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MEDIA COMPETITION, INFORMATION PROVISION AND POLITICAL PARTICIPATION: EVIDENCE FROM FRENCH LOCAL NEWSPAPERS AND ELECTIONS, 1944-2014

Julia Cagé

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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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Abstract

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JEL Classification: D72, L11, L13, L82

Keywords: media competition, newspaper content, size of the newsroom, hard news, soft news, political participation

Julia Cagé - julia.cage@sciencespo.fr
Sciences Po Paris and CEPR

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Media Competition, Information Provision and Political Participation: Evidence from French Local Newspapers and Elections, 1944-2014*†

Julia Cagé
Sciences Po Paris and CEPR

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†An online Appendix with additional empirical is available here.

1 Introduction

Will an increase in competition in the marketplace for news and ideas – triggered by technical change and information technologies – lead to a better coverage of general information and an increase in political participation? Or might it have the opposite outcome? This paper investigates the consequences of an increase in the number of media outlets on the quantity and quality of news provided and, ultimately, changes in voter turnout at elections.

More media competition is often seen as implying an increase in the dissemination of information, thereby enhancing the extent of ideological diversity, promoting truth and contributing to the political process.[1] In this spirit, recent studies in political economy have advanced the existence of a positive causal link between radio and newspaper entry and political participation (Strömberg, 2004b; Oberholzer-Gee and Waldfogel, 2009; Gentzkow et al., 2011). However the focus of these studies is on media access – the move from 0 to 1 media outlet. In this paper, I consider instead media competition – the move from $n > 0$ to $n + 1$ media outlets. There is indeed no reason to expect that the intensive margin of the media acts as the extensive margin; in particular because media competition may affect the content of media outlets.

To tackle these questions, I first provide a simple motivating theoretical framework generating a number of predictions, which I then test using a unique dataset on local newspapers and elections in France covering the 1944-2014 period. My general conclusion is that, in this particular setting, increased media competition has a mostly negative impact (business-stealing effect). While this conclusion does not necessarily apply to other settings, my results shed light on the conditions under which increased media competition can be detrimental or beneficial to access to information.

My theoretical framework builds upon existing literature on vertical product differentiation. I explore the conditions under which an increase in the number of newspapers can decrease both the quantity and quality of news provided. To that end, I consider a class of models with heterogeneous consumers and two profit-maximizing newspapers facing quality-dependent fixed costs. Newspapers first choose simultaneously their quality and then compete simultaneously in price. Consumers are heterogeneous with respect to their willingness-to-pay for newspaper quality. When heterogeneity in consumers' willingness-to-pay is high, the market is not covered under competition. The entrant expands the market and newspapers differentiate on quality to soften price competition and increase market power. One duopolist produces a lower-quality newspaper than the monopolist, and the other one a higher-quality newspaper. On the contrary, when heterogeneity is low, the market is covered under competition. In the extreme case of no heterogeneity, the entrant garners half of the market and

[1] According to Hamilton (2004), *""more news is better news" appears to be an axiom favored in discussions about the news marketplace."* (p.21).

halves the incumbent newspaper's circulation (business stealing). Consumers derive no additional benefit from the new newspaper, but resource use on fixed costs is doubled, reducing social surplus. Both duopolists produce a lower-quality newspaper than the monopolist.

I then introduce a second dimension of heterogeneity between readers, namely regarding their taste for "hard news" and "soft news".[2] Hard news corresponds to public affairs news, for example national and international news or economic news, and tends to be regarded as informative in the political process. On the contrary, soft news corresponds to entertainment or commodity news, say about sports or fashion. If there is more heterogeneity in the willingness-to-pay for an attribute (say soft news) than for the other (say hard news), everything else being symmetrical, both duopolists reduce the quality of the low-heterogeneity attribute (in this case hard news) compared to the monopolist.[3] The intuition is as follows: both newspapers benefit from differentiating on the dimension with higher heterogeneity so as to relax price competition, but they offer the lowest quality of the dimension with lower heterogeneity to contain costs.

Ultimately, if more informed voters are more likely to vote (see e.g. Feddersen and Pesendorfer, 1996, 1999; Lassen, 2005; Feddersen and Sandroni, 2006a,b), then an increase in competition leads to a decrease in political participation at elections when heterogeneity in the willingness-to-pay for quality is low.

This simple theoretical framework guides the empirical exercise and aids in interpreting the results. The empirical analysis has three objectives. First, I test for and quantify the effect of entry on the quality of newspapers, and explore how this effect varies with the extent of heterogeneity. Second, I extend the analysis to investigate how the entry of a newspaper affects the share of hard news in newspapers and how this effect varies with the relative heterogeneity in the willingness-to-pay for hard and soft news. Finally, I measure the impact of a change in the number of newspapers on turnout at elections and study the extent to which this impact depends on heterogeneity.

To perform this analysis, I build a new panel of local daily newspapers and local election turnout in France from 1944 to 2014. For several reasons, the French local daily newspapers industry is well suited to testing the impact of media competition on turnout at local elections. First, with on average more than 70% of the eligible voters in a county[4] reading a local daily newspaper every day, this industry may be key to political participation at the local level. Newspapers are arguably the most important of local media when it comes to local news and

[2] I use here the terminology hard in the colloquial and political science meaning of hardness as a measure of information content. Hard does not mean hard in the economic sense of verifiability.

[3] Higher heterogeneity in the preferences for soft news may come from the fact that soft news has more dimensions (music, sport, movies, crime,...) than the political space which can often be reduced to two dimensions.

[4] In this paper, for the sake of simplicity, I use the term "county" when referring to a "département". In the administrative division of France, a "département" corresponds roughly to a county in the United States (more on this below).

public affairs (see e.g. Snyder and Strömberg, 2010). Television and radio rarely allocate more than a few seconds to a local news story (Hess, 1991). Contrariwise, local daily newspapers in France tend to publish several editions: while these editions share a number of "national" or "regional" pages, several local news pages vary from one edition to the other, with most often city-level editions. Second, during this time period, I observe many entries and exits of newspapers that I can use for identification. Finally, I choose to focus on this industry because of the availability of excellent data.

My dataset includes every local daily newspaper published in France over this time period. I determine for each year between 1944 and 2014 the number of newspapers present in each French county – the natural news market; I collect annual data on each paper's location and circulation. I also put together annual information on the total number of journalists working for each newspaper. Furthermore, for the sub-period 1960-2014, I collect annual information on each paper's costs and revenues, as well as on the journalists' monthly gross salary.[5] I use this data to quantify the effect of entry on the quality of newspapers; following the existing literature, I use the number of journalists on staff as my first proxy for newspaper quality (see e.g. Hamilton, 2004; Berry and Waldfogel, 2010; Angelucci and Cagé, 2016; Cagé et al., 2017). I supplement this data for recent years (2005-2012) with measures of newspaper content, in particular of the size of newspapers (number of articles and of words). This data allows me to study how the quantity of news provided by newspapers varies with the market structure. I use the quantity of news as my second proxy for newspaper quality; more content is indeed presumably always preferred to less (see e.g. Berry and Waldfogel, 2010). Finally, I use newspaper content data to classify each article as hard news or soft news.

The first empirical challenge is to isolate the impact of newspaper entry on incumbent newspapers. My identification strategy uses the timing of entries as shocks affecting incumbents. I estimate the effect of newspaper entry by comparing counties that experience an entry to similar counties in the same years that do not. Because the entry decision is made to maximize profits, counties that experience an entry are likely to differ from other counties, both at the time of entry and in future periods. The identifying assumption is that newspapers in these other counties form a valid counterfactual for the incumbent newspapers in counties that experience an entry, after conditioning for differences in pre-existing trends, newspaper fixed effects, year fixed effects, and a large set of demographic covariates controlling for the

[5]To give a flavor of what is generally available in terms of newspaper cost and revenue data, it is worth remembering that in their study of how economic incentives shape ideological diversity in the media, Gentzkow et al. (2014) have no other choice but to use balance sheet data on anonymous newspapers that they match with newspapers using circulation value. On the contrary, I have actual annual balance sheet data for French local daily newspapers from 1960 to 2014. Moreover, to the extent of my knowledge, I am the very first to provide detailed historical information on the annual number of journalists at the newspaper level; I collect this data from paper records of the *"Commission de la carte d'identité des journalistes professionnels"* (the organization that issues press cards to journalists in France). To my knowledge, these exhaustive journalist data covering the 1944-2014 period are unique to France and were never used before (see Cagé, 2016).

age composition, occupational structure and educational level of counties. In particular, I show that counties that experience entry and these counterfactual counties exhibit similar trends in circulation, revenues, expenses, and number of journalists prior to newspaper entry. I use both aggregate event studies and a fixed-effect model allowing for time-varying effects of entry to perform this analysis.

The second empirical challenge is to quantify the extent of heterogeneity in the willingness-to-pay across counties. While the theoretical framework yields a precise measure of heterogeneity, the choice of data in order to approximate willingness-to-pay heterogeneity is more problematic. I proceed as follows. First, I compute a measure of heterogeneity in the willingness-to-pay for quality based on regional-level income inequality (using exhaustive income tax data). Second, I quantify the relative heterogeneity in the willingness-to-pay for hard news and soft news. I proxy the willingness-to-pay for hard news with a measure of political polarization: the share of the votes for extreme-right and extreme-left parties.

The empirical evidence confirms the predictions of my simple theoretical framework. First, I show that entry reduces the circulation of incumbent newspapers by nearly 20%. This business stealing is particularly strong in low-heterogeneity areas (44%). This leads to a 38 to 43% decrease in incumbent newspapers' revenues and expenses and a 19 to 35% decrease in the number of journalists working for incumbent newspapers. The drop in the size of the newsroom is of 50% in low-heterogeneity counties. Moreover, this decrease in the number of journalists is not compensated by an overall increase in the aggregate number of journalists working at the news-market level. I provide anecdotal evidence of a "switching effect", with a number of journalists working for the incumbent newspaper's newsroom switching to the entrant's one. In practice, my results suggest that most counties in France are "low-heterogeneity", in the sense that the business-stealing effect dominates. The high-heterogeneity counties appear to be limited to South-East France, i.e. the counties with higher regional-level income inequality.

Second, using data for recent years (2005-2012), I show that an additional newspaper leads to a 16 to 53% decrease in newspapers' size (depending on the measures used), to a 9 to 13% decrease in the share of hard news and to a 25 to 32% decrease in the amount of hard news. The decrease in hard news is driven by counties in which political polarization is low. Moreover I find that more competition leads to more newspaper differentiation and that this effect is lower in low-heterogeneity counties in which newspapers have less space for differentiation.

Finally, I look into the impact of media competition on participation at elections. I match my data on the number of local newspapers with city-level data on turnout at mayoral elections that I digitize from official records.[6] My empirical strategy follows Gentzkow et al.

[6]City-level data on turnout at mayoral elections is hardly available in the United States. Ferreira and

(2011). I look at changes in political participation in cities that experience a newspaper entry or exit relative to other cities in the same region and year that do not. I find that an increase in newspaper competition has a robust negative impact on local election turnout, with one additional newspaper decreasing turnout by approximately 0.3 percentage points. When considering only low-heterogeneity areas, this negative impact increases to 0.6 percentage points. This effect is robust to a range of alternative specifications and controls which bring confidence in interpreting it as being causal.

Literature review My results complement a growing literature on media and politics. Considering different media outlets, a number of papers have found that media access increases political participation (Strömberg, 2004b; Gentzkow, 2006; Oberholzer-Gee and Waldfogel, 2009; Schulhofer-Wohl and Garrido, 2013; Banerjee et al., 2010; Snyder and Strömberg, 2010; Gentzkow et al., 2011).[7] My paper contributes to this literature by studying the non-monotonicity of this finding. Moving from 0 to 1 newspaper (media access) can have very different effects than moving from $n > 0$ to $n + 1$ newspapers (media competition). Under certain conditions, an increase in the competitiveness of the market may indeed lead to a "race to the bottom" with a dumbing-down of newspapers' content and a decrease in political participation (Zaller, 1999; Arnold, 2002). Considering the intensive margin of the media is thus of particular importance in today's high-choice media environment. George and Waldfogel (2006) show that the expansion of *The New York Times* led to substitution away from local newspapers among high-income readers, also affecting local newspapers positioning.

To the extent of my knowledge, Drago et al. (2014) is the only paper to study the effect of newspaper competition on electoral participation beyond the effect of newspaper access.[8] They find that the entry of local newspapers leads to an increase in turnout in municipal elections in Italy. They also find that it increases total readership per capita. In the theoretical framework I develop in this paper, such a market expansion could explain the increase in turnout they obtain and might be due to high heterogeneity of Italian readership. Determining whether this is the case requires investigating the incentives of the media to deliver news. This is the second contribution of my paper.

While existing literature has focused on the economic incentives that shape ideological diversity in the media (Strömberg, 2004a; Mullainathan and Shleifer, 2005; Gentzkow and Shapiro, 2006; Anand et al., 2007; Gentzkow et al., 2014; Qin et al., 2013), I test empirically

Gyourko (2009) collect information on mayoral elections between 1950 and 2005 in over 400 cities which is, to the extent of my knowledge, the most complete dataset as of today.

[7] Gentzkow et al. (2011), using a panel of local US daily newspapers, show that one additional newspaper increases turnout at national elections but underline that the effect is *"driven mainly by the first newspaper in a market"*.

[8] Becker and Milbourn (2011) study the effect of increased competition in the ratings industry on the quality of ratings and find that it tends to decrease this quality.

how an increase in the number of newspapers in a news market affects the quality of newspapers (the size of the newsroom and the number of articles) and the share of hard news in newspapers' content. In my setting, newspapers face heterogeneous consumers which differ *vertically* in their willingness-to-pay for quality rather than *horizontally* in their political bias. From this point of view, my paper is related to the research on product quality in the context of vertical consumer heterogeneity (Shaked and Sutton, 1982; Tirole, 1988; Choi and Shin, 1992; Motta, 1993).

Investigating newspapers' decision to supply different type of news is important because different consumers may sort into different news. My findings on participation at local elections relate to studies by Falck et al. (2014), Gavazza et al. (2015) and Campante et al. (2017), who all estimate a negative effect of the introduction of the internet on turnout, due to a substitution away from media with greater news content.[9] Increased competition in the media market – or reciprocally, ownership consolidation through mergers (Fan, 2013) – may affect media outlets' content decision. Using evidence from radio broadcasting, Berry and Waldfogel (2001) find that increased concentration increases variety.[10] Similarly, focusing on the impact of market size on product quality, Berry and Waldfogel (2010) show that in daily newspapers, the average quality of products increases with market size, but that the market does not offer much additional variety as it grows larger. They measure quality with the paper's number of pages and of reporters on staff. Angelucci and Cagé (2016) document a negative effect of the introduction of advertising on French television on the amount of journalistic-intensive content produced by national newspapers, as proxied by the size of their newsroom. George (2007) also uses data on reporters when studying how differentiation and variety increase with concentration in markets for daily newspapers. This paper differs from this past empirical work in the direct use of media content to measure the size of newspapers and the shares of hard and soft news[11], in the large sample of media outlets I cover (287 newspapers), and in my ability to study these effects over a long period of time (1944-2014).

The remainder of the paper is organized as follows. Section 2 below lays out the simple theoretical framework and presents a number of qualitative predictions that guide the subse-

[9] See also Gentzkow (2006) and Prior (2005), who find that once television and cable TV, respectively, become available to US viewers, some of them stop watching news programs and sort into entertainment programs. Enikolopov et al. (2011) show that exposure to an independent TV news channel reduces turnout in parliamentary elections in Russia.

[10] See also DellaVigna and Hermle (2017) on media concentration and bias coverage.

[11] There is a growing empirical literature studying newspaper content but its focus is on political bias and not on the quantity or kind of news produced. Various measures of media bias have been used, in particular measures of newspapers' political leanings (endorsement, candidate mentions,...) using automated searches of news text. Groseclose and Milyo (2005) proxy the political positions of US media outlets by the average ideology of the think tanks they quote. Gentzkow and Shapiro (2010), exploiting the Congressional Record, use similarities between language used by media outlets and congressmen. Puglisi and Snyder (2015) propose a new method for measuring the relative ideological positions of newspapers using data on ballot propositions. Finally, Gentzkow et al. (2016) develop a new methodology based on high-dimensional data and machine learning to measure the partisanship of congressional speech.

quent empirical exercise. In Section 3, I describe the French local daily newspaper industry, provide evidence on turnout at local elections, and review the new dataset I build for this study. In Section 4, I study empirically the impact of an entry on the quality of newspapers (measured by the number of journalists and the size of newspapers) and on the content they produce (the share of hard news). In Section 5, I investigate the impact of changes in the number of newspapers on turnout at local elections. Section 6 discusses alternative mechanisms and external validity. Section 7 concludes. Finally, the paper is supplemented by an extensive online Appendix including all details of data sources and empirical specifications, as well as a full-fledged theoretical model and associated formal propositions and proofs.

