Supplemental Appendix for:

Natural Disasters, "Partisan Retrospection," and U.S. Presidential Elections

May 28, 2019

A. Data and Variable Construction

The variables used in our two sets of analyses differ in their sources and construction, though there is significant similarity in the treatment variable—disaster damage—across the two studies. In both studies, we utilize data from the Spatial Hazard Events and Losses Database (SHELDUS) to assess disaster damage at the county level. In our analysis of Hurricane Sandy, we define treatment as the natural log of property and crop damage, stemming from Sandy, per 10,000 county residents. Our broader re-analysis of Gasper and Reeves data uses a similar definition of disaster damage, one that is also used by Gasper and Reeves in their study: the natural log of property damage over the prior six months, per 10,000 county residents.

A.1. Hurricane Sandy Analysis

In addition to disaster damage, our analysis of Hurricane Sandy's impact on the 2012 election uses a number of county-level data sources. To calculate Democratic share of the two-party vote in 2008 and 2012, we used data from Dave Leip's U.S. Election Atlas. We identified counties that were given a disaster declaration in response to Hurricane Sandy from the website of the Federal Emergency Management Agency (FEMA), which has a searchable database of recent disaster declarations.[1]

Beyond damage from Hurricane Sandy, some of our models incorporate other non-Sandy disaster damage as a control variable. We used SHELDUS data to calculate the natural log of property and crop damage per 10,000 county residents over the prior six months and two years, respectively. We also incorporated non-Sandy disaster declarations over the previous two years, a list of which was generously provided by Richard Sylves.[2]

To capture economic factors that might influence vote share, we used data from the Internal Revenue Service (IRS) and Zillow, a real estate research firm.[3] Our IRS tax

[1] https://www.fema.gov/disasters.

[2] Official January 2016 FEMA data made available by Professor Richard Sylves, University of Delaware, 4/26/2017.

[3] IRS data is available at: https://www.irs.gov/uac/soi-tax-stats-individual-income-tax-return-form-

data is reported at the county level, and provides a raw count of tax returns filed, total exemptions claimed, and total gross income. Using this data, we calculated the per-exemption mean gross income at the county level, which we consider a reasonable proxy for per capita income.[4] This data allows us to calculate the change in income per capita (gross income per exemption) from 2011 to 2012, to account for the impact of temporal economic change on 2012 vote share. In alternative models, we construct this variable using a more limited definition of income: gross income from salary and wages per exemption.[5] The same source also reports the total number of tax returns reporting income from unemployment compensation over the prior year. We use this data as a proxy for unemployment during the year, calculating our proxy-unemployment rate as the number of returns reporting unemployment compensation over the total number of returns filed in county i; this allows us to calculate the change in unemployment from 2011 to 2012.[6]

Our final economic variable uses data from Zillow on average home prices. Zillow provides county-level data on median home price, which we use to calculate the change in home prices from 2010 to 2012, to capture the depth and duration of the housing market collapse during the Great Recession. Importantly, Zillow only provides this data for larger markets: our data includes unique annual estimates of median home price for 1,213 counties in the U.S. For the remaining counties, which constitute less active real estate markets, we use their respective state-level estimates in lieu of county-specific data.[7]

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[4]The total number of exemptions in a county approximates a county's total population, while total gross income approximates total income.

[5]Income from salary or wages excludes income earned from, for instance, interest and dividends.

[6]In alternative models reported in this Supplemental Appendix, we use changes in these economic variables over either two or four years instead—see Table A.4.

[7]To illustrate, Zillow provides unique county-level estimates for all 53 of Virginia's counties and county-equivalents. However, Zillow only provides county-level estimates for six of Utah's 23 counties; for the remaining 17 counties in Utah, we use Zillow's state-level average instead.

A.2. U.S. Presidential Elections, 1972-2004

Our second analysis, which covers U.S. presidential elections from 1972 to 2004, relies heavily on replication data provided by Gasper and Reeves.[8] In the main results presented in the paper, we draw all raw data from Gasper and Reeves' replication data: we use their estimates of disaster damage, vote share, median household income, and counts of disaster declarations and turndowns. We briefly summarize these variables' construction, drawing heavily from Gasper and Reeves' descriptions, below.

Disaster damage mirrors the operationalization in our Sandy analysis, and is defined as the natural log of disaster damage over the prior six months, per 10,000 county residents. Disaster declarations and declaration request turndowns are counts of both variables over the six months prior to an election. Median income is median household income, in thousands of dollars, drawn from the U.S. Census. Finally, like Gasper and Reeves, we typically include two lagged values of the dependent variable, incumbent share of the two-party vote, on the right-hand side.

As noted above, our primary analysis uses Gasper and Reeves' replication data and little else. We use their data on incumbent vote share to divide counties into co-partisan, swing, and contra-partisan counties, respectively. We supplement their data only by adding vote share from 1960. Their dataset did not include data prior to 1964, because they studied the period 1972 to 2004 and included up to two lags in their models, extending their data back to 1964. In contrast, we use three previous elections to categorize counties as co-partisan, swing, or contra-partisan, and therefore needed data that included 1960. We add 1960 vote share, obtained from the Inter-University Consortium for Political and Social Research (ICPSR), to their dataset for this purpose.[9]

In the course of replicating Gasper and Reeves' findings and assessing treatment effect heterogeneity, we became aware of a number of duplicate observations in their replication

[8] Gasper and Reeves 2011.

