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▶ **To cite this version:**

Charles Angelucci, Julia Cagé, Michael Sinkinson. Media Competition and News Diets. American Economic Journal: Microeconomics, In press. hal-03880088

HAL Id: hal-03880088
https://sciencespo.hal.science/hal-03880088

Submitted on 30 Nov 2022

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Media Competition and News Diets*

Charles Angelucci[1], Julia Cagé[2], and Michael Sinkinson[3]

[1]Massachusetts Institute of Technology
[2]Sciences Po Paris and CEPR
[3]Yale University and NBER

October 5, 2022

Abstract

Technological innovations in content delivery, such as the advent of broadcast television or of the Internet, threaten local newspapers' ability to bundle their original local content with third-party content such as wire national news. We examine how the entry of television – with its initial focus on national news – affected local newspapers as well as consumer news diets in the United States. We construct a novel dataset of U.S. newspapers' economic performance and content choices from 1944 to 1964 and exploit quasi-random variation in the rollout of television to show that this new technology was a negative shock in both the readership and advertising markets for newspapers. Newspapers responded by providing less content, particularly local news. We tie this change towards increasingly nationalized news diets to an increase in party vote share congruence between Congressional and Presidential elections.

Keywords: Media, Local News, Television, Newspapers, Advertising, Bundling, Split-Ticket Voting

JEL No: D4, D7, L11, L15, M37, N72

*The authors would like to acknowledge the valuable advice and suggestions provided by seminar audiences at the Berlin Applied Micro Seminar, Columbia University, the FCC, Imperial College, Harvard/MIT joint IO Workshop, INSEAD, London Business School, London School of Economics, the University of Mannheim, Microsoft, the NYC Media Workshop, Stanford University, the Toulouse School of Economics, the Universitat de Barcelona, and Wharton. We are also grateful to conference participants at the 19th CEPR-JIE Applied IO Conference, the HEC Montréal-CIRANO-RIIB Conference on Industrial Organization, the Petralia Workshop 2017, the 15th Annual Media Economics Workshop, the IAST Workshop on "Information, Communication, and Knowledge in Historical Perspective", the 4th Rome Junior Conference on Applied Microeconomics, and the Social & Political Economics Conference at John Hopkins. This paper particularly benefited from discussions with Clément de Chaisemartin, Ruben Enikolopov, Lisa George, Doh-Shin Jeon, Sarah Laval, Simone Meraglia, Andrea Prat, Jonah Rockoff, and Ekaterina Zhuravskaya. We thank Luca Bassem Abdul Hay, Matteo Di Bernardo, Paul Berthe, Shelley Han, Jameson Lee, Ondre Padgett, Timothy Rickert, Arjuna Sakae Anday, Rachel Tosney, and more particularly Nicolas Longuet Marx and Jett Pettus for excellent research assistance, and Yannick Guyonvarch for his precious help with the $didmultiple_GT$ analysis. Julia Cagé thanks the French National Research Agency (ANR) for funding (reference: ANR-17-CE26-0004-01), and the Sciences Po's Scientific advisory board (SAB). All errors remain our own. An online Appendix with additional empirical material is available here.

1 Introduction

A local newspaper's traditional economic model was to bundle its original local news content with different types of third-party content, such as wire national news, weather, and sports, into a single product to sell to consumers, and, in turn, to sell consumers' attention to advertisers. Over the past several decades, technological innovations such as television and the Internet have challenged local newspapers' once unique ability to monetize third-party content. In particular, there has been a fall in distribution costs and a proliferation of advertising-financed media outlets catering to specific types of content traditionally included in local media bundles: sports channels, classifieds websites, national cable news channels, etc. These new media outlets have affected both how information is produced (Cagé et al., 2020) and consumed (Boczkowski et al., 2017; Athey et al., 2018; Kennedy and Prat, 2019), and have weakened the traditional economic model of local print media. Local newspapers are becoming smaller, lighter publications with fewer readers and advertisers, when they do not simply go out of business (see e.g. Abernathy, 2020). The resulting decline in the production and consumption of local news could have far-reaching political and social consequences, which we are only beginning to fully appreciate.

We investigate how local newspapers adjust their production of local news when the market for national news becomes more competitive. We also study whether the resulting changes in the amount of local versus national news individuals are exposed to affect political party vote share congruence between local and national elections. To analyze these issues, we use historical data to examine how the entry of television affected local newspapers in the United States from 1944 to 1964. We exploit the fact that technological constraints at the time meant that television stations offered mostly national news and general entertainment programming, whereas virtually all newspapers bundled original local news with syndicated national news.

The main empirical challenge we face in examining the effect of television stems from the non-exogenous nature of the roll-out of television: television entered larger and wealthier cities first. Our empirical strategy exploits exogenous variations in the timing of the introduction of television in mid-sized markets in the United States. In particular, in the spirit of Gentzkow (2006) and Gentzkow and Shapiro (2008), we use the timing of the Federal Communications Commission (FCC) "freeze" that occurred between 1948 and 1952, primarily due to engineering difficulties. The freeze occurred as many mid-size markets were receiving licenses, and therefore we observe a natural experiment in the entry date of television in a large set of television markets on opposite sides of the freeze. A typical television market covered several newspaper markets, offering a large set of treatment and control print news markets. These features allow us to isolate and measure the impact of television on local newspapers.

The empirical analysis required a significant data collection effort. We digitized annual circulation, cover price, advertising rates, and advertising quantity data for the universe of

U.S. daily newspapers for 1944-1964.[1] We combine this with data we digitized regarding the first broadcast dates of all television stations in the U.S.. For each station, we observe the tower's location, height, channel, and broadcasting power. We use this data to construct reception contours to precisely determine which newspaper markets were exposed to television at a given point in time. For a subset of newspapers exposed to the freeze whose content have been digitized, we further gather data on the content of the newspaper itself. We focus on a sample of 102 newspapers that had full issues available from an online archive. We code the content of these newspapers for the third Tuesday and Saturday of March and the third Thursday and Saturday of September for each year from 1946 to 1955. We manually measure the quantity of news (categorized by type) versus advertising, photos, and editorials, noting any content sourced from a wire service. We additionally use machine learning techniques to identify the amount of article text on each page of each of these issues, giving us an objective measure of the amount of content contained within each issue.

We find that the entry of television led to a 3.1% decrease in circulation and a 3.3% decrease in subscription price. These effects are mostly concentrated among evening newspapers, which were the majority of newspapers at the time and which faced fiercer competition from TV. This suggests consumer substitution away from newspapers following the introduction of the new technology. Moreover, the entry of television represented the entry of a new competitor in the advertising side of the market: according to our estimates, it led to a 2% decrease in newspaper advertising rates and to a 3.9% decrease in evening newspapers' national advertising quantity. We do not find an effect on local advertising quantities; this is most likely due to the absence of local advertising on television at the time.[2] We confirm these results with a matching estimator and robustness checks.

Next we investigate the extent to which the entry of television affected newspaper content, and in particular, the provision of local news. We find that following the entry of television, the total number of stories published decreased by 6.6%. The decrease in the number of stories is driven mainly by a 10.1% drop in original local news stories. By contrast, the drop in the number of (wire) national news is small and not statistically significant. Consistent with this, we find limited evidence of lower reliance on subscriptions to news services.

Taken together, the introduction of television with its primarily national focus in news, the fall in local newspapers' readership, and the lower production of local news by newspapers point to a strong shift towards more national news diets. The resulting change in voters' news diets, in turn, offers a unique setting to test whether less exposure to local news leads to greater "nationalization" of local politics, and particularly to voting outcomes in local

[1] The data come from the *Editor & Publisher International Yearbook*. Advertising quantity data, or "lineage", come from a separate but related data source, and cover a majority, but not all, publications. While there is less coverage, the data are conveniently broken out by type of advertising, including local, national, classified, etc.

[2] We do not find an effect on classified advertising either.

elections that are increasingly similar to voting outcomes in national elections (e.g., because of voters' lower likelihood to engage in split-ticket voting; c.f. Hopkins, 2018). We examine party vote share congruence between Congressional and Presidential elections by collecting county-level election data for the period 1932-1964 and by computing for each county the share of its territory covered by television. We document that counties that were exposed earlier to television exhibit greater party vote share congruence, especially for House elections which, arguably, were more dependent on newspapers' local coverage.

Our contribution is threefold. First, we build an entirely novel and comprehensive dataset on local newspapers and television stations. In particular, we collect detailed information on prices and quantities prevailing on both sides of the market from historical records available only in paper format. Our dataset covers $1,963$ newspapers, $1,537$ news markets, and $32,296$ newspaper-years. Moreover, to the extent of our knowledge, our paper is the first to provide detailed information on the evolution of the actual content of newspapers and, in particular, their provision of local news.[3] Second, we provide direct evidence of the effect of television's entry on the market for newspapers: we document a direct substitution effect towards television on both sides of the market. Third, we show that the entry of (national) news from television had compositional effects on the average news diets of consumers. On the one hand, it affected the quantity of news consumed – given the substitution away from newspapers. On the other hand, for those consumers still reading the same newspapers, it affected the news they were given to read on a daily basis. We take this, combined with our findings on party vote share congruence across local and national elections, as evidence that shocks to ad-supported media can have significant real effects outside of the market for news.

Our findings also contribute to the ongoing debate regarding the provision of local news in the modern media landscape. Although one needs to be careful in drawing too much of a parallel between different technological innovations, the entry of television and the advent of the internet have in common that they allowed low-cost national distribution of content. By and large, these innovations did not lead to entry in the market for local news: to this day, local newspapers effectively remain the exclusive providers of city-level journalism. Instead, both innovations diminished local newspapers' ability to monetize third-party content such as national news or entertainment.[4] Much like the entry of television meant that newspaper readers could get their national news elsewhere, with the internet classified ads have moved to specialized online outlets (e.g., craigstlist.com or monster.com), soft news about local

[3]There exists a growing empirical literature studying newspaper content, but its focus is on political bias rather than the nature or quantity of news produced (Groseclose and Milyo, 2005; Gentzkow and Shapiro, 2010; Puglisi and Snyder, 2015; Gentzkow et al., 2019). Cagé et al. (2020) investigate the quantity of news produced online, but only for one year (2013).

[4]Naturally, both the advent of television and that of the Internet also constituted strong negative shocks to the advertising side of the daily newspaper market (see e.g. Athey and Gans, 2010; Athey et al., 2018). By contrast, Chandra and Kaiser (2014) document that in the case of magazines, the Internet has had a positive effect on the value of targeted advertising.

communities are provided free of charge on social media, and the largest national news outlets have become ever more dominant. Although more evidence is needed before making drastic policy suggestions, our results suggest a pessimistic view on the economics of providing local news.

Literature review An important strand of literature has highlighted how changes in the market for news affect political outcomes (see e.g., Snyder and Strömberg, 2010; Gentzkow et al., 2011; Drago et al., 2014; Cagé, 2020). Analyzing the effect of the introduction of the Internet in, respectively, Germany and the United Kingdom, Falck et al. (2014) and Gavazza et al. (2019) show that the Internet decreased turnout, due to a substitution away from media with higher news content. Moreover, the provision of local news is key to both political participation and government accountability at the local level (see e.g., Strömberg, 2004; Ferraz and Finan, 2008; Snyder and Strömberg, 2010; Mastrorocco and Ornaghi, 2020). The expansion of national media into local news markets may affect the consumption of local news and, therefore, political outcomes (Martin and McCrain, 2019). Gentzkow (2006) shows that the introduction of television led to lower Congressional election turnout, and provides aggregate evidence suggestive of a crowding-out of local political information.

Gentzkow (2006) is the first paper to exploit the FCC freeze as an exogenous source of variation of the entry of television (see also Gentzkow and Shapiro, 2008). Our paper is complementary to his: we explicitly investigate the effect of the introduction of television on newspapers' circulation and content choices. We depart in terms of identification with respect to this previous work as we have richer data: there are many newspaper markets per television market and we have annual data on outcomes of interest. Therefore, we are able to focus on the markets that saw entry of television precisely before and after the freeze, i.e., that were most clearly exogenously treated by the freeze. Further, our findings suggest that the decrease in turnout found by Gentzkow (2006) may be due not only to a substitution of readers away from local newspapers, but also to a reduction in the amount of local news offered to the consumers who carry on reading newspapers. Building on these findings, we document that voters' greater reliance on national news led to higher party vote share congruence between Congressional and Presidential elections (see additional references in Section 6).