2 Competition and news production: Theoretical framework and predictions

In this section I present my theoretical framework and a number of qualitative predictions that guide the subsequent empirical exercise and help to interpret the results. For the sake of concision, and also because the main contribution of the paper is empirical in nature, the presentation of the full-fledged theoretical model is left to the online Appendix (see online Appendix sections E and F). Here I only describe the main intuitions.

My theoretical framework builds upon models of vertical product differentiation. For simplicity, I consider a model where two profit-maximizing newspapers compete to attract readers. Assume first that there exists a single attribute along which newspapers can differentiate themselves, namely newspaper quality, and that readers are heterogeneous in their willingness-to-pay for quality. I also assume that there are increasing returns to scale in the production of newspaper quality, in the sense that higher quality involves higher fixed costs (typically a larger newsroom and journalist wage bill) but no additional marginal cost (once the higher quality news is produced, it can be reproduced for a limited cost). Newspapers first choose simultaneously their quality, and then compete simultaneously in price. Under fairly general conditions, one can obtain the following theoretical prediction :

Prediction 1 (Newspaper quality)
(i) When heterogeneity in the willingness-to-pay for quality is high, one duopolist produces a lower-quality newspaper than the monopolist, and the other one a higher-quality newspaper.
(ii) When heterogeneity in the willingness-to-pay for quality is low, both duopolists produce a lower-quality newspaper than the monopolist.

The basic intuition behind Prediction 1 is the following. When heterogeneity is high, the market is not covered under competition, and newspapers can differentiate on quality to soften price competition and increase market power. One duopolist produces a lower-quality

newspaper than the monopolist, and the other a higher-quality newspaper. In contrast, when heterogeneity is low, the market is covered under competition, leading to a business-stealing effect. Newspapers have little space for differentiation, which leads to stronger price competition (battle for market shares), decrease in profit, and lower resources available for quality investment.

The extreme case involves no heterogeneity at all in taste for quality. Under these conditions, it is clear that competition does not bring anything useful in terms of social efficiency. The business-stealing effect dominates, and both newspapers under duopoly can end up producing a lower-quality newspaper than the monopolist. By continuity, this result also applies when heterogeneity is small.

If we introduce a second dimension of heterogeneity between readers, namely regarding their preference for hard news vs soft news, then we obtain the following prediction:

Prediction 2 (Type of news)
(i) When heterogeneity in the willingness-to-pay for hard news is higher than heterogeneity in the willingness-to-pay for soft news, one duopolist produces lower-quality hard news than the monopolist and the other one higher-quality hard news.
(ii) When heterogeneity in the willingness-to-pay for hard news is lower than heterogeneity in the willingness-to-pay for soft news, both duopolists produce lower-quality hard news than the monopolist.

The intuition is the following. Regardless of where the other newspaper is located, each newspaper's best product strategy is to choose a distinct product (i.e. differentiation on at least one dimension). Newspapers always choose to differentiate along the dimension with the greater heterogeneity (here soft news). The attribute with more heterogeneity plays the same role as the single dimension. In effect, newspapers differentiate along this attribute to relax price competition, and use the attribute with less heterogeneity to manage demand and cost considerations.

If we combine this model of newspaper competition with a model of information acquisition and voting behavior, then we also obtain a corollary prediction on media competition and turnout. It has long been pointed out that people acquire information for their voting decision as a by-product of newspaper readership (Hamilton, 2004; Prior, 2007), and that more informed voters are more likely to vote (see e.g. Palfrey and Poole, 1987; Feddersen and Sandroni, 2006a,b; Banerjee et al., 2010; Campante and Do, 2014). This leads us to our third prediction[12]:

[12]Piolatto and Schuett (2015) propose a different mechanism that allows turnout to decrease with media competition. They show that newspaper entry can reduce turnout for partisan voters through the revelation of information on their candidate's ability.

Prediction 3 (Turnout)
(i) When heterogeneity in the willingness-to-pay for quality is high, the entry of a newspaper leads to an increase in turnout.
(ii) When heterogeneity in the willingness-to-pay for quality is low, the entry of a newspaper leads to a decrease in turnout.

We now turn to the description of the data sources and empirical strategies that we develop in order to test these predictions.

3 Local daily newspapers and local elections in France: Data sources and descriptive statistics

As stated in the introduction, the French local daily newspaper industry is particularly interesting to study because of the importance of this industry and the availability of high-quality data. I construct an annual dataset on the evolution of the French newspaper market between 1944 and 2014. Section 3.1 discusses basic industry characteristics, presents its historical development and reviews the dataset. Section 3.2 describes the French electoral system for local elections, presents the new dataset I built on election results at the municipal level and provides descriptive statistics on turnout. Finally, Section 3.3 describes my empirical measures to proxy for heterogeneity in consumers' willingness-to-pay for quality.

3.1 News industry characteristics and historical development

My sample includes 287 local daily newspapers over the 1944-2014 period. These newspapers are general information newspapers that offer a mix of soft and hard news topics. On average, about two thirds of the space in these newspapers is devoted to soft news (one third to hard news) but this ratio can vary widely (Table 1 presents descriptive statistics on newspapers' content). The average newspaper issue contains 421 articles of relatively small length (286 words per article). The size of newspapers is one of my proxies for quality. The other proxy I use is the number of journalists on staff. On average, 59 journalists work in each newspaper (Table 2 provides descriptive statistics on papers' costs, revenues and the size of the newsroom).

[Table 1 about here.]

[Table 2 about here.]

Overall, the local daily newspaper industry generated €2.3 billion in total revenues in 2014 (the last year of my sample), nearly four times more than the national daily newspaper

industry (€632 million). It represents nearly 30% of the total revenues generated by the print media industry (€7.74 billion[13]). 66% of theses revenues come from sales and 34% from advertisement. Its total circulation is around 4.4 million copies a day, compared to 883,000 for the national daily newspaper industry.

To get a sense of how important these circulation numbers are, it is useful to present them in terms of market penetration. The natural news market for a local daily newspaper in France is a county[14]; there are 87 counties in metropolitan France excluding the area of Paris.[15] On average, there are 2.7 newspapers per county and the total newspaper circulation in a county is around 80,000 copies, representing 24% of the eligible voters (see Table 3 which presents summary statistics on newspaper circulation). Given that the average ratio of reported readership to circulation is 3, this implies that more than nearly three-quarters of the eligible voters in a county read a local daily newspaper. Therefore, the issue of how changes in the news market structure affect the provision of information by daily local newspapers is key. Although there is a downward trend in circulation over the period 1944-2014, the total circulation of local newspapers has always been extremely large. The number of copies sold everyday ranges from 15 to 35% of the eligible voters during my period of interest.[16]

Given the high circulation across nearby counties – between 1944 and 2014, 42.7% of the local daily newspapers circulated in more than one county, and these newspapers circulated on average across 4 counties[17] – my main variables of interest are at the newspaper-county level.

[Table 3 about here.]

3.1.1 Newspaper entries and exits

The central independent variable in my analysis is the change in the number of newspapers. My sample includes 703 newspaper-county pairs. I observe a total of 356 county-years with net newspaper entry and 355 county-years with net newspaper exit. Figure 1 shows for each year

[13] I.e. 0.36% of the GDP. In comparison, according to the Newspaper Association of America (NAA), the US newspaper media industry generated $37.6 billion in total revenues in 2013, i.e. 0.22% of the GDP (in 2014, the NAA stopped releasing industry-wide revenue data).

[14] A county ("département" in French) is a French administrative division. The median land area of a county is 2,303 sq mi, which is slightly more than three-and-half times the median land area of a county in the United States. In 2010, excluding Paris, the median population of a county is 478,366 inhabitants and the median number of eligible voters is 350,658. (French local jurisdictions are described in more detail in the online Appendix Section A).

[15] In my analysis, I exclude the Paris area. In this area, local daily newspapers are indeed competing in a different way with national newspapers. Given that Paris has a national dimension, a lot of "local" information concerning the area of Paris is covered in national newspapers. So there is much more competition between the different newspapers than in the rest of France and considering only competition between local newspapers would be misleading.

[16] See the online Appendix Figure B.5. This ratio was above 35% only for a few years following WWII.

[17] More detailed summary statistics on the circulation of newspapers across counties are available in the online Appendix Section B.

the number of counties with net newspaper entry (upper figure 1a) and the number of counties with net newspaper exit (bottom figure 1b). The high number of entries and exits between 1944 and 1955 is a result of the Second World War. The wartime period marked an almost wholly clean break with the prewar media system, with the press industry effectively rebuilt from scratch once the conflict ended.[18] When I exclude this post-war period (1944-1954), I am left with a total of 96 county-years with net newspaper entry and 228 county-years with net newspaper exit.[19] The entering newspapers are either new newspapers entering the newspaper market from scratch (in 24% of cases[20]) or existing newspapers entering a neighboring market. Importantly, in more than 83% of cases, newspapers in a given market are owned by different owners.

[Figure 1 about here.]

Given that entries and exits are key for my identification strategy, it is critical to understand the forces that cause them. The existing literature suggest two primary determinants of the number of newspapers in a market: income[21] and population (see e.g. Gentzkow et al., 2011). As I underline above, newspapers have fixed costs, so market size is a major determinant of the number of newspapers in a market (Bresnahan and Reiss, 1991; Berry, 1992). In the online Appendix Table D.1, I provide evidence that, on the one hand, the market size is a good predictor of the number of active newspapers, and that on the other hand, newspapers move in where there is a trending population.

3.1.2 Newspaper data

I now briefly describe the news dataset I have constructed for this paper. I discuss further details of the construction of the data in the online Appendix (Section A). Those readers who feel uninterested in these technical details may want to go directly to Section 3.2.

Newspaper circulation, costs and revenues To determine for each year between 1944 and 2014 the number of newspapers present in each French county, I use various sources of information (e.g. official registries) that I digitize and merge. I count local daily newspapers from these sources: in each year, I extract the name and the counties in which every local

[18] In the immediate postwar period, newspapers accused of collaboration with the Nazi occupiers were closed down and their assets redistributed to owners untainted by collaboration. While the old pre-war press groups were eliminated, a new press system was reconstituted from independent companies. Of the 206 (local and national) daily newspaper titles that had been published in France in 1939, only 28 were able to resume operations after the war (Guillauma, 1988).

[19] Section B in the online Appendix presents a more detailed overview of this data.

[20] 85 out of the 356 county-years with net newspaper entry I observe come from these new newspapers. Among these 85 cases, 71 are caused by new newspaper owners entering the local daily newspaper industry.

[21] Richer counties can command both greater consumer willingness-to-pay for newspapers and marketability to advertisers.

daily newspaper circulates. I match newspapers across time using their title and counties. For each county-year, I also compute the number of local daily newspapers which serves as my key explanatory variable.

For the period 1944-1989, newspaper circulation data comes from official data I digitize and merge. Data for recent years (1990-2014) comes from the French press observatory. For each newspaper, I have annual information not only on their total circulation but also – for newspapers circulating across nearby counties – on their circulation in each of the counties in which they circulate.

I compute annually for local daily newspapers between 1960 and 2014 a number of important economic indicators, namely total operating revenues that I can split between revenues from sales and revenues from advertising, and total operating expenses. This dataset is, to the extent of my knowledge, the most complete existing dataset on newspapers' costs and revenues. I collect data covering the period 1960-1974 from the archives of the Ministry of Information. Between 1960 and 1974, French newspapers were asked by the Ministry of Information to report annually on circulation, expenditures and revenues. From 1984 to 2014[22], the data comes from the Enterprise Survey of the French National Institute of Statistics (INSEE). I identify newspapers in the dataset using the French registry of establishments and enterprises. For the newspapers not covered in the Enterprise Survey, I use information from the Bureau van Dijk's websites (in particular ORBIS).

Given that my analysis is at the newspaper-county level, I need to construct newspaper-county-level values of the variables. This is simple when the only newspapers circulating in a county are headquartered in this county and do not circulate outside. It is more problematic when a newspaper circulates across nearby counties. In this case, I use data on the geographical dispersion of circulation; for each newspaper, I assign to the counties in which it circulates a percentage of the value of the variable (e.g. total revenues from sales, operating expenses,...) equal to its share of the newspaper circulation.[23]

Size of the newsroom I collect annual data on the number of journalists at the newspaper level from the non-publicly available paper records of the "*Commission de la carte d'identité des journalistes professionnels*" (the organization that issues press cards to journalists).[24] These data are from Cagé (2016). For each of the local daily newspapers, I know the number of journalists (including both monthly-paid salaried workers and freelancers) on an annual basis from 1944 to 2014. I also compute information on each journalist's annual compensation,

[22] Unfortunately, no data is available for the period 1975-1983. However, I collect annual data on the number of journalists for the entire 1944-2014 period (see below).

[23] I show that the results are robust to rather assigning to each county an equal share of the variable of interest.

[24] In France, the press card has been granted to journalists on an annual basis by the "Commission de la carte d'identité des journalistes professionnels" (CCIJP) since 1936.

i.e. their monthly gross salary from 1960 to 2014. To the extent of my knowledge, this is an unprecedented dataset on newspapers' newsrooms.[25]

Newspaper content I supplement this data for recent years with measures of newspaper content, in particular of the size of newspapers. I use three different measures of size. First, for each newspaper issue, I count the number of words by front page. Front pages are available daily for 51 newspapers over the period 2006-2012. I download them from the local daily press syndicate website using an automated script.[26]

Second, I collect data on the entire daily content of each newspaper by using an automated script to retrieve for each day all the articles published in the newspaper. I download the data from two different websites which aggregate content from newspapers (Factiva and Lexis-Nexis). I construct a dataset covering 22 different newspapers over the period 2005-2012 with information on the total number of articles and the total number of words per issue.[27]

I next use the metadata (tag) associated with each article on Lexis-Nexis (title, subject, topic) to classify articles as hard news or soft news. The share of articles on hard news is defined as the number of articles on agriculture, economics, education, environment, international affairs or politics, divided by the total number of articles I am able to classify. The share of articles on soft news is defined as the number of articles on movies, culture, leisure activities, sports, "news in brief" (*faits divers*), religion or health, divided by the total number of articles I am able to classify.[28] (More details on the classification of articles between hard and soft news are presented in Section 4.5.)

Finally, I use the article classification into sub-categories to construct a measure of newspaper differentiation. This measure is an Herfindhal index ranging from 0 – no specialization, i.e. no differentiation between newspapers that all deal with all the topics – to 1 – perfect newspaper specialization, i.e. important newspaper differentiation, each newspaper being specialized in a given topic (e.g. music or sport). This index is equal to the sum of the squares of the shares of the different newpaper topics in each newspaper issue.

[25] Regarding US newspapers, annual information on the number of journalists is available at the newspaper level for recent decades in the Bacon's newspaper directories, but the directories do not go back in time. (The Editor and Publisher yearbooks go back in time but do not provide information on the number of journalists; they only have some non-systematic information on editors.) Moreover, I am the very first to compute annual individual-level information on compensation for journalists.

[26] Using front pages is not new in literature for this field. To establish evidence of media capture, DiTella and Franceschelli (2011) construct an index of how much first-page coverage of the four major newspapers in Argentina is devoted to corruption scandals.

[27] Berry and Waldfogel (2010) also use the size of the paper to measure quality, but they measure it with the number of pages, not with the number of articles per issue.

[28] By construction, the sum of both shares is equal to 100.

3.2 Local elections and demographic controls

The focus of this paper is on local (city-level) elections (the so-called *"élections municipales"*). As of today, there are 36,570 cities in metropolitan France. There are 2,282 towns and cities with more than 3,500 inhabitants outside the area of Paris. I focus on these cities over 3,500 inhabitants since the electoral rule for local elections for towns with fewer than 3,500 inhabitants is different. For each election, I measure turnout as the ratio of cast votes to eligible voters in the first round of the election. I use cast votes rather than total votes since in France blank votes are not included in turnout.

Local elections take place in France every six years. Between 1944 and 2014, 12 elections took place: 1947, 1953, 1959, 1965, 1971, 1977, 1983, 1989, 1995, 2001, 2008, and 2014.[29] Before 1983, data on French local elections have never been digitized. I construct the first electronically available dataset on French local elections results at municipal level between 1944 and 1982, using official data sources in paper format. More recent data are available in digitized format from the *Centre de Données Socio-Politiques* (CDSP) of Science-Po Paris, the Interior Ministry, and Bach (2011). Not all municipalities have data for all years, and I include municipalities if they have turnout data available for a majority of the years from 1947 to 2014.