[9] Inter-university Consortium for Political and Social Research. General Election Data for the United States, 1950-1990. ICPSR00013-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2013-11-22. https://doi.org/10.3886/ICPSR00013.v2.

dataset. These duplicates, while numerous, do not appear to influence the authors' results in their 2011 paper (Gasper and Reeves 2011), as we document directly in Table A.6. In our analysis—using an independent data source for incumbent vote share, and removing all duplicate county-years from the data—the authors' findings regarding the impact of disaster damage, disaster declarations, and request turndowns are all unchanged in both statistical and substantive terms.[10]

Nonetheless, to ensure that duplicates in the original Gasper and Reeves replication data do not influence *our* findings, we took two steps. First, we replaced their vote share data with a full set of voting results from 1960 to 2004, drawn from ICPSR.[11] Second, and far more importantly, we removed all duplicate county-years from the original replication data. In total, we removed 3,704 duplicate county-years from the replication data, reducing the total sample size from 29,746 to 26,042. The single year with the largest number of duplicates was 1976, with 854 duplicate counties included.

As with Gasper and Reeves' findings, our findings are unaffected by the duplicates which we discovered in the data. Across both datasets and a wide range of models, counties were more generous toward co-partisan politicians in the wake of a disaster than they were toward contra-partisan counties. We include results from both datasets in this Appendix in the interest of full transparency. In tables of results using our own data, in which we have removed duplicate county-years, we specify in the title that the models use "Corrected Data."

[10]To compare results using Gasper and Reeves' replication data and our independent data, compare Table 2 in their 2011 article (or Table 2, Columns 1 and 3 in our primary manuscript) to Table A.6. The core results from Gasper and Reeves' original article are not influenced by the data source.

[11]Inter-university Consortium for Political and Social Research. General Election Data for the United States, 1950-1990. ICPSR00013-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2013-11-22. https://doi.org/10.3886/ICPSR00013.v2.

B. Hurricane Sandy Analysis

B.1. Alternative Operationalizations of Co-Partisanship

In this section, we report results from models that use different definitions of co- and contra-partisanship. Our primary models estimate heterogeneous treatment effects of Sandy damage across three categories of co-partisanship, which we define as co-partisan (>55 percent vote share in the previous election), swing (45-55 percent vote share in the previous election) and contra-partisan (<45 percent vote share in the previous election). In Table A.1, we report results using five categories of partisanship, which we define using quantiles of Democratic vote share in the previous election, 2008. Specifically, the five categories are defined by the following ranges of Democratic share of the two-party vote in 2008:

Quantile 1: > 61.4 percent

Quantile 2: 54.5 to 61.4 percent

Quantile 3: 48.4 to 54.5 percent

Quantile 4: 41.4 to 48.4 percent

Quantile 5: < 41.4 percent

The H_0 P-Value reported at the bottom of Table A.1 is the difference between the coefficients for the two most extreme categories, i.e. the difference between treatment effects in Quantile 1 and Quantile 5. Finally, Figure A.1 plots the coefficients and 95 percent confidence intervals from model 3 in Table A.1, focusing on the five partisanship categories. As in our primary analysis with three partisanship categories, the difference in treatment effects between strongly co-partisan and strongly co-partisan counties is significant and in the direction predicted by our theory.

Moving from three to five partisanship categories allows for greater heterogeneity in treatment effects. An alternative approach to this same problem—allowing the effect of

the treatment variable to vary across values of a second variable—consists of a continuous-by-continuous interaction term. In Table A.2, we treat co-partisanship as a continuous variable, simply taking the Democratic share of the two-party vote in 2008 as our indicator of partisanship. We interact Democratic vote share in 2008 with damage from Hurricane Sandy. As Table A.2 shows, the effect of disaster damage varies dramatically with pre-2012 Democratic support—in counties in which Obama did well in 2008, the effect of disaster damage is more strongly positive.[12] This effect is visualized in Figure A.2, which plots the estimated treatment effect from model 3 in Table A.2 across different levels of partisanship. Consistent with our primary findings regarding Hurricane Sandy, strongly Democratic counties affected by Sandy rewarded the incumbent Obama, while strongly Republican counties that were similarly affected tended to punish him.

[12]Note that, unlike the results presented thus far, this table does not report a post-estimation F-test comparing two coefficients. Rather, the continuous-by-continuous interaction term captures the changing effect of the treatment at different levels of partisanship. The positive and statistically significant coefficient reported for *Damage * 2008 Vote Share* in Table A.2 indicates that the effect of disaster damage becomes larger (i.e. more positive) as pro-Democratic partisanship increases.

