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Media Competition, Information Provision and Political Participation*†

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JOB MARKET PAPER

(Please click here for an updated version)

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Abstract

This paper investigates the impact of increased media competition on the quantity and quality of news provided and, ultimately, changes in political participation. Drawing from the literature on vertical product differentiation to model the production choices of newspapers, I show how an increase in the number of newspapers can decrease both the quantity and quality of news provided. I build a new county-level panel dataset of local newspaper presence, newspapers' costs and revenues and political turnout in France, from 1945 to 2012. I estimate the effect of newspaper entry by comparing counties that experience entry to similar counties in the same years that do not. These counties exhibit similar trends prior to newspaper entry, but newspaper entry then leads to substantial declines in the total number of journalists. More newspapers are also associated with fewer news articles and lower hard news provision. These effects are concentrated in counties with homogeneous populations, as predicted by the model, with little impact on counties with heterogeneous populations. Newspaper entry, and the associated decline in information provision, is ultimately found to decrease voter turnout.

Keywords: media competition, newspaper's content, hard news, soft news, product differentiation, political participation

JEL No: D72, L11, L13, L82

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†An online Appendix with the proofs of the theoretical results and additional empirical material is available here.

"Half of the American people have never read a newspaper. Half never voted for President. One hopes it is the same half." (Gore Vidal)

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? 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 media entry and political participation (Stromberg, 2004; 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 motivating theory model. I draw from the literature on vertical product differentiation to study the production choices (price and quality) of newspapers under monopoly and duopoly. There are a continuum of 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 with no heterogeneity, the entrant garners half of the market and 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.

In an extension of the model, I divide newspaper content between "hard news" and "soft

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

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 entertaining or commodity news, say about sports or fashion. Consumers are heterogeneous with respect to their willingness-to-pay for these two attributes of newspapers. 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, I find that 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 turnout at local elections in France from 1945 to 2012. For several reasons, the French local daily newspapers industry is well suited to testing the predictions of my model. First, with on average more than 70% of the egilible voters in a county reading a local daily newspaper everyday, this industry may be key to political participation at the county level.[4] 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 1945 and 2012 the number of newspapers present in each French county

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

[3] Higher heterogeneity in the tastes 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 refering to a "département". In the administrative division of France, a "département" corresponds roughly to a county in the United States (more on this below).

– the natural news market; I collect annual data on each paper's location and circulation. For the sub-period 1960-2012, I collect annual information on each paper's costs and revenues, as well as on the number of employees.[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). 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. This information allows me to test the prediction of the extension of my simple theoretical framework on the impact of newspaper competition on the share of hard 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 effets, and a large set of demographic covariates controlling for the 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 employees prior to newspaper entry. I use both an 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 is more problematic. First, I compute a measure of heterogeneity in the willingness-to-pay for quality based on the distribution of individuals across socio-economic groups. The higher the probability that two randomly selected individuals in a county belong to two different socio-economic groups, the higher the heterogeneity in this county. Second, to test the prediction of the extended version of the simple theoretical frame-

[5] To give a flavour 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. (2012) 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 2009.

work, 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 theoretical framework. First, I show that entry reduces the circulation of incumbent newspapers by nearly 25%. This business stealing is particularly strong in low-heterogeneity areas (44%), as predicted by the model. This leads to a 20 to 36% decrease in incumbent newspapers' revenues and expenses and a 57% decrease in the number of journalists working for incumbent newspapers in low-heterogeneity counties. 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. Second, using data for recent years (2005-2012), I show that an additional newspaper leads to a 14 to 29% decrease in newspapers' size, 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. (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 turnout at local elections, 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.

The remainder of the paper is organized as follows. Section 2 below relates my work to the existing literature. Section 3 lays out the simple theoretical framework. In Section 4, I describe the French local daily newspapers industry and review the new dataset I build for this study. Sections 5 and 6 test the predictions of the model. In Section 5, 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 6, I investigate the impact of changes in the number of newspapers on turnout at local elections. Section 7 discusses alternative mechanisms and external validity. Finally, Section 8 concludes.

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

2 Relation to Existing Literature

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 (Stromberg, 2004; Gentzkow, 2006; Oberholzer-Gee and Waldfogel, 2009; Schulhofer-Wohl and Garrido, 2009; Banerjee et al., 2010; Snyder and Strömberg, 2010; Gentzkow et al., 2011; Campante et al., 2013).[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.

To the extent of my knowledge, Drago et al. (2013) is the only paper studying 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 it is the case requires modeling – and testing – the incentives of the media to deliver news. This is the second contribution of my paper.

While the existing literature has focused on the economic incentives that shape ideological diversity in the media (Strömberg, 2004; Mullainathan and Shleifer, 2005; Gentzkow and Shapiro, 2006; Anand et al., 2007; Gentzkow et al., 2012; Qin et al., 2013), I model and test empirically 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). Following Wauthy (1996), I offer the complete characterization of quality choices without assuming ex ante that the market is, or not, covered. But while in Wauthy (1996) there is no cost of producing quality, I model competition under fixed costs of quality improvement. Newspapers indeed operate under increasing returns to scale.

[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.

Moreover, dividing the content of newspapers between hard and soft news, I introduce a second dimension of vertical differentiation (Vandenbosch and Weinberg, 1995; Lauga and Ofek, 2011).

Investigating newspapers' decision to supply different type of news is important because different consumers may sort into different news.[9] Increased competition in the media market – or reciprocally, ownership consolidation through mergers (Fan, 2013) – may affect this 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 large. They measure quality with the paper's number of pages and of reporters on staff. George (2007) also uses data on reporters when studying how differentiation and variety increase with concentration in markets for daily newspapers.[11] My research 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[12], in the large sample of media outlets I cover (264 newspapers), and in my ability to study these effects over a long period of time (1945-2012).

3 Theoretical Framework: Competition and News Production

In this section, I present a simple theoretical framework that guides the subsequent empirical exercise and aids in interpreting the results.

There is a continuum of consumers of mass 1 and two profit-maximizing newspapers under duopoly, newspaper 1 and newspaper 2 (only one newspaper under monopoly, newspaper m). I study the production choices (price and quality) of newspapers under monopoly and duopoly. The analysis is based on a two-stage non-cooperative sequential game. Newspapers first choose simultaneously their quality and then compete simultaneously in price.

[9] Gentzkow (2006) and Prior (2005) find for example that once television and cable TV, respectively, become available to US viewers, some of them stop watching news programs and sort into entertainment programs.

[10] See also Della Vigna and Kennedy (2011) on media concentration and bias coverage.

[11] In their study of the effect of the *New York Times* penetration on local product positioning, George and Waldfogel (2006) similarly use data on the assignment of reporters and editors to topical beats.

[12] 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. Finally, Puglisi and Snyder (2011) propose a new method for measuring the relative ideological positions of newspapers using data on ballot propositions.

3.1 Model Set-Up: Consumers

Consumers choose whether to buy a newspaper. I assume that there is unit-demand: consumers cannot buy more than one unit of the newspaper. Moreover, in order to keep the model tractable, I assume that there is no multi-homing: when there are two newspapers, consumers can only buy one of the two. They cannot buy both newspapers at the same time. Each consumer has an outside option normalized to 0.[13]

I assume that there is vertical differentiation.[14] Consumers are heterogeneous with respect to their willingness-to-pay for a single attribute of the newspaper: the quality of the newspaper whatsoever the type of content.

Consumer i maximizes the following utility function:

$$V_i = \begin{cases} \gamma_i n_j - p_j, & \text{if she buys newspaper j} \\ 0, & \text{otherwise} \end{cases}$$

where p_j is the price of newspaper j, n_j is its quality and γ_i is consumer i's willingness-to-pay for quality. I assume that γ is uniformly distributed with unit density over the interval $\left[\underline{\gamma}, \overline{\gamma}\right]$: $U \sim \left[\underline{\gamma}, \overline{\gamma}\right]$.[15]

In the monopoly case, consumer i buys newspaper j iff

$$\gamma_i n_j - p_j \geq 0$$

In the duopoly case, newspaper j's ($j = 1, 2$) demand, D_j, is defined as the set of consumer types who get greater surplus from its quality-price offering than from the other firm's quality-price offering or the outside option:

$$D_j = \left\{\gamma \sim U\left[\underline{\gamma}, \overline{\gamma}\right] : \gamma n_j - p_j \geq \gamma n_z - p_z \ \forall z = 0, 1, 2\right\} \tag{1}$$

Higher types (consumers with a high γ) more strongly prefer higher-quality newspapers since they get a higher marginal benefit. They thus choose the higher-quality newspaper

[13] Assuming the existence of an outside good is a common assumption in discrete choice models. The distinction between the outside good and the competing products is that the price of the outside good is not set in response to the prices of the inside goods. In the absence of an outside good, consumers are forced to choose from the inside goods and demand depends only on differences in prices (Berry, 1994).

[14] Products are vertically differentiated when all consumers agree about the quality ordering of the products but differ in how much they are willing to pay for higher quality. On the contrary, products are horizontally differentiated when consumers disagree about which type of product provides them with greater utility holding prices constant.

[15] Assuming that consumers type are distributed uniformly allows me to remove non-uniformity of the consumer preference distribution as a possible explanation of product positioning. With a uniform distribution, if a firm chooses to produce a certain quality, it is not because more consumers have that quality as their ideal product than any other. On the contrary, with non-uniform distributions, firms may tend to cluster around the majority customer preference ("agglomeration effect") (see e.g. Ansari et al., 1994). Moreover, the uniformity assumption is convenient for deriving analytical results.

under duopoly. Middle types choose the lower-quality newspaper. Finally, if the market is not covered, lower types choose the outside option. Importantly here I am not assuming market coverage ex ante. The extent of consumers' heterogeneity – measured by the ratio $\frac{\overline{\gamma}}{\underline{\gamma}}$ – determines whether the market is actually covered or not. Market coverage is an endogenous outcome of the quality game, as it will appear clearly below.

3.2 Model Set-Up: Newspapers

Newspapers maximize their profits by choosing their price p and their quality n:

$$\max_{(n_j,p_j)} \Pi_j = \left[p_j D_j \left(\mathbf{n}, \mathbf{p} \right) - \frac{c n_j^2}{2} - S \right] \tag{2}$$

where S is the fixed cost for setting up a newspaper.[16] Implicitly in this profit function, I am considering advertising revenues as a per-reader proportional subsidy.[17]

Key here are the increasing returns to scale. The production cost is a quadratic function of the quality n and is given by $\frac{cn_j^2}{2}$. This cost is fixed with respect to output. The cost of producing the first newspaper is indeed high and increasing in quality – it depends on the number of journalists on staff –, but once this fixed cost has been borne, the variable cost of selling additional newspapers is limited to the cost of paper, printing and distribution, which is relatively low (see e.g. Baron, 2006; Berry and Waldfogel, 2010). Note that this quadratic production cost increases with quality at a faster rate than any agent's willingness-to-pay (consumers' utility functions are linear in quality).

3.3 Timing of the Game

The game proceeds as follows:

1. Newspapers simultaneously choose their product positioning n.

2. Newspapers simultaneously choose their price.

This time ordering is standard. Price can indeed often be adjusted faster than product characteristics can. Competing first simultaneously in quality before competing simultaneously in price allows newspapers to differentiate in quality in order to soften price competition.

[16] This includes the annual costs that must be incurred in order to set up a newspaper (office space, equipment, printing press, etc.) and to maintain a reputation as a media outlet (e.g. one needs to have a minimal number of journalists covering core issues, etc.).

[17] I am implicitly assuming here that advertisers place the same value on all kind of readers. One could argue that depending on the demographics of the readers, advertisers may place different values for example on those who prefer soft news than on those who prefer hard news. In an extension of the model below (Section 3.5), I divide newspaper's content between hard and soft news. One simple way to take into account different values advertisers place on different readers is simply to assume different average tastes for hard and soft news.

The two-stage modeling enables the existence of a pure-strategy equilibrium, when none would exist if qualities and prices were chosen simultaneously.[18]

3.4 Solving the Model

I compare the production choices of newspapers under monopoly and under duopoly. I do not consider the cases with more than two newspapers. That is, I assume that the set-up cost is sufficiently large ($S > \underline{S}$) so that a third entrant would suffer losses. Whether monopoly or duopoly prevails in equilibrium also depends on S. One can easily show that if S is sufficiently small ($\underline{S} < S < \overline{S}$), the second entrant can make positive profits, so that there is a duopoly. Conversely, for S sufficiently large ($S > \overline{S}$), no entry is profitable, and there is a monopoly (see online Appendix Section E).

I solve the game by backward induction. I only consider pure-strategy equilibria. Solutions fall under two cases depending on the degree of heterogeneity of consumers' willingness-to-pay. Comparing the quality of the newspaper under monopoly (n_m^*) to the quality of the competing newspapers under duopoly (n_1^*,n_2^*), I obtain the following proposition.

Proposition 1 (Business stealing and returns to scale in news production)
Assume n_m^* is the monopoly equilibrium and (n_1^*,n_2^*) is the duopoly equilibrium. $\exists\ \underline{\lambda}, \overline{\lambda}$ such that
If $\frac{\overline{\gamma}}{\underline{\gamma}} \geq \overline{\lambda}$ (high heterogeneity of tastes), $n_1^* < n_m^* < n_2^*$ (i.e. under duopoly, one duopolist produces a lower-quality newspaper than the monopolist, and the other one a higher-quality newspaper).
If $\frac{\overline{\gamma}}{\underline{\gamma}} < \underline{\lambda}$ (low heterogeneity of tastes), $n_1^* < n_2^* < n_m^*$ (i.e. under duopoly, both duopolists produce a lower-quality newspaper than the monopolist).

