Newspapers and Parties: How Advertising Revenues Created an Independent Press*

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Abstract

Do higher advertising revenues make media outlets more willing to be independent from external political groups of influence? I use data on 19th century American newspapers to show that in cities with higher circulation-adjusted advertising rates newspapers were more likely to be independent from political parties. I find similar results when local advertising rates are instrumented by local regulations of outdoor advertising and hanbill distribution. I also show that newly created newspapers were more likely to enter the market as indpendents in places with higher advertising rates. Finally, I present evidence that political channel affected the choice of political affiliation for a newspaper, as newspapers in county seats, which were more populous and richer cities, were less likely to be independent.

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1 Introduction

How can independent media emerge? What conditions encourage media freedom? In this paper, I argue that the growth of an advertising market promotes media independence from interest groups and political parties, and test this argument empirically using data from American newspapers in 1881-1886. There are at least two theoretical reasons for this argument to work.

First, as shown formally in Besley and Prat (2006) and Gentzkow et al. (2006), if profitability of advertising is high, it is difficult for external groups to pressure media outlets. Any deviation from the news coverage preferred by media consumers is costly for a media outlet, as the loss of an audience means the loss of corresponding advertising revenues. This mechanism implies that independent newspapers should have larger circulation than the newspapers affiliated with political parties, as they should be preferred by the audience. Some theoretical models show that this effect should take place not only in a monopolistic market, but also in a duopoly (Gabszewicz et al., 2001; Petrova, 2008).

Second, given high fixed costs of production, the growth of advertising revenues allows media to become independent from external influence even if the same media outlets could live on subsidies with small advertising revenues..This mechanism does not require media consumers to prefer less biased news coverage and is consistent with demand-side explanation of media bias (Mullainathan and Shleifer, 2005, Gentzkow and Shapiro, 2006, 2007). There might be also private benefit of control over media for media owners and editors associated with the possibility to express their own opinion (Djankov et al. 2003).

Empirically, I look at data from American newspapers during the period 1881-1886. At that time, majority newspapers were affiliated with a major political party, but some of them were independent. As discussed in the background section, the main difference between partisan newspapers (newspapers affiliated with a Democratic or Republican party) and independent newspapers was the extent of control which a party had over the newspaper's news coverage. Editors of independent newspapers could print whatever they want, while editors of partisan newspapers were restricted in their decisions.

This paper makes several contributions to literature. First, it presents empirical evidence that shows that there is a link between the development of advertising markets and newspaper independence. Though this argument has been discussed in the literature (e.g. Baldasty 1992, Smythe 2002, Starr 2004), so far there was no systematic empirical evidence to establish this relationship. I show that even in specifications with newspaper fixed effects, there is a significant positive correlation between local circulation-adjusted advertising rates and independent political affiliation of a newspaper. I also look separately at the entry of new newspapers to capture the incentives which may have been present for newly created newspapers to choose a particular political affiliation in a given advertising environment.

Second, the paper goes beyond showing the correlation between local advertising rates and newspaper independence and presents some evidence on causality of this relationship. For the state of Massachusetts, I report the results of instrumental variables estimation which uses local regulation of outdoor advertising and of handbill distribution as instruments for local advertising rates. Results, qualitatively and quantitatively, are consistent with results for the fixed effect estimations and the analysis of entry.

Third, I present evidence that economic development was not the only cause of the development of an independent press, but the structure of political powers in a city played an important role. In particular, I show that in county seats, in which there were more opportunities for political parties to capture local newspapers, there were, on average, less independent newspapers, despite the fact that county seats were, on average, more populous and more developed as compared with other cities in the same county.

This paper also shows that the most popular causal mechanism for the relationship between advertising and media independence discussed in the literature (Baldasty 1992, Gentzkow et al. 2006, Kaplan 2002, Schudson 1978, Starr 2004) finds mixed support in data. The key assumption in all these works is that independent newspapers had, on average, larger circulation, and this was the primary reason why higher potential advertising revenues made newspapers, especially new ones, more likely to be independent. My results show, however, that this was not the case for the sample of all newspapers, dailies and weeklies together, while it was the case for the sample of daily newspapers only (approximately 1/10th

of the sample). Note that it is important to look at weeklies, not only at dailies, as they played an important role in exposing corruption and promoting progressive era legislation during "muckraking" era (Dyck et al., 2008).

I chose to focus on 19th century U.S. for several reasons. First, at that time the newspaper market was very dynamic, newspapers entered and exited the market every year, and advertising rates exhibited significant variation over time and space. This allows using a variety of fixed effects in the estimation. Second, at that time newspapers had self-reported political affiliations (Republican, Democratic, Independent), which provides a convenient proxy for the control by political parties. The background section of the paper discusses different mechanisms that the parties used to exercise such control. Third, a major advertising agency published newspaper's advertising rates and political affiliations during the time period, so there are data that can be used to test my claims. Fourth, during the time period different local regulations of advertising were adopted, which permits the use of instrumental variable analysis. Finally, the institutional environment in the United States in 1880's (the "Gilded Age") is similar to that of many modern middle-income countries, like Russia or Mexico, with weak institutions (Shleifer and Treisman 2004). The results of this paper, then, are not necessarily specific to the unique path of political development of the late19th century United States, but may have some external validity and could be extended, with caution, to media systems in developing countries of our time.

This paper is based upon previous empirical works on the development of media independence in the United States by Gentzkow et al. (2006) and Hamilton (2004). Hamilton (2004) provides an empirical analysis of the political affiliation of newspapers in the largest U.S. cities to show that there were more independent newspapers in more populous cities and cities with smaller foreign-born and African American populations. Gentzkow et al. (2006) show that there is a correlation between the population of big cities and the share of readership of independent newspapers in these cities.[1] My paper contributes to this

[1] They also use content analysis for news on major corruption scandals to present evidence that the content of newspapers was becoming less biased and more objective over time.

literature as I present evidence of positive relationship between local advertising rates and independence, shows why thus relationship may be interpreted as causal, and provides empirical arguments that some political factors contributed to the growth of independent newspapers, in additional to economic factors.

The rest of the paper is organized as follows. Section 2 contains a brief overview of the related literature, section 3 presents basic background information on 19th century American newspapers and their relationships with political parties, section 4 contains the main empirical results, and section 5 concludes.

2 Theoretical background

How does the growth of an advertising market affect the media market? Are media outlets more likely to be independent from external influence groups if they could earn higher profits from advertising? The most popular answer to the latter question in the existing literature (descriptive or theoretical) is "yes", though there are some theoretical reasons for why it is not necessarily the case. Historical studies (e.g. Baldasty 1992, Starr 2004) suggest that the growth of advertising revenues was one of the causes for the development of an independent press in the United States. The logic is that higher profits from advertising allow newspapers to break their affiliation with political parties and declare themselves independent.

There are some theoretical models related to this argument, which are based on the assumption that higher advertising per capita increases the benefits of being independent, while costs remain constant. In Besley and Prat (2006) and Gentzkow et al. (2006) newspapers are less likely to be biased in favor of the government or the interest group if advertising revenues per reader are high.[2] The important assumption in these papers is that media consumers prefer to read independent or unbiased newspapers. It is not clear, however, to what extent this assumption is realistic.[3] In an earlier paper, Gabszewicz et

[2] In Besley and Prat(2006), the comparative statics is derived with respect to the "degree of media commercialization", or the maximum amount of audience related media revenues.

[3] Recently, some theoretical and empirical papers (Mullainathan and Shleifer, 2005, Getzkow and Shapiro, 2006, 2007)

al. (2001) show that larger unit advertising receipts increased the probability of centrist equilibrium, in which both newspapers choose the same politically neutral ideology. The important assumption in their model is that media consumers are uniformly distributed along the Hotelling line, and thus being closer to the center is newspaper's best response to any position of another paper, if the goal is to maximize the newspaper's audience. Petrova (2008) presents a model in which profitability of advertising moves two newspapers under the influence of one or two interest groups toward the center. The logic is, again, based on Hotelling competition, though the presence of special interest groups moves equilibrium away from the median point.

The theoretical underpinning for the relationship between potential advertising revenues and media bias, therefore, depends on the assumptions of the corresponding models.[4] Another important assumption regarding the demand for bias, implicit in the theoretical models mentioned above, is that the size of the advertising market grows and all other things remain equal, while in the real world, it could be the case that the willingness to pay for an additional reader by special interest groups or political parties increases as well. Empirically, it is likely that the disposable incomes for advertisers and for political parties or other groups of influence co-move together. The overall effect of advertising, therefore, becomes ambiguous even within the models mentioned earlier.

In sum, there are strong theoretical reasons to believe that the growth of the advertising market reduces the effect of external pressure on political media outlets. There could be, however, effects that work in the opposite direction. The question about the relative importance of advertising revenues for media independence is, therefore, mostly an empirical question. In this paper, I focus on empirical tests

emphasize the demand side explanation of media bias, which suggests that news media are slanted because their audience would like them to be slanted.

[4]Ellman and Germano (2006) point out another source for ambiguity in these results. In their model, advertisers themselves have preferences over the news content, and the increase in advertising can lead to more or less pro-advertiser bias, depending on the extent of competition among newspapers and the ability of advertisers to use punishment cut-off strategies.

of this argument.

3 Literature

Recent literature highlights that independent media is important for the quality of governance. Free and competitive media promote accountability of elected politicians (Lacrinese et al., 2007, Puglisi and Snyder, 2008), while uninformative media prevent an accountability mechanism from working (Besley and Prat, 2006, Besley and Burgess, 2002, Strömberg 2006). Countries with low media freedom are more prone to corruption (Brunetti and Weder 2003, Ahrend 2002), have a lower level of social spending (Petrova 2008), and less efficient bureaucracy (Egorov et al. 2007). Independent media outlets are important to prevent corrupt and incompetent governments from staying in power. McMillan and Zoido (2004), for example, show how in Peru a small independent TV channel created opportunity for country's citizens to overthrow the corrupt government. My paper, therefore, examines the problem which is relevant to economic development.

Media plays an important role in policy outcomes. During recent years, several new studies that use experimental and instrumental variable approaches have shown that media effects are significant, and are not confined to reinforcement of existing preferences, in contrast to earlier findings of political communication literature.[5] DellaVigna and Kaplan (2007) use the idiosyncratic diffusion of Fox News before the 2000 U.S. elections to show that it made voters in the affected counties more likely to vote for Republican candidates. Gerber et al. (2007) conducted a randomized experiment, providing individuals with a free subscription to The Washington Times or The Washington Post. They find a substantial effect on voting behavior: those who received The Washington Post were 8% more likely to vote for Democratic candidates. Enikolopov, Petrova and Zhuravskaya (2007) use geographic variation in the availability of NTV, a formerly independent TV channel in Russia, to identify its impact on voting for and against a

[5] E.g. Lazarsfeld et al. 1944, Berelson et al. 1954, Converse 1966

government-supported party and turnout in 1999 Russian Parliamentary elections using both aggregate- and individual-level data. We find that NTV had a positive effect on the vote for the opposition party, supported by the channel, and a larger negative effect on the vote for the pro-government party. George and Waldfogel (2006) use penetration of the New York Times in the 1990s in the U.S. local newspaper markets to show that it decreases turnout in local elections. This is, of course, not a full list of existing works.

There are also studies that show that media may influence public policy. Strömberg (2006) finds that in the U.S. in the 1930s radio diffusion in a county was positively correlated with the level of public expenditures in the region. Einesee and Strömberg (2007) show that during the last thirty five years the amount of media coverage, instrumented by external newsworthy events such as the Olympic Games, determined U.S. disaster relief. Besley and Burgess (2002) find that in India state governments are more responsive to falls in food production and crop flood damage in places where newspaper circulation is higher. Reinikka and Svensson (2005) show that in Uganda public spending on education was higher in schools whose funding arrangements were covered by local newspapers.

4 Historical background

Newspapers and parties

In the second half of the 19th century, the majority of American newspapers were partisan, i.e., they had official affiliation with either the Republican or the Democratic party. Being partisan had both benefits and costs for newspapers. Benefits included direct and indirect subsidies from political parties and better access to some kinds of information. The costs consisted of restrictions on the content of a newspaper, i.e. the lack of control, and of inability to address broad audience with different political preferences.