Table SA1: Hurricane Sandy and Obama Vote Share
Five Partisanship Categories

	(1)	(2)	(3)
Partisan_5 * Damage	0.030	0.030	0.023
	(0.03)	(0.03)	(0.03)
Partisan_4 * Damage	0.093*	0.090*	0.085*
	(0.04)	(0.04)	(0.04)
Partisan_3 * Damage	-0.006	-0.007	-0.015
	(0.04)	(0.04)	(0.04)
Partisan_2 * Damage	-0.134$^+$	-0.136*	-0.141*
	(0.07)	(0.07)	(0.07)
Partisan_1 * Damage	-0.269$^+$	-0.271$^+$	-0.275$^+$
	(0.16)	(0.16)	(0.16)
Partisan_5	-1.026*	-1.004*	-1.028*
	(0.50)	(0.50)	(0.50)
Partisan_4	-2.030*	-2.008*	-2.039*
	(0.35)	(0.35)	(0.35)
Partisan_3	-1.573*	-1.588*	-1.604*
	(0.28)	(0.28)	(0.28)
Partisan_2	-0.941*	-0.949*	-0.949*
	(0.21)	(0.21)	(0.21)
Dem. Vote Share, 2008	1.072*	1.071*	1.072*
	(0.01)	(0.01)	(0.01)
Income Change, 1 Year		-1.360*	-1.289*
		(0.51)	(0.51)
Unemp. Change, 1 Year		0.000	0.000
		(0.00)	(0.00)
Home Price Change, 2 Years		-0.358	-0.493
		(1.13)	(1.13)
Disaster Damage, 2 Years			0.025*
			(0.01)
Declarations, 2 Years			0.062
			(0.08)
H_0 P-Value	**.035***	**.034***	**.036***
N	3113	3078	3078
r^2	0.961	0.961	0.961

Note: Dependent variable is Democratic vote share in the 2012 presidential elections, at the county level. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

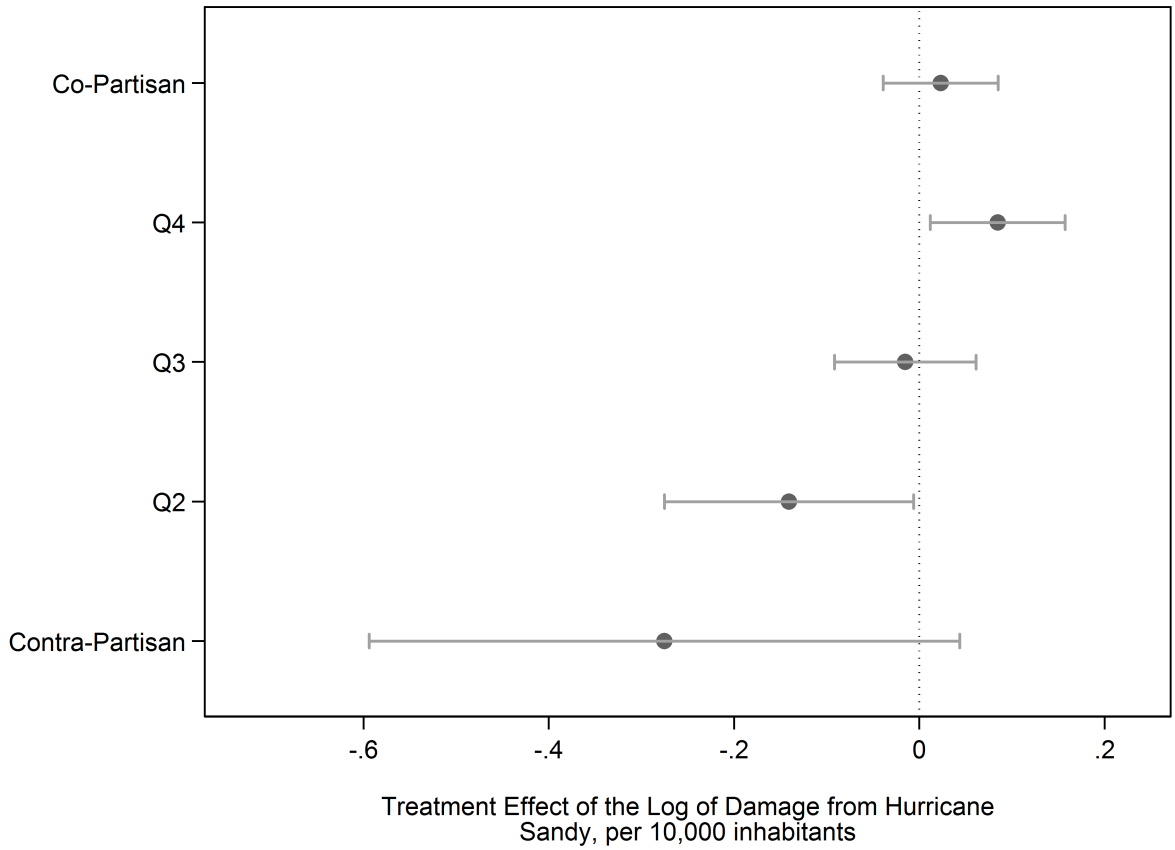

Figure A.1: The treatment effect of disaster damage from Hurricane Sandy, by levels of pre-existing partisanship. Point estimates and 95 percent confidence intervals are presented for the treatment effect across five categories of pro-Democratic partisanship. Results are drawn from Table A.1, Column 3.

