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

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Research investigating whether natural disasters help or hurt politicians' electoral fortunes has produced conflicting results. Some find that voters punish elected officials indiscriminately in the wake of a natural disaster (i.e., 'blind retrospection'). Others find that voters instead incorporate elected officials' subsequent relief efforts in their assessment (i.e., 'attentive retrospection'). In this paper, we argue that an additional consideration affects voters' response to natural disasters: the elected official's partisan affiliation. We contend that whether voters reward or punish incumbents following a disaster is influenced by whether or not the official is a co-partisan. We look for evidence of such 'partisan retrospection' by examining the effects of Hurricane Sandy on the 2012 presidential election, and find that voters' reactions to disaster damage were strongly conditioned by pre-existing partisanship, with counties that previously supported Obama reacting far more positively to disaster damage than those that had earlier opposed him. We then use existing data to investigate the relationship between disasters and presidential elections between 1972 and 2004. We find that incumbent-party candidates performed no worse in disaster-affected co-partisan counties than in non-affected co-partisan counties, but that they underperformed in disaster-affected counties safely in the opposing party column.

Introduction

In recent years, a number of studies have examined the effect of natural disasters on election outcomes. These studies are part of a broader research agenda on representative democracy, as they provide insight into the logic that underlies voters' reliance on retrospective voting – or voters' ability to evaluate the actions of elected officials that affect their well-being and reward or punish them accordingly in subsequent elections (Key 1966; Fiorina 1981; Healy and Malhotra 2013). Since natural disasters are events that are outside of elected officials' control, voters should not hold them responsible for any resulting negative effects that they experience. If voters do in fact punish elected officials, however, it suggests that they rely on what Achen and Bartels (2016) have called "blind retrospection" – the act of indiscriminately lashing out at politicians in power for pain or discomfort that they experience.

There is no consensus in the literature as to how voters behave following natural disasters. Achen and Bartels (2002; 2016) and Heersink, Peterson, and Jenkins (2017) have identified cases in which voters did punish incumbent presidential candidates after natural disasters. Other scholars have found, however, that voters react as an "attentive electorate" by incorporating how elected officials respond in the wake of disasters. For example, Healy and Malhotra (2009) find no evidence that disaster damage influences presidential candidates' vote share, but do show a relationship between relief spending and support for the party of the incumbent president. Similarly, Healy and Malhotra (2010) and Gasper and Reeves (2011) find that while voters punish incumbent presidents for damage from severe weather, they also reward those presidents who provided aid by signing disaster declarations.

In this paper, we argue that an additional consideration might also affect voters' response to natural disasters: shared partisan affiliation with an elected official. An extensive literature has shown that voters use their own partisanship as a "perceptual screen" through which they

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interpret political information (Campbell et al 1960; Bartels 2002; Evans and Andersen 2006; Gaines et al 2007; Jerit and Barabas 2012; Jones 2019) and attribute credit and blame for political outcomes (Marsh and Tilley 2010; Tilley and Hobolt 2011; Bisgaard 2015). We test whether American voters in areas affected by a natural disaster may view events through a partisan screen, and punish or reward not simply based on disaster damage or the government response, but also based on whether the incumbent president is of their political party. If natural disasters are associated with better incumbent performance among those counties that are safely in their parties' column and worse performance among contra-partisan counties, this introduces a new concern about voters' ability to accurately judge the performance of elected officials through retrospective voting – since it suggests that contra-partisans may punish (and co-partisans reward) elected officials for the same extreme weather event.

We assess whether voters rely on partisan retrospection using two empirical approaches, both of which are common in the study of natural disasters and elections. The first approach is based on showing the direct effect of natural disasters on elections (Achen and Bartels 2002; 2016). We do so by examining the effect of Hurricane Sandy on the 2012 presidential election. Sandy was a major natural disaster that occurred mere days before the election. As a result, the extent to which the federal government could provide real relief to those affected prior to the election was limited, and voter reactions are less likely to be based on the government's response. The second approach accounts for the actions of politicians by studying the impact of both disasters *and* government relief efforts (Healy and Malhotra 2009, 2010; Gasper and Reeves 2011). We do so by investigating cases of severe weather, subsequent relief operations, and their effects on presidential elections between 1972 and 2004, using data collected by Gasper and Reeves (2011).

We find strong evidence that the electoral effect of a disaster is conditional on shared partisan affiliation with the president. Voter responses to Hurricane Sandy diverged sharply across partisan lines: Democratic incumbent Barack Obama saw his vote share decline in those contra-partisan counties that were affected by the hurricane relative to contra-partisan counties that were not affected. The effect of disaster damage in "swing" counties lies between co-partisan and contra-partisan. In co-partisan counties, disaster damage may have helped, or at least did not hurt, Obama's reelection bid. We find similarly heterogeneous effects of disaster damage during the 1972-2004 period, conditional on preexisting support for the incumbent party.

To be sure, our reliance on aggregate data limits our ability to assess the causal mechanism that produces such results. That is, based on election results alone it is not possible to assess whether these differences are the product of persuasion or mobilization (or, indeed, both) in different types of counties. However, our results do suggest that voters are not consistent in following either blind *or* attentive retrospection when judging the performance of elected officials following disasters. Indeed, there appears to also be an element of "partisan retrospection," in which voters use shared partisan ties to evaluate incumbents for outcomes beyond their control. These findings suggest that the democratic accountability mechanism provided by regular elections may be more problematic than previously thought.

Natural Disasters, Elections, and 'Partisan Retrospection'

Studies of how natural disasters influence elections contribute to our understanding of retrospective voting. Voters' response to natural disasters is particularly important because disasters are (mostly) exogenous events: occurrences over which elected officials have no direct

influence.[1] For example, while presidents may have some ability to affect the country's economic performance or national security, they cannot prevent a natural disaster from occurring. Thus, if voters behave "blindly" and punish elected officials simply because they were exposed to an extreme weather event, they weaken the accountability mechanism of elections. However, if voters also incorporate the quality and quantity of politicians' post-disaster relief efforts into their voting behavior, they help preserve electoral accountability.

To this point, studies of the effects of disasters and relief operations have come to contradictory conclusions. Achen and Bartels (2002, 2016) have established a foundation for blind retrospection, finding that citizens punished incumbent party candidates for seemingly random events like shark attacks off the coast of New Jersey in 1916 and droughts and floods across much of the 20th century.[2] Heersink, Peterson, and Jenkins (2017) show that voters in the American South in the wake of the 1927 Mississippi Flood punished Republican presidential candidate Herbert Hoover – who had been personally responsible for administering the Coolidge administration's post-flood relief operation – reducing his vote share in affected counties by more than 10 percentage points.[3]

In contrast, other studies find that voters are more sophisticated in their retrospection. That is, voters represent an "attentive electorate" that judges elected officials based not only on the effects of a disaster but also subsequent relief operations. Healy and Malhotra (2009), for

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[1] It is debatable whether natural disasters are randomly distributed: certainly, some geographic areas are more likely than others to experience earthquakes, hurricanes, droughts, tornados, and other natural disasters. Additionally, voters may hold elected officials responsible for any long-term policies they believe might have contributed to the natural disaster or its severity. However, politicians do not have direct influence on the specific timing or location of the occurrence of a natural disaster.

[2] But see also Fowler and Hall (2018) and Achen and Bartels (2018).

[3] Heersink, Peterson, and Jenkins (2017) rely on one measure in their statistical model to reflect both disaster and relief, because, in the case of the 1927 Mississippi Flood, disaster severity and aid distribution were highly correlated. As a result, the measure of disaster damage includes the effect of both the disaster and subsequent relief efforts.

example, find a positive relationship between relief spending and voter support for an incumbent party in presidential elections. Similarly, Healy and Malhotra (2010) and Gasper and Reeves (2011)[4] find that, while voters do punish incumbent presidents for severe weather damage, they also reward them for disaster declarations – and that the reward outweighs the negative effects of the disaster itself. Studies outside the US context have also found that voters incorporate relief operations in their vote choice, and that in some cases elected officials can actually *benefit* from natural disasters as long as they engage in such relief efforts (Bechtel and Hainmueller 2011; Cole, Healy, and Werker 2012; Gallego 2012).[5]

It is possible, however, that voters rely on an additional heuristic to interpret politicians' response to natural disasters: partisanship. An extensive literature has shown that party identification plays an important role in how citizens interpret (political) information and determine their vote. On the most basic level, voters are generally consistent in supporting the candidates nominated by their own party (Campbell et al 1960). In addition, voters process information through a partisan lens, which shapes their interpretation of the state of the economy (Bartels 2002; Evans and Andersen 2006; Wlezien, Franklin, and Twiggs 1997; Jones 2019) and of war casualties (Gaines et al 2007), and affects their ability to remember factual information that is positive or negative about their preferred party (Jerit and Barabas 2012). Voters also appear to adjust how they attribute either credit or blame to elected officials based on their (lack

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[4] Though see also Mummolo and Peterson's (2011) note on interpreting the findings presented in Gasper and Reeves (2011).

