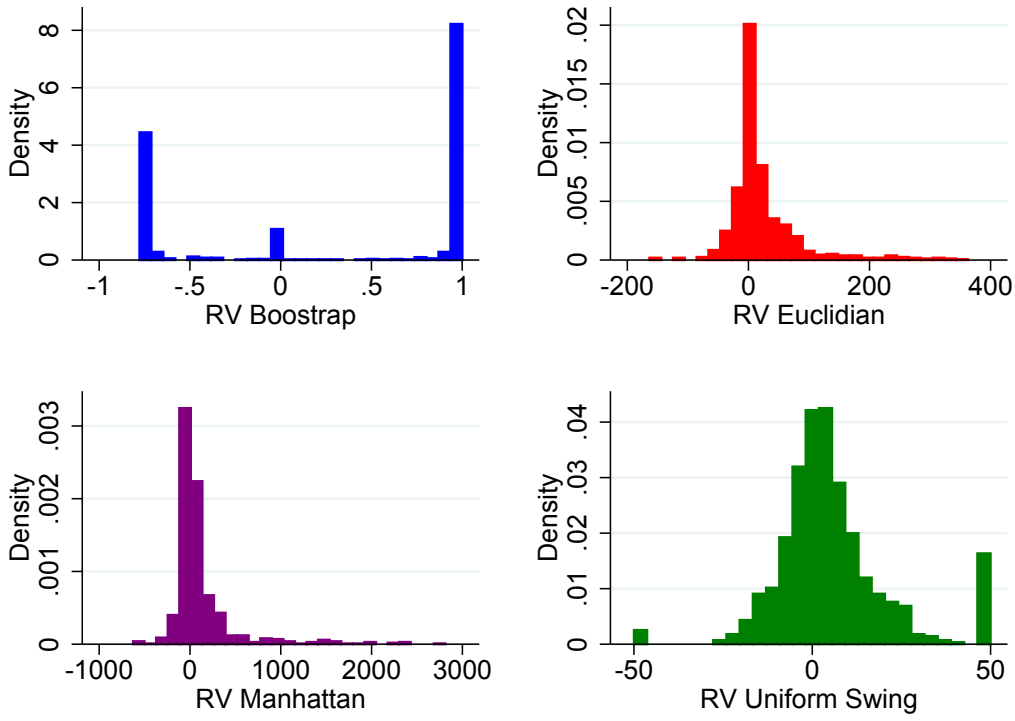
Similar Rankings and Results with Bootstrap Simulations

In this subsection, we show that our results are robust to the simulation approaches proposed in the literature on PR systems (Fiva, Folke, and Sørensen 2014; Folke 2014; Kotakorpi, Poutvaara, and Terviö 2013). We follow Kotakorpi, Poutvaara, and Terviö (2013) and generate the running variable based on a resampling approach. For district d in state i at time t, we resample n voters with replacement according to the empirical distribution of votes in the district. The results presented below are based on n=500, but the results are not sensitive to the choice of n. Based on all the resampled district elections, we determine whether the Democrats in state i at time t won a majority of the seats or not. We repeat the process 10,000 times (again the results are not sensitive to this specific choice) and for each state-year election, we calculate the fraction of bootstrap elections in which the Democrats won a majority, p_{it}. The running variable is then calculated as p_{it} minus the highest p_{it} for all observations where the Democrats did not win a majority, and p_{it} minus the lowest p_{it} for all observations in which the Democrats secured a majority of the seats. Thus the running variable takes on negative values for all observations where the Democrats did not win a majority and positive values for all observations where the Democrats did win more than 50% of the seats.

In Table 2, we present Spearman's rank correlations between the different distance measures. As one would expect, the rank correlations are fairly strong and ranges from 0.855 to 0.998. This suggests that our measures and the bootstrap measure overall rank the observations in the same order.

