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Media, Secret Ballot, and Democratization in the US

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ABSTRACT

Can the media determine the success or failure of major institutional reforms? We study the adoption of secret voting in the United States and the complementary role of the media in this arguably crucial step to improve democracy. Using a difference-in-differences identification strategy and a rich dataset on local newspapers, we show that in areas with high media penetration, democratization outcomes improved following the adoption of the secret ballot. Specifically, the press contributed to the decrease in partisan attachment and support for dominant parties. Remarkably, it also undermined the manipulation of electoral boundaries (redistricting) and the unintentional decline in turnout incentivized with the secret ballot. To further address the potential endogeneity of newspapers, we use an instrumental variable that exploits the introduction of wood-pulp paper technology in 1880 and counties' initial woodland coverage. We argue that the media mattered

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through the distribution of information to voters and increased public awareness about political misconduct.

Keywords: Media, democratization, secret ballot, electoral reform, Gerrymandering

Introduction

Formal institutional reforms, while similar in appearance, often have diverging outcomes. In some cases, they effectively move society in the desired direction; in others, they are ineffective or even backfire (Acemoglu *et al.*, 2011; Acemoglu and Robinson, 2008). In 2011, for example, the World Bank found that among countries receiving support for public sector reforms less than half improve their Country Policy and Institutional Assessment scores, a quarter observe a decline in their rankings, and more than a third stayed the same (Andrews, 2013).

A key reason why institutional reforms are sometimes ineffective is that they produce winners and losers, and the latter actively try to counteract them (Acemoglu and Robinson, 2006; Bowler and Donovan, 2007). Electoral reforms are particularly prone to this risk: though they impact political outcomes directly, incumbent politicians may manipulate several levers to undo the impacts of any given reform (Persson *et al.*, 2003).

We argue that the media can crucially shape these responses and resulting outcomes. A free press helps keep the losers accountable and the winners informed, consolidating the effects of the reform. These conditions cannot be taken for granted in developing democracies, where reforms are most needed. The media is often hindered by a lack of resources, political biases, and selective censorship (Fergusson *et al.*, 2018; Gentzkow *et al.*, 2006; Snyder and Strömberg, 2010; Strömberg, 2015).

To test these ideas, we focus on one of the most critical electoral reforms for effective democratization: the introduction of the secret ballot. We analyze the case of the United States, recognized for its clientelistic relationships and weak institutional framework during the 1880s and 1890s (Keyssar, 2009). Analyzing the impact of the secret ballot and the media on electoral outcomes, in general, and the case of U.S. democratization, in particular, offers valuable lessons for today (Engstrom and Kernell, 2014).

Using a difference-in-differences identification strategy exploiting temporal variation in the adoption of vote secrecy across states and pre-existing degrees of county-level media penetration, we show that in places with greater access to newspapers in 1888 (when the process of secret ballot adoption in state legislatures began) democratization outcomes improved following the reform.

In particular, relative to areas with lower access to newspapers, turnout rates increased[1] while partisan attachment and vote shares for the dominant parties decreased. Moreover, the media presence undermined the responses of political machines affected by the electoral reform. More specifically, it reduced the manipulation of electoral boundaries (or Gerrymandering), arguably through the increase of public awareness about political misconduct (Galvis *et al.*, 2016).

The magnitude of the effects we uncover is also meaningful. An increase of one additional newspaper per thousand people in 1888 leads to an increase of approximately 8% in turnout after the introduction of the secret ballot, a 6.3% decline in the vote share for the dominant party, an expansion of split-ticket voting of 6.4%, and a 15% decrease in a summary measure of the extent of Gerrymandering.

Addressing concerns about our identification strategy, we show that our results are not likely driven by omitted time-varying factors or pre-existing differential trends, nor are they explained by state-specific time trends or initial conditions. Moreover, we rule out three alternative hypotheses emerging from the literature on democratization. First, we address the possibility that our results are just a sub-product of economic development (i.e., consistent with the modernization hypothesis). Second, we explore if our findings are explained by correlated processes of urbanization that, according to some scholars, promote democratization. Finally, we explore whether media penetration captures disenfranchisement against various groups of voters like foreigners, African Americans, and women. We find no evidence that these alternative interpretations explain our findings.

To further address the potential concern that newspapers influence outcomes for reasons other than their role in the diffusion of information after the adoption of secret voting, we use an instrumental variable approach. The introduction of wood-pulp-paper technology facilitated newspaper expansion in some areas more than others, depending on their relative woodland coverage. This motivates using the potential for wood-pulp production as an instrument for newspaper presence in each county. This approach also confirms our main findings.

To explore the mechanisms behind these results, we examine heterogeneous effects between southern and non-southern states. Our results are mostly concentrated in non-southern states, where the press was less monopolized and literacy rates were high. Only one-tenth of southerners lived in urban areas, and transportation between cities was difficult, except by water (McPherson, 2003). This made civil mobilization against political machines harder to

[1]Our empirical strategy exploits the different trends in places with more or less media. Looking at aggregate trends, however, turnout rates across the United States declined after introducing the Australian ballot as Burnham (1965) and Heckelman (1995, 2000) have previously documented and as we corroborate in our baseline results (Table 3).

consolidate and, therefore, less likely in the South. These results are consistent with the idea that the media mattered because it provided information to voters and increased accountability, where civil mobilization was a concern for the political machine. More generally, one key message from our analysis is that democratic institutions are complementary to each other. Therefore, improvements in one dimension (in our case, electoral reforms increasing voter freedom) require other dimensions (an active press) to be effective.

Our paper contributes to multiple literatures. Several scholars have examined the effects of ballot design on electoral outcomes (e.g., Augenblick and Nicholson, 2015; Bonneau and Loepp, 2014; Herrnson *et al.*, 2012; Kimball and Kropf, 2008; Song, 2019). The documented effects of the secret ballot in particular, in the United States and elsewhere, include impacts on turnout (Aidt and Jensen, 2017; Gerber *et al.*, 2013; Guenther, 2016; Heckelman, 1995, 2000; Reed, 2014), votes for different political parties when multiple offices are up for election or "split-ticket voting" (Calvo *et al.*, 2009; Engstrom and Kernell, 2014; Raymond, 2014; Rusk, 1970), and different types of political misbehavior and fraud (Kam, 2017; Kuo and Teorell, 2016; Wittrock *et al.*, 2007). We contribute by showing that ballot design can affect not only voter behavior but also the strategies of political machines. We also revise the conventional approach that defines the introduction of the secret ballot as the simple adoption of state-printed tickets and show how specific features of the ballots facilitate or hinder voter manipulation by political machines.