[5] Similarly, Eriksson (2016) argues that Swedish voters punished the incumbent party following Storm Gudrun in 2006, as a result of the government's poor response in the wake of the disaster. Ramos and Sanz (2018) find that in the wake of wildfires in Spain incumbent parties' electoral performance improves. In contrast, Bovan, Banai, and Banai (2018) find no electoral effect either way in the wake of flooding in Croatia in 2014 and 2015 – even when incorporating relief efforts.

of) shared partisanship (Rudolph 2003; Marsh and Tilley 2010; Tilley and Hobolt 2011; Bisgaard 2015; Jones 2019).

While partisanship does not make voters entirely blind to reality – for example, experimental studies suggest that when the evidence is clear enough, even partisan respondents are less inclined to reject it (Redlawsk et al 2010; Nyhan and Reifler 2019) – we argue that voters incorporate some level of partisanship in attributing credit or blame to elected officials following a natural disaster. Our belief in the potential importance of voters' partisanship and their assessment of natural disasters is not based exclusively on studies of how partisanship functions as a perceptual screen in other issue areas: scholars who have looked at natural disasters and elections have identified partisanship as a core element in how voters respond. For example, Malhotra and Kuo (2008), in a survey experiment conducted after Hurricane Katrina, show that respondents rely partially on partisan cues in attributing blame for the government's poor response to the disaster.[6] Chen (2013) finds that that in the 2004 election individual voters who recently received FEMA funding from the then-incumbent Bush administration after a hurricane were more likely to turn out and vote – but only if they were registered Republicans. Chen argues that receiving aid "provides yet an additional motivation to turn out and reelect the incumbent" for voters who are already inclined to support the incumbent (Chen, 2013, 204). And Hazlett and Mildenberger (Forthcoming) find that in response to wildfires, support for climate-related ballot measures increases – but only in those areas that are more heavily Democratic.

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[6] Our study is distinct from that of Malhotra and Kuo (2008) in several ways. We focus on vote outcomes, rather than survey responses regarding blame for poor disaster response. We also analyze the disaster itself – in line with most retrospection literature – in addition to relief efforts, while Malhotra and Kuo focus exclusively on disaster response. Finally, Malhotra and Kuo rely on a national survey sample, meaning that most, if not all, respondents were not directly affected by Hurricane Katrina or the botched relief efforts that followed it.

If voters do indeed rely on "partisan retrospection" in the wake of natural disasters, this raises new concerns regarding retrospective voting and voters' ability to accurately assess the performance of incumbent politicians. Certainly, voters can interpret elected officials' actions differently based on their own partisan worldview. For example, it is hardly surprising that Democratic and Republican voters might have very different views of the Affordable Care Act (or "Obamacare"). As a result, in the 2012 election, they might have incorporated this law differently in assessing Barack Obama's first-term performance: Democrats may have rewarded him for fulfilling a campaign promise, while Republicans may have punished him for passing legislation they found particularly egregious. However, voters' response to natural disasters – events outside of politicians' direct control – should *not* be different. If voters are affected by the same natural disaster, partisanship should not play a role in their response to it.

We assess whether voters rely on partisan retrospection in response to a natural disaster by testing whether the relationship between disaster exposure and incumbent performance differs depending on the preexisting partisanship of an area. Specifically, we study the association between disaster exposure and vote share in co-partisan counties, and the same association in contra-partisan counties, and investigate whether the direction and magnitude of those relationships are fundamentally different. First, we assess a single important case: Hurricane Sandy and its effect on voting in the 2012 presidential election. Second, we conduct a more systematic analysis by examining all severe weather incidents and their effects on presidential elections between 1972 and 2004, using data from Gasper and Reeves (2011).

Hurricane Sandy and the 2012 Presidential Election

Hurricane Sandy – which hit the northeast United States in the fall of 2012 – provides an interesting test case for our partisan retrospection thesis for three reasons. First, Sandy was a

major natural disaster that caused considerable damage in Connecticut, Delaware, New York, Ohio, North Carolina, Maryland, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Virginia, and West Virginia. Sandy was the deadliest hurricane to hit the East Coast of the US since Hurricane Agnes in 1972 (Diakakis et al 2015). At least 650,000 houses were damaged or destroyed, and 8.5 million customers lost power.[7] Initial reports of the cost of these damages were close to $50 billion, though subsequent assessments place it as high as $68.3 billion (Blake et al 2013; NOAA National Centers for Environmental Information 2017). Second, Sandy hit between October 26 and November 2, days before the November 6 presidential election. Thus, voters in affected counties were very recently 'treated' with this natural disaster, and it is likely to have been an especially salient topic as they went to the polls. Finally, Sandy directly affected the campaign: incumbent president and Democratic nominee Barack Obama oversaw the federal government's response, while Republican presidential nominee Mitt Romney was forced to cancel his campaign appearances. Notably, the immediate assessment of Obama's response to Sandy was positive, with even Republican Governor Chris Christie (NJ) – a Romney surrogate in the 2012 campaign – praising Obama as "wonderful," "tremendous," and "deserving great credit" for his administration's response (Halperin and Heileman 2013, 455).

We study the impact of Hurricane Sandy on Barack Obama's electoral performance in affected counties. Between October 26 and November 2, the SHELDUS data that we use records damage in 332 counties, ranging from Florida in the south to Maine in the north, and west to Wisconsin.[8] We map this data in Figure 1. The most severe destruction was concentrated in New

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[7] https://www.usatoday.com/story/news/nation/2013/10/29/sandy-anniversary-facts-devastation/3305985/
[8] Note that we do not explicitly limit the data to Hurricane Sandy, but the geographic reach of all damage between October 26th and November 2nd suggests that it is all related to that event.

Jersey, where early damage estimates were on the order of $29.4 billion, according to Governor Christie.[9]

[Figure 1 about here]

Our outcome variable is President Obama's share of the two-party vote in 2012, measured at the county level. Our data on disaster damages are drawn from the Spatial Hazard Events and Losses Database (SHELDUS), which provides county-level estimates of crop and property damage for all affected counties (ASU Center for Emergency Management and Homeland Security 2019). Following other authors in the literature (e.g., Gasper and Reeves 2011), we construct a measure of a county's disaster damage that is the log of total damage per 10,000 residents. This is the measure that we use in all models in the text. In our data, the median *affected* county suffered nearly $15,000 in damage per 10,000 residents.

Unlike the prevailing literature, our focus is on differential responses to disasters, conditional on pre-existing partisanship. That is, we are interested in the extent to which voters may have interpreted events through the perceptual screen of partisanship, such that (relatively speaking) Democrats would reward the incumbent Democratic president in the wake of a disaster and Republicans would punish him. To allow for heterogeneous treatment effects as a function of pre-existing partisanship, we interact our damage treatment variable with a measure of support for Obama in 2008, differentiating between safely-Democratic co-partisan counties (where Obama won more than 55 percent of the vote in 2008), swing counties (where Obama's vote share fell between 45 and 55 percent in 2008), and safely-Republican contra-partisan counties (where Obama won less than 45 percent of the vote in 2008).[10]

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[9] https://www.nj.com/news/2012/11/hurricane_sandy_causes_294b_to.html
[10] Our results are substantively unchanged when using a continuous measure of partisanship; results are presented in the Supplementary Materials.

We denote partisanship in a county i with a set of dummy variables distinguishing co-partisan counties, swing counties, and contra-partisan counties, with the latter category serving as the omitted category. We interact these indicators with our "Sandy Damage" treatment variable to estimate the heterogeneous effects of Sandy damage, measured using logged damage per 10,000 residents, on subsequent vote share by each county's pre-existing partisanship.