However, as indicated by figure 2, the distributions are quite different. Whereas the Euclidian, Manhattan and Uniform Swing RVs approximate the normal distribution, the bootstrap RV has a distinct bimodal shape with many extreme observations. This distribution is a direct consequence of the simulation approach. To illustrate the point, consider the hypothetical case in which the Democrats won 50% of the seats + 1 seat (all with 100% winning margins) and the case where the Democrats won 100% of the seats (all with 100% winning margins). The bootstrap simulations will produce the same RV for these cases whereas our measures suggest that the former case is closer to the majority threshold than the latter. In other words, the simulated RV contains less information than our analytical measures.

Figure 2 – Running Variable Histograms



As a result of the underlying distribution, the optimal bandwidth based on the bootstrap measure contains fewer observation compared to the analytical approach. As indicated by Table 3, the results are overall very similar, but the bootstrap-based RV contains fewer observations and more noise compared to the analytical distance measures. We only report these results out to $k = 6$ because thereafter the extremely low sample sizes for the bootstrap measure prevent meaningful estimation.

Table 2 – Spearman's Rank Correlations between Running Variables.

	Euclid	Manhat	Uniform	Bootstrap
Euclid	1.000			
	(0.000)			
Manhat	0.998	1.000		
	(0.000)	(0.000)		
Uniform	0.997	0.992	1.000	
	(0.000)	(0.000)	(0.000)	
Bootstrap	0.833	0.838	0.873	1.000
	(0.000)	(0.000)	(0.000)	(0.000)

Table 3 – Effects of Majority-Party Status on Downstream Electoral Outcomes.

Terms Downstream	Euclidian RV	Boostrap RV
$k = 1$	0.13	0.18
	[-0.08, 0.33]	[-0.35, 0.72]
	$N = 370$	$N = 69$
$k = 2$	-0.05	-0.11
	[-0.24, 0.15]	[-0.19, -0.02]
	$N = 351$	$N = 66$
$k = 3$	-0.01	0.66
	[-0.20, 0.19]	[-0.36, 1.68]
	$N = 356$	$N = 64$
$k = 4$	-0.03	0.09
	[-0.21, 0.16]	[-0.93, 1.10]
	$N = 380$	$N = 63$
$k = 5$	-0.01	0.09
	[-0.22, 0.20]	[-0.92, 1.10]
	$N = 354$	$N = 60$
$k = 6$	-0.19	0.05
	[-0.42, 0.05]	[-1.04, 1.15]
	$N = 276$	$N = 56$

All estimates use Calonico et. al. optimal bandwidth implemented with rdrobust in Stata. 95% confidence intervals in brackets.

Dropping Southern States

As discussed in the paper, here we re-estimate the main analysis dropping the Southern states. As the table shows, we continue to find highly similar results.

Majority-Party Disadvantage in Professionalized State Legislatures

One possibility is that majority parties are advantaged only in contexts where they have the institutional power they need to succeed, and are disadvantaged in places where they lack this power. Some state legislatures are weakly organized, with loose or informal committee structures and leaders with relatively few procedural authorities (Squire 2012). The disadvantage we observe in state legislatures might be concentrated in these unprofessional legislatures and may not reflect what we would observe at the federal level, for example, if we could estimate majority-party effects for the House and Senate.

To see whether the results are driven by less professionalized legislatures, in Figure 3 we re-estimate the difference-in-differences and the MRD, as in Figure 4 in the paper but including only the 20 most professionalized state legislatures. We identify the twenty most professionalized state legislatures based on each state's average score on the professionalization index from Squire (2012). As the figure shows, we continue to find the same pattern: a downstream majority-party disadvantage. These results are noisier due to the much smaller sample size, but they make it clear that the overall analysis is not obscuring a majority-party advantage in more professionalized legislatures.

