

Newspaper Closures Polarize Voting Behavior

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Abstract: Changes to the media environment have increased polarized voting in America through both addition and subtraction. We argue that the decline of local newspapers has contributed to the nationalization of American politics: as local newspapers close, Americans should rely more heavily on available national news or partisan heuristics to make political decisions. We assess the impact of newspaper closure on polarized voting, using genetic matching to compare counties that are statistically similar on the observables but for the loss of a local newspaper. We identify a small but significant causal decrease in split-ticket voting in presidential and senatorial elections in these matched communities: in areas where a newspaper closes, split-ticket voting decreases by 1.9 percent.

Keywords: political polarization; newspapers; local media; matching; partisanship

Newspaper Closures Polarize Voting Behavior

Rapidly changing technologies are disrupting traditional means of content distribution, advertising revenues, and intermedia competition. The political news industry is grappling with ongoing economic and technological shocks that are linked to changing patterns of partisan polarization. Local news sources are not merely suffering in this new marketplace—many are disappearing for good (Hindman, 2009; Shaker, 2014). As newspapers close, other local media are not emerging to fill the information gaps, with negative impacts on important political outcomes (Hayes & Lawless, 2015; Hindman, 2009, 2011; Hopkins, 2018; Mondak, 1995; Schulhofer-Wohl & Garrido, 2013; Shaker, 2014; Trussler, 2018; Waldman, 2011).

A growing body of literature examines the polarizing effects of the changing media environment, focusing on the expanding set of national media outlets with less attention paid to declining local news. The proliferation of cable television channels and access to broadband internet have affected mass voting behavior, sorting, and social polarization, as well as elites' partisan voting behavior, by providing more choice for accessing political (and apolitical) information (Arceneaux et al., 2016; Hopkins & Ladd, 2014; Lelkes, Sood, & Iyengar, 2017; Levendusky, 2013; Prior, 2007). Many of these new entrants to the market tend to be more extreme, partisan, and polarizing than news of the past, with important consequences for voters (Levendusky & Malhotra, 2016; Stroud, 2011). Focusing on the political effects of these *additions* to the marketplace of news may be too limited, however: polarized voting could also be explained by patterns of *subtraction and replacement*, particularly in local news markets.

Another emerging literature details negative consequences of declining local news. Where local newspapers are weaker, people know less about their representatives and subnational governments and turn out at lower rates (Hayes and Lawless, 2015, 2018; Kübler &

Goodman, 2018; Shaker, 2014), and municipal governments spend less and borrow at higher rates (Gao et al., 2018; Yazaki, 2017). These studies show the importance of local newspapers for citizen engagement in subnational politics, but none examine the potentially polarizing effects of local media decline.

In this article, we bridge the divide between the literatures on the polarizing effects of the changing news environment and the consequences of weakening local media. We argue that losing a local newspaper may encourage reliance on partisan heuristics when voting and, possibly, a turn to readily available national media (Hopkins, 2018; Trussler, 2018), which is rife with partisan rancor and intense cues from polarized elites (Arceneaux & Johnson, 2013, 2015; Levendusky & Malhotra, 2016; Padgett, 2014; York, 2013). Voter opinions can be changed by exposure to national news, even in elections uncovered by those national sources (Della Vigna & Kaplan, 2007; Gerber, Karlan, & Bergan, 2009; Trussler, 2018). Party cues, the cheapest sources of information, enable voters to make judgments about races they might otherwise ignore due to lack of information, which—in the case of nearly all non-presidential contests—comes from local news or the candidates (Downs, 1957; Schaffner, Streb, & Wright, 2001). Partisan cues from national news are more intense than information about local candidates in local newspapers, and are likelier to permeate the attention of inattentive consumers.¹ When local newspapers close, the influence of polarized and intense national news should increase.

We assess the impact of local newspaper closures on polarized voting. We expect to observe political effects of choice *depletion* that are unrelated to the amount or bias of political

¹ Martin & McCrain (2018) find evidence of partisan learning through local television news following an increase in nationalized content instigated by very recent ownership changes.

content in the news source that closes. We identify a significant effect in voting patterns in matched communities that have and have not experienced the closure of a local newspaper: communities with newspaper closures have lower rates of split-ticket voting in presidential and senatorial elections. We subject this finding to a sensitivity analysis and a placebo test, finding support for a causal interpretation of this association, and conduct auxiliary analyses showing that reliance on partisan heuristics, not a decrease in political information, may explain these effects.

Our study advances the communication literature in two ways, and suggests important avenues for future research. First, by linking the literature on polarization with research on the negative effects of declining local news, we add to the growing body of work investigating the ways that structural changes to the media environment may exacerbate polarization (Arceneaux et al., 2016; Lelkes et al., 2017; Trussler, 2018), and encourage future work on polarizing forces other than fragmented media and partisan news. Second, we contribute to the literature on declining local news and to newer work on the nationalization of politics and the media (e.g. Hopkins, 2018; Trussler, 2018) by focusing on negative effects beyond decreased awareness and engagement in subnational politics. We show that the displacement of local newspaper audiences leads to polarization, suggesting other possible implications of displacing local audiences relevant to other subfields in communication, including local disease tracking and prevention (e.g. Jerit et al., forthcoming), responses to natural disasters, and awareness of public health interventions.

The Nationalizing Media Environment and Political Polarization

The decline of local newspapers is an important trend in American media and contributes to the nationalization of American politics (Hayes & Lawless, 2017; Hopkins, 2018; Martin & McCrain, 2018; Trussler, 2018). Local newspapers need not supply substantial political information to be useful to democracy: their very existence acts as a bulwark against the

domination of Americans' news diets by readily available national alternatives (Arceneaux & Johnson, 2015). Declining access to quality local news is harmful to voter behavior and responsive governance, leading to more corruption (Arnold, 2004; Besley, Burgess, & Prat, 2002; Campante & Do, 2014; Strömberg, 2004) and lower voter turnout (Schulhofer-Wohl & Garrido, 2013). In the absence of quality local news options, Americans may rely on partisanship and national news to inform their political decisions (Hopkins, 2018; Trussler, 2018).