Our basic model takes the form

$$Obama\ Share\ 2012_i$$
$$= \beta_0 + \beta_1 Damage_i + \beta_2 Copartisan_i * Damage_i + \beta_3 Swing_i * Damage_i$$
$$+ \beta_4 Copartisan_i + \beta_5 Swing_i + \gamma X_i + \alpha ObamaShare2008_i + \varepsilon_i$$

The substance of the model is the interaction between indicators for partisan lean and the Sandy damage measure, and relevant base terms. We control for preexisting Obama support by including Obama's 2008 vote share. Counties are indexed by i and X is a vector of county-level control variables. We present results for models both with and without Census Division fixed effects, to help account for non-Sandy-related regional vote patterns.[11] We use heteroskedasticity-robust standard errors for inference.

Our substantive interest is in the coefficients on Sandy Damage and the interactions therewith. These coefficients encode three distinct treatment effects – the impact of disaster damage in contra-partisan (β_1), co-partisan ($\beta_1 + \beta_2$), and swing ($\beta_1 + \beta_3$) counties. Our primary concern, however, is whether voters respond *differently* to disaster damage in contra-

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[11] There are nine census divisions: New England, Middle Atlantic, South Atlantic, East North Central, East South Central, West North Central, West South Central, Mountain, and Pacific. We use Census Division fixed effects as a happy medium between the four Census Regions and the fifty states, but show robustness to using either state or region fixed effects in the Supplementary Materials.

partisan and co-partisan areas (with differences between either of these and swing counties an interesting, but secondary, concern). Our primary interest, then, is the coefficient β_2, which is the estimate on the interaction between co-partisan and Sandy damage. Because contra-partisan is the omitted category, this coefficient captures the difference in the effect of Sandy damage in co-partisan and contra-partisan counties.

Our null and alternative hypotheses therefore are:

$$H_0: \beta_2 \leq 0$$

$$H_a: \beta_2 > 0$$

This statement of the null hypothesis makes two aspects of our argument clear. First, we do not make explicit predictions regarding the direction or magnitude of the effect of Sandy damage in either type of county. It could well be that both types of counties reward or punish incumbents for disasters and recovery from them. Our expectation is merely that the *difference* between the effect in these types of counties will be positive. This implies that, in counties affected to the same extent by a natural disaster, co-partisan counties will be more generous than contra-partisan counties in terms of vote share for an incumbent candidate.[12]

The results of our analysis of Hurricane Sandy appear in Table 1. In column 1, we report the results of an aggregate model, without incorporating partisanship, that estimates the average effect of Sandy damage on 2012 vote share, while controlling for Obama's vote share in 2008. In contrast to extant findings regarding blind retrospection, this initial model does not suggest that

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[12] To be clear, if the marginal effect in both types of counties was negative, but the interaction was positive, this would suggest that both co-partisan and contra-partisan counties punished the incumbent in the wake of a disaster, but that co-partisan counties punished the incumbent *less* than contra-partisan counties, consistent with a theory of partisan retrospection.

voters punished the incumbent, Barack Obama, in response to damage from Hurricane Sandy. As disaster damage increases, we estimate a small increase in Obama vote share, but this estimate is not statistically distinguishable from zero. In column 2, we estimate the same model, but with the inclusion of Census District fixed effects; we see that this appreciably changes the estimate, making it negative and significant.

[Table 1 about here]

Columns 3 and 4 provide the first direct test of our hypothesis regarding heterogeneous treatment effects, as we disaggregate the effect of Sandy damage by counties' preexisting levels of partisanship. The estimates for *Damage* are both negative, and the estimate in the model with Census Division fixed effects is statistically significant at the 5 percent level; substantively, however, they differ considerably. In contrast, the interaction between *Damage* and *Co-Partisan* is positive, statistically significant at the 5 percent level, and nearly identical in the two models. While our aggregate treatment effect estimate assumed that all counties reacted similarly, our disaggregated results show that Sandy's effect varied sharply across different types of counties. Columns 3 and 4 differ as to whether disaster damage increased or decreased Obama vote share in swing and co-partisan counties, but provide definitive support for our expectation that voters in co-partisan and contra-partisan counties would react differently. [13]

Finally, in columns 5 and 6, we add a number of other control variables that help to rule out alternative explanations for why voters in different types of counties might diverge even more after Hurricane Sandy. Given the depth of the 2007-8 financial crisis and its spatial variation, local economic conditions are likely to shape vote choice. We control for this

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[13] We expect the effect of damage in swing counties to lie between that for co-partisan and contra-partisan counties. Our expectation is borne out perfectly in the ordering of the point estimates (although they are not statistically distinguishable from each other).

possibility by including measures of county-level economic change over the previous years: changes in mean per capita income (in 1000s of dollars) between 2011 and 2012, changes in the unemployment rate between 2011 and 2012, and changes in mean home prices (in 10,000s of dollars) between 2010 and 2012.[14] We also account for the possible effect of other natural disasters, controlling for disaster damage (logged damage per 10,000 residents) and FEMA disaster declarations (total number) over the previous two years. The data covering disaster damage is from the NOAA Storm Events Database (National Oceanic and Atmospheric Administration 2020), and FEMA disaster declarations over the prior two years are from Richard Sylves (Sylves n.d.). We provide full details of the data assembly in the Supplementary Appendix. Importantly, our results are little-changed by the inclusion of these covariates: we continue to find a positive and significant difference between the effect of Sandy damage in co-partisan relative to contra-partisan counties, and we continue to find that the marginal effects are generally shifted down in the models with Census District fixed effects.

To illustrate the differential effects of Hurricane Sandy by partisanship, Figure 2 plots the marginal effect of Sandy damage on subsequent Obama vote share by county type—co-partisan, contra-partisan, or swing—as well as the difference between the effect in contra- and co-partisan counties. The estimates are drawn from column 6 of Table 1, and the error bars represent 95 percent confidence intervals. As this figure shows, contra-partisan (Republican) counties reacted much differently from co-partisan (Democratic) counties, with the former

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[14] Data on county-level home prices were obtained from Zillow, a real estate research firm. We used data from November 2010 and November 2012 to calculate the change in home prices. Home price estimates are either county-specific, where Zillow has such data, or are state-level estimates attributed to individual counties. Estimates of per capita income and unemployment rate were calculated from Internal Revenue Service data at the county level. Further details on variable construction are provided in the Supplemental Appendix.

appearing to punish Obama for the effects of the disaster. Swing counties, as one might expect, fall between the two extremes.

[Figure 2 about here]

In the Supplemental Appendix, we show that our results are not driven by any particular modeling choices. We explore alternative categorizations of counties, a binary measure of Sandy damage, a variety of alternative operationalizations of our control variables, alternative lagged dependent variables and fixed effects, and models with interactions through all covariates. Through all of these robustness checks, we continue to estimate a positive interaction between the indicator for co-partisan county and Sandy damage, though it fails to meet conventional levels of statistical significance in some more demanding models. Taken together, these robustness checks provide assurance that our results are not the consequence of particular data and modeling choices, but rather capture a meaningful pattern in voters' responses to disaster.[15]

Disasters and Presidential Elections, 1972-2004

Our analysis to this point takes advantage of a case with rich data on election outcomes and disaster damage. However, in any single case analysis – no matter how substantively interesting or important – voter reactions may have been idiosyncratic, limiting our ability to generalize. To address these concerns, we provide a more systematic test of our hypothesis by replicating and extending Gasper and Reeves' (2011) study of attentive retrospection. Gasper and Reeves examine the impact of severe weather damage on incumbent party vote share in

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[15] One additional variable of interest is counties' ideology—that is, is it partisanship that moderates reactions to disasters, or ideology? Unfortunately, in the modern period, when estimates of county-level ideology are available (based on methods developed in Tausanovitch and Warshaw (2013) and available at https://americanideologyproject.com), the two concepts are very highly correlated: in our sample, Obama 2008 vote share and Tausanovitch and Warshaw's estimates of county ideology are correlated at approximately 0.7, inhibiting an ability to distinguish between the two.

presidential elections between 1972 and 2004. Using this data, we estimate models that allow

disaster damage to have heterogeneous effects on vote share, depending on the preexisting

partisanship of an affected county.[16] Unlike our results regarding Hurricane Sandy, this analysis

covers a time period that includes seven different presidents and a wide variety of natural

disasters.