Figure 2 plots local election turnout for the years 1947-2014. Although turnout was volatile over the period, the figure shows a marked decline at the end of the 1980's.

[Figure 2 about here.]

Local elections and local news Note that while newspapers enter/exit at the county level, the entry/exit "treatment" can be applied to towns. French local daily newspapers indeed provide in-depth municipal-level coverage of local news stories. On the one hand, newspapers – either circulating in only one county or across nearby counties – publish several local editions: eight on average (online Appendix Figure B.6 plots the distribution of the number of editions per newspaper for the year 2014). Moreover, most of them also have local news desks. The average number of news desks for the local daily newspapers in 2014 is 8.4 (see online Appendix Figure B.7 for the distribution of this number).

For example, a newspaper like *Le Courrier de l'Ouest*, which circulates across two different counties (the Maine-et-Loire and the Deux-Sèvres counties), publishes on a daily basis five different editions: Angers, Cholet, Nord Anjou, Saumur, and Deux-Sèvres. Furthermore, it has 15 different news desks: in Angers, Avrille, Beaufort en Vallée, and Les Ponts-de-Cé for the Angers edition; in Cholet, Beaupreau, and Trélazé for the Cholet edition; in Segré for the

[29] A mayoral election also took place in 1945. I choose not to include it in the dataset since this election took place before the end of the Second World War in very special conditions and just two years before the 1947 election.

Nord Anjou edition (also covered by the Trélazé desk); in Saumur and Doué-la-Fontaine for the Saumur edition; and finally in Bressuire, Niort, Parthenay, Thouars, and Saint-Maixent for the Deux-Sèvres edition. Even a newspaper like *La Charente Libre*, published in only one county (the Charente county), publishes three editions (Sud, Pays de Cognac, and Nord) and has five news desks (in Angoulême, Confolens, Cognac, Barbezieux, and Ruffec). In other words, local daily newspapers in France, despite being county-based, provide in depth municipal-level coverage.

Demographic controls Finally, I collect municipal-level demographic data. Demographic data from the French census is available in electronic format from 1962 to 2014 (the census took place in 1962, 1968, 1975, 1982, 1990, 1999, 2008, and 2013). I digitize data for the 1936, 1946 and 1954 censuses from original paper publications by the French National Institute of Statistics. I compute the share of the population by age group, occupation and degree. For each measure, I interpolate both the numerator and denominator between census years using a natural cubic spline (Herriot and Reinsch, 1973) and divide the two to obtain an estimate of the relevant share.

3.3 Measures of heterogenity

An important feature of my simple theoretical framework is that the effect of entry depends on the extent of heterogeneity in consumers' willingness-to-pay.

Heterogeneity in the willingness-to-pay for quality The choice of the data to quantify the extent of heterogeneity in the willingness-to-pay for quality across counties is a complicated issue. The most natural way to proceed is to use income inequality measures. Exhaustive income tax tabulations are available at the regional level over the 2004-2014 period in France. I use this data and generalized Pareto interpolation techniques (Blanchet et al., 2017) in order to compute regional measures of income dispersion. The regions with the highest income inequality levels tend to be located in the South-Eastern part of the country.

I then split my sample of counties between low-heterogeneity and high-heterogeneity counties on the basis of the regions to which they belong. That is, I classify as high-heterogeneity counties all counties in the top-four high-inequality regions (Provence-Alpes-Côtes d'Azur, Languedoc-Roussillon, Rhônes-Alpes, and Corsica).[30] Counties from other regions are classified as low-heterogeneity counties located in low-heterogeneity regions. Given the fact that in my simple theoretical framework the results depend on whether a county is below or above

[30]For instance, the ratio between the 90th and 10th percentile of the income distribution is equal to 14.6 for these four regions, vs. 11.7 on average in other regions. The exact ranking of regions varies slightly with the inequality indicator (interdecile ratios, inverted Pareto coefficients, Gini indexes, etc.), but these four regions are the only regions which systematically belong to the top-five high-inequality regions (whatever the indicator).

a heterogeneity threshold, such a binary measure of heterogeneity is more relevant than a continuous measure.

Generally speaking, my results suggest that counties are characterized by relatively low heterogeneity in France, in the sense that the business-stealing effect appears to dominate (on average). However, as I show below, this result comes entirely from the low-heterogeneity counties, and does not apply in high-heterogeneity counties (i.e. located in the top-four high-inequality regions). While my measure of heterogeneity is obviously imperfect, these results are consistent with the theoretical predictions.[31]

Relative heterogeneity in the willingness-to-pay for hard and soft news Finally, I proxy heterogeneity in the willingness-to-pay for hard news with a measure of political polarization. Higher heterogeneity in preferences for soft news may indeed come from the fact that soft news has more dimensions than the political space. Using electoral results for the 2002 presidential election (the last election to take place before 2005 – the first year for which I have newspaper content data), I construct for each county the share of the votes for extreme-right and extreme-left parties. In practice, counties with high extreme-vote shares coincide partly but not completely with the counties in the four high-inequality regions described above. My assumption is that the higher the extreme-vote share, the higher the heterogeneity in the willingness-to-pay for hard news. As I show below, my results validate this assumption.

4 Newspaper competition and news quality

In this section, I study how newspaper quality varies with the market structure and interact the effect of the market structure with the degree of heterogeneity in consumers' willingness-to-pay. To measure empirically the quality of newspapers, I follow the existing literature and use the number of journalists on staff (see, e.g. Hamilton, 2004; Berry and Waldfogel, 2010; Fan, 2013; Angelucci and Cagé, 2016; Cagé et al., 2017).[32]. The advantage of this measure is that it allows me to use the panel dimension of the dataset to exploit the timing of entries and exits for identification. My second proxy for quality is "quantity" – the size of newspapers. Indeed, consumers presumably always prefer more content to less. I use quantity to estimate both the impact of competition on newspaper quality and on the type of news produced –

[31] Note that low- and high-heterogeneity counties differ in terms of demographic covariates. In the online Appendix Table C.2, I perform a t-test on the equality of means for education, socioeconomic groups, age, total population and the number of newspapers of high- and low-heterogeneity counties. I find that low-heterogeneity counties have a higher proportion of farmers and a lower proportion of artisans and senior executives. They also have a higher proportion of individuals between 25 and 54 years old, and of individuals with only secondary and vocational education. All the specifications control for these demographic characteristics. I also control for the interaction between these covariates and the heterogeneity indicator.

[32] Anderson and Waldfogel (2015) for instance note that *"(i)n newspapers, some of the direct input cost measures – page length and staff size – are directly suggestive of quality."*

hard versus soft news. I perform this analysis taking a reduced-form approach. I use all the variations in the data from $n > 0$ to $n + 1$ newspapers.

4.1 Empirical strategy

The main empirical challenge is to isolate the impact of entries and exits on incumbent newspapers. My identification strategy relies on the timing of these events. I estimate the effect of the entry (or exit) of a newspaper by comparing counties that experience an entry (or exit) to similar counties in the same year that do not. Because the entry decision is made to maximize profits, counties that experience an entry are likely to differ from other counties, both at the time of entry and in future periods. The identifying assumption is that newspapers in these other counties form a valid counterfactual for the incumbent newspapers in counties that experience an entry, after conditioning for differences in pre-existing trends, newspaper fixed effects, year fixed effects, and a large set of demographic covariates controlling for the age composition, occupational structure and educational level of counties. I provide evidence below that entries are orthogonal to the outcomes I study: there are no pretrends in circulation, revenues, expenses and the number of journalists before entries (Section 4.2).[33]

Given the existence of treatment and control counties with a common underlying trend, I can quantify the entry effect that induces a sharp deviation from this trend. As underlined above, between 1944 and 2014, I observe a total of 356 county-years with net entry and 355 county-years with net exit, and of 96 county-years with net entry and 228 county-years with net exit when I drop the postwar period.

4.2 Results: market expansion or business stealing?

According to the simple theoretical framework I propose, the entry of a newspaper into a market may have a negative impact on incumbent newspapers if there is business stealing: the total circulation of the entrant exceeds the increase in the news market total circulation. To estimate whether this is the case, I use my panel data on newspaper competition and track the impact of a change in competition on newspapers' circulation. I study how a change in the number of newspapers in a county affects (i) the circulation of incumbent newspapers (per eligible voter) in the county; and (ii) the total newspaper circulation (per eligible voter) in the county. I estimate alternatively aggregate event studies and a fixed-effect model that allows for time-varying effects of entries and exits.

[33] Orthogonality may come from the fact that, in the spirit of a latent variable model with threshold crossing, small increases in population create a discontinuity. While entry is discontinuous, demographic characteristics indeed change smoothly.

Aggregate event studies The event of an entry (alternatively an exit) is the cross-sectional dimension and the years around the event are the temporal dimension of my panel. In the case of an entry, incumbent newspapers are defined as the newspapers circulating in the county the year before the entry. I study how the circulation of these newspapers is affected by the introduction of a new newspaper. Business stealing corresponds to a decrease in the circulation of incumbent newspapers. In the case of an exit, incumbent newspapers are defined as the newspapers circulating in the county the year before the exit *except* the newspaper which exits. The exit of a newspaper should either increase or not affect the circulation of incumbent newspapers. The analysis is robust to summing the variables of interest over incumbent newspapers or to consider each incumbent newspaper separately (in which case the cross-sectional dimension is the interaction of an event and a newspaper). I present the results here using the sum over incumbents.

I study the effect of newspaper entry and exit separately since the impact of entry and exit on circulation may not be symmetrical.[34] One of the main reasons why it may not be symmetrical is the life cycle of newspapers. Newspapers enter large but exit small. On average, circulation in the year of entry is equal to 116% of a newspaper's lifetime average circulation; circulation in the last year before exit is equal to 75% of the lifetime average.

Newspaper entry I consider first newspaper entry. Let c index counties, e index entry events, t index calendar years and j index event periods. By normalization, entry takes place in $j = 0$. The outcome of interest, $circulation_{cte}$, is the (aggregate) circulation of incumbent newspaper(s) per eligible voter.

I estimate the following model:

$$circulation_{cte} = \sum_{k=-10}^{+10} \alpha^k \mathbf{1}_{\mathbf{cte}}^{\mathbf{j=k}} + \mathbf{X}_{\mathbf{ct}}^{'}\delta + \gamma_t + \eta_c + \varepsilon_{cte} \tag{1}$$

where γ_t are year fixed effects, η_c county fixed effects, and ε_{cte} is the error term. The vector of controls $\mathbf{X}_{\mathbf{ct}}^{'}$ includes the share of the population with only secondary and vocational education diplomas, with the (French) baccalaureate, and with higher (post-secondary) education, the share of the population below 24, between 25 and 54, and between 55 and 64 year old, the share of the working population made up of farmers, artisans, shopkeepers and company managers, senior executive or knowledge workers, employees, and which has intermediate occupations, and the total population in county c and year t. Standard errors are clustered by events.

[34] There are some episodes during which there are simultaneously one (or more) entry(ies) and one (or more) exit(s) in a given county a given year. When entry(ies) and exit(s) cancel out I drop the episode. My results are robust to either considering as entries the episodes during which there are more entries than exits (net entry) or to dropping them. Similarly, they are robust to either considering episodes of net exit as exit or dropping them.

The set of coefficients α^k are my coefficients of interest.[35] In Figure 3, I first plot these coefficients α^k for the entire period 1944-2014. The dependent variable is total circulation (per eligible voter) in the upper figure (Figure 3a) and the circulation of incumbent newspapers (per eligible voter) in the bottom figure (Figure 3b). Two things need to be underlined. First, whether I consider total county circulation or circulation of incumbent newspapers, there is no pre-trend before the entry. All the α^k coefficients before the event are not statistically significant and the point estimates are close to zero. Second, despite the fact that there is some market expansion – the total circulation per capita increases by around 5 percentage points (Figure 3a) – we observe a strong and permanent business-stealing effect (Figure 3b). The circulation of incumbent newspapers per eligible voter decreases by more than 6 percentage points after entry, which corresponds to a 20% decrease.[36] Given the specificity of the postwar period, I show in the online Appendix Figure D.1 that these results are robust – even if of smaller magnitude – to only considering the post-1960 period. This also corresponds to the time period for which I have the newspapers' revenue and expenditure data.

According to my simple theoretical framework, the business-stealing effect should be especially strong in low-heterogeneity counties. In Figure 4, focusing on the 1960-2014 period, I investigate the effect of entry separately for low- and high-heterogeneity counties. It clearly shows that the business-stealing effect is much more significant in low than in high-heterogeneity places. In low-heterogeneity counties, there is no market expansion after an entry (Figure 4a). There is a negative impact on the circulation of incumbent newspapers at the time of entry, and this impact becomes stronger in the years following the entry. Eight years after the entry, we observe a 10-percentage-point decrease in the circulation of incumbent newspapers per eligible voter, which corresponds to a 44% decrease.[37] The business-stealing effect is much smaller in high-heterogeneity counties. First, in these counties, there is a small market expansion following the entry: the total county circulation per eligible voter increases by 1.6 percentage points (Figure 4b). Second, the incumbent newspapers' circulation only decreases by 1.9 percentage points at the time of the entry (Figure 4d).

[Figure 3 about here.]

[Figure 4 about here.]

Newspaper exit Does an exit symmetrically increase the circulation of remaining newspapers? I estimate equation (1) considering only episodes of exit. Figure 5 shows the coefficients

[35] Years around the event go from -10 to $+10$ but results are robust to the use of other time intervals. Results are also robust to estimating the model in first differences rather than in level.

[36] Between 1944 and 2014, the average circulation of incumbent newspapers per eligible voter the year before an entry is 30%.

[37] Between 1960 and 2014, the average circulation of incumbent newspapers per eligible voter the year before an entry is 22.55%.

α^k from this estimation for the period 1960-2014 controlling for demographics. Contrary to what we observe for entries, the magnitude of the effects for exits is very small (to make it appear clearly, I use the same scale for the y-axis of the figures for entry and exit). This difference in magnitude may come from the fact that, as I underline above, while newspapers enter large, they exit small (the circulation of exiting newspapers follows a decreasing trend before exit). We observe an increasing trend in the circulation of incumbent newspapers before exit (Figure 5b). Incumbent newspapers recover the circulation of the exiting newspaper even before the actual exit of the newspaper. The existence of a pre-trend in the circulation of incumbent newspapers before an exit makes the event-study approach – which relies on the timing of the events of entry and exit – less relevant for the analysis of the effect of exits (contrary to entries). In the next section I will thus focus on the impact of entry on incumbent newspapers.

[Figure 5 about here.]

4.3 The effect of newspaper entry on the size of the newsroom

How does the market structure affect the size of the newsroom? To answer this question, I use my panel of newspaper economic indicators that covers the period 1944 to 2014. In particular, for each newspaper, I observe the number of journalists on an annual basis as well as, for the sub-period 1960-2014, journalists' compensation, i.e., their monthly gross salary. I study how the entry of a newspaper into the market affects the value of these outcomes for incumbent newspapers.

Aggregate event studies In Figure 6, I plot the coefficients α^k that I obtain by estimating equation (1) with, as before, a -10 to $+10$ window. The dependent variable is the total number of journalists working in the county in the upper figure (Figure 6a) and the number of journalists working for incumbent newspapers in the bottom figure (Figure 6b).

If we first consider the number of journalists working for incumbent newspapers, it appears clearly that there is no pre-trend. The negative effect of entry happens on impact and persists over time (similarly to what happens for circulation). I find that the number of journalists working for incumbent newspapers decreases by 4 to 8.5 after an entry. Table C.1 in the online Appendix presents descriptive statistics for incumbent newspapers the year preceding an entry. The total number of journalists working for incumbent newspapers is on average equal to 44. The entry of a newspaper thus leads to a decrease of around 19% of the size of the newsroom of incumbent newspapers. This decrease was expected given the decrease in incumbent newspapers' circulation.

Even if small in terms of magnitude, one may be surprised by the on-impact decrease in the number of journalists. This may be due to the decision of the entrant newspaper to poach

journalists from the incumbent newspaper (and therefore of journalists to quit the incumbent newspapers without being encouraged to do so). Given the importance of local coverage for local daily newspapers, this would make perfect sense for the entrant newspaper to choose such a strategy. Faced with a decrease in its circulation (as shown above), the incumbent newspaper may decide not to hire a new journalist as a replacement.

Interestingly, the drop in the size of the newsroom seems indeed to come from the fact that, when there is an entry, a number of journalists working for the incumbent newspaper(s) go and work for the entrant. Indeed, I find nearly no change in the total number of journalists working in the county after an entry (Figure 6a).