More importantly, we show that the effects of ballot design can depend on the availability of the media. There is a large body of literature exploring the role of the media in U.S. politics (e.g., Gentzkow *et al.*, 2006, 2014; Puglisi and Snyder, 2015; Snyder and Strömberg, 2010)[2]. But our emphasis on understanding the role of the mass media in explaining the effectiveness of institutional reforms — including the response of politicians facing those changes — is more novel.

Our findings complement and reinforce a key message from the literature on democratization: often, existing political elites invest to counteract the effects of these reforms. Acemoglu and Robinson (2008) develop a theory in which elites react to reforms that threaten their political power by investing in de facto methods to avert changes in equilibrium outcomes. Several studies present evidence consistent with the use of such methods, including electoral manipulation (e.g., Anderson *et al.*, 2015; Baland and Robinson, 2008; Bruce and Rocha, 2014; Gray and Jenkins, 2023) and violence (e.g., Fergusson *et al.*, 2021; Naidu, 2012).

Our paper is the first to address — using a systematic empirical strategy — the importance of the media in shaping the consequences of the secret ballot

[2]For a broader review see Strömberg (2015).

on the process of democratization in the United States. Furthermore, to the best of our knowledge, this is the first paper to quantitatively measure the impact of vote secrecy on an unintended and complex type of fraud: the manipulation of electoral districts (and how this phenomenon was attenuated in places with high levels of media penetration). Cox and Katz (2002), Engstrom (2013), and Engstrom and Kernell (2014) point out different theories related to Gerrymandering during the partisan era (1840–1900) but do not study the effect of the secret ballot on this practice.

Our work also contributes to the political science literature addressing the importance of paper ballot design on the success of electoral reforms (Engstrom and Roberts, 2020; Reynolds and Steenbergen, 2006). We show that what mattered in the United States was not just adopting state-printed tickets,[3] which has been the focus of most research on the secret ballot, but also eliminating the straight-party option. We argue that a straight-party choice simplified political brokers' ability to observe and/or instruct voters at the polls and, therefore, did not guarantee vote secrecy completely. This lines up with the conclusions of others who highlight the importance of the ballot design beyond the change of the printer (Reed, 2014; Wittrock *et al.*, 2007).

Historical Background

In the nineteenth century, "machine politics" was pervasive in the United States. Political machines recruited voters with the promise of granting jobs and social services. Voters turned to the machine's representatives in their county, who provided them with money or other assistance in exchange for casting their distinctive party ticket.[4]

In each neighborhood, various civil servants were working under a 'boss' who was responsible for the representation of each party and on the command of multiple political brokers. This hierarchical system was intended to mobilize and monitor voters, which in this way supported the election of other machine leaders. Political machines benefited from a system relying on party tickets, which were printed by political parties before elections. The tickets were easy to identify, so voter decisions were easily monitored.

[3]Moskowitz and Rogowski (2019) show that the adoption of state-printed tickets had null effects on legislative behavior and congressional representation. However, we prove that what mattered for these reforms was not the adoption of the Australian ballot per se but the further elimination of the straight-party option. See the section "The Design of the State-Printed Ballots and Vote Secrecy" for more details on our definition of the Secret Ballot.

[4]This phenomenon was typical of large cities. However, dominant parties in rural areas behaved very similarly (Nichols and Unger, 2017, p. 321). For recent and very detailed coverage of this period, see Nichols and Unger (2017, Ch 4 to Ch 6)

Election officials and state legislatures sought formulas to provide voter secrecy by abolishing the colorful and distinctive shape of the old paper ballots. This motivated the introduction of the state-printed blanket ballot — or "Australian ballot" — which hampered monitoring, and hence, obstructed vote control (Engstrom and Kernell, 2014). Indeed, concerns about fraud triggered the adoption of these blanket ballots, and over 5 years, at least two-thirds of the states adopted some version of them. The first state to introduce the Australian ballot was Massachusetts in 1888, but by 1900, almost the entire country had approved the new paper ballots (Lott and Kenny, 1999; Ludington, 1911).

Like other factors during the *Progressive Era*, the adoption of the Australian ballot responded to a critical national juncture leading to a significant electoral transformation during the nineteenth century. Nevertheless, why the adoption spread so rapidly across states is still debated (Engstrom and Kernell, 2014; Teorell *et al.*, 2016).

During this era, the media also played an essential role, best exemplified by the emergence of the Muckrakers' movement. Created by multiple associations of journalists, the Muckrakers were known for their "factually detailed articles that exposed government corruption, poverty, hazardous working conditions, child labor, wasteful use of natural resources, and other problems facing American society" (Hillstrom, 2010, p. 21). These inquiries that attacked established institutions and leaders, denouncing corruption and political misconduct through contestatory manuscripts, articles, and cartoons, were important for the emergence and success of the institutional reforms adopted during this era. As Hillstrom (2010, p. 30) explains quoting Dorman (2000),

> The reports of the muckrakers shocked the American people and inspired them to demand change. In this way, the writers fed the fires of Roosevelt's progressive reform efforts. "They turned local issues into national issues, local protests into national crusades, [...] They didn't preach to the converted; they did the converting."

As we will argue below, the differential success of the ballot reforms depended at least partly on the complementary presence of an active media.

Theoretical Framework

Vote secrecy may influence the behavior of both voters and politicians. We now discuss our theoretical expectations concerning their reactions and the implications for observable outcomes, which we then examine in the data.

Voter Behavior

Given that one of the relevant features of the institutional change was the implementation of a homogeneous printed ballot including all offices, the cost of split-ticket voting (supporting different parties for different offices) may have decreased. Furthermore, those who were resolute and qualified to vote were also able to express their electoral preferences more freely and detached from the partisan blocks induced by the ballot design (Rusk, 1970). In fact, with the new paper ballots, choosing among candidates running for different offices and opposing parties was more transparent, easier to do, and harder to monitor by political brokers (Aidt and Jensen, 2017; Engstrom and Kernell, 2014). Consequently, the introduction of vote secrecy should have harmed the shares of votes for hegemonic parties and increased the rates of split-ticket voting.

Importantly, we expect these effects to be greater in areas with better access to an active and informative media. Without information, citizens will have few clues to choose between competing candidates and could simply continue relying on the partisan cue to guide their decision. Also, they might be less aware of the potential benefits of exercising their right to vote freely and of choosing better alternatives in the new political environment.

Turning to the effects on electoral turnout, citizens who were compensated for selling their votes may have decided not to do so anymore. It could have been the case, for example, that the extra costs of reading and marking the new paper ballots were too high for the population, who were used to picking up the party tickets before the elections and casting them directly on election day. Note that at the time, most of the clients of the political machine were illiterate and foreign-born citizens who could not read English (Allen, 1910). This could have reduced their turnout to the polls (Heckelman, 1995, 2000). On the other hand, counteracting these effects, a free and politically empowered citizenry may be more willing to express their (true) preferences in the ballot boxes. This implies an ambiguous expectation on overall turnout following reforms to increase voter secrecy. However, since the positive impact crucially depends on having a more informed electorate, we expect the interaction between voter secrecy and more media access to have an unambiguously positive impact on electoral participation.