As in the Hurricane Sandy analysis, our hypothesis concerns heterogeneity in treatment

effects. Our hypothesis does not necessarily imply that voters will reward or punish incumbents

in the wake of a disaster in the aggregate. Rather, we contend that the extent to which voters will

reward or punish an incumbent is conditional on whether the incumbent is a co-partisan. This

again means that our interest is in the *difference* in the effect of damage between co-partisan and

contra-partisan counties.

To start, we replicate Gasper and Reeves' county-level model of presidential vote share.

The outcome variable in their study, and our replication, is two-party vote share for the

incumbent party in county i at time j. Our treatment variable is disaster damage. Similar to our

case study of Hurricane Sandy – and like Gasper and Reeves' own operationalization –disaster

damage is defined as the logged dollar value of damages per 10,000 residents in the six months

prior to an election.[17] Following Gasper and Reeves, we include a county's median income and

incumbent vote share in the two most recent presidential elections, and we also include county-

and year-fixed effects.[18]

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[16] We obtained the Gasper and Reeves dataset from the Harvard Dataverse. We thank the authors for making their
replication data readily available online. See Gasper and Reeves (2011) for the relevant details. See also Gallagher
(n.d.) for a discussion of the handling of "missingness" and spatial correlation in these data and models.
[17] The sole difference between this operationalization and that adopted in our analysis of Hurricane Sandy is that the
former covers the six months prior to an election, while the latter included only damage specifically attributed to
Hurricane Sandy.
[18] We utilized the Gasper and Reeves' data on median income and vote share in our primary replication models,
though we note areas where we extend or diverge from their models below.

Our primary interest is in the heterogeneous treatment effect of disaster damage. However, a strength of Gasper and Reeves's study is their ability to simultaneously assess the effects of disaster damage *and* governmental response, either in the form of a disaster declaration or a turned down request for such. Gasper and Reeves incorporate the visible efforts presidents make to respond to disaster damage by including a count of declared federal disasters in a county in the previous six months, and a state-level count of whether the president turned down a governor's request for a disaster declaration in the same time period.[19] Because these additional measures ought to influence voters' reactions to disaster damage, we additionally include these measures and—as with disaster damage—allow their effect to vary by the pre-existing partisanship of a county.

To be concrete, the basic model we employ takes the form

$$Inc.VoteShare_{it}$$
$$= \beta_1 Damage_{it} + \beta_2 Declarations_{it} + \beta_3 Turndowns_{it} + \beta_4 Copartisan_{it}$$
$$* Damage_{it} + \beta_5 Swing_{it} * Damage_{it} + \beta_6 Copartisan_{it} * Declarations_{it}$$
$$+ \beta_7 Swing_{it} * Declarations_{it} + \beta_8 Copartisan_{it} * Turndowns_{st}$$
$$+ \beta_9 Swing_{it} * Turndowns_{st} + \beta_{10} Copartisan_{it} + \beta_{11} Swing_{it}$$
$$+ \beta_{12} MedianIncome_{it} + \beta_{13} IncVoteShare_{i,t-1} + \beta_{14} IncVoteShare_{i,t-2}$$
$$+ \alpha_i + \tau_t + \varepsilon_{it}$$

where counties are indexed by *i* and years by *t*.[20] Included are two lags of the incumbent party's vote share in that county, from the prior two presidential elections, and county (α) and year (τ)

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[19] This measure is described as an indicator in Gasper and Reeves (2011), but has unique values of 0, 1, and 2; to maintain consistency with the original analysis, we use the unaltered variable and treat it as a count.

[20] *s* indexes states; all counties are nested in states, but we suppress this notation for concision.

fixed effects. We cluster standard errors by county, to account for any within-county over-time correlation.

As in our analysis of Hurricane Sandy, our hypothesis concerns heterogeneity in the effects of disasters; unlike in our analysis of Hurricane Sandy, however, we now have three disaster-related measures for which we explore heterogeneity. As before, we expect the difference between the effect of disaster damage in co-partisan and contra-partisan counties to be positive—that is, co-partisan counties punish incumbents relatively less (or reward them relatively more) for disaster damage. Formally, our main null and alternative hypotheses for this analysis are:

$$H_0: \beta_4 \leq 0$$

$$H_a: \beta_4 > 0$$

That is, we expect that the difference in the effect of damage between co-partisan and contra-partisan counties to be positive. We have less-concrete expectations for the effect of disaster declarations and turndowns, but expect roughly the same pattern. We are agnostic regarding the direction of the aggregate effect of any of the three measures, and speculate that the overall effect could vary from disaster to disaster. Our interest is in the direction and size of the *difference* in treatment effects across types of counties. Again, our argument does not make predictions regarding the direction or magnitude of the marginal effects for any measure in any type of county: our theoretical expectation is about the *difference* in the marginal effects in co- and contra-partisan counties.

We first directly replicate Gasper and Reeves (2011, p. 352); these results appear in columns 1 and 3 of Table 2.[21] Building on these models, we group counties into three levels of preexisting support for the incumbent party. This distinction between counties allows us to estimate the impact of disaster damages separately for groups that have different partisan affiliations with the incumbent president. Based on average vote share over the previous three presidential elections, we categorize counties as "co-partisan" with the incumbent (>55%), swing (45-55%) and "contra-partisan" with the incumbent (<45%). We interact these indicator variables with our treatment variables – disaster damage, declarations, and turndowns – to allow the impact of these to vary across levels of pre-existing pro-incumbent partisanship. To ensure that other specification choices do not affect our results, we leave all other aspects of Gasper and Reeves' models intact, including county fixed effects, year fixed effects, and lagged values of incumbent vote share. We simply supplement the model with binary indicators of pre-treatment vote share and interaction terms that are necessary to estimate heterogeneous treatment effects. The interaction terms we use capture the impact of disaster damage, disaster declarations, and disaster declaration turndowns among different types of counties.

[Table 2 about here]

We extend Gasper and Reeves's (2011) analysis to test the partisan retrospection hypothesis directly in columns 2 and 4. Column 2 omits declarations and turndowns entirely, and focuses only on disaster damage; this permits comparison with the Sandy analysis. Using this specification, we find, as with the Sandy analysis, that the interaction between co-partisan and

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[21] Note that our results do not exactly match Gasper and Reeves's (2011) results; this is because we identified duplicate observations in their replication data, which we have removed. The results are substantively unchanged. We are successful in directly replicating their results if we use their unaltered replication data; see the Supplementary Appendix.

disaster damage is positive and significant, providing confirmation of our main hypothesis. The marginal effects are again ordered: a negative marginal effect of disaster damage in contra-partisan counties, a slightly negative effect in swing counties, and a slightly positive marginal effect in co-partisan counties. In column 4, we add in disaster declarations and turndowns, and their interactions with the co-partisan and swing indicators. Our estimates of the marginal effects of disaster damage are nearly unchanged. We find evidence of slightly different patterns for the other two measures. The effect of disaster declarations differs little across types of counties, though it is generally positive, as we might expect (particularly when controlling for actual damage). The marginal effect of turndowns is quite negative except in co-partisan counties, where the effect is near-zero.[22] Overall, the results strongly support the partisan retrospection hypothesis. While Gasper and Reeves find small negative effects of disaster damage on vote share in the aggregate, we estimate *increases* in vote share among the incumbent's co-partisans, and substantively large *decreases* in vote share among the incumbent's opponents due to disaster damage.[23] Our main hypothesis, that the interaction between co-partisan and each of the treatments (which encodes the difference in the effect between co- and contra-partisan counties) is positive, is affirmed for damage and turndowns, though not for declarations. The treatment effect heterogeneity is illustrated starkly in Figure 3, which plots (standardized) marginal effect estimates and confidence intervals for each of the three measures for each of the three groups in our main model (Table 2, column 4).

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[22] When we fully split the sample into the three types of counties and estimate separately in each, we find that turndowns have a negative (but still less negative) effect in co-partisan counties.

[23] Our analysis focuses on both "true incumbents" (e.g., George H.W. Bush in 1992 and Bill Clinton in 1996) *and* presidential candidates of the incumbent party (e.g., George H.W. Bush in 1988 and Al Gore in 2000). When restricting the sample to true incumbents only, we find results that are substantively similar to those reported in the text, though with an even larger difference between the effect of damage in co- and contra-partisan counties. See Table C.6 in the Supplementary Appendix.