Party affiliation is the cheapest source of information available to voters (Downs, 1957). These cues are even more useful in low-information downballot races, where voters rely upon candidates' party affiliation to express preferences to pollsters and complete their ballots (Schaffner, Streb, & Weaver, 2001): for example, adding party labels to previously non-partisan ballots brings local election results in line with national ones for lower-information contests (Garlick, 2015). Partisan heuristics enable voters to make judgments about races they might otherwise ignore due to lack of information, which—in the case of nearly all non-presidential contests—comes from local news sources or the candidates themselves (Trussler, 2018).

National outlets do not have the space, time, nor interest to cover 535 legislative offices, much less fifty state governments and thousands of municipal governments (Arnold, 2004). National news outlets focus on the president and national governmental institutions such as Congress, the courts, and federal agencies (Gardner & Sullivan, 1999; Farnsworth & Lichter, 2004). A relative reduction of local news in the media marketplace may result in less exposure to local news and more regular exposure to national media, with significant effects on engagement and partisan voting (Clinton & Enamorado, 2014; Hopkins & Ladd, 2014; Hopkins, 2018). Voter opinions can be swayed by any expansion of media choice in the marketplace, even in elections uncovered by those new sources (Della Vigna & Kaplan, 2007; Gerber, Kaplan, & Bergen,

2009). Absent quality local options, national news is likely to replace local news for habitual news consumers at least, shifting its relative weight in democratic decision-making (Hopkins, 2018; Martin & McCrain, 2018; Trussler, 2018).

More regular exposure to national news in the absence of a local newspaper fosters polarization in the public for two reasons.² First, national news outlets primarily cover national politicians, elections, and issues, and national elites are deeply polarized along partisan lines (Hetherington, 2001). A backdrop of increasingly polarized national politicians has led to national coverage rife with elite party cues, party distinctions, and partisan conflict and rancor (Padgett, 2014; Arceneaux & Johnson, 2015; Müller et al, 2017; van Klingerden, Boomgaarden, & de Vreese, 2017). National audiences may see politics as framed by the contests and conflicts between the two major parties, increasing consumers' awareness of polarization (Darr & Dunaway, 2017; Levendusky & Malhotra, 2016; Stroud, Muddiman, & Lee, 2014). Second, national news media—particularly broadcast television and cable news outlets—are prone to cover the most contentious aspects of national party politics. Press coverage of national politics reflects the news values of novelty and sensationalism, made clear by heavy focus on uncivil behavior among elite partisans (York, 2013). In their congressional coverage, national outlets use sound bites from party extremists at higher rates than non-extremists, and quote party leaders

² In supplemental analyses, we use data from Gentzkow & Shapiro (2010) to demonstrate that partisan phrases are more common and represent a higher proportion of political coverage in national newspapers than in local newspapers. See the section, “Supplemental Analysis on Partisan Cues in Local and National Media Gentzkow & Shapiro (2010) Content Analysis Data,” on pages 3-7 of the Supplementary Material, for further details and full results.

more often than rank and file members (Padgett, 2014). Given congressional leaders' focus on message cohesion (Groeling, 2010), such coverage is full of partisan cues from elites delineating clear distinctions between the parties (Hetherington, 2001; Levendusky, 2009).

This contrasts with local newspaper coverage of representatives, which focuses on their actions as local agents and less on game frame coverage (Arnold, 2004). Local news provides subnational officeholders a venue to cultivate their "personal vote," touting service and accomplishments to the local constituency and serving as a bulwark against a rising national tide of mass partisanship (Fenno, 1978; Trussler, 2018). Local newspapers cover the political officeholders and actors pertinent to their local constituency and media market. In a study of local newspaper coverage of twenty-five legislators, for example, Arnold (2004) finds that the median legislator earned 14.9 articles per month. No typical rank-and-file member earns that regularity of coverage from national media outlets; elected officials serving local constituencies simply cannot attract the media attention necessary to claim credit and cultivate a personal vote (Snyder & Stromberg, 2010). Unlike national outlets, local newspapers prioritize elected officials' relevance to their geographic audience instead of leadership positions or prominence in Congress. The legislators typically neglected in local newspaper coverage are those who share their media market with other districts (Arnold, 2004; Snyder & Stromberg, 2010).

Local newspaper coverage of members of Congress is also relatively positive when compared to national coverage: most stories about legislators are neutral, while 25 percent are positive and only 5 percent are negative (Arnold, 2004). Members are covered most extensively by local newspapers when they are working to attract or retain constituency benefits. Historically, local newspaper coverage of legislators and their accomplishments had its strongest effects among voters in the representative's out-party (Schaffner, 2006), overcoming voters'

partisanship and encouraging voters to reward or punish performance in the district (Trussler, 2018). Through this coverage of legislators' locally relevant activities, local newspapers facilitate democratic accountability in subnational politics (Snyder & Stromberg, 2010).

Though the arrival and proliferation of the Internet prompted the structural disruptions ultimately responsible for many local newspaper closures, it is paradoxically offered as a reason not to worry about the disappearance of local newspapers. Yet, many reports show that local news accounts for only a tiny fraction of all online traffic (e.g. Hindman, 2009). Even though the internet provides the opportunity for low-cost entry into local newspaper markets, it is clear that online local news traffic is too low to sustain a healthy level of local reporting. Would-be online venues for local news are losing out to national news, and the Internet has not produced more local news outlets as predicted (Hindman, 2011). Local television news also cannot and does not sufficiently fill the gaps left by local newspapers. Time constraints imposed by the need for ads, sports, weather, disasters, and traffic leave only a minute or two for coverage of subnational politics (Arnold, 2004). Studies of local television find that political coverage is largely absent, and when present, lacks substance, focusing largely on the horserace (Dunaway, 2008).