For a newspaper, the official affiliation with a political party was not just a self-stated political affiliation. Partisan newspapers were, at least with respect to editorial policy, controlled by party officials,

while independent newspapers were fully controlled by newspaper owners and editors. As a result, the presence of political affiliation (or its absence) implied a particular organizational structure of a newspaper, its news coverage, and a way of its financing.

There were several mechanisms of subsidizing newspapers which were available to parties. It is difficult to find evidence of direct sponsorship, though some evidence suggests that direct subsidies were used (Baldasty 1992, Lee 1923, Mott, 1941). Parties widely used budget money to indirectly sponsor newspapers with which they were affiliated. All new local laws, ordinances, and regulations have to be published, by law, in local newspapers, and these newspapers were paid from the budget for publications. These newspapers were chosen by the members of city councils or boards of aldermen, that is, by people usually affiliated with political parties (see the list of analyzed charters of laws and ordinances in Table A4). Ordinances often explicitly require chosen newspapers to represent the interests of one of two major parties. For example, Ithaca's charter of 1897 stated "ordinances... should be published in at least two official newspapers... The members of the common council... should designate, in writing, a paper fairly representing the political party to which they respectively belong.[6] The amount of money distributed through this channel was fairly large. The ordinance of the city of Brooklyn, N.Y., for example, required that no more than $100,000 per year should be paid to four official partisan newspapers, for publishing new municipal acts and ordinances.[7] This corresponds to approximately $1.5 million in 2000 dollars.

This mechanism was easier to apply in state and county capitals, also called *county seats*. County seats are capitals of counties, administrative subdivisions of a state. Some county seats had also authority to enact and enforce municipal ordinances. As discussed in Baldasty (2002), county seats were especially prone to newspaper patronage, as they could reward newspapers in cash through county-level printing contracts, in addition to municipal printing contracts.

There were also indirect perks which partisan newspapers, in contrast to independent newspapers,

[6] Charters and Ordinances, City of Ithaca, New York. Ithaca, N.Y. 1897

[7] Laws as contained in an Act to revise and combine in a single act all existing special and local laws affecting public interests in the City of Brooklyn. Albany, N.Y., 1888.

enjoyed. Parties facilitated gathering political information and news reporting for affiliated newspapers. All partisan newspapers could gain access to state congress hearings as well as to the party's caucuses (something sometimes problematic for independent newspapers). Newspapers affiliated with parties used party officials as one of the primary sources of their information.

Finally, partisan newspapers were parts of party machines. Party members were obliged to support local partisan newspapers, even if the price was relatively high. Party officials insisted that the subscription for a partisan newspaper was a necessary duty of any devoted party member (Kaplan, 2002). Parties generated the audience of these newspapers and, in turn, enjoyed their enthusiastic political support.

Parties required newspapers to support all official decisions of a party, prohibited them from covering conflicting points of views, even within a party, and, overall, restricted the content these newspapers could publish. For example, after Free Press, an official Democratic newspaper in Detroit, refused to support Horace Greeley, an official Democratic candidate in the 1872 Presidential race, its editor had to raise capital and buy out a conflicting owner's share, as the newspaper was threatened with losing its status as a party organ (Kaplan 2002).

In sum, partisan newspapers - newspapers, officially associated political parties, - were different from independent newspapers, and the main difference was the extent of control over the newspaper content. These newspapers were different not only in their organization and financial structure, but also in their news coverage and the pattern of their endorsements (Gentzkow et al. 2006, Kaplan 2002, Mott 1941, Smythe, 2003).[8] I do not make any strong claim about the extent of political bias in the news in partisan newspapers as compared with independent newspapers, though there is some indirect evidence about it

[8] For example, Kaplan (2002) conducted content analysis of different newspapers in Detroit in the second half of 19^{th} century and found that Republican newspapers focused almost exclusively on Republican issues (endorsed Republican candidates, wrote about the dangers of the Ku-Klux-Klan and racism, criticized Democrats), while Democratic newspapers focused on Democratic issues (endorsed Democratic candidates, wrote about crimes committed by Blacks or corrupted Republican politicians, criticized Republicans in general).

in the literature (Kaplan 2002, Starr 2004).[9]

5 Empirical evidence

5.1 Hypotheses

I employ data on U.S. newspapers for the years 1881-1886. This time period has two features which makes it attractive for the analysis. First, at that time newspapers reported their political affiliations (Republican, Democratic, Independent), which was published in newspaper catalogs. Second, the newspaper market at that time was very dynamic: newspapers entered and exited the market every year, and advertising rates exhibit significant variation over time and space. Yet many other factors which might affect the demand for independent newspapers, such as literacy and education, were roughly constant over this relatively short time period, which allows me to isolate the effect of advertising.

In order to track the effect of per capita advertising, I focus on spatial and cross-temporal differences in the profitability of advertising in different newspaper markets. Specifically, I use the data on newspapers' advertising rates at the city or county level to estimate the profitability of advertising on the level of the newspapers' market. The profitability of advertising corresponds to the concept of (exogenous) unit advertising receipt in Gabszewicz et al. (2001), advertising revenue per reader in Gentzkow et al. (2006), the maximum amount of audience related media revenues in Besley and Prat (2006), or the profitability of advertising (Petrova, 2008). The main goal of analysis is to investigate how changes in the advertising environment affected a newspaper's decision to be politically independent.

What was the source of variation in advertising rates in 1880s? Population growth and urbanization increased consumer capacity and allowed differentiated products to coexist in the market. As a

[9] I tried to use content analysis to show that partisan newspapers were systematically different from independent newspapers in terms of their content. I analyzed approximately 40 newspapers from "American Histrical Newspapers" database and I didn't find any significant differences.

result, advertising became more and more important in product placement. Falling transportation costs reinforced this trend. There were technological changes in the production of existing products, shocks to production in agriculture and manufacturing, and the introduction of new products. In addition, during that time some cities and counties adopted different laws and ordinances which regulated and, sometimes, prohibited certain types of advertising. Thus, some determinants of advertising were predictable and slowly changing, while others could be changed in a discontinuous way. In the instrumental variable analysis, I am using exogenous demand and supply shocks to the profitability of advertising for identification purposes.

The main hypothesis in the paper is that the local profitability of advertising increased the number of independent newspapers. In other words, higher potential advertising revenues created incentives for media outlets to become independent from political parties. If this empirical hypothesis is to find confirmation in data, it would be empirical evidence in favor of the theoretical predictions of Besley and Prat (2006), Gabszewicz et al. (2001), and Gentzkow et al. (2006).

Hypothesis 1 *Local profitability of advertising increased the likelihood that the newspaper was independent.*

If Hypothesis 1 is to be confirmed, it is interesting to see through which channel the effect of advertising was working. For any causal mechanism which can link advertising and newspaper independence, it should be applicable not only for newspapers which coexist in the market at any given point of time, including newspapers with long traditions and history, but also for new newspapers which just enter the market. Therefore, I test the next hypothesis.

Hypothesis 2 *Local advertising profitability increased the probability that newly created newspapers chose to be partisan.*

If Hypothesis 2 is to be confirmed, it would constitute a cleaner test of a relationship between advertising and media independence. For new newspapers that just entered the market, all potential costs and benefits considerations discussed above should be of particular importance, in contrast to the ongoing

decisions of established newspapers with their own reputations and historical relationships with political parties (or their absence).

In the above-mentioned theoretical models, the mechanism of advertising effects is primarily based on the assumption that media outlets with lower bias are preferred by the audience, as compared with partisan newspapers, so that the lower bias in favor of political parties increases the profit of a media outlet. Independent newspapers could have less distortion in news coverage, as compared with partisan newspapers, which were under external pressure by political parties. As a result, independent newspapers are expected to have a larger audience. Empirically, I test whether it is true or not.

Hypothesis 3 *Independent newspapers had larger circulation than partisan newspapers.*

5.2 Data description

The main source of the data is Ayer's Directory of Newspapers 1881-1886, an annual catalog of newspapers and magazines published by the advertising agency Ayer and Sons Company.[10] For each newspaper, the directory reports the prevailing advertising rate that the publisher charged its advertisers. In addition, the directory provides information on the political affiliation of each newspaper, its circulation, size of a newspaper page, number of pages, periodicity, and geographical location (i.e. the main city, county, and state where the newspaper was distributed). The purpose of the publication was to provide information to potential advertisers.[11]

In the dataset, I include only those newspapers that were published at least once per week and had a clear political affiliation as Democratic, Republican or Independent. I exclude magazines, scientific journals, travel almanacs, advertising catalogs, as well as religious newspapers. Overall, the dataset contains 32546 observations on 10204 newspapers in 5015 cities in 2202 counties. Summary statistics for

[10] Ayer's directory stopped reporting advertising rates in 1887; from that point it published subscription prices instead. Ayer's catalogs were published from 1880 to 1985.

[11] See Hower, 1939 for the history of the Ayer and Son's Company.

newspaper-level variables are given in Table 1.

For each newspaper, I created dummy variables *ind*, *rep*, *dem*, which are equal to 1 if the political affiliation of the newspaper was Independent, Republican, or Democratic, respectively, and 0 otherwise. I also use data on advertising rates (in dollars per 10 lines for one month), circulation (in distributed copies), year of establishment, and periodicity (weekly, daily, bi-weekly, tri-weekly etc).

From Ayer's catalog, I also use data on city population (logged) as a control variable. City population in Ayer was reported on the basis of detailed Census data or population estimates. It does not vary from year to year.

As demand for independent or partisan newspapers may depend on the population's political preferences, it is important to take these into account in the analysis. To control for changing political preferences, I use data on county-level electoral results in presidential and congressional elections, from the Clubb et al. (2006) dataset provided by the Interuniversity Consortium for Political and Social Research (ICPSR). For each county and year, I use the percentage of votes for Republican, Democratic, and other party candidates, as well as the turnout from the most recent presidential and congressional elections. I also use data on county seat locations from the Sechrist(1986) dataset of ICPSR (ICPSR study 8159).

Finally, I use the data on population from the Census data as reconstructed by Haines (2005). In different specifications, I use total county population (logged), share of urban population (computed as population in cities with population above 25000, divided by total population), average wage in manufacture (logged), and average agricultural income per family (logged; computed as total income in agricultural sector divided by the number of families in agriculture). For the years 1881-1886 (between the 1880 and 1890 censuses), I use linearly interpolated data.

Summary statistics for city-level and county-level variables are presented in Tables 2 an 3.

5.3 Market structure

The market structure for political newspapers in a city varied significantly, according to the data. Some were the only newspaper in a city, some were in duopolistic market, most were in a market with the number of newspapers below 5. In the regression sample, 4087 newspapers were located in a single newspaper city, 2997 located in two-newspaper city, 1513 in a city with three newspapers, 858 in cities with 4 or 5 newspapers, and 358 in cities with more than 5 newspapers.

The market operated primarily on the city level. Local newspapers used to write about the local news, and subscription, the primary source of distribution of small and average newspapers, was available only to city residents. Weekend editions of high-circulation newspapers in Boston, New York, and Washington, however, were distributed more broadly, and in big cities some newspapers were distributed on the streets. Newspapers located in different cities, however, did not directly compete with each other, at least during that time period.

The variation for a newspaper's political affiliation can be decomposed to entry (new newspapers enter the market), exit (old newspapers exit the market), changes (newspapers which change their political affiliation), and mergers and acquisitions (which are difficult to trace as they look like entries and exits in data). The data is available for 10204 newspapers, and from them 7319 newspapers were located in places for which I was able to find socioeconomic data from Census and electoral statistics. Overall, in the final dataset there are 515 changes, 2992 entries, and 2834 exits for year before 1886. The sample is truncated at year=1886. Note that the data do not reflect the fact that some entry and exits were caused by mergers and acquisitions, so that the number of entries and exits in the sample is likely to be somewhat overstated.