Electoral Strategies

Vote secrecy may have increased the cost of vote-buying, making it difficult for political machines to monitor voters and therefore reducing its demand (Baland and Robinson, 2008). This reduction should have impacted the turnout rates. However, it did not necessarily imply a decline in electoral fraud as a whole.

In fact, some recent studies have shown that it could have incentivized the introduction of new types of electoral trickery and manipulation. For instance, it may have increased turnout buying (Kam, 2017; Nichter, 2008), motivated the violent coercion of potential opposition or induced ballot stuffing (Kuo and Teorell, 2016). Furthermore, incumbent politicians who were highly dependent on vote-buying could modify their approach to influence outcomes, relying on changes in electoral rules or other techniques to compensate their loss in comparative advantage (Fergusson *et al.*, 2022). In our context, one relevant manipulation is setting up new congressional districts or modifying already existing ones for their electoral benefit (Engstrom, 2013), a practice also known as Gerrymandering.[5]

In short, threatened by the erosive impact of vote secrecy on political machines, we expect incumbent politicians to respond by attempting to increase both voter intimidation and manipulation of electoral boundaries. An empowered citizenry might, however, be more reluctant to admit these attempts, so the net overall effect of the secret ballot on these variables remains ambiguous.

However, we expect the media to counteract politicians' efforts to intimidate voters or manipulate electoral boundaries while reinforcing voters' effective opposition to these strategies. By providing information to voters, the media could help capitalize the intended reduction of fraud, denouncing new electoral misconduct and deception and increasing political accountability. For instance, the role of the media in denouncing the manipulation of electoral boundaries is exemplified by the origin of the word "gerry-mander". Online Appendix Figure A1 illustrates its first appearance in a cartoon of the Boston Gazette in 1812. This cartoon "expressed opposition to state election districts newly redrawn by Massachusetts' Jeffersonian Democratic-Republican Party" (National Museum of American History, n.d.) and was quickly reproduced in all the national newspapers at the time. In short, the interaction between the secret ballot and media should be unambiguously negative on measures of voter intimidation and electoral rules manipulation.

Finally, we note that to have meaningful effects, the media had to be (1) accessible to a significant part of the electorate, (2) neither captured nor silenced by those who were threatened by vote secrecy, and (3) able to

[5]Redistricting, providing opportunities for Gerrmandering (see, e.g., Coriale *et al.*, 2020) currently takes place at regular 10-year intervals following the census. Instead, during our period of study redistricting was both more frequent and less supervised: "Redistricting in the 19th century, by contrast, was largely unfettered. [...] Ohio, for example, redistricted seven times between 1878 and 1892 — at one point conducting six consecutive congressional elections with six different plans [...] Even though the decision was made by state parties, some states redistricted frequently, while others went decades without writing a new districting plan [...] In this era before the courts supervised redistricting, state parties enjoyed wide discretion with regard to the timing and structure of their districting choices". (Engstrom, 2013, p. 1, p. 59–61).

influence people's choices effectively. Therefore, the positive effects of the secret ballot should be concentrated in places with high levels of literacy, where a particular party did not monopolize the media and where the voters could be mobilized.

Data

Sources of Information

We use multiple sources of information to construct the main dataset required for the empirical strategy. To study voting behavior, we employ electoral data from the Inter-university Consortium for Political and Social Research (ICPSR), which provides detailed electoral statistics from 1840 to 1972 at the county level in the United States (Clubb *et al.*, 2006). We restrict our analysis to the 1880–1920 period, covering the Progressive Era (1890–1914) while avoiding potential contamination from the introduction of women's suffrage, another major electoral reform, at the beginning of the 1920s. This period also includes the years when the Australian ballot was adopted (1888–1911) for all states in the union during the Gilded Age, and it covers a sufficient number of elections before and after the adoption (± 8 years), which is needed for the verification of pre-trends.

To analyze electoral strategies, we use shapefiles on historical district boundaries compiled by Lewis *et al.* (2013), who trace all the changes in the boundaries of congressional districts since 1791. Additionally, we follow Kuo and Teorell (2016)'s coding to study violence against voters in disputed house district races from the archives of the U.S. House of Representatives committee on elections.

Data on the adoption of the Australian ballot and details about the use of special straight-ticket options come from the study of American laws conducted by Ludington (1911) and the subsequent works of Lott and Kenny (1999), Engstrom and Kernell (2014), and Kuo and Teorell (2016).

To explore the influence of the media, we gather rich data on the number, circulation, and partisan attachment of newspapers at the county level from two American Newspaper Directories: Rowell (1869) and Ayer (1910). Both sources include a description of all the newspapers and periodicals published in the United States from 1880 to 1909. We focus on the number of newspapers per thousand population instead of circulation figures as the primary independent variable. Data on circulation in these directories is incomplete and missing data is likely not random, which could generate not just less precise but also biased estimates of media penetration.

Additional demographic characteristics and other controls at the county level are taken from the U.S. Decennial Censuses. When required, these data

were interpolated using the pre- and post-census figures for election years that do not coincide with the census.

Outcome Variables

Voting Behavior

We consider three electoral outcomes: Presidential Turnout, Vote Share for the Dominant Party, and Partisan Attachment, measured as the split-ticket voting between presidential and congressional elections when both elections coincide. For county c and presidential election t, we define:

$$\textbf{Turnout}_{c,t} = \frac{\text{Total valid votes}_{c,t}}{\text{Electoral Census}_{c,t}} \tag{1}$$

$$\textbf{Split-TicketVoting}_{c,t} = \left| \begin{matrix}\text{Democrat Vote Share} \\ \text{Presidential Election}_{c,t}\end{matrix} - \begin{matrix}\text{Democrat Vote Share} \\ \text{Congressional Election}_{c,t}\end{matrix} \right| \tag{2}$$

$$\textbf{Vote Share Dominant Party}_{c,t} = \min \left\{ \begin{matrix}\text{Presidential Vote Share}_{c,t} \\ \text{of } \textit{Dominant Party}\end{matrix} ; \begin{matrix}\text{Congressional Vote Share}_{c,t} \\ \text{of } \textit{Dominant Party}\end{matrix} \right\} \tag{3}$$

The parties' vote share is calculated as bipartisan vote fractions between Republicans and Democrats. Therefore, the measure of split-ticket voting is the same if we use the vote share of Republicans in the definition instead of the vote share of Democrats. *Dominant Party* is defined as the party that simultaneously obtained more than the 50% of the votes in the presidential and congressional elections in at least two of the three races in 1880, 1884, and 1888. By using electoral results before the first adoption of the Australian ballot in 1888 we capture the prevailing party machine that dominated the county prior to the introduction of this reform. Finally, the vote share of the dominant party is not defined in places with competitive presidential and congressional elections before 1888. However, just 5% of counties per election year have missing values since this period was characterized by strong partisan domination (Engstrom and Kernell, 2014; Gould, 2001).