Proof. See online Appendix E ■

The only Nash Equiblrium is an asymmetric equilibrium in which one newspaper is of higher quality than the other newspaper. Newspapers indeed always choose to differentiate because differentiation allows them to relax price competition while a symmetric equilibrium yields Bertrand competition – and zero profits – in the second stage of the game. The key point is thus to determine whether the high-quality duopolist produces a higher-quality newspaper than the monopolist. The impact of competition on the quality of newspapers depends on the degree of taste heterogeneity. Under competition, newspapers can choose between delivering a high-quality newspaper or lowering their price. They do not want to be close on quality since that leads to less market power. Prices increase both in the quality of the newspaper and in the quality differential ($n_2 - n_1$) for both newspapers.

[18] The sequential game specification has also implications for what markets a second paper enters. Specifically, I am ruling out any limit-pricing type of behavior where a first-mover positions itself to deter entry by others.

What is key for the result of Proposition 1 is that I do not assume market coverage *ex ante*.[19] Total reading increases – the business stealing effect decreases – with $\frac{\overline{\gamma}}{\underline{\gamma}}$. When heterogeneity is high ($\frac{\overline{\gamma}}{\underline{\gamma}} \geq \overline{\lambda}$), the market is not covered under competition. Entry expands the market 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 one a higher-quality newspaper.

On the contrary, when heterogeneity is low ($\frac{\overline{\gamma}}{\underline{\gamma}} < \underline{\lambda}$), the market is covered under competition. There is business stealing: the second newspaper reduces the incumbent newspaper's output. Resources used on the fixed costs of news production increase and competing newspapers reduce their quality. Both newspapers under duopoly thus produce a lower-quality newspaper than the monopolist. Since there is no multi-homing, each reader is less informed than under monopoly and the social surplus is reduced.[20]

3.5 Extension: Hard vs. Soft News

In this extension of my simple theoretical framework, I divide newspaper content between hard news (h) and soft news (s). Consumers are heterogeneous with respect to their willingness-to-pay for these two attributes of newspapers. Consumer i maximizes the following utility function:

$$V_{ij} = \begin{cases} \theta_i h_j + \alpha_i s_j - p_j, & \text{if she buys newspaper j} \\ 0, & \text{otherwise} \end{cases}$$

where h_j is the quality of hard news produced by newspaper j, s_j the quality of soft news, and p_j the price.

θ_i is consumer i's willingness-to-pay for high-quality hard news. It is uniformly distributed with unit density over the interval $\theta \sim U\left[\underline{\theta}, \overline{\theta}\right]$. Similarly, α_i is consumer i's willingness-to-pay for high-quality soft news and $\alpha \sim U\left[\underline{\alpha}, \overline{\alpha}\right]$. I assume that θ and α are mutually independent.

Newspapers maximize their profits by choosing their price p, the quality of hard news h and the quality of soft news s:

[19] The existing literature studying oligopolies in which firms sell products of different qualities often assume ex ante that the market is, or is not, covered. For example, Choi and Shin (1992) and Moorthy (1988) assume that firms do not cover the market. On the contrary, Tirole (1988) assumes that firms cover the market. To the extent of my knowledge, Wauthy (1996) is the first to provide a full characterization of quality choices, without assuming ex ante market coverage. But he assumes zero costs. On the contrary, I assume the existence of a quadratic cost function for quality.

[20] This result is in line with the findings of the literature on free entry and social inefficiency. Berry and Waldfogel (1999) quantify for example the inefficiency due to free entry in the radio market (see also Steiner, 1952). The main difference here is that while Berry and Waldfogel (1999) model the radio broadcasting industry as a homogenous-goods industry, I introduce differentiation in newpapers' characteristics and heterogeneity in consumers' willingness-to-pay for these characteristics. When heterogeneity is not high enough, then the social inefficiency result holds.

$$\max_{(h_j,s_j,p_j)} \Pi_j = \left[p_j D_j\left(\mathbf{h},\mathbf{s},\mathbf{p}\right) - \frac{c_h h_j^2}{2} - \frac{c_s s_j^2}{2} - S \right]$$

where the production cost of hard news is given by $\frac{c_h h_j^2}{2}$ and the production cost of soft news by $\frac{c_s s_j^2}{2}$. As before I assume that these costs are quality-dependent fixed costs.[21] Following the general case, newspapers first choose their product positioning (h and s) and then simultaneously compete in price.

I allow more heterogeneity in the tastes for one attribute (say soft news) than for the other attribute (say hard news). A simple way to do it is to assume that $\theta_i = \theta \, \forall i$. Everything else is assumed to be symmetrical. The average taste for hard and soft news is the same: $\theta = \frac{\underline{\alpha}+\overline{\alpha}}{2}$. The cost of producing hard and soft news is also identical: $c_h = c_s$.

To increase tractability, I only present results in a discrete setting (however there are robust to a continuous setting). h and s can only take two values: a low value ($\underline{h}$, $\underline{s}$) and a high value ($\overline{h}$, $\overline{s}$). I assume that $\left[\underline{h}, \overline{h}\right] = [\underline{s}, \overline{s}]$. There is no cost of producing a low value of hard or soft news, and a cost $c > 0$ of producing a high value. There are 4 possible strategies for the newspaper:

1. $(\underline{h}, \underline{s})$ (cost = 0);
2. $(\underline{h}, \overline{s})$ (cost = c);
3. $\left(\overline{h}, \underline{s}\right)$ (cost = c);
4. $\left(\overline{h}, \overline{s}\right)$ (cost = 2c).

Monopoly Consider first what happens in the monopoly case. Comparing the profits in the 4 possible cases leads to Lemma 1:

Lemma 1 (Monopoly)
As the production cost increases, a monopoly newspaper first cuts on soft news and then cuts on hard news. That is, the monopoly chooses:

$$(h_m^*, s_m^*) = \begin{cases} (\overline{h}, \overline{s}) & \textit{if} \;\; c < c_1^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(M1)} \\ (\overline{h}, \underline{s}) & \textit{if} \;\; c_1^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) < c < c_2^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(M2)} \\ (\underline{h}, \underline{s}) & \textit{if} \;\; c > c_2^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(M3)} \end{cases}$$

[21] To be consistent with the general case of the model, I am assuming here that consumers differ *vertically* in their preferences for hard and soft news. However combining heterogeneity in the willingness-to-pay for newspaper quality with *horizontal* differentiation in the tastes for hard news and soft news will deliver similar predictions.

Proof. See Appendix E ■

Two things have to be highlighted. First, it is never optimal for the monopoly to choose $(\underline{h}, \overline{s})$. Second, the value of hard and soft news provided by the monopoly depends on the degree of taste heterogeneity $\frac{\overline{\alpha}}{\underline{\alpha}}$. The cost thresholds $c_i^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha})$ $(i = 1, 2)$ are functions of $\frac{\overline{\alpha}}{\underline{\alpha}}$ and $\frac{\overline{s}}{\underline{s}}$. For a given ratio $\frac{\overline{s}}{\underline{s}}$, the more heterogeneity in tastes $\frac{\overline{\alpha}}{\underline{\alpha}}$, the higher the threshold cost $c_1^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha})$ and the lower $c_2^m(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha})$. That is to say, for a given $\frac{\overline{s}}{\underline{s}}$, a higher heterogeneity $\frac{\overline{\alpha}}{\underline{\alpha}}$ increases the chances of soft news being low and hard news being high.

Duopoly Lemma 2 is obtained by computing the best response functions of each newspaper and solving for the Nash equilibrium.

Lemma 2 (Duopoly)
For all production costs, newspapers under duopoly specialize along the soft news dimension. That is, competing newspapers choose:

$$(h_1^*, s_1^*), (h_2^*, s_2^*) = \begin{cases} (\overline{h}, \underline{s}), (\overline{h}, \overline{s}) & \textit{if} \;\; c < c_1^d(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(D1)} \\ (\underline{h}, \underline{s}), (\underline{h}, \overline{s}) & \textit{if} \;\; c_1^d(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) < c < c_2^d(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(D2)} \\ (\underline{h}, \underline{s}), (\overline{h}, \overline{s}) & \textit{if} \;\; c > c_2^d(\underline{s}, \overline{s}, \underline{\alpha}, \overline{\alpha}) & \text{(D3)} \end{cases}$$

Proof. See Appendix E ■

Regardless of where the other newspaper is located, each newspaper's best product strategy is always to differentiate on at least one dimension. Newspapers always differentiate along the dimension with the greater heterogeneity, here soft news: if one newspaper chooses to produce $\underline{s}$, the other newspaper's best product strategy is always to produce $\overline{s}$. One can think of the attribute with more heterogeneity as playing the same role as the single dimension. Firms differentiate along this attribute to relax price competition. The role of the second attribute is different. Newspapers use this attribute to manage demand and cost considerations. If the production cost is low (equation (D1)), both newspapers produce a high value of hard news $\overline{h}$ (since it is not costly for them to do so). When the production cost increases above c_1^d (equation (D2)) then newspapers choose to offer a low value of information $\underline{h}$ to contain costs. Finally, when the cost increases above c_2^d (equation (D3)), it becomes optimal for newspaper 2 to sell to high-end consumers only to alleviate price competition. In this case, newspapers exploit both dimensions to differentiate.

Monopoly vs. duopoly Combining together the results for the monopoly and the duopoly case, I obtain the following proposition:

Proposition 2 (Specialization effect)
There is an intermediate cost interval $[\tilde{c}, \hat{c}]$ *s.t.* $\forall c \in [\tilde{c}, \hat{c}]$ *both newspapers under duopoly produce less hard news than the newspaper under monopoly:*

1. ***Monopoly***: $(h_m^*, s_m^*) = (\overline{h}, \underline{s})$.

2. ***Duopoly***: $(h_1^*, s_1^*), (h_2^*, s_2^*) = (\underline{h}, \underline{s}), (\underline{h}, \overline{s})$.

Proof. See Appendix E ■

3.6 Corollary Prediction: Political Participation

Proposition 1 shows how newspaper quality varies with the number of newspapers and how this effect depends on the extent of heterogeneity. When heterogeneity is low, an increase in the number of newspapers leads to a decrease in the quality of the two competing newspapers. If more informed voters are more likely to vote (see e.g. Parlfrey and Poole, 1987; Banerjee et al., 2010; Campante and Do, 2013), then an increase in competition leads to a decrease in political participation.[22]

Proposition 3 (Media competition and political participation)
Assume consumers differ in their willingness-to-pay for quality.
When heterogeneity in the willingness-to-pay for quality is high, newspaper entry leads to an increase in turnout at elections.
When heterogeneity in the willingness-to-pay for quality is low, newspaper entry leads to a decrease in turnout at elections.

In the online Appendix to this paper (Section F) I combine Proposition 1 with a voting model to formalize this prediction.

3.7 Summary: Empirical Predictions

The simple theoretical framework above generates three testable predictions that I bring to the data:

1. **Newspaper quality**: if heterogeneity in the willingness-to-pay for quality is low, newspaper entry leads to a decrease in the quality of the two competing newspapers compared to the monopolist.

[22] I assume that people learn information for their voting decision as a by-product of newspaper readership. An important number of studies have indeed shown that people often learn politically relevant facts as a by-product of nonpolitical routines (Prior, 2007). As underlined by Hamilton (2004): *"The small chance that an individual reader's political action can influence events makes it unlikely he or she will search out the information helpful in making a voting decision."* (p.2) .

2. **Type of news produced** (extension): if the heterogeneity in the willingness-to-pay for hard news is lower than the heterogeneity in the willingness-to-pay for soft news, newspaper entry leads to a decrease in the quality of hard news produced by the two competing newspapers compared to the monopolist.

3. **Voter turnout**: if heterogeneity in the willingness-to-pay for quality is low, newspaper entry leads to a decrease in voter turnout at elections.

Before testing these predictions, I describe the French local daily newspaper industry and present the new dataset I build for this study.

4 Industry and Data Characteristics

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 availaility of high-quality data. I construct an annual dataset on the evolution of the French newspaper market between 1945 and 2012. Section 4.1 discusses basic industry characteristics and presents its historical development. Section 4.2 reviews the dataset. Finally Section 4.3 describes my empirical measures to proxy for heterogeneity in consumers' willingness-to-pay for quality.

4.1 Industry Characteristics and Historical Development

My sample includes 264 local daily newspapers over the 1945-2012 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 mix 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, 201 journalists work in each newspaper (Table 2 provides descriptive statistics on papers' costs and revenues).

[TABLES 1 & 2 HERE]

Overall, the local daily newspaper industry generates €2.515 billion ($3.424 billion) in total revenues in 2012, three times more than the national daily newspaper industry (€687 million). It represents nearly 30% of the total revenues generated by the print media industry (€8.705 billion[23]). 63% of theses revenues come from sales and 37% from advertisement. Its

[23] I.e. $11.850 billion or 0.43% of the GDP. In comparison, according to the Newspaper Association of America, the US newspaper media industry generates $38.6 billion in total revenues in 2012 (0.25% of the GDP).

total circulation is around 5.5 million copies a day, compared to 1.5 million 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[24]; there are 90 counties in metropolitan France excluding the area of Paris.[25] On average, there are 2.67 newspapers per county and the total newspaper circulation in a county is $80,981$ copies which represents 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 2.93, this implies that more than 70% of the egilible voters in a county read a local daily newspaper. Hence 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 1945-2012, the total circulation of local newspapers has always been extremely large. The number of copies sold everyday ranges from 20 to 30% of the eligible voters during my period of interest.[26]

Given the importance of circulation across nearby counties – between 1945 and 2012, 42% of the local daily newspapers circulate in more than one county, and these newspapers circulate on average across 4 counties[27] – my main variables of interest are at the newspaper-county level.