Some changed from being partisan to being independent (280) and from being independent to being partisan (259). Some even changed from being Democratic to being Republican (32) and from being Republican to being Democratic (25). It is not the case that all these newspapers were located in South and changed their political affiliation due to partisan realignment which could follow the end of

Reconstruction (the number of switchers in South was 7 and 6, respectively). Some newspapers changed their affiliation more than once, so the numbers do not sum up.

Newspapers which changed their political affiliation did it because of poor financial situation. Regression with dummy for switching with dependent variable show that the most significant predictor of switching was newspaper's low circulation. Also, newspapers were more likely to switch if they were located in counties with lower wages, not in county seats, and with larger city population. Finally, independent newspapers were more likely to switch than partisan ones. This happens as They often started as independents and then, after 1-2 years of operation, became affiliated with one of two major political parties.[12]

5.4 Methodology and empirical results

Advertising and media independence, fixed effects

In order to test Hypothesis 1, I estimate the following fixed effects model:

$$\Pr(ind_{it} = 1) = \beta_0 + \beta_1 A_{it} + X_{it}\boldsymbol{\beta_2} + \gamma_c + \delta_t + \epsilon_{it} \tag{1}$$

Here, A_{it} is local profitability of advertising, computed for the newspaper i, computed in year t. X_{it} is a vector of controls for a newspaper i in year t, γ_c is a county dummy variable, and δ_t is a time dummy variable. Control variables X_{it} include time-varying county characteristics, such as income, county population, and electoral returns in the last presidential and congressional elections, and city-specific variables such as city population and a dummy for city being a county seat.

Unfortunately, data do not contain information on the profitability of advertising, so some proxy must be used instead. There are several different methods to estimate local profitability of advertising,

[12] For the subsample sample of switchers, the relationship between the year of establishment and a dummy for switching from independent to partisan is negative but not significant.

or advertising receipt per unit of circulation. I use local circulation-adjusted advertising rates[13] as a proxy for the profitability of advertising. Circulation-adjusted advertising rate a_{it} is just a ratio of advertising rate to circulation. Circulation is logged in computations, as otherwise the distribution of the resulting variable is substantially skewed to the left (if no logarithmic transformation is used, the results are still robust but depend more on outliers). All profitability of advertising variables are computed at the city level, as it was the primary market level for newspapers in 1880s.

The functional form is primarily driven by the theoretical literature. The concept of profitability of advertising corresponds to unit advertising receipt in Gabszewicz et al. (2001), advertising revenue per reader in Gentzkow et al. (2006), the maximum amount of audience related media revenues in Besley and Prat (2006), or the profitability of advertising (Petrova, 2008). Alternatively, one can use just a plain advertising rate or a plain advertising rate controlling for circulation as a proxy for A. Robustness check section of the paper discuss these possibilities.[14]

To estimate model (1), I mainly use a linear probability model. It is preferable to a fixed effect logit model as it doesn't suffer from the incidental parameter problem of panel logit for small T, large N data.[15] Results of estimation of fixed effect logit, however, are consistent with results of fixed effects OLS, as discussed in the robustness check section.

Table 1 contains results of estimation of equation (1) for different estimators for A. Column 1 in the table presents results with average circulation-adjusted advertising rates used to proxy for unit advertising

[13] Advertising rates, reported by Ayer's Newspaper Annuals, are given as the prices of 10 lines of advertising published for one month.

[14] See, for example, Table 16 for flexible controls for circulation.

[15] The incidental parameter problem refers to the situation in which the existence of incidental, auxiliary parameters (such as fixed effects) in the model makes impossible consistent estimation of structural parameters, or parameters of interest. In particular, logit with fixed effects is not consistent if T is fixed and N approaches infinity. Some discussion of the incidental parameter problem can be found in Lancaster (2000).

receipt, i.e.

$$\widehat{A}_{jt} = \frac{\sum_{i \in city(j)} a_i}{N_j} \tag{2}$$

where the sum is computed for all newspapers in the city, and N_j is the number of newspapers in the city in which newspaper j is located. The coefficient for A in column 1 implies that one standard deviation increase in local profitability of advertising made local newspapers 2.36% more likely to be independent in a given year. The effect seems to be small, but if it multiplies over time, it can explain a significant part of the massive transformation of newspapers from mostly partisan to most independent which took place in the U.S. in 1870-1920.

Further in column 1, the joint significance of voting variables is 0.29 with F-statistics being equal to 1.13, so it is unlikely that changes in the political preferences of a population drove an increase in newspaper independence. The coefficient for city being a county seat is negative and highly significant, which is consistent with the hypothesis of Baldasty (1992) that parties had more opportunities to influence newspapers in county capitals in which all county legislative acts should be published in the newspapers chosen by the members of these parties. Note that the coefficient for city population is negative and highly significant, in contrast to findings of Gentzkow et al. (2006) and Hamilton (2004), that is, larger city population is negatively correlated with newspaper independence, once year fixed effects and county fixed effects are taken into account. Further tests (results not reported here) imply, however, that this negative effect emerges when county fixed effects and income controls are included. In other words, the effect of city population is negative for within-county variation in newspaper independence, but is positive for between-county variation, if no fixed effects or other controls are included. Results of Gentzkow et al.(2006) and Hamilton (2004) are naturally based on between variation, as their dataset consist of large American cities, so there is no contradiction between my results and theirs. Coefficients for average wage and average agricultural income are negative. It could imply that the effect of advertising emerges just because of collinearity between these variables and the profitability of advertising. But these coefficients

both remain negative even if profitability of advertising is excluded from regression (results not reported here). So it is unlikely that the correlation between advertising rates and average income drives all the result. Most probably, income variables are negative and insignificant in this context because county fixed effects which capture most of cross-county income differences are controlled for. Once county fixed effects are excluded (see column 2), average agricultural income and county census population controls become positive and significant, which is more in line with the general intuition of Gentzkow et al. (2006). Note that in column 2 the coefficient for advertising remains positive, significant, and has approximately the same magnitude as the corresponding coefficient in column 1.

Column 3 presents the result of estimation of model (1) with newspaper fixed effects. The coefficient for advertising implies that the increase in local profitability of advertising by one standard deviation would increase the probability that this particular newspaper would be independent by 2.95%. This magnitude of the effect is similar to magnitudes of corresponding coefficients in columns 1 and 2. This specification is, again, based on an average circulation-adjusted advertising rate computed by formula (2) as a proxy for A.

The main drawback of the specifications discussed so far is potential endogeneity. It might be the case that independent newspapers have, on average, higher advertising revenue per reader, as compared with partisan newspapers, and then the reported results are driven by this correlation, as advertising revenue per reader for this newspaper enters (2). One way to solve this problem is to compute local profitability of advertising using a's of all newspapers in a city except this one. Column 4 reports this specification. With this method, the effect of advertising is a 2.2% increase in the probability that the newspaper was independent corresponding to one standard deviation change in A. This 2.2% is lower than magnitudes in previous columns. One potential explanation is larger measurement error in this specification. If regressions in columns 3 and 4 are weighted by the number of observations per city used to compute A (results not reported here), the effects of advertising become equal to 3.7% and 3.2%, which is consistent with a measurement error hypothesis.

There is another way to compute an estimate for A: to look at the magnitude of city fixed effect in the regression with circulation-adjusted advertising rate as a dependent variable and year fixed effects as regressors. The advantage of this approach is that it allows the use of all possible information to identify a constant city-specific A, taking out the effect of common time trends. Column 5 reports results for this specification. The estimated effect of A is 4.26% for this specification, which is substantially larger than similar results in previous columns. A potential explanation is lower measurement error, as more points are used to compute average value, and common time shocks are isolated and partialled out in this model.

Column 6 further deals with potential endogeneity in data. As it was mentioned earlier, it might be the case that independent newspapers were more likely to have higher circulation-advertising rates. Also, advertising rates of newspapers in the same market (city) may be best responses to each other's advertising price, despite the evidence cited above that these prices were set as a result of negotiation with the advertising agency as mediator. As a result, the estimate in column 4 might be biased. A potential solution for this problem is to use average circulation-adjusted advertising rate in other cities in a county as an instrument for the circulation-adjusted advertising rate in a particular city, i.e. by $\widehat{A}$ computed by formula (2) in which the sum is taken for all newspapers in a county outside the city of newspaper j. The idea is that advertising rates in this city should be positively correlated with advertising rates in other cities in a county because of location similarities, but advertising rates in other markets could not be a basis for a best response for newspapers in this market. This method goes in line with the approach used in industrial organization literature by Nevo (2001) and Chintagunta et al. (2006), who use advertising prices in other markets as instrument for advertising price in a given market, to avoid the endogeneity problem of within-market estimates. The results of the estimation are presented in column 6. The coefficient for advertising rate is positive, significant, and the magnitude of effect is 6.12% which is quite large as compared with all previous estimates. The results of corresponding OLS regression for the same sample are presented in column 7. The size of effect in OLS estimation is 3.32% which is almost two

times lower than IV estimated. A probable explanation for this discrepancy is a measurement error. This comparison implies that true effects in columns 1-5 are likely to be understated. Further IV estimates with different advertising regulations as instruments are presented in the next section.

One alternative explanation of the results in Table 5 is that independent newspapers set higher circulation-adjusted advertising rates, as they are more motivated by advertising profits, and this explains all correlations in Table 5. I checked if newspaper's own circulation-adjusted advertising rate, instead of local average circulation-adjusted advertising rate, is a significant predictor of being independent in specifications (1)-(3) of Table 1. I find that newspaper's own A is not a significant predictor of being independent in specifications (1) and (3)-(4) (t-statistics of the positive coefficient for A is 1.05 in specification similar to (1), and the corresponding coefficient is negative with t-statistics 0.04 in specifications (3)-(4). So, it is reasonable to use average circulation-adjusted advertising rate for all newspapers, instead of the same variable computed for all newspapers except this one, as it reduces the measurement error in this variable, allows to use larger sample, and does not create potential reverse causality problems. Column 4, however, reports that the most important result in the table with newspaper fixed effects still holds if A is computed for all newspapers in the city excluding this one.

Overall, the results of Table 1 can be summarized as follows. Local profitability of advertising had a significant positive effect on the probability that a given newspaper was independent. The size of the effect in different specifications ranges from a 2.2% to a 6.1% increase in the probability of being independent following one standard deviation change in local circulation-adjusted advertising rate. These results are consistent with Hypothesis 1. Another important result in this table is that there were less independent newspapers in the cities which were county seats. This is indirect evidence of the story about parties' control over partisan newspapers. County seats were, on average, more developed and more populous cities as compared with non-county seats, and they should have more independent newspapers according to the work of Gentzkow et al. (2006), but for political parties it was easier to subsidize partisan newspapers in these places.

Advertising and media independence, entry of new newspapers

To better understand the channel through which the effect of advertising works, I test Hypothesis 2 and look at entries of new newspapers. In order to track the effect of the profitability of advertising on political affiliation of new newspapers, *entrants*, I estimate the model (1) for the subsample of new newspapers. The hypothesis is that new newspapers were more likely to choose being independent in counties with higher local advertising profitability A.

Table 6 presents the results of this analysis. The number of observations does not permit an estimate specification with county fixed effects, so state×year effects are used instead, and the average profitability of advertising is computed on a county level. Column 1 presents a baseline model with average circulation-adjusted advertising rate being computed for all newspapers in a county excluding this particular newspaper. The magnitude of the effect is similar to magnitudes obtained before: 2.7% increase in the probability of starting as an independent newspaper following one standard deviation increase in a local circulation-adjusted advertising rate. Column 2 presents similar results with average circulation-adjusted advertising rate being computed for all newspapers in a county. Column 3 shows that even if lag of local advertising profitability is taken instead of present value, there is still an effect of advertising on the political independence of new entrants, though the magnitude of the effect decreases to 1.91%. The specification in column 3 is the best for dealing with the potential endogeneity problem which might arise as advertising rates of all newspapers in a county might be chosen at the same time as a reaction to each other's strategy. But, however, it is the weakest one for estimation the magnitude of the effect, as advertising environment could change from year to year.