Related to our study are Seamans and Zhu (2014), Angelucci and Cagé (2019), and Djourelova et al. (2021). Both Seamans and Zhu (2014) and Djourelova et al. (2021) analyze the impact of the entry of online classified-ads platform Craigslist on local U.S. newspapers, with the latter documenting a downsizing of editorial staffs and a decline in political news with consequences for local politics. Angelucci and Cagé (2019) exploit the end of the prohibition against television advertising in France to show that national newspapers responded to lower advertising revenues by decreasing their newsrooms and lowering their subscription

and advertising prices.[5] By contrast, this paper looks at the consequences of the introduction of television, which constituted a direct shock not only to the advertising side of the daily newspaper market but also to the reader side. We exploit the fact that television at the time had mostly a national news focus to investigate how newspapers modified their provision of local versus national news, and to tie resulting changes in news diets to party vote share similarity across presidential and congressional elections. Unlike Angelucci and Cagé (2019), who, because of their focus on national newspapers, do not look at local news, we measure local content by analyzing newspaper articles. Our paper is also related to Bhuller et al. (2020) who analyze the consequences of broadband internet on the Norwegian print newspaper market. They show that the internet caused a drop in the circulation of national tabloid and non-tabloid newspapers, and that these reacted by reducing their staff and content offering. Local newspapers' circulation, by contrast, was unaffected, arguably because of their repositioning towards greater journalistic content. In our setting, virtually all newspapers were local and the most salient observable dimension of heterogeneity was the distinction between morning versus evening publications. We show that the introduction of television (with mostly afternoon and evening content) was a negative shock to evening newspapers but that morning newspapers were largely unaffected.

Finally, our analysis is related to the literatures that study the relationship between market structure and content variety (e.g., Berry and Waldfogel, 2001; Seim, 2006; Sweeting, 2010, 2013; Jeziorski, 2014; Berry et al., 2016), as well as the relationship between market structure and content quality (e.g., Gentzkow et al., 2006; Berry and Waldfogel, 2010; Petrova, 2011).[6] In the daily newspaper market, George (2007) finds that greater market concentration leads to more content variety. The closest papers to ours are George and Waldfogel (2006) and Fan (2013).[7] Among other newspaper characteristics, Fan (2013) looks at the provision of total content (the "news hole") and the local news ratio in the context of a simulated merger of local newspapers. She finds that ownership consolidation leads to a lower newshole and a lower local news ratio. We differ in that we examine how the entry of television, with its mostly national focus, affected local newspapers and their choices of sub-types of content. George and Waldfogel (2006) analyze how the expansion of *The New York Times* into local markets affected local newspapers' readerships and newsroom compositions. Unlike George and Waldfogel (2006) and Fan (2013), who mostly rely on newspaper reporters' topic assignments and job titles to proxy content, we measure content variety by directly analyzing the

[5]Relatedly, Shiller et al. (2017) show that the use of ad blocking leads to a decrease in the quality of websites.

[6]Further, de Corniere and Sarvary (2018) build a model to look at the impact of social media on newspapers' choice of quality. See also Jeon and Nasr (2016) on news aggregators and newspaper quality.

[7]Also related to our paper are Gentzkow et al. (2014), who estimate a model of newspaper entry and editorial choices in which newspapers compete to attract readers and advertisers, and George and Waldfogel (2003), who analyze the effects of preference externalities on news diets.

stories newspapers choose to print. We also differ in that we explicitly investigate whether the observed changes in consumers' news diets affect local electoral outcomes. We contrast our findings with theirs in greater detail in Section 5.2.

The rest of the paper is organized as follows. In Section 2, we discuss the historical context of the introduction of the television in the United States, introduce the new dataset we build for this study, and provide descriptive statistics. Section 3 provides a conceptual framework, which builds upon a theoretical analysis contained in Section E. In Section 4, we estimate the impact of the entry of television on both sides of the newspaper market, and in Section 5, we perform a content analysis and investigate how newspapers adjusted their editorial choices after the entry of television. Section 6 investigates the relationship between the change in news diets triggered by the introduction of television and the nationalization of local politics. In Section 7, we perform a number of robustness checks. Finally, Section 8 concludes and discusses an epilogue case study of the current status of 10 of the papers in our analysis.

2 Background and Data

2.1 Newspapers

Our focus is on the 1944-1964 time period. During this period, newspapers were partisan (Gentzkow et al., 2015) and relied heavily on advertising (Hamilton, 2004; Schudson, 1981; Starr, 1982).[8] Newspapers were common even in very small towns (Gentzkow et al., 2011; McChesney and Nichols, 2010) and the majority of daily newspapers in this era produced evening editions only (see online Appendix Figures B.2 and B.3). Most small towns – representing the vast majority of daily newspapers – had a single evening newspaper as their source of news. Larger towns had competing evening newspapers, or even morning newspapers.

Newspapers were widely circulated and constituted the primary source of news to most individuals before the introduction of television. While the vast majority of American households had radios at the time of the entry of television, radio broadcasting content was mainly devoted to general entertainment and newspapers covered a much wider range of news topics than radio news programs (Lazarsfeld, 1940).[9,10]

[8] In 1956, advertising revenues represented 70% of newspapers' total revenues. U.S. newspapers are still primarily ad-supported today, albeit to a lower extent (Cagé, 2016). Online Appendix Figure B.1 plots the long-run evolution of the advertising share in newspaper total revenues.

[9] Lazarsfeld (1940) reports the broadcasting time of all the 700-odd stations in the United States in a typical week during April 1938: 52.5% of this time was devoted to music while only 9.8% was devoted to "news and sports." News broadcasts were large in the size of their listening audience, however.

[10] The 1952 American National Election Study provides information on media use: 79% of participants reported reading about the 1952 campaign in newspapers (21% did not), and 70% of them reported hearing about the campaign on radio. In the 1956 American National Election Study, the share of people who reported reading about the campaign in newspapers was 68% and the share who reported listening about the campaign on the radio was 45%. The 1952 American National Election Study is available at

2.2 The Introduction of Television and the FCC "Freeze"

Television was first licensed for commercial broadcasting on July 1, 1941 and then quickly expanded in the 1950s.[11] Online Appendix Figure B.4 plots the evolution of the number of stations broadcasting from 1946 to 1961, as well as the associated total broadcasting revenues. During these initial years, television stations broadcast mostly national programming – due to the then excessively high cost of producing original local content – and relied heavily on network content (Hess, 1991).[12] The news television stations provided had a strong national focus. Moreover, most local and network programming was live as videotape recording had not yet been invented (Head and Sterling, 1994).[13] Some local stations developed their own news shows at the time but it was the exception rather than the rule. As highlighted by de Leon (2015), *"most local stations offered little more than brief summaries of wire-service headlines, and the expense of film technology led most to emphasize live entertainment programs instead of news."*

While the FCC licensed a few commercial broadcasters in 1941, the start of World War II led to a halt of commercial broadcasting. In 1945, the FCC decided to resume television licensing and by July 1946, it had issued twenty-four new licenses (Barnouw, 1990). The post-war roll-out of television was interrupted in the late 1940s by the so-called FCC "Freeze" that took place between September 30, 1948 and April 14, 1952 due to engineering problems. More precisely, on September 30, 1948, the FCC announced a freeze on the granting of new television licenses. Stations previously authorized were allowed to begin or continue operations – over 100 licenses had already been granted at the time – however, no new licenses were granted, even though over 700 applications had been received. The FCC implemented this drastic measure because it was unable to resolve several important interference, allocation, and other technical issues, which it anticipated would only grow more significant if it continued to grant licenses at the current speed. Moreover, while the freeze was originally planned to last only six months, it ended up lasting nearly four years.[14] We provide additional technical history in the online Appendix Section A.

From 1948 to 1952, 108 television stations were on the air and the number of television

https://electionstudies.org/data-center/1952-time-series-study/. The 1956 American National Election Study is available at https://electionstudies.org/data-center/1956-time-series-study/.

[11]Television was first successfully demonstrated in 1927; however, television penetration stayed very low until the end of the 1940's. Hence the development of television in the U.S. can be closely associated to that of commercial broadcasting. The first TV commercial aired was a very short spot for a watch and jewelry company, Bulova. Political advertising appeared a decade later on television, in 1952, with "Eisenhower Answers America", the first political spot ad campaign broadcast on television (Wood, 1990).

[12]The Prime Time Access Rule which required local television stations to broadcast a certain amount of non-network programs – in particular local news and documentaries – was instituted by the FCC in 1970 to limit the importance of network programming (see e.g. Prior, 2007).

[13]On local live entertainment programs, see Koenig (2018).

[14]Much of this information comes from several sources that are detailed in the online Appendix, including an excellent overview at the Museum of TV, "Freeze of 1948" webpage, available at http://www.museum.tv/eotv/freezeof1.htm.

sets grew from a quarter million to 17 million (Head and Sterling, 1994). Only 24 cities had two or more stations, and many had only one. Most smaller and even some major cities – like Denver, Colorado and Austin, Texas – had none at all. Our empirical strategy exploits this interruption to TV expansion. We exploit the timing of the freeze, which occurred as many mid-size markets were receiving licenses. As highlighted above, this freeze has already been used by Gentzkow (2006) who documents the exogeneity of this shock. In particular, following Gentzkow (2006), we take advantage of three different historical facts. First, the freeze provides us with exogenous geographical variations in the introduction of television. Second, television adoption, once introduced, was extremely quick. This is of particular importance because it allows us to study its impact directly around the shock. Finally, the fact that a given television station broadcasts over a large area is helpful as the entry of a single television broadcaster typically affected multiple, separate newspaper markets. The reason for this is that at the time, newspaper distribution costs were strongly increasing in distance, while wireless waves propagate at no cost.

As we will show, the entry of television was a strong negative shock to both sides of the newspaper industry. Television quickly became an important source of national news. By the early 1960s, surveys indicated that the public thought of television as the most trustworthy and also their main source of news (Head and Sterling, 1994). On the advertising side, the top television advertisers were also among the top newspaper advertisers. The 1955 Television Factbook provides information on the 100 top network television advertisers (for the first six months of 1954). The main company to advertise, Procter & Gamble Co., spent more than 11 million dollars on network television, but also over 1 million dollars on newspaper advertising. For newspapers, Procter & Gamble was one of the main advertisers, together with General Motors Corp., Colgate-Palmolive Co., General Foods Corp. and Lever Bros. Co., all of which were among the top 10 television advertisers. As a consequence, while the total volume of advertising was expanding quickly in the United States in the 1950s, we observe an increase in the share of this volume captured by television (nearly 15% in 1961) and a drop in the share of newspapers (online Appendix Figure B.5).[15]

We will also document that the introduction of television led local newspapers to produce less local news. We exploit the resulting increased national focus in the information consumed by individuals to test whether it made local (congressional) elections' outcomes more correlated with presidential elections' outcomes. As we discuss in Section 6, split-ticket voting was relatively common and, if anything, growing during our time of interest. Even though they were affiliated with the Democratic or Republican parties, local politicians enjoyed their own "brand" and the extent to which national matters influenced local politics was low by

[15]Note however that overall, in absolute terms, the advertising volume in newspapers continued to grow during this period.

today's standards (e.g., Jacobson, 2016; Hopkins, 2018). Nevertheless, if television shifted voters' attention to national matters, we expect their voting choices in local elections to become increasingly determined by candidates' party affiliations and, in turn, party vote shares to become increasingly similar across local and national elections.

2.3 Data Sources and Descriptive Statistics

We use information from a number of different data sources to build our new dataset on the newspaper and television markets. Our dataset covers 1,963 newspapers, 1,537 news markets and 32,296 newspaper-years for the period 1944-1964, as well as all television stations in the United States and their precise coverage. For our content analysis, we use scanned archives from newspapers.com and newspaperarchive.com for 102 local newspapers from the time period 1946-1955. Finally, we use county-level data on House, Senatorial, and Presidential Elections for the period 1932-1964.

Newspaper data We collect information from two different sources. All data were hand-coded by undergraduate students at the University of Pennsylvania, Columbia University, and Sciences Po Paris. First, we collect annual newspaper-level information on circulation, main city of circulation, subscription prices, advertising prices, and wire news service subscriptions from the *Editor & Publisher International Yearbook*.[16] We code a newspaper's associated main city of circulation as its *market*.[17]

Second, we digitize and merge information on annual newspaper-level advertising quantity (lineage) from the Editor & Publisher *Annual Lineage Supplement*. The information is available for a majority, but not for all, daily newspapers, and is broken out by national versus local advertisers for a very large part of our sample. We will henceforth refer to "national advertising" as advertising purchased by national advertisers, while "local advertising" refers to local advertisers. This is of particular importance because we plausibly expect the entry of television to have offered an alternative to national advertisers more than to local advertisers in print media, as television programming was national at the time and television advertising took the form of sponsored programming. To the extent of our knowledge, this paper is the first to exploit the detailed historical information on the quantity of advertising published in different categories in U.S. newspapers. Figure B.7 in the online Appendix shows an example of a page of the Lineage Supplement.

[16] We use the 1945 to 1965 yearbooks, which cover the years 1944 to 1964. Figure B.6 in the online Appendix shows an example page from such a yearbook.