The shifting demands of news consumers may partially explain these trends. Local political news is packaged by newspapers alongside other desirable content about local sports, shopping, businesses, and entertainment, and is less attractive to voters once removed from that bundle (Hamilton, 2004). Audiences in high choice environments, therefore, are increasingly unlikely to seek out replacement sources for local political information, particularly given recent evidence suggesting that audiences prefer stories about national news relative to local news (Hopkins, 2018). The result is a higher likelihood of regular exposure to national news media relative to local news, which should heighten partisan affect (Lelkes, Sood & Iyengar, 2017).

When a local newspaper exits the marketplace, voters know less about local elections than voters in similar areas (Mondak, 1995). Voters may substitute to other forms of local media, but these tend to lack information on local elections compared to newspapers. Jeffrey Mondak's (1995) study of the Pittsburgh newspaper strike of 1992 resembles ours—his study matches Pittsburgh to Cleveland, and examines the media environment instead of news content—but much has changed, and our study applies the logic of his study to a national sample.

We expect to observe political effects from choice *depletion* that are unrelated to the amount or bias of political content in the news source that closes, similar to the political effects Markus Prior (2007) details in his work on media choice *expansion*. The exit of local newspapers from the local marketplace is associated with large, discrete changes in readership, relative to trends before or after the opening or closing of a newspaper (Gentzkow, Shapiro, & Sinkinson, 2011). The disappearance of any local news source is a meaningful political event in the information marketplace, even one comprised of many other options (Hayes & Lawless, 2018; Hopkins, 2018; Martin & McCrain 2018; Shaker, 2014). Newspapers set the agenda within their markets, and cable and broadcast outlets rely on newspapers to gather news (Druckman, 2005).

We base our hypotheses and analyses on several assumptions informed by previous research. First, we assume that when local newspapers are lost, replacement with alternative sources of local political information is unlikely due to lack of supply in most markets (Hindman, 2011). We do not assume that news diets are fixed, but consider it likely that when local newspapers close, habitual news users will replace them with sources that cover national politics (Lelkes, Sood & Iyengar, 2017; Hopkins, 2018; Trussler, 2018). We also assume that national news outlets provide less coverage of subnational political actors and events relative to local outlets (Arnold, 2004), and that political coverage is qualitatively different across local and

national news providers (Hopkins, 2018). We expect that the loss of a local newspaper should encourage voters to replace that news with national content, with effects on partisan voting.

Another hypothesis—that any effects on partisan voting can be explained by the loss of information provided by local news sources—must be considered. If information loss is the mechanism behind changes in partisan voting, there should be higher rolloff in downballot races. If voters are turning to national news, however, rolloff should not be affected: increased partisan cues should lead to a convergence of partisan preferences without impacting ballot completion. Partisan cues from national news are likelier to permeate the attention of inattentive citizens than information about specific local candidates—either through incidental exposure or indirect communication via social networks (Feldman et al., 2014; Tsafati & Chotiner, 2015)—simply because of the relatively higher intensity of messages containing national party cues.

Communities losing local news options, therefore, find themselves in a media environment with two trends encouraging partisan voting: (1) less available information about their local politicians and community, leading to reliance on cheaper forms of information such as party cues, and (2) a media choice set with a higher proportion of partisan and contentious national options. Given the crucial differences between local newspaper coverage and national media coverage, losing a local newspaper should increase readers' propensity towards partisan voting, either through reliance upon partisan heuristics or replacement with national news media for political information. *We expect more polarized voting in communities that have experienced the closure of a local newspaper relative to communities where local newspapers survive.*

Research Design and Data

Our research design uses patterns of partisan voting behavior in counties to discern signs of polarized voting at the local level. Our dependent variable is split-ticket voting, defined as the

absolute value of the difference between the percentage of voters in each county supporting President Obama in 2012, and the percentage of voters supporting the Democratic candidate for the Senate in 2012. In 1992, 37 percent of states with Senate races elected a Senator from a different party than for president. In 2016, not a single state did so for the first time in a century (Bump, 2016). Split-ticket voting, once called “a privilege which the American electorate exercises almost uniquely,” is falling out of favor with voters (Campbell & Miller, 1957).

Though the first studies of split-ticket voting found an association with lower levels of political motivation and knowledge, subsequent studies show that split-ticket voting is unrelated to political interest and can be explained by partisanship and candidate visibility (Beck et al., 1992; Campbell & Miller, 1957; Converse, 1962). Recent research on split-ticket voting identifies individual-level political characteristics such as partisan identity, ambivalence, and indifference as key predictors (Davis & Mason, 2016; Davis, 2015), suggesting an important role for the media environment (Lelkes, Sood & Iyengar, 2017). Declining local news should reduce candidate visibility at the local level as it strengthens awareness of national, polarized political elites, encouraging greater reliance upon partisanship in voting decisions (Trussler, 2018). Just as others expected the decline of partisan newspapers to *increase* split-ticket voting, we expect the decline of non-partisan newspapers to *decrease* split-ticket voting. The split in party outcomes in local voting districts is a reasonable metric for the electorate’s willingness to consider candidates from both parties, an arguably appealing normative outcome.³

³ Without voter-level data, we infer a pattern of split-ticket voting from county level data. Burden and Kimball (1998; 2009) explain the limitations of using aggregate level data to estimate ticket-splitting, and suggest using King’s (1997) estimation procedure for ecological

We utilize nationwide data on newspaper closures from the “Chronicling America” project, part of the National Digital Newspaper Program, which maintains a searchable database of the founding and closing dates of past and current U.S. newspapers (Library of Congress, 2016). We consider a newspaper “closed,” and include it in our sample, only if its closing date is denoted as between 2009 and 2012. Our sample contains 110 newspaper closures: 54 in 2009, 25 in 2010, 15 in 2011, and 16 in 2012. The median newspaper sells more than eighty percent of its copies in its home county (Gentzkow & Shapiro, 2010; Gentzkow, Shapiro, & Sinkinson, 2011), making county an appropriate unit of market reach.