[TABLE 3 HERE]

Newspaper entries and exits The central independent variable in my analysis is the change in the number of newspapers. My sample includes 630 newspaper-county pairs. I observe a total of 276 county-years with net newspaper entry and 361 county-years with net newspaper exit. Figure 1 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). The high number of entries and exits between 1945 and 1955 comes from the Second World War. The wartime period marks an almost wholly clean break with the prewar media

[24] 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 details in the online Appendix section A).

[25] In my analysis, I exclude the Paris area. In this area, local daily newspapers are indeed competing in a different way with national newspapers. Paris having a national dimension, a lot of "local" information concerning the area of Paris is covered in national newspapers. Then 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.

[26] See the online Appendix Figure B.11.

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

system, with the press industry effectively rebuilt from scratch once the conflict is over.[28] When I exclude this post-war period (1945-1954), I am left with a total of 79 county-years with net newspaper entry and 222 county-years with net newspaper exit.[29] The entering newspapers are either new newspapers entering the newspaper market from scratch (in 24% of the cases[30]) or existing newspapers entering a neighboring market. Importantly, in more than 76% of the cases, newspapers on a given market are owned by different owners. This share increases to 80% when considering markets with only two newspapers.

[FIGURE 1 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 (see e.g. Gentzkow et al., 2011). The first is population. 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. The second determinant of the number of newspapers is income; richer counties can command both greater consumers' willingness to pay for newspapers and marketability to advertisers. For the recent period 2003-2010, I have county-level annual data on the total income tax revenue collected by the government.[31] This proxy for income is significantly and positively correlated with the number of newspapers.

4.2 Data

In this section, I briefly describe the 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 by these technical details may want to go directly to Section 4.3.

Newspaper circulation, costs and revenues To determine for each year between 1945 and 2012 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

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

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

[30] 65 out of the 276 county-years with net newspaper entry I observe come from this new newspapers. Among these 65 cases, 51 are caused by new newspaper owners entering the local daily newspaper industry.

[31] This data is from the Finance Ministry.

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 1945-1990, newspaper circulation data comes from official data I digitize and merge. Data for recent years (1990-2012) comes from the French press observatory. I collect annual data on newspaper readership between 1957 and 2011 from studies on French newspaper readers principally conducted for the advertising market. These surveys cover, for each newspaper, information on its aggregate readership.

I compute annually for local daily newspapers between 1960 and 2009 a number of important economic indicators, namely sales, profits, value-added, operating expenses (on intermediate goods and labor), operating revenues (revenues from sales and revenues from advertising) and the number of employees. 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, expenses, revenues and profits. From 1984 to 2009[32], the data comes from the Enterprise Survey of the French national institute for statistics. 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). For 24 newspapers between 1999 and 2012, I also collect information on the number of journalists. The correlation between the total number of employees and the number of journalists is equal to 0.94 and is statistically significant at the 1% level. Finally I collect price data for my entire sample of newspapers between 1960 and 2012.

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 sales, operating expenses,...) equal to its share of the newspaper circulation.

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

[32] Unfortunately, no data is available for the period 1975-1983.

syndicate website using an automated script.[33]

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.[34]

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, environnement, international 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.[35] (More details on the classification of articles between hard and soft news are presented in Section 5.5.)

Finally, I use the article classification in 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.

Electoral data and demographic controls I focus on mayoral (city-level) elections. As of today, there are 36,570 cities in metropolitan France. There are 2,282 cities with more than 3,500 inhabitants outside the area of Paris. In this paper I focus on these cities over 3,500 inhabitants since the electoral rule for mayoral elections for cities under 3,500 inhabitants is different. For each election, I measure turnout as the ratio of cast votes to eligible voters. I use cast votes rather than total votes since in France blank votes are not included in turnout. Mayoral elections take place in France every six years. Between 1945 and 2012, 11 elections took place: 1947, 1953, 1959, 1965, 1971, 1977, 1983, 1989, 1995, 2001 and 2008.[36] Before 1983, data on French mayoral elections have never been digitized. I construct the first electronically available dataset on French local elections results at the city level between 1945 and

[33] Using front pages is not new in the literature. 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.

[34] 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.

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

[36] 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.

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). On average over the period, the turnout rate is equal to 67%.[37]

City-level demographic data from the French census is available in electronic format from 1960 to 2012. I digitize data for the 1936, 1946 and 1954 censuses from original publications by the French national institute for statistics. I compute the share of the population by age group (1945-2012), occupation and degree (1960-2012). 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.

4.3 Measures of Heterogenity

The most novel 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 While the model yields a precise measure of heterogeneity $\left(\frac{\overline{\gamma}}{\underline{\gamma}}\right)$, the choice of the data to quantify the extent of heterogeneity in the willingness-to-pay for quality across counties is more problematic. If data on the income distribution of individuals within each county were available, I could have used the dispersion of this distribution as my measure of county-level heterogeneity.[38] The income distribution follows a Pareto distribution and one can estimate the slope of the distribution using regression techniques. However, income data at the county level is only available since 2003 and, moreover, it is aggregated into 6 different categories, precluding such an estimation of the dispersion. Nevertheless, I can compute an heterogeneity measure by using the distribution of individuals across socio-economic groups. Individuals (the working population between 15 and 64 year old) in the census are indeed classified into $n = 6$ different socio-economic groups[39] and the data is available since 1960. Following the existing literature, the heterogeneity measure I use is one minus the Herfindahl index of the share of the socio-economic groups (see e.g. Alesina et al., 2012):

[37] In the online Appendix Figure C.1, I show the evolution of the turnout rate between 1947 and 2008.

[38] Tirole (1988) shows for example that γ can be viewed as the inverse of the marginal rate of substitution between income and quality rather than as a taste parameter. As far as the choice between buying and not buying is concerned, the consumer's preferences could be read as $V_{ij} = n_j - \frac{1}{\gamma_i} p_j$. On this interpretation, all consumers derive the same surplus from the newspaper, but they have different incomes and therefore, different marginal rates of substitution between income and quality $\frac{1}{\gamma_i}$. Wealthier consumers have a lower "marginal utility of income" or, equivalently, a higher γ.

[39] (i) Farmers; (ii) Artisans, shopkeepers and company managers (*"artisans-commercants-chefs d'entreprises"*); (iii) Senior executives and knowledge workers (*"cadres et professions intellectuelles supérieures"*); (iv) Intermediate occupations (*"professions intermédiaires"*); (v) Employees; (vi) Laborers. In the online Appendix Figure C.2 I show the evolution of the socio-economic composition of France between 1960 and 2012.

$$Heterogeneity_{ct} = 1 - \sum_{i=1}^{n} p_{ict}^2$$

where p_{ict} is the share of the population from socio-economic group i in county c and year t. $Heterogeneity_{ct}$ increases when the evenness of the distribution of the individuals among the different categories increases. It gives us the probability that two randomly selected individuals in a county belong to two different socio-economic groups.

I compute the heterogeneity measure for each county for the first year for which I have socio-economic group data in the census, namely 1960 (this also corresponds to the first year for which I have data on newspapers' revenues and expenses). Using the median over all the counties, I then split my sample of counties between low-heterogeneity and high-heterogeneity counties. Given the fact that in the model the results depend on whether a county is below or above a heterogeneity threshold, such a binary measure of heterogeneity is more relevant than a continuous measure. I compute this measure at the beginning of the time period rather than on an annual basis to avoid any endogeneity issue.

Importantly, this measure of heterogeneity is not correlated with county size. However, low- and high-heterogeneity counties differ in terms of other demographic covariates. In the online Appendix Table C.2, I perform a t-test on the equality of means for education, socio-economic 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 low-educated people (who only achieve elementary primary school), a higher proportion of farmers and of laborers, and a higher proportion of individuals below 20 years old.

Relative heterogeneity in the willingness-to-pay for hard and soft news Finally, to bring to the data the prediction of the extended case of my simple theoretical framework, I need to quantify the relative heterogeneity in the willingness-to-pay for hard news and for soft news. As I underline above, higher heterogeneity in the tastes for soft news may come from the fact that soft news has more dimensions than the political space. I proxy heterogeneity in the willingness-to-pay for hard news with a measure of political polarization. Using electoral results for the 2002 presidential election (the last election which takes place before 2005 – the first year for which I have newspaper's content data), I construct for each county the share of the votes for extreme-right and extreme-left parties. My assumption is that the higher this share, the higher the heterogeneity in the willingness-to-pay for hard news. The next section studies empirically the impact of an entry on the quality of newspapers.

5 Newspaper Competition and News Quality

In this section, I test the predictions of the simple theoretical framework described in Section 3 (proposition 1) and of its extension (proposition 2). 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 vertical quality attribute of newspapers, I first use the total number of employees; as I show above, this number is strongly correlated with the number of journalists on staff. 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. More content is indeed presumably always preferred to less by consumers. I use quantity to estimate both the impact of competition on newspaper quality and on the type of news produced – hard versus soft news. I perform this analysis taking a reduced-form approach to shed light on whether the empirical results are consistent with the predictions of my theoretical framework. I use all the variations in the data from $n > 0$ to $n+1$ newspapers.

5.1 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 effets, and a large set of demographic covariates controlling for the age composition, occupational structure and educational level of counties, as well as for the circulation of national newspapers. I provide below evidence that entries are orthogonal to the outcomes I study: there are no pretrends in circulation, revenues, expenses and the number of employees before entries (Section 5.2).[40] 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 1945 and 2012, I observe a total of 276 county-years with net entry and 361 county-years with net exit, and of 79 county-years with net entry and 222 county-years with net exit when I drop the postwar period.

[40] 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 charateristics indeed change smoothly.

5.2 Results: Market Expansion or Business Stealing?

According to the simple theoretical framework I propose, the entry of a newspaper on 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 it 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 an aggregate event studies and a fixed-effect model that allows for time-varying effects of entries and exits.

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 *excepted* 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 here the results 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.[41] One of the main reason 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.

[41] 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. Additional details on the construction of the episodes are available in the online Appendix section A.

I estimate the following model:

$$circulation_{cte} = \sum_{k=-10}^{+10} \alpha^k \mathbf{1}_{\mathbf{cte}}^{\mathbf{j=k}} + \mathbf{X}_{\mathbf{ct}}^{'}\delta + \gamma_t + \eta_c + \varepsilon_{cte} \tag{3}$$

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 higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker and the total population in county c and year t. Standard errors are clustered by events.

The set of coefficients α^k are my coefficients of interest.[42] In Figure 2, I first plot these coefficients α^k for the entire period 1945-2012 and without controls. The dependent variable is total circulation (per eligible voter) in the upper figure (Figure 2a) and the circulation of incumbent newspapers (per eligible voter) in the bottom figure (Figure 2b). Two things need to be underlined. First, whether I consider total county circulation or circulation of incumbent newspapers, there is no pretrend 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 4 percentage points (Figure 2a) –, we observe a strong and permanent business stealing effect (Figure 2b). The circulation of incumbent newspapers per eligible voter decreases by around 7 percentage points after entry, which corresponds to a 26% decrease.[43]

According to my simple theoretical framework (proposition 1), the business-stealing effect should be especially strong in low-heterogeneity counties. In Figure 3, controlling for demographics (education, socio-economic groups and population) and focusing on the 1960-2012 period, I investigate the effect of entry separately for low- and high-heterogeneity counties. It appears clearly that the business-stealing effect is much more important in low than in high-heterogeneity places. In low-heterogeneity counties, there is no market expansion after an entry (Figure 3a). 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. 8 years after the entry, we observe a 10 percentage points decrease in the circulation of incumbent newspapers per eligible voter, which corresponds to a 44% decrease.[44] 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 3b). Second, the incumbent newspapers' circulation only

[42] 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.

[43] Between 1945 and 2012, the average circulation of incumbent newspapers per eligible voter the year before an entry is 26.92%.

[44] Between 1960 and 2012, the average circulation of incumbent newspapers per eligible voter the year before an entry is 22.55%.

decreases by between 1.9 percentage points at the time of the entry and 3.5 percentage points ten years after the entry (Figure 3d).

[FIGURES 2 & 3 HERE]

Newspaper exit Does an exit symmetrically increase the circulation of remaining newspapers? I estimate equation (3) considering only episodes of exit. Figure 4 shows the coefficients α^k from this estimation for the period 1960-2012 controlling for demographics, for both low-heterogeneity (4a and 4c) and high-heterogeneity counties (4b and 4d). Contrary to what we observe for entries, the magnitude of the effects for exits are very small (to make it appears 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 in both low- and high-heterogeneity counties (Figures 4c and 4d). Incumbent newspapers recover the circulation of the exiting newspaper even before the actual exit of the newspaper. The existence of a pretrend 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 4 HERE]

5.3 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 periods 1960 to 2009 (2012 for the number of employees). For each newspaper I observe circulation, operating expenses (on intermediate goods and labor), revenues (from sales and from advertising) and number of employees. I study how the entry of a newspaper on the market affects the value of these outcomes for incumbent newspapers.