[17] In the relatively few cases in which multiple cities are grouped together, we code the largest listed city as the newspaper's market. In rare cases, newspapers circulated in multiple cities and, sometimes, in multiple counties. Unfortunately, no systematic data exist documenting newspapers' exact geographic markets.

Content data We identified all evening newspapers for which full-issue content had been scanned by newspapers.com and newspaperarchive.com between 1946 and 1955. We restricted our search to the subset of newspapers exposed to the freeze (i.e., newspapers in newspaper markets treated by television licenses that began operation after 1947 and before 1953 – see Section 4).[18] There are 102 such newspapers (online Appendix Table C.1 presents summary statistics for these newspapers). We manually code the content of these newspapers for the third Tuesday and Saturday of March and the third Thursday and Saturday of September for each year. We restricted our attention to Tuesday/Saturday pairs and Thursday/Saturday pairs that belonged to the same two weeks to ensure that the dates of our manual content analysis were a subset of the dates used for our Matlab analysis (see below).

More precisely, for each issue, we first extract the number of pages. Then, we determine the number of wire articles versus original stories through manual counting of bylines (wire articles explicitly state the news agency they are wired from and are thus easy to identify). Similarly, we count the number of local, national, entertainment, weather, and editorial stories, as well as the number of photos.[19,20] Finally, to validate our manual approach, we determine the space devoted to news content using Matlab's image processing machine learning capabilities. Matlab has built-in image processing functions to detect text regions that correspond to the text of news articles; moreover, it uses the size of the text to filter out headlines, photos, or advertising copy. We further specify text of a particular size to identify article content. Figure B.9 in the online Appendix shows the content highlighted for all 16 pages of the entire March 10, 1947 issue of the *Altoona Mirror*. We compute a total content score for that day's issue from those pages. We performed this exercise for all issues published in the third week of

[18] Our focus on evening newspapers is due to the much lower number of morning publications relative to evening newspapers.

[19] In almost all cases, news articles that cover events happening outside of the newspaper's main city of circulation explicitly mention another locality either in the headline or at the very beginning of the article. We were thus able to code as 'local' all articles that either did not mention a locality or whose indicated locality belonged to the state where the newspaper's main city of circulation is located. For most newspapers, this ultimately meant coding as 'local' news articles that covered events that occurred either in the main city of circulation or in nearby cities and counties. Most local stories cover local politics or provide community information (e.g., local schools or wedding announcements). Inevitably, the boundaries of an article were sometimes subjective (most often because information is organized by topic and may include several headlines of varying font size). For ease of classification, we counted as a single news article all information associated with a single overarching headline (e.g., "news about our Marines"). Moreover, following industry practice, we coded as 'national' both national and international stories. Information about financial markets were included in 'national' news stories. Also, a picture is counted both as a picture and a story if it has a caption. Note that although we coded 'Editorials' separately, in practice the vast majority of editorials were wired. Similarly, all 'Entertainment' news articles were wired stories about either Sport, Cinema, or Fashion. Online Appendix Figure B.8 illustrates our strategy for *The Courier-Express*, a local daily newspaper published in Dubois (Pennsylvania), on September 14 1953.

[20] To approximate local newspapers' content following *The New York Times*' geographic expansion, George and Waldfogel (2006) use information on journalists' assignment to topical beats. We are unable to implement a similar strategy for our period of interest because journalist directories such as the *Burelle's Media Directory* were not available at the time.

March and the third week of September for those newspapers present on newspapers.com.[21] Note that, not surprisingly, the Matlab score is positively correlated with the number of stories published in the paper that we collected manually: for the issues for which we have information on the two variables, we find a correlation of 0.47 statistically significant at the one percent level.

Summary Statistics Table 1 provides descriptive statistics on the newspaper markets for morning and evening newspapers. On average during our time period, around 80% of the newspapers are evening newspapers, and 8% morning ones. The remaining newspapers circulate editions both in the morning and in the evening. In 82% of the newspaper market-years, there is only one newspaper circulating (a monopolist). The average circulation of a newspaper during our period of interest was around $20,140$ copies a day for evening newspapers, and $97,887$ for morning newspapers.[22] The subscription price of evening newspapers was slightly lower than the price of morning newspapers. We also observe a lower advertising rate but this is likely mechanically related to having lower circulation. Our empirical analysis will highlight differential effects on morning versus evening newspapers.

Turning to newspaper content, Table 2 shows summary statistics for the different types of content that we measure. On average, newspapers are 16.2 pages long. They include 120.3 news stories, of which 28.3 are national wire stories and 61.1 are local original stories. As noted earlier, we have more observations for the variables created using Matlab's image processing analysis because we performed our analysis on significantly more dates.

Television data We obtain the date of the initial broadcast for all commercial and non-commercial licensed television stations from the Advanced Television Factbook (published by Warner Communications). We use five different Factbooks of compiled station information (1951, 1953, 1956, 1960, and 1966).[23] For each station, the Factbook provides information on the precise location of the broadcasting tower (latitude and longitude), the tower's height (feet above ground), the tower's channel, and the visual broadcast power of the tower (kW). This data has been collected since the advent of television.[24] Figure B.10 in the online Appendix shows examples of entries in the 1955 book for WBRC (Birmingham, AL) and WALA (Mobile, AL), whose respective dates of first broadcast took place soon before and soon after

[21] For the newspaper issues we obtained from newspaperarchive.com, we limited ourselves to the third Tuesday of March and the third Thursday of September for each year (i.e., the same dates as those for our manual analysis).

[22] A decent number of newspapers circulated both in the morning and in the evening, we do not treat those as evening newspapers for the purpose of this analysis. However, doing so does not affect our main results, as discussed in the robustness checks section.

[23] Television factbooks can be downloaded at https://worldradiohistory.com/Television_Factbook_Page.htm.

[24] The Factbook stopped reporting precise location in 1956. For stations that begin operation in 1956 or later, we use the centroid of the city of license for that TV station.

	Mean	St.Dev	P25	Median	P75	Obs
Morning Newspapers						
Subscription price	0.44	0.13	0.36	0.42	0.47	6,245
Daily Circulation	97,887	179,971	15,218	40,690	96,611	6,245
Advertising Rate	2.0	1.8	0.8	1.4	2.3	5,844
National Lineage	1.5	1.3	0.5	1.3	2.2	2,422
Local Lineage	7.9	5.8	3.7	6.5	11.0	2,451
Classified Lineage	2.1	2.0	0.7	1.6	3.0	2,432

	Mean	St.Dev	P25	Median	P75	Obs
Evening Newspapers						
Subscription price	0.43	0.10	0.36	0.40	0.46	25,586
Daily Circulation	20,140	53,565	4,260	7,021	14,044	25,586
Advertising Rate	0.8	1.0	0.4	0.5	0.8	24,238
National Lineage	0.5	0.4	0.3	0.4	0.6	14,724
Local Lineage	3.8	2.8	2.1	3.1	4.7	14,739
Classified Lineage	0.8	0.9	0.3	0.5	1.0	14,646

Table 1: Summary Statistics for Market Outcomes

Notes: The table provides summary statistics. An observation is a newspaper-year. The time period is 1944-1964. Subscription price and advertising rates are in constant (2016) dollars. Advertising lineage is in millions of agate lines.

	Mean	St.Dev	P25	Median	P75	Obs
Total text	120.3	65.8	73.0	107.0	154.0	3,232
National wire	28.3	18.6	16.0	24.0	36.0	3,232
Local original	61.1	39.8	34.0	51.0	78.0	3,232
Local wire	10.1	12.2	3.0	7.0	13.0	3,232
Photos	12.5	11.5	5.0	10.0	17.0	3,232
Editorials	7.6	7.3	3.0	7.0	10.0	3,232

(a) **Manual Coding**

	Mean	St.Dev	P25	Median	P75	Obs
Nb pages	16.2	11.7	8.0	12.0	20.0	6,829
Matlab total score	114.7	118.4	26.1	82.4	153.5	6,829
Matlab mean score	7.6	6.0	2.2	6.9	10.8	6,829

(b) **Machine Learning Approach**

Table 2: Summary Statistics for Newspaper Content

Notes: The table provides summary statistics. An observation is a newspaper-date. The time period is 1946-1955. There are a total of 102 different newspapers analyzed. All papers are evening newspapers that circulated in markets affected by the FCC's "freeze" on licensing. In the upper Table 2a, data are average counts of a variable across all issues analyzed. "Total text" includes additional content types beyond the ones listed, such as weather forecasts and entertainment news. Wire and original stories are identified by their bylines. In the bottom Table 2b, we report the summary statistics for Matlab's image processing analysis.

the freeze. We account for eventual changes in the antennas' characteristics that occur during our time period. For each year, we use the information provided by the most recent Factbook.

With this data, we can construct the "Grade B" and "Grade A" signal contours that define the area in which a television signal could be received using the FCC's TV signal propagation tools. We use the Irregular Terrain Model (ITM) (Hufford et al., 1982), which is a modified version of the Longley-Rice model (Longley and Rice, 1968) which gives the propagation of electromagnetic waves over the Earth's surface. This model allows us to compute the received signal strength for each emitter-receiver pair, depending on the topographical conditions the signal had to go through. We assign a newspaper to be treated by a television station if the newspaper market's centroid falls within this Grade's reception contour. We follow the FCC's guidelines in computing the Grade A and B contours based on the station's channel, since VHF waves in different bands (channels 2-6 vs 7-13) propagate differently. Grade B contours are larger than and encompass Grade A contours because they specify a lower quality of signal reception (and the quality of signal reception decreases with the distance from the antenna).[25] In our main analysis, we focus on Grade B contours. Focusing on Grade A contours does not affect our main results, as discussed in the robustness checks section. Figure 1 illustrates our approach by focusing on the State of Illinois in 1952 and plotting the contours of several television stations and the locations of the state's newspaper markets.

To visualize the impact of the freeze on the roll-out of television, we first count the number of newspaper markets treated by television over time. Figure 2 shows this for the 1938-1964 period. The impact of the "freeze" is obvious: while television spread rapidly in 1947-1949, it greatly slowed in 1950 and stopped entirely in 1951, before a slew of new broadcasting in 1952 and 1953. We show the precise evolution around the freeze graphically in Figure 3. Each map is a snapshot of active television stations as of September 1 of that year. The maps for 1950 and 1951 are nearly identical, and the maps for 1952 and 1953 show a rapid development of new stations after the lifting of the freeze.

Election data Our analysis focuses on House, Senatorial, and Presidential Elections. We collect county-level data on all three types of elections for the period 1932-1964.[26] The data – which contain the number of votes for each party and the total number of votes – come from the "United States Historical Election Returns, 1824-1968" and is available online on the Inter-University Consortium for Political and Social Research's website.[27] We investigate

[25]The thresholds for Grade B are: -70.78dBm for channels 2-6, 61.78dBm for channels 7-13 and -53.78dBm for channels 14-69.

[26]For a seminal analysis of voting behavior in presidential elections during our time period see Campbell et al. (1960).

[27]Inter-university Consortium for Political and Social Research. United States Historical Election Returns, 1824-1968. Inter-university Consortium for Political and Social Research [distributor], 1999-04-26. https://doi.org/10.3886/ICPSR00001.v3.

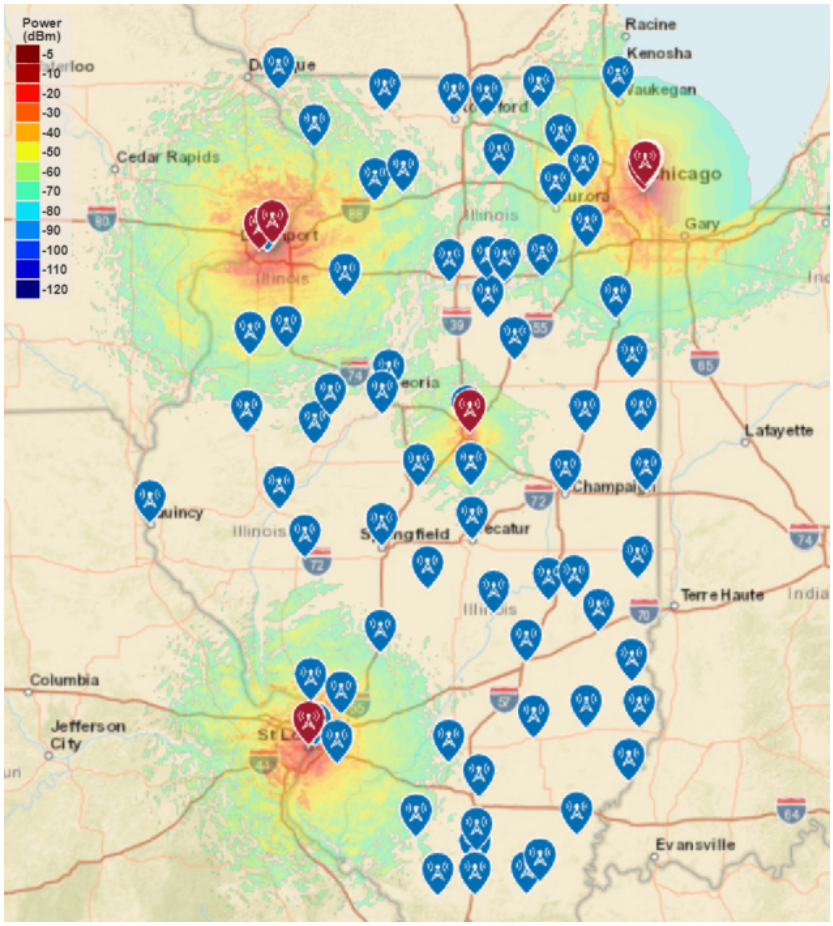


Figure 1: Newspaper markets covered by television in Illinois in 1952

Notes: Every red marker represents the location of a television antenna ("emitter") and every blue marker represents the center of a newspaper market ("receiver'). Both Grade A contours (in yellow) and Grade B contours (in green) are shown. They are constructed taking into account topographic conditions.

