A Supporting Information (Online Only)

Contents

A.1 Alternative mechanisms

We consider four alternative mechanisms. First, consumers have been found to select into consuming news outlets that confirm their ideological priors (Levendusky 2013b). Building on this finding, local newspaper exits may affect polarization if affected consumers (i) substitute by consuming news from a highly partisan outlet or (ii) switch to a remaining local news outlet that differs in its ideological slant. The first scenario requires the existence of sufficiently partisan alternatives. While abundant today, such alternatives were rare during our study period (1980–2009). Most commonly, highly partisan environments can be found on the internet (see e.g. Lelkes, Sood and Iyengar 2017). However, Ridder (2005) shows that internet use was non-existent during the majority of our time period (see also section A.2 for more information). Similarly, partisan cable news channels do not exist in Germany, and newspapers tend to exhibit only weakly partisan tendencies (Blotevogel 1984). As a result, we consider it unlikely that local newspaper exits caused selection into partisan outlets, at least for the period that we analyze.

Second, consumers may also switch from the exiting outlet to another, remaining local outlet. Instead of consuming national news, individuals may substitute local news with local news. If local newspapers are sufficiently partisan and if consumers select into local news based on their priors, we might expect that switching to a different local outlet lowers polarization. If readers initially base their choice of news outlet based on ideological closeness, switching to a remaining local outlet would then lower ideological agreement between a reader and the outlet she reads. Crucially, this requires that ideological variation between local newspapers is large enough to cause selection based on partisan preferences. However, the previously mentioned lack of evidence for partisan slanting in German local newspapers suggests that changes in ideological congruence between readers and local outlets due to exits are likely small. Therefore, it appears improbable that partisan differences between local newspapers would affect polarization.

Third, the relationship between newspaper exits and polarization could be related to what Martin and McCrain (2019) term 'demand' rather than supply effects. If newspaper exits are caused by underlying demographic or economic trends, such as downturns or population declines, trends in polarization may simply reflect these underlying secular trends. Similarly, individuals might perceive the exit of local newspapers as a signal of economic decline. To punish incumbent centrist parties, voters might shift their electoral support to parties further from the ideological center, leading to political polarization. We return to this potential mechanism in section A.9, where we demonstrate that our results are robust to the inclusion of time-varying control variables that capture economic and demographic decline. This suggests that demand effects cannot account for our results.

Fourth, the observed effects may stem from changes in political accountability or the quality of governance as a result of newspaper exits. Prior research suggests that exits negatively affect accountability and lead to more inefficient local governance (Gao, Lee and Murphy 2020), which may, in turn, affect voting behavior. To test for this mechanism, we use municipal debts as an indicator of the quality of governance. Using a cross-sectional design, we find no evidence that fewer local outlets are associated with higher municipal debts (we describe the analysis and results in more details in section A.15 in the SI). This analysis suggests that our results are not driven by changes in the governance behavior of politicians.

A.1.1 Zaller's RAS framework

We note that different theoretical predictions can arise from an alternative to motivated reasoning: Zaller's (1992) *RAS* (Receive-Accept-Sample) model. A key difference between motivated reasoning and the RAS model is that motivated reasoning allows consumers to move in the opposite ideological direction of a message they receive from a news outlet, as we describe above. In contrast, the RAS model predicts that respondents either move in

the direction of a message (e.g. become more conservative when exposed to conservative messaging), or entirely reject the message based on source cues of ideological priors. Under certain conditions, these assumptions predict that more ideologically extreme but balanced news sources do not induce ideological polarization. However, the absence of a polarizing effect is not the only possible prediction. As Prior (2013) notes, "in both the RAS model and the motivated reasoning framework, exposure even to balanced or neutral news can lead to attitude polarization" (p. 109).

The RAS model does not predict an increase in polarization if consumers accept both left- and right-leaning messages. According to Prior (2013), exposure to balance but more extreme does not result in polarization (i) if there are insufficient source cues and (ii) if consumers do not reject counter-attitudinal messages based on source cues. In this scenario, news consumers process both left- and right-leaning messages, such that the persuading effects cancel each other out, and individual ideology remains unchanged. However, when consumers are able to dismiss counter-attitudinal messages but embrace attitude-consistent information, switching to national outlets may result in greater attitudinal polarization. In this scenario, consumers only process more ideologically extreme messages that align with their ideological priors, and therefore become more ideologically extreme themselves. In Zaller's framework, whether consumers reject counter-attitudinal messages depends on their political sophistication and strength of partisan prior: citizens with low levels of political knowledge, who are not attentive to current affairs and who do not have strong prior partisan attachments, are more likely to be swayed by counter-attitudinal messages. Accordingly, the RAS models predicts increased political polarization due to the nationalization of news only if consumers are not already politically sophisticated and strongly partisan.

A.2 Local newspapers in Germany

Similar to the American market, the German media market is characterized by high levels of newspaper circulation, the early establishment of mass-circulation newspapers, and a high degree of professionalization among journalists and media companies (Hallin and Mancini 2004). The recent history of the German media landscape is unique in that it was fundamentally restructured after World War II. In West Germany, the Allies administered the transition into a pluralistic and free newspaper market. In the socialist East, on the other hand, the Soviet Union established a closely regulated, state-run media system. We do not include East Germany in our analysis prior to 1990. In addition, we conduct a robustness check to ensure that our results are not driven by the dynamics of the East German democratic transition after 1990 (see Table A.4).

During our study period, local newspapers constituted a highly trusted source of information for a large share of the adult population in Germany. While readership has declined since the late 1970s, local newspapers still reached 55.8% of all adults in Germany in 2011, down from more than 70% in the year 1979 (Bundesverband Deutscher Zeitungsverleger 2011; Vogel 2014). In section A.5 in the SI, we systematically examine the individual-level correlates of local news readership using a 2009 survey of more than 2000 eligible voters. We find that local news readership is particularly high among older, more educated individuals with high levels of political interest. We only find marginal differences in local news readership across states. Using the same data, we find that German voters rarely subscribe to multiple local news outlets at the same time. While 73% of respondents indicated that they read one local newspaper, only about 7% reported reading multiple local outlets.

Local newspapers are viewed as more credible than most other forms of media. According to recent survey data, Germans view local newspapers as more trustworthy than even the most reputable national newspapers (Nic et al. 2018, p. 81). When asked about the reasons for reading the local newspaper, respondents most frequently mention local news reports

about the region (87%), edging out national and international news.

While local newspapers enjoy high levels of trust, their numbers and readership have decreased since the 1980s. This process has primarily been attributed to two developments: increased competition for customers after the introduction of private broadcasting services (paired with lower advertising revenue and higher production and circulation costs), and a lower propensity to consume newspapers among younger cohorts (Stieler 2009). Private television and radio stations only became widespread in the first half of the 1980s, and quickly gained in popularity, especially among the younger generation. This development greatly increased competition for consumers and reduced advertising revenues, which constituted a major source of earnings for local newspapers. At the same time, younger cohorts became less likely to read local newspapers. Notably, this behavior largely persisted as individuals aged – even older individuals would not start to consume local newspapers if they never did so in the first place (Vogel 2014).

Conversely, we find only limited support for the influence of short-term economic shocks (see section A.9) or proactive migration to national outlets prior to local news exits (see figure 5 in the manuscript). An overwhelming majority of daily newspapers are sold via automatically renewing yearly subscription services, which limits the customer's ability for ad-hoc cancellations or outlet changes.

Due to the persistent deterioration of local newspaper market conditions, especially small independent outlets became unprofitable and consequently stopped publication. As we discuss in the manuscript, we observe exiting newspapers to be substantially smaller than remaining competitors. These exits either imply the termination of unprofitable newspapers, or takeovers by other newspapers that sought to reduce competition (Stieler 2009).

German local newspapers prioritize local events and politics in their reporting, providing the "informational backbone of what people know about social life in their city" (Leupold, Klinger and Jarren 2018, p.960). Their style of reporting mirrors the consensual norms of

decision-making at the local level – reporting tends to be factual and does not exhibit pronounced degrees of partisan slant. While local newspapers used to be aligned with political parties before World War II, readers have since come to prefer unaligned and independent local news over partisan reporting (Blotevogel 1984). In a 2009 survey of more than 2,000 individuals, more than 85% of respondents agreed that political reporting in the local newspaper they read was not biased in favor of a particular party (GLES 2019). This statistic also informs the behavior of the surviving local newspapers after exits occur. Since German consumers value the lack of partisanship in local news reporting, we do not expect that local news outlets face incentives to shift their style of reporting when competitors exit.

Although local newspapers do report on national politics, the relative share of editorial space dedicated to national news is much lower than in national newspapers. As an example, local newspapers report less frequently on policies that are traditionally associated with national politics, such as migration, law and order, or environmental issues (see figure A.11, which is based on content-coded news articles by GLES (2014)).

Finally, we emphasize that online news outlets were either completely absent or of limited importance during the time period covered in our study (1980 – 2009). The total number of broadband internet connections in Germany has steadily increased since 2001, but was still at low overall levels prior to 2009 (see figure A.4 in the appendix). In 2010, only 16% of the population indicated that they consumed online news. In the 2009 German Longitudinal Election Study survey, only 5.7% of respondents reported reading a daily newspaper online (GLES 2016). Similarly, only about 7% of the German population were active users of the largest online social network, Facebook, in the year 2010 (Statista 2014). Online news sources were generally not viewed as credible – in a 2011 survey, only 6% of respondents list online news as their most trusted source of news. Finally, we note that 69% of the federal election observations we use fall into the period prior to 1998, when online news consumption was negligible (see section 3 for more details).

The majority of the German population consumes national news on a regular basis, most commonly in the form of national newspapers or television. Between 1980 and 2005, television reached between 77% and 89% of all individuals over the age of 14, while national newspapers reached between 51% and 76%. For more data on news consumption in Germany, see Ridder (2005).

A.3 Additional information on data and estimation

A.3.1 Details on newspaper exit coding

We collected data on the market exit, entry, and coverage areas of all local newspapers in Germany from the *STAMM Leitfaden durch Presse und Werbung* ("STAMM Leitfaden"), an annual publication that is intended for public relations and advertising purposes of companies, organizations, and agencies. We obtained, digitized, and hand-coded relevant chapters for all editions published between 1980 and 2012, with the exception of 1999.

We observe all local newspapers as listed in the Stamm Leitfaden. Each newspaper can have multiple local editions whose content focuses on and appears in non-overlapping geographies. The raw data is collected at the municipality level. We aggregate this information up to the county level and measure the number of unique local outlets available in each county. We argue that this does not introduce substantial measurement error, as coverage regions of German local newspapers generally go beyond a single municipality and span the entire surrounding county (or multiple counties).

In 1999, the general layout of the STAMM Leitfaden and the way that newspapers' coverage areas are recorded changed. This change resulted in a reduction in the number of captured newspapers from 1999 to 2001. For this reason, we treat the years 1980 – 1999 and 2001 – 2012 as separate datasets: We never exploit variance in local newspaper market structure across the two time periods. We therefore exclude the 2002 federal election from

our analysis.

Our categorical treatment variable measures changes in the number of unique local news outlets available in a given county over time. To do this, we first compare the outlets available in county c in year t to the outlets available in the same county c in year $t-1$. To account for measurement error in our original data source, we do not count the following events as changes in the local newspaper market:

- the entry of a newspaper in year t that exited in the previous year $t-1$

- the entry of a newspaper in year t that exits in the next period $t+1$

- the exit of a newspaper in year t that will re-enter the dataset in the next year $t+1$

- the exit of a newspaper in year t that just entered in the previous period $t-1$

We also exclude any changes that relate to 'non-unique newspapers'. For example, when two newspapers are editorially identical because two local editions of the same regional newspapers contain the same content, we assign them the same newspaper id. If both are available in county c at time t but only one of them is available at time $t+1$, we do not count this as a market exit. We also exclude regional editions of the national newspaper *Bild* from our dataset. For East-Germany, we record changes in local newspaper availability starting in 1992. We show the distribution of unique outlets in our data set in Figure A.1.