Table SA2: Hurricane Sandy and Obama Vote Share Continuous Measure of Partisanship

	(1)	(2)	(3)
Sandy Damage	-0.345*	-0.351*	-0.360*
	(0.09)	(0.09)	(0.09)
Dem. Vote Share, 2008	1.043*	1.042*	1.042*
	(0.00)	(0.00)	(0.00)
Damage * 2008 Vote Share	0.007*	0.007*	0.007*
	(0.00)	(0.00)	(0.00)
Income Change, 1 Year		-1.139*	-1.072*
		(0.52)	(0.52)
Unemp. Change, 1 Year		0.000	0.000
		(0.00)	(0.00)
Home Price Change, 2 Years		-0.605	-0.741
		(1.15)	(1.15)
Disaster Damage, 2 Years			0.023*
			(0.01)
Declarations, 2 Years			0.038
			(0.08)
N	3113	3078	3078
r^2	0.960	0.959	0.960

Note: Dependent variable is Democratic vote share in the 2012 presidential elections, at the county level. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

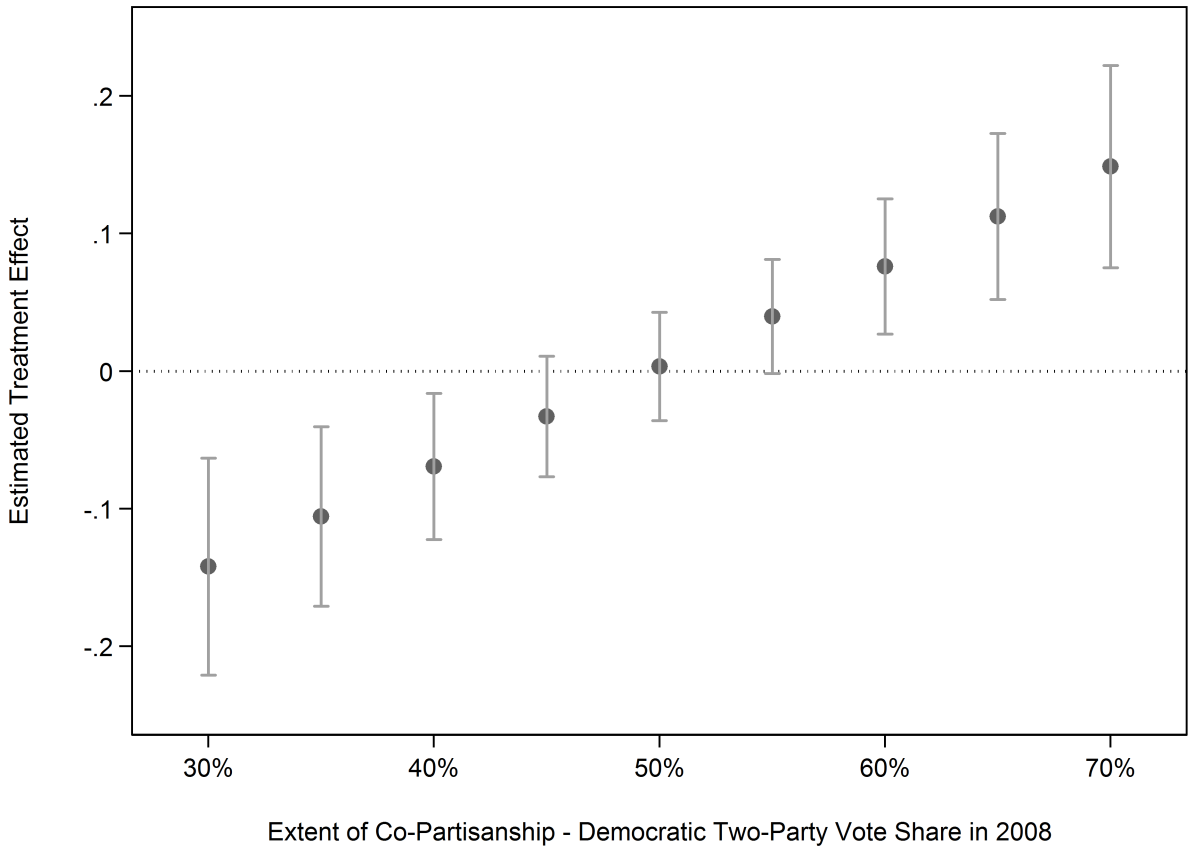

Figure A.2: Varying effects of disaster damage from Hurricane Sandy, by increasing levels of prior pro-Democratic support. At low levels of pre-existing Democratic support (i.e. contra-partisan counties), the effect of damage is negative; at high levels of pre-existing Democratic support (co-partisan counties), the effect of damage becomes increasingly positive.

B.2. Alternative Operationalization of Sandy Damage

Our primary models investigating the impact of Hurricane Sandy on Obama's vote share use a continuous measure of disaster damage, as described in section A.1 of this appendix. The property damage from Hurricane Sandy was extremely concentrated, with damage in just two counties (Monmouth and Ocean Counties, New Jersey) accounting for over three-quarters of total damage from the storm. Our operationalization of disaster damage, which takes the natural log of total damage and adjusts it to account for county population, deals with these outliers in a principled way. However, as a further robustness check, we re-estimated our models using a binary indicator of damage from Sandy.[13] In Table A.3, we report these models, in which we interact a dummy variable for Sandy treatment with three categories of partisanship. The results of these models are consistent with our primary findings, in that co-partisan counties rewarded Obama in the wake of Hurricane Sandy, while contra-partisan counties punished him.

[13]We define a county as being impacted by Sandy if it experienced non-zero crop and property damage from Sandy. We do not include counties that experienced injuries or fatalities, but experienced no crop or property damage. In total, 278 counties meet this criterion.