5.4.1 *Advertising and media independence, IV estimation*

A potential drawback of all estimation procedures in Table 5, no matter how precisely A is estimated, is that newspaper independence might be driven by some time-varying unobserved heterogeneity on the county or city level. While it is difficult to deal with this problem in general, it is possible to

present evidence that at least for the state of Massachusetts it is not the case. This evidence is based on instrumental variable estimation, in which different regulations related to advertising are used to instrument for the profitability of advertising on city level.

I collected data on local ordinances regulating outdoor advertising and handbill distribution for the state of Massachusetts. For each city, I recorded whether it had a legal restriction for these activities in a given year. I included only data from sources which indicate when a particular piece of legislation was adopted. The list of analyzed sources in given in Table 4.

Outdoor advertising was the main competitor of newspaper advertising, so the presence of regulation of outdoor advertising is expected to have a positive effect on the profitability of newspaper advertising. Regulations of handbill distribution were, in contrast, applicable to the distribution of newspapers. For example, they restricted the distribution of advertising bills and newspapers in streets, so that only delivery to mailboxes or under the door was allowed. The presence of regulation of handbill distribution is, therefore, expected to have a negative effect on the profitability of newspaper advertising, as it restricted the distribution of newspapers which contained advertising.

Most of these regulations said that outdoor advertising or handbill distribution required permission of the mayor or city council or that there be a license for outdoor advertising. Some also regulated the size of advertising placards and their position on the street. In some places, distribution of circulars or advertising handbills in the streets was prohibited. Several places adopted these regulations during the analyzed time period (1881-1886), while others either didn't adopt them at all or adopted them later. For each city and year for which I was able to find data, I created variables $outdoor\_regulation$ and $handbill\_regulation$, which are equal to 1 in the presence of regulation and 0 in its absence. Table 7, which shows raw correlations between main variables, confirms the intuition about the signs of this coefficients. The regulation of outdoor advertising is positively correlated with average circulation-adjusted advertising rate in a city, while the correlation of the latter variable with the regulation of handbill advertising is negative.

Table 8 shows the results of first stage estimation. It reports results separately for the sample with and without Boston newspapers (Boston is an outlier in this exercise). It also shows the results with a different combination of instruments. The last row shows that used instruments are not weak: F-statistics for instruments is never less than 16.07. Coefficients for both types of advertising regulations have a predicted sign. They are jointly significant at least at 5% level and individually significant in all columns except column 6 which shows that the dummy for restrictions of outdoor advertising, when included together with restrictions on handbill distribution, is not significant in the sample without Boston. The absolute value of the point estimate for the regulation of handbill distribution is larger than the point estimate for the regulation of outdoor advertising. It implies that the regulation of handbill distribution, which, in fact, restricted newspaper distribution, was relatively more important for newspaper advertising as compared with the regulation of outdoor advertising, the competitor of newspaper advertising. The coefficient for city population is negative and insignificant, but being a county seat is highly significant and positive. One explanation is that city population is insignificant because of collinearity of city population and being a county seat, while another explanation suggests that publishing local ordinances in county seats decreased the space in the newspaper available for advertising, which drove advertising rates up. Basic collinearity diagnostics, however, rejects the presence of multicollinearity between a dummy for a county seat and a logged city population (VIF is less than 2 for both variables), so the second explanation seems to be more plausible.

Table 9 shows the results of the estimation of model (1) with OLS and IV methods. Second stage results of IV estimation are reported. Higher circulation-adjusted advertising rates in the city increase the probability that a given newspaper was independent. In the sample with Boston (columns 1-4), the magnitude of the effect is big: one standard deviation increase in local advertising profitability would raise the probability that the newspaper was independent, by 44.2%- 73.6%, for different estimates. In columns 5-8, which show the results without Boston, the effects of one standard deviation change in A are reduced to 6.0%-9.62% for different estimates, the numbers which are much closer to the numbers in

Table 5.[16] The main explanation for the difference in results between columns 1-4, on the one hand, and columns 5-8, on the other hand, is the effect of Boston, an outlier. Note that for Boston the standard deviation of circulation-adjusted advertising rates is approximately 7 times larger than the corresponding standard deviation computed on the sample without Boston (numerical values are 0.105 without Boston and 0.706 with Boston), so this difference can explain the difference in marginal effects in these two samples.

There is one potential caveat in the above analysis. It could be the case that the regulations which encourage newspaper advertising were adopted as the response to lobbying from independent newspapers which benefited most from these regulations. There are at least two arguments against this story. First, the wave of these ordinances was triggered by a scandal involving the advertisement of a patent medicine "S T 1860 X" painted on a rock near Niagara Falls (Taylor and Chang, 1995), an event plausibly orthogonal to the development of an independent press elsewhere on a county level. Second, partisan newspapers were, on average, larger and older and they had connections with local politicians, so it would be easier for them to lobby for regulations, as compared with independent newspapers. This argument implies that in places with more partisan newspapers these regulations, profitable for all newspapers, were adopted earlier.[17]

Throughout Table 8, IV coefficients are larger than OLS coefficients, probably because of a measurement error. Results of the Hansen over-identification test for specifications with two instruments

[16] Note that the coefficient for advertising in column 5, in the specification with only one instrument computed for the sample without Boston, is positive but not significant, though it is still larger than its standard error. Probably, it happens because of the reduced size of the sample (128 data points without Boston newspapers vs 179 points with Boston newspapers). I also checked the alternative specification, in which the main variable of interest is local advertising rate not adjusted by circulation, and logged circulation is included as a control (results not reported). In such a specification, the coefficient for local average advertising rates is positive and significant at 10% level.

[17] Kroszner and Strahan (1999) and Benmelech and Moskowitz (2008) argue that regulations were adopted (cancelled) earlier in places in which there were powerful interests which supported (opposed) these regulations.

(reported in the last row of Table 8) suggests that used instruments are valid. Overall, the results of IV estimation are consistent with other results in the paper.

5.4.2 *Newspapers and parties: a political channel*

This paper not only presents evidence in favor of economic explanation of the commercialization of the news and the development of independent press. Its results are consistent with political economy considerations behind this development. First, as mentioned before, the result for county seats, in Table 5 and 6, is an evidence in favor of the political channel, as they suggest that newspapers in county seats, cities which were richer but provided more opportunities for political patronage, were more likely to be independent. The corresponding coefficients in Table 5 and Table 6 imply that the effect of being located in a county seat is similar in magnitude to the effect of advertising rates. These two variables together explain 81.5% of within-county variation in newspaper independence in specification (1) in Table 5 (62.1% in specification (1) in Table 6 for entry of newly created newspapers).

Second evidence comes from year fixed effects. Though most tables do not show year fixed effects, they are presented for most specifications in Table ... As one can see, the years in which the newspapers were less likely to be independent were years of 1881 and 1885, just after Presidential elections of 1880 and 1884, when for political parties it was more important to have partisan newspapers. Note that data on local newspapers and their political affiliation were collected in the end of the year preceding publication. (If a new newspaper affiliated with a political party emerged before presidential elections, it should be recorded in the following year's catalog for the first time.) The pure economic story would say that the growth of independent newspapers should be faster following the years of economic growth. Note that the real growth of American economy was faster in 1880-1881 than in consequent years. In 1879 real GDP in 2000 dollars was equal to \$156.9, in 1880 - \$169.9, in 1881 - \$191.1. From 1882 to 1885 it gradually increased from \$201.3 to \$204.1.[18] The years of fastest economic growth were, therefore,

[18] Source: Louis D. Johnston and Samuel H. Williamson, "What Was the U.S. GDP Then?" MeasuringWorth, 2008.

1880 and 1881. At the same time, the number of independent newspapers was significantly less in 1880 and 1884, which is consistent only with political story.

These two evidence together suggest that market development alone could not explain the peculiarities of the growth of independent newspapers. Pure market expansion story suggests that newspapers in county seats, which were richer and more populous, as compared with other cities, should be more likely to be independent, but they were not. Pure economic development story suggest that the growth of independent newspapers should be more prominent in 1881 and 1882, as compared with subsequent years, but it was not. The political channel, however, can explain these features of data.

Circulation and media independence

Hypothesis 3 implies that the politically centrist newspapers, or independent newspapers, had a larger audience than those with a political affiliation.[19] To test this hypothesis, I estimate the following model:

$$circ_{it} = \beta_0 + \beta_1 ind_{it} + X_{it}\boldsymbol{\beta}_3 + \gamma_c + \delta_t + \epsilon \tag{3}$$

where $circ_{it}$ is the circulation of a newspaper i in year t, logged, and ind_{it} is dummy for being an independent newspaper. Partisan (Democratic and Republican) newspapers constitute a baseline, so that the coefficient $\beta_1$shows how the circulation of independent newspapers was different from the circulation of politically affiliated newspapers. The vector of controls includes the same county-level and city-level controls as that in previous models.

[19] Note that the hypothesis that independent newspapers are preferred by the audience does not necessarily imply that independent newspapers have larger circulation. It could be the case that it is more profitable to be a partisan newspapers if there is enough independent newspapers already in the market. The situation, however, was the opposite: partisan newspapers occupied the market, and independent newspapers entered the market in the late 19th century. So, this consideration can not explain why independent newspapers had the same circulation as partisan newspapers, though it could explain why independent newspapers would have larger circulation than partisan newspapers.

Table 11 reports the results for model (3), for the whole sample of newspapers and separately for daily newspapers only. Columns 1-4 show the results of OLS estimates with county fixed effects. Column 1 shows, however, that for the sample of all newspapers, circulation was not significantly associated with political affiliation. Columns 2 and 3 show, however, that actually the effect of being independent was negative significant for weekly newspapers, and positive and significant for daily newspapers. The latest result is consistent with Hypothesis 3, while the result for weeklies implies that weekly newspapers, at least at the analyzed time period, had, on average, smaller circulation if they were independent. Column 4 shows that the positive effect of being independent for dailies in cities with more than 10000 population was even stronger. This explains why scholars writing on the subject claimed that independent newspapers had larger circulation, as they probably looked only at dailies in the biggest cities like New York, Boston, or Philadelphia.

One problem with Table 11 is that it does not allow to test contrafactual hypothesis: which circulation this particular newspaper in this particular city would have if it were partisan instead of being independent, or vice versa. One way to solve this problem is to use matching estimator, which compares the circulation of an independent newspaper with the circulation of a partisan newspapers located close to the first newspaper in a parameter space.[20] Column 5 and column 6 show the results of this estimation. As one can see from these column, the effect of being independent for all newspapers is negative and significant, while the corresponding effect for dailies is positive and significant, so these results are consistent with the previous findings. Another way to solve this cotrafactual problem is to use the specification with newspaper fixed effects, which analyzes within-newspaper variation in circulation given that the political affiliation of a newspaper is not constant over time. All coefficients in corresponding regressions with logged circulation as dependent variable are insignificant. However, if plain circulation is used instead of logged circulation, and newspaper fixed effects are included, then being independent has a significant positive coefficient (results not reported).

[20] I use nearest neighbor matching procedure of Abadie et al. (2004).

Another problem with this Table 11 is that it ignores the market structure. In particular, the premise that independent newspapers had, on average, larger circulation follows from theories of Gentzkow et al. (2006) or Petrova (2008) only for monopolistic markets. In the markets with more than one newspaper, the market structure and the distribution of preferences of the population could play a role. One way to solve this problem is to run the corresponding regression only for the subsample of newspapers located in one-newspaper cities. The results (not reported) show that being independent had a positive effect on newspaper's circulation in one-newspaper cities, though this effect becomes insignificant in some specifications. I didn't look separately at dailies and weeklies in this setup, as only 48 out of 1299 newspapers located in one-newspaper cities were published daily.

Overall, the results of Table 11 indicate that there is no strong empirical support for the causal mechanism of the effect of advertising on newspaper independence that the previous literature (Baldasty,1992, Gentzkow et al. , 2006, Starr, 2004) suggested. The lack of significance does not, however, mean that this mechanism was absent. Results of column 5 without city fixed effects suggest that there is a significant difference between certain partisan and independent newspapers . It implies, however, that on average newspapers didn't become independent because they were attracted by potentially gaining larger circulation.