Aggregate event studies In Figure 5, I plot the coefficients α^k that I obtain by estimating equation (3) with a -9 to $+9$ window and different left-hand side variables for incumbent newspapers: alternatively profits (5a), total revenues (5b), revenues from sales (5c); advertising revenues (5d); total expenses (5e), expenses on intermediate goods (inputs) (5f), expenses on labor (payroll) (5g), and the number of employees (5h). For each of these eight variables, it appears clearly that there is no pretrend. The negative effect of entry happens on impact and grows larger over time (similarly to what happens for circulation). I find that

total revenues decrease by $15,830$ (constant 2009) thousand euros[45] six years after an entry. Table C.1 in the online Appendix presents descriptive statistics for incumbent newspapers the year preceding an entry. The total revenues of incumbent newspapers are on average equal to €77,762 thousand. The entry of a newspaper thus leads to a 20% decrease of the total revenues of incumbent newspapers. This decrease was expected given the decrease in incumbent newspapers' circulation. It mainly comes from a decrease in revenues from sales which decrease by 27% (€11,605 thousand). Advertising revenues also decrease but only by 15% (€4,897 thousand). This decrease in revenues goes along with a decrease in incumbent newspapers' total expenses. Total expenses decrease by 24% six years after the entry (€18,916 thousand). Especially striking is the decrease in labor expenses (payroll) which are reduced by 31%. In comparaison, intermediate goods expenses decrease by 25% and this decrease is only statistically significant at the 10% level. Finally, the number of employees working for incumbent newspapers decrease by 83 after six years, a 16% decrease.

According to my model, the negative effect of an entry on incumbent newspapers' revenues, expenses and number of employees should be especially strong in low-heterogeneity counties. Focusing on the total number of employees which is my first proxy for newspapers' quality, I show that it is indeed the case. In Figure 6 I plot the coefficients α^k that I obtain by estimating equation (3) with the number of employees as the dependent variable separately for low- (6a) and high-heterogeneity counties (6b). Entry has a negative effect on the number of employees of incumbent newspapers only in low-heterogeneity areas. The entry of a newspaper reduces the number of employees by 122 after seven years, a 24% decrease.

[FIGURES 5 & 6 HERE]

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 expenses, revenues and the number of employees 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:

[45] In the remainder of the paper, to save on space, I simply use the terminology "euros" when refering to "constant 2009 euros".

$$y_{cnt} = \sum_{k=-2}^{+5} \beta_k \ \mathbf{1}entry_{ct}^{j=k} + \sum_{k=-2}^{+5} \gamma_k \ \mathbf{1}exit_{ct}^{j=k} + \alpha_c + \eta_t + \rho_n + \mathbf{X'_{ct}}\delta + \varepsilon_{cnt} \tag{4}$$

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.[46] The set of controls $\mathbf{X'_{ct}}$ includes as before the share of the population with higher (post-secondary) education, the share of working population between 15 and 64 year old which is senior executive or knowledge worker and the total population. The dependent variable y_{cnt} is alternatively newspapers' profits, expenses, revenues and number of employees.

Table 4 presents the results for incumbent newspapers. 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 circulation, the negative effect is statistically significant beginning the year of the entry and then grows larger over time. The long-term effect of entry on circulation (captured by the indicator variable $\mathbf{1}entry_{ct}^{5}$) is minus three percentage points (column 1). This corresponds to a 30% decrease in circulation (the average circulation per eligible voter of a newspaper in a county is 9%).

For the other outcomes of interest, the negative effect of an entry only becomes statistically significant after three years. In the long run, total revenues decrease by €$6,044$, a 36% decrease (column 3). The number of employees in the long run decreases by more than 70, a 57% decrease. Moreover, while entry has a strong negative effect on each individual newspaper' revenues, expenses and number of employees, 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 revenues and expenses at the time of an entry nor in the following years. In particular, there is no increase in aggregate payroll or number of employees. 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 county level.

[TABLE 4 HERE]

[46] 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.

Heterogeneity Finally, I study how the impact of an entry on circulation, revenues, expenses and the number of employees 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 and the 2nd post-entry year) and long-run entry ($\mathbf{1}entry_{ct}^{\text{long-run}} = 1$ in the 3rd 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.[47] More precisely, my empirical specification is (abstracting from the exit terms):

$$\begin{aligned} y_{cnt} = {} & \beta_{\text{pre-entry}}\ \mathbf{1}entry_{ct}^{\text{pre-entry}} + \theta_{\text{pre-entry}}\ \mathbf{1}entry_{ct}^{\text{pre-entry}} * \text{Low Heterogeneity}_c \\ & + \beta_{\text{short-run}}\ \mathbf{1}entry_{ct}^{\text{short-run}} + \theta_{\text{short-run}}\ \mathbf{1}entry_{ct}^{\text{short-run}} * \text{LowHeterogeneity}_c \\ & + \beta_{\text{long-run}}\ \mathbf{1}entry_{ct}^{\text{long-run}} + \theta_{\text{long-run}}\ \mathbf{1}entry_{ct}^{\text{long-run}} * \text{Low Heterogeneity}_c \\ & + \mathbf{X_{ct}'}\delta + \mathbf{X_{ct}'} * \text{Low Heterogeneity}_c\sigma \\ & + \alpha_c + \eta_t + \rho_n + \varepsilon_{cnt} \end{aligned} \tag{5}$$

where 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 (5) with different dependent variables at the newspaper level: circulation, profit, revenues, expenses and the number of employees. For all these 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 employees in high-heterogeneity counties, this number decreases by 89 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.

[TABLE 5 HERE]

Robustness These results are robust to using education heterogeneity rather than socio-economic group heterogeneity. Individuals above 15 years old are classified into $n = 6$ different education degrees in the census.[48] However, the main advantage of using socio-economic

[47] In the online Appendix Table D.3, I find estimates consistent with the ones in Table 4 using these indicator variables rather than the yearly indicator variables.

[48] (i) No diploma; (ii) "Certificat d'études primaires" which is a diploma awarded at the end of elementary primary education in France (which was officially discontinued in 1989); (iii) "BEPC" or "brevet" which is a diploma given to French pupils at the end of the "3ème" (which corresponds to year 10 or ninth grade); (iv) "Certificat d'aptitude professionnelle" (CAP) or "brevet d'études professionnelles" (BEP) which are secondary

groups rather than education degrees comes from readers' demographic characteristics. In the online Appendix Table C.3, using survey data for the year 2006, I show that the distribution of local daily newspapers' readers among socio-economic groups is almost similar to the distribution of the French population among these groups – while interestingly and as one would have expected, there are important differences if one considers the characteristics of *national* daily newspapers' readers. On the contrary, it appears that local daily newspapers' readers are more educated than the average.

The results are also robust to using an alternative measure of heterogeneity derived from Shannon's measure of information entropy: $H_{ct} = \sum_{i=1}^{n} p_{ict} log\left(\frac{1}{p_{ict}}\right)$, where p_{ict} is the share of the population from socio-economic group i in county c and year t. This measure is strongly correlated with the measure constructed using the Herfindahl index.

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

5.4 The Effect of Newspaper Entry on the Size of Newspapers

5.4.1 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 newspapers' 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:

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

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-day-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

and vocational education diplomas; (v) "Baccalauréat" which is an academic qualification taken at the end of the lycée (secondary education) and the main diploma required to pursue university studies; (vi) Higher (post-secondary) education. In the online Appendix Figure C.3 I show the evolution of the educational attainment in France between 1960 and 2012.

number of words by newspaper; (iii) the total number of words on the newspaper frontpage. 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 the upper panel I consider the total number of articles in the newspaper (6a), in the middle panel the total number of words (6b) and in the bottom panel the total number of words on the frontpage (6c). 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 136, a 32% decrease (column 1). The total number of words decreases by 43% and the number of words on the frontpage by 15%. 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 of the market decreases the number of articles in the newspaper by more than 280 in low-heterogeneity counties (column 2). This result is robust to controlling for year fixed effects (column 3) as well as for the demographic covariates and their interaction with the heterogeneity indicator (column 4). Moreover, I find similar results when considering the total number of words in the newspaper and the number of words on the newspaper frontpage. 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 varies with the market structure.

[TABLE 6 HERE]

5.5 Extension: Newspapers and the Type of News Produced

In the extension of the theoretical framework, I divide newspaper content between hard and soft news. Classifying newspaper content between 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 a citizen may not be for another one. I consider as hard news articles which are informative for the reader at the time of the elections, even if they sometimes incorporate entertainment elements. On the contrary, soft news is non-informative in the political process.[49]

[49] According to Patterson (2000), soft news are *"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).

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 for each article its category. I create 13 different categories: agriculture, culture, economics, education, environnement, health, international, 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, environnement, international or politics, 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 (6) 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 the theoretical framework for proposition 1 – I proxy heterogeneity in the willingness-to-pay for quality using socio-economic group heterogeneity, 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.[50]

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). As predicted by the model, 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

[50] When I estimate equation (6) with the share of articles on hard news as the dependent variable, I find that this share decreases when the number of newspapers increases, but that there are no statistically significant differences between low- and high-heterogeneity counties. I present these results in the online Appendix Table D.4. Only the number of articles on soft news decreases statistically significantly more in low- than in high-heterogeneity counties.

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 articles on hard news in the newspaper. I find that this impact is negative and statistically significant. An increase by 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 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 HERE]

Newspaper specialization These results are consistent with the predictions of the extension of my simple theoretical framework when there is more heterogeneity in the tastes for soft news than for hard news. Another testable implication of the model is that an increase in competition leads to an increase in newspaper specialization. In the online Appendix Table D.5, I present the results of the estimation of equation (6) with newspaper specialization – measured with the Herfindahl index described in Section 4.2 – as the dependent variable. I find as expected that more competition leads to more newspaper differentiation: a one-standard deviation increase in the number of newspapers leads to a 0.19 standard deviations 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.

6 Media 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.

6.1 Specification and Identification Strategy

To test this prediction, I match my panel data on newspaper competition with mayoral election results from 1947 to 2008 and track the impact of a change in competition on turnout. Let w index cities, c index counties and $t \in \{1, ..., 11\}$ 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:

$$\begin{aligned} \Delta turnout_{wct} = \alpha_1 \Delta N_{wct} + \alpha_2 \Delta N_{wct} * \text{Low Heterogeneity}_c \\ + \Delta \mathbf{X'_{wt}}\delta_\mathbf{1} + \Delta \mathbf{X'_{wt}} * \text{Low Heterogeneity}_c \delta_\mathbf{2} + \Delta\mu_{rt} + \varepsilon_{wct} \end{aligned} \tag{7}$$

where Δ is a first-difference operator. The vector of controls $\mathbf{X'_{wt}}$ includes as before the share of the population (15+-year old) with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is laborer and the total population. Controls are defined at the city level.

6.2 Main Results

Table 8 presents the results. In the upper table (8a), 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 columns 2 and 3, it appears clearly 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%. The online Appendix Figure C.1 shows how it varies between 1947 and 2008. It oscillates between 70% and 77% during the period 1947-1977 and since then has been declining. In the 2008 election it was equal to 62%. Related

to the 15 percentage points decrease in turnout between 1947 and 2008, 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 siginificant 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 the bottom table (8b), 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 upper table (8a) as causal effects.

[TABLE 8 HERE]

In this paper I estimate the impact of local newspapers on local elections because in the television and internet era, local newspapers remain the most important source of information only about local politics; information on national politics is widely available throug other media outlets. In the online Appendix, I show that there is no statistically significant effect of a change in the number of local daily newspapers on turnout at national (Congressional or Presidential) elections.

6.2.1 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 7 I plot the coefficient α^k from the following specification:

$$\Delta turnout_{wct} = \sum_{k=-1}^{+1} \alpha^k \Delta N_{wc(t-k)} + \Delta \mathbf{X}'_{\mathbf{wt}} \delta + \Delta \mu_{rt} + \Delta \varepsilon_{wct} \tag{8}$$

where variables are defined as in equation (7). I perform the analysis for the entire sample (upper Figure 7a) and for low-heterogeneity counties only (bottom Figure 7b). The prediction that newspaper entry decreases turnout corresponds to the negative spike in the plot at $k = 0$. Importantly, there are no significant trends before or after the event.[51] Moreover, the effect is of higher order of magnitude for low-heterogeneity counties, as predicted by the model.

[FIGURE 7 HERE]

[51] With only 11 elections in the sample, it is not possible to estimate equation (8) with a k higher than 1.

7 Discussion

7.1 Alternative Mechanisms

Clearly I have not established that my simple theoretical vertical differentiation framework is the only theory 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 about 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 the content of news 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 cover less legislation than in the 1970s while celebrity coverage has increased (see also Hamilton, 2004; Jones, 2010). 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 taste for hard than for soft news.

An alternative argument is that the race to the bottom may simply reflect a general decline in tastes 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's content between hard news and soft news. In this framework, under the assumption that the average willingness-to-pay for high-quality soft news (α) is higher than (rather than equal to) the average willingness-to-pay for high-quality hard news (θ), 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 to a change in the average willingness-to-pay the same way. 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 the 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 literature model the market for news as a two-sided market and study how advertising affects content (see e.g. Ellman and Germano, 2009). Taking into account different values advertisers may place on different readers is beyond the scope of this paper but is the goal of ongoing research (Angelucci et al., 2012). However, just as a general decline in tastes 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 news organizations (see e.g. Hamilton, 2004; Jones, 2010). 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 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 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 in my simple theoretical framework that newspapers are benevolent and operate under a positive-profit constraint will lead to similar predictions under low heterogeneity.

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 it 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 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.[52] This view relies on the assumption that media outlets are biased; I show below that it is not the case of the French

[52]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).

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 obstacle the decision making. Anyhow these 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 newspapers. Whether 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. 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.

7.2 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 countries to countries and specific patterns will differ depending on context. The finding in Drago et al. (2013) 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 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 1950's. Moreover, according to Hamilton (2004), nonpartisan reporting also dominates in American newspaper markets.[53] (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.[54]

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 – of which some people believe it 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, 2013). Digital platforms account for only 8% of time spent consuming news in the US (Edmonds,

[53] 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).

[54] Abstracting from horizontal differentiation also allows me to keep the model tractable while identifying a new effect of newspaper competition on the provision of information.