When we measure changes between election years (e.g. between 1994 and 1998), we aggregate the year-to-year changes that we coded as described above. If at least one unique newspaper exited the local market in at least one year, we code this as 'market exit'. If at least one unique newspaper entered the local market in at least one year, we code this as 'market entry'. If both events occurred between the two periods, we code this as 'exit and entry'. If neither of the events happened, we code this as 'no change' (all indicator variables are set to zero).

Figure A.1: Distribution of the number of local outlets in county
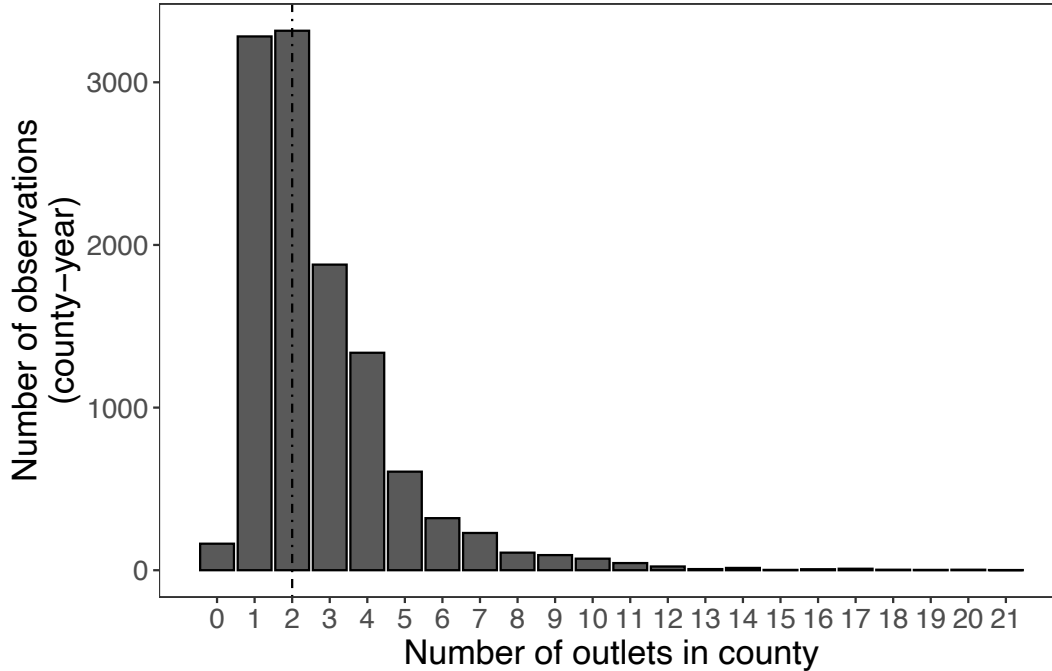
Note: The figure shows the distribution of the number of local outlets across counties in our data. The median number is two local outlets (vertical dotted line).

Finally, we note that the measurement of our treatment relates to the presence of unique newspaper titles, not changes in ownership structure. For example: when a newspaper is acquired by its competitor in a duopolistic market but continues to be published as a distinct outlet, this would not be coded as a newspaper exit in our data. When a newspaper is acquired and rebranded, this would count as both exit and entry at the same time, and hence be captured in our residual treatment category. Finally, suppose a newspaper ceases to be published as a distinct outlet after being acquired. In this scenario, we would observe a newspaper exit in our data.

A.3.2 Details on remaining changes in newspaper markets

We note that the coefficients for the $\mathbb{1}_{Entry,t+k}$ and $\mathbb{1}_{Entry\cap Exit,t+k}$ indicators cannot be interpreted analogously to the coefficient for the $\mathbb{1}_{Exit,t+k}$ indicator. Newspaper entry, in our

setting, in most cases, does not capture the entry of genuinely new local newspapers. Entries often represent larger regional outlets (often focused on a large city such as Stuttgart or Duesseldorf) expanding their reach. Overall, this is driven by the structural challenges faced by local news outlets during our study period. It is not evident that such "entries" correspond to increased local news provision in all or most cases. More likely, they are driven by a desire to cut costs by providing more general regional content to a larger readership base. We also note that newspaper entries are relatively rare during our study period, occurring far less often than exits. In sum, the coefficients on "entry" or "exit and entry" do not represent meaningful quantities of interest in our setting.

We focus on the estimates for newspaper exits because our interest lies in understanding the effects of reduced local news access, which is a direct consequence of newspaper exits. Increasing local news provision, in contrast, is a rare phenomenon during our study period.

A.3.3 Municipal election data

Our data on municipal elections covers 66 out of all 72 municipal elections that were held during this time period (92%). Election data for some municipal elections was not available from official sources (Rademacher 2018). We also use the Manifesto data to calculate polarization in municipal elections. Bräuninger et al. (2020)[p.57] show that federal and state-level party positions strongly correlate.

For municipal elections, our main outcome variable $Y_{m,t}$, electoral polarization in municipality m in election t, is defined as:

$$Y_{m,t} = \sqrt{\sum_j \psi_{j,m,t}(\tau_{j,t} - \overline{\tau}_t)^2}$$

where $\psi_{j,m,t}$ is the vote share of party j in municipality m at time t, $\tau_{j,t}$ is the position of

party j at time-period t across the left-right political spectrum, and $\overline{\tau}_t$ is the mean party position in Germany at time t (weighted by the number of votes). Municipality elections do not all occur at the same time. We therefore translate between the federal and municipal election years as follows: we link each municipal election to the closest federal election. As an example, municipal elections held in either 2004 or 2006 are linked to the 2005 federal election. To estimate the mean party position $\overline{\tau}_t$, we then calculate the weighted mean of the party positions $\tau_{j,t}$, where the weights are municipal-level vote shares $\psi_{j,m,t}$, for all municipal elections that occur in close temporal proximity to a given federal election t.

While we measure the polarization outcome at the municipality level, we always use standard errors clustered at the county level. The treatment (newspaper exit) is likewise measured at the county level. We note that in municipal council elections, not all major parties field candidates in all municipalities, as opposed to federal elections, where all major parties are always on the ballot in all counties. For our polarization measure, this is not an issue, since the aggregate polarization measure would then just be based on the parties that are on the ballot. For the small party vote share variable, we omit the party in question from the sum that forms this variable.

A.3.4 News consumption data

The MLFZ data contains information on 'exposure probabilities' (*Kontaktwahrscheinlichkeiten*) in percentage points for different news outlets. Exposure probabilities as measured in MLFZ always relate to the two-week period prior to the survey date. We observe the share of published issues that a respondent has read over the last two weeks. For example, if a respondent read every other issue over a two-week period, this would translate into an exposure probability of 50%. We dichotomize these variables at the individual level: exposure probabilities greater than zero are coded as one. We consider a respondent as regularly exposed to a news outlet if she has read at least one issue of the paper within the last two weeks prior to the

survey.

As for our main analysis, the definition of t follows electoral cycles. We aggregate four-year periods of consumption data per county. As an example, we would obtain our consumption measure for a county c in the 1998 election by calculating the mean consumption across all respondents in this county between 1995 and 1998. While this method allows for easier comparison with the electoral polarization outcome, it also increases the number of observations we can use to calculate the county-level means of media consumption behavior. We present more information on the number of respondents per county in figure A.7 in the appendix. For the median county, we have about 140 observations, while there are more than 100 respondents for 75% of all counties.

A.3.5 Additional details on empirical strategy

Our preferred specification includes period-fixed effects α_t. This implies that we compare the change in polarization in counties in which a local newspaper exit occurred to counties in which the structure of the local media market remained unchanged between subsequent election periods (e.g. between 1994 and 1998). Crucially, we only leverage comparisons across consecutive election periods for identification. For example, we do not compare outcome changes measured after local news exit in 1994 to control counties measured in 2005. We also include an indicator ($\mathbb{1}_{Entry_{c,t} \cap Exit_{c,t}}$) for rare cases in which counties experienced both exits and entries during the same time period (see section 3.2). This ensures that our control group only consists of counties that did not experience any change in the market for local news between subsequent election periods. We use robust standard errors clustered at the county level for all of our analyses. Finally, we also conduct an additional analysis to account for possible spillovers between counties, which we discuss in more detail in section A.9.

To further probe when exits occur, we present a supplementary analysis in figure A.16 in the appendix. Here, we use population, employment rates, and GDP/capita to predict exits.

We find no clear evidence that newspaper exits are more likely in counties that experience population decline or changes in employment rates. However, positive changes in GDP per capita are associated with a slightly larger probability of newspaper exits. To account for these potential confounders, we estimate additional specifications where we explicitly account for time-varying covariates (see section A.9).

The definition of the time period t depends on the election cycle. Generally, we measure changes in both polarization and media market structure between consecutive elections. For example, we measure both the change in polarization and local news availability in a given county between the federal elections 2009 and 2005. Federal elections are generally held every 4 years. For municipal elections, the election cycle varies across states. A detailed overview of all elections covered in our analysis can be found in figure A.6 in the appendix. Our panel only covers West Germany from 1980 to 1991. Starting in 1991, our panel includes all counties in East Germany (former GDR). 1994 is hence the first election in which East German counties enter the analysis. For this election, we measure the change in the number of local news outlets between 1991 and 1994. In a supplementary analysis, we verify that our results are not driven by structural changes in the East German media landscape after reunification (see section A.9).

For our main results, we rely on first-difference estimator. We choose this specification over the canonical two-way fixed effects model or more recent DiD estimators (Goodman-Bacon 2021) because it allows us to accommodate a number of unique features of our setting, and at the same time closely approximates the design-based logic underlying the DiD design. First – in contrast to the two-way fixed effects estimator – our specification makes explicit comparisons between localities that experienced local newspaper exits in a given time period vs. those that did not. Second, using a first-difference specification allows us to account for the fact that a given county's treatment status can vary over time. Since our treatment is defined as the change in local newspaper presence between two consecutive elections, the same county might experience local newspaper entry between periods t_1 and t_2 *but* a

newspaper exit between periods t_3 and t_4. In using a first-difference estimator, our empirical strategy mirrors Gentzkow, Shapiro and Sinkinson (2011), a prominent prior study in this literature.

We recognize that our treatment, local newspaper exit, is not randomly assigned. As we lay out in section A.2 in the SI, the decline of local newspapers is likely related to demographic trends or local market conditions. However, we emphasize that our empirical design does not require that local news exits are randomly assigned. By comparing *changes* in electoral polarization across counties over time, our panel design explicitly accounts for level differences in factors such as demographics or local purchasing power. While polarization is clearly stronger in some regions of the country than in others, our results do not simply arise from a comparison of level differences in polarization across disparate regions of the country.