[Figure 3 about here]

Consider the difference in results between column 1 and column 2. In column 1, Gasper and Reeves estimate a negative overall effect of disaster damage on incumbent vote share, with a substantive effect size that could be considered moderate. In column 2, we divide that aggregate effect of disaster damage into three distinct treatment effects, one for each "type" of county in the data – strong co-partisans of the incumbent, strong contra-partisans of the incumbent, and counties with moderate levels of previous support for the incumbent party. Our estimates are not just different across these three groups, they are also dramatically different from those of Gasper and Reeves. A disaster in a pro-incumbent area can yield small gains in vote share for the incumbent, while a disaster in an anti-incumbent area can generate sharp and overwhelming punishment by voters.[24]

The results presented thus far rely on at least two coding decisions that could be considered arbitrary. The most important is the decision of how to classify counties based on partisanship. We chose to use three broad categories, because grouping counties into just three categories – based on cutpoints at 45 and 55 percent of the two-party vote share – is a typical approach in the literature (Kriner and Reeves 2015; Lowande, Jenkins, and Clarke 2018). However, aggregation on this scale might miss nuances between, for instance, co-partisan counties that are still relatively competitive, at 55 percent of the two-party vote share, and co-partisan counties that are incumbent strongholds (at 75 percent vote share). To ensure that our

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[24] These results are broadly consistent with those of Heersink, Peterson, and Jenkins (2017), which show a large decrease in support for the 1928 Republican presidential candidate in counties affected by a catastrophic flood of the Mississippi River. While Heersink, Peterson, and Jenkins interpret this finding as support for blind retrospection, it is also consistent with partisan retrospection, since most of the affected counties were strongly opposed to the incumbent Republican Party. One advantage of a research design based on replicating Gasper and Reeves' findings is that it covers a much broader range of counties and provides greater variation in the types of counties affected by disasters.

results are not driven by our chosen categorization scheme, we tried a number of alternative approaches. In the Supplementary Appendix we present results based on a continuous measure of district partisanship, as well as a five-bin measure of partisanship. These alternative specifications bring us to the same substantive conclusion as the in-text models. Beyond the categorization of counties, we also estimated models without county fixed effects, models without lagged incumbent vote shares, models estimated by splitting the sample fully into our three bins of counties, and models estimated after splitting our sample into cases with true incumbents and cases when Republicans and Democrats were the incumbent party. Full results for all models are provided in the Supplemental Appendix. In the vast majority of the models, our main results hold, with co-partisan counties reacting more generously to the incumbent than contra-partisan counties in the wake of a disaster.[25]

Beyond the formal hypothesis test whose results we reported in Table 2, our primary results are also substantively significant. In the average election year in our sample, nearly half of all US counties experience some level of disaster damage in our data. Among these disaster-affected counties, the median level of damage suffered in the six months before an election is $27,304 per 10,000 residents (equivalent to 10.215 in terms of our logged treatment variable). Taking the estimates from Table 2, column 4, this implies significant divergence in electoral effects across co-partisan and contra-partisan counties. In the median disaster-affected county that is co-partisan, our estimates suggest that the incumbent would gain nearly a quarter percentage point of the two-party vote share relative to an unaffected co-partisan county, a non-

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[25] Most notably, our findings appear to be specific to Republican incumbents; when restricting the sample to Democratic incumbents, we no longer observe a positive difference in treatment effects between co- and contra-partisan counties; instead, the estimate is negative, albeit not significant at the 5 percent level. However, these results should be interpreted with caution, because our sample includes just three elections in which Democrats were the incumbent presidential party (1980, 1996 and 2000).

trivial, but relatively modest (and not statistically distinguishable from zero) change. Thinking of a contra-partisan county, however, a similarly affected county would give almost a full percentage point less to the incumbent than an unaffected contra-partisan county. These substantive effect sizes are based on the median disaster-affected county, with larger effects predicted in more extreme cases.

[Figure 4 about here]

The varying substantive effect of disaster damage on vote share is illustrated in Figure 4, which plots the estimated aggregate effect of different levels of disaster damage, depending on the partisanship of the affected counties. As Figure 4 shows, even at moderate levels of damage, the difference between co-partisan and contra-partisan counties are sufficiently stark that they produce substantively meaningful differences in treatment effects. Of course, these figures alone underestimate the true potential for disasters to reshape electoral outcomes, because they ignore the potential for a single disaster to affect many counties. Given the scale of damage caused by some natural disasters, these estimates suggest the possibility of large effects on electoral outcomes from a single widespread disaster, a finding that is consistent with the results presented in the Hurricane Sandy case study.

Conclusion

In this paper we estimate whether voters in areas affected by a natural disaster treat presidential candidates of an incumbent party differently, depending on whether the counties are safely co- or contra-partisan. We conducted two separate analyses: first, we determined the effects of Hurricane Sandy on the 2012 presidential election, and second, we pursued a more systematic analysis by investigating cases of severe weather and their effects on presidential elections between 1972 and 2004, using data collected by Gasper and Reeves (2011).

Our results strongly suggest that partisanship plays into voters' responses to natural disasters. In the case of Hurricane Sandy – a major natural disaster that occurred days before the 2012 presidential election – the reactions of voters in counties that were affected by Sandy differed dramatically depending on the preexisting partisanship of the county. Voters in contra-partisan counties punished the incumbent president, while those in co-partisan counties either rewarded him or stood pat, depending on the specification. The *difference* in the reaction between the types of counties, however, is consistently estimated to be large and statistically significant. Our estimates suggest that a county experiencing the median level of damage from Hurricane Sandy (among affected counties) would diverge in the vote given to President Obama in 2012 by nearly 1.2 percentage points depending on whether it was co- or contra-partisan – same damage, but far different electoral results.

Similarly, in our analysis of the Gasper and Reeves' data on presidential disaster declarations in the wake of severe weather conditions, we find that in counties that were safely in the incumbent party's column – co-partisan counties – candidates of that party were on average rewarded in the wake of a natural disaster. In swing counties, candidates of the incumbent party experienced no discernible impact on their electoral fortunes. Counties that were safely in the opposition party column, however, punished incumbent party candidates severely.

These results are relevant both to the study of the effects of natural disasters on election outcomes and the broader question of whether voters engage in accurate and unbiased retrospective voting in elections. Regarding the former, our findings indicate that while voters do appear to incorporate the combination of disaster and relief in their vote choices, partisanship is also a crucial predictor in this regard. That is, we find strong evidence that voters reward or punish incumbent party candidates after a natural disaster based on the underlying partisanship in

the county. With respect to retrospective voting in general, voters may face considerable difficulty in accurately relying on their past experiences to determine their vote in the next election. Since voters' partisan identification is at least partly a product of their own ideological beliefs, it is possible that voters respond differently to the same actions of an elected official. However, because elected officials cannot directly prevent natural disasters and exposure to a disaster is non-political and non-ideological, partisan identification should not predict voter responses to a disaster. That it does is evidence that voters do indeed use partisanship to inform their reaction to a disaster, in contrast to theories of both blind and attentive retrospection.

Our conclusion that voters rely partially upon partisanship to assess elected officials in the wake of natural disasters thus raises new questions about their ability to incorporate past events in their future voting decisions. To be sure, we cannot identify the exact causal mechanism that produces such different results between co-partisan and contra-partisan counties. That is, while we observe disaster-affected counties vote more strongly in the pro-incumbent (co-partisan) or anti-incumbent (contra-partisan) party direction relative to similar counties that were not disaster-affected, we lack the ability to assess why that is the case. We suspect the most likely explanation is that co- and contra-partisan voters are focusing on different components of the combination of natural disaster and relief operations. It is possible that contra-partisan voters focus on the disaster element – the traditional form of 'blind retrospection' – and become more likely to turn out and vote against the incumbent than voters in similar counties who lack the natural disaster as an inspiration to turn out. In contrast, co-partisans may focus on the relief efforts or experience a broader "rally around the flag" sentiment in being more supportive of the incumbent president or their party, making them more likely to turn out and vote in support of their candidates. However, there are a number of other paths that could produce the same results

– including possible persuasion effects, in which voters who otherwise would have voted for/against the incumbent party's candidate moved in the direction of the majority of voters in their county. Future, possibly experimental, research can help clarify the exact causal mechanism that produced these outcomes and shed further light on the exact role partisanship plays in how voters respond to natural disasters.