Considering Variation in Majority-Party Effect Over Time

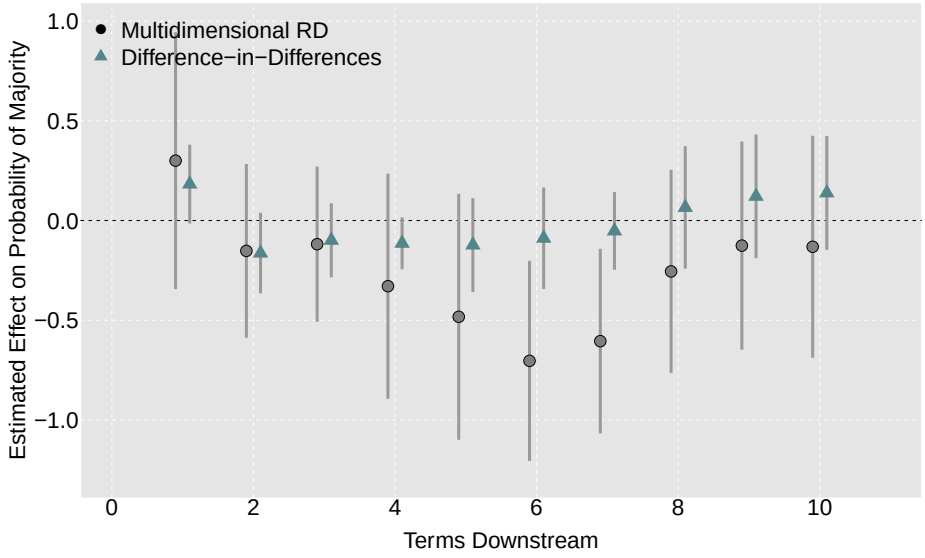
The main results presented above focus on the short- and long-run consequences of changes in majority-party status that take place between 1968 and 1990, in order to ensure the sample remains fixed as we look at outcomes 2 years downstream, 4 years downstream, and so forth. In that sample, we have shown both a remarkable lack of a majority-party advantage and, in fact, evidence for a majority-party disadvantage. Here we consider the possibility that this pattern of results is an artifact of the time period studied. Perhaps the sharp rise in partisanship since 1990 has inverted this relationship, turning the majority-party disadvantage into an advantage.

Table 4 – Effects of Majority-Party Status on Downstream Electoral Outcomes Excluding Southern States. Both the MRD and the Diff-in-Diff show a pronounced downstream disadvantage.

Terms Downstream	MRD	Diff-in-Diff	Diff-in-Diff w/ Trends
$k = 1$	0.02 [-0.32, 0.37] $N = 164$	0.13 [-0.00, 0.27] $N = 267$	0.04 [-0.11, 0.19] $N = 267$
$k = 2$	-0.34 [-0.63, -0.05] $N = 122$	-0.08 [-0.23, 0.08] $N = 267$	-0.11 [-0.26, 0.04] $N = 267$
$k = 3$	-0.09 [-0.45, 0.27] $N = 147$	-0.05 [-0.16, 0.06] $N = 267$	-0.04 [-0.20, 0.11] $N = 267$
$k = 4$	-0.16 [-0.52, 0.19] $N = 157$	-0.12 [-0.18, -0.05] $N = 267$	-0.08 [-0.18, 0.02] $N = 267$
$k = 5$	-0.24 [-0.60, 0.11] $N = 146$	-0.17 [-0.31, -0.03] $N = 267$	-0.12 [-0.31, 0.07] $N = 267$
$k = 6$	-0.35 [-0.69, -0.01] $N = 155$	-0.19 [-0.35, -0.03] $N = 267$	-0.12 [-0.33, 0.09] $N = 267$
$k = 7$	-0.21 [-0.55, 0.14] $N = 164$	-0.10 [-0.22, 0.01] $N = 267$	-0.01 [-0.12, 0.10] $N = 267$
$k = 8$	-0.12 [-0.46, 0.22] $N = 158$	-0.10 [-0.28, 0.07] $N = 267$	-0.03 [-0.19, 0.14] $N = 267$
$k = 9$	-0.04 [-0.34, 0.25] $N = 188$	-0.07 [-0.24, 0.11] $N = 267$	-0.02 [-0.20, 0.17] $N = 267$
$k = 10$	0.14 [-0.17, 0.45] $N = 169$	0.07 [-0.08, 0.21] $N = 267$	0.11 [-0.00, 0.23] $N = 267$

MRD estimates use Calonico, Cattaneo, and Titiunik (2014) optimal bandwidth implemented with rdrobust in Stata. 95% confidence intervals in brackets; Difference-in-differences standard errors clustered by state.