A.4 Descriptive statistics

Figure A.2: County-level electoral polarization
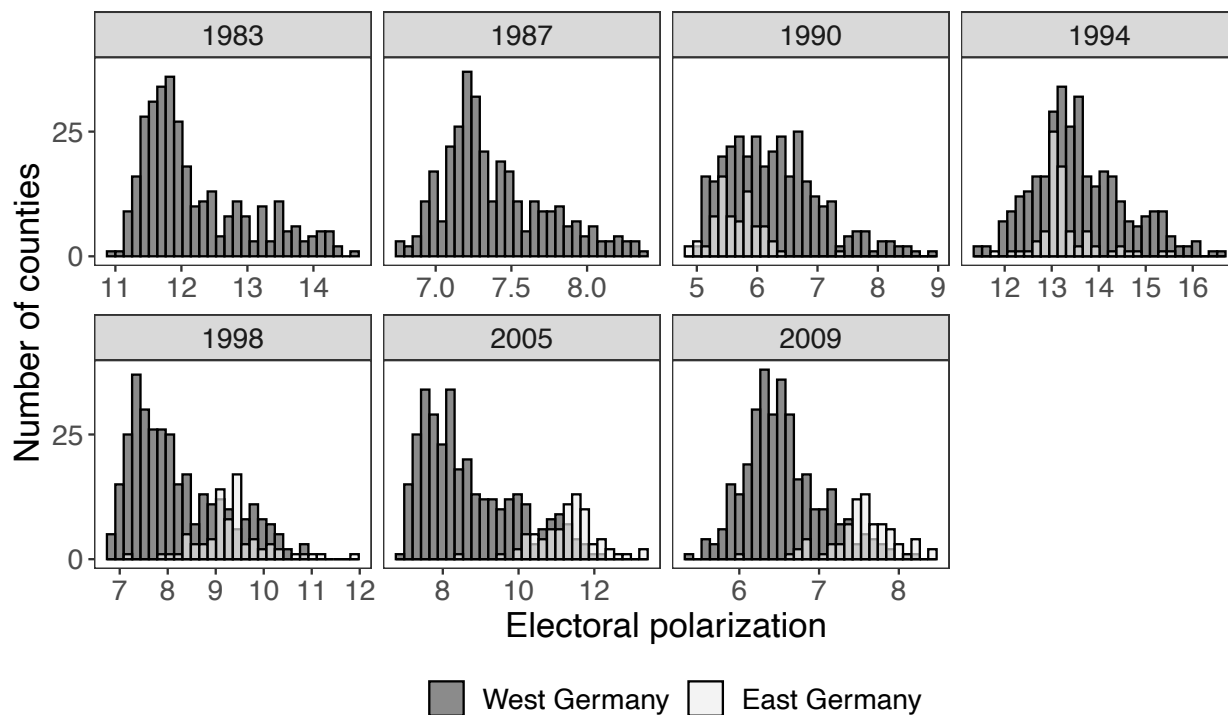
Note: The figure shows the distribution of our electoral polarization measure across counties in each federal election year (see section 3.1), for East and West Germany. East Germany only enters our sample after reunification in 1990. Our sample contains 325 (West German) counties prior to reunification and 401 counties thereafter.

Figure A.3: Newspaper exits over time
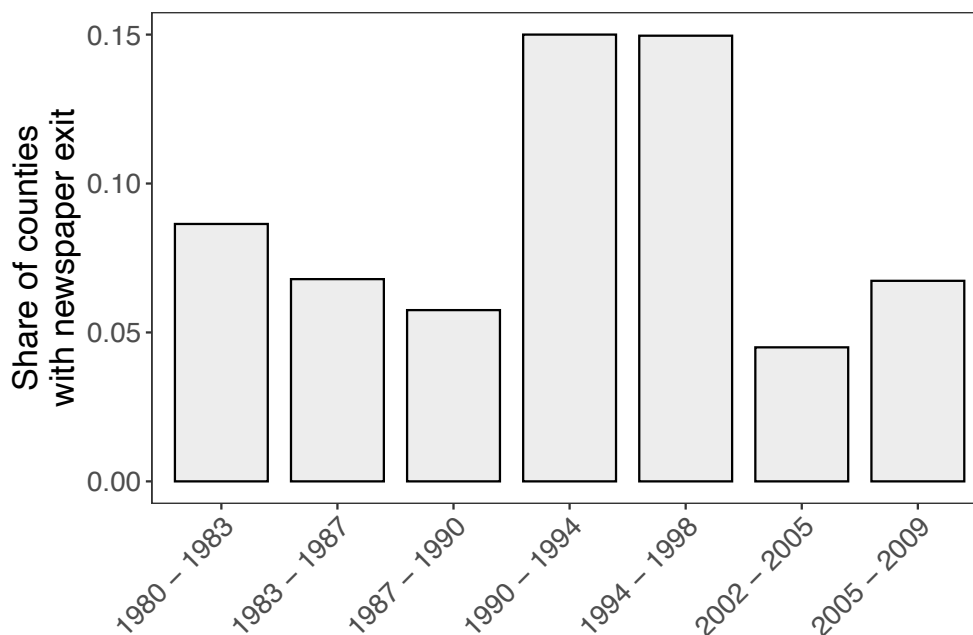
Note: The figure shows the distribution of our treatment over time. We show the share of counties who experienced local newspaper exits prior to each federal election. Our sample of counties only covers West-Germany prior to reunification in 1990. Our sample contains 325 counties prior to reunification and 401 counties thereafter. Because the coding of coverage areas in our main data source changed between 1999 and 2001, we do not measure newspaper exits during this time period. For more information see Section A.3.1 in the S.I.

Figure A.4: Broadband internet in Germany, 2001 − 2019
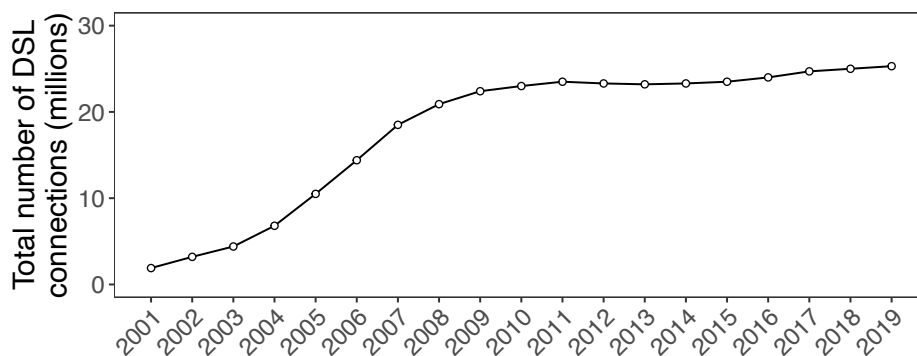
Note: The figure shows the total number of digital subscriber lines (DSL) in Germany between 2001 and 2019. Data obtained from Statista (2020*a*).

Table A.1: Summary statistics, federal election data

| Variable	Mean	Median	S.D.	N	Min	Max
SPD vote share	0.33	0.33	0.10	2651	0.10	0.65
CDU/CSU vote share	0.42	0.42	0.11	2651	0.14	0.75
Greens vote share	0.07	0.06	0.03	2651	0.00	0.26
FDP vote share	0.09	0.09	0.04	2651	0.02	0.34
Left party vote share	0.06	0.03	0.08	2003	0.00	0.38
Other parties vote share	0.04	0.04	0.03	2651	0.00	0.14
Turnout	0.78	0.79	0.07	2651	0.55	0.93
Newspaper exit (0/1)	0.09	0.00	0.29	2570	0.00	1.00
Electoral polarization	15.92	14.70	3.84	2651	9.39	24.74
East Germany (0/1)	0.14	0.00	0.35	2651	0.00	1.00
Population size (thousands)	192.37	144.95	162.20	2632	33.33	1774.22
GDP per capita (thousands)	19.27	17.16	9.33	2569	5.27	80.37
SPD vote share	-0.02	-0.02	0.06	2574	-0.22	0.17
CDU/CSU vote share	-0.02	-0.03	0.04	2574	-0.19	0.09
Greens vote share	0.01	0.01	0.02	2574	-0.10	0.10
FDP vote share	0.00	0.01	0.03	2574	-0.28	0.09
Left party vote share	0.03	0.02	0.03	1602	-0.05	0.19
Other parties voteshare	0.01	0.01	0.02	2574	-0.13	0.10
Electoral polarization	-0.85	-2.64	6.25	2250	-9.27	13.78
Population size (thousands)	2.04	1.74	9.84	2232	-99.68	136.05
GDP per capita (thousands)	2.34	2.04	2.18	2169	-17.26	25.63

Notes: The table shows summary statistics for the federal election data. The unit of analysis is the county. We present summary statistics for either levels or differences between the current period and the previous election (see section 3). East German counties only enter the sample after reunification in 1990.

Table A.2: Summary statistics, individual-level data

Variable	Mean	Median	S.D.	N	Min	Max
Levels						
Partisan identification	0.48	0	0.50	57544	0	1
Party ID intensity	1.51	0	1.78	57942	0	5
Political involvement	1.12	1	0.45	18072	1	4
Changes (first-differences)						
Partisan identification	-0.02	0	0.47	57544	-1	1
Party ID intensity	-0.08	0	1.61	57942	-5	5
Political involvement	-0.05	0	0.48	18072	-3	3

Notes: The table shows summary statistics for the individual-level panel data. The unit of analysis is the respondent. We present summary statistics for either levels or differences between the current period and the previous period. East German respondents only enter the sample after reunification in 1990. The number of observations differs across outcomes, since political involvement is not asked as frequently as the other two outcomes.

Figure A.5: Left-right position of political parties in federal elections in Germany
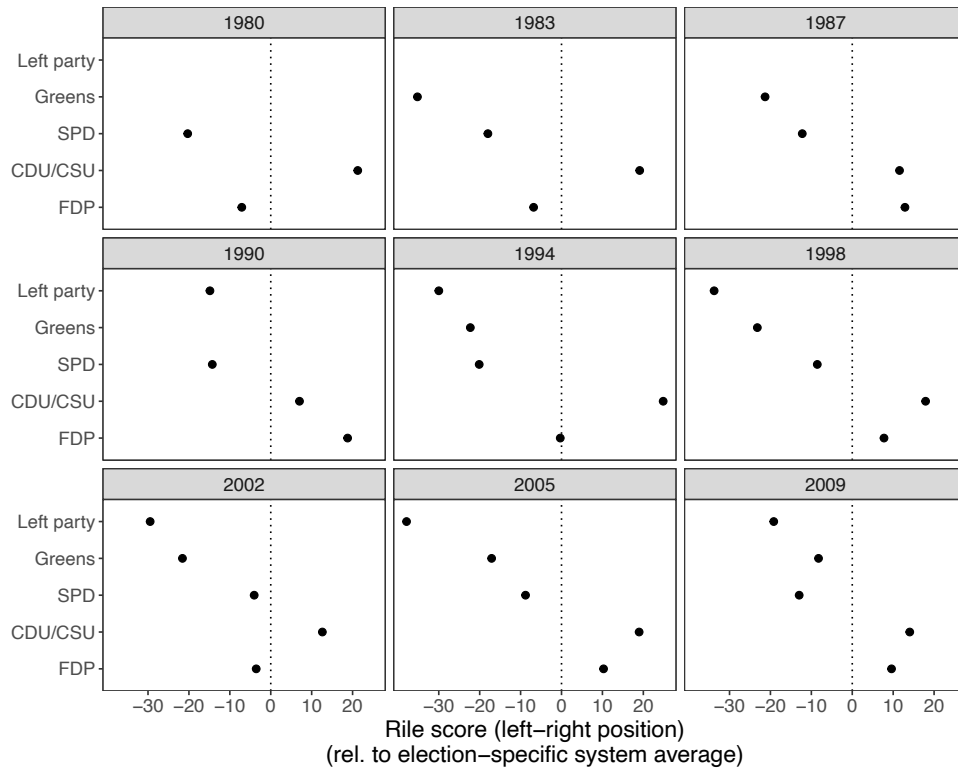
Note: The figure shows the average RILE scores of political parties in Germany between 1980 and 2009, based on the Manifesto data (Volkens et al. 2020). Higher scores correspond to more right-wing political platforms. We standardize scores for each election by plotting them relative to the party system mean, which is at 0 on the x-axis for each election. The party system mean is defined as the voteshare-weighted average of the party-specific left-right scores in a given election.