Electoral Strategies

We examine two measures of electoral manipulation. First, we use the incidences of voter intimidation reported in challenged congressional races filed with the US committee on elections. Those reports were made by citizens and losers of House elections who specified the general grounds of their charges and

provided detailed proofs to justify their claims. For the congressional district d and election t, we define the dummy variable:

$$\textbf{Violence}_{d,t} = \mathbb{1}\ (\text{Election } t \text{ contested on the grounds of Intimidation in } d)_{d,t} \quad (4)$$

Second, we consider the alteration of electoral boundaries at the district level. We employ five variables now commonly used[6] by some courts as evidence in disputed cases of Gerrymandering (Azavea, 2010) and other problems derived from the redrawing of congressional districts in states with constitutional requirements on districts' contiguity and compactness (Crocker, 2012). Each measure quantifies the degree of compactness of congressional districts based on different benchmarks and reports values that range from 0 to 1, 1 being a district with perfect compactness and arguably not gerrymandered (Figure 1). The Polsby–Popper ratio and the Schwartzberg ratio quantify the level of indentation of the district d (i.e., how smooth or contorted the boundaries of a district are). The Area to Convex Hull ratio and the Reock ratio measure the degree of the district's dispersion (i.e., the extent to which the shape of a district is spread out from its center). Finally, we construct a **Gerrymandering**

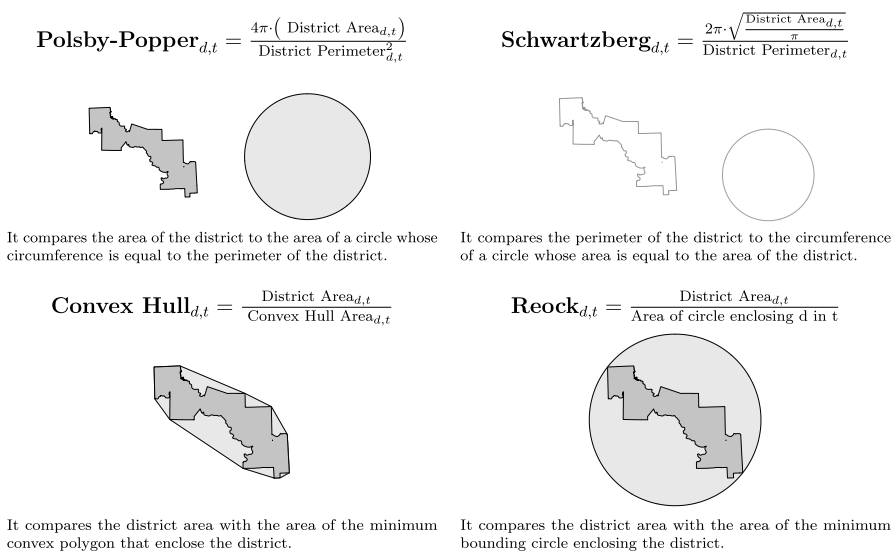

Figure 1: Measures of compactness of congressional districts.

[6]See, for instance, how plaintiffs use the criterion of compactness to justify their cases here: http://redistricting.lls.edu

Index using the minimum of the four measures' standardized values. The motivation for taking the minimum is not only that negative deviations imply less compact boundaries, but also that the manipulation could occur in multiple dimensions.

Independent Variables

Based on Ludington (1911) and Engstrom and Kernell (2014), we construct a dummy variable ($SecretBallot_{s,t}$) that equals one if the state s at election year t had adopted state-printed ballots in *all* the counties of its territory. An additional variable ($SecretBallot\ NPO_{s,t}$) equals one if the state s had adopted the state-printed ballot but *did not allow* for any special method of voting a straight-party ticket.[7]

Empirical Framework

Basic Facts and Reduced-form Evidence

We begin with a simple regression analysis which shows the correlations of the ballot reform with the proxies of democratization defined in the section "Outcome Variables".

The Design of the State-Printed Ballots and Vote Secrecy

State-printed ballots hindered, but did not fully avoid, political machines' efforts to mobilize and monitor voters. Even reformed paper ballots were easily checked by machine-hired personnel at the polls if they included (in addition to candidate lists) party logos, party circles, or any option to vote a straight-party ticket (see Online Appendix Figure A2). In fact, this apparently minor feature generated significant opposition from groups of citizens who argued that it served the political machine to continue its manipulation, especially of the illiterate and the non-English-speakers during elections (Allen, 1910; Rusk, 1970). Reed (2014) notes that party leaders were concerned about the "rather dramatic shift away from the older, more public party-strip balloting system [...] took steps to educate their voters about the new laws and distributing sample ballots in place of the old party tickets".

Bearing this in mind, we focus our analysis on the effect of the secret ballot *without* the straight-ticket option. This captures more accurately the moment in which voters could cast their ballots privately, frustrating training and monitoring.

[7]We present key summary statistics, the coding of secret ballot, and presence of newspapers in Online Appendix Table A1 and Online Appendix Figures A3 and A4.

Table 1: Ballot reforms, voting behavior and electoral strategies.

	Voting behavior			Electoral strategies	
Dependent variables:	Turnout	Split ticket voting	Vote share dominant party	Voter intimidation	Gerrymandering Index
	(1)	(2)	(3)	(4)	(5)
Panel A: Adoption of state-printed ballots without special straight-party option					
Secret ballot NPO	−0.0602	0.0303	−0.0135	−0.0148	−0.0566
	(0.0246)**	(0.0061)***	(0.0096)	(0.0065)**	(0.0532)
	[0.0044]***	[0.0020]***	[0.0037]***	[0.0050]***	[0.0549]
R-squared	0.7742	0.3067	0.5844	0.0832	0.7487
Panel B: Adoption of state-printed ballots (Australian Ballot)					
Secret ballot	0.0049	−0.0012	0.0064	−0.0145	−0.0158
	(0.0497)	(0.0096)	(0.0244)	(0.0059)**	(0.0817)
	[0.0077]	[0.0029]	[0.0070]	[0.0053]***	[0.0753]
R-squared	0.7677	0.2906	0.5838	0.0825	0.7485
County fixed effects	Yes	Yes	Yes	No	No
Congressional district fixed effects	No	No	No	Yes	Yes
Election year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	17,774	17,893	16,900	5,896	5,896