One can use the journalist dataset constructed by Cagé (2016) in order to illustrate this phenomena with some informative anecdotal evidence. Consider the example of the newspaper *L'Union* which circulates in the Marne county (it is headquartered in the city of Reims). In 1981, *L'Union*, which was at the time in a monopolistic situation in the county, faced the entry of *L'Est Républicain*. While 115 journalists were working for *L'Union* before the entry, there were only 110 in 1982-83, 108 in 1984, 93 in 1985 and 84 in 1987, i.e. a 31-journalist drop within the six years following the shock. It is of interest to investigate what happened to these journalists. I find that 10 of them went to work for the entrant, *L'Est Républicain*. Maurice S., Bernard M., Jean-Marc R., Pierre L., Jean-Pierre M., and Bernard G. all left *L'Union* after the entry and immediately started working for *L'Est Républicain*.[38] The transition was not so smooth for Jacques F. and Bruno C. who left *L'Union* in 1984 but were only hired by *L'Est Républicain* in 1987 and 1989, respectively, or for François C. (he left *L'Union* in 1985 and was hired by *L'Est Républicain* in 1988) and Jean B. (1983-1986). They were indeed unemployed in the interim period.

Obviously, this example does not mean that there was a one-to-one transfer from the incumbent to the entrant newspaper. A number of journalists simply quit journalism at the time, e.g. Aldo F. who left *L'Union* in 1981, at the age of 68, and Michel M. who left in 1982, at the age of 60.[39] Some journalists also left *L'Union* to find a job in a newspaper other than *L'Est Républicain*, e.g. Igor U. who went to work for *Les Dernières Nouvelles d'Alsace* just after he left *L'Union* in 1981, or Daniel B., who had to wait four years before being hired by the *Midi Libre*.[40] But it is of interest to see that to some extent there is a split in the size of the newsroom just as there is one in the circulation due to the business-stealing effect.

[Figure 6 about here.]

[38] Interestingly, while his colleagues then stayed at *L'Est Républicain*, Bernard G. is the only one who came back to work for *L'Union* three years later.

[39] Or at least they quit working for general information media outlets. The journalist dataset I built in Cagé (2016) only includes general information local and national newspapers, television channels, radio stations and the news agency Agence France Presse. Excluded are trade magazines and specialist publications, entertainment magazines as well as, for example, music radio.

[40] He left *L'Union* in 1984 and was hired by the *Midi Libre* in 1988.

As a robustness check, I reduce my sample of interest to those newspapers facing an entry in the county in which they are headquartered. In this case, for each newspaper, rather than assigning to the counties in which it circulates a percentage of the newsroom equal to its share of the newspaper circulation, I consider its total number of journalists. (Obviously, this does not affect newspapers circulating in only one county.) I perform the analysis at the newspaper level. Hence I estimate the following model:

$$circulation_{nte} = \sum_{k=-10}^{+10} \kappa^k \mathbf{1}_{\mathbf{nte}}^{\mathbf{j=k}} + \mathbf{X}_{\mathbf{ct}}^{'}\delta + \gamma_t + \varphi_n + \varepsilon_{nte} \quad (2)$$

where γ_t are year fixed effects, but I now control for newspaper fixed effects (φ_n), and ε_{nte} is the error term. The vector of controls $\mathbf{X}_{\mathbf{ct}}^{'}$ is the same as before, and standard errors are clustered by events.

The set of coefficients κ^k are my coefficients of interest. In Figure 7, I plot these coefficients κ^k for two different left-hand side variables: the total number of journalists working for the incumbent newspapers (Figure 7a), and the average journalist compensation of the journalists working for these newspapers (Figure 7b)[41]. If we first consider the number of journalists, it is reassuring to observe that, as for the previous specification, there is no pre-trend before entry. Moreover, we observe a statistically significant drop in the size of the newsroom after entry. (Standard errors are not surprisingly larger in this case given the lower number of shocks.) In terms of magnitude, the number of journalists decreases by 2.5 on impact, and by 8.3 ten years after the entry. On average, newspapers facing an entry in the county in which they are headquartered employ 85 journalists the year preceding the entry. In other words, the decrease in the size of the newsroom they suffer is on average nearly 10% ten years after the shock.

What are the characteristics of the journalists leaving the incumbent newspapers? To provide some elements of response to this question, I compute the average journalists' compensation. The results are presented in Figure 7b. I find no change in journalists' monthly salary around the time of the entry. This may be due to the fact that both the (mainly younger and less experienced) newcomers and the oldest journalists (at the age of retirement) leave, so that on average there is no change in the average compensation paid.[42] Such a hypothesis is consistent with the additional evidence I present in the online Appendix where I show that there is no change in the average age of the journalists working for the incumbent newspaper around the time of entry (online Appendix Figure D.3a). I also investigate the extent to which entry affects the share of women working in the newsroom. This is of par-

[41] For journalists' compensation, the dataset only covers the 1960-2014 period.

[42] Moreover, it is important to note that the distribution of journalists' compensation is relatively equal for local daily newspapers (while it is not the case for example for national daily newspapers and for television stations, as shown in Cagé (2016)).

ticular interest given that it is well-known that women are under-represented in journalism. Online Appendix Figure D.3b presents the results. The effects are small and are statistically significant at the 5%-level for only a subset of the post-shock years, but if anything I do find that the share of women working in incumbent newspapers' newsrooms decreases following the entry of a newcomer.

[Figure 7 about here.]

I perform an additional robustness check to ensure that the drop in the number of journalists does not happen "by construction" for those newspapers circulating across counties (given that in this case in the main specification I allocate the number of journalists to the different counties depending on the share of the newspaper's circulation in each county). Rather than computing a circulation-weighted number of journalists, I simply allocate to each of the n^{th} counties in which the newspaper circulate $\frac{1}{n}$ times its number of journalists (i.e. for a newspaper with a 100-journalist newsroom circulating across two counties, I attribute 50 journalists to each county). Online Appendix Figure D.2 presents the results. They are entirely consistent with the findings of Figures 6b and 7a. On the one hand, there is no change in the size of the newsroom before an entry. On the other hand, there is a statistically significant drop following the entry which grows larger over time. If anything, the impact of the entry is of higher magnitude.

Fixed effects model I next show that these results are robust to estimating a fixed effects model. The advantage of the fixed effects model are threefold. First, as I underline above, low- and high-heterogeneity counties differ in terms of demographic covariates. The fixed effects model allows me to control, on top of these covariates, for the interaction between these covariates and the heterogeneity indicator. Second, with the fixed effects model, I can control for the events of exit. Finally, this additional model can be seen as a robustness check of my results.

Given the finding that the effect of an entry on both circulation and the number of journalists grows larger over time, I allow for time-varying effects of entry on outcomes (Laporte and Windmeijer, 2005). More precisely, to quantify the dynamics effects of the event and control for lags and leads, I define indicator variables for different years around the event and an indicator variable isolating the long-run effect of the shock. My estimating equation is:

$$y_{cnt} = \sum_{k=-2}^{+5} \beta_k \ \mathbf{1}entry_{ct}^{j=k} + \sum_{k=-2}^{+5} \gamma_k \ \mathbf{1}exit_{ct}^{j=k} + \eta_t + \rho_n + \mathbf{X_{ct}'}\delta + \varepsilon_{cnt} \tag{3}$$

where c indexes counties, n indexes newspapers and t indexes years. $\mathbf{1}entry_{ct}^{-2} = 1$ in the 2nd year before an entry; $\mathbf{1}entry_{ct}^{-1} = 1$ in the 1st year before an entry; $\mathbf{1}entry_{ct}^{0} = 1$ the

year of an entry; $\mathbf{1}entry_{ct}^{1} = 1$ in the 1st year after an entry;...; and $\mathbf{1}entry_{ct}^{5} = 1$ in the 5th year after an entry and all subsequent years. The base period is the years before the entry, excluding the 2nd and 1st years before entry (i.e. from t-3 backwards). I control for a set of indicator variables for exit $\mathbf{1}exit_{ct}^{j=k}$ that are defined the same way.[43] The set of controls $\mathbf{X'_{ct}}$ includes, as before, the share of the population with only secondary and vocational education diplomas, with the (French) baccalaureate, and with higher (post-secondary) education, the share of the population below 24, between 25 and 54, and between 55 and 64 year old, the share of the working population made up of farmers, artisans, shopkeepers and company managers, senior executives or knowledge workers, employees, and which has intermediate occupations, and the total population in county c and year t. The dependent variable y_{cnt} is alternatively the logarithm of newspapers' size of the newsroom, revenues (total, from sales and from advertising) and total expenditures.

Table 4 presents the results for incumbent newspapers.[44] For all the dependent variables, I find no statistically significant effect for the pre-entry indicator variables $\mathbf{1}entry^{-2}$ and $\mathbf{1}entry^{-1}$. Moreover, as expected given the results I obtain with the aggregate event studies specification, I find a negative and statistically significant impact of entry on the different outcomes of interest. For the number of journalists, the negative effect is statistically significant beginning the year of the entry (minus 35%) and then grows larger over time (minus 39% three year after entry). The long-term effect of entry on the number of journalists (captured by the indicator variable $\mathbf{1}entry_{ct}^{5}$) is minus 32% and is statistically significant at the 5% level (column 1).

Reassuringly, results are of the same order of magnitude for the other outcomes of interest (revenues and expenditures), in spite of the less balanced data coverage. Total revenues decrease by 33% on impact (column 2). This effect comes both from a decrease in revenues from sales and in advertising revenues. We observe a similar decrease in total expenditures (column 5). The negative effect is statistically significant for the four years following the entry; however the statistical significance vanishes for the long-term effect ($\mathbf{1}entry_{ct}^{5}$).

Furthermore, while entry has a strong negative effect on each individual newspaper's revenues, expenses and number of journalists, I show in the online Appendix Table D.2 – in which the dependent variables are values aggregated at the county level – that it has no positive effect at the aggregate market level. There are no statistically significant changes in total county's journalists, revenues and expenses at the time of an entry nor in the following years. Given the fixed costs of news production, through the duplication of these costs, the entry of a newspaper may lead to a decrease in the total amount of news produced at the

[43] To save on space, I only report the coefficients for entry variables since there are the only coefficients of interest. Results are robust to controlling or not for the exit indicator variables.

[44] Given that the balance sheet data is only available from 1960, I report the results for the 1960-2014 period for the sake of comparability. Consistently with the graphical evidence presented in the aggregate event study, results are robust to considering the entire 1944-2014 for journalists, and are available upon demand.

county level.

[Table 4 about here.]

Heterogeneity Finally, I study how the impact of an entry on the size of the newsroom, revenues and expenditures varies with heterogeneity. For the sake of simplicity and readability, I regroup my indicator variables for the years before and after entries into three indicator variables: pre-entry ($\mathbf{1}entry_{ct}^{\text{pre-entry}} = 1$ in the 2nd and 1st pre-entry year), short-run entry ($\mathbf{1}entry_{ct}^{\text{short-run}} = 1$ in the entry year, the 1st, 2nd, 3rd and 4th post-entry year) and long-run entry ($\mathbf{1}entry_{ct}^{\text{long-run}} = 1$ in the 5th post-entry year and all subsequent years). The base period is the years before the entry, excluding the pre-entry period (i.e. from $t-3$ backwards). I interact these indicator variables with the heterogeneity indicator variable. More precisely, my empirical specification is (abstracting from the exit terms):

$$\begin{aligned} y_{cnt} = {} & \beta_{\text{pre-entry}}\ \mathbf{1}entry_{ct}^{\text{pre-entry}} + \theta_{\text{pre-entry}}\ \mathbf{1}entry_{ct}^{\text{pre-entry}} * \text{Low Heterogeneity}_c \\ & + \beta_{\text{short-run}}\ \mathbf{1}entry_{ct}^{\text{short-run}} + \theta_{\text{short-run}}\ \mathbf{1}entry_{ct}^{\text{short-run}} * \text{LowHeterogeneity}_c \\ & + \beta_{\text{long-run}}\ \mathbf{1}entry_{ct}^{\text{long-run}} + \theta_{\text{long-run}}\ \mathbf{1}entry_{ct}^{\text{long-run}} * \text{Low Heterogeneity}_c \\ & + \Gamma\ \text{Low Heterogeneity}_c + \mathbf{X_{ct}'}\delta + \mathbf{X_{ct}'} * \text{Low Heterogeneity}_c\sigma \\ & + \eta_t + \rho_n + \varepsilon_{cnt} \end{aligned} \tag{4}$$

where $\text{Low Heterogeneity}_c$ is the low-heterogeneity indicator variable equal to one for low-heterogeneity counties and to zero otherwise. I allow the demographic covariates $\mathbf{X_{ct}'}$ to have a different impact in low- and high-heterogeneity counties.

In Table 5, I estimate equation (4) with different dependent variables at the newspaper level: the number of journalists (columns 1 and 2), total revenues (columns 3 and 4), revenues from sales (columns 5 and 6), revenues from advertising (columns 7 and 8), and total expenditures (columns 9 and 10). Odd columns present the results without accounting for heterogeneity. Consistently with the results of Table 4, I find that the entry of a newspaper has a negative impact on incumbent newspapers' number of journalists, revenues and expenditures following the shock (with no pre-trends). After 5 years, the negative effect is only statistically significant for the number of journalists (with a 32% drop), but the sign of the coefficients goes in the expected direction for all the other variables of interest.

In the even columns, I investigate the extent to which the effect varies depending on heterogeneity. For all the variables, it appears clearly that the negative effect of an entry is entirely driven by low-heterogeneity areas. While there is no impact of an entry on the number of journalists in high-heterogeneity counties, this number decreases by around 50% in low-heterogeneity counties. This is consistent with the first testable prediction of my simple

theoretical framework, when I proxy newspaper quality by the number of journalists: under low heterogeneity in the willingness-to-pay for quality, the entry of a newspaper leads to a decrease in the quality of newspapers. Note however that the interaction is not statistically significant in the long run (after five years).

[Table 5 about here.]

In the next sub-section, I study how the number of newspapers on a market impacts the size of the newspapers (total number of articles and of words), which is my second proxy for newspaper quality.

4.4 The effect of newspaper entry on the size of newspapers

4.4.1 Cross-sectional analysis

How does the structure of the news market affect the quantity of news produced by newspapers? I cannot estimate as before the impact of the entry of a newspaper given the fact that I only have data on newspaper content for recent years (2005-2012). I thus simply estimate the impact of the number of newspapers on the size of newspapers using a cross-sectional approach. A potential issue is that there may be selection in the cross-section. Reassuringly, the results of the previous section are robust to such an approach.

Let c index counties, d index the date (in days), t index year and n index newspapers. I assume that:

$$\begin{aligned} size_{ntd} =& \alpha_1 + \alpha_2 N_{nct} + \alpha_3 N_{nct} * \text{Low Heterogeneity}_c + \alpha_4 \text{Low Heterogeneity}_c \\ &+ \mathbf{X'_{ct}}\alpha_{\mathbf{5}} + \mathbf{X'_{ct}} * \text{Low Heterogeneity}_c \alpha_{\mathbf{6}} + \mu_t + \varepsilon_{nctd} \end{aligned} \tag{5}$$

where N_{nct} is the number of newspapers in year t in the county c in which the newspaper n is headquartered, $\mathbf{X'_{ct}}$ is a vector of observable characteristics, μ_t is a year fixed effect and ε_{nctd} is a newspaper-county-date-year shock. Low Heterogeneity$_c$ is the low-heterogeneity indicator variable equal to one for low-heterogeneity counties and to zero otherwise.

$size_{ntd}$, my key dependent variable of interest, is the size of the newspaper. I compute three different indicators of the size: (i) the number of articles by newspaper; (ii) the total number of words by newspaper; (iii) the total number of words on the newspaper front page. To adjust standard errors for possible dependence in residuals, I cluster my standard errors at the county-year level.

Table 6 shows the impact of the number of newspapers on the news market on the size of newspapers and how it varies with the extent of heterogeneity. In columns 1 and 2, I consider the total number of articles in the newspaper, in columns 3 and 4 the total number

of words, and in columns 5 and 6 the total number of words on the front page. The results I obtain are robust to using these three measures. First, I find that the number of articles in a newspaper statistically significantly decreases with the number of newspapers on the market: one additional newspaper decreases the number of articles by 178, a 42% decrease (column 1). The total number of words decreases by 53% and the number of words on the front page by 16%. Second, this effect is driven by low-heterogeneity counties. While I find no statistically significant impact of the number of newspapers on the size of newspapers in high-heterogeneity counties, I find that one additional newspaper on the market decreases the number of articles in the newspaper by more than 200 in low-heterogeneity counties (column 2). Moreover, I find similar results when considering the total number of words in the newspaper and the number of words on the newspaper front page. This negative correlation between the number of newspapers on the market and the size of newspapers in low-heterogeneity counties is consistent with the first prediction of my simple theoretical framework when I proxy the quality of newspapers with their size. In the next section, I investigate how the content of newspapers (hard vs. soft news) varies with the market structure.