Figure A.6: Elections by state and year
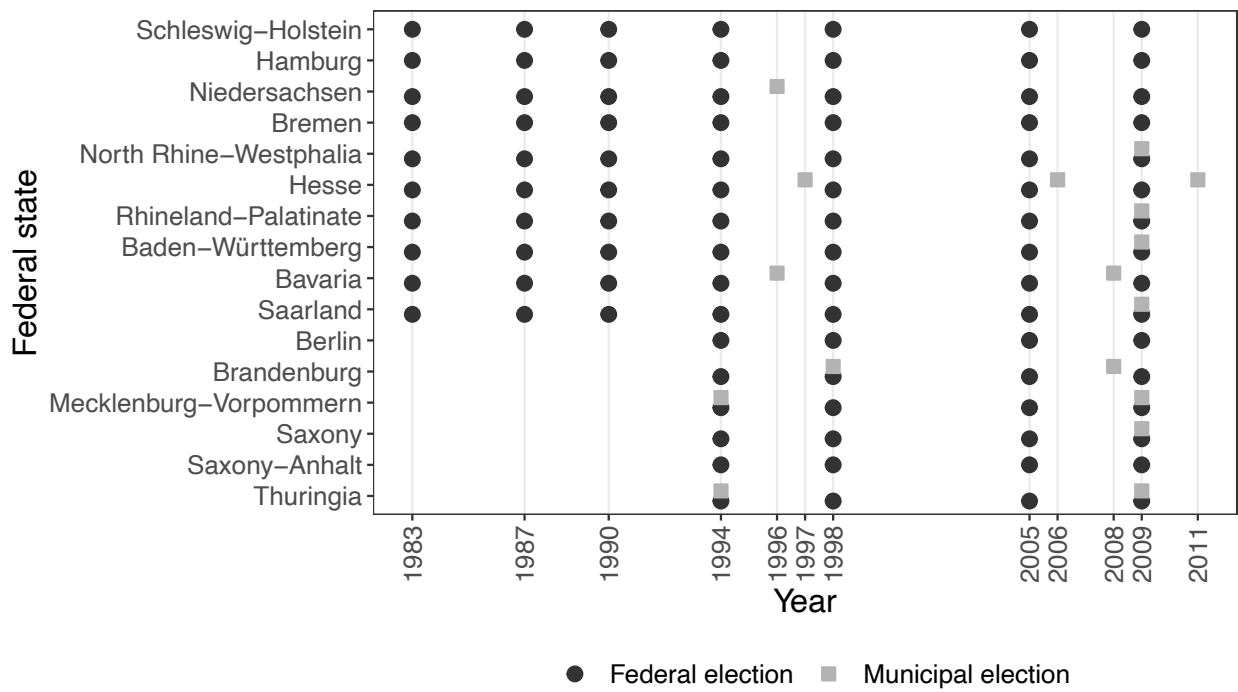
Note: The figure shows all elections used in our analysis, by state, year and type of election. The five states at the bottom of the table are East German states, where free elections were first held after the German unification in 1989.

Figure A.7: Newspaper consumption data: number of individual respondents by county and election
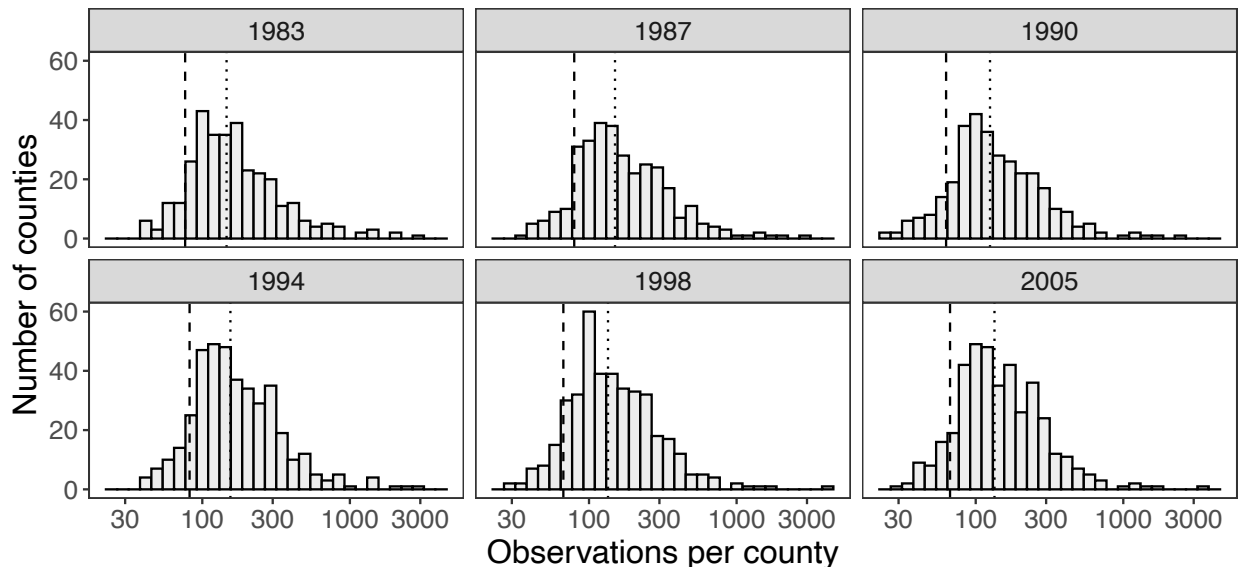
Notes: The figure shows the number of individual survey respondents across counties by election. For the measure used in the paper, we aggregate responses from all individual survey participants to the county level. The dashed vertical line indicates the bottom decile – for this number, 90% of counties in a given year have more respondents. The dotted vertical line indicates the median. Since the number of respondents is skewed, we use a log scale on the x-axis.

A.5 Correlates of local news readership

In this section, we examine the individual-level correlates of local news readership. To do this, we draw on the 2009 GLES pre-election survey. This is a survey of more than 2,000 eligible voters conducted prior to the 2009 federal election. We refer to the study documentation available on GESIS for more details on the survey methodology and sampling scheme (GLES 2019). We use a survey item that asks respondents whether they occasionally or regularly read a daily local or regional newspaper. We recode this item to a binary indicator variable that equals one for respondents who read local news. To descriptively examine the correlates of local news readership, we then estimate a linear probability model where local news readership, as defined above, is the outcome variable. We include the following covariates:

- Gender (male vs. female)

- Age in years (divided by 10 to ease the interpretation of effect estimates)

- Education (respondents with an A-levels degree (*Abitur*) vs. those without A-levels (0/1)

- Having at least one foreign-born parent (0/1)

- Political interest (measured on a scale from 1–5); to ease the interpretation of the results, we reversed the scale such that higher values correspond to higher levels of political interest

- Federal state fixed effects

Figure A.8: Individual-level correlates of local news readership
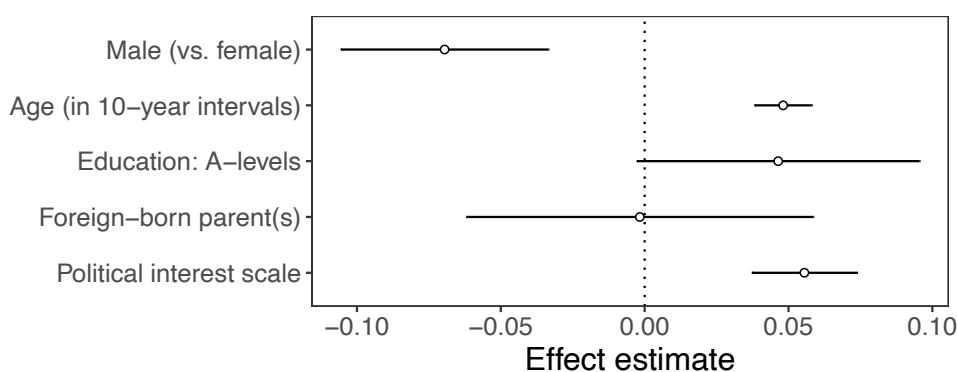
Note: The figure shows the OLS effect estimates from linear probability models, where a binary indicator for local news readership is the outcome variable. We use data from the 2009 GLES survey for this analysis (GLES 2019). Additional details on this analysis are provided in section A.5 in the SI.

We present the results in Figure A.8. Because we estimate a linear probability model, the effect estimates can be interpreted as average changes in the probability of local news readership for a one-unit change in each covariate. Local news readership is highest among older, more educated individuals with higher levels of political interest. However, it should be noted that local news readership is generally at very high levels. In the 2009 GLES sample, more than 73% of respondents indicated that they read a local newspaper.

To provide additional background information on local news readership, we visualize the share of respondents who indicate that they read local news by federal state in Figure A.9.

Figure A.9: Local news readership in GLES sample by state

While there is some variation in local news readership across states, local news readership is generally at very high levels. In all states except Berlin, more than 50% of respondents indicate that they occasionally or regularly read a daily local or regional newspaper. We note that the GLES sample is not necessarily representative of the population within each federal state. We hence caution against over-interpreting the raw numbers presented in Figure A.8.

A.6 Partisanship among national newspaper readers

Drawing on a 2009 survey of more than 2,000 respondents (GLES 2019), we present evidence that national news readership in Germany is not divided along ideological lines. In Figure A.10, we show the distribution of partisan identification among readers of different news outlets. The readership of the four national outlets covers the entire political spectrum from left to right, with a large share of independent readers who do not lean toward a particular political party. This applies to the *Bild* in particular, whose readership comprises a particularly high share of independents.

Figure A.10: Partisanship by national news readership

Note: The figure shows the distribution of partisan identification conditional on national news readership. Individuals in the survey can indicate to read multiple news outlets and may therefore appear in multiple conditional distributions. We use data from the 2009 GLES survey ($N \approx 2,200$) for this analysis (GLES 2019).

A.7 Local and national newspaper consumption and party identification

Based on the same German election survey from 2009 (GLES 2019), we also show that local newspaper readership is associated with a higher propensity to vote for and identify with the large centrist party. The outcomes are dummies that capture if respondents voted for or identified with either CDU/CSU or SPD. The independent variables are dummies which denote if a respondent reported to consume either local newspapers or the major national tabloid *Bild*.

Table A.3 that local newspaper readership is associated with a significantly higher propensity to vote for and identify with the centrist mainstream parties. We observe clear null effect for *Bild* readership. Results from this representative sample suggest that regularly consuming non-political local news coverage is associated with more support for the center parties.

Table A.3: Local newspaper consumption and center party support

	Dependent variable:	
	Vote for centrist parties	Identifies with centrist party
	(1)	(2)
Reads Local News	0.144***	0.146***
	(0.023)	(0.024)
Reads Bild Tabloid	0.035	0.006
	(0.023)	(0.023)
Observations	2,173	2,173
Fixed Effects	State	State
R^2	0.039	0.041

Notes: The table shows models from OLS-regression models with state fixed effects and standard errors clustered by respondents. *p<0.1; **p<0.05; ***p<0.01
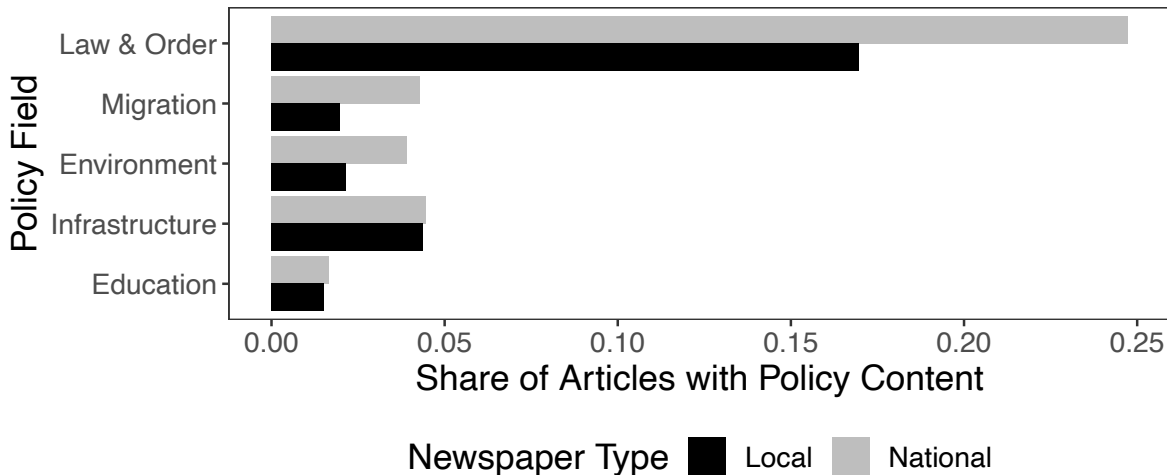
A.8 Differences between local and national newspaper content

Evidence from the US highlights that local and national newspapers strongly differ in their style on political reporting (Darr, Hitt and Dunaway 2021). At the same time, (Hayes and Lawless 2017, 2021) find that American local newspapers contain increasingly fewer original editorial articles covering local politics, leading to a trend of nationalization even among local outlets. To assess differences in local and national newspaper reporting for our case, we compared the coverage of different policy fields based on data of the 'Long-Term Media Agenda Analysis' by the German Longitudinal Election Survey (GLES 2014). It provides newspaper content analyses for the time period from 2009 to 2013. Around local and federal elections, GLES has collected newspaper articles from the main page and politics section of five national newspapers and magazines (Bild, FAZ, SZ, Spiegel, Focus), as well as fourteen regional newspapers. Matches between newspaper content and dictionary items were counted on the article level. Although the GLES newspaper tracking includes only a fraction of the entire German local newspaper market (that we use in the main analysis), the data enables us to assess if local and national newspapers differ in terms of their content. Note that the analysis is based on recent a content analysis starting in 2009, when centralization and cost-cutting pressures among local news outlets should have already rendered their content more national (see Hayes and Lawless 2017, 2021).