2013). The Internet represents less than 5% of the total revenues of the print media industry in France in 2012. Moreover I provide evidence in the online Appendix of the relatively low internet penetration rate among French local daily newspaper readers compared to national daily newspaper readers. Using survey data, I also show that local daily newspaper readers think they are better informed through daily newspapers than through other media. Local newspapers are likewise still important for local news in the United States. According to the *State of the Media Report* 2013 of the Pew Research Center, *"papers in smaller markets, like those Warren Buffett is buying, can remain the go-to source for local news and a strong vehicle for local advertisers."*

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 of the total circulation of daily newspapers. The top one daily newspaper is a local newspaper – *Ouest France* – and accounts for 3.3% of this total circulation. Moreover, its circulation is 2.3 times the one of the top two 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 – or similarly of number of pages viewed –, the top five websites garner more than 53% of the total traffic, with 21% for the top one who is *Le Monde*. Moreover the most popular websites are websites of national daily newspapers.[55] 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 exception of Seamans and Zhu (2013), there is no empirical evidence on how media outlets adjust their content in response to increased competition in an online word.[56] But this means that the amount of information provided by local newspapers is still an important determinant of local political participation in the internet era.

[55] 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."*

[56] Esfahani and Jeon (2013) offer a model of multiple issues to investigate how news aggregators affect the quality choices of competing newspapers on the Internet.

8 Conclusion

In this paper, I investigate both theoretically and 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. Modeling the production choices of newspapers in a vertical product differentiation framework, 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 the size of newspapers (number of articles). Moreover, dividing the content of newspapers between hard news and soft news, I find that if consumers differ less in their taste for hard than for soft news, an increase in the number of newspapers may lead newspapers to produce a lower share of hard news. The evidence I obtain from a variety of identification strategies using a new dataset of French local daily newspapers between 1945 and 2012 is consistent with these predictions. I also find that under low heterogeneity, an increase in the number of local newspapers leads to a decrease in political participation at local elections.

The findings of this paper may benefit the public debate by questioning the view that more media competition is necessarily socially efficient.[57] 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, such as subsidies for the press, support for news agencies, tax credits for journalists or antritrust exemptions in the spirit of the American Newspaper Preservation Act (1970) permitting newspaper competitors to enter into a joint operating agreement and to combine business operations.

[57] 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).

References

Abramowitz, A. I. (2010). *The Disappearing Center: Engaged Citizens, Polarization, and American Democracy.* Yale University Press.

Alesina, A. F., Michalopoulos, S., and Papaioannou, E. (2012). Ethnic Inequality. NBER Working Papers 18512, National Bureau of Economic Research, Inc.

Anand, B., Tella, R. D., and Galetovic, A. (2007). Information or Opinion? Media Bias as Product Differentiation. *Journal of Economics & Management Strategy*, 16(3):635–682.

Angelucci, C., Cagé, J., and De Nijs, R. (2012). Price Discrimination in Two-Sided Markets: Theory and Evidence from the Newspaper Industry. Working paper.

Ansari, A., Economides, N., and Ghosh, A. (1994). Competitive Positioning in Markets with Nonuniform Preferences. *Marketing Science*, 13(3):248–273.

Arnold, D. R. (2002). The Press and Political Accountability. Prepared for delivery at a conference on political accountability.

Bach, L. (2011). Should Politicians be Forbidden Multiple Office-Holding? Evidence from France. Mimeo.

Banerjee, A. V., Kumar, S., Pande, R., and Su, F. (2010). Do Informed Voters Make Better Choices? Experimental Evidence from Urban India.

Baron, D. (2006). Persistent Media Bias. *Journal of Public Economics*, 90:1–36.

Becker, B. and Milbourn, T. (2011). How did increased competition affect credit ratings? *Journal of Financial Economics*, 101(3):493–514.

Berry, S. T. (1992). Estimation of a Model of Entry in the Airline Industry. *Econometrica*, 60(4):pp. 889–917.

Berry, S. T. (1994). Estimating Discrete-Choice Models of Product Differentiation. *The RAND Journal of Economics*, 25(2):pp. 242–262.

Berry, S. T. and Waldfogel, J. (1999). Free Entry and Social Inefficiency in Radio Broadcasting. *The RAND Journal of Economics*, 30(3):pp. 397–420.

Berry, S. T. and Waldfogel, J. (2001). Do Mergers Increase Product Variety? Evidence from Radio Broadcasting. *The Quarterly Journal of Economics*, 116(3).

Berry, S. T. and Waldfogel, J. (2010). Product Quality and Market Size. *Journal of Industrial Economics*, 58(1):1–31.

Besley, T. and Prat, A. (2006). Handcuffs for the Grabbing Hand? Media Capture and Government Accountability. *American Economic Review*, 96(3):720–736.

Boczkowski, P. J. (2010). *News at Work: Imitation in an Age of Information Abundance*. University of Chicago Press.

Bresnahan, T. F. and Reiss, P. C. (1991). Entry and Competition in Concentrated Markets. *Journal of Political Economy*, 99(5):977–1009.

Campante, F. R. and Do, Q.-A. (2013). Isolated Capital Cities, Accountability and Corruption: Evidence from US States. NBER Working Papers 19027, National Bureau of Economic Research, Inc.

Campante, F. R., Durante, R., and Sobbrio, F. (2013). Politics 2.0: The Multifaceted Effect of Broadband Internet on Political Participation. NBER Working Papers 19029, National Bureau of Economic Research, Inc.

Choi, C. J. and Shin, H. S. (1992). A Comment on a Model of Vertical Product Differentiation. *The Journal of Industrial Economics*, 40(2):pp. 229–231.

Della Vigna, S. and Kennedy, A. (2011). Does Media Concentration Lead to Biased Coverage? Evidence from Movie Reviews. Working paper.

Dewatripont, M. and Tirole, J. (2005). Modes of Communication. *Journal of Political Economy*, 113(6):1217–1238.

DiTella, R. and Franceschelli, I. (2011). Government Advertising and Media Coverage of Corruption Scandals. *American Economic Journal: Applied Economics*, 3(4):119–151.

Drago, F., Nannicini, T., and Sobbrio, F. (2013). Meet the Press: How Voters and Politicians Respond to Newspaper Entry and Exit. IZA Discussion Papers 7169, Institute for the Study of Labor (IZA).

Edmonds, R. (2013). New research finds 92 percent time spent on news consumption is still on legacy platforms. Technical report.

Ellman, M. and Germano, F. (2009). What Do That Papers Sell? A Model of Advertising and Media Bias. *The Economic Journal*, 119(537):680–704.

Esfahani, N. and Jeon, D.-S. (2013). News Aggregators and Competition Among Newspapers in the Internet. IDEI Working Papers 770, Institut d'Économie Industrielle (IDEI), Toulouse.

Éveno, P. (2003). *L'argent de la presse française des années 1820 à nos jours*. CTHS histoire. Editions du CTHS.

Fan, Y. (2013). Ownership Consolidation and Product Characteristics: A Study of the US Daily Newspaper Market. *American Economic Review*, 103(5):1598–1628.

Feddersen, T. and Sandroni, A. (2006a). A Theory of Participation in Elections. *American Economic Review*, 96(4):1271–1282.

Feddersen, T. J. and Pesendorfer, W. (1996). The Swing Voter's Curse. *American Economic Review*, 86(3):408–424.

Feddersen, T. J. and Pesendorfer, W. (1999). Abstention in Elections with Asymmetric Information and Diverse Preferences. *The American Political Science Review*, 93(2):pp. 381–398.

Feddersen, T. J. and Sandroni, A. (2006b). Ethical Voters and Costly Information Acquisition. *Quarterly Journal of Political Science*, 1(3):187–311.

Federal Communication Commission (2003). Report and Order and Notice of Proposed Rulemaking.

Ferreira, F. and Gyourko, J. (2009). Do Political Parties Matter? Evidence from U.S. Cities. *Quarterly Journal of Economics*, 124(1):349–397.

Fiorina, M. P. and Abrams, S. J. (2012). *Disconnect: The Breakdown of Representation in American Politics*. Julian J. Rothbaum Distinguished Lecture Series. University of Oklahoma Press.

Gentzkow, M. (2006). Television and Voter Turnout. *Quarterly Journal of Economics*, 121(3):931–972.

Gentzkow, M. and Shapiro, J. M. (2006). Media Bias and Reputation. *Journal of Political Economy*, 114(2):280–316.

Gentzkow, M. and Shapiro, J. M. (2010). What Drives Media Slant? Evidence from US Daily Newspapers. *Econometrica*, 78(1).

Gentzkow, M. and Shapiro, J. M. (2013). Ideology and Online News. NBER Working Papers 19675, National Bureau of Economic Research, Inc.

Gentzkow, M., Shapiro, J. M., and Sinkinson, M. (2011). The Effect of Newspaper Entry and Exit on Electoral Politics. *American Economic Review*, 101(7):2980–3018.

Gentzkow, M., Shapiro, J. M., and Sinkinson, M. (2012). Competition and Ideological Diversity: Historical Evidence from US Newspapers. Working Paper 18234, National Bureau of Economic Research.

George, L. (2007). What's fit to print: The effect of ownership concentration on product variety in daily newspaper markets. *Information Economics and Policy*, 19(3-4):285–303.

George, L. M. and Waldfogel, J. (2006). The New York Times and the Market for Local Newspapers. *American Economic Review*, 96(1):435–447.

Groseclose, T. and Milyo, J. (2005). A Measure of Media Bias. *Quarterly Journal of Economics*, 120(4):1191–1237.

Guillauma, Y. (1988). *La presse en France*. La Découverte, Paris.

Hamilton, J. (2004). *All the News That's Fit to Shell: How the Market Transforms Information Into News*. Princeton University Press.

Herriot, J. G. and Reinsch, C. H. (1973). Algorithm 472: procedures for natural spline interpolation [E1]. *Commun. ACM*, 16(12):763–768.

Jones, A. S. (2010). *Losing the News. The Uncertain Future of the News that Feeds Democracy*. Oxford University Press.

Laporte, A. and Windmeijer, F. (2005). Estimation of panel data models with binary indicators when treatment effects are not constant over time. *Economics Letters*, 88(3):389–396.

Lassen, D. D. (2005). The Effect of Information on Voter Turnout: Evidence from a Natural Experiment. *American Journal of Political Science*, 49(1):pp. 103–118.

Lauga, D. O. and Ofek, E. (2011). Product Positioning in a Two-Dimensional Vertical Differentiation Model: The Role of Quality Costs. *Marketing Science*, 30(5):pp. 903–923.

Moorthy, K. S. (1988). Product and Price Competition in a Duopoly. *Marketing Science*, 7(2):pp. 141–168.

Motta, M. (1993). Endogenous Quality Choice: Price vs. Quantity Competition. *The Journal of Industrial Economics*, 41(2):pp. 113–131.

Mullainathan, S. and Shleifer, A. (2005). The Market for News. *American Economic Review*, 188(2):355–408.

Neven, D. and Thisse, J.-F. (1989). On Quality And Variety Competition. CORE Discussion Papers 1989020, Université catholique de Louvain, Center for Operations Research and Econometrics (CORE).

Oberholzer-Gee, F. and Waldfogel, J. (2009). Media Markets and Localism: Does Local News en Espanol Boost Hispanic Voter Turnout? *American Economic Review*, 99(5):2120–2128.

Parlfrey, T. and Poole, K. (1987). The Relationship Between Information, Ideology and Voting Behavior.

Patterson, T. E. (2000). *Doing Well and Doing Good: How Soft News and Critical Journalism are Shrinking the News Audience and Weakening Democracy - and what News Outlets Can Do about it.* Joan Shorenstein Center on the Press, Politics and Public Policy, John F. Kennedy School of Government, Harvard University.

Popkin, S. L. (2007). Changing Media and Changing Political Organization: Delegation, Representation and News. *Japanese Journal of Political Science*, 8(01):71–93.

Prior, M. (2005). News vs. Entertainment: How Increasing Media Choice Widens Gaps in Political Knowledge and Turnout. *American Journal of Political Science*, 49(3):pp. 577–592.

Prior, M. (2007). *Post-Broadcast Democracy: How Media Choice Increases Inequality in Political Involvement and Polarizes Elections.* Cambridge Studies in Public Opinion and Political Psychology. Cambridge University Press.

Puglisi, R. and Snyder, J. (2011). The Balanced U.S. Press. Working Paper 17263, National Bureau of Economic Research.

Qin, B., Wu, Y., and Stromberg, D. (2013). The Determinants of Media Bias in China. Working paper.

Schulhofer-Wohl, S. and Garrido, M. (2009). Do Newspapers Matter? Short-run and Long-run Evidence from the Closure of The Cincinnati Post. Working Paper 14817, National Bureau of Economic Research.

Seamans, R. and Zhu, F. (2013). Competition and Platform Positioning. Working paper.

Shaked, A. and Sutton, J. (1982). Relaxing Price Competition through Product Differentiation. *Review of Economic Studies*, 49(1):3–13.

Snyder, J. and Strömberg, D. (2010). Press Coverage and Political Accountability. *Journal of Political Economy*, 188(2):355–408.

Steiner, P. O. (1952). Program Patterns and Preferences, and the Workability of Competition in Radio Broadcasting. *The Quarterly Journal of Economics*, 66(2):pp. 194–223.

Strömberg, D. (2004). Mass Media Competition, Political Competition, and Public Policy. *Review of Economic Studies*, 71(1):265–284.

Stromberg, D. (2004). Radio's Impact on Public Spending. *Quarterly Journal of Economics*, 119(1).

Sunstein, C. R. (2002). *Republic.com*. Princeton University Press.

Sunstein, C. R. (2009). *Republic.com 2.0*. Princeton University Press.