[Table 6 about here.]

4.5 Extension: newspapers and the type of news produced

In the second prediction of my very simple theoretical framework, I divide newspaper content into hard and soft news. Classifying newspaper content into hard and soft news is an empirical challenge *per se*, especially because there are "news hybrids" and because what is informative in the political process for one citizen may not be for another. I consider as hard news articles which are informative for the reader at the time of the elections, even if they sometimes incorporate elements from entertainment. In contrast, soft news is non-informative in the political process.[45]

In order to study the distribution of articles by topic, I use the information provided by the website Lexis-Nexis. When I retrieve the entire content of newspapers, I also retrieve all the metadata (tag) associated with each newspaper article, and in particular its title, topic and subject. Combining information from the title, topic and subject, I determine the category of each article. I create 13 different categories: agriculture, culture, economics, education, environment, health, international affairs, leisure activities, movies, "news in brief" (*faits divers*), politics, religion and sports. I define the share of hard news articles as the number of articles on agriculture, economics, education, environment, international affairs or politics,

[45] According to Patterson (2000), soft news is *"typically more sensational, more personality-centered, less time-bound, more practical, and more incident-based than other news"* (p.4). Another possible terminology is the one used by Boczkowski (2010) who distinguishes "public affairs" news (national, business, economic and international topics) and "non-public affairs" news (sports, entertainment and crime subjects).

divided by the total number of articles classified by topics. Symmetrically, I define the share of soft news articles as the number of articles on culture, health, leisure activities, movies, "news in brief", religion or sports, divided by the total number of articles classified by topics.

I then estimate equation (5) with the share of hard news articles, the number of hard news articles and the number of soft news articles as my dependent variables of interest. An important empirical issue here is the choice of the heterogeneity measure. While until now – following Prediction 1 – I proxy heterogeneity in the willingness-to-pay for quality using income inequality, the prediction of my extended theoretical framework does not depend on heterogeneity in the willingness-to-pay for quality, but on the relative heterogeneity in the willingness-to-pay for hard news and for soft news: holding heterogeneity in the willingness-to-pay for soft news constant, newspaper entry leads to a decrease in the quantity and share of hard news produced by newspapers if heterogeneity in the willingness-to-pay for hard news is low.

I thus use the measure of heterogeneity in the willingness-to-pay for hard news described above, namely political polarization. Table 7 presents the results. The upper table presents the results for the share of articles on hard news (7a), the middle table for the number of articles on hard news (7b) and the bottom table for the number of articles on soft news (7c). I find that the share of articles on hard news decreases with the number of newspapers on the market. An increase by one in the number of newspapers decreases the share of articles on hard news by around 3.5 percentage points, a 10.5% decrease (column 1). This effect is robust to introducing year fixed effects (column 3) and to controlling for demographics (column 5). Moreover, this effect is stronger in low- than in high-heterogeneity counties. In low-heterogeneity counties, one additional newspaper decreases the share of hard news by more than 18%.

The decline in the share of articles on hard news can come either from a decrease in the number of articles on hard news or an increase in the number of articles on soft news (possibly with no change in the number of articles on hard news). In the middle table 7b, I estimate the impact of the number of newspapers on the number of hard news articles in the newspaper. I find that this impact is negative and statistically significant. An increase of one in the number of newspapers decreases the amount of articles on hard news by between 33 and 49 depending on the specifications, a 37 to 54% decrease. Moreover, I find that this effect is higher in low- than in high-heterogeneity counties, as predicted by the simple theoretical framework. Finally, in the bottom table 7c, I investigate how the number of articles on soft news varies with the number of newspapers. I find that it decreases with the number of newspapers but that there are no statistically significant differences between low- and high-heterogeneity counties once I control for year fixed effects and demographics.

[Table 7 about here.]

Newspaper specialization These results are consistent with the predictions of my simple theoretical framework when there is more heterogeneity in the preferences for soft news than for hard news. Another testable prediction of the framework is that an increase in competition leads to an increase in newspaper specialization. In the online Appendix Table D.3, I present the results of the estimation of equation (5) with newspaper specialization – measured with the Herfindahl index described in Section 3.1.2 – as the dependent variable. I find as expected that more competition leads to greater newspaper differentiation: a one-standard deviation increase in the number of newspapers leads to a 0.19 standard deviation increase in the Herfindahl index of newspaper specialization. Moreover, this effect is lower in low-heterogeneity counties (the α_3 coefficient is negative and statistically significant). This finding is in line with the intuition of the theoretical framework: when heterogeneity is low, there is less space for differentiation and newspaper specialization is thus lower. In the next Section, I look into the impact of a change in the number of newspapers on political participation.

5 Newspaper competition and electoral turnout

According to the third prediction of my simple theoretical framework, under low willingness-to-pay for quality heterogeneity, the entry of a newspaper leads to a decrease in turnout at elections.

5.1 Specification and identification strategy

To test this prediction, I match my panel data on newspaper competition with mayoral election results from 1947 to 2014 and track the impact of a change in competition on turnout. Let w index cities, c index counties and $t \in \{1, ..., 12\}$ index election years (one time unit representing six calendar years). The outcome of interest, y_{wct}, is voter turnout in city w in county c at time t. The key independent variable of interest is N_{wct}, the number of newspapers in city w in county c at time t. Since turnout varies at the city level while the number of newspapers varies at the county level (if two cities are in the same county, they have the same number of newspapers), I cluster the standard errors at the county level.

I assume that

$$\begin{aligned} turnout_{wct} = \alpha_1 N_{wct} + \alpha_2 N_{wct} * \text{Low Heterogeneity}_c + \alpha_3 \text{Low Heterogeneity}_c \\ + \mathbf{X'_{wt}}\delta_\mathbf{1} + \mathbf{X'_{wt}} * \text{Low Heterogeneity}_c\delta_\mathbf{2} + \rho_w + \mu_{rt} + \varepsilon_{wct} \end{aligned}$$

where ρ_w is a city fixed effect, μ_{rt} is an election-region fixed effect, $\mathbf{X'_{wt}}$ is a vector of observable characteristics at the city level, $\delta_\mathbf{1}$ and $\delta_\mathbf{2}$ are vectors of parameters and ε_{wct} is a city-county-

year shock. Low Heterogeneity$_c$ is the low-heterogeneity indicator variable equal to one for low-heterogeneity counties and to zero otherwise.

Similarly to what is done in Gentzkow et al. (2011), I estimate the model in first differences. My estimation equation is then:

$$\begin{aligned}\Delta turnout_{wct} = \alpha_1 \Delta N_{wct} + \alpha_2 \Delta N_{wct} * \text{Low Heterogeneity}_c \\ + \Delta \mathbf{X'_{wt}} \delta_\mathbf{1} + \Delta \mathbf{X'_{wt}} * \text{Low Heterogeneity}_c \delta_\mathbf{2} + \Delta \mu_{rt} + \varepsilon_{wct}\end{aligned} \tag{6}$$

where Δ is a first-difference operator. The vector of controls $\mathbf{X'_{wt}}$ includes as before the share of the population with only secondary and vocational education diplomas, with the baccalaureate, and with higher (post-secondary) education, the share of the population below 24, between 25 and 54, and between 55 and 64 year old, the share of the working population made up of farmers, artisans, shopkeepers and company managers, senior executives or knowledge workers, employees, and which has intermediate occupations, and the total population. Controls are defined at the city level.

5.2 Main results

Table 8 presents the results. In the first two columns, I show the effect of an additional newspaper on local turnout. Column 1 presents this effect without considering heterogeneity. I find that one additional newspaper decreases turnout by approximately 0.3 percentage points. In column 2, it can clearly be seen that this negative effect is driven by low-heterogeneity counties. I find no statistically significant impact of a change in the number of newspapers on turnout at elections in high-heterogeneity counties. On the contrary, when I focus on low-heterogeneity counties, I find that the effect of an entrant on the market is minus 0.6 percentage points and is statistically significant at the five-percent level.

The average turnout rate at local elections is 67%. Figure 2 shows how it varies between 1947 and 2014. It oscillates between 70% and 77% during the period 1947-1977 and since then has been declining. In the 2014 election it was equal to 60%. Related to the 17 percentage points decrease in turnout between 1947 and 2014, the 0.6 percentage points negative effect of a typical entry is thus of importance. Note moreover that this negative turnout effect is only due to the introduction of an additional local newspaper. If I extrapolate my results to other medias, this suggests that the large increase in media competition during recent decades can potentially explain a significant fraction of the historical decline in turnout.

My identification relies on changes in the number of newspapers over time. As a result it is correct as long as the timing of these changes is random. In columns 3 and 4, I undertake a falsification test using the timing of the changes which seems to confirm that it is indeed the case. I estimate the impact of a future change in the news market on current turnout. The coefficients I obtain are all non-significant. This suggests that changes in the number

of newspapers are not driven by election results and brings confidence in interpreting the coefficients of the first two columns as causal effects.

[Table 8 about here.]

5.2.1 Diagnosing bias using pre-trends

Finally, as an additional check supporting a causal interpretation of my findings, I use pre-trends. If the relationship between ΔN_{wct} and Δy_{wct} comes only from a causal effect, ΔN_{wct} cannot be correlated with past values of Δy_{wct}. On the contrary, if the observed relationship is driven by omitted components, ΔN_{wct} and past values of Δy_{wct} may be correlated.

In Figure 8 I plot the coefficient α^k from the following specification:

$$\Delta turnout_{wct} = \sum_{k=-1}^{+1} \alpha^k \Delta N_{wc(t-k)} + \Delta \mathbf{X'_{wt}} \delta + \Delta \mu_{rt} + \Delta \varepsilon_{wct} \tag{7}$$

where variables are defined as in equation (6). The prediction that newspaper entry decreases turnout corresponds to the negative spike in the plot at $k = 0$. Importantly, there are no significant trends either before or after the event.[46]

[Figure 8 about here.]

5.2.2 Magnitude of the effects

My estimates suggest that increasing newspaper competition by introducing an additional newspaper to a county decreases mayoral turnout per eligible voter by about 0.3 percentage points on average, and 0.6 percentage points in low-heterogeneity counties. The average share of individuals reading at least one newspaper is 70%. Following the logic of Gerber and Green (2000)'s intent-to-treat calculation (see also Gentzkow et al., 2011), my point estimate in low-heterogeneity counties corresponds to a $(0.7/0.70) = 0.86$ percentage point effect.

To get a better sense of what the magnitude of my estimates implies, I also compute the corresponding persuasion rate (DellaVigna and Kaplan, 2007; DellaVigna and Gentzkow, 2010). The persuasion rate captures the effect of the persuasion treatment on the relevant behavior, adjusting for exposure to the message and for the size of the population still to be convinced. In my case, everyone is exposed the same way to newspapers so I do not need to adjust for exposure to the message. The change in behavior is from voting to not voting, so the set of potentially affected individuals is the set of those who turn out, which represents on average 67% of the population. The 0.7 percent of eligible voters who do not vote as a result of an increase in newspaper competition therefore implies a negative persuasion rate of $(0.7/0.67) = 0.9$ percent.

[46] With only 12 elections in the sample, it is not possible to estimate equation (7) with a k higher than 1.

These estimates are lower bounds. The entry of a newspaper indeed raises the share of individuals reading at least one newspaper by about 8 to 12 percentage points. While the "intensive" margin of newspaper competition – through the decrease in the quality of the information provided to readers – has a negative effect on the probability of voting, this "extensive" margin – the increase in the number of readers – may have the opposite effect, since previously non-informed citizens now have access to a source of information. I am not capturing here the positive effect of the extensive margin of entry; however, whereas the focus of the literature has been on the extensive persuasion rate – media access leads to higher turnout at elections – I show that the intensive margin of the media – the change in media quality – can reverse the extensive effect.

Abstracting from the change in the share of hard versus soft news in newspapers, I finally compute the number of citizens who change their behavior from voting to not voting due to a decrease of one in the number of journalists. Depending on the specifications, the entry of a newspaper leads to a decrease of about 9 to 25 journalists. As I underline above, the treatment effect of the entry of a newspaper is a .86 percentage point decrease in turnout, which represents on average $3,000$ voters in a county. In other words, each newspaper cost cut of one journalist results in about 120 to 333 citizens failing to vote.

6 Discussion and interpretation of the results

6.1 Alternative mechanisms

Clearly I have not established that my simple theoretical framework built upon models of vertical product differentiation is the only framework that could generate a negative correlation between newspaper competition and a decrease in turnout at elections. Other theories – I discuss them in turn in this section – may rationalize this finding. But I believe that it is difficult to find an alternative theory for the result regarding the effect of the interaction between the market structure and the extent of heterogeneity in the willingness-to-pay for quality.

The issue of a dumbing-down of news content has been raised both for newspapers and television. Zaller (1999) points out that increased market pressure is sometimes associated with cutbacks in reporting and editorial quality which lead to a race to the bottom (see also Arnold, 2002). Focusing on television, Popkin (2007) highlights that competition changes content; he shows that in the 1990s, network news covered less legislation than in the 1970s while celebrity coverage increased (see also Hamilton, 2004; Jones, 2010).[47]

[47] Angelucci and Cagé (2016) and Angelucci et al. (2017) exploit historical data to examine how, respectively, the introduction of advertising on television in France and the introduction of television in the United States affected newspaper content. They document a decline in quality following increased competition.

How to explain such a race to the bottom in quality selections? The argument I develop in this paper is that under low heterogeneity, competition leads to the division of the readership into smaller groups which reduces the revenues available to each newspaper to produce a high-quality paper. On the one hand, this simple theoretical framework rationalizes the observed decrease in the quality of competing newspapers compared to the monopolist in low-heterogeneity counties; on the other hand, it provides an explanation for the negative correlation between the number of newspapers in a market and the share of hard news in newspapers when consumers differ less in their preference for hard than for soft news.

An alternative argument is that the race to the bottom may simply reflect a general decline in preferences for hard news compared to soft news. I can rationalize this argument easily in the extension of my simple theoretical framework in which I divide newspaper content into hard news and soft news. In this framework, under the assumption that the average willingness-to-pay for high-quality soft news is higher than the average willingness-to-pay for high-quality hard news, everything else being equal, newspapers choose to produce more soft news than hard news. This argument may explain part of the historical decline in hard news coverage, but not the impact of the market structure on the share of hard news, since the monopolist and the duopolists react in the same way to a change in the average willingness-to-pay. On the contrary, my simple theoretical framework can account for the decrease in the share of hard news under increased competition.

A second argument that is often put forward in existing literature is the role played by advertising: *"In broadcast markets, viewers aged 18-34 command higher advertising rates. News outlets may cater to the preferences of these younger viewers who are much less likely to express interest in traditional hard news stories."* (Hamilton, 2004). Recent papers in the field model the market for news as a two-sided market and study how advertising affects content (see e.g. Ellman and Germano, 2009; Angelucci and Cagé, 2016; Shiller et al., 2017). Taking into account different values advertisers may place on different readers is beyond the scope of this paper. However, as with a general decline in preferences for hard news, advertising cannot account for the impact of the market structure on the share of hard news.

Finally, the observed race to the bottom in quality selections has been linked to the move from nonprofit to profit-driven news organizations (see e.g. Hamilton, 2004; Jones, 2010; Cagé, 2015).[48] According to Hamilton (2004), *"media companies once covered public affairs in part because this brought prestige to the firm's owners and regulatory protection in the case of licensed broadcasters. Now that newspapers and television channels are part of large publicly traded firms, the focus on profits demanded by shareholders means less attention to public*

[48]It may also be that, as highlighted by Noam (2009), in media industries in which competition is weak, owners can afford to offer content based on their personal preferences, rather than on their readers' preferences, which may include a sense of public service, i.e. more hard news. With increased competition, they may have on the contrary to cater to their readers' taste for soft news. Boczkowski and Mitchelstein (2013) quantify the extent to which the content choices of journalists and consumers diverge.

affairs reporting." In my simple theoretical framework, I assume that newspapers are profit maximizing. This assumption is driven both by the move from nonprofit to profit-driven news organizations in the United States and by the evidence from France where news organizations, especially local daily newspapers, are profit-maximizing firms. Having said that, assuming that newspapers are benevolent and operate under a positive-profit constraint will lead to similar predictions under low heterogeneity in my simple theoretical framework.