We also include closed weekly newspapers in our analyses. In 2008, the year preceding our study, only 45 percent of counties in the U.S. (excluding Alaska) contained a daily newspaper headquarters. There are many more weekly newspapers than dailies, and weeklies may influence politics even without extensive political reporting, much like entertainment channels impacted politics by altering consumers’ choice sets (Prior 2007). Given that our theoretical expectation does not depend on the local political content in newspapers—merely their existence as a media option—weekly newspapers should not be excluded, even if they

inference instead. However, Cho and Gaines (2004) demonstrate the difficulty of applying King’s technique to split-ticket voting. Rather than use ecological inference here, we maintain that it is reasonable to examine the difference between Senate and presidential vote shares as a metric of split-ticket voting given the highly polarized context during the time period we examine, though we note this potential limitation to our approach.

rarely cover political matters (Leather 1998).⁴ Figure 1 contains a map of counties with newspaper closures between 2009 and 2012.

[Insert Figure 1 here]

Newspaper closures are not randomly assigned. Without the ability to experimentally manipulate the existence of a local newspaper, we instead construct a matched dataset balanced on observable variables: percent of population over voting age; percent White, Black, and Hispanic residents of the voting age population;⁵ median age; percent female; median income; and percent with some college education. Latitude and longitude of the county centroid are added from the U.S. Census Gazetteer to account for geographic variation. We exact match on states to account for heterogeneity across Senate races. We also match on the pre-closure penetration of broadband providers at the county level, taken from the replication files of Lelkes, Sood, and Iyengar (2015). Finally, we match on the county's pre-newspaper closure level of partisan voting, measured by the absolute difference of the county's 2008 vote share for the Democratic candidate and 0.50. We do not match on the pre-closure value of the dependent variable because a majority of the closure counties in 2012 did not hold Senate elections in 2008.

Matching seeks to enhance the covariate balance between our closure and comparison counties. Generally, there exists no single standard for ideal or acceptable balance in the literature (Diamond & Sekhon, 2013). We aim to maximize balance on the observables without discarding any observations. In the matching procedure to follow, it is especially crucial to

⁴ We conducted additional analyses using daily newspaper closures only, but separating dailies from weeklies reduces the affected N to the point where statistical precision is no longer feasible.

⁵ These data are maintained by Stephen Wolf, a contributor to DailyKos Elections.

ensure that covariates that might be strongly related to the dependent variable are balanced across comparison and control counties. Our estimates would be more suspect if, for instance, the populations in our closure counties were substantially more educated or partisan than in the matched comparison counties. We therefore require a matching procedure that renders the distributions of these covariates indistinguishable across closure and comparison counties.

We use genetic matching (Diamond & Sekhon, 2013) to construct optimal weights for matching, which leverages a genetic algorithm (Mebane & Sekhon, 2011) that maximizes balance between treated (or “closure,” as we will refer to them) and control (or “comparison”) units, while discarding as little data among observations with newspaper closures as possible.

The comparisons we draw between geographic units have full support on all the observable covariates above. Based on the results of bootstrapped Kolmogorov-Smirnov (KS) tests, we conclude that our matched set is well-balanced on the observables.⁶ Balance statistics are presented in Table 1. Table 1 shows that the matching procedure improved the comparability of the closure and comparison samples. No p-value is lower than 0.452 after matching. The distributions of the observables, including partisanship and education, are statistically indistinguishable across the closure and comparison samples. We use the `Matching` (Sekhon, 2011) and `rgenoud` (Mebane & Sekhon, 2011) packages in the R programming language to construct these weights (R Core Team, 2016). While some work using genetic matching includes a propensity score in the slate of covariates to be matched upon (Chen, 2013), we do not do so here. King and Nielsen (2016) show that the inclusion of propensity scores can increase imbalance on some covariates. We do not need to discard any counties that lost a newspaper and voted in a Senatorial election to improve balance.

⁶ All results presented in Table 1 are based on 10,000 bootstrap repetitions.

[Insert Table 1 here]

Results and Additional Tests

Given the strong balance between closure and comparison units obtained via genetic matching, we present the Average Treatment Effect among the Treated (ATT) in Table 1. We present ATT estimates because we have a limited number of observations with a newspaper closure relative to our comparison counties. As such, covariate values which have no support among our closure set should not enter into our estimates, which the ATT estimator avoids (Sekhon 2009, 495). Recall that we define split-ticket voting as the absolute value of the difference between the percentage of voters in a given county who supported President Obama in 2012, and the percentage of voters in that same county who supported the Democratic candidate for Senate in 2012. As such, negative estimates indicate that newspaper closure is associated with less split-ticket voting in that county; results of the test of our hypothesis appear in Table 2.

[Insert Table 2 here]

Table 2 shows that newspaper closure is associated with a negative and statistically significant ($\alpha = 0.05$) amount of split-ticket voting relative to the comparison counties. Substantively, the magnitude of the effect of newspaper closure on president-Senate split-ticket voting is plausibly small, about 1.9 percent, but comparatively larger than findings in other studies of changes in the local media environment (0.4 to 0.7 percent, Della Vigna & Kaplan, 2007; 0.3 percent, Lelkes, Sood, & Iyengar, 2017). This careful identification of one of the many causes of polarized voting

contributes to our understanding of this phenomenon by accounting for the subtraction of local media sources from the set of media choices available to consumers.⁷

Sensitivity Analysis: Was the Selection Process Adequately Modeled?

Our estimates can only be interpreted as causal if several key assumptions are met. We must satisfy the assumption that newspaper closure is independent conditional on the observables: after conditioning on the observable covariates listed above, was the closure of a newspaper assigned as-if randomly? Keele and Minozzi (2013) argue that geographic units, even those on adjacent state borders, differ significantly. We probe the plausibility of this assumption for statistically significant findings with a sensitivity test (Rosenbaum 2002), finding moderately strong support for our assumption of independent selection conditional on observables. This sensitivity test presents the p-value of the difference between the closure and comparison counties under a variety of conditions. The Γ entries indicate an odds-ratio on an omitted confounder in the selection process. When the upper bound of a p-value associated with a given Γ exceeds our $\alpha = 0.05$ threshold, this Γ value represents the sensitivity of our results to violations of the selection on observables assumption. We conducted this test using the `psens` command in the `rbounds` package (Keele, 2014) for the R programming language.