Table SA3: Hurricane Sandy and Obama Vote Share
Binary Treatment (Sandy) Variable

	(1)	(2)	(3)	(4)
Sandy Dummy	0.198			
	(0.19)			
Co-Partisan * Sandy		0.773*	0.779*	0.716*
		(0.34)	(0.34)	(0.35)
Swing * Sandy		0.650*	0.626+	0.578+
		(0.33)	(0.33)	(0.33)
Contra * Sandy		-0.684*	-0.691*	-0.751*
		(0.32)	(0.33)	(0.33)
Swing		-1.718*	-1.722*	-1.734*
		(0.21)	(0.22)	(0.22)
Contra		-1.437*	-1.481*	-1.482*
		(0.28)	(0.29)	(0.29)
Dem. Vote Share, 2008	1.047*	1.019*	1.017*	1.017*
	(0.00)	(0.01)	(0.01)	(0.01)
Income Change, 1 Year			-1.379*	-1.310*
			(0.52)	(0.52)
Unemp. Change, 1 Year			0.000	0.000
			(0.00)	(0.00)
Home Price Change, 2 Years			-0.339	-0.468
			(1.13)	(1.14)
Disaster Damage, 2 Years				0.024*
				(0.01)
Declarations, 2 Years				0.049
				(0.08)
H_0 P-Value		**< .001***	**< .001***	**< .001***
N	3113	3113	3078	3078
r^2	0.960	0.961	0.960	0.961

Note: Dependent variable is Democratic vote share in the 2012 presidential elections, at the county level. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

B.3. Alternative Control Variables

This section reports several robustness checks of our primary results, in which we vary the construction of our control variables, and alter the number of lagged values of the dependent variable that we include on the right-hand side. Our primary models use the following control variables:

1. Single lag of Democratic vote share (2008)
2. Change in per capita income, 2011-2012
3. Change in unemployment rate, 2011-2012
4. Change in home prices, 2010-2012
5. Total disaster damage over previous two years
6. Disaster declarations over previous two years (count)

Table A.4 reports models in which we vary the construction of our economic variables. Model 1 uses the change in income from salary and wages, rather than total income, over the period 2010 to 2012.[14] Model 2 returns to total income, but calculates income change over the period 2009 to 2012 instead, accounting for the possibility that income changes are slow to occur and reflect longer-term trends for which voters might punish Obama at the ballot box. Model 3 replicates our primary models, but calculates the change in home price over a four year period rather than two years—again, recognizing the possibility that voters are attuned to changes since the start of Obama's first term, rather than shorter-term changes over one or two years.

Table A.5 returns to our core set of control variables, but alters the number of lags that we include as independent variables. In our primary models, we employ a single lag of Democratic vote share from 2008 on the right-hand side. Model 1 replicates this primary finding for the sake of reference, which is identical to Model 4 in Table 1 in the primary

[14]Further details on the construction of this variable are provided in Section A.1 of this appendix.

manuscript. Models 2 and 3 add additional lags on the right-hand side: two previous elections in Model 2 and three previous elections in Model 3, respectively.

Table SA4: Hurricane Sandy and Obama Vote Share Alternative Control Variables

	(1)	(2)	(3)
Co-Partisan * Damage	0.062^{+}	0.055	0.073*
	(0.03)	(0.03)	(0.03)
Swing * Damage	0.064^{+}	0.061^{+}	0.111*
	(0.03)	(0.03)	(0.03)
Contra * Damage	-0.063^{+}	-0.080*	0.049
	(0.03)	(0.03)	(0.04)
Swing	-1.705*	-1.864*	-1.789*
	(0.22)	(0.21)	(0.22)
Contra	-1.477*	-1.623*	-1.565*
	(0.29)	(0.29)	(0.29)
Dem. Vote Share, 2008	1.018*	1.015*	1.018*
	(0.01)	(0.01)	(0.01)
Salary Change, 2 Year	6.044*		
	(1.92)		
Income Change, 1 Year			-1.765*
			(0.50)
Income Change, 4 Years		-2.454*	
		(0.35)	
Unemp. Change, 1 Year	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)
Home Price Change, 2 Years	-1.091	0.872	
	(1.13)	(1.15)	
Home Price Change, 4 Years			0.508
			(0.53)
Disaster Damage, 2 Years	0.025*	0.022*	0.025*
	(0.01)	(0.01)	(0.01)
Declarations, 2 Years	0.051	0.068	0.083
	(0.08)	(0.08)	(0.08)
H_0 P-Value	**.005***	**.002***	**.309***
N	3078	3078	2914
r^2	0.961	0.961	0.964

Note: Dependent variable is Democratic vote share in the 2012 presidential elections, at the county level. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

Table SA5: Hurricane Sandy and Obama Vote Share Alternative Numbers of Lags

	(1 Lag)	(2 Lags)	(3 Lags)
Co-Partisan * Damage	0.053	0.049	0.045
	(0.03)	(0.03)	(0.03)
Swing * Damage	0.057^{+}	0.050	0.047
	(0.03)	(0.03)	(0.03)
Contra * Damage	-0.076*	-0.072*	-0.070*
	(0.03)	(0.03)	(0.03)
Swing	-1.764*	-1.700*	-1.744*
	(0.22)	(0.21)	(0.21)
Contra	-1.519*	-1.547*	-1.641*
	(0.29)	(0.28)	(0.29)
Dem. Vote Share, 2008	1.017*	0.946*	0.959*
	(0.01)	(0.01)	(0.01)
Dem. Vote Share, 2004		0.084*	0.009
		(0.01)	(0.02)
Dem. Vote Share, 2000			0.064*
			(0.02)
Income Change, 1 Year	-1.324*	-0.987^{+}	-0.789
	(0.52)	(0.51)	(0.52)
Unemp. Change, 1 Year	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)
Home Price Change, 2 Years	-0.465	-0.601	-0.187
	(1.14)	(1.13)	(1.13)
Disaster Damage, 2 Years	0.024*	0.019*	0.016^{+}
	(0.01)	(0.01)	(0.01)
Declarations, 2 Years	0.059	-0.026	-0.042
	(0.08)	(0.08)	(0.08)
H_0 P-Value	**.003***	**.005***	**.007***
N	3078	3078	3077
r^2	0.960	0.961	0.961