References

Achen, Christopher H., and Larry M. Bartels. 2002. "Blind Retrospection: Electoral Responses to Drought, Flu, and Shark Attacks." Paper prepared for presentation at the Annual Meeting of the American Political Science Association, Boston.

Achen, Christopher H., and Larry M. Bartels. 2016. *Democracy for Realists: Why Elections Do Not Produce Responsive Government*. Princeton: Princeton University Press.

Achen, Christopher H., and Larry M. Bartels. 2018. "Statistics as If Politics Mattered: A Reply to Fowler and Hall." *Journal of Politics* 80 (4): 1438-1453.

Arizona State University Center for Emergency Management and Homeland Security. 2019. "Spatial Hazard Events and Losses Database for the United States (SHELDUS)." Version 18.1. Accessed September 25, 2020.

Bartels, Larry M. 2002. "Beyond the Running Tally: Partisan Bias in Political Perceptions." *Political Behavior* 24(2): 117-50.

Bechtel, Michael M. and Jens Hainmueller. 2011. "How Lasting is Voter Gratitude? An Analysis of the Short and Long-Term Electoral Returns to Beneficial Policy." *American Journal of Political Science* 55 (4): 851-867.

Bisgaard, Martin. 2015. "Bias Will Find a Way: Economic Perceptions, Attributions of Blame, and Partisan-Motivated Reasoning during Crisis." *Journal of Politics* 77(3): 849-60.

Blake, Eric S., Todd B. Kimberlain, Robert J. Berg, John P. Cangialosi, and John L. Beven II. 2013. "Tropical Cyclone Report: Hurricane Sandy (AL182012)." *National Hurricane Center*.

Bovan, Kosta, Benjamin Banai, and Irena Pavela Banai. 2018. "Do Natural Disasters Affect Voting Behavior? Evidence from Croatian Floods." *PLOS Current Disasters* (April 6).

Campbell, Angus, Philip E. Converse, Warren E Miller, and Donald E. Stokes. 1960. *The American Voter*. New York: Wiley.

Chen, Jowei. 2013. "Voter Partisanship and the Effect of Distributive Spending on Political Participation." *American Journal of Political Science* 57 (1): 200-217.

Cole, Shawn, Andrew Healy, and Eric Werker. 2012. "Do Voters Demand Responsive Governments? Evidence from Indian Disaster Relief." *Journal of Development Economics* 97(2): 167-181.

Diakakis, Michalis, Georgios Deligiannakis, Katerina Katsetsiadou, and Efthymios Lekkas. 2015. "Hurricane Sandy Mortality in the Caribbean and Continental North America." *Disaster Prevention and Management* 24 (1): 132-148.

Eriksson, Lina M. 2016. "Winds of Change: Voter Blame and Storm Gudrun in the 2006 Swedish Parliamentary Election." *Electoral Studies* 41: 129-142.

Evans, Geoffrey, and Robert Andersen. 2006. "The Political Conditioning of Economic Perceptions." *American Journal of Political Science* 68 (1): 194-207.

Fiorina, Morris. 1981. *Retrospective Voting in American National Elections*. New Haven: Yale University Press.

Fowler, Anthony and Andrew B. Hall. 2018. "Do Shark Attacks Influence Presidential Elections? Reassessing a Prominent Finding on Voter Competence." *Journal of Politics* 80 (4): 1423-1437.

Gaines, Brian J., James H. Kuklinski, Paul J. Quirk, Buddy Peyton, and Jay Verkuillen. 2007. "Same Facts, Different Interpretations." *Journal of Politics* 69 (4): 957-74.

Gallagher, Justin. N.d. "Natural Disasters that Cause No Damage: Retrospective Voting and a Reanalysis of 'Make it Rain.'" *Working Paper*.

Gallego, Jorge. 2012. "Natural Disasters and Clientelism: The Case of Floods and Landslides in Colombia." Universidad del Rosario Economics Working Paper No. 178. Available at: http://www.urosario.edu.co/economia/documentos/pdf/dt178/

Gasper, John T., and Andrew Reeves. 2010, "Replication Data for: Make it Rain? Retrospection and the Attentive Electorate in the Context of Natural Disasters," hdl:1902.1/15136, Harvard Dataverse, V2.

Gasper, John T., and Andrew Reeves. 2011. "Make it Rain? Retrospection and the Attentive Electorate in the Context of Natural Disasters." *American Journal of Political Science* 55 (2): 340-55.

Halperin, Mark, and John Heilemann. 2013. *Double Down: Game Change 2012*. New York: The Penguin Press.

Hazlett, Chad, and Matto Mildenberger. Forthcoming. "Wildfire Exposure Increases Pro-Environment Voting within Democratic but Not Republican Areas." *American Political Science Review*.

Healy, Andrew, and Neil Malhotra. 2009. "Myopic Voters and Natural Disaster Policy." *American Political Science Review* 103 (3): 387-406.

Healy, Andrew, and Neil Malhotra. 2010. "Random Events, Economic Losses, and Retrospective Voting: Implications for Democratic Competence." *Quarterly Journal of Political Science* 5 (2): 193-208.

Healy, Andrew J., and Neil Malhotra. 2013. Retrospective Voting Reconsidered. *Annual Review of Political Science* 16: 285-306.

Heersink, Boris, Brenton D. Peterson, and Jeffery A. Jenkins. 2017. "Disasters and Elections: Estimating the Net Effect of Damage and Relief in Historical Perspective." *Political Analysis* 25 (2): 260-68.

Jerit, Jennifer, and Jason Barabas. 2012. "Partisan Perceptual Bias and the Information Environment." *Journal of Politics* 74 (3): 672-84.

Jones, Philip Edward. 2019. "Partisanship, Political Awareness, and Retrospective Evaluations, 1956-2016." *Political Behavior*. https://doi.org/10.1007/s11109-019-09543-y

Key, V. O. 1966. *The Responsible Electorate: Rationality in Presidential Voting, 1936-1960*. Cambridge: Harvard University Press.

Kriner, Douglas L., and Andrew Reeves. 2015. *The Particularistic President: Executive Branch Politics and Political Inequality*. Cambridge: Cambridge University Press.

Lowande, Kenneth S., Jeffery A. Jenkins, and Andrew J. Clarke. 2018. "Presidential Particularism and US Trade Politics." *Political Science Research and Methods* 6 (2): 265-81.

Malhotra, Neil, and Alexander G. Kuo. 2008. "Attributing Blame: The Public's Response to Hurricane Katrina." *Journal of Politics* 70(1): 120-35.

Marsh, Michael, and James Tilley. 2010. "The Attribution of Credit and Blame to Governments and Its Impact on Vote Choice." *British Journal of Political Science* 40 (1): 115-34.

Mummolo, Jonathan, and Erik Peterson. 2018. "Improving the Interpretation of Fixed Effects Regression Results." *Political Science Research and Methods* 6 (4) 829-835.

National Oceanic and Atmospheric Administration. 2020. "Storm Events Database." Accessed Summer 2020. URL: https://www.ncdc.noaa.gov/stormevents/ftp.jsp.

NOAA National Centers for Environmental Information (NCEI). 2017. "U.S. Billion-Dollar Weather and Climate Disasters."

Nyhan, Brendan, and Jason Reifler. 2019. "The Roles of Information Deficits and Identity Threat in the Prevalence of Misperceptions." *Journal of Elections, Public Opinion and Parties* 29 (2): 222-44.

Ramos, Roberto, and Carlos Sanz. 2018. "Backing the Incumbent in Difficult Times: The Electoral Impact of Wildfires." Working paper, SSRN, available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3135155.

Redlawsk, David P., Andrew J. W. Civettini, and Karen Emmerson. 2010. "The Affective Tipping Point." *Political Psychology* 31 (4): 563-93.

Rudolph, Thomas J. 2003. "Who Is Responsible for the Economy?" *American Journal of Political Science* 47 (4): 698-713.

Sylves, Richard T. Emeritus Professor, University of Delaware. N.d. "FEMA Declaration Data 5/2/1953 to 11/26/2013 from FEMA's National Emergency Management Information System (FEMIS)" [Sylves archive]. Emailed to author 4/20/2020.

Tausanovitch, Chris and Christopher Warshaw, 2013. "Measuring Constituent Policy Preferences in Congress, State Legislatures, and Cities." *The Journal of Politics* 75(2): 330-342.