[Insert Table 3 here]

⁷ In addition to the simple ATT estimator, we also estimated OLS regressions on the pre-processed matched dataset (Ho et al., 2007). Across several specifications, including those featuring state-clustered errors and state fixed effects, newspaper closure was negatively and significantly associated with president-Senate split-ticket voting. This robustness check increases our confidence that these results are not explained by idiosyncrasies across Senate races in 2012.

The results in Table 3 provide moderate support for a causal interpretation of our finding in Table 2; we would have had to have missed a covariate with substantial influence on the selection process. Table 3 shows that our results are robust to violations of the selections on observables assumption up to a Γ of 1.9: if we failed to account for a covariate that increased the odds of selection into newspaper closure by 100 percent, then our estimate would no longer be statistically significant at conventional levels. To put this result in context, adding an additional broadband provider increases the probability of selection by 13 percent: an omitted confounder would need to exert over seven times the effect on the probability of selection as introducing a new broadband provider for the selection on observables assumption to fail (at $\alpha = 0.05$).

Analysts should continue to probe the selection process into newspaper closure, given that, as Keele and Minozzi (2013) observe, selection issues abound when conducting causal inference on geographic units. Future work should continue to explore the correlates of newspaper closure to better model the selection process, including examining whether effects are consistent across different regions of America. As local newspapers continue to close, analysts should continue gathering data to support even stronger causal inference designs, particularly those that we were unable to estimate due to the limited number of closure counties in our sample, such as difference in differences estimators (Abadie, 2005). Alternatively, as more data become available, scholars could compare voting patterns across geographically contiguous counties that did not and did not experience newspaper closure as an alternative to matching.

Placebo Test: Did Newspaper Closure After 2012 Affect Voting in 2012?

Next, we subject our findings to a placebo test. The placebo test is simple: for counties that lost a newspaper after the 2012 elections, did this loss cause any decline in presidential-Senate split-ticket voting in the 2012 elections, relative to the comparison counties? The timing

of these events precludes any causal interpretation of the effect of a post-2012 newspaper closure on 2012 voting patterns. We collected information about post-2012 newspaper closures, finding twenty-five counties that lost a newspaper in either 2013 or 2014 that serve as our closures set for this placebo analysis. Full balance statistics are presented in Table S1 in the Supplemental Information, and results of our placebo test are presented in Table 4.

[Insert Table 4 here]

Table 4 presents the ATT estimates for our placebo test, showing that newspaper closure after 2012 does not cause a similar decline in president-Senate split-ticket voting. This result supports a causal interpretation of the association presented in Table 2 between newspaper closures from 2009-2012 and decreased split-ticket voting in 2012. The results in Table 2 pass the placebo test, improving our confidence that effects of newspaper closure on split-ticket voting are not explained by observable county characteristics that also explain newspaper closure.⁸ Decreased split-ticket voting is only observed after the closure of a newspaper.⁹

Is the Mechanism Information Loss or Partisan Heuristics?

⁸ We cannot statistically compare our primary findings to the placebo test: the set of closure counties varies across the two analyses, precluding tests of nested or non-nested models.

⁹ To further buttress these results, we conducted an additional placebo test (reported in Table S3 of the Supplemental Information) examining the effect of newspaper closures between 2009 and 2012 on split-ticketing in the 2008 Senate elections. We obtained acceptable balance (see Table S2 for full balance statistics) and find no statistically significant association between 2008 split-ticketing and a newspaper closure in subsequent years.

The decline in split-ticket voting we observe in Table 2 could be the result of one of two mechanisms: a general loss of political information may follow the closure of a local newspaper, or citizens who lose their local newspaper may shift their news consumption to national media. Shifts in news consumption to national media seem likely to increase (or at least not diminish) the effect of partisan heuristics, given the prevalence of high-intensity messages about national party politics in the national news during elections.

If the first mechanism is the correct one, then newspaper closures should also cause increases in ballot rolloff: following a newspaper closure, voters may lack sufficient information to choose candidates in down-ballot races and leave those blank. We define ballot rolloff at the county level as the total votes cast for Barack Obama and Mitt Romney, minus the total votes for Republican and Democratic Senate candidates, divided by the total number of votes cast for Barack Obama and Mitt Romney (range: -0.05 to 0.63). Positive values indicate more votes were cast in the presidential race than the Senate race, and negative values the converse. If the second mechanism is correct, newspaper closures should have no causal effect on rolloff. If voters shift their media use elsewhere and partisan heuristics are strengthened, then party labels on down-ballot candidates should be sufficient for voters. Table 5 presents an ATT estimate of the causal effect of newspaper closure on president-Senate ballot rolloff on the same sample as Table 2.

[Insert Table 5 here]

The results in Table 5 show that newspaper closures do not cause changes in ballot rolloff. This evidence is suggestive rather than conclusive because less political knowledge could increase use of party cues for votes in lieu of abstention. Still we take this as limited evidence that declines in split-ticket voting are likely the product of increased reliance on national media and exposure to

partisan cues. Newspaper closures appear to cause declines in president-Senate split-ticket voting, but the mechanism is likely not a general loss of political information.

Conclusion

Concerns about mass partisanship are based on the idea that the heuristics of Democrat and Republican will supplant more deliberative tools for sorting through the complex array of federal, state, and local politics. One useful indicator of reliance on party cues is the rate of split-ticket voting across political geographies. Ideally, voters will incorporate a host of important factors along with party when making electoral decisions, particularly when the issues are local and fit less neatly into the constraints of national party ideology. This sort of voter cognition should be reflected in higher rates of split-ticket voting, based on the punishment or rewarding of incumbents, voting for person over party, and issue-based voting. Naturally, strong mass partisanship and partisan-ideological sorting have been viewed at times as good for democracy (Broder, 1972; Dalton & Wattenberg, 2000; Hetherington, 2001) and, at other times, as detrimental (Muirhead, 2006). Party cues and partisan allegiances make it easier for ordinary citizens to vote their preferences, but sorting and partisanship also encourage team-mindedness and social polarization (e.g. Garrett et al., 2014; Mason, 2015; Mason, 2016), inhibiting cooperation between people with different values and convictions.