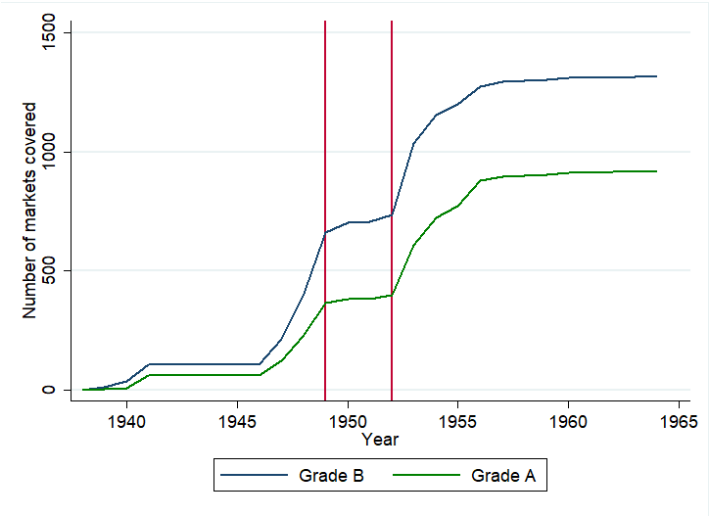


Figure 2: Evolution of the number of newspaper markets covered by TV

Notes: There are 1,539 newspaper markets in total. The freeze occurred between September 30, 1948 and April 14, 1952.

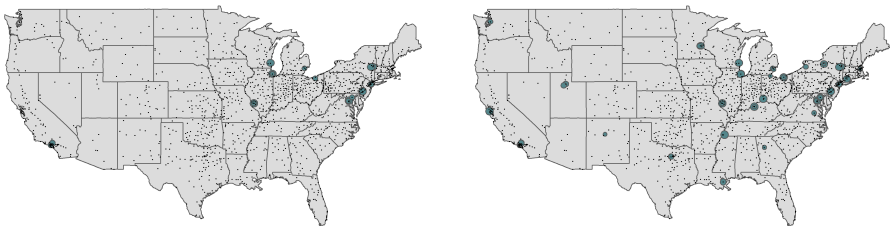
whether the changes in news diets brought about by the introduction of television led local elections' party vote shares to become more similar to presidential elections' party vote shares.

We look at Senate and House elections that correspond to presidential election years. The advantage of this approach is that we (arguably) hold constant turnout, voters' information, etc., across both the local and the national election. For each election, we compute the share of votes going to the Democratic Party candidate. We then compute the difference (in absolute value) between the share of votes going to the Democratic candidate in the local election (House and Senatorial) and the share of votes going to the Democratic candidate in the Presidential election. We expect this difference to shrink in the counties where news diets became more 'nationalized' following the introduction of television.

Lastly, for the analysis on voting, we build a grid covering the continental United States. This grid has points at every 0.1 degrees of latitudes and longitudes (approximately 10km depending on the location). We then compute, using an Irregular Terrain Model, the signal strength received at each point of this grid. We consider a county as treated depending on the share of points within the county that receive a signal above the Grade B threshold and compute results for different thresholds.

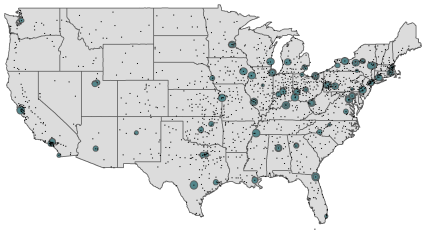
Other data Finally, to compute our control variables, we combine several datasets from the Historical, Demographic, Economic, and Social Data: The United States, 1790-2002 (ICPSR 2896).[28] First, the census data for 1930, 1940, 1950, 1960 and 1970 provide us with information

[28]Haines, Michael R., and Inter-university Consortium for Political and Social Research. Historical, Demographic, Economic, and Social Data: The United States, 1790-2002. Inter-university Consortium for Political and Social Research [distributor], 2010-05-21.

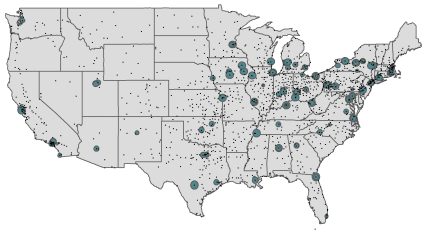


(a) 1947

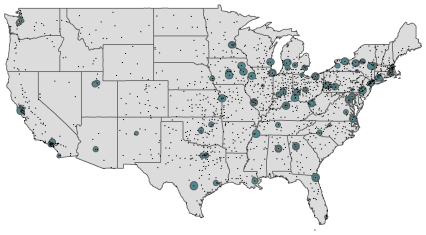
(b) 1948



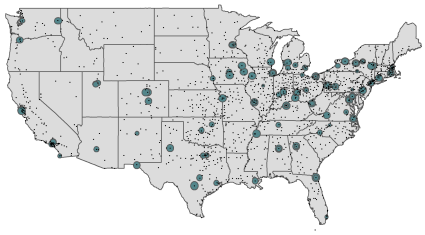
(c) 1949



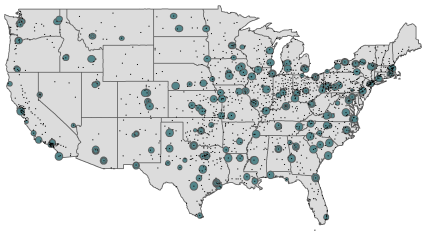
(d) 1950



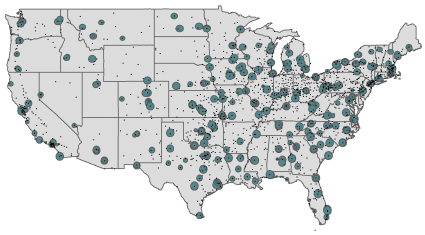
(e) 1951



(f) 1952



(g) 1953



(h) 1954

Figure 3: Timing of Television Entry, 1947-1954

Notes: Each television broadcast tower is represented by a circle once it is active. Circles show the reception area based on 47 dBu (ignoring topographic conditions), which the FCC defines as the "Grade B" service contour for analog television reception. Points indicate centroids of newspaper markets. Prior to 1947, the only licensed broadcast towers were in New York, Philadelphia, and Chicago.

on population per county, median income per county (1950 only), median school year for those above 25 years per county (1940 and 1950 only), the percentage of church members per county (1950 only), the percentage of foreigners per county (all years[29]), the percentage of black population (all years) and the percentage of urban population per county (missing for 1960 and 1970). For periods pre-1950, we use $(1 - \%$ illiterate$) \times 10$ as a proxy for the median school years.[30] Second, the County data book for 1952, 1956, 1962 and 1967 give us the median school years, the median income, and the urban population for post-1950 years. Information on post-1950 percentage of church members comes from the Religious Study. For all these variables, we interpolate the results for each year using a natural cubic spline interpolation. Finally, we use the newspaper market population data from Gentzkow et al. (2011), which is imputed for non-census years.

3 Conceptual Framework

The vast majority of our newspaper markets are monopolies and virtually all newspapers produce original local content which they bundle with third-party content, most notably wire national news and wire entertainment news (e.g., sports). Newspapers generate revenues from subscriptions and advertising. Following the introduction of television, consumers gain access to an alternative platform with both entertainment and national news (but without local news). Television also provides advertisers with an additional channel through which to reach consumers. In this context, what does theory predict regarding local newspapers' content repositioning, particularly in terms of their provision of local and national news?

Models of horizontal differentiation would predict local newspapers to increase their share of local content following the entry of television (Hotelling, 1929). Three features complicate this prediction. First, producing local news was likely much more expensive than printing (wire) national news, a feature that may significantly weaken the substitution from national to local content. Second, advertising considerations may either exacerbate or mute local newspapers' incentives to double down on local content, depending on (i) whether television and newspapers were complementary or substitute advertising channels and (ii) advertisers' preferences over readers with heterogeneous tastes for local and national news. Finally, there exists in principle no physical constraint forcing a newspaper to produce more of one type of content when it reduces the other (unlike, for instance, a radio station with a maximum of 24 hours of content a day).

Further, simple models of vertical differentiation would treat local and national news

[29]Note that for 1930, this is only the percentage of white foreigners.

[30]Because the average number of years of schooling is not included in the 1940 decennial census, we use $(1 - \%$ illiterate$) \times 10$ as a proxy. For example, this gives, for a county with a 50% illiteracy rate, an average number of years of schooling of 5 (approximately the number of years needed to develop literacy).

(and any other type of content) as a single product ("content") and predict newspapers – if television is assumed to provide more, or better, content – to decrease their overall provision of content in order to differentiate and appeal to more price-sensitive consumers (Gabszewicz and Thisse, 1980; Shaked and Sutton, 1982). In practice, though, newspapers and television stations were distinct media that offered distinct bundles of various types of content. Some types of content – such as entertainment – may have been perceived as superior on television, but others – such as national news or editorials – may well have been perceived as inferior. Other types of content (e.g., local news) were provided exclusively by one medium (newspapers). Such strong heterogeneity in content offering makes it difficult to rank newspapers and television stations based on quality, and limits the immediate applicability of canonical models of vertical differentiation.[31]

Our setting is also related to the strand of literature that centers on "preference externalities" in media markets (see Anderson and Waldfogel, 2015, for a review). According to this framework's logic, if the consumers who stop reading newspapers to switch to television have a strong preference for national content, newspapers should react by offering less national content because of the associated fixed costs of production and continue to produce local content to target their remaining consumers (George and Waldfogel, 2003, 2006). This effect should be stronger the more consumers switch to watching television exclusively, and the more valuable to advertisers these consumers are. In our context, several features may make these predictions subtler. First, consumers who switch to watching television exclusively might nevertheless have enjoyed local content previously, in which case, because of a scale effect, their departure might actually weaken newspapers' incentives to produce local content. Second, as mentioned above, although television provides national news, its offering is likely less comprehensive than the national content provided by local newspapers. It is conceivable that the consumers most interested in national news continue to read local newspapers (possibly in addition to watching television), which may dampen newspapers' incentives to reduce national news. Finally, local newspapers subscribe to wire agencies for their national news. The subscription fee they pay is often independent of the number of wire stories they print. Unless they end their subscriptions, printing fewer national news stories would not reduce their fixed costs of production.

In online Appendix E, we develop a simple model of newspaper content choice which borrows various elements from the theories reviewed above to fit our empirical setting. In the model, an incumbent newspaper chooses how much local and national news to include in its bundle in order to maximize profits across both the readership and advertising sides of the market. Bundling serves a price-discrimination purpose. It allows the newspaper to reduce the

[31] Heterogeneous costs of production across types of content (e.g., original local news versus wire national news), possible synergies, and advertising considerations complicate matters further. Moreover, consumers may also have preferences over the type of medium (television vs newspaper) per se.

dispersion in readers' and advertisers' effective willingness-to-pay and thus to extract a greater share of surplus. We show that entry in the market for national news makes bundling less profitable by limiting the incumbent newspaper's ability to extract surplus. This diminished ability to leverage bundling, in turn, decreases the incumbent's incentives to provide *both* local and national news. Although the model is special in several ways, it offers a cautionary tale regarding the production of local news in a more competitive national news environment. We also discuss several natural extensions of the baseline model. For example, explicitly accounting for the fact that national news were syndicated (as opposed to local news, which were produced in-house) leads to the prediction that television entry should have a larger effect on newspapers' coverage of local versus national news. Similarly, allowing newspapers and television stations to compete not only in the market for national news, but also in the market for entertainment news, exacerbates television's negative impact on local news provision. By contrast, allowing for consumers to both watch television and read newspapers, or, relatedly, for newspapers' coverage of national news to be superior, dampens (without reversing) the negative effect of television entry on newspapers' incentives to produce local news.