Tilley, James, and Sara B. Hobolt. 2011. "Is the Government to Blame?" *Journal of Politics* 73 (2): 1-15.

Wlezien, Christopher, Mark Franklin, and Daniel Twiggs 1997. "Economic Perceptions and Vote Choice: Disentangling the Endogeneity." *Political Behavior* 19 (1): 7-17.

Table 1: Impact of Hurricane Sandy on Obama Vote Share

	(1)	(2)	(3)	(4)	(5)	(6)
			Dependent variable: Obama Vote Share 2012			
Damage	0.018	-0.084**	-0.058	-0.151**	-0.069*	-0.134**
	(0.024)	(0.029)	(0.037)	(0.039)	(0.036)	(0.037)
Co-Partisan X Damage			0.147**	0.151**	0.108**	0.125**
			(0.051)	(0.054)	(0.050)	(0.052)
Swing X Damage			0.098	0.073	0.069	0.054
			(0.062)	(0.063)	(0.061)	(0.061)
Copartisan			1.478**	1.524**	1.617**	1.564**
			(0.350)	(0.321)	(0.292)	(0.255)
Swing			-0.282	0.176	-0.140	0.276
			(0.238)	(0.226)	(0.212)	(0.197)
Income Change, 1 Year					-0.084**	-0.063**
					(0.017)	(0.015)
Unemployment Change, 1 Year					-3.049	-21.576**
					(9.069)	(9.580)
Home Price Change, 2 Years					-0.270**	-0.186**
					(0.076)	(0.068)
Disaster Damage, 2 Years					0.018	0.013
					(0.013)	(0.011)
Declarations, 2 Years					0.186**	-0.001
					(0.055)	(0.053)
Obama Vote Share, 2008	1.038**	1.047**	1.009**	1.013**	1.012**	1.024**
	(0.005)	(0.006)	(0.009)	(0.010)	(0.007)	(0.007)
Constant	-4.537**		-3.497**		-4.077**	
	(0.215)		(0.326)		(0.306)	
Census Division FE		✓		✓		✓
Observations	3,154	3,154	3,154	3,154	3,116	3,116
R^2	0.936	0.944	0.938	0.945	0.958	0.965

Note: Entries are linear regression coefficients with robust standard errors in parentheses.
*p<0.10, **<0.05 (two-tailed test).

Table 2: Impact of Disaster Damage on Incumbent Vote Share, 1972-2004

	Dependent variable:			
	Incumbent Party Two-Party Vote Share			
	(1)	(2)	(3)	(4)
Damage	-0.019**	-0.091**	-0.028**	-0.096**
	(0.008)	(0.015)	(0.008)	(0.015)
Declarations, 6 Months			0.475**	0.434**
			(0.105)	(0.205)
Turndowns, 6 Months			-0.950**	-1.832**
			(0.087)	(0.126)
Co-Partisan X Damage		0.122**		0.119**
		(0.019)		(0.020)
Co-Partisan X Declarations				0.196
				(0.255)
Co-Partisan X Turndowns				1.989**
				(0.180)
Swing X Damage		0.074**		0.076**
		(0.019)		(0.020)
Swing X Declarations				-0.209
				(0.261)
Swing X Turndowns				0.695**
				(0.184)
Co-Partisan		-0.788**		-1.235**
		(0.244)		(0.251)
Swing		0.263		0.132
		(0.193)		(0.201)
Median Income	0.019**	0.020**	0.024**	0.026**
	(0.009)	(0.009)	(0.009)	(0.009)
Incumbent Party Vote Share, Lag 1	0.558**	0.560**	0.556**	0.559**
	(0.007)	(0.007)	(0.007)	(0.007)
Incumbent Party Vote Share, Lag 2	0.339**	0.344**	0.342**	0.346**
	(0.006)	(0.007)	(0.006)	(0.007)
Observations	27,894	27,875	27,894	27,875
R^2	0.815	0.816	0.816	0.817

Note: Entries are linear regression coefficients with county-clustered standard errors in parentheses. All models include county and year fixed effects. *$p<0.10$, **<0.05 (two-tailed test).
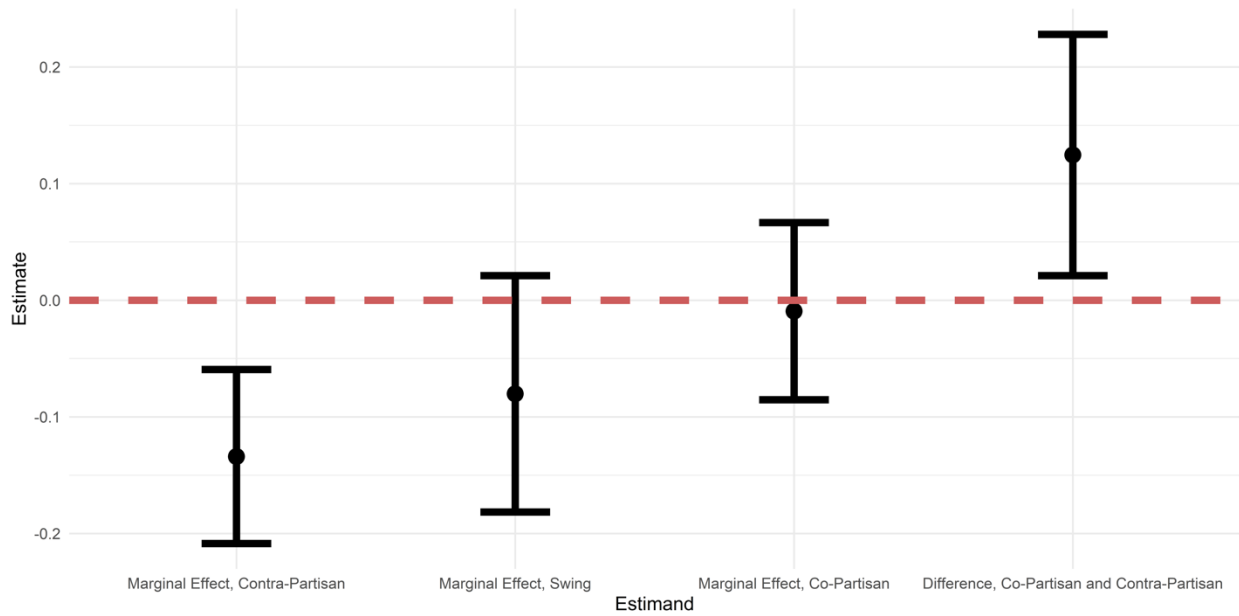
**Figure 1: Reported Property Damage Related to Hurricane Sandy**
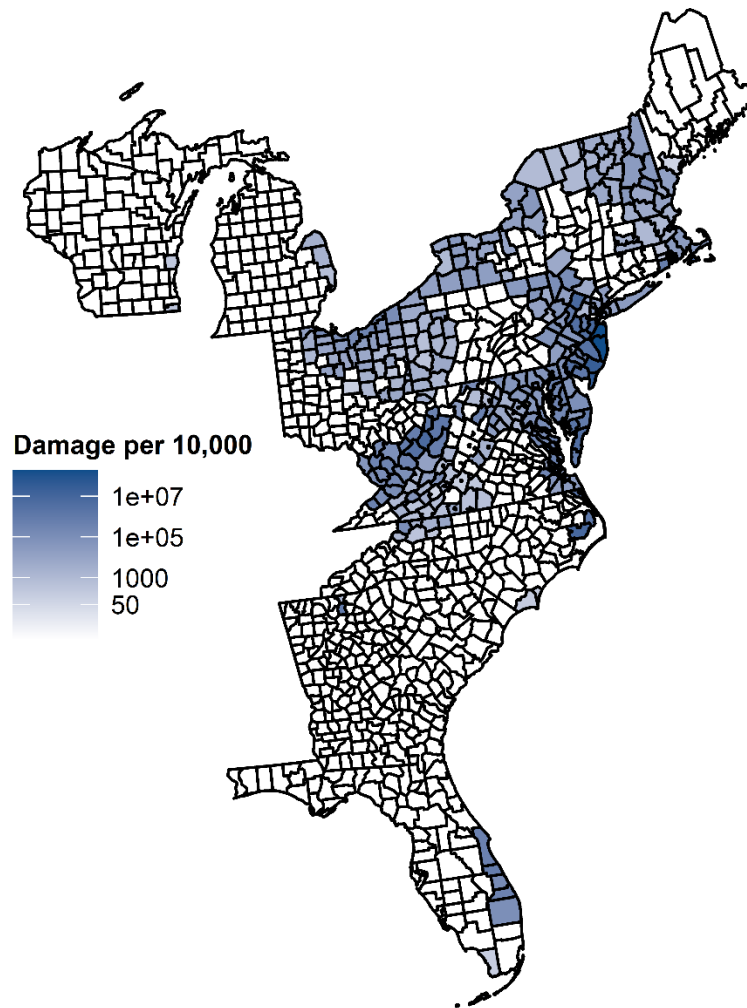
Source: Spatial Hazard Events and Losses Database 18.1 (SHELDUS).