Note: Dependent variable is Democratic vote share in the 2012 presidential elections, at the county level. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

C. Disasters and Presidential Elections, 1972-2004

C.1. Using Corrected Data

Our primary results use replication data provided by Gasper and Reeves for their study of disasters and attentive retrospection (2011). As noted in Section A.2 above, our review of that data uncovered a number of duplicate county-years that were included in their analysis. As previously discussed, removing these duplicates does not alter their results in any meaningful way. For the sake of full transparency, we implemented Gasper and Reeves' models and our own on our corrected data, reporting the results in Table A.6. The models in Table A.6 use the same specifications as in Table 2 of our paper. Columns 1 and 3 are replications of Gasper and Reeves' own findings—as the table shows, their substantive conclusions regarding the impact of disaster damage, disaster declarations and turndowns are unchanged, becoming—if anything—substantively larger. Columns 2 and 4 replicate our own results on this corrected dataset; again, our results are unchanged by the removal of duplicate observations, with the divergence between co- and contra-partisan counties significant at the 5 percent level in a post-estimation Wald test.

Table SA6: Disaster Damage and Incumbent Vote Share - Corrected Data

	G&R Model 1	Ext. 1	G&R Model 3	Ext. 3
Disaster Damage	-0.026*		-0.038*	
	(0.01)		(0.01)	
Co-Partisan * Damage		0.038*		0.027*
		(0.01)		(0.01)
Swing * Damage		-0.038*		-0.051*
		(0.01)		(0.02)
Contra * Damage		-0.100*		-0.111*
		(0.02)		(0.02)
Incumbent Vote Share, L1	0.520*	0.515*	0.519*	0.515*
	(0.01)	(0.01)	(0.01)	(0.01)
Incumbent Vote Share, L2	0.368*	0.367*	0.370*	0.370*
	(0.01)	(0.01)	(0.01)	(0.01)
Median Income	0.027*	0.027*	0.032*	0.033*
	(0.01)	(0.01)	(0.01)	(0.01)
Swing		0.947*		0.996*
		(0.22)		(0.22)
Contra-Partisan		0.447+		0.520*
		(0.26)		(0.26)
Declarations, 6 Months			0.711*	0.674*
			(0.12)	(0.12)
Turndowns, 6 Months			-0.973*	-0.990*
			(0.09)	(0.09)
Intercept	22.200*	22.051*	22.217*	21.925*
	(0.38)	(0.61)	(0.38)	(0.60)
H_0 P-Value		**<.001***		**<.001***
N	27729	27729	27729	27729
r^2	0.789	0.790	0.790	0.791

Note: Dependent variable is incumbent vote share in county i in time t. All models include county and year fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

C.2. Alternative Operationalizations of Partisanship

This section reports the first robustness checks for our analysis of US presidential elections over the period 1972 to 2004. Our primary models employ three categories of partisanship, based on the mean vote share for the incumbent over the previous three elections. We define counties as co-partisan (>55 percent vote share for the incumbent over the previous three elections), swing (45-55 percent) and contra-partisan (<45 percent). In the primary manuscript, we also briefly reported a set of results using ten partisanship categories, in which partisanship was defined as deciles of pro-incumbent support averaged over the previous three elections. These results were reported in a coefficient dot plot; the full table of results are provided in Table A.7. The variable $Partisan_{10}$ represents the most co-partisan counties, while $Partisan_{1}$ indicates the most strongly contra-partisan counties.

The next two tables in this section, Table A.8 and Table A.9, also employ alternative operationalizations of partisanship. Equally importantly, they also use our corrected data—noted in the previous section—in which we have removed duplicate county-years from the analysis. Table A.8 uses five partisanship categories (defined using quantiles of pro-incumbent vote share over the previous three elections) and corrected data, while Table A.9 uses ten partisanship categories (defined as deciles in the same manner) and our corrected data.

Table SA7: Disaster Damage and Incumbent Vote Share Ten Partisanship Categories

	Model 1	Model 2
Partisan_{10} * Damage	0.019	0.013
	(0.01)	(0.01)
Partisan_{9} * Damage	-0.019	-0.026
	(0.03)	(0.03)
Partisan_{8} * Damage	-0.043	-0.051^{+}
	(0.03)	(0.03)
Partisan_{7} * Damage	-0.014	-0.023
	(0.03)	(0.03)
Partisan_{6} * Damage	-0.024	-0.034
	(0.03)	(0.03)
Partisan_{5} * Damage	-0.012	-0.025
	(0.03)	(0.03)
Partisan_{4} * Damage	-0.012	-0.024
	(0.03)	(0.03)
Partisan_{3} * Damage	-0.023	-0.033
	(0.03)	(0.03)
Partisan_{2} * Damage	-0.088^{*}	-0.103^{*}
	(0.03)	(0.03)
Partisan_{1} * Damage	-0.117^{*}	-0.127^{*}
	(0.03)	(0.03)
Incumbent Vote Share, L1	0.488^{*}	0.486^{*}
	(0.01)	(0.01)
Incumbent Vote Share, L2	0.293^{*}	0.296^{*}
	(0.00)	(0.00)
Median Income	0.026^{*}	0.032^{*}
	(0.01)	(0.01)
Declarations, 6 Months		0.474^{*}
		(0.11)
Turndowns, 6 Months		-0.962^{*}
		(0.09)
H_0 P-Value	**$<.001^{*}$**	**$<.001^{*}$**
N	29746	29746
r^2	0.819	0.820