4 Empirical Results for Market Outcomes

This section examines the effect of the entry of television on prices and quantities in both the readership and advertising markets for newspapers. The primary challenge in identification is that the entry of television was not entirely random. Large markets with more commercial potential were the first to see firms pursue broadcast licenses, which may bias results as the newspapers in those markets may have been particularly robust, for example.

We proceed in two parts: first, we exploit the natural experiment of the freeze and limit our data to markets that were treated by TV in a narrow window around the freeze (20 months before the start of the freeze and up to 20 months after the end of the freeze), when variation in exposure to television is most likely to be exogenous as discussed in section 2.2.[32,33] We show in Appendix Tables 9 and 10 that once we limit our attention to this subgroup, census characteristics and newspaper characteristics no longer predict which markets and newspapers receive TV before or after the freeze in both a Probit and Linear Probability Model framework,

[32]Online Appendix Table C.2 shows the last twenty television markets to receive TV prior to the freeze and the first twenty television markets to receive TV after the freeze. Looking at the list, the idea is that newspapers in markets near cities on either side should be comparable. Alternatively, one may use the list of pending applications (at the onset of the freeze) to determine the list of control newspaper markets. While the information exists, we have not digitized it. First, to the best of our understanding, it was common for pending applications to be denied. Second, for the pending applications, antenna information is not as complete as in our dataset and therefore cannot be used to compute reception areas. Third, restricting attention to the list of pending applications would mean that we cannot vary the window of months used to define our sample. A qualitative review of the pending applications at the time suggests that the markets with applications pending mirrors the set of markets that we use as controls.

[33]Online Appendix Table B.3 replicates the analysis using all newspapers in our sample.

which gives us confidence that treatment by television was quasi-random in this subset of markets. Given the length of our panel, we can further verify that treated markets did not have different pre-trends than untreated markets; in Appendix Figure 4, we follow de Chaisemartin and D'Haultfœuille (2020) and find no evidence of different pre-trends for our primary outcome variables. As a second strategy, we implement a nearest-neighbor matching estimator using variables from the census matched to newspaper markets to explicitly create a control group for treatment by television. We examine only outcomes in 1951, when the FCC freeze was most salient, and match on market demographics as well as newspaper characteristics from the era prior to television. This addresses the concern of unobserved heterogeneity at the market level. All approaches show a consistent result: television was a negative shock to both readership and advertising, concentrated among evening newspapers.

4.1 Primary Analysis

Our approach focuses on the exact timing of the FCC freeze to isolate the impact of television on newspapers. We designate this sample as the set of "freeze" markets. Thanks to the rich data on newspaper markets, we can ignore all other markets and leverage this natural experiment by running regressions that only include these markets. Our main specifications use as a sample all newspaper markets that were impacted by newly active television broadcasts starting up to twenty months prior to and up to twenty months after the freeze, which took place from September 30, 1948 until April 14, 1952. The sample includes 136 TV licenses and $1,291$ newspapers out of the $1,965$ newspapers included in our database.[34]

$$y_{it} = \alpha + \sigma \cdot TV_{it} + \mathbf{X_{it}}\beta + \gamma_t + \delta_i + \epsilon_{it} \tag{1}$$

where i index the newspapers and t the years. y_{it} is an outcome of interest for newspaper i in time period t (e.g. its circulation) in natural logarithm. We construct TV_{it} as an indicator variable for whether or not newspaper i is in the range of an active television broadcast in year t. Following Gentzkow (2006), we assume that any broadcasts that begin in the final four months of a year only affect outcomes the following year. $\mathbf{X_{it}}$ is a vector that includes the newspaper market population (in log), an indicator for the population not being observed, as well as categorical variables for the number of newspapers in the market. Finally, our specification includes year and newspaper fixed effects. We cluster standard errors at the television station level as regional shocks may be correlated across newspaper markets, even when there is no competition across markets among newspapers.

Focusing only on the markets that were most clearly exogenously treated by the freeze is a departure in terms of identification with respect to the existing literature using this

[34] Online Appendix Table C.3 presents summary statistics for these newspapers. In the robustness checks section, we show that our results are robust to using different windows around the freeze.

	Subscription price			Circulation		
	(1)	(2)	(3)	(4)	(5)	(6)
TV	-0.033**	-0.039**	-0.031**	-0.031*	0.005	-0.034**
	(0.015)	(0.019)	(0.015)	(0.016)	(0.017)	(0.016)
Year & Newspaper FEs	✓	✓	✓	✓	✓	✓
Sample	All	Morning	Evening	All	Morning	Evening
R-sq	0.53	0.58	0.53	0.99	0.99	0.98
R-sq (within)	0.16	0.20	0.16	0.44	0.40	0.45
Observations	19,159	3,884	15,267	19,159	3,884	15,267
Clusters (TVStation)	197	130	181	197	130	181
Nb of newspapers	1,156	282	910	1,156	282	910

Table 3: Readership: Empirical Analysis

Notes: * p<0.10, ** p<0.05, *** p<0.01. The time period is 1944-1964. Models are estimated using OLS. Standard errors are clustered at the television station level. Dependent variables are in natural logs. All specifications include city population as a control, an indicator for city population missing, categorical variables for the number of newspapers in the market, and year and newspaper fixed effects. The total number of newspapers is slightly lower than the sum of morning and evening newspapers because of frequency changes (i.e., morning newspapers becoming evening newspapers, or the opposite).

shock. Gentzkow (2006) includes all the media markets in the analysis, controlling for fourth-order polynomials in time interacted with county-level observable characteristics. Similarly, to identify the effect of television on test scores, Gentzkow and Shapiro (2008) use variation across local markets in the timing of the introduction of television. They divide DMAs into three groups according to the year in which they began receiving television broadcasts. By contrast, we identify the impact of television by using variations in adoption within the 1947-1953 time period where the impact of television can clearly be considered as being more plausibly exogenous.

4.2 Results

Results are presented in Table 3 and Table 4. The first table looks at the readership side, and finds negative effects on prices and quantities. According to our estimates, the introduction of television led to a 3.3% decrease in the subscription price of newspapers and to a 3.1% decrease in circulation. The negative circulation effect is consistent with previous findings in the literature that point toward the crowding out of newspapers when television (or later the Internet) is introduced (see e.g., Gentzkow, 2006; Gavazza et al., 2019). This effect is concentrated among evening newspapers, for which we observe a 3.4% decrease in circulation. Interestingly, morning newspapers see little impact, possibly because very few stations came in the air before noon at the time.[35]

[35]See, for instance, the Advanced Television Factbook of 1956 which reports that in 1955 about 10% of sets were turned on between 7am and 4pm and about 60% between 7pm and 9pm.

Table 4 presents the results for the advertising side of the market. According to our estimates, the introduction of television led to a 2.2% decrease in the advertising rate, where the effect is concentrated primarily among evening newspapers (Columns 1 to 3). The advertising price effect may be due in part to the decreased circulation, which would mechanically lead to lower prices in advertising. It may also be driven by the fact that the introduction of an alternative advertising platform (television) decreased advertisers' willingness-to-pay for newspaper readers' attention.

Looking at advertising quantities, the negative impact of television is primarily in national advertising for evening newspapers. For those newspapers, we observe a 3.9% decrease in the amount of national advertising following the introduction of television. We find no impact on local advertising or classified advertising. This is probably because television programming was mostly national during this time period due to the excessively high cost of producing original local content. National television advertising took the form of sponsored programs (Lichty and Topping, 1975), unlike "spot" advertising that developed in the late 1960s and 1970s as the cost of program development exceeded the value to a single advertiser.[36]

Starting with a matching estimator exercise in Section 4.3 and a host of other robustness checks described in Section 7 and included in the Online Appendix, we show that our main estimates, to the exception of the effect on subscription prices, are very robust to the use of alternative specifications.[37]

One concern may be that the entry of TV stations may have been anticipated by the newspapers located in cities where no TV stations were granted before the freeze. In particular, the freeze was at first expected to last only six months. Hence, newspapers may have reacted preemptively to the entry, e.g. by adjusting their prices or changing their content. If this were the case, our estimates should then be considered as lower bounds of the true effect of TV entry. Note also that during this time period there was very little cross-ownership of newspapers and broadcast stations.[38] Hence, there were effectively few applicants for a broadcast license that were also local newspaper owners anticipating the effects of their own application.

[36]We do not find any evidence of an effect of television on the extensive margin of newspapers. It is possible that the shock we exploit was too short relative to the decision to shut down or merge. Additionally, newspaper readership was generally on an upward trajectory during this era, and so the negative shock might not have been sufficient to push firms to shut down.

[37]The fact that competition between two-sided platforms who compete on both sides of the market leads to weakly lower prices is consistent with the theoretical literature (Armstrong, 2006). See Seamans and Zhu (2014) on a related context in which competition between two-sided platforms occurs on one side only, which can result in the price charged to the opposite side going up (i.e., the well-known "waterbed effect").

[38]The newspaper-broadcast cross-ownership rule was initiated by the FCC in 1975. This rule banned cross-ownership of a newspaper and broadcast station in the same market. However, during our period of interest (1944-1964, i.e. before the ban), we observe very few occurrences of cross-ownership. In 1975, at the time of the FCC ban, only 16 cities had companies that owned both a newspaper and a television station which were required to sell at least one of the properties.

	Ad Prices			Local Advertising			National Advertising			Classified Advertising		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TV	-0.020*	0.007	-0.023**	0.004	0.071	-0.003	-0.020	0.088	-0.039*	0.005	0.050	0.005
	(0.011)	(0.022)	(0.009)	(0.018)	(0.044)	(0.019)	(0.021)	(0.061)	(0.021)	(0.026)	(0.060)	(0.027)
Year & Newspaper FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sample	All	Morning	Evening	All	Morning	Evening	All	Morning	Evening	All	Morning	Evening
R-sq	0.97	0.96	0.96	0.76	0.82	0.72	0.85	0.86	0.79	0.84	0.85	0.82
R-sq (within)	0.34	0.23	0.39	0.19	0.25	0.19	0.32	0.29	0.33	0.20	0.20	0.20
Observations	18,360	3,714	14,638	10,457	1,351	9,098	10,456	1,349	9,099	10,381	1,340	9,033
Clusters (TVStation)	196	129	180	183	84	169	183	84	169	183	83	169
Nb of newspapers	1,151	279	907	895	164	745	893	163	744	889	161	742

Table 4: Advertising: Empirical Analysis

Notes: * p<0.10, ** p<0.05, *** p<0.01. The time period is 1944-1964. Models are estimated using OLS. Standard errors are clustered at the television station level. Dependent variables are in natural logs. All specifications include city population as a control, an indicator for city population missing, categorical variables for the number of newspapers in the market, and year and newspaper fixed effects. The total number of newspapers is slightly lower than the sum of morning and evening newspapers because of frequency changes (i.e., morning newspapers becoming evening newspapers, or the opposite).

	Subscription price	Circulation	Ad price	National Ad
	(1)	(2)	(3)	(4)
TV	-0.001	-0.041***	-0.050***	-0.098**
	(0.010)	(0.013)	(0.015)	(0.039)
Match on Demographics	X	X	X	X
Match on Prior Circulation	X	X	X	X
Observations	832	832	805	566

Table 5: Nearest-Neighbor Matching Estimators, 1951 Outcomes

Notes: * p<0.10, ** p<0.05, *** p<0.01. Models are estimated using the `nnmatch` module in Stata. Dependent variables are in natural logs. The sample is all morning and evening monopoly newspapers. All specifications match on city population, median family income, median schooling, and percent urban, as well as the newspaper's average annual circulation for the years 1945–1947. Estimates are bias-adjusted.

4.3 Matching Estimator

Our second empirical approach employs a nearest-neighbor matching estimator (Abadie and Imbens, 2006) to assess the impact of the entry of television on newspapers. This alternative approach no longer requires that assignment to treatment was random, but instead controls for unobserved market-level heterogeneity by matching on observables. We no longer limit our analysis to the "freeze" sample and we match by linking demographics about a newspaper's home county to each newspaper as well as lagged newspaper characteristics. This approach estimates a sample average treatment effect in our data.

We choose to focus only on outcomes in the year 1951 when the "freeze" is most salient. We choose 1951 since by then, all television licenses granted prior to the freeze are fully operational and no new licenses will begin broadcasting until later in 1952. Limiting our outcomes to a single year of data greatly reduces the effective size of our dataset. We match newspapers based on census demographics of the newspaper's home county (population, median family income, median schooling, and percent urban), as well as their average circulation for the years 1945–1947, prior to the main entry of television stations across the country. We further restrict our attention to monopoly newspaper markets to prevent other unobserved factors from contaminating the comparisons. This matching estimator is therefore directly comparing the 1951 outcome variables for monopoly papers that had similar circulation prior to television in 1945–1947, in similarly sized cities, with similar demographics, but that either were or were not treated by television.