Notes: The unit of observation in Columns 1 to 3 is a county-presidential-election-year, while in Columns 4 and 5, the unit of observation is a district-congressional-election-year. The sample period is 1880 to 1920. Secret ballot NPO is a dummy variable that is one when the state has adopted the voting secrecy at year t with a paper ballot that does not allow for a straight party ticket option. Secret ballot is a dummy variable that is one when the state implemented the voting secrecy regardless of the format of the paper ballot. Outcome variables are defined in the section "Outcome Variables". Robust standard errors are clustered at the state level in parentheses. Robust standard errors are clustered at the county level in square brackets. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 1 supports this idea. Columns 1 to 3 show that what mattered the most for the voting behavior was not the adoption of state-printed ballots by itself (Panel B) but that those ballots did not include any particular option for casting a straight party ticket (Panel A). In fact, once we control for county- and year-fixed effects, the conditional correlation of the secret ballot with straight-party option and the voting behavior is not only statistically insignificant but also close to zero. In contrast, the secret ballot *without* the straight-party option is associated with: (1) less turnout, (2) higher levels of split-ticket voting, and (3) lower vote shares for the dominant parties. In the case of the electoral strategies presented in columns 4 and 5, the differences are less stark. With or without the straight-party ticket option, the secret

ballot correlates with less voter intimidation. For the Gerrymandering index, the coefficients are negative but not statistically significant. However, the magnitude of the correlation is five times larger when using the definition without the straight-party ticket option. Overall, state-printed ballots without the straight-party correlate more strongly with changes in voter and politician behavior.

Also, the secret ballot without a straight party ticket best identifies the moments in which the political machine puts serious efforts into reversing the reform and its consequences. As shown in Online Appendix Figure A4, none of the states abandoned state-printed ballots once implemented. However, multiple states set back or delayed the abolition of the straight-ticket voting. Taking this into account, we regress our outcome variables on three indicator functions generated from the possible stages displayed in Online Appendix Figure A4, namely the years when the "First Secret Ballot" took place, the years when the state experienced a "Reform Reversal," and the period when a "Second Secret Ballot" was adopted. Figure A5 illustrates these periods for California. These regressions include county and election year-fixed effects (or congressional district-fixed effects as appropriate), while the omitted category is set to be the period before the adoption of the first secret ballot.

Figure 2 reports the results. There are two takeaways from this exercise. First, some of the positive impacts of the secret ballot vanished during the stages of reversal, revealing the possible success of the political machine to overcome the initial reform. In the case of the split-ticket voting, the withdrawal of vote secrecy reduces the splitting to the pre-reform levels; after the second adoption, the variable increases again to the levels following the first reform. Furthermore, the decline in turnout — associated with a decrease in the mobilization of voters — completely vanishes and even shifts to an increase in attendance during the reversal period. Second, the main impact of the reform seems to occur during the first adoption of the secret ballot. The coefficients for the first attempt are not just more precise but often larger in magnitude than the point estimates coming from the second attempt, showing a potential adaptation of voters and political machines to the initial reform. One exception is the vote share for the dominant party, where the point estimates are increasing in magnitude (though not significantly different to each other).

The latter results also highlight one challenge for our identification strategy. The reasons why some states exhibited reversals and others not are likely to be endogenous to the electoral results after the first adoption of the vote secrecy. To avoid endogeneity biases derived from the reversals, in what follows, we restrict our sample in each state to the elections covering only the years before and after the introduction of the first secret ballot.[8]

[8]This corresponds to the definitions of Pre 1st secret and 1st secret in Online Appendix Figure A5.

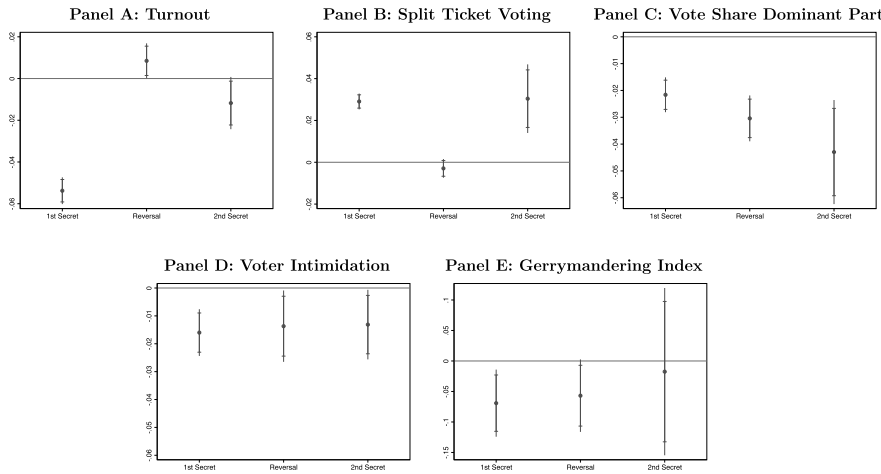

Figure 2: Adoption of secret ballot without straight-party ticket and its reversals.

Notes: Point estimates and 90% and 95% confidence intervals obtained from the estimated values of γ's in the model $y_{ct} = \alpha + \delta_c + \delta_t + \gamma_1(\text{1st Secret}_{ct}) + \gamma_2(\text{Reversal}_{ct}) + \gamma_3(\text{2nd Secret}_{ct}) + e_{ct}$. Outcome variables y_{ct} correspond to the title of each panel and are defined in the section "Outcome Variable". Definitions of the variables included are explained using the state of California as example in Figure A5. The models for Voter Intimidation and Gerrymandering Index include district fixed effects instad of county fixed effects. The omitted category in all the regressions is the period before the first secret ballot (Pre 1st Secret).

Identification Strategy

We follow a difference-in-differences identification strategy that exploits the variation in the adoption of the secret ballot and the levels of media penetration across states and time. This approach allows us to test whether — relative to outcome patterns before the adoption of the vote secrecy — counties with more newspapers exhibited higher turnout rates, less partisan attachment, and smaller vote shares for the dominant parties after introducing the electoral reform. The baseline specification for outcome y in county c, state s and election year t is given by:

$$\begin{aligned} y_{c,s,t} \;=\; & \delta_c + \delta_t + \alpha \cdot \mathit{SecretBallot\ NPO}_{s,t} \\ & + \beta \cdot \left(\mathit{SecretBallot\ NPO}_{s,t} \times \mathit{Newspapers}_{c,t=1888}\right) + \epsilon_{c,s,t}, \end{aligned} \tag{5}$$

where δ_c represents a set of county-fixed effects capturing non-time-varying county-specific characteristics affecting $y_{c,s,t}$ and δ_t denotes a set of election-year fixed effects corresponding to presidential elections from 1820 to 1920.