5.5 Alternative explanations and robustness checks

Non-linear relationship between advertising rates and circulation

Throughout the paper, I used advertising rate per circulation (logged) as the key independent variable. The theoretical justification for this is that corresponding models (Besley and Prat, 2006, Gabszewicz et al., 2001, Glaeser et al., 2006, Petrova, 2008) use advertising rate per capita or unit advertising receipt as the main variable of interest. If the underlying relationship between advertising rates and circulation is non-linear, however, many results could be driven by the relationship between circulation and independence rather than advertising and independence. I checked if the results of the paper,

summarized in Table 5 and Table 8, still work if the main variable of interest is average advertising rate and logged circulation is being controlled for. In all specifications, the sign of the variable of interest remains positive, and its significance remains the same or higher. Columns 1 and 2 of Table 15, for example, present the results with newspaper fixed effects, controlling for average advertising rate in a city, computed for all newspapers excluding this one, and either logged circulation or polynomial function of circulation raised from 1/2 to 1/5 degree.

Third variable explanation

Results of Table 5 show that independent newspapers flourished in counties with the fastest growth of advertising rates, but, besides the direct effect of advertising, there may be some other alternative explanations for these results. Coefficients for local advertising rates may imply either the causal effect of advertising on a newspaper's independence or the existence of some third variable which simultaneously causes advertising rates and media independence to grow. The fixed effects don't solve this problem, because the issue is that the level of place variables (e.g. city size) might be correlated with both changes in ad markets and changes in independence. To cope with this possibility, I include specifications with any important city / county characteristics interacted with year dummies. I also include base year circulation interacted with year dummies. Corresponding results are presented in columns 3 and 4 of Table 15. As one can see, the coefficients for circulation-adjusted advertising rates remain positive and significant at 5% level even if all control variables except electoral controls (which exhibit natural over-time variation) are interacted with year dummies. Effects of one standard deviation increase in circulation-adjusted advertising rate are, however, lower than the corresponding numbers in column 4 of Table 5 (from 2.2 in Table 5 to 1.57-1.68 in Table 15). This could be the case because the sample size in these specifications goes down, as it does not increase the newspapers created after 1881.

Another potential method to deal with this problem is to use matching technique conditional on observables. In particular, I divide the whole sample into to large groups: newspapers located in cities with average advertising rates above the median value in a state and newspapers located in cities with

average advertising rates below the median value in a state. I use nearest neighbor covariate matching (Abadie et al. 2004).For each newspaper located in a city with high advertising rates, the matching algorithm finds a newspaper in a place with low advertising rates, i.e. the Nth nearest neighbor in the space of all matching parameters. I use exact matching by state and year, so the matching algorithm finds the nearest neighbor in the same state. The use of matching allows to take into account all control variables in the most flexible way. The results of this exercise are given in Table 16.

The robustness checks, presented here, do not completely eliminate the possibility that there is some unobservable third variable not partialled out by place and newspaper fixed effects. They allow, however, controlling for the effect of observable characteristics in the most flexible way and show that this does not change results substantially.

This argument implies that there should be more independent newspapers in cities with rapid economic development and large population. Results for a county-seat variable in Tables 5 and 8, however, go against this argument. They imply that county seats, which were, on average, richer and more populous cities as compared with all the other cities, had less independent newspapers. A possible explanation for these results is that newspapers in county seats were more prone to patronage by political parties, because by law all county-level ordinances had to be published in local newspapers, and these printing contracts were distributed to newspapers by the elected representatives affiliated with political parties (Baldasty 2002). In sum, results for county seats are consistent with capture theory, but not consistent with pure economic argument.

Changing political preferences

One explanation of my results is that in counties with the fastest growth of population, the political preferences of the people were becoming more centrist. This should not necessarily be reflected in electoral returns, as election results may reflect direction but not the magnitude of these preferences. An alternative hypothesis is that in the places with the fastest growth of advertising rates people were becoming more centrist, and, as a result, increasingly preferred reading independent newspapers.

To address this issue, data on roll call votes can be used as a proxy for the electorate's preferences. In theory, roll call votes in Congress reflect the individual preferences of the members of Congress, preferences of the party and special interest groups, and preferences of their constituency. If we assume that the preferences of parties/special interest groups remained relatively constant over these 6 years and, more importantly, over space, then changes in the pattern of roll call votes corresponded to changes in the preferences of their constituency and some noise in the form of idiosyncratic preferences. As a measure of the pattern of roll call voting, I use NOMINATE data of Poole and Rosenthal (1997) who estimate the parameters of the spatial model of voting, including the ideal points, from the observed record of roll call votes. By assumption, NOMINATE scores reflect not only the idiosyncratic preferences of members of Congress and the influence of parties and special interest groups, but also the preferences of the members' constituencies.

According to Poole and Rosenthal, during the "Gilded Age" the first dimension of the NOMINATE score reflected liberal-conservative, Republican-Democratic split, while the second dimension reflected the emerging conflict between urban and rural interests, North vs South and far West. In order to test the hypothesis that the preferences of constituencies were becoming more centrist in counties with the fastest growth of both advertising rates and independent newspapers, I created a measure of legislator bias, computed as the absolute value of the deviation from the median for the corresponding dimension of the NOMINATE score. The hypothesis implies that an increase in the local advertising rate and in the proportion of independent newspapers in a county should be significantly correlated with lower legislator bias. Table 7 shows the results of the estimation of the corresponding models.

Legislator bias, computed on the basis of the first dimension of NOMINATE, was not significantly correlated with lower advertising rates or a lower fraction of independent newspapers. Legislator bias for the second dimension of NOMINATE was significantly *higher* in districts with a larger fraction of independent newspapers, which is not consistent with the hypothesis that legislators were becoming more centrist in such districts. Also, legislator bias was significantly lower in districts with a larger fraction of

Democratic newspapers.

Note that the results of Table 7 constitute stronger test for the hypothesis that independent newspapers emerged in more centrist districts than simple inclusion of NOMINATE scores as controls for specifications in Table 1. These results are stronger because they show that even without controlling for dynamic county characteristics, the proposed mechanism for the relationship between independent newspapers, advertising rates, and legislator biases does not work. I checked, however, that the results of Table 1 are not significantly affected by the inclusion of NOMINATE scores as control variables (results not reported here). I find that the results are generally consistent, though the level of significance of advertising variables changed in a couple of specifications.

Overall, the evidence in Table 7 does not agree with the hypothesis that the preferences of the constituency, measured by NOMINATE scores as imperfect proxies, were becoming more centrist in counties with the fastest growth of both circulation-adjusted advertising rates and independent newspapers.

Migration and African Americans

One more potential explanation of the results of Table 1 is linked to migration. It might be the case that the counties with faster advertising growth and faster population growth were the counties with a larger inflow of immigrants who were not interested in local politics and, therefore, preferred to read independent newspapers. Table 8 shows how aggregate newspaper characteristics and voting outcomes in a county depended on the fraction of foreign-born individuals in the total population. Again, since it is important to look at the dynamic component, county fixed effects are included in the estimation. Table 8 shows that it is not the case that immigration was associated with a higher local advertising rate or a higher fraction of independent newspaper. The fraction of Republican newspapers was larger in places with more immigrants, consistent with a fact that Republican party represented the interests of foreign-born constituency at that time period.[21] Similarly, there is no indication that changes in the

[21] Note that these results are consistent with findings of McCarty, Poole and Rosenthal (2006) that immigrants increase, not decrease the polarization of electorate for the later period.

fraction of African Americans in the population cause both advertising rates and independent newspapers to grow (Table 9). Coefficients for African American population in the models with advertising rate or independent newspapers as dependent variables (columns 1-3 in Table 9) have different signs and are insignificant. Overall, the results in Tables 8 and 9 are inconsistent with the proposed alternative explanation. Note that these results are consistent with findings of Hamilton (2004).

I also checked that the results of Table 1 are robust to the inclusion of the fraction of immigrants or the fraction of African Americans in regressions (results not reported). In this exercise, all coefficients for A retain approximately the same magnitude and remain significant at 1% significance level.

Changing political competition

It could be the case that changing political competition in a county can explain coevolution of advertising rates and independence of local newspapers. For example, an increase in political competition can increase the number of independent newspapers, as voters, in order to be able to make an informative choice, increasingly prefer to have less biased information on all political parties. At the same time, advertising rates might go up as places with growing political competition might grow economically as well. There is also an alternative story about the effect of political competition. Growing political competition might increase competition between newspapers, which in turn drives local advertising rates down. At the same time, the number of independent newspapers might go down as parties become more interested in influencing newspapers. To test these alternative explanations, I create a measure of political competition in a county, vote margin. Vote margins are computed as an absolute value of differences between vote for Democrats and vote for Republicans in a county. Larger vote margins correspond to higher political competition. Table 10 presents the results of estimation of model (1) with added vote margin as a control. Table 10 shows that results of Table 1 are robust to inclusion of vote margin as a control variable. In addition, it shows that higher political competition was associated with a higher probability that a newspaper in a county was independent.

Other robustness checks

In addition to specification (1), it is important to take into account the size of the audience of independent newspapers. Newspapers with larger audience could be more influential, therefore, all specifications in Table 1 can be estimated with weights which weigh more newspapers with larger circulation. The results of this estimation, not reported here, are consistent with Table 1: coefficients for all measures of A remain significant at 1% level, and marginal effects of one standard deviation change in A remain similar in magnitude. Also, I estimated the same set of specifications using the share of circulation of independent newspapers as dependent variable, instead of a dummy for independent newspaper. All observations in this exercise were weighted with frequency weights to remove the influence of duplicate observations. The results remain consistent with Table 1, as coefficients for all measures of A retain their sign and the level of significance. Finally, I estimated the effect of circulation-adjusted local advertising rates in a collapsed dataset in which the unit of observation is city-year, and the share of circulation of independent newspapers is a dependent variable. The results are consistent with basic specifications in Table 1.

I also estimated model (1) with a dummy for Democratic or Republican newspapers as the dependent variable, to be sure that the effect of advertising works differently for partisan newspapers. The effect of the local advertising rate on the probability of being a Democratic newspaper is negative and significant. A similar effect for Republican newspapers is also negative, but stops being significant after the inclusion of city or newspaper fixed effects. These results suggest that local advertising rates stimulated the growth of independent newspapers, but not that of partisan newspapers.

In addition, I checked that the main result of the paper, the effect of local advertising environment on a newspaper's independence, still holds for data collapsed by city, as otherwise the results could be caused by complex patterns of correlation between newspapers interacting within the same market. My calculations for collapsed data show that higher local advertising rates led to a larger fraction of independent newspapers.

Unfortunately, I was not able to find education or literacy data on a county level for that time

period. At ICPSR dataset, Census data for literacy are available only for 1880 and 1900 on a state level. Moreover, the Census of 1880 reports if people over 10 could read, while the Census of 1900 reports percentage of literate males over 21, so it is not clear how to construct a single variable which captures literacy in 1880-1900. I checked, however, that my results are robust to the inclusion of state×year fixed effects. This implies that these results are also robust to the inclusion of any state-level literacy index based on interpolation of 1880 and 1900 variables.

Finally, I checked if my results still work if Southern states are excluded. The coefficients for advertising rates remain positive and significant and similar in magnitude even for the specification with newspaper fixed effects, which suggest that my results are not driven by this kind of sample selection. If only Southern states are included in the sample, however, only coefficients in specifications with newspaper fixed effects remain positive and significant. Weak results for Southern states could be explained by its peculiar political structure and the lack of political competition. Independent newspapers in South could in fact be sponsored by non-dominant party and, therefore, be similar to partisan newspapers in North. Newspapers in South, however, comprise only around 10% of the whole sample.

6 Conclusion

In the middle of the 19^{th} century, most U.S. newspapers were partisan, as are many media outlets in the beginning of 21^{st} century all over the world. Sponsored by political parties, they represented the interests of the politicians in their news and editorials. While there were no editorial pages, all the news of that time would be called editorials today. Between 1865 and 1920, however, U.S. newspapers experienced a great transformation, changing from being overwhelmingly partisan to being mostly independent. What accounts for this transformation and which conditions facilitated it remain questions without an unambiguous answer in the literature. One of the most popular explanations is that improving economic conditions stimulated the change from partisan to independent media (Baldasty 1992, Gentzkow et al.