The results in Table 5 mirror the quantitative results from our earlier analysis, showing a significant drop in circulation, national advertising, and advertising rates for newspapers treated by television. The results from the matching estimator approach provide additional reassurance of the main effects we document using the freeze as a natural experiment.

5 Newspaper Content Analysis

While typical studies of shocks to product markets focus mostly on prices and quantities, the market for print newspapers features a far more complex product, whose quality and content can be adjusted over time. This section of the paper analyses how newspapers responded to the entry of television in terms of the product they offered to readers.

5.1 Intuition

As reviewed in Section 3, it is not clear what one should expect to occur to a local media outlet's offering of local vs. national news once faced with competition from television in both the readership and advertising sides of the industry. For example, one line of Industrial Organization theory suggests we should see newspapers devote more space to local content in order to differentiate themselves from national television news. Or, in line with the model summarized in Section 3 and developed in Online Appendix E, entry in the market for national news could lower newspapers' incentives to incur the fixed costs necessary to produce both local and national news because competition reduces newspapers' ability to extract consumer surplus. Moreover, because national wire stories were more economical for print media, we might expect a higher reliance on wire stories over original local reporting.

5.2 Results

Our approach to content mirrors our primary approach to prices and quantities: we exploit the natural experiment of the freeze where our outcomes are now the stories printed in newspapers, as described in Section 2.3. Given how costly content analysis is, we limit our sample to newspapers treated exactly before and after the freeze. This yields a set of newspapers that are a subset of those counted in our freeze sample in the price and quantity analysis. Since our data are counts of different types of content, we first use a Poisson regression model with two-way fixed effects for dates and newspapers. Table 6 presents the results. In Columns (1) to (5) we report the results we obtain when manually studying the content of the newspapers. Overall, we find a reduction of 6.6% in the total number of news stories (Column 1), driven by a drop of 10.1% in the number of local original stories (Column 3). The estimated marginal effects point to 7.99 fewer stories, including 6.15 fewer local news stories, due to the introduction of television. The drop in the number of local original stories is statistically significant at the 1% level. It is robust to the use of an OLS specification similar to the one presented in the market outcomes part of the paper (online Appendix Table D.1), and to the use of a negative binomial regression (online Appendix Table D.2). Looking at the other types of content (Columns (2), (4), and (5)), the coefficients are negative but not statistically significant at conventional levels. Unlike original local news, therefore, we find

no clear evidence of changes in local newspapers' provision of national news. Similarly, we find no clear evidence of a drop in newspapers' reliance on wire local stories (which covered mostly state-level affairs). These findings are consistent with the fact that wire stories were free to print (see next section for an analysis of subscriptions to wire services).

Further, Column (6) to (8) present the results for the number of pages and the machine-learning content score measure. As described in the data section, the number of observations is higher because the Matlab processing capabilities allow us to handle a large number of issues compared to what can be done manually. While the coefficient for the number of pages is negative, it is not statistically significant at conventional levels (Column (6)). Interestingly, we obtain a drop in the Matlab content score (Columns (7) and (8)), consistent with there being less article text in the newspaper; this result holds whether we consider the total Matlab score of the issue or the average quantity of content per page.

Comparing these findings with those present in George and Waldfogel (2006) and Fan (2013) is informative. Fan (2013) simulates a merger between two local newspapers and shows that common ownership leads both newspapers to reduce their "news hole" and their local news ratio. Our setting is different in that we look at a change in the number of news outlets rather than changes in ownership. Closer to our setting, George and Waldfogel (2006) look at the impact of the expansion of *The New York Times* into local markets using a fixed-effects approach on a short panel dataset. They find that increased competition in the market for national news leads newspapers to increase the share of journalists assigned to local news assignments, which is interpreted as a greater focus on local news. In contrast, increased competition in the market for national news in our setting leads local newspapers to decrease their news hole (i.e., the Matlab score content) and the overall number of local news stories they print. What might explain these differences? First, our setting involves the entry of a new mass media technology. Conceivably, the entry of television was more disruptive to local newspapers than the entry of a national newspaper. Consistent with this view, we showed in Section 4 that television led to a significant drop in newspapers' readerships. Instead, George and Waldfogel (2006) find that the entry of *The New York Times* did not reduce local newspapers' total readerships. In addition, George and Waldfogel (2006) show that local newspapers' readerships became less educated following the entry of *The New York Times*. Unfortunately, we do not have data on the composition of local newspapers' readerships during our period of study. Nevertheless, it is conceivable that the introduction of television triggered different compositional changes in newspaper readerships compared to the introduction of *The New York Times*. Television offered superior entertainment relative to local newspapers and its news content, though mostly national in focus, was in most cases not as comprehensive or in-depth as that provided by local newspapers (unlike *The New York Times*, with its extensive and relatively high-brow national content). Unlike with the expansion of *The New York Times*,

	(1) Total text	(2) National wire	(3) Local original	(4) Local wire	(5) Photos	(6) Editorials	(7) Nb pages	(8) Matlab total	(9) Matlab mean
main									
TV	-0.066**	-0.061	-0.101***	-0.041	-0.053	-0.056	-0.024	-0.147**	-0.085**
	(0.030)	(0.048)	(0.030)	(0.067)	(0.058)	(0.055)	(0.027)	(0.062)	(0.043)
Date FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Newspaper FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	3,196	3,196	3,196	3,196	3,196	3,196	6,829	6,829	6,829
Clusters (TVStation)	61	61	61	61	61	61	48	48	48
Nb of newspapers	102	102	102	102	102	102	71	71	71
Marginal Effect	-7.99	-1.72	-6.15	-0.42	-0.67	-0.43	-0.39	-16.85	-0.64

Table 6: Newspaper content: Poisson Regression

Notes: * p<0.10, ** p<0.05, *** p<0.01. The time period is 1946-1955. Models are estimated using a Poisson regression. An observation is a newspaper-date. Standard errors are clustered at the television station level. All specifications include city population as a control, an indicator for city population missing, categorical variables for the number of newspapers in the market, and date and newspaper fixed effects.

the readers keenest on national news likely continued to subscribe to their local newspapers after the introduction of television, which, in turn, meant that newspapers continued to have strong incentives to cater to their preferences. Second, the method employed to proxy newspapers' local news focus is different in our paper compared to George and Waldfogel (2006) and Fan (2013). While they rely on journalists' titles and assigned beats to proxy newspapers' local news provision (i.e., newspapers' "input"), we measure newspapers' content by directly counting the types of stories they chose to print (i.e., newspapers' "outputs").[39] Lastly, Bhuller et al. (2020) show that household adoption of broadband internet in Norway prompted different responses by national and local newspapers, with the former decreasing their content offering and the latter increasing theirs. In our setting, the distinction between local and national newspapers is unsuitable because virtually all newspapers were bundles of local and syndicated national news. Presumably, newspapers found it advantageous to decrease their provision of costly local content and to leave largely unchanged their offering of syndicated national news (see below for an analysis of subscriptions of news wires).[40]

Finally, our results that television caused a 3% drop in readership and a 6-10% drop in newspaper content are also related to (i) Gentzkow (2006)'s findings whereby the introduction of television led to a decrease of about 2 percentage points in voter turnout during off-cycle elections (which he argues might be due to substitution away from local newspapers), and (ii) Gentzkow et al. (2011)'s findings whereby the presence of one or more newspapers causes a 0.7 percentage point increase in voter turnout during off-cycle elections. These findings taken together suggest that the 3% drop in newspaper circulation we have documented is unlikely to account for a large share of the decrease in voter turnout found in Gentzkow (2006) and that, if anything, the relative resilience of newspapers in the early days of the television era prevented television's strong direct negative effect on voter turnout to be even larger.

To summarize, the implications of the content results are significant. While the entry of television was a shock to both the readership and advertising markets, newspapers further responded by reducing the amount of content they provided. With television, the bundle of the local newspaper faced direct competition on only a single dimension – national news – and yet we see a decrease in the provision of mostly original, local news. Note that the amount of local information consumed unambiguously decreased: some newspaper customers

[39]Relatedly, our findings may not be perfectly comparable with George and Waldfogel (2006)'s because they proxy local news production with the *share* of journalists assigned to local news topics, whereas we look at the *absolute* number of local news stories printed. An increase in the share of journalists assigned to local news topics is consistent with an increase, a decrease, or no change in the total number of journalists assigned to local news topics (and thus possibly an increase, a decrease, or no change in the number of local news stories). Because we are interested in changes in news diets and consumers' information, we prefer to report our content findings for each category separately.

[40]A more direct comparison with Bhuller et al. (2020) is difficult because, to the best of our knowledge, no distinction is drawn between local and national news or between syndicated versus original content. Rather, the focus of their analysis is on the distinction between national tabloid, national non-tabloid, and local newspapers.

stopped reading the newspaper, while those who continued to read received a lower amount of content. We exploit this shift in "news diets" in Section 6, where we analyze whether the lower exposure to local news results in more nationalized local elections.

News services During our time period, newspapers relied on news agencies for their national and international news. In return for the subscription fee, newspapers were allowed to print as many wire stories as they wished. For the time period 1946-1960, we collected annual information on the news services to which each of the newspapers subscribe (i.e. AP, UP, etc.). We have information for 18 different news agencies.[41] However, only the following news services can be considered "of importance" (with on average more than 1% of the newspapers subscribing to them): AP, UP, INS, NANA, CTNYN, NYT, CDN, DJ, NYHT, and RN. Online Appendix Figure B.11 plots the share of the newspapers which subscribe each year to each of these news services. While the vast majority of the newspapers subscribe to at least one news service – only 6% of the newspaper-year in our sample have no subscription to a news service – less than a third of the newspapers subscribe to more than two news services (online Appendix Figure B.12).

In Table 7, we investigate how the number of news services to which the newspapers subscribe varies following the entry of television. In Column (1), we use an ordered probit and report the results for the total number of news services to which the newspaper subscribes: the coefficient estimate is negative but not statistically significant at conventional levels. If we consider each of the major news services separately (dependent variables in Columns (2) to (7) are indicator variables equal to one if the newspaper subscribes to a given news agency and to zero otherwise), we find a decrease in the probability to subscribe to the AP (Column (2)) as well as to the Dow Jones (Column (7)). Overall, the substitution away from wire services seems limited, which is consistent with our earlier finding whereby newspapers did not react to the introduction of television by significantly reducing their provision of national news.

6 Nationalization of Local Politics

Voters often choose between the same political parties in the various local and national elections they participate in. Many scholars have documented a sharp tendency for local politics to become increasingly "nationalized" (e.g., Jacobson, 2015; Abramowitz and Webster, 2016; Hopkins, 2018).[42] Vote choices become nationalized when *"voters use the same criteria to choose candidates across the federal system"* or *"when voters are engaged with and knowl-*

[41] In alphabetical order, AP, CanP, CDN, CS, CTNYN, DJ, INS, McNS, NANA, NYHT, NYT, ONA, RN, SHNA, TP, TS, UP, and WCN. These are the abbreviations used by Editor & Publisher.

[42] For earlier work shedding light on nationalization trends see also Stokes (1967).

	Ordered probit	OLS					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Number of News Services	AP	UP/INS	NANA	CTNYN	NYT	DJ
main							
TV	-0.111	-0.018*	0.004	-0.000	-0.004	-0.005	-0.014***
	(0.079)	(0.010)	(0.014)	(0.005)	(0.006)	(0.003)	(0.005)
Year & News FEs	X	X	X	X	X	X	X
ME	All	All	All	All	All	All	All
R-sq		0.84	0.76	0.71	0.65	0.74	0.44
Observations	13,297	13,297	13,297	13,297	13,297	13,297	13,297
Clusters (TVStation)	197	197	197	197	197	197	197
Nb of newspapers	1,042	1,042	1,042	1,042	1,042	1,042	1,042

Table 7: Subscription to news services

Notes: * p<0.10, ** p<0.05, *** p<0.01. The time period is 1946-1960. An observation is a newspaper-year. Models are estimated using OLS estimations in Columns (2) to (7) and an ordered probit in Column (1). Standard errors are clustered at the closest TV station level. All specifications include city population and the number of newspapers circulating as a control, and year and newspaper fixed effects. In Columns (2) to (7) the dependent variables are indicator variables equal to one if the newspaper subscribes to the given news service (e.g. AP in Column (2)), and to zero otherwise.

edgeable about national politics to the exclusion of state or local politics" (Hopkins, 2018, p. 3). As Jacobson (2016) observes: *"Whereas in earlier decades, American voters were open to presidential and congressional candidates from the other political party, fewer and fewer voters are now willing to back out-party candidates."* This trend is not inherently good or bad, but it raises some serious questions about electoral institutions. In particular, the extent to which local politics are nationalized may influence political accountability at the local level. If voters are no longer informed about local politics, local officials' alignment with national politics may matter more than their performance in office.[43,44]

Hopkins (2018) hypothesizes that changes in media market structures are key drivers of these trends. Older media, such as local newspapers, had audiences that were "geographically bounded." These outlets had relatively strong incentives to produce local content. With recent decreases in distributions costs and increased competition from national outlets, voters' attention has drifted away from local content towards national politics (see also Martin and McCrain, 2019). In the previous sections, we showed that the introduction of television led to a strong shift away from local news, with fewer individuals reading newspapers and with newspapers producing less local content. The FCC freeze therefore offers a unique opportunity to test whether voters who consume less local news rely more on their national political preferences when participating in local elections.