Tirole, J. (1988). *The Theory of Industrial Organization*. Cambridge, Mass.

Vandenbosch, M. B. and Weinberg, C. B. (1995). Product and Price Competition in a Two-Dimensional Vertical Differentiation Model. *Marketing Science*, 14(2):pp. 224–249.

Wauthy, X. (1996). Quality Choice in Models of Vertical Differentiation. *The Journal of Industrial Economics*, 44(3):pp. 345–353.

Zaller, J. R. (1999). *A Theory of Media Politics: How the Interests of Politicians, Journalists, and Citizens Shape the News*.

Table 1: Summary Statitics of Newspapers' Content

	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 (between 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, environnement, international 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 differentation. The Herfindahl index is equal to the sum of the squares of the shares of the different newpaper topics in each newspaper issue: agriculture, culture, economics, education, environnement, health, international, leisure activities, movies, "news in brief", politics religion and sports.

Table 2: Summary Statitics of Newspapers' Costs and Revenues

	1960-2009	**1999-2012**
	mean/sd	mean/sd
Profits	974	
	(37,973)	
Total Revenues	44,339	
	(64,426)	
Revenues from Sales	25,627	
	(49,092)	
Advertising Revenues	16,893	
	(22,146)	
Total Expenses	43,052	
	(55,440)	
Expenses on Labor (Payroll)	24,815	
	(25,198)	
Expenses on Intermediate Goods (Inputs)	32,236	
	(36,362)	
Number of Employees	432	
	(407)	
Number of Journalists		201
		(123)
Share of Journalists in Employees		0.36
		(0.20)
Observations	2,169	353

Notes: The table gives summary statistics for newspapers' revenues, expenses and number of employees and journalists. It presents the average and the standard deviations (between parentheses) of the variables. Variables are values for newspapers. All variables (excepted the number of employees and journalists) are in (constant 2009) thousand euros. Time period is 1960-2009 for all the variables excepted the number of journalists (1999-2012).

Table 3: Summary Statitics of Newspapers' Circulation

	1945-2012 mean/sd	**1945-2012** mean/sd	**1945-2012** mean/sd	**1959-2011** mean/sd
County-level variables				
Total County Circulation (# copies)	79,454			
	(82,554)			
Total County Circulation per eligible voter (%)	0.24			
	(0.12)			
Average Number of Newspapers in a County	2.69			
	(1.51)			
Newspaper*county-level variables				
Newspaper Circulation per county (# copies)		29,784		
		(38,457)		
Newspaper Circulation per county and eligible voter (%)		0.09		
		(0.08)		
Newspaper-level variables				
Total Circulation (# copies)			82,106	
			(118,691)	
Ratio of Readership to Circulation				2.86
				(1.65)
Observations	5,866	11,994	6,092	2,119

Notes: The table gives summary statistics for newspapers' circulation. it presents the average and the standard deviations (between parentheses) of the variables. For circulation, time period is 1945-2012. For readership, time period is 1959-2011.

Table 4: The Effect of Entry on Newspapers' Revenues, Expenses and Number of Employees (newspaper-level analysis)

			Revenues			Expenses			
	(1) Circulation	(2) Profit	(3) Total	(4) Sales	(5) Ad	(6) Total	(7) Inputs	(8) Payroll	(9) Employees
$\mathbf{1}entry^{j=-2}$	-0.00	-232.87	-100.95	-96.03	484.41	1,118.97	456.92	785.22	3.23
	(0.01)	(517.12)	(2,331.83)	(1,095.82)	(688.97)	(2,245.91)	(1,020.65)	(1,229.92)	(18.66)
$\mathbf{1}entry^{j=-1}$	-0.01	-718.63	-1,116.49	-362.77	213.48	734.58	400.27	720.48	-6.00
	(0.01)	(623.82)	(2,849.69)	(1,503.78)	(994.55)	(2,799.22)	(1,095.93)	(1,742.17)	(23.05)
$\mathbf{1}entry^{j=0}$	-0.01*	-728.60	-2,714.67	-1,638.34	-419.09	-803.42	-538.14	-2.03	-25.53
	(0.01)	(667.26)	(3,066.32)	(1,794.66)	(1,124.49)	(2,887.37)	(1,195.85)	(1,719.92)	(22.11)
$\mathbf{1}entry^{j=1}$	-0.01*	-947.77	-3,737.25	-2,870.66	-564.61	-2,133.41	-1,154.10	-619.64	-33.18
	(0.01)	(843.24)	(3,201.66)	(1,886.89)	(1,163.09)	(2,923.87)	(1,349.45)	(1,701.64)	(22.37)
$\mathbf{1}entry^{j=2}$	-0.01*	-571.18	-3,506.84	-2,978.59	-393.13	-1,995.65	-945.82	-718.40	-33.89
	(0.01)	(822.21)	(3,525.35)	(1,963.50)	(1,318.41)	(3,392.81)	(1,445.40)	(1,966.51)	(28.51)
$\mathbf{1}entry^{j=3}$	-0.01*	-368.95	-5,232.64	-4,067.84**	-1,557.67	-3,691.44	-1,691.92	-1,763.63	-47.41*
	(0.01)	(391.28)	(3,484.77)	(1,869.80)	(1,067.66)	(3,162.30)	(1,777.41)	(1,596.07)	(25.73)
$\mathbf{1}entry^{j=4}$	-0.02**	-715.72	-8,536.74**	-6,004.21**	-3,241.02**	-7,168.77*	-3,727.97	-3,391.63*	-77.22**
	(0.01)	(532.95)	(4,094.62)	(2,404.33)	(1,402.71)	(3,845.37)	(2,280.68)	(1,962.24)	(37.84)
$\mathbf{1}entry^{j\geq 5}$	-0.03***	-839.32	-6,042.97**	-6,836.36***	-4,226.67***	-4,699.48*	-2,026.54	-2,202.20	-70.62***
	(0.01)	(671.38)	(3,022.30)	(2,163.20)	(1,084.97)	(2,695.34)	(1,498.46)	(1,675.75)	(23.16)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
News FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.65	0.47	0.81	0.83	0.80	0.82	0.84	0.77	0.77
Observations	5,158	3,388	3,367	2,624	2,614	3,384	3,390	3,388	3,598
Clusters	87	78	78	78	78	78	78	78	87
Mean DepVar	0.09	270.99	16,961.10	10,445.64	7,220.46	16,664.42	8,713.58	7,133.33	124.63

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1960-2009. Models are estimated using OLS estimations. All variables (excepted employees and price) are in thousand (constant 2009) euros. Price is in (constant 2009) euros. Models include year and county fixed effects and demographic controls. The demographic controls are the share of the population with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker and the total population in county c and year t. Variables are described in more details in the text.

Table 5: The Effect of Entry on Incumbent Newspapers' Revenues and Expenses and Number of Employees, by Heterogeneity (newspaper-level analysis)

			Revenues			Expenses			
	(1) Circulation	(2) Profit	(3) Total	(4) Sales	(5) Ad	(6) Total	(7) Inputs	(8) Payroll	(9) Employees
Pre Entry (t-2, t-1)	-0.00	29.24	3,520.56	1,879.16	1,253.37	3,936.25	2,018.32	2,037.68	4.84
	(0.01)	(603.90)	(4,252.05)	(2,175.55)	(1,775.96)	(3,878.75)	(1,449.09)	(2,452.94)	(29.56)
Pre Entry * Low Heterogeneity (t-2, t-1)	-0.00	-1,114.67	-7,914.18	-3,646.19	-1,348.14	-5,699.86	-3,232.54	-2,251.50	-9.33
	(0.01)	(1,008.48)	(5,443.72)	(2,897.04)	(2,156.81)	(5,257.89)	(2,184.60)	(3,084.50)	(42.87)
Short-run Impact of Entry (t, t+1, t+2)	0.00	-144.71	3,000.23	1,529.57	1,658.10	3,750.59	1,606.85	2,202.81	1.65
	(0.01)	(683.90)	(4,661.22)	(2,760.51)	(2,183.98)	(4,748.04)	(1,594.79)	(3,139.39)	(36.33)
Short-run * Low Heterogeneity Impact of Entry (t, t+1, t+2)	-0.02*	-1,159.44	-11,615.18**	-7,173.65**	-3,800.88	-9,920.14*	-4,808.06**	-4,730.24	-58.45
	(0.01)	(1,108.26)	(5,779.21)	(3,433.84)	(2,418.46)	(5,529.89)	(2,203.80)	(3,473.21)	(44.35)
Long-run Impact of Entry (t+3, onwards)	0.01	49.03	-643.96	-24.77	633.88	-41.28	-126.72	190.55	-6.54
	(0.01)	(346.47)	(2,846.28)	(2,103.11)	(1,649.07)	(3,037.41)	(1,567.90)	(1,952.07)	(30.16)
Long-run * Low Heterogeneity Impact of Entry (t+3, onwards)	-0.04***	-1,215.94*	-9,965.04**	-7,127.45**	-4,270.39*	-8,740.20*	-4,051.23	-4,402.63*	-82.83**
	(0.01)	(684.69)	(4,873.48)	(3,479.97)	(2,193.40)	(4,390.62)	(2,509.17)	(2,599.26)	(39.73)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
News FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.65	0.48	0.81	0.84	0.80	0.82	0.84	0.77	0.77
Observations	4,701	3,388	3,367	2,624	2,614	3,384	3,390	3,388	3,598
Clusters	87	78	78	78	78	78	78	78	87
Mean DepVar	0.09	270.99	16,961.10	10,445.64	7,220.46	16,664.42	8,713.58	7,133.33	124.63

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1960-2009. Models are estimated using OLS estimations. All variables (excepted employees) are in thousand (constant 2009) euros. Models include year and county fixed effects, demographic controls and demographic controls interacted with the heterogeneity indicator variable. The demographic controls are the share of the population with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker and the total population in county c and year t. Variables are described in more details in the text.

Table 6: The Effect of the Number of Newspapers on the Size of Newspapers

(a) **Number of Articles**

	Number of Articles in the Newspaper			
	(1)	(2)	(3)	(4)
Number of newspapers	-136.45***	-61.79	-61.05	-70.17
	(28.39)	(74.63)	(68.71)	(64.00)
Number of newspapers * Low Heterogeneity		-225.04***	-221.61***	-155.84**
		(84.19)	(79.88)	(67.82)
Low Heterogeneity		567.13***	549.68***	-233.82
		(144.29)	(145.09)	(228.63)
Year FE	No	No	Yes	Yes
Controls	No	No	No	Yes
R-sq	0.11	0.23	0.25	0.65
Observations	27,708	27,708	27,708	27,708
Clusters (County-Year)	106	106	106	106
Mean DepVar	421.17	421.17	421.17	421.17

(b) **Number of Words**

	Number of Words in the Newspaper			
	(1)	(2)	(3)	(4)
Number of newspapers	-46,282***	-17,858	-16,536	-15,553
	(7,065)	(21,239)	(19,315)	(19,898)
Number of newspapers * Low Heterogeneity		-66,443***	-65,104***	-52,957**
		(23,102)	(21,354)	(21,242)
Low Heterogeneity		158,223***	152,088***	-41,013
		(37,834)	(37,126)	(59,848)
Year FE	No	No	Yes	Yes
Controls	No	No	No	Yes
R-sq	0.18	0.29	0.32	0.65
Observations	30,502	30,502	30,502	30,502
Clusters (County-Year)	106	106	106	106
Mean DepVar	107,044	107,044	107,044	107,044

(c) **Number of Words on the Front Page**

	Number of Words on the Frontpage			
	(1)	(2)	(3)	(4)
Number of newspapers	-54.16***	-12.92	-23.70*	-20.34
	(12.16)	(14.89)	(13.35)	(14.99)
Number of newspapers * Low Heterogeneity		-117.61***	-108.32***	-87.31***
		(26.72)	(25.66)	(28.54)
Low Heterogeneity		250.62***	233.53***	-255.25
		(61.44)	(58.59)	(173.09)
Year FE	No	No	Yes	Yes
Controls	No	No	No	Yes
R-sq	0.03	0.07	0.11	0.17
Observations	94,901	94,901	94,901	94,901
Clusters (County-Year)	274	274	274	274
Mean DepVar	370.39	370.39	370.39	370.39

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 the upper table (Table 6a) the dependent variable is the number of articles per newspaper. In the middle table (Table 6b), the dependent variable is the number of words per newspaper. Finally in the bottom table (Table 6c), the dependent variable is the number of words per newspaper frontpage. The demographic controls are the share of the population with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker, the total population in county c and year t and demographic controls interacted with the heterogeneity indicator variable. Variables are described in more details in the text.

Table 7: The Effect of the Number of Newspapers on Newspapers' Content

(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. The controls include demographic controls (the share of the population with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker and the total population in county c and year t) and the demographic controls interacted with the heterogeneity indicator variable. Variables are described in more details in the text.