In figure A.11, we show the differences in media content. We plot the share of articles that include at least one keyword associated with five policy areas. We chose law and order, migration, and environmental policy as issues closely associated with the national policy debate. On the other hand, infrastructure and education are mostly organized on the sub-national level within the German federal system - and constitute issues that are less contested on the national stage. We indeed observe that national newspapers report significantly more often on law and order, migration, and environmental issues compared to their local counterparts. Priming constituents with these policy fields, in which parties take

on distinct positions on the national level, may induce consumer polarization. Conversely, less contested issues, such as infrastructure or education, are equally prevalent in local and national news reporting. Here, many decisions are made on the state- or local level, supported by coalitions across party lines.

Figure A.11: Local and national newspaper content

Note: The plot shows differences in reporting of 23'027 content-coded local and national newspaper articles around federal and national elections between 2009 and 2013. Articles stem from the title page and politics section of each medium. The article content has been coded by GLES (2017) following a dictionary approach. The plot shows the share of articles that included at least one keyword associated with five policy fields: Law and Order, Migration, Environment, Infrastructure, and Education. We find that national outlets are significantly more likely to report on the first three issue areas (two sample t-tests; p<0.001), whereas no significant differences exist among the latter two.

A.9   Robustness and alternative mechanisms

We perform a number of additional checks to ensure the robustness of our main results. First, we address the concern that the observed positive effect on polarization may stem from a common cause, such as economic downturns or demographic decline. If a county loses population or experiences an economic downturn, this may lead to both newspaper exits and electoral losses for the centrist SPD and CDU/CSU parties. We note that this is an unlikely scenario, as treated and untreated counties are on similar electoral trajectories prior to exit (see figure 4). To address this concern, we adjust for time-varying covariates that capture demographic or economic trends that could bias our estimates. Specifically, we

26

estimate models where we control for changes in population and GDP/capita. We present the results in table A.4. We find that our results are generally robust to estimating alternative specifications. This is especially true for the period prior to 2000, where all but one specification is significant at $\alpha = 0.01$ (see figure 3).

We note that, in some specifications, adding covariates leads to a decrease in the size of the estimated effects of newspaper exits. We note that this decrease in effect size is *not* directly due to the covariates. Rather, there is some missingness in the covariate values, which reduces the sample size by either 4% or 15%, depending on the outcome. The reduction in effect size stems from the resulting change in the sample, as we demonstrate in table A.6: once we drop observations with missing covariate value, including or excluding the covariates itself only leads to very small differences in the magnitude of the estimated effect.

In addition to the model-based approach to mitigating these concerns, we also note that if the explanation behind our results was economic or demographic decline, we would not expect to only find sizable effects prior to 2000. However, the fact that the effects of exits decrease over time is consistent with a mechanism that stems from changes in media consumption after exits, since local newspaper readership was lower after 2000. This suggests that changes in media consumption behavior rather than economic or demographic trends explain our findings.

Second, we verify that our results are not driven by structural changes in the East German media landscape after reunification. In table A.4, we show that our results remain unchanged when we omit East German counties during the 1994 election from the sample (since we use first differences, the 1990 election in East Germany is never part of our analyses). In table A.5, we further show that when allowing for varying time trends between East and West German counties, we still observe a significant, positive impact of newspaper exits on electoral polarization and small party support before the year 2000 (See Table A.5 in the SI). However, these estimates are notably smaller than those in our main specification (0.3%

for small-party votes, 0.1 for polarization).

Third, we evaluate whether our results are sensitive to varying definitions of the party system mean $\bar{\tau}$. In our main specifications, we use weighted RILE scores in election t, with party vote shares at the federal level as weights. In figure A.14 in the appendix, we present results using two alternative definitions of $\bar{\tau}$, using state- and county-level vote shares as weights for the party system mean. Reassuringly, we find that the results remain largely unchanged when using alternative definitions of the party system mean.

Fourth, we test for spillover effects after newspaper exits between counties. In doing so, we examine whether polarization in a given county is affected by newspaper exits in neighboring counties. To implement this, we run a similar difference-in-differences analysis as for our main results, but now regress changes in polarization on newspaper exits in neighboring counties. For this analysis, we subset to those counties that never experience newspaper exits themselves during our study period. We present the results in figure A.15, and provide more details on the estimation in section A.13. Reassuringly, we do not find evidence for spillovers across adjacent counties. Polarization is not affected by newspaper exits in adjacent media markets.

Sixth, to verify that variance in the scale of the outcome and resulting variance in between-election changes in electoral polarization are not driving our results, we employ two alternative outcome definitions. The first uses z-score standardization to account for changes in election-specific means and standard deviations. The second applies min-max normalization to set the outcome on a 0–1 scale. As we document in section A.10.1 in the SI, our empirical findings remain robust under these alternative specifications.

Finally, we implement an alternative difference-in-difference estimator to account for potential bias due to treatment effect heterogeneity in staggered designs (de Chaisemartin and D'Haultfœuille 2020). We present the results in table A.5 for the sample in which we see the strongest results, i.e. the sample for years prior to 2000. We find that, for both our main outcomes, our conclusions remain unchanged.

A.10 Main results and alternative specifications

Table A.4: Summary of main results for different samples, outcomes and model specifications.

Outcome	Election	Model	Estimate	SE	T-stat	P	N
1. Full sample							
Small party vote share	Federal	Year FE	0.006	0.002	3.510	0.000	2,568
Small party vote share	Federal	Covars + Year FE	0.003	0.002	1.950	0.051	2,163
Polarization	Federal	Year FE	0.489	0.086	5.663	0.000	2,244
Polarization	Federal	Covars + Year FE	0.339	0.086	3.935	0.000	2,163
Small party vote share	Municipal	Year FE	0.005	0.004	1.173	0.241	11,861
Small party vote share	Municipal	Covars + Year FE	0.005	0.003	1.497	0.134	11,431
Polarization	Municipal	Year FE	0.552	0.201	2.748	0.006	11,688
Polarization	Municipal	Covars + Year FE	0.545	0.206	2.643	0.008	11,341
2. Before 2000							
Small party vote share	Federal	Year FE	0.008	0.002	4.493	0.000	1,772
Small party vote share	Federal	Covars + Year FE	0.005	0.002	3.199	0.001	1,369
Polarization	Federal	Year FE	0.603	0.097	6.228	0.000	1,448
Polarization	Federal	Covars + Year FE	0.405	0.099	4.099	0.000	1,369
3. After 2000							
Small party vote share	Federal	Year FE	-0.003	0.003	-0.821	0.412	796
Small party vote share	Federal	Covars + Year FE	-0.002	0.003	-0.545	0.586	794
Polarization	Federal	Year FE	0.112	0.147	0.760	0.447	796
Polarization	Federal	Covars + Year FE	0.130	0.145	0.896	0.371	794
4. Full sample (omitting East Germany in 1994)							
Small party vote share	Federal	Year FE	0.003	0.001	2.275	0.023	2,492
Small party vote share	Federal	Covars + Year FE	0.003	0.002	1.950	0.051	2,163
Polarization	Federal	Year FE	0.343	0.088	3.882	0.000	2,168
Polarization	Federal	Covars + Year FE	0.339	0.086	3.935	0.000	2,163

Notes: The table lists estimates and related quantities for the main models presented in the paper. Each row represents an estimate of the coefficient τ (see also the discussion in section 3). We present estimates for four different samples, two elections and two different model configurations. The last column lists the number of observations.

Figure A.12: Effect of newspaper exit on turnout
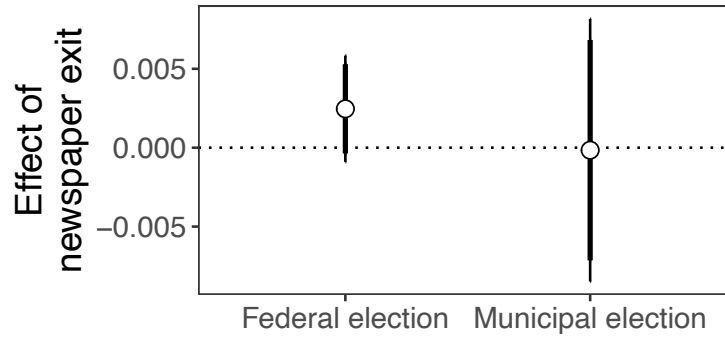
Note: The plot shows the estimated effect (τ) of a newspaper exit on turnout. The results are based on the benchmark specification, which uses first-differenced outcomes and year fixed effects.

Table A.5: Additional specifications

	Polarization			Small party vote share (0-1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Newspaper exit	0.603***	0.102*	0.255***	0.008***	0.003**	0.005**
	(0.097)	(0.056)	(0.021)	(0.002)	(0.002)	(0.002)
Model	Year FEs	Year×East FEs	dC&D	Year FEs	Year×East FEs	dC-D
R^2	0.983	0.991		0.585	0.640	
Observations	1,448	1,448	1,373	1,772	1,772	1,373

Note: The table shows the estimated effect (τ) of a newspaper exit on two outcomes: political polarization, as well as the vote share of small parties. Models 1 and 4 use year fixed effects, models 2 and 5 use year×East fixed effects, and models 3 and 6 use the de Chaisemartin and D'Haultfœuille (2020) estimator (labelled "dC&D"). Polarization is measured as the weighted ideological dispersion of party positions on the county level (see Dalton 2008). Small party vote share is obtained by summarizing the vote share of all non-mainstream parties. We present results from pre-2000 sample, for federal elections. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table A.6: Effects conditional on dropping observations with missing covariate values

	Polarization			Small party vote share (0–1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Newspaper exit	0.489***	0.343***	0.339***	0.006***	0.003**	0.003*
	(0.086)	(0.088)	(0.086)	(0.002)	(0.002)	(0.002)
Sample	Full	Non-missing	Non-missing	Full	Non-missing	Non-missing
Covariates	No	No	Yes	No	No	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.967	0.963	0.964	0.801	0.824	0.827
Observations	2,244	2,163	2,163	2,568	2,163	2,163

Note: The table shows the estimated effect (τ) of a newspaper exit on two outcomes: political polarization, as well as the vote share of small parties. Models 1 and 4 contain the main results for federal elections shown in figure 2. Models 2 and 5 use the set of observations for which covariate values are not missing, but do not include covariates. Model 3 and 6 include the covariates, and therefore are the same models as reported for federal elections in table A.4. Polarization is measured as the weighted ideological dispersion of party positions on the county level (see Dalton 2008). Small party vote share is obtained by summarizing the vote share of all non-mainstream parties. We present results for federal elections. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table A.7: Results for the FDP, Green Party and Left Party

	FDP	Green Party	Left Party
	(1)	(2)	(3)
Newspaper exit	-0.004**	0.002***	0.012***
	(0.002)	(0.0008)	(0.003)
Year FEs	Yes	Yes	Yes
R^2	0.713	0.811	0.344
Observations	2,568	2,568	1,596

Note: The table shows the estimated effect (τ) of a newspaper exit on three outcomes, for federal elections. The results are based on the main specification. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

A.10.1 Alternative outcome definitions

Table A.8: Alternative outcome definitions

	Polarization (standardized)		Polarization (0–1)	
	(1)	(2)	(3)	(4)
Newspaper exit	0.138*	0.242***	0.087***	0.137***
	(0.070)	(0.087)	(0.016)	(0.018)
Sample	Full	Before 2000	Full	Before 2000
Year FEs	Yes	Yes	Yes	Yes
R^2	0.017	0.023	0.072	0.152
Observations	2,244	1,448	2,570	1,774

Note: The table shows the estimated effect (τ) of a newspaper exit on two alternative versions of defining the outcome outcomes. Polarization is measured as the weighted ideological dispersion of party positions on the county level (see Dalton 2008). We present results from the overall and the pre-2000 sample, for federal elections. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

In table A.8 below, we present results from specifications in which we use alternative outcome definitions that address the shifting scale of the polarization outcome (see figure A.2). We present two separate definitions.