6.1 Empirical Approach

To test Hopkins (2018)'s hypothesis, we use county-level voting returns for House, Senatorial, and Presidential elections for the period 1936-1964.[45] For both types of congressional elections, we investigate whether voting congruence with Presidential elections increased for those counties that were exposed earlier to television. We restrict our attention to on-cycle elections (as opposed to mid-term elections). The advantage of this approach is that turnout, voters, and information are presumably the same across both congressional and Presidential elections.

We develop a measure of party vote share congruence between congressional and Presidential elections. First, for each election and each county, we compute the share of votes for the Democratic candidate. Online Appendix Figure B.14 provides summary statistics for this variable. Second, for each local election, we compute the difference between this share and the corresponding share at the Presidential election in the same electoral year (in absolute terms).

[43] See Mayhew (1974) for a seminal analysis of congressmen and congresswomen activities and election concerns when the nationalization of local politics was relatively limited and local politicians could develop their own "brand". On the behavior of representatives in the US electoral system, see also Cain et al. (1990).

[44] A growing nationalization of local politics is also directly related to the debate about polarization, with voters' opinions and behaviors increasingly predicted by the party they support during presidential elections.

[45] Unfortunately, the voting data is not available at the news market nor at the city level. See Key (1966) for a canonical study of voters' behavior in presidential elections in the 1936-1960 period.

Our hypothesis is that news diets' greater national focus raises party vote share congruence between congressional and Presidential elections, because it increases voters' propensity to engage in straight-ticket voting.[46]

Our empirical specification is the same as before (equation (1)), except that the observations are at the level of county. This approach is again exploiting the natural experiment of the freeze.[47] Our vector of controls includes the log of the county population, the share of Blacks, the share of urban population, and the share of foreigners. We also control for county and year fixed effects. As before, we only focus on the counties exposed to the freeze.

Because the analysis in this part is at the county level, we use a grid approach to approximate the share of the county covered by TV: our TV explanatory variable is not a binary variable as in the previous two sections. We compute for each year the share of the county that is covered by a signal of quality Grade B using a grid of points. Hence, the TV variable here is this share which varies between zero and one. As in the rest of the analysis, our main specification uses as a sample all counties that were impacted by newly active television broadcasts starting just before and just after the freeze, which took place from September 30, 1948 until April 14, 1952. We designate this sample as the set of "freeze" counties. Because the treatment variable in this analysis is continuous, the sample of freeze counties is sensitive not only to the dates used to define the window but also to the threshold we specify above which a county is considered to be treated.

One challenge we face is that populations are not uniformly distributed and we do not observe within-counties' spatial distributions of population. Thus, a given share of a county's surface treated by television may not translate into the same share of that counties' voters treated by television. As a result, if we specify a very low threshold, we risk including many false positives. By contrast, if we specify a very high threshold, we risk including relatively few

[46] We are unable to test the intermediate step whereby less local information leads to more straight-ticket voting because we observe only aggregate voting data. However, the observation that less local information might lead to greater party vote share congruence via less split-ticket voting is correct under the assumptions that underpin standard spatial voting models. To illustrate, suppose voters participate in a local and in a national election and that they value candidates' ideology and valence. Suppose also that a candidate's valence depends on her individual valence as well as the valence of her party, but that voters are unable to perfectly disentangle the two. Finally, assume that candidates from the same two parties run in both elections and that same-party candidates share a similar ideology. Under complete information, voters treat both elections independently and a fraction of voters engages in split-ticket voting because of differences in relative valence across the two elections. For example, if the valence of the Democratic candidate relative to the Republican candidate is higher in the local election compared to the national election, some voters who vote for the Republican candidate in the national election will vote for the Democratic candidate in the local election (and all other voters will engage in straight-ticket voting). Now suppose that information about local candidates' valence decreases: voters rely on the national candidates' valence to infer the local candidates' valence and both elections are perceived as relatively similar. As a result, the fraction of split-ticket voters decreases and party vote share differences across the two elections unambiguously go down.

[47] As an extra measure of caution, we again follow de Chaisemartin and D'Haultfœuille (2020) and compute the long-difference placebos for our congruence measures. Doing so allows us to test whether the treated and the control groups follow parallel trends prior to entry. Reassuringly, online Appendix Figure B.15 shows that the common trends hold over several periods.

false positives but may run into power issues. In Table 8, we report our preferred specification, with thresholds of 60% and 70% of the county's area receiving a Grade B signal. Figure D.3 in the Online Appendix reports our estimated coefficient of interest for all possible thresholds between 0% and 100% in steps of 5%. Last, because our measure of congruence can be equal to zero, we report the results of the estimation both with the dependent variable in level and with the inverse hyperbolic sine transformation of congruence.[48]

6.2 Results

Table 8 presents the results of the empirical estimation. In Columns (1) to (4), we report the results with the 60% threshold, and in Columns (5) to (8) with the 70% one. As hypothesized, we find a negative and statistically significant decrease in the difference between the local and the national vote shares following the introduction of television. Regarding the magnitude of the effects, we find that TV penetration led to a decrease by around 2 percentage points in the absolute difference in the relative vote share for Democrats between the House of Representatives and the Presidential elections (Column 1), i.e. roughly 12% of a standard deviation. In other words, in the median county where the absolute vote difference is equal to 6.8 percentage points, an increase by one standard deviation, i.e. by 0.36, in TV penetration – e.g. from 0 to 36% of the county covered –, leads to a change in the vote share difference from 6.8 to 6.06 percentage points, a 11% decrease. The magnitude of the effect is of the same order for the Senate elections but not statistically significant in most specifications. In Figure D.3 in the Online Appendix, we show that our coefficient estimates are robust to using various thresholds to construct the sample of freeze counties.

Conceivably, the sharper results for House elections may be due to the fact that local newspapers' coverage was likely more important for House than Senatorial elections. Because senators represent larger geographical areas than congressmen and congresswomen (and thus multiple newspaper markets), wire agencies to which newspapers subscribed were more likely to offer coverage. By contrast, producing information on House elections was likely not economical for wire agencies and thus depended more directly on local newspapers' original reporting. Finally, note that Gentzkow (2006) shows that the introduction of television did not reduce turnout for congressional elections that coincided with presidential years. This observation makes it more likely that changes in information (as opposed to changes in the composition of voter turnout) led to a nationalization of local elections.

Moskowitz (2021), following Snyder and Strömberg (2010), exploits geographical mismatches between media markets and electoral areas as sources of variation in voters' knowledge about local politics. Using individual survey data, he finds that higher exposure to local news increases (i) voters' knowledge about local officials and (ii) voters' probability of casting

[48] A log transformation would indeed truncate the zero observations.

a split president-local official ticket vote in the 2012 and 2016 elections. Our analysis complements his in important ways. We focus on a time period that predates rising nationalization trends and during which split-ticket voting was relatively frequent (see e.g., Hopkins, 2018).[49] In contrast to Moskowitz (2021)'s preference-externality argument, we exploit exogenous timing in the entry of a national news media outlet as a source of variation in news diets. Despite the distinct underlying mechanisms and time periods, our results line up remarkably. Taken together, they constitute strong evidence that shifts in news diets away from local content are a key driver of the nationalization of local politics.

7 Robustness Checks

Finally, we perform a number of additional robustness checks. This section briefly describes them; the detailed results for these tests are available in the online Appendix (Section D).

Changing the size of the window to define the "freeze" period In our preferred empirical strategy, we have focused on all the newspaper markets affected by television between 1947 and 1953. Online Appendix Figure D.1 shows that our results are robust to using different windows around the freeze. Each sub-figure reports the $\sigma\cdot$ coefficient associated with the TV indicator variable in the different specifications depending on the number of months we use to define the window. From an empirical point of view, there is a clear trade-off in the choice of the optimal window: the smaller the window, the more similar the newspaper markets, but the lower the number of observations (as illustrated in the online Appendix Figure D.2) and so the lower the statistical power for the empirical estimations.[50]

Further, in the online Appendix Tables D.3 and D.4, we perform a similar analysis as before but this time we include all the newspapers in our sample, effectively allowing for an unlimited window around the "freeze." Hence, we now have a larger number of observations (around $29,000$ compared to around $21,000$). The main qualitative results remain unchanged.

Next, we similarly investigate what happens in terms of content when we include all the newspapers for which we have collected content in our sample (i.e. 159 newspapers rather than 102 when we focus on freeze evening newspapers). Online Appendix Table D.5 reports the results. We see that the results of the manual content analysis are not affected if we

[49] Figure B.16 in the online Appendix plots the evolution of the absolute difference between the vote share of the Democratic Party in the Presidential elections and the House elections during our period of interest.

[50] Figure D.1 starts with a window of five months, which is roughly the time it took for the first television station with a license granted after the end of the Freeze to start broadcasting. Some of the coefficients change discretely at the 9th and 20th month cutoffs. This is an artifact of a simple calendar effect. Increasing the window from 8 to 9 months and from 19 to 20 months means including in our sample newspapers that saw the entry of television in, respectively, January 53 and January 47. As it turns out, TV stations with large reception contours (i.e., TV stations that enter many newspaper markets at once) exhibit a marked tendency to start broadcasting during the month of January. These sample size effects can also be seen in Figure D.2, which plots the size of our sample as a function of the size of the window.

	60% coverage				70% coverage			
	(1) House (level)	(2) House (IHS)	(3) Senate (level)	(4) Senate (IHS)	(5) House (level)	(6) House (IHS)	(7) Senate (level)	(8) Senate (IHS)
TV	-2.01**	-0.02**	-1.98*	-0.02*	-1.85**	-0.02**	-1.38	-0.01
	(0.86)	(0.01)	(1.07)	(0.01)	(0.90)	(0.01)	(1.13)	(0.01)
Year & County FEs	X	X	X	X	X	X	X	X
R-sq	0.49	0.50	0.50	0.51	0.49	0.50	0.51	0.51
R-sq (within)	0.02	0.02	0.00	0.00	0.02	0.02	0.00	0.00
Observations	10,041	10,041	6,717	6,717	8,737	8,737	5,846	5,846
Mean DepVar	13.57	0.13	10.83	0.11	13.37	0.13	10.66	0.10
Sd DepVar	17.31	0.16	14.94	0.14	17.05	0.16	14.65	0.14

Table 8: Absolute difference in the vote share for the Democrats between "Local" and Presidential Elections

Notes: * p<0.10, ** p<0.05, *** p<0.01. The time period is 1932-1964 and a year is a Presidential election year. Models are estimated using OLS. Standard errors are clustered at the county level and observations are at the year-county level. The dependent variable is the absolute difference in the vote share for the Democrats between the Presidential elections and the House of Representative elections in Columns (1), (2), (5) and (6), and between the Presidential elections and the Senate elections in Columns (3), (4), (7), and (8). In the odd columns, the dependent variable is the level of the absolute vote difference (in percentage points). In even columns, we report the results when using the inverse hyperbolic sine transformation. All specifications include the logarithm of the county population, the share of Blacks, the share of urban population, and the share of foreigners as controls, and year and county fixed effects.

do so, except that the coefficient on the number of photos is now negative and statistically significant.

Considering "all day" newspapers as evening newspapers As noted in Section 2.3, 11% of the newspapers in our sample are "all day" newspapers, i.e. newspapers circulating both in the morning and in the evening. In the main specification, we do not consider these newspapers as evening newspapers (nor as morning) when we consider evening and morning newspapers separately to investigate the heterogeneity of the effects. As an additional robustness check, we verify that our results regarding evening newspapers are not driven by this exclusion, i.e. we consider the "all day" newspapers as evening newspapers. Online Appendix Table D.6 presents the results. The magnitude and statistical significance of the results for subscription price and circulation are unaffected, as well as for advertising price. When we do so, the decrease in the quantity of national advertising is no longer statistically significant, however. This is not surprising given that newspapers circulating both in the morning and in the evening may face no change or a slight increase in the quantity of national advertising published in their morning editions, therefore mitigating the effect observed for the evening ones.

Alternative controls In our preferred empirical specification, we control for city population, an indicator for city population missing, and categorical variables for the number of newspapers in the market. However, the market structure can be considered as a "bad" control in the sense of Angrist and Pischke (2009). Online Appendix Tables D.7 and D.8 present the results of the estimation of equation 1 without the number of newspapers as a control. The results are very similar to those presented in Tables 3 and 4.