In Eq. (5), outcomes $y_{c,s,t}$ are turnout, split-ticket voting or the vote share of the dominant party defined in Eqs. (1)–(3), and SecretBallot $\text{NPO}_{s,t}$ is a dummy variable equal to one if county c in state s had adopted the Australian ballot (i.e., the state-printed ballot) without a straight-party ticket option

during election year t. Finally, $\text{Newspapers}_{c,t=1888}$ denotes the number of daily and weekly newspapers per thousand population registered in county c by 1888. Finally, we cluster the standard errors at the state level, our level of identifying variation.

The identification assumption here is a parallel trend presumption, requiring temporal trends in voting behavior to be the same in the absence of vote secrecy. Though this assumption is not directly testable, we validate it by checking for parallel trends before the adoption of the secret ballot in the next section, and with additional econometric exercises in the Online Appendix Section A.2.

For voter intimidation and Gerrymandering, which vary at district and congressional election levels, we estimate an analogous model to Eq. (5) testing whether districts with more media penetration after the adoption of secret ballots report less of these practices. Since redistricting depends fundamentally on the district's total population, all specifications of electoral strategies include contemporaneous total population interacted with the dummy of the Secret Ballot.[9]

Results

Are more Newspapers Associated with a Greater Diversity of Views?

We begin our analysis by examining the relationship between the number of newspapers per capita in 1888 and the diversity of political views covered by those media outlets. If the media was always captured by one political party, more newspapers are not necessarily associated with more diversity of views. We examine this possibility using data at the county level by running regressions of the form:

$$\begin{aligned} &\textit{MediaConcentration}_{c,s,t=1888} \\ &\quad = \delta_s + \lambda \cdot \textit{Newspapers}_{c,t=1888} + \sum_{m=1}^{M} \rho_m \cdot X^m_{c,t=1888} + \epsilon_{c,s,t}, \end{aligned} \tag{6}$$

where δ_s represent state-fixed effects, $\{X^m_{c,t=1888}\}^M_{m=1}$ a set of controls at the county level fixed at 1888, and $\textit{MediaConcentration}_{c,s,t=1888}$ is either an indicator variable equal to one if there are at least two newspapers of distinct partisan attachments, or a Herfindahl–Hirschman index based on the number (or the circulation) of Democratic, Republican, and other media outlets.

[9]Since re-drawing one district is not independent of drawing others within the state clustering our standard errors at the state level in this case is even more important. These clusters account not just for the time dependency of the error terms but also for their spatial dependency across congressional districts.

Table 2: Diversity of political views and newspapers in 1888.

Dependent variable:	County has at least two partisan outlets		Herfindahl Index based on number of newspapers		Herfindahl Index based on newspapers' circulation	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Full sample of counties						
Newspapers in 1888	0.4717**	0.3315**	−0.1538**	−0.1119**	−0.1260**	−0.0838**
	(0.1289)	(0.1189)	(0.0555)	(0.0518)	(0.0408)	(0.0357)
Observations	2,034	2,034	2,034	2,034	1,976	1,976
R-squared	0.4524	0.5940	0.4189	0.5611	0.3852	0.5115
Panel B: South counties						
Newspapers in 1888	1.0034**	1.1018**	−0.4196**	−0.4620**	−0.2422**	−0.3017**
	(0.2331)	(0.2770)	(0.0777)	(0.0973)	(0.1040)	(0.1287)
Observations	738	738	738	738	698	698
R-squared	0.2638	0.3174	0.2079	0.2617	0.0869	0.1448
Panel C: Non-south counties						
Newspapers in 1888	0.3065**	0.2296**	−0.0765*	−0.0680*	−0.0722*	−0.0690**
	(0.1069)	(0.0886)	(0.0445)	(0.0375)	(0.0355)	(0.0328)
Observations	1,296	1,296	1,296	1,296	1,278	1,278
R-squared	0.2132	0.3359	0.1876	0.3064	0.1657	0.2591
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Cross-section of counties in 1888. Each panel corresponds to the subsample of counties used in the regressions. All regressions include the following additional covariates, fixed at 1888: otal population, percent of population in places with 2,500 or more inhabitants, percento of White population, percent of male population, manufacturing output per capita, farm output per capita, and foreign born population. Robust standard errors are clustered at state level in parentheses; $^{**}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 2 presents the results in three panels. Panel A shows the results using all the counties, whereas Panels B and C display the results for southern and non-southern states, respectively.[10] Overall, the estimates suggest that more newspapers in 1888 are associated with a greater diversity of views and that such a relationship holds regardless of the sample of counties considered.

Baseline Results and Validating the Identification Assumption

We turn next to the baseline results, shown in Panel A of Table 3. The odd columns present the models using the full sample of elections while the even

[10] We code as southern states the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

Table 3: Baseline results: Secret ballot and the role of media.

	Voting behavior						Electoral strategies			
Dependent variable:	Turnout		Split ticket voting		Vote share dominant party		Voter intimidation		Gerrymandering Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Difference-in-differences estimates										
Secret ballot NPO	−0.0581**	−0.0920**	0.0206**	0.0193	−0.0094	−0.0162	−0.010	−0.011	−0.026	0.019
	(0.0167)	(0.0275)	(0.0088)	(0.0127)	(0.0112)	(0.0168)	(0.006)	(0.009)	(0.067)	(0.085)
Secret ballot NPO ×	0.0439	0.0802**	0.0227*	0.0641**	−0.0430**	−0.0634**	−0.002	−0.002	0.051**	0.075**
Newspapers in 1888	(0.0300)	(0.0370)	(0.0133)	(0.0216)	(0.0201)	(0.0282)	(0.003)	(0.004)	(0.019)	(0.025)
R-squared	0.8402	0.8408	0.3361	0.3491	0.6025	0.6148	0.101	0.114	0.776	0.766
Panel B: Checking for pre-trends										
Secret ballot NPO	−0.0528**	−0.0940**	0.0205**	0.0160	−0.0128	−0.0108	−0.011	−0.015	−0.018	0.036
	(0.0181)	(0.0337)	(0.0081)	(0.0135)	(0.0095)	(0.0154)	(0.008)	(0.010)	(0.070)	(0.089)
Secret ballot NPO ×	0.0478	0.0929**	0.0265*	0.0630**	−0.0633**	−0.0630**	−0.002	−0.003	0.051**	0.078**
Newspapers in 1888	(0.0349)	(0.0427)	(0.0142)	(0.0224)	(0.0190)	(0.0301)	(0.003)	(0.004)	(0.020)	(0.027)
Pre-secret ballot NPO	0.0161	−0.0051	−0.0009	−0.0058	−0.0071	0.0102	−0.004	−0.009	0.029	0.046
	(0.0163)	(0.0212)	(0.0097)	(0.0101)	(0.0229)	(0.0198)	(0.012)	(0.010)	(0.029)	(0.033)
Pre-secret ballot NPO ×	0.0159	0.0514	0.0181	−0.0017	−0.1008	−0.0043	−0.002	−0.003	−0.002	0.012
Newspapers in 1888	(0.0559)	(0.0733)	(0.0399)	(0.0351)	(0.0944)	(0.0684)	(0.002)	(0.003)	(0.027)	(0.026)
R-squared	0.8404	0.8408	0.3362	0.3493	0.6034	0.6149	0.101	0.114	0.776	0.766