We are not the first to treat rates of split-ticket voting as inversely related to polarization, nor are we the first to assert that elite cues and the media play important roles in shaping mass partisanship, polarization, and voting behavior (e.g. Hetherington, 2001; Levendusky, 2009; Groeling & Baum, 2013). We address a narrower question, borne from normative concerns about polarization and consequences of the declining newspaper industry: what is the impact of local newspaper closure on political polarization? We discern a significant effect—a decline of split-

ticket voting across votes for the presidency and the Senate—from the loss of any local newspaper. These declines are not observed in counties that lost newspapers immediately after the 2012 elections, a standard placebo test, and are reasonably robust to the omission of a confounding selection variable, suggesting a causal interpretation. Our findings connect the literature on the polarizing effects of the changing news environment to scholarship on the negative democratic consequences of the decline of local news: just as adding the internet or partisan cable news to the media environment can influence voting behavior, removing a local news source from the marketplace may polarize the choices citizens make.

Our findings also reflect troublesome trends in down-ballot voting behavior. Hopkins (2018) argues that the continuing expansion of media choice is producing three important effects: less citizen exposure to news about subnational politics; less knowledge about state and local politics; and less engagement with state and local politics. His explanation is based on both supply and demand: Americans are increasingly more interested in national news than local news, and as political news content is less frequently bundled with other useful information, consumers will be less likely to choose news about local politics. The implications of our study fit with those of Hopkins (2018) and Trussler (2018), despite our narrower focus on reductions in the supply of local news through the loss of local newspapers. Changes in the provision of local news are encouraging the use of partisan labels and attitudes associated with national party politics, altering the decision rules applied in voting behavior (Trussler, 2018).

While the changes we observe are for national offices (albeit for ones with ties to subnational geographic constituencies), the implied consequences for elections further downballot seem bleak. Senators are the most likely downballot officeholders to occasionally make the national news. If we observe an effect for an erosion of split-ticket voting between

presidential and Senate races, the loss of local newspapers should affect selections about other state and local officials even more dramatically. As the units of geography and governance shrink, national coverage is much less likely to serve as a suitable information replacement and decision rules based on national party platforms are increasingly ill-suited for the task at hand.

Though our data cannot speak to this directly, it may also be that local newspapers have variable impact across markets in different geographic locales. Extant literature reveals significant differences in the quality of local information environments (Hayes & Lawless, 2018; Napoli et al., 2017), and suggests two characteristics of local communities that can provide some insulation from the loss of a local newspaper: community size and resources. Napoli et al. (2017) find that local communities with higher concentrations of resources have higher quantity and quality of news in their local information ecosystems. In the context of their finding that smaller newspapers experienced the largest declines in local news coverage, Hayes and Lawless (2018) argue that major metro areas can more easily absorb declines in local coverage because several local television stations and possibly some online venues still provide local information for those willing to seek it out. When areas served by smaller newspapers lose those newspapers, however, they are likely losing their only source of substantive information about local politics.

There are plenty of reasons to be troubled about the loss of local newspapers, not the least of which are concerns about journalists' ability to perform the watchdog role in their community. Readers may reach different conclusions about whether our identified effect of split-ticket voting is normatively troubling, but the amount of public concern presently expressed about polarization suggests our findings offer one more reason to bemoan the decline of local newspapers. If trends continue, the national lens may be Americans' only remaining option through which to view their political choices.

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Figures

Figure 1. Newspaper closures, 2009 – 2012. Each dot represents one closed newspaper.



Note. Data comes from the U.S. Newspaper Directory of the Library of Congress.

Tables

Table 1. Matching balance statistics, President-Senate split-ticket analysis.

	<i>Before Matching</i>			<i>After Matching</i>		
	Paper Closure Mean	No Paper Closure Mean	Boot-strapped KS-Test <i>p</i> -value	Paper Closure Mean	No Paper Closure Mean	Boot-strapped KS-Test <i>p</i> -value
Voting-age population (VAP)	414,860	100,618	<0.001	414,860	432,657	0.838
% White VAP	0.776	0.815	0.003	0.776	0.769	0.825
% Black VAP	0.059	0.058	<0.001	0.059	0.068	0.675
% Latino VAP	0.088	0.091	<0.001	0.088	0.092	0.688
Median age	39.758	40.215	0.310	39.758	39.606	0.917
% Female	0.506	0.500	0.024	0.506	0.506	0.568
Household median income	\$57,268	\$46,779	<0.001	\$57,268	\$57,284	0.692
% some college (> age 25)	0.281	0.303	<0.001	0.281	0.283	0.912
Broadband Providers (2008)	9.758	8.020	<0.001	9.758	9.691	0.924
County Partisanship (2008)	0.123	0.125	0.633	0.123	0.124	0.460
Latitude	41.103	38.923	<0.001	41.103	40.819	0.452
Longitude	-90.832	-93.185	<0.001	-90.832	-90.608	0.999

Table 2. Average treatment effect of newspaper closure among the treated on split-ticket voting in 2012 elections.

	President-Senate Split-Ticket Voting
Estimated ATT	-0.019
Abadie-Imbens Standard Error	0.009
T-statistic	-2.082
<i>p</i> -value	0.038
N treated	66
N control (unweighted)	77

Table 3. Sensitivity analysis, President-Senate split-ticket voting ATT.

Γ	Lower bound p-value	Upper bound p-value
1.0	<0.001	<0.001
1.1	<0.001	<0.001
1.2	<0.001	0.001
1.3	<0.001	0.003
1.4	<0.001	0.005
1.5	<0.001	0.009
1.6	<0.001	0.015
1.7	<0.001	0.022
1.8	<0.001	0.033
1.9	<0.001	0.045
2.0	<0.001	0.060
2.1	<0.001	0.078

Table 4. Placebo test: Average treatment effect of newspaper closure after 2012 among the treated on split-ticket voting in the 2012 elections.