Figure 3 – The Downstream Majority-Party Disadvantage: 20 Most Professionalized U.S. State Legislative Lower Chambers, 1968–2014. Presents estimated effects from gaining majority-party status at time t on majority-party status in subsequent legislative sessions, from $t+1$ to $t+10$, for the 20 states with the highest average professionalization scores according to the Squire (2012) index. Black dots represent estimates from the Multidimensional RD; blue triangles are from difference-in-differences design. As the plot shows, there is a pronounced downstream disadvantage. Both techniques produce highly similar estimates, with the difference-in-differences providing more statistical efficiency.

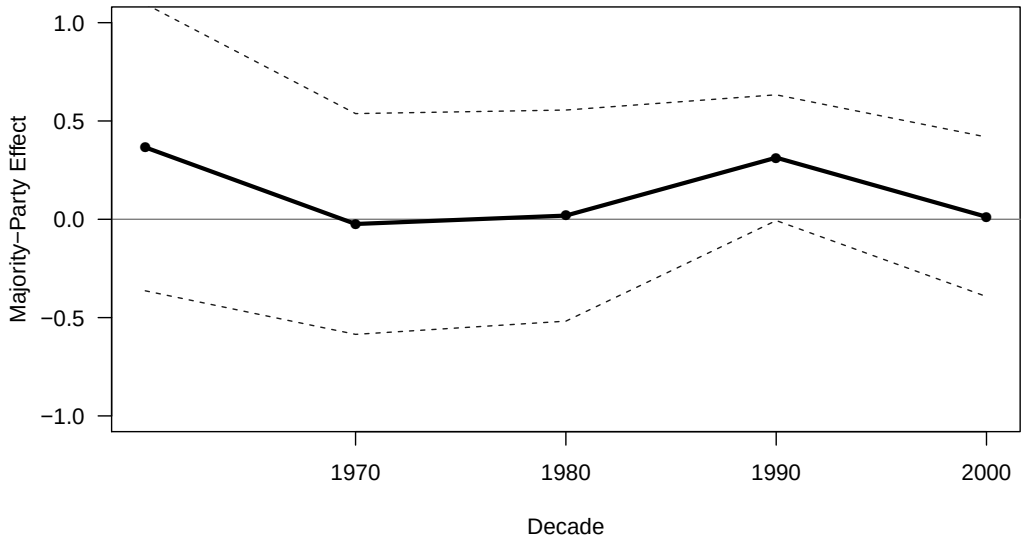


Note: Bars represent 95% confidence intervals; MRD standard errors computed as in Calonico, Cattaneo, and Titiunik (2014); Difference-in-differences standard errors clustered by state.

First, in Figure 4, we re-estimate equation 1 for $k = 1$, i.e., to study the probability of holding majority-party status at $t+1$, by decade, placing no restrictions on the comparability of the sample. As the plot shows, the only sign of a majority-party advantage is in the 1990s. The advantage is very close to zero both in the 1970s and 1980s, and also in the 2000s. Since the 2000s were in fact even more partisan—across many indicators of both legislative and voter partisanship (e.g., McCarty, Poole, and Rosenthal 2006)—the pattern is thus inconsistent with a story in which the majority-party advantage is rising over time along with polarization.