(*Continued*)

Table 3: (*Continued*)

	Voting behavior						Electoral strategies			
Dependent variable:	Turnout		Split ticket voting		Vote share dominant party		Voter intimidation		Gerrymandering Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Congressional district fixed effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Election year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Elections included	1880–1920	Pre and Post 1st Secret Ballot	1880–1920	Pre and Post 1st Secret Ballot	1880–1920	Pre and Post 1st Secret Ballot	1880–1920	Pre and Post 1st Secret Ballot	1880–1920	Pre and Post 1st Secret Ballot
Observations	17,774	15,738	17,893	15,810	16,900	15,015	5,887	5,282	5,887	5,282

Notes: The unit of observation in Columns 1 to 6 is a county-presidential-election-year, while in Columns 7 to 10, the unit of observation is a district-congressional-election-year. The sample period is the one specified in the section row "Elections Included". Secret Ballot NPO is a dummy variable that is one when the state has adopted the voting secrecy at year t with a paper ballot that does not allow for a straight party ticket option. Newspapers in 1888 refers to the total number of daily and weekly newspapers per thousand population registered by 1888 at the county or congressional district level. Outcome variables are defined in the section "Outcome Variables". Robust standard errors are clustered at the state level in parentheses. $^{**}p < 0.01$, $^{**}p < 0.05$

columns consider just the elections before and after the adoption of the first secret ballot (i.e., excluding periods of reversals and reintroduction of reforms). We demeaned the newspapers' measure before computing the interaction terms to facilitate the interpretation of the direct effect.

The comparison between odd and even columns supports the concern about the endogeneity of the reversals and second adoptions presented in the section "The design of the state-printed ballots and vote secrecy". For the even columns, the interaction coefficients are larger than those shown in the odd columns, highlighting the downward bias generated by the inclusion of periods when the political machine could have revoked the reform. Not restricting the sample not only biases the estimates but also reduces precision in the estimated parameters. In the case of the voter behavior outcomes, for example, the statistical significance of the interaction coefficients decreases once we employ the full sample of elections.

A key message from this table is that areas with higher levels of media penetration, measured as the number of newspapers per thousand population in 1888, increased and reinforced the positive consequences of the secret ballot. More specifically, those areas displayed additional increments in split-ticket voting and further declines in support of dominant parties. Furthermore, they seem to compensate for the negative outcomes of the ballot reform, counterbalancing the decline in turnout and the increasing levels of Gerrymandering. We do not find a significant decrease in voter intimidation, but the estimated coefficients have the expected sign.

The magnitude of the latter effects is also meaningful. An increase of one additional newspaper per thousand population in 1888 leads to an increase of approximately 8% in turnout after the introduction of the secret ballot. Moreover, the same increase in publications is associated with a 6.3% decline in the vote share for the dominant party and an expansion of the split-ticket voting of 6.4%.

Likewise, in the regressions at the district level, one additional newspaper per thousand population in 1888 is associated with an increase of approximately 0.075 points in the minimum deviation of compactness of congressional districts after the adoption of the secret ballot. This effect corresponds to a 15% increase with respect to the sample mean of the Gerrymandering index (recall this reflects an increase in compactness and, therefore, a decrease in Gerrymandering).

Checking for pre-trends: To support the identification assumption in Panel B of Table 3, we check for pre-trends including an indicator variable for one period (year) before the adoption (*PreSecretBallot NPO*) and its interaction with newspapers. We find no evidence of anticipation effects in any of the outcome variables. Figure 3 presents the extended version of the same exercise using multiple leads and lags, setting a window of 8 years pre- and post-reform. We include both 90% and 95% confidence intervals for

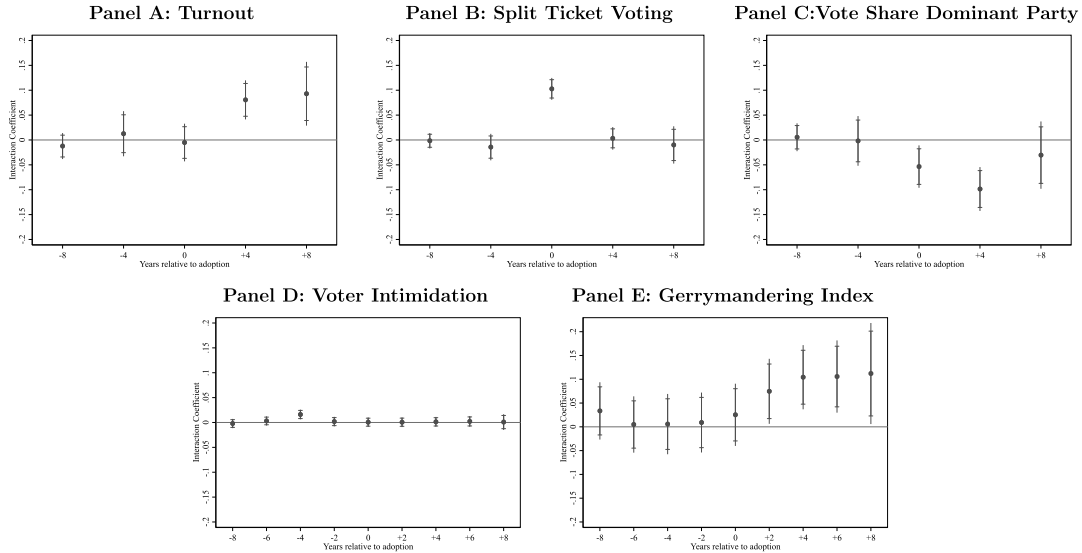

Figure 3: Event-studies: checking for anticipation and timing effects.