First, we redefine $\Delta Z_{c,t} = Z_{c,t} - Z_{c,t-1}$, where $Z_{c,t} = \frac{Y_{c,t} - \hat{\mu}_t}{\hat{\sigma}_t}$, where $\hat{\mu}_t$ is the sample mean of $Y_{c,t}$ for period t, and $\hat{\sigma}_t$ is the sample standard deviation for period t. This is the standard z-score standardization, which means that the average polarization for election t is 0 and has a standard deviation of 1. We note that this occurs before we difference the outcome, i.e. we standardize the levels and then calculate the difference.

Second, we define another version of the outcome, which results in a 0–1 scale, where 1 equals the maximum polarization in a given year, and 0 the minimum. To achieve this, we employ a min-max normalization technique and redefine the alternative outcome as $\Delta Z_{c,t} = Z_{c,t} - Z_{c,t-1}$, where

$$Z_{c,t} = \frac{Y_{c,t} - \min(Y_{c,t})}{\max(Y_{c,t}) - \min(Y_{c,t})}.$$

In this version, the outcome is bounded between 0 and 1, with 1 indicating maximum polar-

ization and 0 indicating minimum polarization for each period t. Like the z-score method, this normalization is done prior to differencing the outcome to obtain $\Delta Z_{c,t}$. Both definitions aim to alleviate the issue of scale variance, and offer complementary perspectives on the time dynamics of polarization. We then re-estimate our main specifications using these two alternative outcome definitions, with the results shown in table A.8 below. We find that (i) the estimated sign for the effect of newspaper exits is positive and (ii) estimated effects are statistically significant. These results suggest that our findings are not driven by idiosyncrasies in the polarization scale.

A.11 Results by number of remaining outlets after exit

We now differentiate exits according to how many outlets remain after an exit occurs. In doing so, we estimate an augmented version of the main specification:

$$\Delta Y_{c,t} = \alpha_t + \sum_j \tau_j \mathbb{1}_{Exit_{c,t}^j} + \gamma \mathbb{1}_{Entry_{c,t}} + \delta \mathbb{1}_{Entry_{c,t} \cap Exit_{c,t}} + \epsilon_{c,t}$$

Except for the second term on the right-hand side, the specification is the same as the main specification described in section 3. Instead of one term for newspaper exits, we now distinguish between three types of newspaper exits, indexed by j: exits where one outlet remains, exits where two outlets remain, and exits where three or more outlets remain. We do not observe exits after which no outlets remain. In about 85% of observations for which exits occur, one newspaper exits. Therefore, these categories can also be considered to measure the relative reduction in the number of available outlets. Exits with one remaining outlet correspond to a $\sim$50% reduction, exits with two remaining outlets correspond to a $\sim$33% and exits with three or more remaining outlets correspond to at most a 25% reduction.

From the specification above, we obtain three coefficients τ_j for each of these three scenarios. In figure A.13, we present coefficient estimates for the three τ_j for our two main

outcomes in federal elections. We find that the estimated effects are largest for exits where one or two newspapers remain. These results are consistent with the argument that more severe changes in the market for local news have greater consequences for political behavior.

Figure A.13: Effect of newspaper exit on polarization – by number of remaining outlets
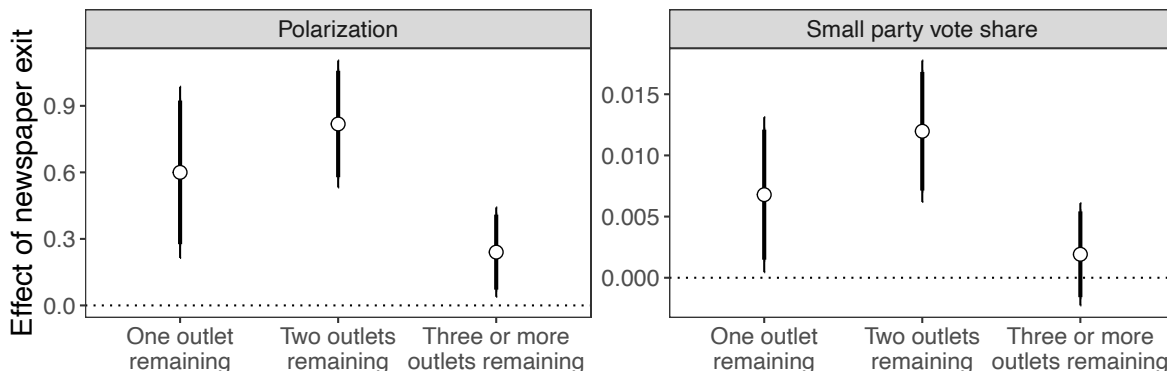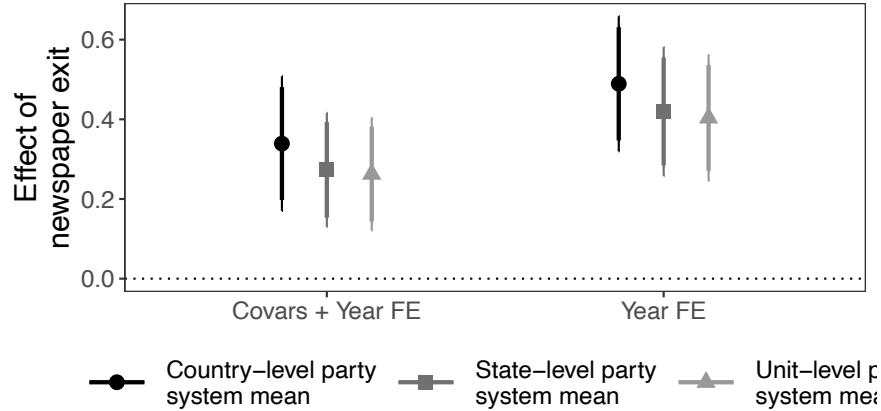

Note: The plot shows the estimated effects (τ_j) of three types of newspaper exits on two outcomes: political polarization, as well as the vote share of small parties. The results are based on the benchmark specification, which uses first-differenced outcomes.

A.12 Results for different reference categories

As described in section 3, our main outcome measures electoral polarization as the weighted distance from a party system mean $\bar{\tau}_t$ at time t. In our main specifications shown in the paper, this is the country-level party system mean in election t, i.e. it is defined as $\sum_j \psi_{j,t}\tau_{j,t}$ where $\psi_{j,t}$ and $\tau_{j,t}$ are the vote share and left-right party position of party j in federal election t, respectively. Instead of using the country-wide party system mean, an alternative approach would be to use the state-level party system mean, or a more local measure like county-level party system means. In figure A.14, we show that the choice of reference unit (i.e. country, state or county) makes little difference for our main results. This result holds when we add year fixed effects as well as covariates to the base first-difference specification.

Figure A.14: Effect on polarization using different reference categories

A.13 Spillover effects

In this section we perform an additional robustness check to test for spillover effects. In particular, we test whether electoral behavior when newspapers exit in neighboring counties. To do this, we create a new treatment indicator variable that takes on the value one if at least one newspaper exit occurred in a contiguous, neighboring county (by this, we mean that counties have to border each other directly). The treatment variable does not equal one if both exits and entries occur in neighboring counties. We then run a similar difference-in-differences analysis as for our main results (see section 3.4), but now regress changes in polarization on newspaper exits in neighboring counties.

$$\Delta Y_{c,t} = \alpha_t + \tau \mathbb{1}_{\text{Exit in neighboring county}_{c,t}} + \epsilon_{c,t}$$

For this analysis, we subset to those counties that never experience newspaper exits themselves during our study period. We present the results in figure A.15. We do not find evidence for spillovers across adjacent counties. Newspaper exits in neighboring counties do

not predict changes in polarization.

Figure A.15: Effect of newspaper exit in neighboring counties
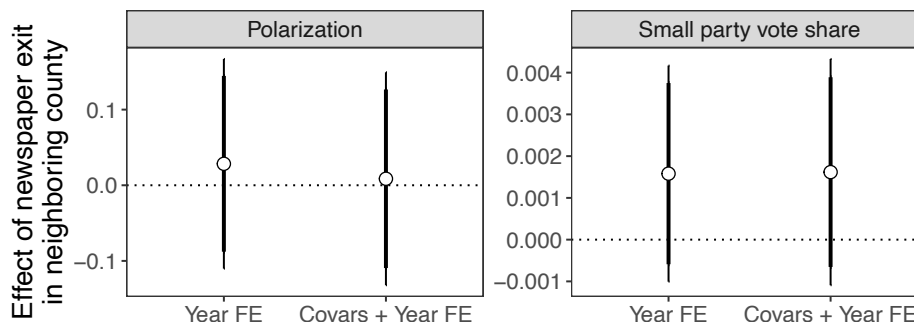
Note: The plot shows the estimated effect (τ) of a newspaper exit in neighboring county on political polarization and small party vote share in federal elections. Polarization is measured as the weighted ideological dispersion of party positions on the county level (see Dalton 2008). We present results for two different specifications. The sample only includes counties that never experience newspaper exits themselves. Standard errors are clustered at the county level.

A.14 Predicting newspaper exit

In this section, we examine whether changes in demographic and economic conditions are correlated with newspaper exit. For this analysis, we obtained data on employment (*Erwerbstätige*) and GDP (*Bruttowertschöpfung*) from Statistische Ämter des Bundes und der Länder (2019). For the period prior to German reunification, only biannual GDP data is available. We used a linear interpolation to impute missing GDP data. For example, we used a linear approximation between 1992 and 1994 to impute the GDP value of a given county in 1993. We obtained county-level data on population size covering the period 1980 to 2013 from the *Statistisches Bundesamt*. County-level data on employment rates prior to 1992 is not available. We scaled both employment and GDP by county population size. We estimate two specifications of the following form:

$$\mathbb{1}_{Exit} = \alpha_t + \beta \Delta X_{c,t} + \epsilon_{c,t}$$

$$\mathbb{1}_{Exit} = \alpha_t + \beta X_{c,t-1} + \epsilon_{c,t}$$

As in the main specification, $\mathbb{1}_{Exit}$ indicates whether a newspaper exits in county c between $t-1$ and t, where we use federal elections as time periods. Since we use a binary outcome, the control group (i.e. $\mathbb{1}_{Exit} = 0$) consists of counties where the number of newspapers stays constant. We use either trends or levels in the covariates to predict exits. In the first equation, we use trends such that $\Delta X_{c,t} = X_{c,t} - X_{c,t-1}$ is the first-differenced covariates. In the second specification, we instead just use $X_{c,t-1}$, i.e. covariate levels in the previous period. We estimate the model with no fixed effects, year fixed effects α_t or year and East Germany fixed effects. We estimate a total of six models, where each covariate enters separately as either the change between two periods or the level in the $t-1$. The coefficient vector β tells us whether demographic and economic conditions predict newspaper exits. We present the results in figure A.16.