Polarization and self-segregation Importantly, one could argue that an increase in media competition may lead to changes in turnout at elections independently of any impact on the quality of information. The first channel through which this may happen is polarization and self-segregation. Through the implied fragmentation of the market, an increase in media competition may reduce common experiences and lead to the polarization of views among groups which avoid hearing information that might contradict their priors (Sunstein, 2002; Hamilton, 2004; Mullainathan and Shleifer, 2005; Prior, 2007; Sunstein, 2009). The widening of media choice and the elicited self-segregation of citizens can affect voter turnout in at least two ways. First, increased media choice leads to lower turnout among people who prefer soft news to hard news because it reduces their exposure to hard news and their acquisition of political knowledge (Prior, 2007). This argument is relevant in the case of television where there are entertainment channels entirely dedicated to soft news; less so for local daily newspapers which always offer a mix of soft and hard news. Second, by confirming readers' prior beliefs, increased media competition may lead to an increase in the polarization of voter preferences and through this channel to an increase in political participation.[49] This view relies on the assumption that media outlets are biased; I show below that this is not the case for the French local daily newspaper industry. Moreover I do find that increased media competition leads to a decrease – not an increase – in participation.

Information overload Finally, even if an increase in media competition were to increase the amount of information available to readers, it could nevertheless lead to a decrease in voter turnout through information overload. The burden of a heavy information load may indeed confuse readers and hamper decision-making. We know from the literature on communication that the communication's informativeness increases with the receiver's attention effort and that *"informational overload may be as detrimental to a receiver as information underload"* (Dewatripont and Tirole, 2005). Informational overload may indeed both distract attention and discourage absorption. Moreover, by being at odds with the information already held, an additional piece of information may hinder the decision-making process. In any case, these

[49] Determining whether citizens have polarized is still an open empirical question and is beyond the scope of this paper. For opposing views on the extent of political polarization in the United States, see e.g. Abramowitz (2010) and Fiorina and Abrams (2012).

theoretical arguments cannot rationalize the empirical findings of the paper. First, I establish that under low heterogeneity, competition leads to a decrease – not an increase – in the quantity of information provided by each competing newspaper. Whether or not summing information over competing newspapers leads to an increase or a decrease in the total amount of information available in a market is a complicated empirical issue that I do not tackle in this paper. But the existing empirical evidence shows that different media outlets tend to cover similar issues so if anything competition leads to a duplication rather than a proliferation of information.[50] Moreover, the availability of more media outlets does not imply that citizens consume more outlets. In particular, evidence from the consumption of local daily newspapers in France shows that consumers tend to single-home.

6.2 External validity

A final question is whether we should expect the patterns I have uncovered in the case of local daily newspapers and local elections in France to be repeated in other contexts. First, should these patterns hold in other countries? And second, should they still hold in the internet era? There are good reasons to think this could be the case.

My simple theoretical framework suggests that the effect of the market structure on political participation operates through two main ingredients: newspapers operate under increasing returns to scale and they face heterogeneous consumers that differ in their willingness-to-pay for quality. The negative effect of competition on turnout should be expected when heterogeneity in consumers' willingness-to-pay for quality is low. The extent of heterogeneity can vary from country to country and specific patterns will differ depending on the context. The finding in Drago et al. (2014) of a positive effect of newspaper competition on electoral participation in Italy may be explained by high heterogeneity of Italian readership. More evidence is certainly in order and it will be interesting to interact the effect of market structure they obtain with a measure of heterogeneity to check whether it is indeed the case. Similarly, while Gentzkow et al. (2011) find no effect of newspaper competition on turnout at national elections, it would be of interest to test for the presence of an effect on local turnout and to study the interaction between the market structure and heterogeneity. The fact that newspapers operate under increasing returns to scale is obviously not specific to the French local daily newspaper industry – nor it is specific to the newspaper industry in general; other media outlets also face quality-dependent fixed costs.

Media bias A characteristic that may be more specific to French local daily newspapers is that they are independent – there is no political bias in these newspapers during my period of

[50] In their study of the production of online information in France in 2013, Cagé et al. (2017) show that only one third of the online content produced by news media is original. See also Boczkowski (2010).

interest. As noted by Éveno (2003), since 1947 *"the story of biased newspapers has been the one of a slow decline"*. The last biased local daily newspapers disappeared in France in the 1950s. Moreover, according to Hamilton (2004), nonpartisan reporting also dominates in American newspaper markets.[51] (The picture is different in American television markets where the logic of niche programming has given rise to the Fox News Channel.) These empirical facts drive my choice of abstracting from horizontal differentiation in my simple theoretical framework.

Adding horizontal differentiation to my simple framework will as a matter of course lead to new predictions. Determining how it will affect the quality of information is a complex issue. On the one hand, horizontal differentiation may allow newspapers to escape price competition and to increase their profits – and so the revenues available to produce high-quality. On the other hand, Neven and Thisse (1989) have shown that under vertical and horizontal differentiation, firms choose maximimal differentiation along one dimension and minimal differentiation along the other. If the horizontal range is broad enough relative to the quality range, then both firms choose the same quality. Neven and Thisse (1989) abstract from the cost of producing quality but such a cost may lead both firms to produce the minimum quality, in line with the prediction of my simple framework.

Internet With the internet – which some believe will allow voters to find all the information they need at the time of the elections – does the information provided in local daily newspapers still matter? There are various ways to tackle this issue. First, it is important to highlight that online news is still in its infancy (Gentzkow and Shapiro, 2015). Even if consumers continue to increase the time they spend consuming digital media, newspapers are still a critical part of the news landscape. As highlighted in a 2016 Pew Research Center survey, *"the digital news era is still very much in its adolescence"*.[52] In the majority of countries, regional or local media carry on being prominent news sources both offline and online (Reuters Institute, 2017). Regarding the United States, according to the *State of the Media Report* 2013 of the Pew Research Center, *"papers in smaller markets (...) can remain the go-to source for local news and a strong vehicle for local advertisers."*

Furthermore, individuals are much more likely to search on the internet for soft news or information about product purchases than for hard news (Hamilton, 2004). Internet expands the overall audience for the national daily newspapers but not for the local daily newspapers. In France, I find that in hard copy sales, the top five daily newspapers account for 9% percent

[51] According to Hamilton (2004), nonpartisan reporting emerged as a commercial product in American newspaper markets: *"In the late nineteenth century the rise of advertising, innovations in printing technology that increased the importance of scale economies, and demographic changes in the size of the reading public made it more profitable for newspapers to adopt "objective" or nonpartisan approaches to public affairs. (...) Objectivity evolved in the market as a commercial product, as publishers frequently found it more profitable to remove partisan coverage in order to attract more readers."* (p.25). See also Petrova (2011).

[52] Allcott and Gentzkow (2017) find that social media was an important but not dominant source of news in the run-up to the 2016 US election.

of the total circulation of daily newspapers. The top daily newspaper is a local newspaper – *Ouest France* – and accounts for 3.3% of this total circulation. Moreover, its circulation is 2.3 times that of the second biggest-selling newspaper, *Le Monde* (a national daily newspaper). The picture is different when I turn to websites. In terms of the number of visits to a website and, similarly, the number of pages viewed, the top five websites garner more than 53% of the total traffic, with 21% for the top paper, *Le Monde*. Moreover the most popular websites are websites of national daily newspapers.[53] The internet is a way for consumers around the country to gain access to national papers and national information (or entertainment), not to gain access to more local information.

Finally, especially for newspapers, the internet brings greater competition, raising the issue of the potential welfare losses that may arise from excessive competition and the duplication of costs. News sites – like newspapers – face fixed costs of content that depend on quality. Furthermore the internet increases the relative importance of these fixed costs: on the internet, the cost of paper and distribution approach zero. Obviously this does not mean that the advent of the internet has not affected the provision of information; with the notable exceptions of Seamans and Zhu (2017) and Cagé et al. (2017), there is little empirical evidence on how media outlets adjust their content in response to increased competition in an online world.[54] But this means that the amount of information provided by local newspapers is still an important determinant of local political participation in the digital era.

7 Conclusion

In this paper, I investigate empirically how an increase in the number of newspapers in a market affects the quantity and type of news provided and, ultimately, changes in political participation. Drawing from literature on vertical product differentiation, I show that if the heterogeneity of consumers' willingness-to-pay for a high-quality newspaper is low, an increase in the number of newspapers leads to a decrease in newspaper quality and, eventually, to voter participation at elections. The evidence I obtain from a variety of identification strategies using a new dataset of French local daily newspapers and local elections between 1944 and 2014 is consistent with this intuition. In particular, I show that newspaper entry sharply reduces the circulation of incumbent newspapers, and that this business stealing is particularly strong in low-heterogeneity counties. Furthermore, thanks to the unique journalist data I gather, I bring to light the consequences of such a decrease, namely a drop in the size of the

[53] Hamilton (2004) finds a similar picture for the United States: *"in hard copy sales, the top 5 among America's largest 100 newspapers account for 21.5 percent of the total circulation. In terms of linking activity, the top 5 websites of these newspapers garner 41.4 percent of the total traffic."*

[54] Jeon and Nasr (2016) offer a model of multiple issues to investigate how news aggregators affect the quality choices of competing newspapers on the internet. Shiller et al. (2017) show that the use of ad blocking leads to a decrease of websites' quality.

newsroom. I also provide anecdotal evidence of a "switching effect", with journalists moving from the incumbent newspaper's newsroom to the entrant's. The decrease in the number of journalists impact the content of newspapers whose size (number of articles or total number of words published) also goes down. Finally, I find that an increase in the number of local newspapers leads to a decrease in political participation at local elections, in particular under low heterogeneity

The findings of this paper question the view that more media competition is necessarily socially efficient.[55] They obviously do not imply that media competition is less desirable than media monopoly as the latter raises other important issues, in particular media capture (Besley and Prat, 2006) and monopoly rents. But they may have important policy implications. In my view, future research should study the relevance of policy interventions to compensate for the welfare losses that may arise from excessive competition under certain conditions. E.g. in some cases it might be desirable to encourage newspaper competitors to enter into a joint operating agreement and to combine business operations (which may require antitrust exemptions in the spirit of the American Newspaper Preservation Act (1970)). This can also involve the development of more favorable legal and fiscal status for media organizations (which in most countries are not allowed to benefit from non-profit status), support for news agencies, or more direct interventions such as tax credits for journalists or other subsidies to the press.

[55] See e.g. the Federal Communications Commission (FCC) in the United States which has sought to diffuse ownership of media outlets among multiple firms in order to diversify the viewpoints available to the public: *"In sum, the modified broadcast ownership structure we adopt today will serve our traditional goals of promoting competition, diversity, and localism in broadcast services. The new rules are (...) necessary in the public interest."* (Federal Communication Commission, 2003).

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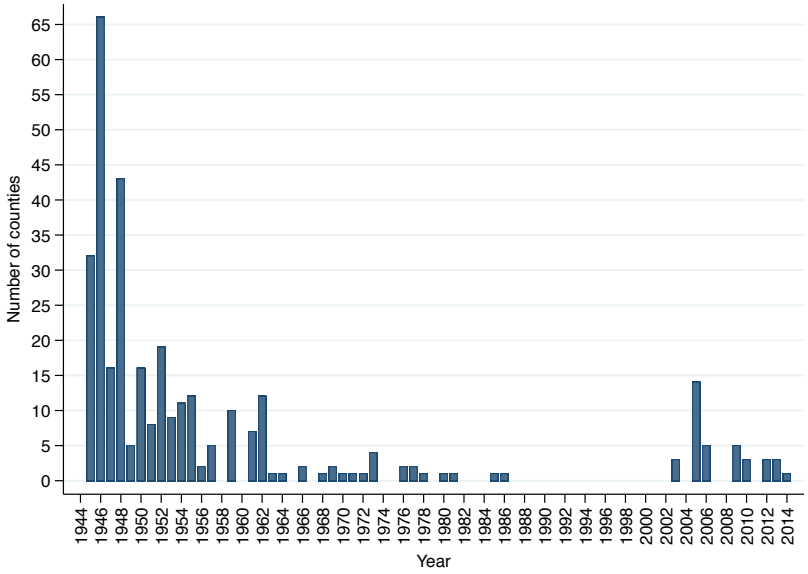
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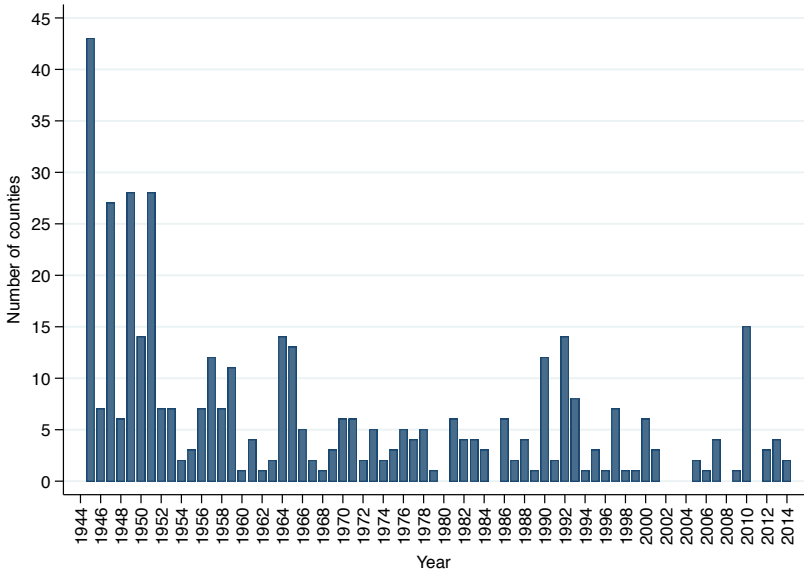
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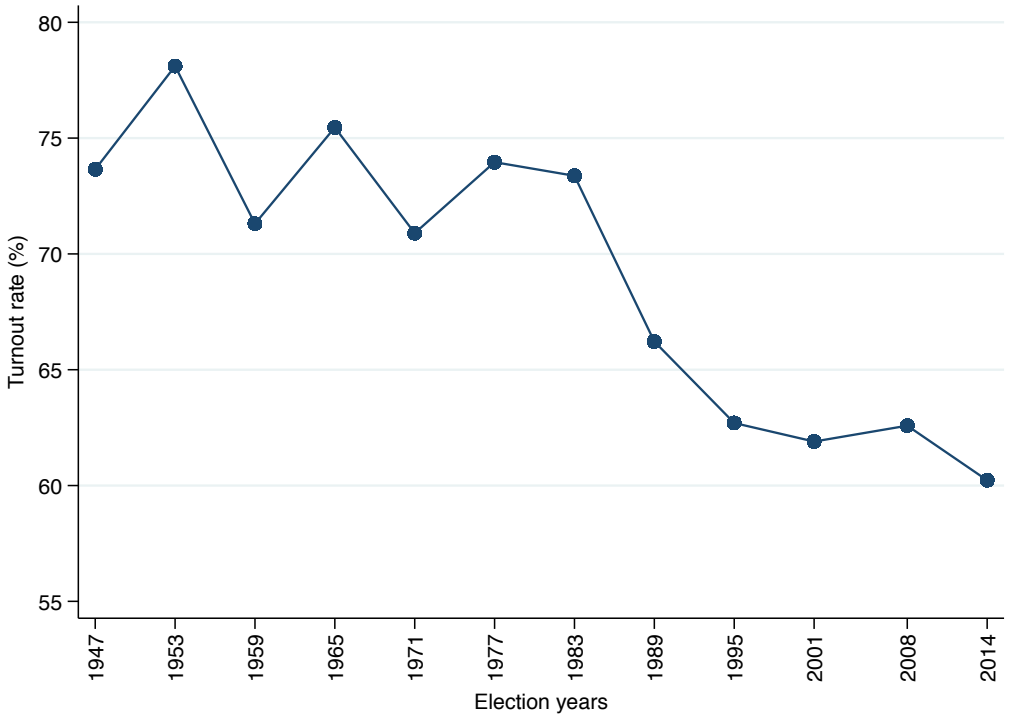
(a) Number of counties with net entry



(b) Number of counties with net exit

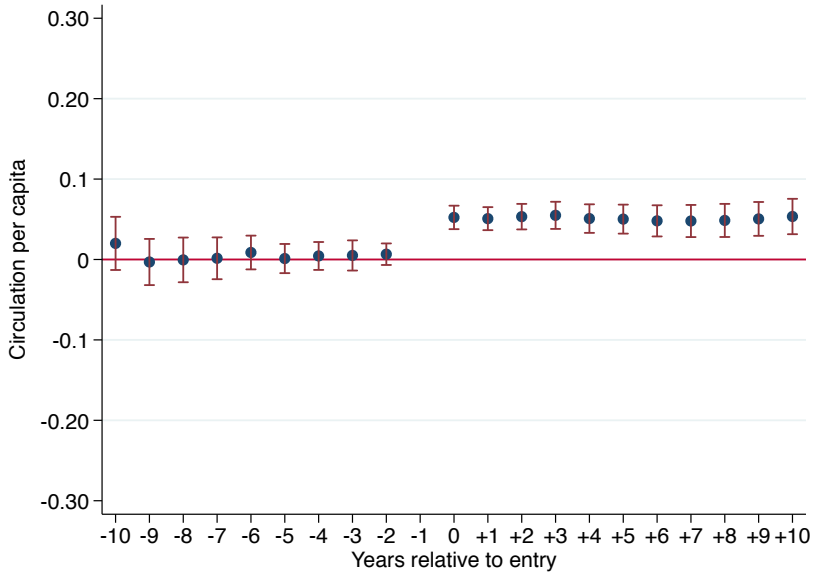
Notes: The figure shows for each year the number of counties with net newspaper entry (upper figure 1a) and the number of counties with net newspaper exit (bottom figure 1b).