2006, Hamilton 2004, Starr 2004, Smythe 2003). There are other explanations for the decline of partisan newspapers and the rise of independent ones: for example, Lippmann (1931) and Park (1925) write about the "natural," "not wholly rational" transition from politically biased news towards more objective reporting, which all media systems necessarily experience. Others argue that such a transition could happen because of various social or technological changes: increased egalitarianism (Schudson 1978), increased literacy (Mott 1941), innovations in printing (Douglas 1999), or in telegraphy (Thompson 1947).

Though economic arguments have been discussed in the literature, there have been few attempts to find systematic empirical evidence for the claim that market conditions, and in particular the demand for media advertising explain the political independence of the media. In this paper, I present such evidence using data on American newspapers in 1880s. I find empirical support for the hypothesis that newspapers' independence was positively related to local advertising rates, adjusted by circulation. I find that in areas with the fastest growth of advertising, newspapers were more likely to be independent. Using separate analysis of entry, exits, and changes, I show that the effect of advertising works through the entry of new newspapers and changes in affiliation of old newspapers, which were more likely to become independent in places with high advertising rates. However, I find only weak evidence for the causal mechanism predicted by most existing works, i.e., that independent newspapers had, on average, a larger audience, and that this was a primary reason for becoming independent. Probably, the existence of alternative mechanism, at least for weekly newspapers explains part of the story.

The results in the paper suggest that the expansion of advertising market gave newspapers opportunity to become independent from political influence in their decision making. These results could also hold for modern developing countries and have implications for policymaking there. It is not clear, however, whether these historical results could be easily extended for today's experience of these countries. Further empirical research is needed to understand whether these results still hold for other times and places.

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Table 1 . Summary statistics for newspaper variables.

Variable	*Observations*	*Mean*	*Standard deviation*	*Min*	*Max*
Independent newspaper (dummy)	24168	.249	.432	0	1
Republican newspaper (dummy)	24168	.3765	.4842	0	1
Democratic newspaper (dummy)	24168	.3768	.4843	0	1
Advertising rate (plain)	24039	2.816	3.350	.5	93.6
Circulation-adjusted advertising rate	22639	.388	.334	.063	7.927
Circulation (logged)	22749	6.885	.723	3.912	12.038
Daily newspaper (dummy)	24161	.097	.296	0	1
Year of establishment	18464	1868.6	15.36	1773	1885

Sources: Ayer's directory of newspapers 1881-1886.

Table 2. Summary statistics for city-level variables. All newspaper variables are collapsed by city.

Variable	*Observations*	*Mean*	*Standard deviation*	*Min*	*Max*
City population	14918	7.255	1.157	4.143	13.650
County seat (dummy)	14918	0.480	0.500	0	1
Circulation-adjusted advertising rate	14918	0.352	0.161	0.067	3.851
Fraction of independent newspapers	14918	0.276	0.414	0	1
Fraction of Republican newspapers	14918	0.359	0.406	0	1
Fraction of Democratic newspapers	14918	0.365	0.414	0	1
Number of newspapers	14918	1.518	0.996	1	22

Sources: Ayer's directory of newspapers 1881-1886; Basic Geographic and Historic Data for Interfacing ICPSR Data Sets, by R. Sechrist, ICPSR 8159.

Note: unit of observation is city. City population is taken from Ayer's directory (which reproduced it from Census 1880). All newspaper level variables are collapsed by city and averaged by year. Maximum city population is larger than maximum county population (see Table 3) as these two variables come from different sources and treat New York City differently.

Table 3. Summary statistics for county-level variables. All newspaper variables are collapsed by county.

Variable	*Observations (county-years)*	*Mean*	*Standard deviation*	*Min*	*Median*	*Max*
Total population, county	10265	25653.7	44837.8	214	17398	967046
Urban population, county	10265	0.028	0.129	0	0	1
Fraction of African American population	10265	0.145	0.225	0		1.352
Fraction of foreign-born population	10265	0.129	0.177	0		2.826
Vote for Democratic candidates, Congress elections	9941	49.544	22.868	0	49.1	100
Vote for Republican candidates, Congress elections	9939	39.577	22.844	0	46.1	100
Vote for Greenback candidates, Congress elections	9947	2.660	8.974	0	0	83.3
Vote for other candidates, Congress elections	9957	2.770	8.694	0	0	98.1
Turnout, Congress elections	9880	68.233	22.207	0	71.5	607.4
Vote for Democratic candidates, Congress elections	10026	50.091	16.849	0	48.7	100
Vote for Republican candidates, Presidential elections	10026	46.034	16.208	0	48.3	95.7
Vote for Greenback candidates, Presidential elections	10026	2.765	5.559	0	0.1	50.6
Vote for other candidates, Presidential elections	10026	1.099	3.191	0	0.1	62
Turnout, Presidential elections	9979	74.845	18.598	10.600	78.5	371
Nominate score, 1st dimension	12839	-0.095	0.417	-0.757	-0.259	0.828
Nominate score, 2nd dimension	12839	0.045	0.143	-0.417	0.051	0.389
Legislator Bias, based on 1st dimension of Nominate score	12839	0.369	0.250	0	0.291	1.082
Legislator Bias, based on 2nd dimension of Nominate score	12839	0.569	0.398	0	0.719	1.217
Fraction of independent newspapers	11272	0.210	0.300	0	0	1
Fraction of Republican newspapers	11272	0.331	0.350	0	0.25	1
Fraction of Democratic newspapers	11272	0.459	0.401	0	0.33	1
Fraction of daily newspapers	11270	0.072	0.196	0	0	1

Table 3. Summary statistics for county-level variables. All newspaper variables are collapsed by county (continued).

Local average circulation-adjusted advertising rate	10786	0.385	0.188	0.076	0.35	2.822
Local average advertising rate	11242	2.616	1.547	0.500	2.33	26.885
Number of newspapers in county	11272	2.887	2.577	1	2	41

Source: Ayer's directory of newspapers 1881-1886; "Electoral Data for Counties in the United States: Presidential and Congressional Races, 1840-1972", ICPSR study 8611; "Historical, Demographic, Economic, and Social Data: The United States, 1790-2000", Census data reconstructed by Michael Haines; ICPSR study 2896; Poole and Rosenthal D-NOMINATE data for from http://www.voteview.com.

Note: Some turnout figures are higher than 100% probably because of election fraud (turnout figures of that period are discussed e.g. in Argersinger, P. H. (1985) "New Perspectives on Election Fraud in the Gilded Age." Political Science Quarterly, 100, pp. 669-87). For all election returns, observations with error code 999.9% were replaced with missing values.

Table 4. List of sources for data on local regulations of advertising

Charter and Revised Ordinances of the City of Beverly. Beverly, Mass., 1903

Charter and Revised Ordinances of the City of Brockton. Brockton, Mass., 1900

Charter and Ordinances of the City of Lowell. Lowell, Mass., 1883

Municipal Manual of the City of Somerville. Boston, 1892

City of Newton Revised Ordinances. Newton, Mass., 1894

Charter and Ordinances. Gloucester, Mass., 1901

Charter. Ordinances. Rules of the Board of Health and City Government of Malden. Boston, 1882

Municipal Register of the City of Haverhill. Haverhill, Mass., 1897

Charter of Laws relating to the City of Troy. Municipal Ordinances. Troy, N.Y., 1891

Ordinances and Rules and Orders of the City of New Bedford, New Bedford, 1884

Ordinances. Rules and Orders, and Laws Relating to City Affairs, 1889. Lawrence, Mass., 1890

Charter and Ordinances of the City of Waltham. Waltham, Free Press Book and Job Office, 1886

The City Charter as amended by subsequent legislation and the Ordinances of the City of Haverhill. Haverhill, Mass., 1880

Charter and Revised Ordinances of the City of Brockton. Brockton, Mass., 1900

City Charter and Revised Ordinances of the City of Fall River. Fall River, Mass., 1887

Laws as contained in an Act to revise and combine in a single act all existing special and local laws affecting public interests in the City of Brooklyn. Albany, N.Y., 1888

The charters of the city of Brooklyn : passed June 28, 1873. Brooklyn : Daily Union Print, 1873

The revised ordinances of 1885, of the city of Boston, as passed and approved December 14, 1885. Boston, Rockwell and Churchill, city printers, 1886

The revised ordinances of the city of Boston : as passed prior to December 31, 1882. Boston, Rockwell and Churchill, 1882

Charters and Ordinances, City of Ithaca, New York. Ithaca, N.Y. 1897

Table 5. Profitability of advertising and newspaper circulation. Basic results.

	Dummy for independent newspaper							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local circulation-adjusted advertising rate (A)	0.0770**	0.0849***	0.0946***	0.0668***	0.217***	0.104**	0.221***	0.105***
	[0.0371]	[0.0266]	[0.0291]	[0.0213]	[0.0437]	[0.0490]	[0.0832]	[0.0262]
Method of computing A	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city, excluding this newspaper	Average A for all newspapers in a city, instrumented by average A in other cities in a county	Average A for all newspapers in a city, computed for the same sample as IV regression in previous column	Average A for all newspapers in a city, instrumented by average A in other cities in a county	Average A for all newspapers in a city, computed for the same sample as IV regression in previous column
Effect of one standard deviation change for given measure of A (in %)	2.02	2.23	3.03	2.21	5.70	2.74	5.81	2.77
Fixed effects	County, Year	Year	Newspaper, Year	Newspaper, Year	County, Year	County, Year	State, Year	State, Year
Log (county population)	0.018	0.070***	0.03	0.036	-0.036	-0.030	0.0879***	0.0946***
	[0.063]	[0.016]	[0.075]	[0.076]	[0.107]	[0.085]	[0.009]	[0.017]
Log (average wage in manufacture)	-0.034	-0.044***	-0.028	-0.030	-0.040	-0.039	-0.0358***	-0.0357***
	[0.022]	[0.010]	[0.024]	[0.024]	[0.042]	[0.034]	[0.005]	[0.011]
Log (average agricultural income per family)	-0.032	0.030**	-0.031	-0.034	-0.010	-0.017	0.011	0.010
	[0.041]	[0.013]	[0.048]	[0.049]	[0.070]	[0.054]	[0.008]	[0.016]
Dummy for city being a county seat	-0.218***	-0.177***			-0.225***	-0.228***	-0.160***	-0.165***
	[0.018]	[0.013]			[0.009]	[0.018]	[0.007]	[0.013]
Log (city population)	-0.106***	-0.041***			-0.110***	-0.107***	-0.056***	-0.0514***
	[0.012]	[0.007]			[0.005]	[0.012]	[0.005]	[0.008]
Number of newspapers in A city (proxy for competition)	0.009	0.0001	0.001	0.0006	0.0042	0.009	-0.009**	-0.0021
	[0.007]	[0.003]	[0.003]	[0.004]	[0.004]	[0.008]	[0.00448]	[0.003]
F-statistics for electoral controls	1.262	7.737	0.757	0.785	2.82	0.813	2.57	2.62
Observations	24168	24168	15224	15224	16323	16323	24168	24168
R-squared	0.35	0.12	0.92	0.92	0.05	0.31	0.14	0.15
N of cities	3444	3444	1472	1472	2602	2602	3444	3444

Standard errors in brackets. Standard errors are clustered by city level. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Electoral controls include percentage of votes for Republicans, Democrats, Greenbacks, and other parties in the most recent presidential and congressional elections, and voter turnout in these elections. Data on population and income are from U.S. Census 1880 and 1890, interpolated for 1881-1886. Newspaper data and data on city population are from Ayer's American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Only Republican, Democratic, or independent newspapers are included in the sample. Data on county seats are from ICPSR 8159 dataset, constructed by R. Sechrist. In column (5) with IV specification χ^2 statistics for electoral variables is reported instead of F-statistics. In all specifications, coefficients for circulation-adjusted advertising rates computed with fixed effect logit (not reported here) have the same or greater level of significance.