Note: Dependent variable is incumbent vote share in county i in time t. All models include county and year fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

Table SA8: Disaster Damage and Incumbent Vote Share
Five Partisanship Categories & Corrected Data

	Model 1	Model 2
Partisan_5 * Damage	0.070*	0.059*
	(0.02)	(0.02)
Partisan_4 * Damage	-0.001	-0.012
	(0.02)	(0.02)
Partisan_3 * Damage	-0.032+	-0.045*
	(0.02)	(0.02)
Partisan_2 * Damage	-0.050*	-0.059*
	(0.02)	(0.02)
Partisan_1 * Damage	-0.120*	-0.131*
	(0.02)	(0.02)
Partisan_4	0.144	0.243
	(0.26)	(0.26)
Partisan_3	0.671*	0.816*
	(0.34)	(0.34)
Partisan_2	0.801*	0.964*
	(0.37)	(0.37)
Partisan_1	-0.416	-0.183
	(0.40)	(0.39)
Incumbent Vote Share, L1	0.501*	0.503*
	(0.01)	(0.01)
Incumbent Vote Share, L2	0.358*	0.363*
	(0.01)	(0.01)
Median Income		0.032*
		(0.01)
Declarations, 6 Months		0.658*
		(0.12)
Turndowns, 6 Months		-0.981*
		(0.09)
Intercept	23.933*	23.063*
	(0.79)	(0.80)
H_0 P-Value	**<.001***	**<.001***
N	27729	27729
r^2	0.790	0.791

Note: Dependent variable is incumbent vote share in county i in time t. All models include county and year fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

Table SA9: Disaster Damage and Incumbent Vote Share
Ten Partisanship Categories & Corrected Data

	Model 1	Model 2
Partisan_{10} * Damage	0.116*	0.105*
	(0.03)	(0.03)
Partisan_{9} * Damage	0.021	0.011
	(0.02)	(0.02)
Partisan_{8} * Damage	-0.012	-0.021
	(0.02)	(0.02)
Partisan_{7} * Damage	0.006	-0.006
	(0.03)	(0.03)
Partisan_{6} * Damage	-0.040	-0.052*
	(0.03)	(0.03)
Partisan_{5} * Damage	-0.023	-0.035
	(0.02)	(0.02)
Partisan_{4} * Damage	-0.051*	-0.058*
	(0.03)	(0.03)
Partisan_{3} * Damage	-0.046^{+}	-0.054*
	(0.03)	(0.03)
Partisan_{2} * Damage	-0.109*	-0.122*
	(0.03)	(0.03)
Partisan_{1} * Damage	-0.128*	-0.136*
	(0.03)	(0.03)
Declarations, 6 Months		0.612*
		(0.12)
Turndowns, 6 Months		-0.960*
		(0.09)
Incumbent Vote Share, L1	0.460*	0.464*
	(0.01)	(0.01)
Incumbent Vote Share, L2	0.333*	0.339*
	(0.01)	(0.01)
Median Income		0.029*
		(0.01)
Intercept	28.311*	27.265*
	(1.02)	(1.04)
H_0 P-Value	**<.001***	**<.001***
N	27729	27729
r^2	0.792	0.793

Note: Dependent variable is incumbent vote share in county i in time t. All models include county and year fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

C.3. Alternative Specifications

Throughout the primary manuscript and this Supplemental Appendix, our analysis of presidential elections over the period 1972 to 2004 has employed two-way fixed effects. In each model, we include county and year fixed effects, in line with Gasper and Reeves' model specification (2011). While we understand the need to control for time-invariant county-specific factors that might otherwise bias estimates of the effect of disaster damage on vote share, it is important to note that the county fixed effects employed do not capture time-invariant support for one party or the other. Rather, these fixed effects capture mean support for incumbents over time, mixing support for the two parties depending on which party currently controls the presidency. We are somewhat skeptical regarding the need to control for time-invariant, county-specific levels of support for incumbents, because pro-incumbent bias in general—as opposed to bias toward a specific incumbent or a specific incumbent party—is not typically a characteristic of political units about which political scientists are concerned. As noted, we include county fixed effects in our primary models because our goal was to replicate Gasper and Reeves' findings and extend them by estimating treatment effect heterogeneity, without imposing any additional assumptions or modeling choices beyond those of the original authors. However, to ensure that the inclusion of county fixed effects are not driving our results, we re-estimated our models while excluding county fixed effects in Table A.10. As the results in that table show, both our results and those of Gasper and Reeves are unchanged by the exclusion of county fixed effects.