Figure 1: Number of counties with net newspaper entry / net newspaper exit by year

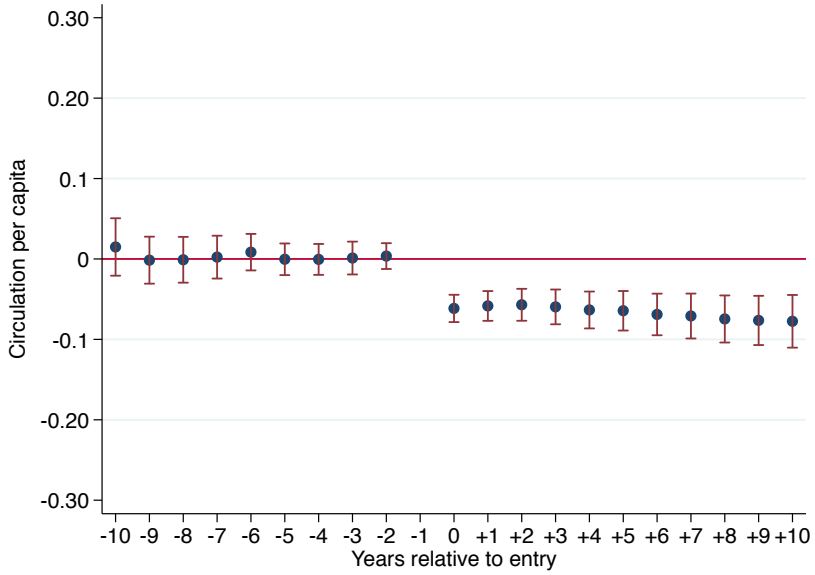


Notes: The figure shows for each election year the average turnout rate.

Figure 2: Turnout rate at local elections (average)



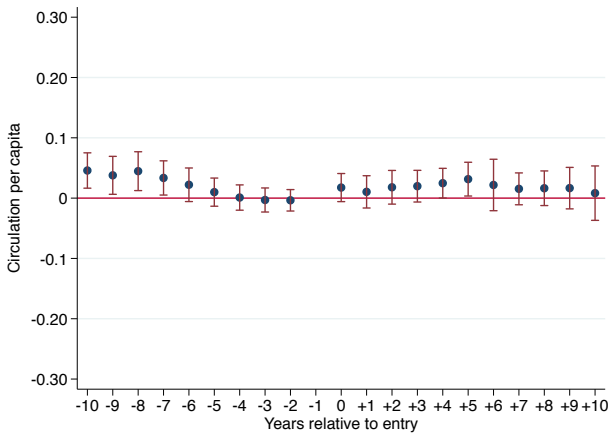
(a) **Total circulation**



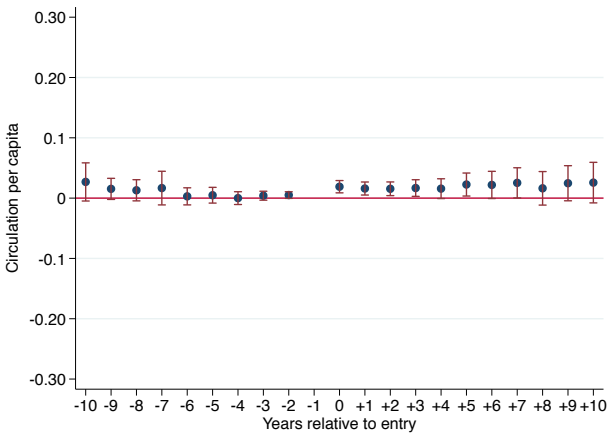
(b) **Circulation of incumbent newspapers**

Notes: The figures show coefficients from a regression of circulation on a vector of year dummies going from -10 to $+10$ with the events of entry taking place in $j = 0$ (see equation (1) for details). In the upper figure (3a), the dependent variable is total county circulation per eligible voter. In the bottom figure (3b), the dependent variable is the circulation of incumbent newspapers per eligible voter. Models include year and county fixed effects and demographic controls. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1944-2014.

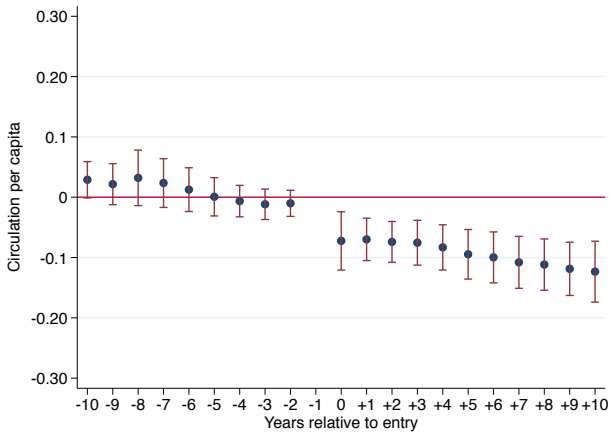
Figure 3: Impact of newspaper entry on newspapers' circulation (1944-2014), controlling for demographics



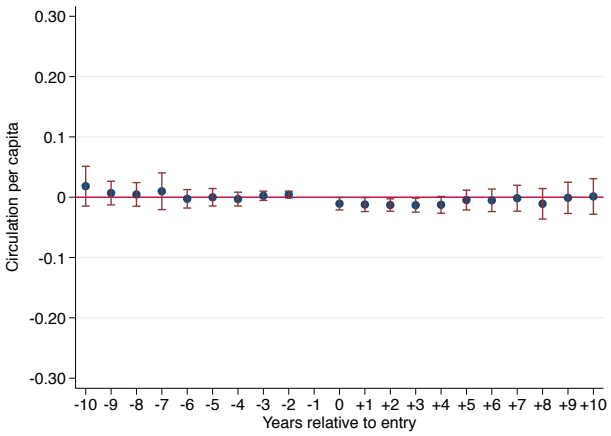
(a) Total circulation
Low-heterogeneity counties



(b) Total circulation
High-heterogeneity counties



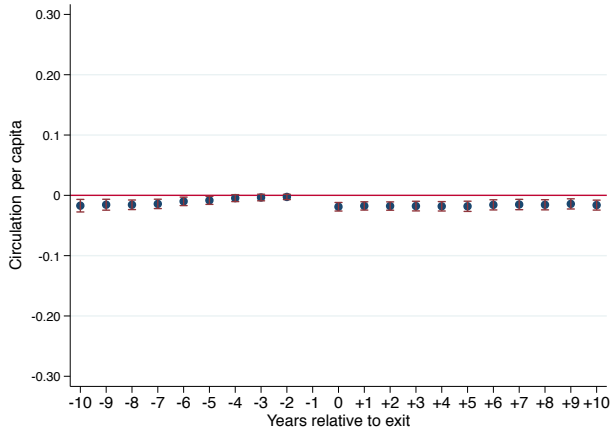
(c) Incumbents' circulation
Low-heterogeneity counties



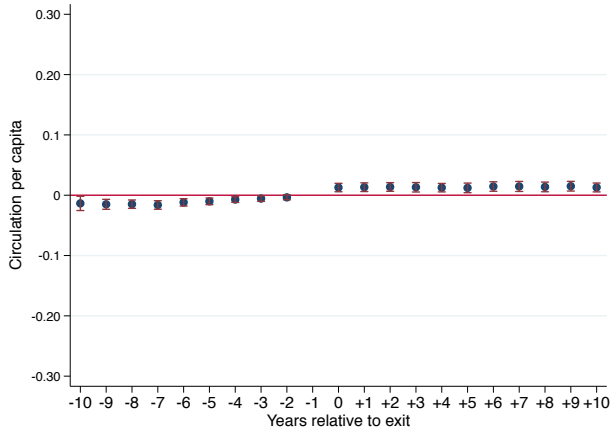
(d) Incumbents' circulation
High-heterogeneity counties

Notes: The figures show coefficients from a regression of circulation on a vector of year dummies going from -10 to $+10$ with the events of entry taking place in $j = 0$ (see equation (1) for details). In the two upper figures (4a and 4b), the dependent variable is the total county circulation per eligible voter. In the two bottom figures (4c and 4d), the dependent variable is the circulation of incumbent newspapers per eligible voter. Figures 4a and 4c show the effect of an entry on circulation in low-heterogeneity counties. Figures 4b and 4d show this effect in high-heterogeneity counties. Models include year and county fixed effects and demographic controls. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1960-2014.

Figure 4: Impact of newspaper entry on newspapers' circulation (1960-2014), by heterogeneity (controlling for demographics)



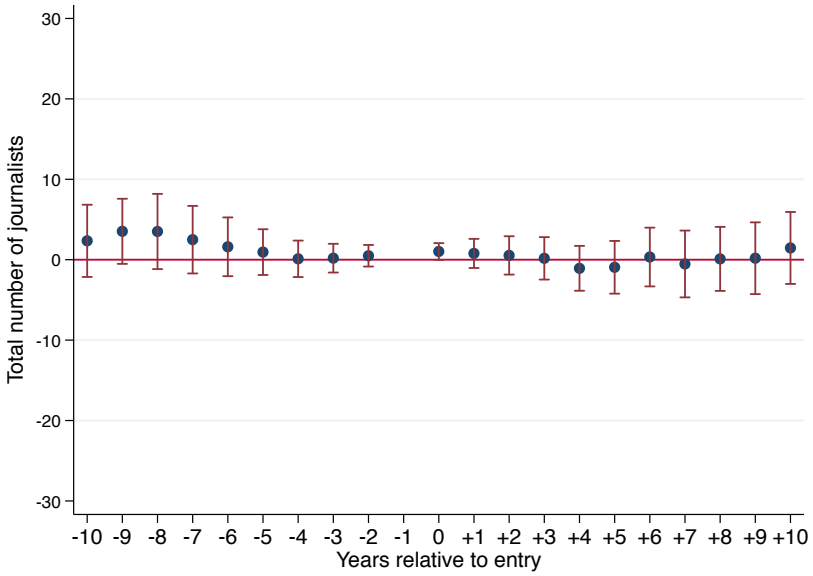
(a) Total circulation



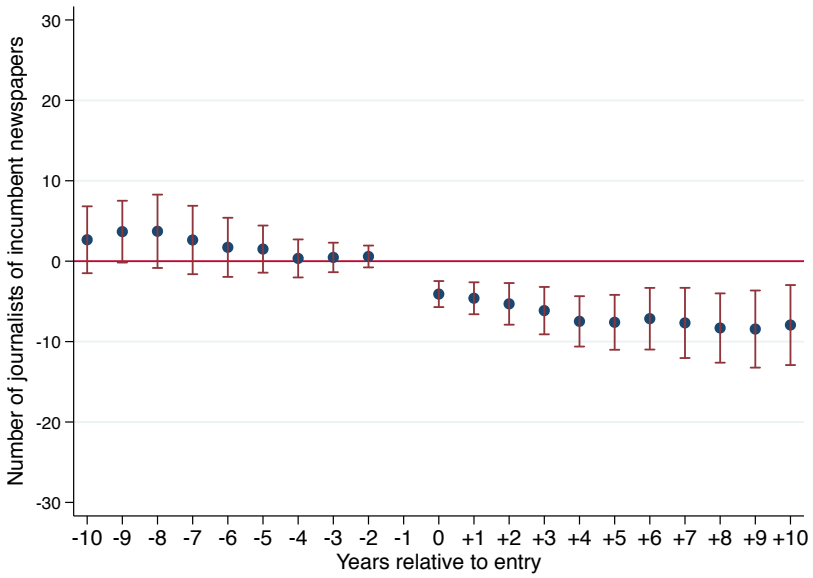
(b) Circulation of incumbent newspapers

Notes: The figures show coefficients from a regression of circulation on a vector of year dummies going from -10 to $+10$ with the events of exit taking place in $j = 0$ (see equation (1) for details). In the upper figure 5a, the dependent variable is the total county circulation per eligible voter. In the bottom figure 5b, the dependent variable is the circulation of incumbent newspapers per eligible voter. Models include year and county fixed effects and demographic controls. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1960-2014.

Figure 5: Impact of newspaper exit on newspapers' circulation (1960-2014), controlling for demographics



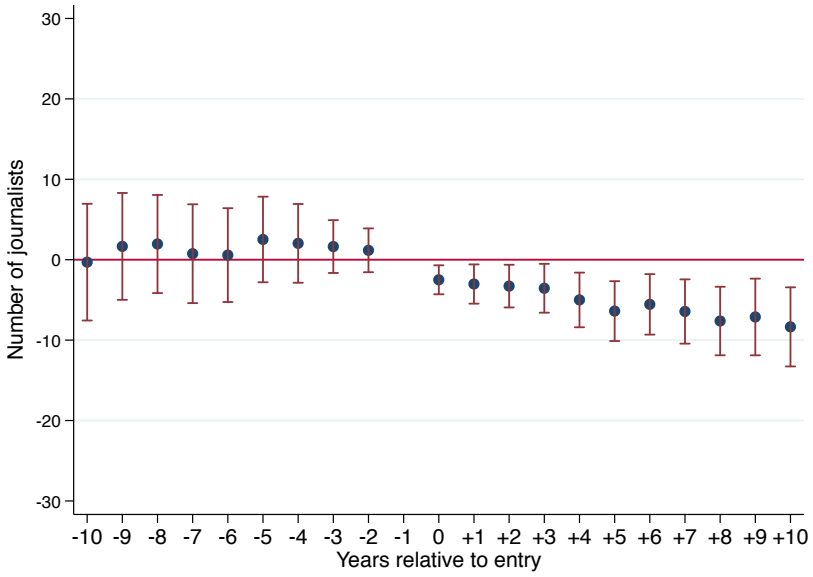
(a) Total number of journalists working in the county



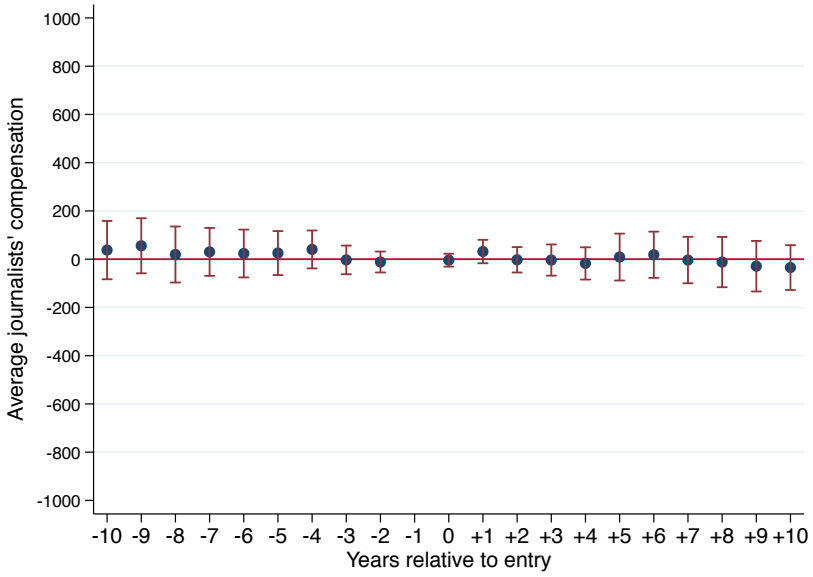
(b) Number of journalists working for the incumbent newspapers

Notes: The figures show coefficients from a regression of the number of journalists on a vector of year dummies going from -10 to $+10$ with the events of entry taking place in $j = 0$ (see equation (1) for details). In the upper figure (6a), the dependent variable is the total number of journalists working in the county. In the bottom figure (6b), the dependent variable is the number of journalists working for incumbent newspapers. Models include year and county fixed effects, and demographic controls. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1944-2014

Figure 6: Impact of newspaper entry on newspapers' size of the newsroom, county-level analysis (1944-2014)