Table 6. Local advertising rates and entry of independent newspapers. Only newly created newspapers are included in the sample.

	Dummy for independent newspaper		
	(1)	(2)	(3)
Local circulation-adjusted advertising rate (A)	0.0920**	0.139***	0.091**
	[0.037]	[0.047]	[0.046]
Method of computing A	Average A for all newspapers in a county, excluding this newspaper	Average A for all newspapers in a county	Average A for all newspapers in a county, lagged 1 year
Effect of one standard deviation change for given measure of A (in %)	2.84	3.41	2.32
Fixed effects	State x Year	State x Year	State x Year
Log (county population)	0.034	0.017	0.042
	[0.030]	[0.025]	[0.028]
Log (average wage in manufacture)	0.040	0.0445*	0.043*
	[0.026]	[0.023]	[0.023]
Log (average agricultural income per family)	-0.087***	-0.069***	-0.067***
	[0.019]	[0.015]	[0.017]
Dummy for city being a county seat	-0.146***	-0.125***	-0.137***
	[0.022]	[0.019]	[0.020]
Log (city population)	-0.046***	-0.037***	-0.039***
	[0.012]	[0.010]	[0.010]
Number of newspapers in a city (proxy for competition)	-0.005	-0.007	-0.007
	[0.006]	[0.005]	[0.005]
F-statistics for electoral controls	2.645	3.074	2.836
Observations	2704	3310	3023
R-squared	0.189	0.174	0.175
N of cities	1764	2143	1968

Standard errors in brackets. Standard errors are clustered by city. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Electoral controls include percentage of votes for Republicans, Democrats, Greenbacks, and other parties in the most recent presidential and congressional elections, and voter turnout in these elections. Newspaper data and data on city population are from Ayer's American Newspaper Annual (1881-1886). Data on income and population are from U.S. Census 1880 and 1890 (reconstructed by Haines in 2005), interpolated for 1881-1886. Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Data on county seats are from ICPSR 8159 dataset, constructed by R. Sechrist. Only newly created Republican, Democratic, or independent newspapers are included in the sample.

Table 7. Raw correlations, local advertising rates and advertising regulations. Massachusetts, 1881-1886

	Circulation-adjusted advertising rate	Regulation of outdoor advertising	Regulation of handbill distribution	City population (logged)	County seat (dummy)	Average wage (logged)	Average agricultural income (logged)	Independent newspaper	Republican newspaper	Democratic newspaper
Circulation-adjusted advertising rate, local average	1.0000									
Regulation of outdoor advertising	0.5601	1.0000								
Regulation of handbill distribution	-0.6032	-0.5721	1.0000							
City population (logged)	0.8921	0.4828	-0.6551	1						
County seat (dummy)	0.2887	-0.1641	-0.229	0.5268	1					
Average wage (logged)	-0.6079	-0.5899	0.4987	-0.6779	0.0782	1				
Average agricultural income (logged)	0.6132	0.6021	-0.5432	0.6168	-0.0825	-0.937	1			
Independent newspaper	0.1931	-0.0266	-0.1334	0.1442	0.1833	0.0636	-0.0729	1		
Republican newspaper	-0.2311	-0.0459	0.069	-0.2223	-0.1949	0.1089	-0.099	-0.6412	1	
Democratic newspaper	0.0512	0.0858	0.0729	0.0976	0.0194	-0.2042	0.2033	-0.3985	-0.4482	1

Table 8. First stage regression. Local advertising rates and advertising regulations. Massachusetts, 1881-1886.

	Circulation-adjusted advertising rate, local average					
	Including Boston newspapers			Excluding Boston newspapers		
Regulation of outdoor advertising	0.146***		0.0514*	0.152***		0.0556
	[0.0292]		[0.0304]	[0.0296]		[0.0356]
Regulation of handbill distribution		-0.247***	-0.195**		-0.237***	-0.182**
		[0.0573]	[0.0751]		[0.0573]	[0.0808]
Vote for Democrats,	-0.0110***	-0.0154***	-0.0140***	-0.00231	-0.00287	-0.00269
congressional elections	[0.00357]	[0.00346]	[0.00370]	[0.00824]	[0.00714]	[0.00733]
Vote for Republicans,	-0.0129***	-0.0144***	-0.0139***	-0.0268	-0.0469	-0.0403
congressional elections	[0.00370]	[0.00348]	[0.00355]	[0.0445]	[0.0375]	[0.0401]
Vote for Greenbacks,	-0.0592***	-0.0619***	-0.0605***	-0.0327	-0.0446	-0.041
congressional elections	[0.00519]	[0.00459]	[0.00475]	[0.0367]	[0.0332]	[0.0339]
Vote for other candidates,	-0.0584***	-0.0558***	-0.0562***	-0.043	-0.0514	-0.0489
congressional elections	[0.00470]	[0.00398]	[0.00412]	[0.0374]	[0.0325]	[0.0335]
Voter turnout,	0.132***	0.120***	0.124***	0.0906	0.116	0.109
congressional elections	[0.0145]	[0.0141]	[0.0144]	[0.0979]	[0.0834]	[0.0861]
Vote for Democrats,	2.617***	1.253***	1.628***	3.136	4.575	4.019
presidential elections	[0.236]	[0.245]	[0.358]	[4.836]	[3.973]	[4.201]
Vote for Republicans,	2.529***	1.146***	1.523***	3.06	4.398	3.874
presidential elections	[0.233]	[0.249]	[0.365]	[4.695]	[3.848]	[4.068]
Vote for Greenbacks,	2.595***	1.282***	1.645***	3.074	4.481	3.941
presidential elections	[0.232]	[0.237]	[0.346]	[4.697]	[3.863]	[4.083]
Vote for other candidates,	2.619***	1.108***	1.514***	3.103	4.321	3.829
presidential elections	[0.240]	[0.273]	[0.398]	[4.759]	[3.896]	[4.111]
Voter turnout,	-0.226***	-0.263***	-0.259***	-0.164	-0.296	-0.26
presidential elections	[0.0174]	[0.0208]	[0.0222]	[0.207]	[0.183]	[0.194]
City population, logged	0.0819	-0.162	-0.127	0.0695	-0.163	-0.124
	[0.0727]	[0.124]	[0.135]	[0.0733]	[0.126]	[0.142]
County-seat	-0.0256	0.222	0.195	-0.0115	0.217	0.188
	[0.0897]	[0.146]	[0.153]	[0.0902]	[0.147]	[0.158]
Average wage in manufacture, logged	0.954***	0.959***	0.957***	0.758	1.128*	1.006
	[0.0815]	[0.0786]	[0.0776]	[0.724]	[0.668]	[0.683]
Average agricultural income, logged	0.495***	0.421***	0.439***	0.0946	-0.374	-0.21
	[0.173]	[0.135]	[0.136]	[0.715]	[0.619]	[0.666]
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179	179	179	128	128	128
R-squared	0.991	0.992	0.992	0.529	0.587	0.6
F-statistics for instruments	24.98	18.64	16.07	26.25	17.05	16.89

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Average circulation-adjusted advertising rate, a measure of A, is computed circulation-adjusted advertising rates for all newspapers in the city. List of sources for advertising regulation variables is presented in Table 4. Income variables are from U.S. Census 1880 and 1890, interpolated for 1881-1886. Data on city population and newspaper data are from Ayer's American Newspaper Annual (1881-1886), originally from the U.S. Census publication. Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Data on county seats are from ICPSR 8159 dataset, constructed by R. Sechrist. Only Republican, Democratic, or independent newspapers are included in the sample.

Table 9. Local advertising profitability and independence of newspapers, city-level, Massachusetts. OLS and IV estimation

Instrumented variable: local circulation-adjusted advertising rate

Instruments: dummies for the presence of restrictions for outdoor advertising and handbill distribution, as regulated by local municipal ordinances

	Dummy for independent newspaper							
	Including Boston newspapers				Excluding Boston newspapers			
	OLS	IV	IV	IV	OLS	IV	IV	IV
Instruments		Outdoor advertising	Handbill distribution	Outdoor advertising, handbill distribution		Outdoor advertising	Handbill distribution	Outdoor advertising, handbill distribution
Local circulation-adjusted	0.625**	0.855**	1.040***	0.995***	0.578*	0.561	0.902***	0.813***
advertising rate	[0.253]	[0.335]	[0.202]	[0.144]	[0.293]	[0.426]	[0.212]	[0.155]
Effect of one standard deviation change for given measure of A (in %)	0.442	0.604	0.736	0.703	0.0616	0.0598	0.0962	0.0867
City controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County electoral and economic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	179	179	179	179	128	128	128	128
R-squared	0.196	0.194	0.191	0.192	0.264	0.264	0.26	0.262
p-value of J-statistics for overidentifying restrictions				0.777				0.558

Standard errors in brackets. Standard errors are clustered by city. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Average circulation-adjusted advertising rate, a measure of *A,* is computed circulation-adjusted advertising rates for all newspapers in the city. In columns (2) and (4), circulation-adjusted advertising rate in a city is instrumented by dummies for the presence of restrictions for outdoor advertising and handbill advertising, as regulated by local municipal ordinances. List of sources is presented in Table 4. City controls include log of city population and dummy for being county-seat. County controls include county population, log of average wage in manufacture, log of average agricultural income per family and 10 electoral controls (percentage of votes for Republicans, Democrats, Greenbacks, and other parties in the most recent presidential and congressional elections, and voter turnout in these elections). Data on county population and income are from U.S. Census 1880 and 1890, interpolated for 1881-1886. Data on city population and newspaper data are from Ayer's American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Data on county seats are from ICPSR 8159 dataset, constructed by R. Sechrist. Only Republican, Democratic, or independent newspapers are included in the sample.

Table 10. Year Fixed Effects for Table 5.

	Dummy for independent newspaper				
	(1)	(2)	(3)	(4)	(5)
Method of computing A	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city, instrumented by average A in other cities in a county	Average A for all newspapers in a city, computed for the same sample as IV regression in previous column
Dummy for year=1881	-0.0197**	-0.0293***	0.006	-0.021**	-0.020**
	[0.009]	[0.0077]	[0.012]	[0.008]	[0.008]
Dummy for year=1882	-0.008		0.010	-0.001	-0.0008
	[0.0079]		[0.010]	[0.009]	[0.009]
Dummy for year=1883	-0.005	0.007	0.009	0.0038	0.004
	[0.006]	[0.0047]	[0.008]	[0.008]	[0.008]
Dummy for year=1884		-0.011	0.011		
		[0.009]	[0.007]		
Dummy for year=1885	-0.0128***	-0.0252***	-0.001	-0.015***	-0.015***
	[0.005]	[0.0098]	[0.006]	[0.005]	[0.005]
Dummy for year=1886	-0.007	-0.0037		-0.0016	0.0007
	[0.007]	[0.009]		[0.008]	[0.008]

Standard errors in brackets. Standard errors are clustered by city level. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: this table contains only coefficient for time fixed effects. Other coefficients for corresponding regressions are presented in Table 5. The specifications reported are specifications (1)-(3) and (7)-(8) from Table 5.