Table 8: The Effect of a Change in the Number of Newspapers on Voter Turnout

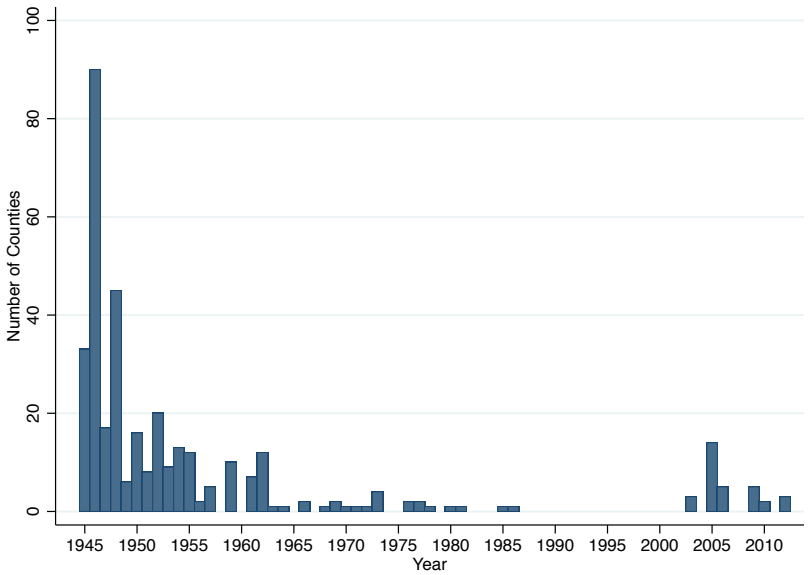
(a) **Effect of Newspaper Entry/Exit on Voter Turnout**

	Turnout		
	(1)	(2)	(3)
Number of Newspapers	-0.003*	-0.001	-0.001
	(0.002)	(0.002)	(0.002)
Number of Newspapers * Low Heterogeneity		-0.005**	-0.005**
		(0.002)	(0.003)
Region-Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Controls*Heterogeneity	No	No	Yes
R-sq	0.37	0.37	0.37
Observations	3,565	3,565	3,565
Clusters (County)	87	87	87
Mean DepVar	-0.024	-0.024	-0.024

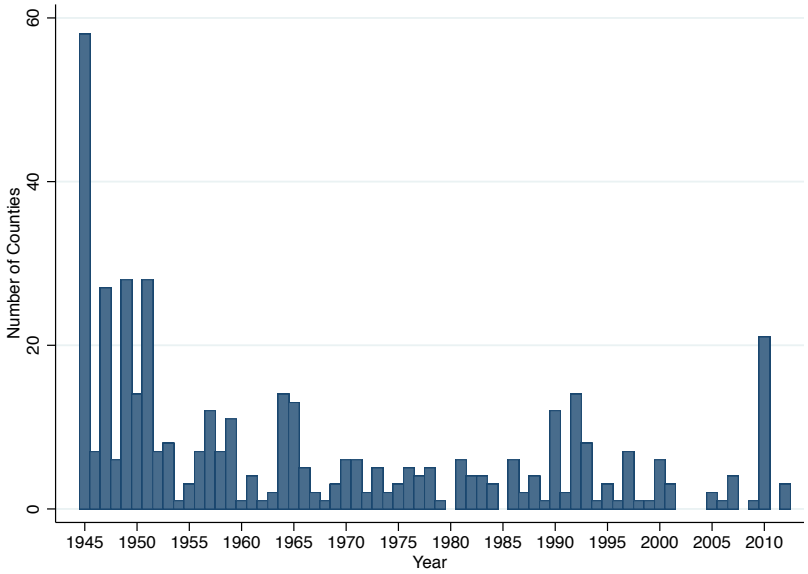
(b) **Falsification Test**

	Turnout at Previous Election		
	(1)	(2)	(3)
Number of Newspapers	-0.000	-0.002	-0.002
	(0.002)	(0.002)	(0.002)
Number of Newspapers * Low Heterogeneity		0.004	0.004
		(0.002)	(0.003)
Region-Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Controls*Heterogeneity	No	No	Yes
R-sq	0.35	0.35	0.35
Observations	3,058	3,058	3,058
Clusters (County)	87	87	87
Mean DepVar	-0.030	-0.030	-0.030

Notes: * p<0.10, ** p<0.05, *** p<0.01. Standard errors in parentheses are clustered by county. Time period is 1947-2008. Models are estimated in first differences. All specifications include election-region fixed effects. The controls include demographic controls (the share of the population with higher (post-secondary) education, the share of the working population between 15 and 64 year old which is senior executive or knowledge worker and the total population in city w and year t) and the demographic controls interacted with the heterogeneity indicator variable. In the upper Table (8a), the dependent variable is turnout. In the bottom Table (8b), I perform a falsification test: the dependent variable is turnout at the previous election.



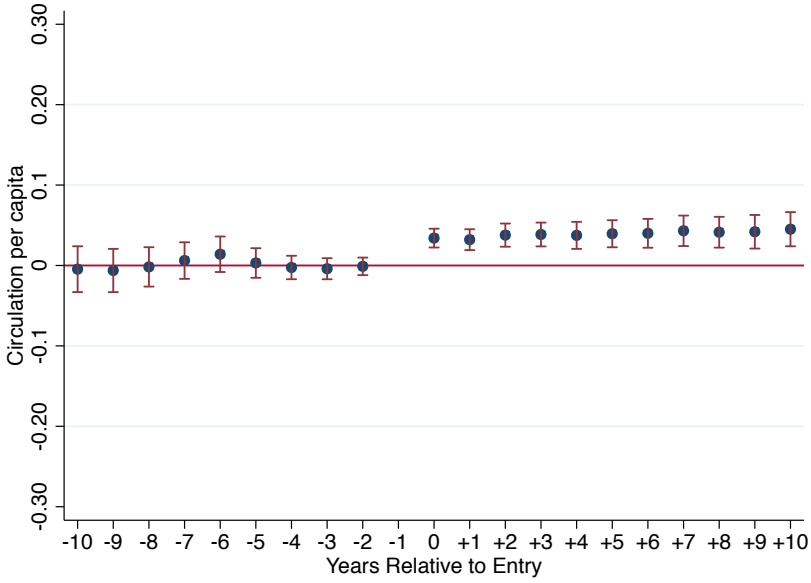
(a) Number of Counties with Net Entry



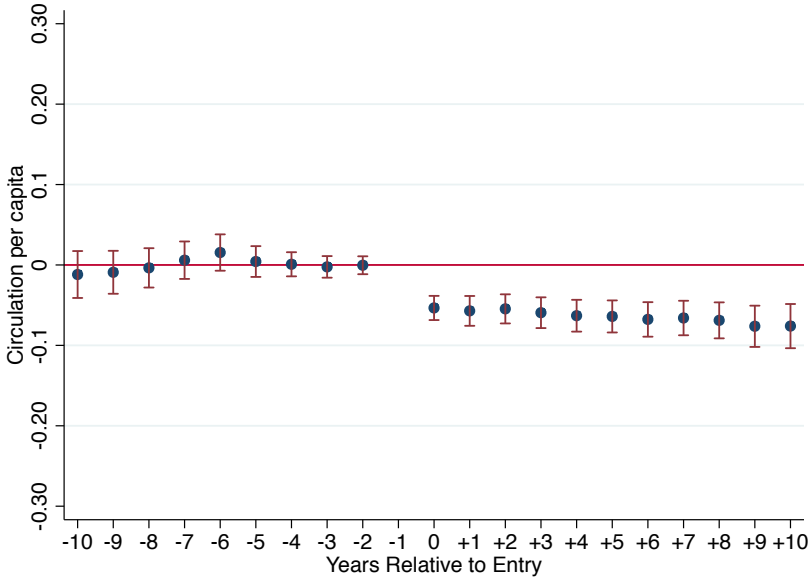
(b) Number of Counties with Net Exit

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



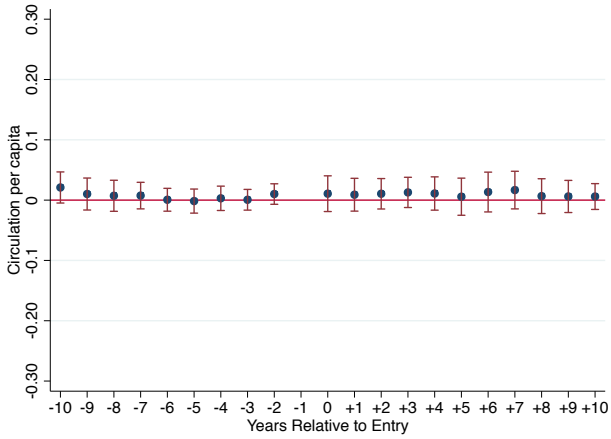
(a) **Total Circulation**



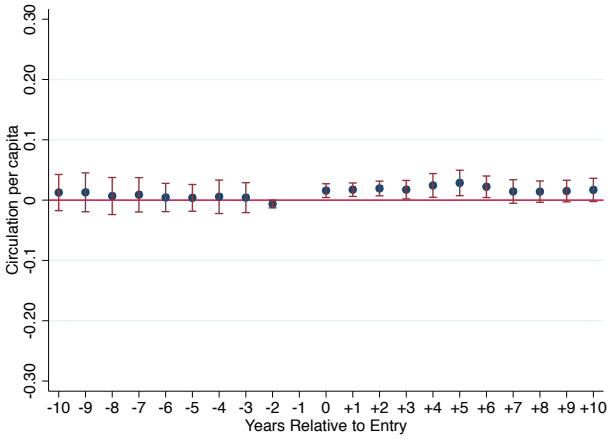
(b) **Circulation of Incumbent Newspapers**

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 (3) for details). In the upper figure (2a), the dependent variable is total county circulation per eligible voter. In the bottom figure (2b), the dependent variable is the circulation of incumbent newspapers per eligible voter. Models include year and county fixed effects. Error bars are $+/-$ 2 standard errors. Standard errors are clustered by events. Time period is 1945-2012.

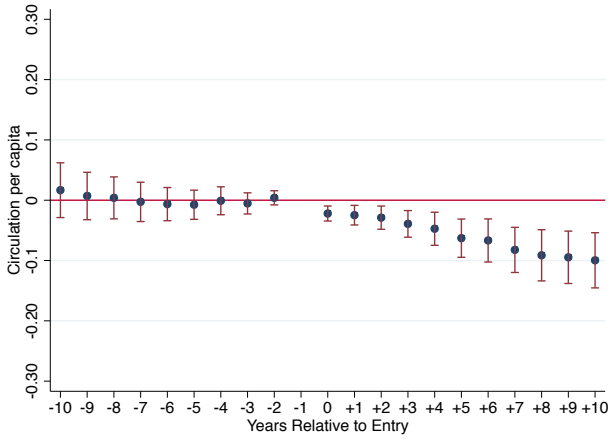
Figure 2: Impact of Newspaper Entry on Newspapers' Circulation (1945-2012) (raw impact without demographic controls)



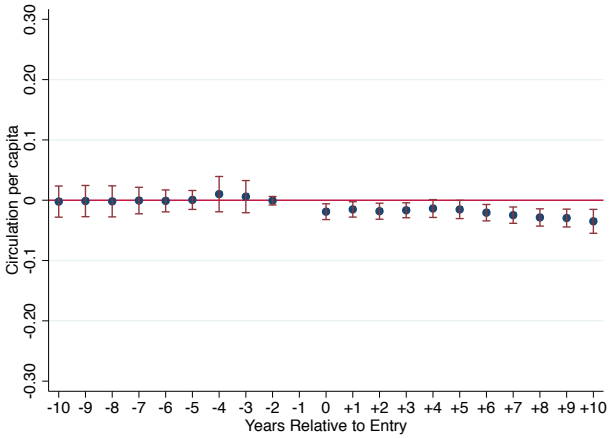
(a) Total Circulation
Low-Heterogeneity Counties



(b) Total Circulation
High-Heterogeneity Counties



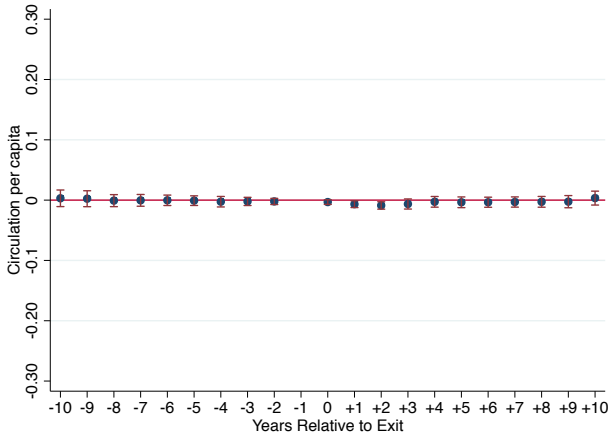
(c) Incumbents' Circulation
Low-Heterogeneity Counties



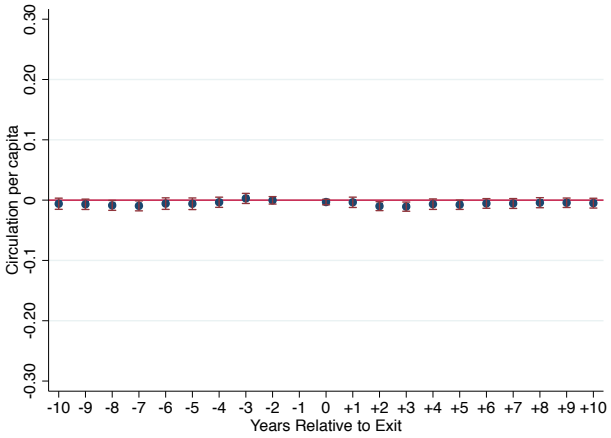
(d) Incumbents' Circulation
High-Heterogeneity Counties

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 (3) for details). In the two upper figures (3a and 3b), the dependent variable is the total county circulation per eligible voter. In the two bottom figure (3c and 3d), the dependent variable is the circulation of incumbent newspapers per eligible voter. Figures 3a and 3c show the effect of an entry on circulation in low-heterogeneity counties. Figures 3b and 3d 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 1960-2012.