Figure A.16: Predicting newspaper exit
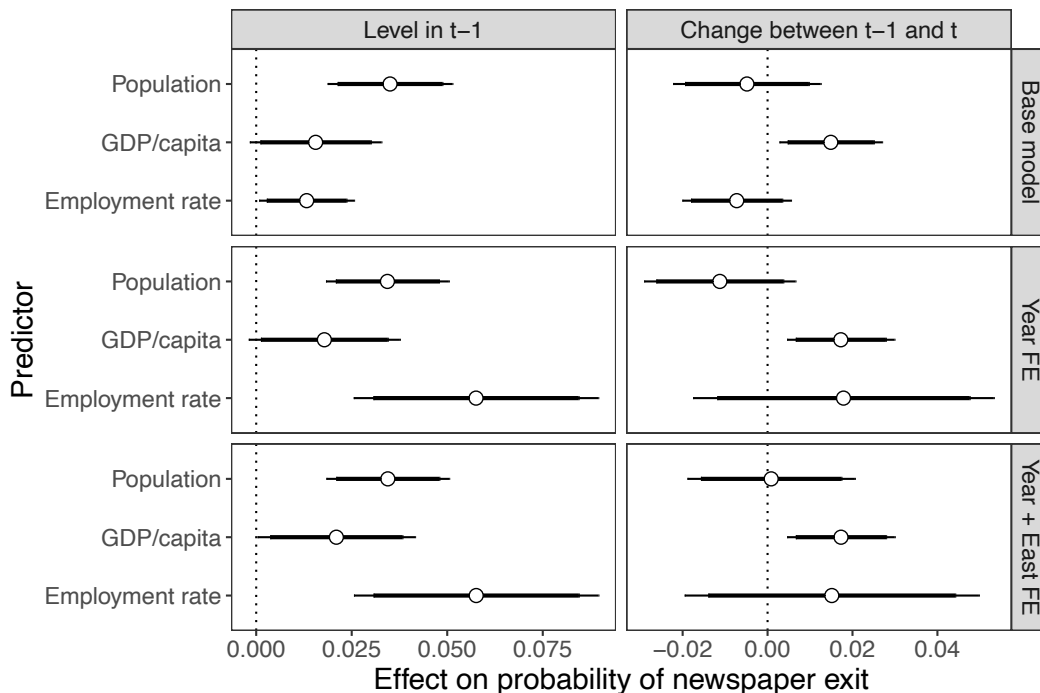
Note: The plot shows the association between the three control variables listed on the y-axis and the probability of newspaper exit. Controls are either levels in the previous period (left-hand side panels) or changes between the previous and the current period (right-hand side panels). We estimate the base model without fixed effects (top row) and with year fixed effects (bottom row). All controls are standardized.

A.15   Newspapers and accountability

Our argument focuses on consumer behavior as the main driver of political polarization after local newspaper exits. An alternative explanation relates to changes in political accountability that occur due to newspaper exits. Potential repercussions for accountability and governance have been documented in prior work Gao, Lee and Murphy (2020); Snyder and Strömberg (2010). Newspaper exits may lead to changes in local policy, e.g. because constituents cannot sufficiently monitor elected officials. If the decreased monitoring leads to declines in the observed quality of local governance, this may induce constituents to switch away from local incumbent parties, which are primarily the CDU/CSU and the SPD. This mechanism is consistent with our main findings, but does not require more nationalized news consumption.

We provide a test for this mechanism by assessing whether decreased newspaper presence is associated with higher local government debts. While there is no perfect indicator for the quality of governance at the local level, prior work suggests that government deficits and increased borrowing are a consequence of decreased accountability (Gao, Lee and Murphy 2020). Accordingly, we estimate a series of cross-sectional models on the county-level, where we regress municipal debts on the number of newspapers that cover the county. Since debt data is only available from 2010, we do not utilize the panel structure of our newspaper presence data, which ends in 2012. Rather, we rely on debt data from 2010 and newspaper presence in 2009, measured as the number of outlets. We additionally include controls for GDP/capita, unemployment, population, right-leaning party share in the 2009 federal elections as well as state fixed effects.

As shown in table A.9, there is no evidence that newspaper presence is associated with changes in municipal government debts. Across six specifications, we find small and insignificant points estimates. In model three, which includes covariates and state fixed effects, we observe that one additional newspaper is associated with a reduction of a mere 7.4 Eu-

Table A.9: Association between county-level newspaper presence and per-capita municipal debts

| | DV: Municipal debts in 2010 (Euro/capita) | | | | | |
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Number of outlets	−15.474	41.896	−7.397			
	(34.380)	(40.428)	(34.441)			
Number of outlets (log)				−83.043	135.715	38.272
				(138.302)	(151.171)	(127.035)
Covariates	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes
DV mean	1567.41	1567.41	1567.41	1567.41	1567.41	1567.41
DV SD	1214.35	1214.35	1214.35	1214.35	1214.35	1214.35
Effect in SD	-0.01	0.03	-0.01	-0.07	0.11	0.03
N	401	401	401	401	401	401
R^2	0.001	0.091	0.482	0.001	0.090	0.482

Notes: The tables contains results from regressing municipal debt per capita (measured at the county level) on the number of outlets that cover a given county. The independent variable is either the number of newspapers, or the logarithm of the number of newspaper. The latter definition accounts for potential non-linearities in the estimated relationship. Controls are GDP/capita, unemployment, population and right-leaning party vote shares in the 2009 federal elections. All right-hand side variables are measured in 2009, while the outcome is measured in 2010. ***p < .01; **p < .05; *p < .1

ros in government debt per capita. This change corresponds to 0.01 standard deviations. Taken together, the results presented in table A.9 provide little evidence towards a mechanism whereby changes in political accountability underlie our results concerning political polarization.

A.16 Split-ticket voting

We now assess whether newspaper exits affect split-ticket voting. We utilize the German mixed electoral system to construct an aggregate-level measure of split-ticket voting, which is defined as the average absolute difference between the county-level vote share for a direct candidate and the vote share for his or her party. Formally, we have the vote share of party j in county c and time t, which is denoted by $\psi_{j,c,t}^{\text{party}}$ (as in section 3.1). We also observe the vote share for the candidate of this party in the same county and election, $\psi_{j,c,t}^{\text{candidate}}$. For each party, we can then define split-ticket voting as follows:

$$S_{j,c,t} = |\psi_{j,c,t}^{\text{candidate}} - \psi_{j,c,t}^{\text{party}}|$$

Our measure of split-ticket voting increases when a given candidate received more or fewer votes than his or her party, and is equal to zero if the candidate received exactly the same number of votes as his or her party. We argue that the potential lack of information about individual candidates that is caused by newspaper exits may lead voters to deviate in either direction – they either update positively or negatively about the individual candidate, which can lead to either a higher or lower vote share relative to the party of the candidate. As a result, a measure that captures split-ticket voting as vote share deviations in either direction appears appropriate for our purposes.

In addition to the measure described above, we can further create a measure of split-ticket voting that averages split-ticket voting across all parties for a given county and election.

$$A_{c,t} = \frac{1}{J} \sum_{j=1}^{J} |\psi_{j,c,t}^{\text{candidate}} - \psi_{j,c,t}^{\text{party}}|$$

We note that this aggregate-level measures suffers from similar drawbacks as other ecological measures. Particularly, we cannot observe individual-level voting, and different patterns of individual-level voting may produce the same value for the measures described above. However, superior (individual-level) measures of split-ticket with comparable geographic and temporal coverage are not available for our setting, so we draw on the measures described above.

To test for potential effects on split-ticket voting, we re-estimate our main specification using the party-specific and overall split-ticket voting measures. As in the main specification, we use first-differenced outcomes. We present the results in table A.10. Overall, we find no evidence that newspaper exits affect split-ticket voting. This result holds both for each individual party, as well as for the average across all parties in a given district.

Table A.10: Newspaper exits and split-ticket voting

	DV: split-ticket voting (percentage points)					
	Overall (1)	**CDU/CSU** (2)	**FDP** (3)	**Greens** (4)	**Left party** (5)	**SPD** (6)
Newspaper exit	-0.029 (0.066)	0.038 (0.109)	-0.100 (0.082)	0.068 (0.112)	-0.009 (0.081)	-0.100 (0.177)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.369	0.233	0.346	0.194	0.031	0.046
Observations	1,916	1,916	1,916	1,916	1,592	1,916

Note: The table shows the estimated effect (τ) of a newspaper exit on the measure of split-ticket voting described above. Model 1 is the average of split-ticket voting across all parties in a given district ($A_{c,t}$), while models 2–6 show effects separately by party ($S_{j,j,t}$). Split-ticket voting is measured in percentage points. The specification is otherwise the same as our main specification, which is described in section 3. Standard errors (clustered by county) are shown in parentheses. We present results for federal elections. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

A.17 Additional data on reasons for switching to *Bild*

Several characteristics of the *Bild* make it more likely that former readers of local newspapers switch to the outlet. First, the tabloid is highly popular and readily available throughout the country. The *Bild* circulation rate of 1.2 million daily copies is larger that the rates of the remaining three competitors combined (as of 2020, see Statista 2020). Due to its popularity, *Bild* is not only available through subscription, but is often offered at local vendors (while the majority of daily newspapers are sold via subscriptions). Next to popularity and availability, the affordability of *Bild* is another incentive which should attract former local newspaper readers. In addition, Bild has a broad readership base that mirrors the general population, and may therefore attract a broader range of readers. Competing national broadsheets specifically target college-educated readers. Table A.11 shows the educational attainment of readers from *Bild* relative to two national broadsheet newspapers (FAZ and SZ). Compared to the broadsheets, *Bild* readership base mostly consists of lower- and middle-educated consumers, which is more similar to the German public. Finally, we can rule out that local newspaper exits are driven by Bild-entry into specific markets. The tabloid has

been available nationwide since 1952 (or 1990 in areas of the former GDR).

Table A.11: Education of newspaper readers (in percentages)

Education level	General population	Bild	FAZ	SZ
Student	4.61	2.14	2.53	2.07
Lower Secondary School	40.24	52.88	8.11	14.37
Secondary School	29.09	31.44	14.84	18.45
High School	12.04	7.18	21.69	21.80
University Graduate	14.02	6.36	52.83	43.30

Notes: The table shows the relative share of education levels among the
German general population and three newspapers as of 2013. The data stem
from Marktforschung Axel Springer SE (2021).

A.18   Details on consumption results

Table A.12: Estimates for the national news consumption outcome

Election rel. to exit	Estimate	SE	Estimate (in SD)	SD of DV	P	N
National news consumption (absolute)						
-2	0.005	0.010	0.047	0.113	0.578	1368
-1	0.003	0.010	0.029	0.111	0.738	1767
1	0.013	0.009	0.116	0.111	0.140	1769
2	0.019	0.007	0.173	0.111	0.004	1771
National news consumption (relative)						
-2	-0.002	0.004	-0.032	0.054	0.697	1368
-1	-0.003	0.005	-0.059	0.056	0.464	1767
1	0.007	0.004	0.118	0.056	0.122	1769
2	0.014	0.003	0.247	0.056	0.000	1771
Estimates including covariates						
Election rel. to exit	**Estimate**	**SE**	**Estimate (in SD)**	**SD of DV**	**P**	**N**
National news consumption (absolute)						
-2	0.009	0.010	0.081	0.113	0.351	1363
-1	0.006	0.010	0.052	0.111	0.559	1762
1	0.014	0.009	0.125	0.111	0.111	1765
2	0.020	0.007	0.177	0.111	0.004	1768
National news consumption (relative)						
-2	-0.001	0.004	-0.014	0.054	0.865	1363
-1	-0.002	0.005	-0.036	0.056	0.661	1762
1	0.007	0.004	0.117	0.056	0.124	1765
2	0.014	0.003	0.244	0.056	0.000	1768

Note: The plot shows the estimated effect (τ) of a newspaper exit on two outcomes: absolute levels of
national newspaper consumption, and the relative share of national outlets among all newspapers that
individuals consume. The first column indicates the election relative to the time when newspaper exit
occurs. Elections labeled -1 and -2 are prior to exit, while elections labeled 1 and 2 are after exit occurs.