Second, in Figure 5, we display this same plot but for $k = 5$, i.e., for the probability of holding majority-party status 5 terms (10 years) downstream. Here we find no evidence for a long-term majority-party advantage in any decade, and again we see a noticeable dip in the 2000s even as

Figure 4 – Effect of Majority-Party Status at time t on Probability of Majority-Party Status at time $t+1$ by Decade.

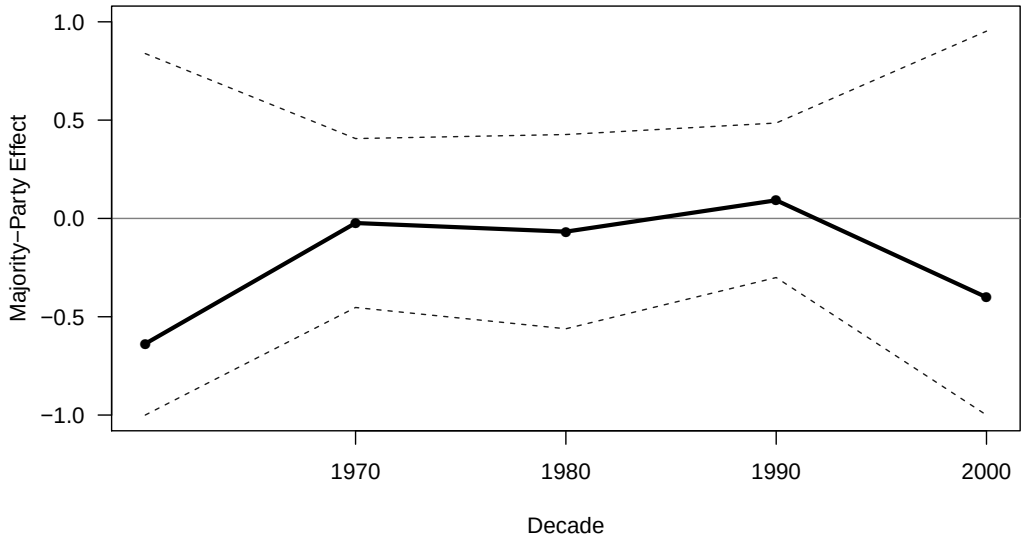


Note: Points reflect MRD estimates as in equation 1. Dotted lines are 95% confidence intervals.

partisanship is rising. Though partitioning the sample prevents precise estimation, both the 1970s and the 2000s display substantively large levels of majority-party disadvantage.

Taken together, these analyses suggest that our conclusions are not drawn by the time period we focus on in the main analysis. Across time periods, we find little evidence of a sustained majority-party advantage—indeed, save for one fleeting occurrence in the 1990s we find no advantage at any time—and we continue to see periods of majority-party disadvantage.

Figure 5 – Effect of Majority-Party Status at time t on Probability of Majority-Party Status at time $t + 5$ by Decade.



Note: Points reflect MRD estimates as in equation 1. Dotted lines are 95% confidence intervals.

References

Calonico, Sebastian, Mattias D. Cattaneo, and Rocío Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82(6): 2295–2326.

Fiva, Jon H., Olle Folke, and Rune J. Sørensen. 2014. "The Power of Parties." SSRN Working Paper, http://ssrn.com/abstract=2221882.

Folke, Olle. 2014. "Shades of Brown and Green: Party Effects in Proportional Election Systems." *Journal of the European Economic Association* 12(4): 1127–1422.

Kotakorpi, Kaisa, Panu Poutvaara, and Marko Terviö. 2013. "Returns to Office in National and Local Politics." CESIFO Working Paper No. 4542, http://ssrn.com/abstract=2378294.

McCarty, Nolan M., Keith T. Poole, and Howard Rosenthal. 2006. *Polarized America: The Dance of Ideology and Unequal Riches*. MIT Press Cambridge, MA.

Squire, Peverill. 2012. *The Evolution of American Legislatures: Colonies, Territories, and States, 1619-2009*. Ann Arbor: University of Michigan Press.