Monopoly markets Next, in the only Appendix Tables D.9 and D.10, we verify that our results are robust to including only monopoly newspaper markets (markets with more than one newspaper could in principle have reacted differently to the introduction of television, since they were more competitive to begin with). Our findings are robust to reducing our sample to monopoly newspaper markets; if anything, the magnitude of the effects on the advertising side is slightly larger, while there are no differences on the reader side. This also holds for the content analysis: our main findings are not affected either quantitatively nor qualitatively when focusing on monopoly newspaper markets (Table D.11).

Next, we adopt a less conservative approach and define as monopoly all those markets that have at most one newspaper per frequency (i.e., markets with one morning newspaper, markets with one evening newspaper, and markets with one morning newspaper and one evening newspaper). These represent 89.39% of all newspaper markets in the entire dataset

(and 89.50% in the freeze dataset). Online Appendix Tables D.12 and D.13 show that our results are also robust to restricting our attention to these markets.[51]

State-year Fixed Effects Our main specification controls for year and newspaper fixed effects. We show that our main results (with the exception of subscription prices) are robust to controlling for state-year fixed effects. Online Appendix Table D.14 and D.15 present the results respectively for readership and advertising.

Grade A Signal Contours Finally, we show that our results are robust to using Grade A signal contours – rather than Grade B as in our preferred specification – to define the area in which a television signal could be received using the FCC's TV signal propagation tools (see Section 2.3 for details). Online Appendix Table D.16 and D.17 present the results respectively for readership and advertising. Despite the different number of observations, our findings are robust to this alternative definition of the TV signal. Similarly, online Appendix Table D.18 shows that the content results are also unaffected when we use Grade A rather than Grade B.

8 Conclusion

The introduction of a new media technology affects both incumbent media outlets and the news individuals are exposed to. Some individuals switch to the new media technology and incumbent media outlets also adjust their content in response to the new competitive landscape. The existing literature has documented that the advent of television in the 1940s and 1950s and, more recently, that of the Internet have led to a crowding out of local political information. The decline of local news provision may in turn affect local government policies and political accountability (Snyder and Strömberg, 2010).

In this paper, we highlight two different channels through which the entry of a new technology may impact news consumption. First, we find that the entry of television led to a drop in newspapers' circulation and advertising revenues, as consumers and advertisers substituted away. Second, we show that the entry of television led to an adjustment in newspapers' content. In particular, newspapers reacted to the introduction of television by printing fewer local news stories. As a result, it is clear the news diets of individuals – both those who continued to read newspapers and those who started watching television exclusively – changed significantly as a result of the technological innovation. We show that television also led to an increase in party vote share congruence between local and national elections, which is consistent with the idea that individuals have less local information to inform their voting decisions. This change

[51] Note that we do not replicate our findings for the remaining roughly 10% of markets because there are too few observations.

in news diets may have other important consequences regarding the quality of the democratic debate and of government accountability given that local newspapers – even today – are still playing an important role in holding local governments accountable.[52]

Epilogue This paper has focused on a historical setting. However, entry on different dimensions of the television bundle have occurred in the intervening years: cable sports channels, Craigslist, and the Internet have introduced competition to sports news, classified ads, weather news, horoscopes, etc. We therefore sought to examine the newspapers whose historical content we had analyzed to see what they looked like today. Of the 102 newspapers whose content we analyzed, 10 were still operating in print format with full issues available online as of 2017. We repeated our manual content coding for these 10 newspapers, by focusing on an arbitrary date: Tuesday the 7th of March 2017. Our findings are simple: the average total number of stories was 95, compared to an average of 152 during the historical era we studied (for the same 10 newspapers), a drop of 37.5%. Moreover, we found that the content was 50 original local news (53% of all articles), compared to 86 (57%) during the historical era, which represents a large decrease in the amount of original reporting in the newspaper. While only anecdotal, this suggests that entry along singular dimensions of content has weakened the value of bundling to the newspaper, leading to a reduction in all types of content, especially local news. Online Appendix Figure B.13 shows the cover of the Altoona Mirror for Tuesday, March 7, 2017.

[52]Consistently, Gao et al. (2020) have shown that municipal borrowing costs increase by 5 to 11 basis points in the long run following a newspaper closure. Their data cover the 1996-2015 period, suggesting that the Internet is not providing adequate substitutes for local journalism.

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A Empirical Appendix

A.1 Selection Into Treatment

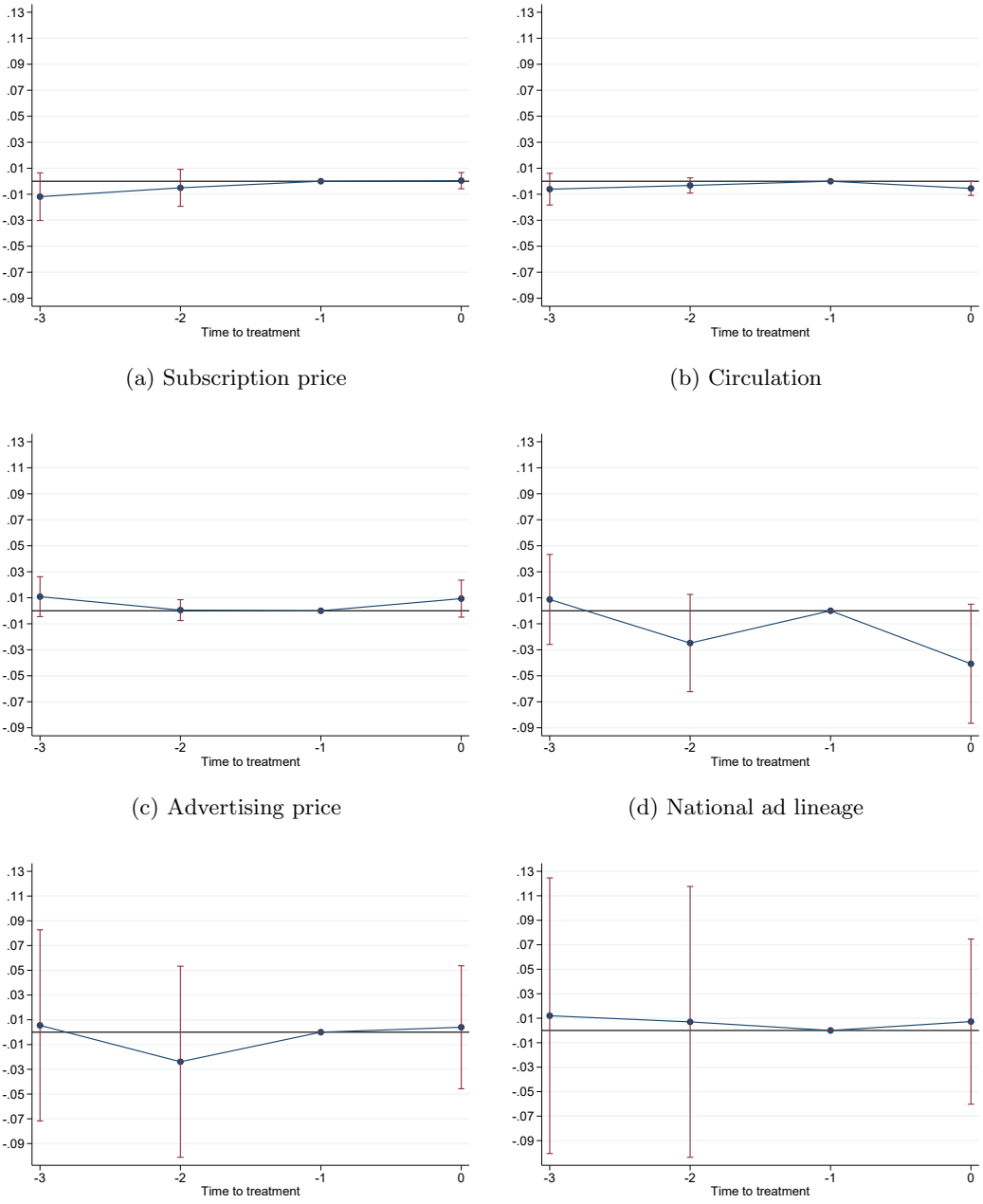
The reason our primary analysis uses only newspaper markets affected most by the FCC freeze – those that received television within a 20 month window of the start and end of the freeze – is to address the concern that TV entered first in larger, wealthier markets that had stronger, more competitive newspapers. To show how limiting to the "freeze" markets addresses this issue, below is a table of regressions of a dummy of TV treatment in 1951 (the middle of the freeze) first on a large set of census variables, and then in the second table on a set of newspaper characteristics. We estimate both a linear probability model and a Probit model. In the first table, the first and third columns show that using the full sample, treatment has strongly significant relationships with population, income, percent urban and percent foreign born. However, in moving to our limited sample in columns 2 and 4 that isolates the variation introduced by the freeze, we now see only weak statistical relationships (none significant at the 5% level). Therefore, in the limited sample, treatment by television can be seen as quasi-random. In the second table, we use lagged newspaper characteristics from 1945 and we see that there is overall much less predictive power of newspaper characteristics on treatment even in the full sample, and that this persists when using our limited sample. We see this as an artifact of the fact that a single television station would reach many newspapers of varying sizes since newspaper markets are generally much smaller geographically than television markets.

A different concern is that markets treated by Television prior to the freeze were different in a way not captured by the above analysis or our matching estimator. That is, perhaps the markets treated prior to the freeze were on different trends than those that received TV after the freeze. We follow de Chaisemartin and D'Haultfœuille (2020) and compute, for our main outcome of interests, the long-difference placebos. Doing so allows us to test whether the treated and the control groups follow parallel trends prior to entry. Reassuringly, Figure 4 shows that the common trends hold over several periods.

	Probit		OLS	
	(1)	(2)	(3)	(4)
Percent African-American	1.364	-0.219	0.262	-0.178
	(0.845)	(1.024)	(0.215)	(0.315)
Percent Urban	-0.891**	0.108	-0.217	0.092
	(0.452)	(0.639)	(0.132)	(0.158)
Percent Foreign Born	3.541**	0.469	0.668	-0.111
	(1.650)	(2.928)	(0.440)	(0.726)
Percent Church Members	0.001	0.012*	-0.000	0.003*
	(0.005)	(0.006)	(0.001)	(0.002)
Median Family Income	0.000***	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Median Schooling	0.081	0.131	0.021	0.031
	(0.066)	(0.092)	(0.018)	(0.021)
Population Growth Rate	1.493	-0.086	0.358	0.175
	(1.399)	(1.727)	(0.266)	(0.467)
Log(Population)	0.311***	0.166*	0.072***	0.021
	(0.063)	(0.095)	(0.015)	(0.020)
Sample	All	Freeze	All	Freeze
Pseudo R-sq	0.32	0.42		
R-sq			0.36	0.45
Observations	1008	609	1008	609

Table 9: Selection into Treatment Regressions: Markets

Notes: The regressions are of a dummy indicating whether or not a newspaper market was treated by Television in 1951, which is effectively asking which side of the freeze a market is on. An observation is a newspaper. All specifications include state fixed effects. Some observations are lost due to missing census variables. * p<0.10, ** p<0.05, *** p<0.01



(a) Subscription price

(b) Circulation

(c) Advertising price

(d) National ad lineage

(e) Total Text Stories

(f) Local Original Stories

Figure 4: Assessing the plausibility of the common trends assumption: Long-difference placebos

Notes: The figures plot the estimates and 95% confidence intervals, using the de Chaisemartin and D'Haultfœuille (2020) method, based on the Stata command did_multipleGT, available from the SSC repository. Standard errors are clustered at the television station level. Dependent variables are in natural logs. All specifications include year and newspaper fixed effects. We use the same scale on all the plots for the sake of comparison.

	Probit		OLS	
	(1)	(2)	(3)	(4)
main				
Lagged Circulation	-0.331	-0.454	-0.090	-0.112
	(0.215)	(0.302)	(0.056)	(0.076)
Lagged Price	-0.147	0.084	-0.025	0.012
	(0.420)	(0.695)	(0.140)	(0.193)
Lagged Ad Price	0.358	0.431	0.105	0.106
	(0.336)	(0.484)	(0.091)	(0.110)
Lagged Ad Lineage	0.444**	0.430	0.117**	0.104
	(0.193)	(0.290)	(0.049)	(0.075)
Sample	All	Freeze	All	Freeze
Pseudo R-sq	0.31	0.40		
R-sq			0.35	0.44
Observations	659	417	659	417

Table 10: Selection into Treatment Regressions: Newspapers

Notes: The regressions are of a dummy indicating whether or not a newspaper was treated by Television in 1951, which is effectively asking which side of the freeze a newspaper is on. Newspaper characteristics are taken from 1945, prior to any significant entry of television. An observation is a newspaper. All specifications include state fixed effects. * p<0.10, ** p<0.05, *** p<0.01