A.19   Panel survey analysis

A.19.1   Data

We shed further light on the mechanisms linking local news exit and political polarization by analyzing individual-level panel data on political attitudes and engagement.

We conduct a direct test of the consequences of local newspaper exits for partisan identification and political activism, known correlates of increasing affective polarization (see Lupu 2015; Mason 2018). We use the German Socio-Economic Panel Study (Schupp 2012), a panel study that provides information on more than 50,000 individuals surveyed between 1984 and 2009. We selected SOEP outcomes that measure (i) if a respondent identifies with any party, (ii) the strength of individual partisanship on a scale from 0–5, and (iii) a four-point scale of participation in political parties, political causes, and initiatives. We leverage the panel structure of the SOEP and analyze the effect of local news exits on within-person changes in party identification, party ID intensity, and political participation.

To the best of our knowledge, no comparable panel survey that measures constituent attitudes and covers our study period (in particular the 1980s and 1990s) is available. We also note that in order to match panel respondents with our local newspaper exit treatment on the county level, we relied on geocoded information. While the main panel is openly accessible, the geocoded data on the county level necessary to conduct the following analyses are restricted for privacy concerns and require personal access at the German Institute for Economic Research (DIW).

While a majority of regularly reoccurring items in the SOEP deal with economic and sociodemographic characteristics, we find three harmonized items particularly suitable to capture the politicization of attitudes: First, participants are regularly asked if they identify with a party. Since the item was surveyed over more than a 20-year period and then harmonized by the SOEP team, the wording of the question deviates slightly. The most common

wordings of the item are:

A. Many people in Germany tend to one party in the long term, even if they occasionally vote for another party. Do you tend to a particular party?

B. A lot of people in Germany lean towards a certain party for a longer time, although they vote from time to time for another party. Do you lean towards a specific party? Respondents could simply agree or disagree with being a long-term supporter of a political party or choose not to answer. We coded this variable as a dummy, where a value of 1 indicates that the respondent is a long-term supporter of a party and 0 shows that she is not. We ignored missing values.

Next, those respondents who indicated possessing a party identification were asked about the intensity of their support. The common wording of the question was:

And to what extent do you tend to this party?

We utilize this item to assess party ID intensity. Survey participants could classify their identification intensity on a five-point scale, or choose not to answer. We recoded the scale so that higher values denote stronger feelings towards a party. In addition, those who previously did not indicate having a party identification have not been asked this question and were assigned a special code in the original survey. We decided to recode them as having an intensity of zero (as they just reported not feeling close to any party), so that we end up with a six-point scale ranging from zero to five, where higher values denote more intense support.

Finally, we measured changes in self-reported political participation. Respondents have been asked how often they participate in parties, local politics, or citizen initiatives during their free time. Constituents could choose from a four point scale (1 to 4) if they never, rarely, monthly, or weekly participated in such political activities. We recoded the values so that higher numbers express more regular participation.

For these three items, we then emulated the estimation strategy applied in the main

analysis (see section 3). First, we made sure to only include respondents that have been surveyed in a federal election year. Then, we calculated the within-person change for the three items across the electoral cycle. For instance, a respondent could score a maximum party ID value of 1 if she reported feeling close to a party at election t, but reported no affiliation at the previous election $(t-1)$. Conversely, a participant could score a minimum value of -1 if she dropped her affiliation in the subsequent election (moving from t to $t+1$). Of course, no changes across elections are possible as well.

For each respondent, we also identified if she was living in a county that experienced a local newspaper exit, a newspaper entry, or an exit and entry over the electoral cycle and coded the treatment status with a set of dummy variables, as described above. Yet again, we were unable to observe changes between 1998 and 2002 due to incompatible coding of the original newspaper coverage regions.

Finally, we run a series of regression models following the equation in section 3.4. The main difference is that the outcome traces within-individual's changes over the electoral cycle. We include time fixed effects to avoid extrapolation across electoral cycles and cluster standard errors at the county level.

A.19.2   Results

Figure A.17 presents evidence from the first-difference models. We observe that local newspaper exits increase respondent levels of identification with a party and degree of participation in politics. Respondents in counties where local newspapers exit become more likely to identify with a party, report stronger feelings towards a given party, and become more likely to be politically active. This aligns with the aggregate-level electoral results, as heightened levels of partisan identification and political activism have been found to be closely associated with rising affective polarization (see Lupu 2015; Mason 2018).

The observed patterns are in line with a shift towards national news intake. National

reporting focuses more strongly on lines of conflict between parties. When confronted with partisan disagreement about policies, voters are more likely to associate themselves with a political faction and develop a stronger partisan identity. This, in turn, should increase the strength of party identification and may affect partisan involvement and mobilization.

Figure A.17: Effect of newspaper exit on individual-level outcomes
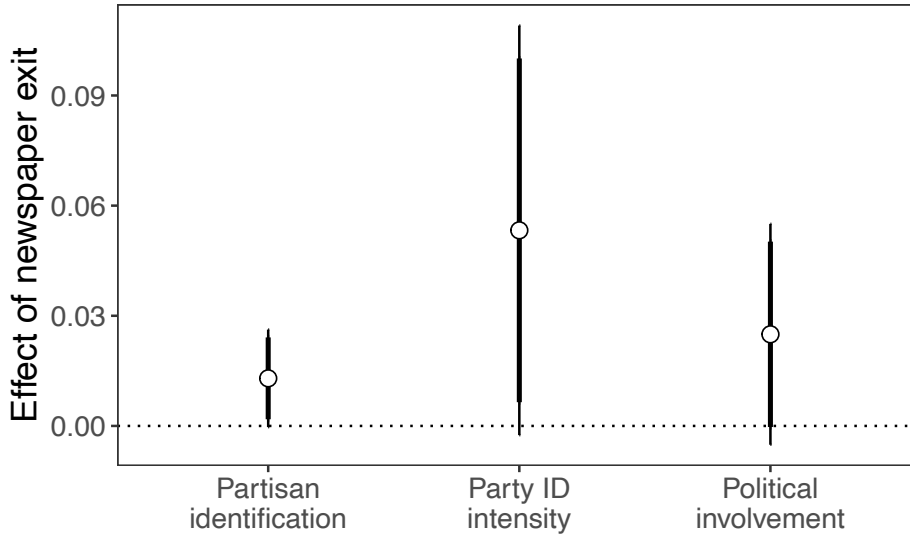
Note: The plot shows exit effects for three outcomes measured as the change between two consecutive federal elections. Partisan identification ranges from -1 to 1 and denotes if a person ceases to lean towards a party (-1), did not change (0), or begins to lean towards a party (+1). Party ID intensity measures the within-person change in intensity on a scale from -5 to 5, where higher scores indicate stronger identification with a given party. Political participation measures the within-person change in activism on a scale from -3 to 3. 90% (thick lines) and 95% (thin lines) confidence intervals are reported based on robust standard errors clustered by county.

References

Blotevogel, Hans Heinrich. 1984. "Zeitungsregionen in Der Bundesrepublik Deutschland: Zur Räumlichen Organisation Der Tagespresse Und Ihren Zusammenhängen Mit Dem Siedlungssystem." *Erdkunde* pp. 79–93.

Bräuninger, Thomas, Marc Debus, Jochen Müller and Christian Stecker. 2020. *Parteienwettbewerb in den deutschen Bundesländern.* Wiesbaden: Springer Fachmedien Wiesbaden.

Bundesverband Deutscher Zeitungsverleger. 2011. "Die Deutschen Zeitungen in Zahlen Und Daten – Auszug Aus Dem Jahrbuch Zeitungen 2011/12.".

Dalton, Russell J. 2008. "The Quantity and the Quality of Party Systems: Party System Polarization, Its Measurement, and Its Consequences." *Comparative Political Studies* 41(7):899–920.

Gao, Pengjie, Chang Lee and Dermot Murphy. 2020. "Financing Dies in Darkness? The Impact of Newspaper Closures on Public Finance." *Journal of Financial Economics* 135(2):445–467.

GLES. 2014. "Langfrist-Medienagenda-Analyse (GLES).".

GLES. 2016. "Langfrist-Panel 2009-2013-2017." GESIS Datenarchiv, Köln. ZA5322 Datenfile Version 1.1.0, https://doi.org/10.4232/1.12627.

GLES. 2019. "Vorwahl-Querschnitt (GLES 2009)." GESIS Datenarchiv, Köln. ZA5300 Datenfile Version 5.0.2, https://doi.org/10.4232/1.13228.

Hallin, Daniel C. and Paolo Mancini. 2004. *Comparing Media Systems: Three Models of Media and Politics.* Cambridge University Press.

Hayes, Danny and Jennifer L. Lawless. 2017. "The Decline of Local News and Its Effects: New Evidence from Longitudinal Data." *The Journal of Politics* 80(1):332–336.

Hayes, Danny and Jennifer L. Lawless. 2021. *News Hole: The Demise of Local Journalism*

and Political Engagement. Communication, Society and Politics Cambridge: Cambridge University Press.

Lelkes, Yphtach, Gaurav Sood and Shanto Iyengar. 2017. "The Hostile Audience: The Effect of Access to Broadband Internet on Partisan Affect." *American Journal of Political Science* 61(1):5–20.

Leupold, Anna, Ulrike Klinger and Otfried Jarren. 2018. "Imagining the City." *Journalism Studies* 19(7):960–982.

Levendusky, Matthew S. 2013. "Why Do Partisan Media Polarize Viewers?" *American Journal of Political Science* 57(3):611–623.

Lupu, Noam. 2015. "Party Polarization and Mass Partisanship: A Comparative Perspective." *Political Behavior* 37(2):331–356.

Marktforschung Axel Springer SE. 2021. "Media-Analyse Agma Media-Micro-Census." https://www.ma-reichweiten.de/.

Mason, Lilliana. 2018. *Uncivil Agreement: How Politics Became Our Identity.* University of Chicago Press.

Nic, Newman, Richard Fletcher, Antonis Kalogeropoulos, David AL Levy and Rasmus Kleis Nielsen. 2018. *Reuters Institute Digital News Report 2018.* Reuters Institute for the Study of Journalism.

Rademacher, Christian. 2018. "Local Party Systems in GermanyLokale Parteiensysteme in Deutschland.".

Statista. 2014. "Facebook - Nutzer in Deutschland 2014." https://de.statista.com/statistik/daten/studie/70189/umfrage/nutzer-von-facebook-in-deutschland-seit-2009/.

Statista. 2020*a.* "Anzahl der DSL-Anschlüsse in Deutschland von 2001 bis 2019." https://de.statista.com/statistik/daten/studie/196001/umfrage/anzahl-der-dsl-

anschluesse-in-deutschland-seit-2001/.

Statista. 2020*b*. "Paid circulation of daily and Sunday newspapers in Germany in selected years from 1975 to 2019." https://www.statista.com/statistics/410995/daily-and-sunday-papers-circulation-germany/.

Statistische Ämter des Bundes und der Länder. 2019. "Bruttoinlandsprodukt, Bruttowertschöpfung (Kreise)." http://www.statistikportal.de/de/vgrdl/ergebnisse-kreisebene/bruttoinlandsprodukt-bruttowertschoepfung-kreise.

Stieler, Sylvia. 2009. *Strukturwandel in der Zeitungswirtschaft: aktuelle Herausforderungen in der Wertschöpfungskette und Folgen für die Beschäftigung.* Number 2009,6 *in* "Informationsdienst / IMU-Institut" überarb. endbericht ed. Stuttgart: IMU-Inst.

Vogel, Andreas. 2014. *Talfahrt der Tagespresse: eine Ursachensuche der Auflagenrückgang der Regionalzeitungen.* Friedrich-Ebert-Stiftung.

Volkens, Andrea, Pola Lehmann, Sven Regel, Krause Werner, Tobias Burst, Theres Matthieß, Nicolas Merz, Bernhard Weßels and Lisa Zehnter. 2020. "The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR). Version 2020a." *Wissenschaftzentrum Berlin (https://manifestoproject. wzb. eu/)* .