	President-Senate Split-Ticket Voting
Estimated ATT	0.004
Abadie-Imbens Standard Error	0.008
T-statistic	0.460
p-value	0.646
N treated	25
N control (unweighted)	25

Table 5. Average treatment effect of newspaper closure on the treated, 2012 ballot rolloff.

	President-Senate Split-Ticket Voting
Estimated ATT	-0.015
Abadie-Imbens Standard Error	0.012
T-statistic	-1.236
p-value	0.216
N treated	66
N control (unweighted)	77

Supplementary Material
“Newspaper Closures Polarize Voting Behavior”

Matching Balance Statistics: Placebo Test

We matched on the same covariates as in the analysis in the main text, exact matching on states and utilizing the genetic algorithm to construct optimal matches. The minimum p-value after matching is 0.386. Table S1 presents the matching balance statistics for the placebo analysis.

Table S1. Matching Balance Statistics, President-Senate Split Ticketing, Placebo Analysis.

	Before Matching			After Matching		
	Paper Closure Mean	No Paper Closure Mean	Boot- strapped KS-Test <i>p</i> -value	Paper Closure Mean	No Paper Closure Mean	Boot- strapped KS-Test <i>p</i> -value

Voting-age population (VAP)	626,682	91,204	<0.001	626682	568487	0.850
% White VAP	0.756	0.816	0.027	0.756	0.764	0.978
% Black VAP	0.084	0.058	<0.001	0.084	0.077	0.975
% Latino VAP	0.101	0.091	0.046	0.101	0.098	0.844
Median age	39.484	40.228	0.148	39.484	38.604	0.386
% female	0.502	0.500	0.467	0.502	0.503	0.615
Household median income	\$58,408	\$46,571	0.011	\$58,408	\$59,395	0.634
% some college (> age 25)	0.289	0.304	0.231	0.289	0.297	0.608
Broadband Providers (2008)	10.569	7.974	<0.001	10.569	10.211	0.854
County Partisanship (2008)	0.097	0.125	0.182	0.097	0.107	0.396
Latitude	40.571	38.893	0.049	40.571	39.789	0.622
Longitude	-89.010	-93.260	0.199	-89.010	-90.411	0.980

Auxiliary Placebo Test Results

We also conducted a placebo test on the effect of newspaper closures 2009-12 on split-ticketing in 2008. Although only 12 counties experienced closure and voted in a Senate election in 2008, we were able to obtain acceptable balance, as shown in Table S2. The minimum p-value after matching is 0.433. Therefore, we present the ATT of closure in Table S3. Once again, there is no statistically significant association between a newspaper closure and subsequent split-ticketing in a county. This finding further supports a causal interpretation of our primary result.

Table S2. Matching Balance Statistics, President-Senate Split Ticketing, Auxiliary Placebo Analysis.

	<i>Before Matching</i>			<i>After Matching</i>		
	Paper Closure Mean	No Paper Closure Mean	Boot-strapped KS-Test <i>p</i> -value	Paper Closure Mean	No Paper Closure Mean	Boot-strapped KS-Test <i>p</i> -value
	Voting-age population (VAP)	215020	63,984	0.013	215020	276340
% White VAP	0.749	0.780	0.457	0.749	0.764	0.981
% Black VAP	0.078	0.074	0.096	0.078	0.081	0.740
% Latino VAP	0.112	0.115	0.723	0.112	0.096	0.443
Median age	38.783	40.209	0.510	38.783	38.508	0.775
% female	0.509	0.501	0.403	0.509	0.509	0.772
Household median income	\$51,126	\$44,666	0.011	\$51,126	\$51,357	0.773
% some college (> age 25)	0.300	0.300	0.568	0.300	0.298	0.770
Broadband Providers (2008)	9.323	7.941	0.148	9.323	9.381	0.984
County Partisanship (2008)	0.121	0.147	0.273	0.121	0.126	0.800
Latitude	40.487	37.980	0.196	40.487	40.632	0.771
Longitude	-89.317	-93.965	0.405	-89.317	-88.790	0.772

Table S3. Average Treatment Effect on the Treated, Auxiliary Placebo Test.

	President-Senate Split-Ticket Voting
Estimated ATT	-0.015
Abadie-Imbens Standard Error	0.014
T-statistic	-1.081
<i>p</i> -value	0.280
N treated	12
N control (unweighted)	12

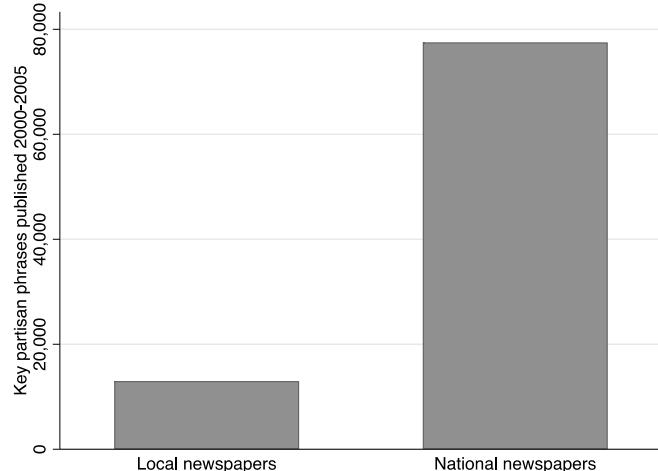
Supplemental Analysis on Partisan Cues in Local and National Media
Gentzkow & Shapiro (2010) Content Analysis Data

The idea that partisan content is more common in national news than in local news is crucial to our analyses. Though this idea is indirectly supported in extant literature (Padgett, 2014; Arceneaux & Johnson, 2015; Müller et al, 2017; van Klingerden, Boomgaarden, & de Vreese, 2017), we do not directly assess this supposed difference in our manuscript. In order to test this key assumption, we turn to a reanalysis of previously published data on this topic. We used the newspaper data file from Gentzkow & Shapiro (2010; ICPSR replication data file number 26242-001-Data) to offer empirical evidence on differences in partisan cues in stories published by local and national newspapers. Though their measure of partisan slant requires calculating the proportion of Republican and Democrat phrases by newspaper, their replication data also contain the raw counts, which essentially provides for us a comparable tally of stories with key partisan phrases (partisan cues) at the newspaper level. The G&S dataset includes more than 400 local daily newspapers, plus four newspapers widely considered to be national level media outlets: *The New York Times*, *The USA Today*, *The Wall Street Journal* and the *Washington Post*. The data provide a newspaper level measure of the total count of published news articles containing key partisan phrases (TOTCOUNT), which allows for a comparison of partisan cues in stories published by local and national newspapers.