Figure 2: Treatment Effect of Disaster Damage from Hurricane Sandy, by Level of Preexisting Partisanship


Note: The left three point estimates indicate the marginal effect of a one-unit increase in ln(Sandy Damage per 10,000) on subsequent Obama vote share by the county's pre-existing partisanship, and the right-most is the difference between the marginal effect in co-partisan and contra-partisan counties. All are presented with 95 percent confidence intervals based on robust standard errors. Results are drawn from Table 1, Column 6.

Figure 3: The Effect of Disaster Damage, Disaster Declarations, and Declaration Turndowns on Incumbent Vote Share, by Preexisting Partisanship
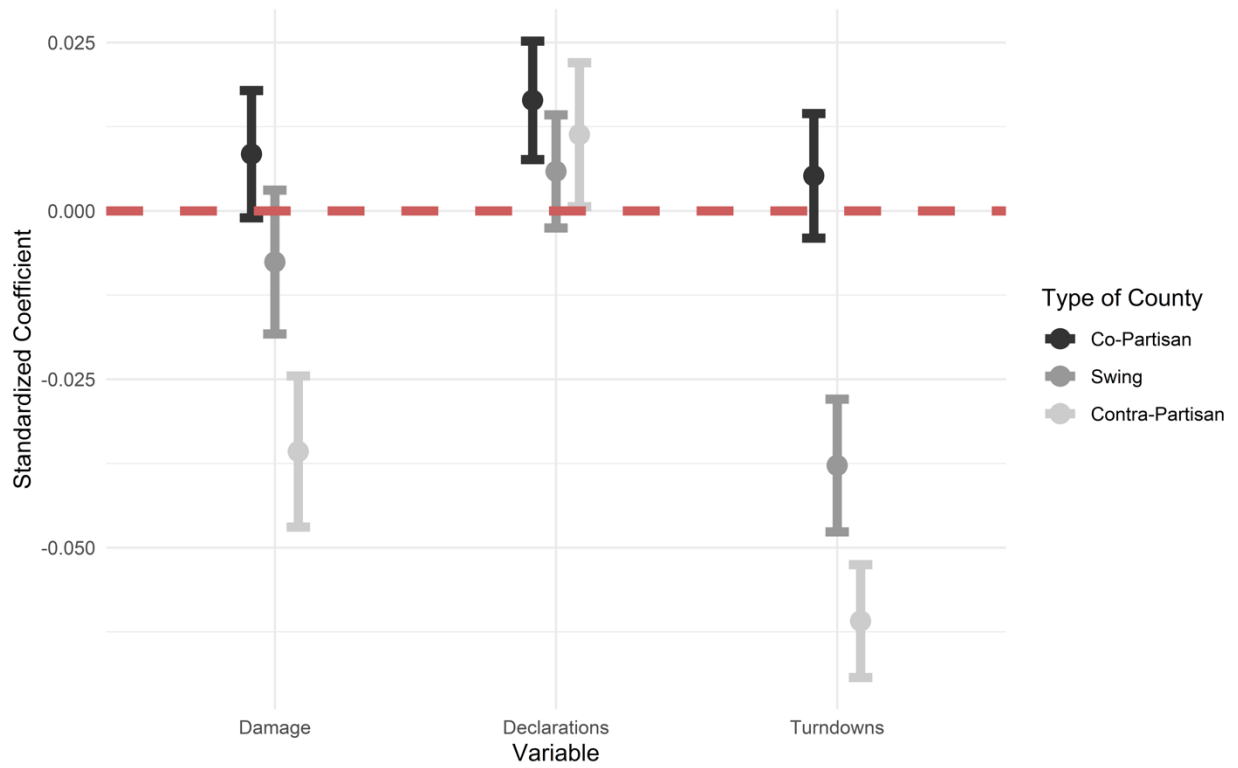
Note: Standardized point estimates, with 95 percent confidence intervals based on county-clustered standard errors. Each coefficient indicates the change in incumbent party vote total (in standard deviations) with a one standard deviation change in the relevant predictor. All variables in model except indicators for county type and fixed effects were standardized.

Figure 4: The Substantive Effect of Varying Levels of Disaster Damage, by Co-Partisanship of Counties Affected
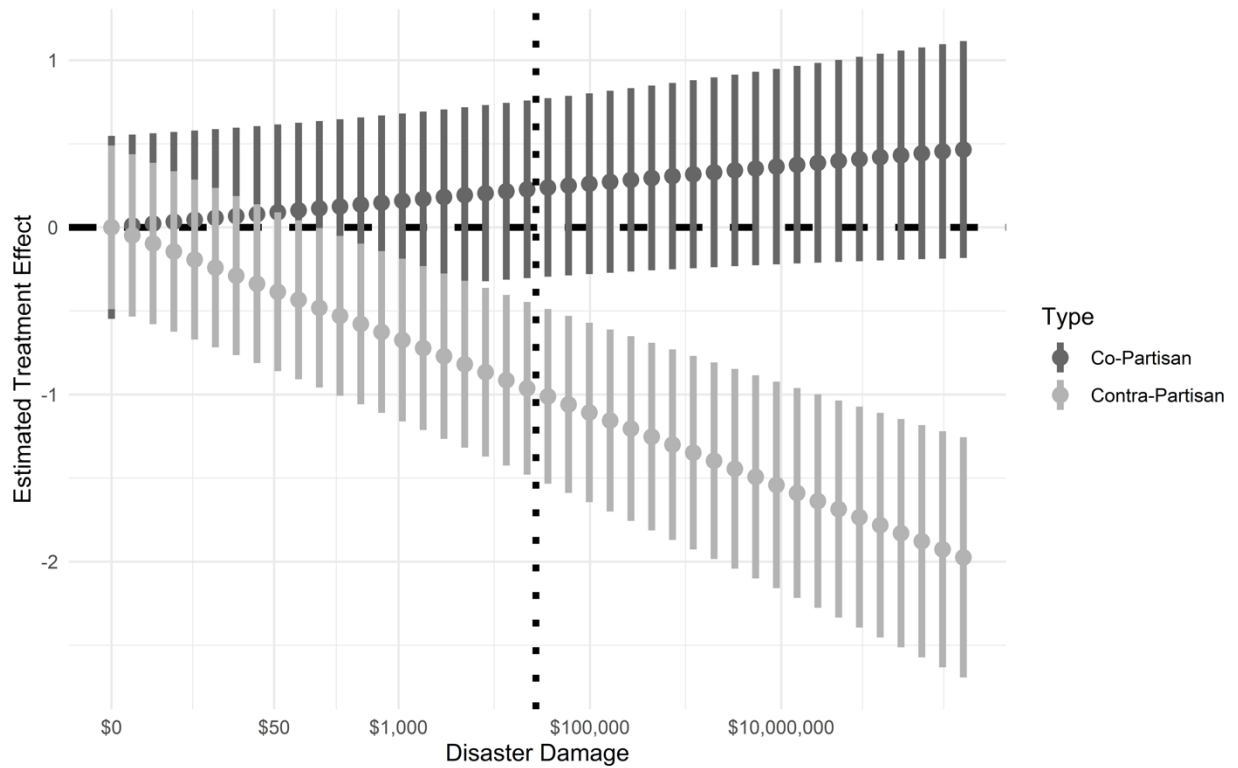
Note: The horizontal dashed line represents a null effect. The vertical dotted line is at the median level of total damage among county-years that experienced non-zero damage. Effect estimates at varying levels of damage were calculated based on the results in Table 2, Column 4. The treatment effect is calculated by taking the difference between the predicted value of the outcome at a given level of damage and the predicted value of the outcome when there is no damage.