Table 11. Newspaper circulation and political affiliation of a newspaper.
(Baseline-partisan newspapers, Democratic or Republican)

	Logged newspaper circulation					
	OLS				Matching estimator	
	All newspapers	Weeklies only	Dailies only	Dailies only, for cities with population>10000	All newspapers	Dailies only
	(1)	(2)	(3)	(4)	(5)	(6)
Independent newspaper (dummy)	0.00105	-0.0361**	0.189*	0.264**	-.074***	.206***
	[0.0206]	[0.0181]	[0.112]	[0.131]	[.013]	[.061]
Fixed effects (exact match parameters)	County, Year	County, Year	County, Year	County, Year	County, Year	County, Year
Year of establishment	-0.00879***	-0.00787***	-0.0105***	-0.0115***	Yes	Yes
	[0.000668]	[0.000665]	[0.00249]	[0.00252]		
Log (county population)	0.435***	0.280***	0.643*	0.44	Yes	Yes
	[0.123]	[0.100]	[0.355]	[0.370]		
Log (average wage in manufacture)	-0.0748	-0.0231	-0.372	-0.355	Yes	Yes
	[0.0635]	[0.0549]	[0.286]	[0.293]		
Log (average agricultural income per family)	-0.0416	-0.0167	-0.00444	0.114	Yes	Yes
	[0.0389]	[0.0305]	[0.196]	[0.283]		
Dummy for city being a county seat	0.150***	0.167***	-0.255	0.0196	Yes	Yes
	[0.0177]	[0.0171]	[0.157]	[0.0508]		
Log (city population)	0.239***	0.216***	0.676***	0.417***	Yes	Yes
	[0.0136]	[0.0125]	[0.0784]	[0.0556]		
Number of newspapers in a city (proxy for competition)	0.0192*	0.00959	-0.0212*	-0.0276**	No	No
	[0.0110]	[0.0101]	[0.0112]	[0.0117]		
Observations	17698	16204	1332	887	17697	1332
R-squared (or percent of exact matches for matching)	0.706	0.675	0.837	0.71	61.9	52.65
N of cities	2799	2747	220	113	2799	220
F-statistics for electoral controls	1.435	0.976	0.405	0.632		

Standard errors in brackets. Standard errors are clustered by city. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: newspaper controls include a dummy variable for a daily newspaper and a number of pages in the newspaper. County controls include county population, fraction of urban population, and 10 electoral control variables, including percentage of votes for Republicans, Democrats, Greenbacks, and other parties in the most recent presidential and congressional elections, and voter turnout in these elections. Data on income and population are from U.S. Census 1880 and 1890 (reconstructed by Haines in 2005), interpolated for 1881-1886. Newspaper data are from Ayer‘s American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Only Republican, Democratic or Independent newspapers are included in the sample.

Table 12. Ideological bias of the members of Congress and county economic characteristics.
(test for alternative explanation)

	Legislator's bias, based on 1st dimension of NOMINATE score				*Legislator's bias, based on 2nd dimension of NOMINATE score*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of independent newspapers	-0.046				0.0660***			
	[0.0645]				[0.0244]			
Circulation-adjusted advertising rate		-0.0719				0.0484		
		[0.0647]				[0.0294]		
Fraction of Democratic newspapers			0.0574				-0.0654**	
			[0.0692]				[0.0276]	
Fraction of Republican newspapers				-0.0129				-0.00401
				[0.0908]				[0.0333]
Fixed effects	Year, District	Year, District	Year, District	Year, District	Year, District	Year, District	Year, District	Year, District
Observations	1536	1536	1536	1536	1536	1536	1536	1536
R-squared	0.656	0.656	0.656	0.656	0.568	0.567	0.568	0.565
Number of districts	294	294	294	294	294	294	294	294

Robust standard errors in brackets. Standard errors are clustered by congressional district. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: dependent variable is absolute value of deviation of NOMINATE score for a member of Congress from its median, based on Poole and Rosenthal (1997) data. Data on county population and urban population are from U.S. Census 1880 and 1890 (reconstructed by Haines in 2005), interpolated for 1881-1886. Newspaper data are from Ayer's American Newspaper Annual (1881-1886). Data on county-congressional district correspondence are from Clubb et. al. (2006) dataset at ISPSR. To construct this table, newspaper-level data were collapsed by county.

Table 13. Migration and dynamic county characteristics.
(test for alternative explanation)

	Independent newspapers in a county, fraction	*Democratic newspapers in a county, fraction*	*Republican newspapers in a county, fraction*	*Local circulation-adjusted advertising rate*	*Log (County population)*
	(1)	(2)	(3)	(4)	(5)
Proportion of foreign-born population	-0.0494	-0.126*	0.176*	0.0248	-1.096***
	[0.0787]	[0.0761]	[0.100]	[0.0298]	[0.133]
Fixed effects	County, Year	County, Year	County, Year	County, Year	County, Year
Observations	10265	10265	10265	9842	10265
R-squared	0.741	0.873	0.842	0.842	0.998
Number of counties	1947	1947	1947	1904	1947

Robust standard errors in brackets. Standard errors are clustered by county
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: table presents results for aggregate county-level data. Data on foreign-born population and data on county population are from U.S. Census 1880 and 1890 (reconstructed by Haines in 2005), interpolated for 1881-1886. Newspaper data are from Ayer's American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. To construct this table, newspaper-level data was collapsed by county.

Table 14. African American population and dynamic county characteristics.
(test for alternative explanation)

	Independent newspapers in a county, fraction	*Democratic newspapers in a county, fraction*	*Republican newspapers in a county, fraction*	*Local circulation-adjusted advertising rate*	*Log (County population)*
	(1)	(2)	(3)	(4)	(5)
Proportion of African	0.0796	0.236	-0.316**	-0.154	-1.469***
American population	[0.217]	[0.225]	[0.136]	[0.338]	[0.152]
Fixed effects	County, Year	County, Year	County, Year	County, Year	County, Year
Observations	10265	10265	10265	9842	10265
R-squared	0.741	0.873	0.842	0.843	0.996
Number of counties	1947	1947	1947	1904	1947

Robust standard errors in brackets. Standard errors are clustered by county
* significant at 10%; ** significant at 5%; *** significant at 1%

Note: table presents results for aggregate county-level data. Data on African American population are from U.S. Census 1880 and 1890 (reconstructed by Haines in 2005), interpolated for 1881-1886. Newspaper data are from Ayer's American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. To construct this table, newspaper-level data was collapsed by county.

Table 15. Local advertising profitability and vote margins.

	Dummy for independent newspaper			
Local advertising circulation-adjusted	0.0901**	0.0904***	0.0936***	0.0665***
Advertising rate (A)	[0.0399]	[0.0237]	[0.0288]	[0.0219]
Method of computing A	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city	Average A for all newspapers in a city, excluding this newspaper
Effect of one standard deviation change for given measure of A (in %)	2.37	2.37	3.0	2.2
Vote margin in Congressional	-0.000309**	-0.000816***	-0.000364**	-0.000360*
elections	[0.000139]	[0.000228]	[0.000185]	[0.000185]
Fixed effects	County, Year	Year	Newspaper, Year	Newspaper, Year
County and city controls	Yes	Yes	Yes	Yes
Observations	24168	24168	15224	15224
R-squared	0.355	0.124	0.92	0.92
N of counties	1599	3444	1472	1472

Standard errors in brackets. Standard errors are clustered by county. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Vote margins are computed as absolute value of difference between percentage of votes for Democratic party and percentage of vote for Republican party. County controls include county population, log average wage in manufacture, log average agricultural income, and 10 electoral control variables, including percentage of votes for Republicans, Democrats, Greenbacks, and other parties in the most recent presidential and congressional elections, and voter turnout in these elections. City controls include dummy for being a county seat and log of city population. Data on population are from U.S. Census 1880 and 1890, interpolated for 1881-1886. Newspaper data and data on city population are from Ayer's American Newspaper Annual (1881-1886). Electoral data are from Clubb et. al. (2006) dataset at ISPSR. Data on county seats are from ICPSR 8159 dataset, constructed by R. Sechrist. Only Republican, Democratic, or independent newspapers are included in the sample.

APPENDIX

Table 16. Advertising and newspaper independence. Some robustness checks

	Dummy for independent newspaper			
Local average advertising rate (computed for other newspapers in a city)	0.00626**	0.00600**		
	[0.00259]	[0.00256]		
Local average circulation-adjusted advertising rate (computed for other newspapers in a city)			0.0534***	0.0534**
			[0.0197]	[0.0224]
County population (logged)	-0.00652	-0.0179	-0.0263	-0.0957
	[0.0761]	[0.0768]	[0.0714]	[0.0774]
Average wage in manufacture (logged)	-0.0106	-0.00763	-0.0152	-0.0213
	[0.0222]	[0.0222]	[0.0230]	[0.0272]
Average agricultural income (logged)	-0.011	-0.00308	0.035	0.0503
	[0.0482]	[0.0483]	[0.0504]	[0.0573]
Number of newspapers (proxy for competition)	0.00104	0.000613	0.000884	0.000631
	[0.00335]	[0.00322]	[0.00294]	[0.00316]
Additional controls included	Circulation, logged	Circulation to degrees 1/2 to 1/5 included	Base year circulation interacted with time dummies	Following variables, interacted with time dummies: base year circulation (logged), average agricultural income (logged), average wage in manufacture (logged), county population (logged), city population (logged), dummy for being county seat
Fixed Effects	Newspaper, Year	Newspaper, Year	Newspaper, Year	Newspaper, Year
Observations	15107	15107	10990	9854
R-squared	0.921	0.922	0.912	0.907
N of cities	1642	1642	1289	1159
F-statistics for electoral controls	0.911	0.913	1.304	1.106
Marginal effect	0.00199	0.0019	0.0168	0.0167

Robust standard errors in brackets. Standard errors are clustered by county

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 17. Advertising and independent newspapers. Matching results.

	Dummy for independent newspaper			
	OLS	Matching	OLS	Matching
Dummy for circulation-adjusted advertising rate being higher than median in a state	.051***	.046***	.006	.052***
Fixed effects (exact matching parameters for matching)	State, Year	State, Year	County, Year	County, Year
County and City Controls (matching parameters for matching)	Yes	Yes	Yes	Yes
Observations	22226	22226	22226	22226
R-squared	0.154		0.328	
Percent of exact matches		98.6		56.8

Table 18. Advertising and independent newspapers. More robustness checks.

	Dummy for independent newspaper			
Local average advertising rate (computed for other newspapers in a city)	0.0511**	0.0507**	0.0669***	0.0672***
	[0.0215]	[0.0213]	[0.0213]	[0.0213]
County population (logged)	0.0325	0.0319	0.0632	0.0171
	[0.0855]	[0.0868]	[0.0984]	[0.0816]
Average wage in manufacture (logged)	-0.0224	-0.0219	-0.0308	-0.0302
	[0.0258]	[0.0256]	[0.0241]	[0.0240]
Average agricultural income (logged)	-0.0341	-0.0306	-0.0347	-0.0323
	[0.0527]	[0.0526]	[0.0480]	[0.0492]
Number of newspapers (proxy for competition)	0.00077	0.000897	0.000688	0.00068
	[0.00391]	[0.00388]	[0.00372]	[0.00376]
Legislator bias (based on 1st dimension of NOMINATE score)	0.00956			
	[0.0123]			
Legislator bias (based on 2nd dimension of NOMINATE score)		0.051		
		[0.0314]		
Fraction of foreign-born population			0.0652	
			[0.216]	
Fraction of African-American population				-0.388
				[0.401]
Fixed effects	Newspaper, Year	Newspaper, Year	Newspaper, Year	Newspaper, Year
Observations	13546	13546	15224	15224
R-squared	0.917	0.917	0.92	0.92
N of cities	1396	1396	1472	1472
F-statistics for electoral controls	0.72	0.746	0.739	0.735

Table 19. Independent newspapers and their own circulation-adjusted advertising rate

	Dummy for independent newspaper		
Newspaper's own circulation-adjusted advertising rate	0.0179	0.0384**	-0.00076
	[0.0170]	[0.0156]	[0.0168]
County population (logged)	0.0386	0.0724***	0.0167
	[0.0657]	[0.0161]	[0.0675]
Average wage in manufacture (logged)	-0.0313	-0.0425***	-0.0148
	[0.0236]	[0.00987]	[0.0192]
Average agricultural income per family (logged)	-0.046	0.0318**	-0.0476
	[0.0429]	[0.0138]	[0.0388]
Dummy for county seat	-0.223***	-0.183***	
	[0.0182]	[0.0135]	
City population (logged)	-0.109***	-0.0441***	
	[0.0120]	[0.00749]	
Number of newspapers (proxy for competition)	0.0139*	0.00435	-0.0006
	[0.00797]	[0.00315]	[0.00359]
Fixed Effects	County, Year	Year	Newspaper, Year
Observations	22639	22639	25790
R-squared	0.373	0.126	0.922
N of cities	3444	3444	4092
F-statistics for electoral controls	1.171	6.973	0.97