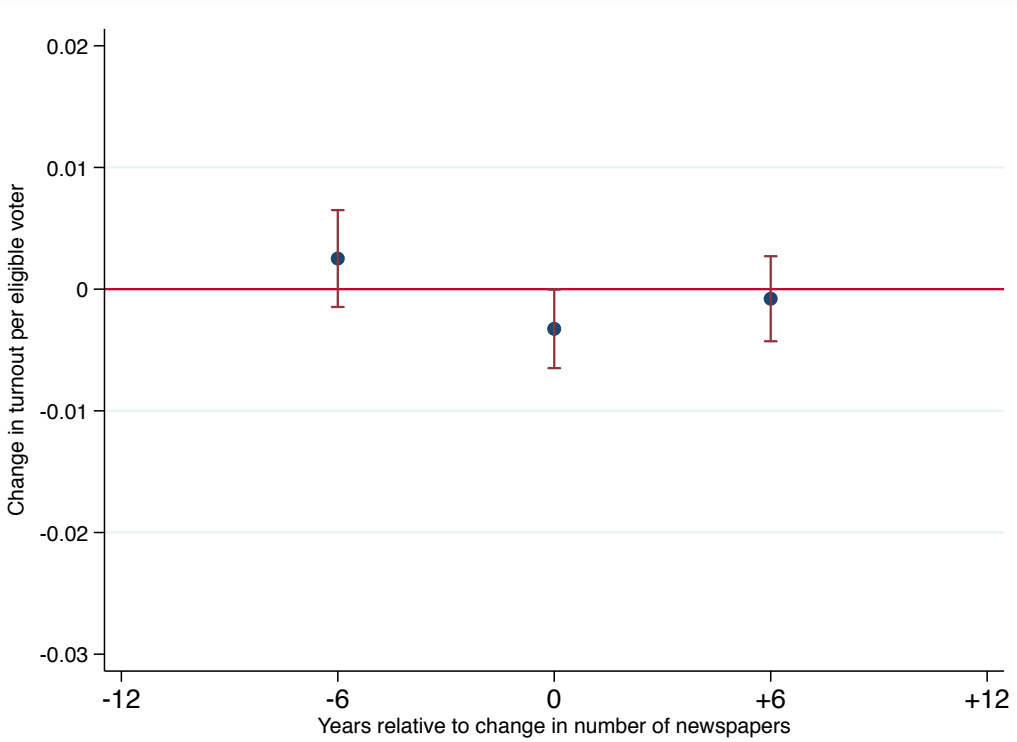
(a) Number of journalists working for the incumbent newspapers



(b) Average compensation of journalists working for the incumbent newspapers

Notes: The figures show coefficients from a regression of circulation on a vector of year dummies going from -10 to $+10$ with the events of entry taking place in $j = 0$. The estimation is performed at the newspaper level (see equation (2) for details). In the upper figure (7a), the dependent variable is the number of journalists working for the incumbent newspapers. In the bottom figure (7b), the dependent variable is the average compensation of the journalists working for incumbent newspapers. Models include year and county fixed effects, and demographic controls. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1944-2014 for the number of journalists, and 1960-2014 for the average compensation.

Figure 7: Impact of newspaper entry on the size of the newsroom, newspaper-level analysis, only counties in which newspapers are headquartered (1944-2014)



Notes: The figures show coefficients from a regression of change in turnout per eligible voters, controlling for demographics, on a vector of leads and lags of the change in the number of newspapers (see equation (7) for details). Models include region-election fixed effects and demographic controls. Error bars are +/− 2 standard errors. Standards errors are clustered by county. Time period is 1947-2014.

Figure 8: Turnout and newspaper entries/exits

Table 1: Summary statitics of newspaper content (2005-212)

	mean/sd	mean/sd	mean/sd
Number of words per front page	370		
	(222)		
Number of articles in the newspaper		421	
		(302)	
Number of words in the newspaper		107044	
		(83165)	
Average article length		286	
		(40)	
Share of articles on hard news			34.8
			(13.4)
Share of articles on soft news			66.5
			(11.5)
Share of words on hard news			32.7
			(13.9)
Share of words on soft news			68.6
			(11.9)
Newspaper specialization (Herfindhal Index)			0.17
			(0.13)
Observations	94,901	30,503	28,180

Notes: The table gives summary statistics for newspapers' content. It presents the average and the standard deviations (in parentheses) of the variables. Variables are values for newspapers. Time period is 2005-2012. The share of articles on hard news is defined as the number of articles on agriculture, economics, education, environment, international affairs or politics, divided by the total number of articles I classify. The share of articles on soft news is defined as the number of articles on movies, culture, leisure activities, sports, "news in brief", religion or health, divided by the total number of articles I classify. Newspaper specialization is an Herfindahl index of newspaper differentiation. The Herfindahl index is equal to the sum of the squares of the shares of the different newspaper topics in each newspaper issue: agriculture, culture, economics, education, environment, health, international affairs, leisure activities, movies, "news in brief", politics, religion and sports.

Table 2: Summary statistics of newspapers' costs, revenues and newsroom

	Mean	Median	sd	Min	Max
Total revenues (thsd €)	43,708	17,563	56,930	6	356,065
Revenues from sales (thsd €)	24,910	9,738	33,521	3	215,486
Revenues from advertising (thsd €)	18,621	7,026	25,552	0	331,169
Total expenditures (thsd €)	41,457	16,975	54,830	15	354,208
Number of journalists	59	28	76	1	563
Journalists' average monthly salary (€)	2,615	2,662	701	743	5,376

Notes: The table gives summary statistics for newspapers' revenues, expenses and number of journalists. The time period is 1960-2014, expect for the number of journalists (1944-2014). Variables are values for newspapers. Variables are at the newspaper/year level. All variables (excepted the number of journalists and their average monthly salary) are in (constant 2014) thousand euros. Journalists' average monthly salary is in (constant 2014) euros.

Table 3: Summary statistics of newspapers' circulation (1944-2014)

	(1)	(2)	(3)
	mean/sd	mean/sd	mean/sd
County-level variables			
Total county circulation (# copies)	79,597		
	(84,751)		
County circulation per eligible voter (%)	24.2		
	(16.8)		
Average number of newspapers in a county	2.7		
	(1.5)		
Newspaper*county-level variables			
Newspaper circulation per county (# copies)		32,769	
		(43,980)	
Newspaper circulation per county and eligible voter (%)		9.9	
		(10.8)	
Newspaper-level variables			
Total circulation (# copies)			82,662
			(117,599)

Notes: The table gives summary statistics for newspapers' circulation. It presents the average and the standard deviations (in parentheses) of the variables. The time period is 1944-2014. Variables are at the county/year level in column 1, at the newspaper/county/year level in column 2, and at the newspaper/year level in column 3.

Table 4: The effect of entry on newspapers' newsrooms, revenues and expenses (newspaper-level analysis)

			Revenues		
	(1)	(2)	(3)	(4)	(5)
	Number of journalists	Total	Sales	Ad	Total expenditures
$\mathbf{1}entry^{j=-2}$	-0.13	-0.07	-0.07	-0.12	-0.12
	(0.15)	(0.19)	(0.20)	(0.18)	(0.19)
$\mathbf{1}entry^{j=-1}$	-0.20	-0.20	-0.21	-0.25	-0.26
	(0.14)	(0.19)	(0.19)	(0.17)	(0.18)
$\mathbf{1}entry^{j=0}$	-0.35**	-0.33*	-0.33*	-0.36**	-0.39**
	(0.14)	(0.18)	(0.18)	(0.17)	(0.18)
$\mathbf{1}entry^{j=1}$	-0.36**	-0.37**	-0.40**	-0.35**	-0.40**
	(0.14)	(0.18)	(0.18)	(0.16)	(0.17)
$\mathbf{1}entry^{j=2}$	-0.34**	-0.37**	-0.35**	-0.38**	-0.44***
	(0.14)	(0.16)	(0.17)	(0.16)	(0.16)
$\mathbf{1}entry^{j=3}$	-0.39***	-0.39**	-0.31*	-0.32**	-0.44***
	(0.14)	(0.16)	(0.16)	(0.16)	(0.16)
$\mathbf{1}entry^{j=4}$	-0.34**	-0.46***	-0.34**	-0.35**	-0.52***
	(0.14)	(0.15)	(0.15)	(0.15)	(0.14)
$\mathbf{1}entry^{j\geq 5}$	-0.32**	-0.18	-0.07	-0.10	-0.18
	(0.15)	(0.14)	(0.14)	(0.14)	(0.14)
Newspaper FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R-sq	0.50	0.53	0.55	0.55	0.57
Observations	11,487	7,534	6,560	6,667	6,594
Clusters (county)	87	87	87	87	87

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1960-2014. Models are estimated using OLS estimations. The dependent variables are in logarithm. All variables (excepted the number of journalists) are in thousand (constant 2014) euros. Models include year and newspaper fixed effects and demographic controls. Variables are described in more details in the text.

Table 5: The effect of entry on incumbent newspapers' newsrooms, revenues and expenses, by Heterogeneity (newspaper-level analysis)

	Journalists		Total revenues		Sales revenues		Ad revenues		Expenditures	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Pre Entry										
(t-2, t-1)	-0.17	0.21	-0.15	0.09	-0.15	0.30	-0.20	0.00	-0.21	-0.20
	(0.14)	(0.30)	(0.18)	(0.25)	(0.19)	(0.30)	(0.17)	(0.26)	(0.18)	(0.30)
Pre Entry * Low Heterogeneity										
(t-2, t-1)		-0.42		-0.26		-0.54		-0.25		0.01
		(0.34)		(0.31)		(0.35)		(0.31)		(0.35)
Short-run										
Impact of Entry										
(t, t+1, t+2, t+3, t+4)	-0.35**	0.22	-0.38**	0.22	-0.35**	0.41	-0.35**	0.34	-0.43***	0.05
	(0.14)	(0.30)	(0.16)	(0.32)	(0.16)	(0.35)	(0.15)	(0.30)	(0.15)	(0.34)
Short-run * Low Heterogeneity										
Impact of Entry										
(t, t+1, t+2, t+3, t+4)		-0.71**		-0.78**		-0.99**		-0.92**		-0.62
		(0.34)		(0.37)		(0.39)		(0.35)		(0.38)
Long-run										
Impact of Entry										
(t+5, onwards)	-0.32**	-0.28	-0.18	0.02	-0.07	0.11	-0.10	0.23	-0.18	-0.03
	(0.15)	(0.34)	(0.14)	(0.40)	(0.14)	(0.41)	(0.14)	(0.40)	(0.14)	(0.43)
Long-run * Low Heterogeneity										
Impact of Entry										
(t+5, onwards)		-0.03		-0.22		-0.21		-0.38		-0.16
		(0.37)		(0.43)		(0.45)		(0.43)		(0.45)
Low Heterogeneity		-3.34		1.23		-0.30		0.63		2.01
		(2.56)		(6.10)		(6.11)		(5.48)		(5.19)
Newspaper FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls*Heterogeneity	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R-sq	0.50	0.53	0.53	0.55	0.55	0.57	0.55	0.57	0.57	0.59
Observations	11,487	11,487	7,534	7,534	6,560	6,560	6,667	6,667	6,594	6,594
Clusters (county)	87	87	87	87	87	87	87	87	87	87

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1960-2014. Models are estimated using OLS estimations. The dependent variables are in logarithm. All variables (excepted the number of journalists) are in thousand (constant 2014) euros. Models include year and newspaper fixed effects, and demographic controls in all the columns, as well as demographic controls interacted with the heterogeneity indicator variable in even columns. Variables are described in more details in the text.

Table 6: The effect of the number of newspapers on newspaper content (size)

	Number of articles		Number of words		Number of words on front page	
	(1)	(2)	(3)	(4)	(5)	(6)
Number of newspapers	-178***	-17	-56,296***	7,389	-60***	52**
	(18)	(44)	(5,284)	(14,056)	(16)	(23)
Number of newspapers						
* Low heterogeneity		-186***		-72,814***		-118***
		(42)		(14,686)		(28)
Low heterogeneity		-66		-18,723		53
		(84)		(30,234)		(55)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.70	0.71	0.69	0.70	0.18	0.20
Observations	27,708	27,708	30,502	30,502	94,901	94,901
Clusters (county-year)	106	106	106	106	274	274
Mean DepVar	421	421	107,044	107,044	370	370

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county-year. Time period is 2005-2012. Models are estimated using OLS. In columns 1 and 2, the dependent variable is the number of articles per newspaper. In columns 3 and 4, the dependent variable is the number of words per newspaper. Finally in columns 5 and 6, the dependent variable is the number of words per newspaper frontpage. Models include year fixed effects and demographic controls. Variables are described in more details in the text.

Table 7: The effect of the number of newspapers on newspapers' type of news

(a) **Share of articles on hard news**

	Share of Articles on Hard News in the Newspaper					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of newspapers	-3.55***	-1.38**	-3.68***	-2.32***	-3.44***	-2.12**
	(0.73)	(0.66)	(0.77)	(0.78)	(0.79)	(0.83)
Number of Newspapers						
* Low Political Heterogeneity		-4.87***		-3.25*		-3.96**
		(1.82)		(1.64)		(1.97)
Low Political Heterogeneity		10.02***		6.40**		7.18*
		(3.52)		(3.11)		(3.68)
Year FE	No	No	Yes	Yes	Yes	Yes
Controls	No	No	No	No	Yes	Yes
R-sq	0.06	0.08	0.12	0.13	0.12	0.13
Observations	25,745	25,745	25,745	25,745	25,745	25,745
Clusters (County-Year)	88	88	88	88	88	88
Mean DepVar	33.73	33.73	33.73	33.73	33.73	33.73

(b) **Number of articles on hard news**

	Number of Articles on Hard News in the Newspaper					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of newspapers	-48.6***	-14.6*	-49.4***	-24.0***	-33.3***	-17.8***
	(8.6)	(8.6)	(8.2)	(8.1)	(7.8)	(5.3)
Number of Newspapers						
* Low Political Heterogeneity		-49.7***		-36.1***		-42.3**
		(14.4)		(13.2)		(19.5)
Low Political Heterogeneity		132.8***		99.2***		76.5**
		(32.9)		(30.3)		(36.3)
Year FE	No	No	Yes	Yes	Yes	Yes
Controls	No	No	No	No	Yes	Yes
R-sq	0.17	0.26	0.27	0.32	0.35	0.36
Observations	27,170	27,170	27,170	27,170	27,170	27,170
Clusters (County-Year)	94	94	94	94	94	94
Mean DepVar	90.8	90.8	90.8	90.8	90.8	90.8

(c) **Number of articles on soft news**

	Number of Articles on Soft News in the Newspaper					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of newspapers	-73.0***	-28.5*	-74.6***	-37.9**	-42.3***	-27.5***
	(13.6)	(16.9)	(13.6)	(16.4)	(12.0)	(10.0)
Number of Newspapers						
* Low Political Heterogeneity		-64.2**		-51.5*		-47.3
		(26.2)		(26.0)		(34.6)
Low Political Heterogeneity		174.4***		144.2**		70.6
		(56.2)		(56.9)		(62.2)
Year FE	No	No	Yes	Yes	Yes	Yes
Controls	No	No	No	No	Yes	Yes
R-sq	0.16	0.23	0.21	0.25	0.33	0.34
Observations	27,291	27,291	27,291	27,291	27,291	27,291
Clusters (County-Year)	94	94	94	94	94	94
Mean DepVar	166.0	166.0	166.0	166.0	166.0	166.0

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county-year. Time period is 2005-2012. In the upper table (Table 7a), the dependent variable is the share of articles on hard news which is defined as the number of articles on agriculture, economics, education, environnement, international or politics, divided by the total number of articles classified by topics. In the middle table (Table 7b), the dependent variable is the number of articles on hard news. In the bottom table (Table 7c) the dependent variable is the number of articles on soft news. Models include year fixed effects in columns 3 to 6, and demographic controls and demographic controls interacted with the heterogeneity indicator variable in columns 5 and 6. Variables are described in more details in the text.

Table 8: The effect of a change in the number of newspapers on voter turnout

	Baseline		Falsification test	
	(1)	(2)	(3)	(4)
	Turnout	Turnout	Previous election	Previous election
Number of newspapers	-0.003*	0.001	0.000	-0.003
	(0.001)	(0.002)	(0.002)	(0.003)
Number of newspapers * Low heterogeneity		-0.006**		0.004
		(0.003)		(0.003)
Region-Year FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Controls*Heterogeneity	No	Yes	No	Yes
R-sq	0.19	0.19	0.26	0.26
Observations	5,923	5,923	4,304	4,304
Clusters (County)	87	87	87	87
Mean DepVar	-0.019	-0.019	-0.018	-0.018
Sd DepVar	0.070	0.070	0.069	0.069

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1947-2014. Models are estimated in first differences. All specifications include election-region fixed effects and demographic controls. In columns 1 and 2, the dependent variable is turnout. In columns 3 and 4, I perform a falsification test: the dependent variable is turnout at the previous election.