These data are not perfect for our purposes, in the sense that they only provide an analysis of a particular type of partisan cue (based on the utterances of Congressional elites), and because they are count-based which means that the relative size of the local and national newspapers complicates our ability to make comparisons. To enable comparisons between national and local newspapers (which are of such different sizes) we supplemented these data with newspaper circulation rates and a measure of the size of each newspaper's available space

for news (their “news hole” or the total number of news articles published in 2005). We base the latter on Hayes & Lawless (2018) technique which finds the total number of news articles published by newspapers in a given year by limiting article searches in the news archive database to year and paper only. Though this measure produces some error due to slight differences in how papers archive articles (see Hayes & Lawless 2018), it is the most reliable way we are aware of for accounting for the size of a newspaper’s space for news articles.

Figure S1. Partisan phrases published from 2000-2005 in local and national newspapers.



Note. Data from Gentzkow and Shapiro (2010), ICPSR data file 26242-001-Data.

Figure S1 shows clearly that national newspapers publish significantly more partisan phrases than local newspapers. Without assessing these results in relation to the total content published by each newspaper, however, this could be a function of relatively higher resources or more space devoted to news by these national newspapers. To account for these possibilities, we perform a negative binomial count regression modelling total number of partisan cues in the Gentzkow & Shapiro data, from 2000 to 2005, as a function of being a national newspaper and the logarithm of circulation size in 2005. We use the “offset” function of the ‘nbreg’ command in

Stata to account for the available space for news in each newspaper (measured by the natural logarithm of the total number of articles on Newsbank for each newspaper in 2005), and control for circulation to account for the resources available to each newspaper.

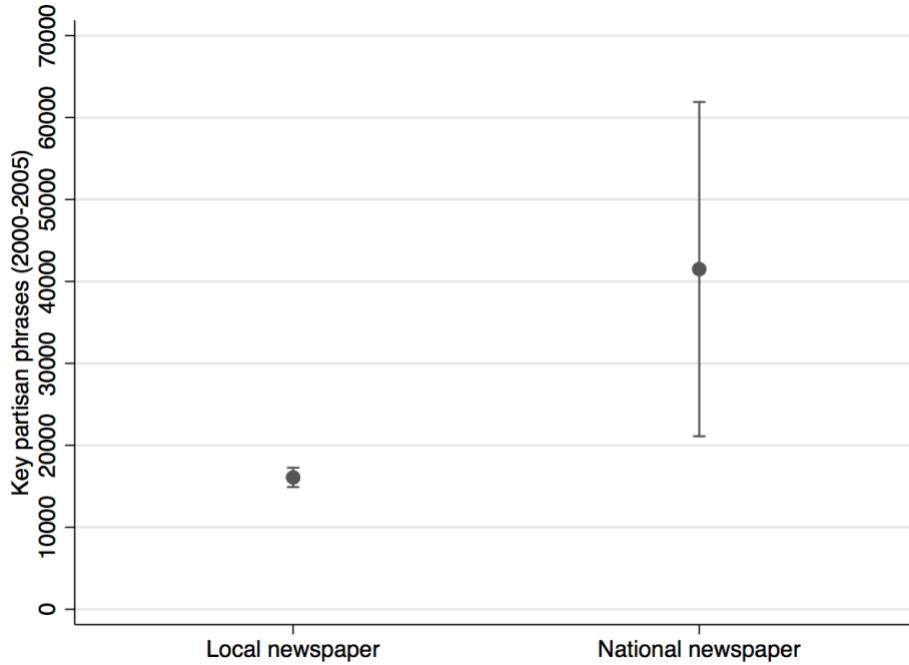
In Table S4, we observe a positive and significant effect for national newspapers, even while controlling for circulation rates. The predicted marginal effects, presented in Figure S2, reveal that the national newspapers dedicate significantly more space to news stories with partisan cues relative to local newspapers.

Table S4. Partisan phrases in national newspapers compared to partisan phrases in local newspapers, 2000-2005. Negative binomial regression, offset using the natural logarithm of the 2005 total published articles to constrain coefficient to 1.

	(1)
	Total key partisan phrases, 2000-2005
National newspaper	0.948*** (0.258)
Log(Circulation)	0.026 (0.024)
Constant	-0.709*** (0.263)
Observations	317

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure S2. Predicted marginal effects of partisan phrases in national newspapers compared to partisan phrases in local newspapers, 2000-2005.



Note. Data from Gentzkow and Shapiro (2010), ICPSR data file 26242-001-Data.

The Gentzkow & Shapiro data allow for a robust, content analysis-based test for differences in partisan cues between local and national media coverage. However, there are a few limitations and caveats worth mentioning. The first limitation is that the Gentzkow & Shapiro data are based on newspaper coverage ending in 2005, which is near the beginning of the period in which Hayes & Lawless (2018) identify a trend in which national news is taking up a growing proportion of local media news hole. These data were also gathered well before the local media ownership changes Martin and McCrain (2018) observe in 2017, which served to increase the partisanship in local television news. It is possible that the changes that occurred after 2005 were eventually significant enough to erode any systematic differences between the amounts of space national and local newspapers dedicate to stories with partisan cues. Overall, however, we believe that these analyses demonstrate a clear difference in the partisan content of local and national news that remained in place for the time period we observe.