Table SA10: Disaster Damage and Incumbent Vote Share
No County Fixed Effects

	G&R Model 1	Ext. 1	G&R Model 3	Ext. 3
Disaster Damage	-0.022*		-0.031*	
	(0.01)		(0.01)	
Co-Partisan * Damage		0.029*		0.020+
		(0.01)		(0.01)
Swing * Damage		-0.035*		-0.046*
		(0.01)		(0.01)
Contra * Damage		-0.075*		-0.082*
		(0.01)		(0.01)
Incumbent Vote Share, L1	0.546*	0.542*	0.546*	0.542*
	(0.01)	(0.01)	(0.01)	(0.01)
Incumbent Vote Share, L2	0.320*	0.318*	0.321*	0.320*
	(0.01)	(0.01)	(0.01)	(0.01)
Median Income	0.025*	0.027*	0.025*	0.026*
	(0.01)	(0.01)	(0.01)	(0.01)
Swing		0.540*		0.574*
		(0.19)		(0.19)
Contra-Partisan		0.191		0.232
		(0.25)		(0.25)
Declarations, 6 Months			0.758*	0.728*
			(0.10)	(0.10)
Turndowns, 6 Months			-0.697*	-0.704*
			(0.08)	(0.08)
Intercept	22.945*	23.032*	23.006*	22.989*
	(0.35)	(0.58)	(0.35)	(0.58)
H_0 P-Value		**<.001***		**<.001***
N	27729	27729	27729	27729
r^2	0.776	0.776	0.776	0.777

Note: Dependent variable is incumbent vote share in county i in time t. All models include year fixed effects but exclude county fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05

C.4. Split Sample Results

Our sample, which spans the period 1972 to 2004, naturally includes cases of both Republican incumbents and Democratic incumbents. Of the nine elections that we study, Democrats controlled the presidency in three of them (i.e. Democrats were the incumbent party) and Republicans controlled the presidency in six. Similarly, our sample includes both "true incumbents" and what we might call "party incumbents." True incumbents are presidential candidates from the incumbent party who were, themselves, presidents. For instance, the 2000 election does not include a "true incumbent," by this definition, because neither Al Gore nor George W. Bush were incumbent presidents. In our primary models, we include the 2000 election and consider Al Gore the incumbent, because his party controlled the presidency at the time of the 2000 election; in the reduced "True Incumbent" models reported in this section, we exclude the 2000 election from the analysis.[15] Column 1 in Table A.11 reports the results of a model that restricts our sample to "true incumbents." Notably, when restricting the sample in this way, we find that *all* types of counties punished the incumbent for disaster damage: even in co-partisan counties, incumbents lost votes in response to disaster damage, at statistically significant levels. However, while both co- and contra-partisan counties punished incumbents in this model, the difference between their estimated treatment effects is still statistically significant and in line with our theoretical expectations. Specifically, the coefficient on *Co-Partisan*×*Damage* is larger than that on *Contra-Partisan*×*Damage*, with $p = 0.018$.

Columns 2 and 3 also report split-sample results. In these models, we limit our analysis to Democratic and Republican cases, respectively, though we incorporate both True Incumbents and Party Incumbents in each set. The results suggest that our findings are driven primarily by Republican cases. Among Republican cases, co-partisan counties strongly reward the incumbent, while contra-partisan counties punish them. In contrast, among Democratic cases, both types of counties punish incumbents, and Democratic candidates are punished marginally more by co-partisan counties than by contra-partisan

[15] The other excluded election occurred in 1988.

counties. These results are suggestive but inconclusive, because our Democratic sample includes just three elections worth of data: 1980, 1996, and 2000. The results highlight several possible avenues for future research, including the possibility that voters react in different ways or have differential expectations of candidates from different parties.

Table SA11: Disaster Damage and Incumbent Vote Share Split Sample Effects

	True Incumbents	All Democratic Cases	All Republican Cases
Co-Partisan * Damage	-0.037*	-0.051	0.087*
	(0.02)	(0.03)	(0.01)
Swing * Damage	-0.042*	-0.026	0.019
	(0.02)	(0.02)	(0.02)
Contra * Damage	-0.086*	-0.022	-0.024
	(0.02)	(0.02)	(0.03)
Incumbent Vote Share, L1	0.583*	0.633*	-0.002
	(0.01)	(0.02)	(0.01)
Incumbent Vote Share, L2	0.320*	-0.128*	0.255*
	(0.01)	(0.01)	(0.01)
Median Income	0.015	0.064*	-0.279*
	(0.01)	(0.02)	(0.02)
Swing	-0.673*	-0.430	1.204*
	(0.24)	(0.39)	(0.25)
Contra-Partisan	-0.784*	-1.328*	2.922*
	(0.30)	(0.48)	(0.38)
Declarations, 6 Months	-0.332*	-0.102	-0.239
	(0.12)	(0.19)	(0.16)
Turndowns, 6 Months	0.228+	-0.844*	-1.221*
	(0.12)	(0.11)	(0.15)
_cons	21.781*	14.163*	59.340*
	(0.75)	(1.27)	(0.86)
H_0 P-Value	**.018***	**.780**	**<.001***
N	18486	9243	18486
r^2	0.860	0.931	0.819

Note: Dependent variable is incumbent vote share in county i in time t. All models include year and county fixed effects. Coefficient estimates are reported in the table, with standard errors in parentheses.
+ p < 0.10, * p < 0.05