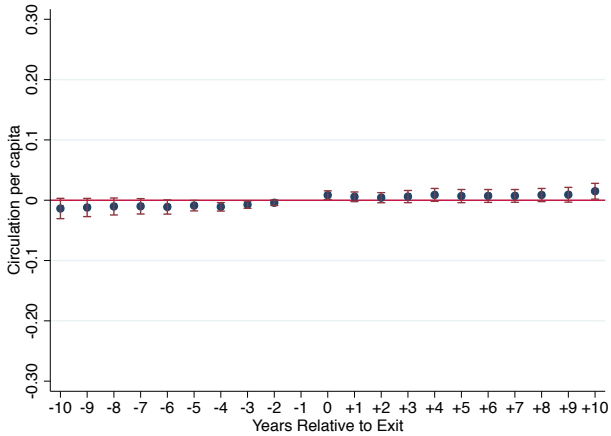
Figure 3: Impact of Newspaper Entry on Newspapers' Circulation (1960-2012), by Heterogeneity (controlling for demographics)



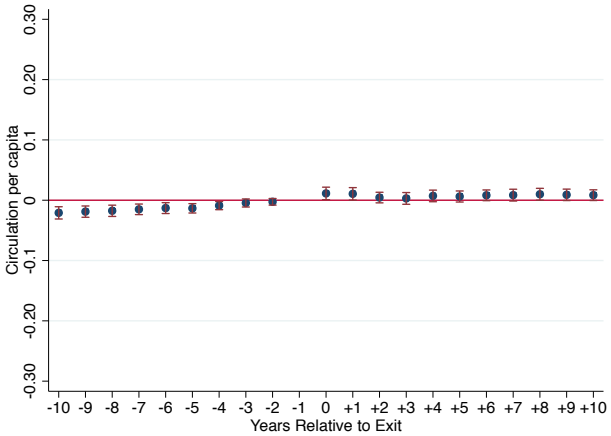
(a) Total Circulation
Low-Heterogeneity Counties



(b) Total Circulation
High-Heterogeneity Counties



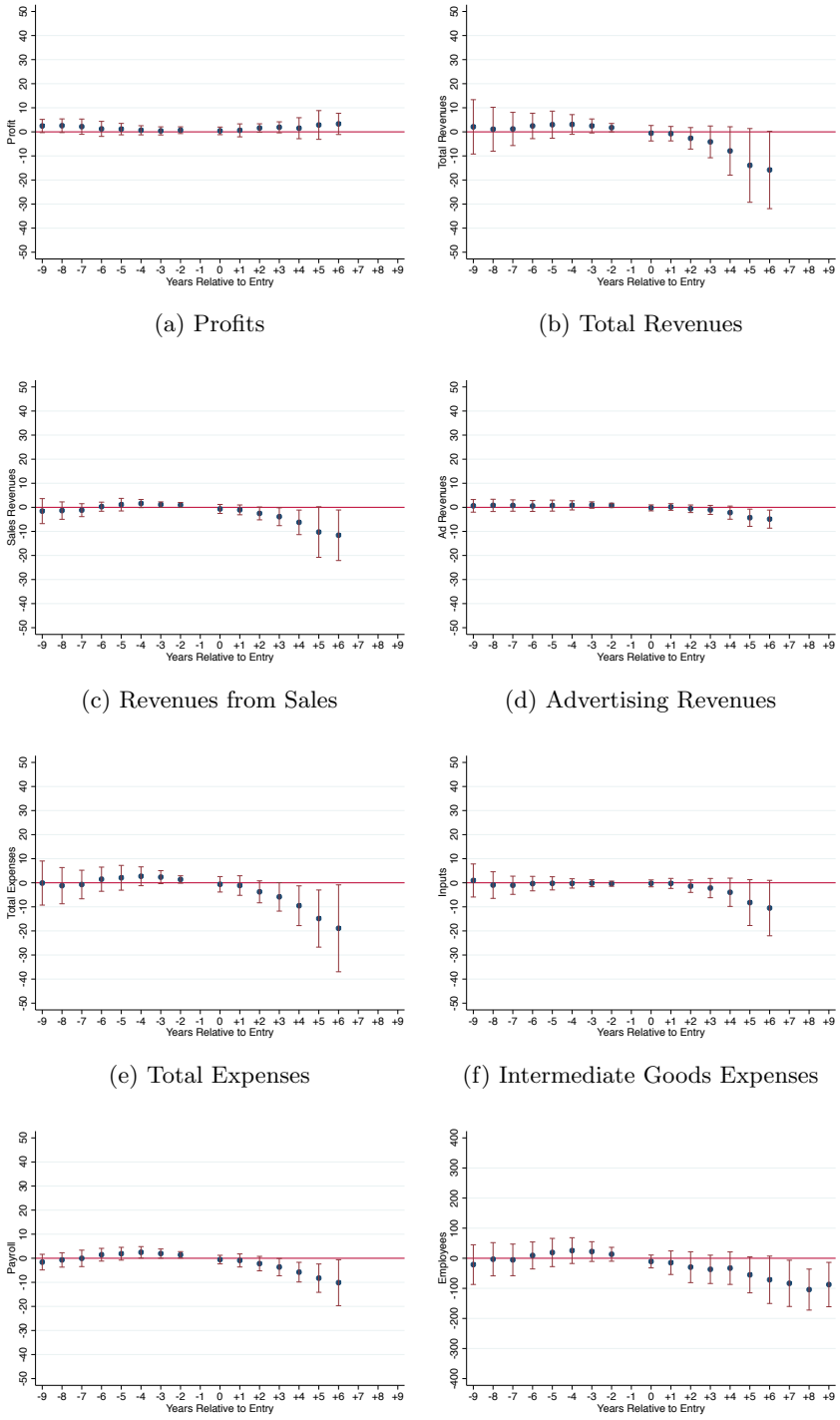
(c) Incumbents' Circulation
Low-Heterogeneity Counties



(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 exit taking place in $j = 0$ (see equation (3) 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 figure (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 1960-2012.

Figure 4: Impact of Newspaper Exit on Newspapers' Circulation (1960-2012), by Heterogeneity (controlling for demographics)



(a) Profits

(b) Total Revenues

(c) Revenues from Sales

(d) Advertising Revenues

(e) Total Expenses

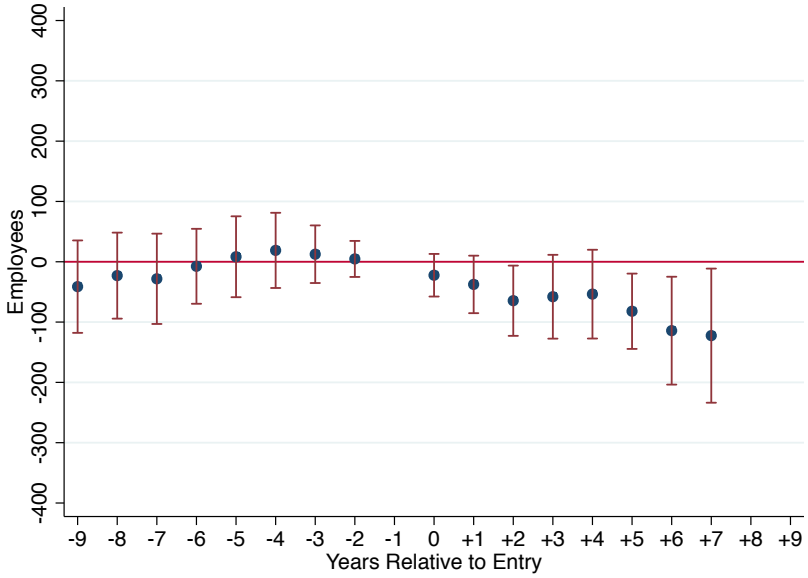
(f) Intermediate Goods Expenses

(g) Labor Expenses (Payroll)

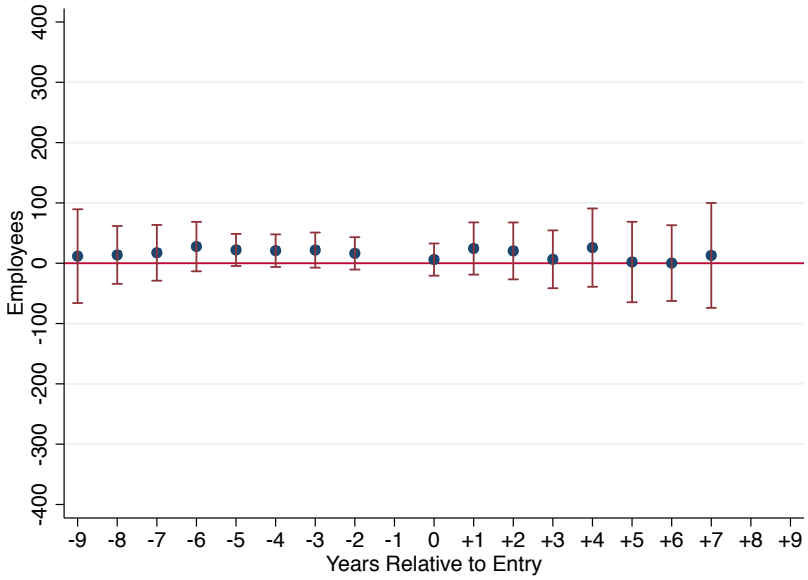
(h) Number of Employees

Notes: The figures show coefficients from a regression of alternatively profits (Figure 5a), total revenues (Figure 5b), revenues from sales (Figure 5c), advertising revenues (Figure 5d), total expenses (Figure 5e), intermediate goods expenses (Figure 5f), labor expenses (Figure 5g) and number of employees (Figure 5h) on a vector of year dummies going from -9 to $+9$ with the events of entry taking place in $j = 0$ (see equation (3) for details). All variables (excepted employees) are in million (constant 2009) euros. Models include year and county fixed effects and demographic controls. Error bars are $+/-$ 2 standard errors. Standards errors are clustered by events. Time period is 1960-2012.

Figure 5: Impact of an Entry on Incumbent Newspapers' Revenues, Expenses and Employees



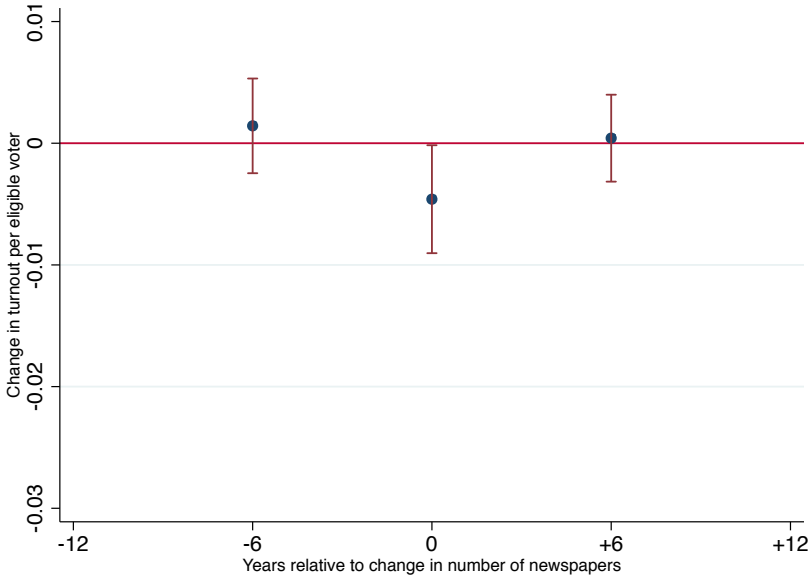
(a) **Low-Heterogeneity Counties**



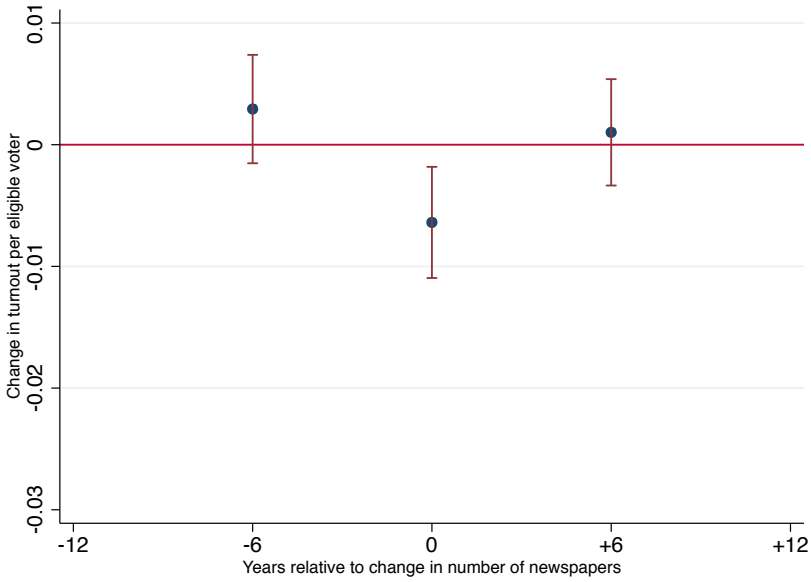
(b) **High-Heterogeneity Counties**

Notes: The figures show coefficients from a regression of the number of employees on a vector of year dummies going from -9 to $+9$ with the events of entry taking place in $j = 0$ (see equation (3) for details). Figure 6a shows the effect for low-heterogeneity counties and Figure 6b for high-heterogeneity counties. Models include year and county fixed effects and demographic controls. Error bars are $+/-$ 2 standard errors. Standards errors are clustered by events. Time period is 1960-2012.

Figure 6: Impact of an Entry on Incumbent Newspapers' Number of Employees, by Heterogeneity



(a) **Entire Sample**



(b) **Low-Heterogeneity Counties**

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 (8) for details). Models include region-election fixed effects. Error bars are +/− 2 standard errors. Standards errors are clustered by county. Time period is 1947-2008.

Figure 7: Turnout and Newspaper Entries/Exits