Notes: Point estimates and 90% and 95% confidence intervals corresponding to the estimated betas in the following regression:

$$y_{c,t} = c + \delta_c + \delta_t + \sum_{l=1}^{\tau} \alpha_l \cdot PreSecretBallot\ NPO_{s,\bar{t}-l} + \sum_{k=0}^{\tau} \alpha_k \cdot SecretBallot\ NPO_{s,\bar{t}+k}$$
$$+ \sum_{l=1}^{\tau} \beta_l \cdot \left(PreSecretBallot\ NPO_{s,\bar{t}-l} \times Newspapers_{c,t=1888}\right) + \sum_{k=0}^{\tau} \beta_k \cdot \left(SecretBallot\ NPO_{s,\bar{t}+k} \times Newspapers_{c,t=1888}\right) + \epsilon_{c,t}$$

Outcome variables y_{ct} correspond to the title of each panel and are defined in the section "Outcome Variable". Secret Ballot NPO is a dummy variable that is one when the state has adopted the voting secrecy at year t with a paper ballot that does not allow for a straight party ticket option. $Newspapers_{c,t=1888}$ refers to the total number of daily and weekly newspapers per thousand population registered by 1888 at the county or congressional district level.

each of the coefficients. These graphs document three empirical facts: (1) the non-existence of pre-trends for all the outcome variables; (3) the absence of significant results for voter intimidation; (3) and finally the timing of the effects, which are immediate for the split-ticket voting, short-lived for the vote shares of dominant parties, and persistent for the extent of Gerrymandering.

Addressing simple and potential reverse causality issues: Even columns in Online Appendix Table A5 present the coefficients of interest after controlling for pre-adoption trends on our outcome variables. These results support the identification assumption. There is no evidence that the pre-adoption conditions within counties or districts drive our results.

Robustness Checks

The Importance of the Straight-Party Ticket

We begin this section by exploring the differential effects of the electoral reform and its interaction with our measure of media penetration depending on the definition of the secret ballot. In particular, we run:

$$\begin{aligned} y_{c,s,t} = {} & \delta_c + \delta_t + \alpha_1 \cdot \mathit{SecretBallot}_{s,t} + \alpha_2 \cdot \mathit{SecretBallot\ NPO}_{s,t} \\ & + \beta_1 \cdot \left(\mathit{SecretBallot}_{s,t} \times \mathit{Newspapers}_{c,t=1888}\right) \\ & + \beta_2 \cdot \left(\mathit{SecretBallot\ NPO}_{s,t} \times \mathit{Newspapers}_{c,t=1888}\right) + \epsilon_{c,s,t}, \end{aligned} \tag{7}$$

This specification allows us to separately identify the effect of the state-printed ballot and the additional option of the straight-party ticket. We present the results of this model in Online Appendix Table A4. We corroborate that — in line with results in Table 1 — for all the outcomes defined in the section "Outcome Variables", the results are mostly driven by the adoption of state-printed ballots *without* the straight-party ticket option.

Alternative Interpretations

In this section, we address the concern that our estimates are driven by factors other than media penetration. We consider three alternative hypotheses highlighted in the literature on democratization. In particular, we examine the urbanization, modernization, and disenfranchisement hypotheses, and test for the significance of these issues by estimating:

$$\begin{aligned} y_{c,t} = {} & \delta_c + \delta_t + \alpha \cdot \mathit{SecretBallot\ NPO}_{s,t} \\ & + \beta \cdot \left(\mathit{SecretBallot\ NPO}_{s,t} \times \mathit{Newspapers}_{c,t=1888}\right) \\ & + \sum_i \eta_i \cdot \left(\mathit{SecretBallot\ NPO}_{s,t} \times \mathit{Alternative\ Story}_{i,c,t=1888}\right) + \epsilon_{c,t}, \end{aligned} \tag{8}$$

where $Alternative\ Story_{i,c,t=1888}$ are county characteristics fixed at 1888.[11]

Urbanization hypothesis: Some scholars have argued that the process of democratization around the world has been promoted by the densification and centralization of urban areas (Barnett, 2014; Glaeser and Steinberg, 2017). They claim that cities facilitate the coordination of public action and drive institutional development by reducing the cost of mobilization. Our results using the number of newspapers may have captured this effect because cities and highly populated areas tend to have, on average, more media access and coverage than other places. To rule out this possibility, we interact the following variables with the reform indicator: total population, the percentage of the population in locations with 2,500 or more inhabitants, and the percentage of the population in areas with 25,000 or more residents.[12]

Immigration and the disenfranchisement hypothesis: It may be the case that the national shock of foreign immigration or the attempts of disenfranchisement of some groups — which partially pressured the introduction of the secret ballot in the first place — induced the changes in our outcome variables (Evans, 1917; Keyssar, 2009). In particular, nationalist and racist movements could have played an important role in changing electoral outcomes, and arguably, the content and availability of media. To check this hypothesis, we use the proportions of foreign-born population, White people, and men in the county as additional interacted controls.

Modernization hypothesis: Similarly, modernization theory (see, e.g., Aidt and Jensen, 2017) claims that economic activity and industrialization — rather than political incentives — were responsible for the democratization process in the United States.

If that were the case, the same economic forces that lead to economic growth would explain the adoption of the secret ballot, media penetration, and the change in our outcome variables. Consequently, controlling for average level of education and economic activity in urban and rural areas is necessary to ensure that they are not confounding our results. To do so, we examine the additional effect of literacy levels and the farm and manufacturing outputs per capita at the county level.[13]

These exercises are reported in Online Appendix Table A3 (Online Appendix Table A6 reports the results for each individual measure of district

[11] We could have controlled for the same factors varying across time. However, this could generate an additional problem of "bad controls" if those variables responded to the Secret Ballot and Newspapers as well.

[12] Notice that these controls also help us address the possibility that our results are just driven by the behavior or large cities where political machines were strongest.

[13] Notice that aggregate trends in economic activity at the state level are also accounted for once we include the state-specific time trends. For literacy we use the data from the 1870 census, the closest date that we hace available before the secret ballot laws.

compactness). To provide a benchmark for comparison, on odd columns we run the baseline specification with the restricted sample for which we have the full set of controls. On even columns, we present the specification with additional controls. Even when these variables are relevant to the outcomes of interest, none of them drive our results. Besides, controlling for these variables increases the precision of interaction coefficients and the overall fit of the model.

Endogeneity of Newspapers

Media penetration may be endogenous to the process of electoral reform and the evolution of electoral outcomes for more subtle reasons than were considered in the section "Alternative Interpretations". For example, it may be the case that places with more newspapers in 1888 were precisely the areas where the political machine was the strongest (i.e., regions where parties were able to capture the media and manipulate elections).

To approach this issue, we consider an instrumental variable procedure that exploits a plausible exogenous source of variation in the availability of newspapers. To do so, we predict the number of publications using the relative potential for wood-pulp production of each county based on data from the agricultural census of 1880, the year that wood-based paper technology started to be broadly available to paper mills in the United States. In particular, we run the following first-stage model for the main independent variable:

$$\begin{aligned} &\textit{SecretBallot NPO}_{s,t} \times \textit{Newspapers}_{c,t=1888} \\ &\quad = \delta_c + \delta_t + \rho_0 \cdot \textit{SecretBallot NPO}_{s,t} \\ &\qquad + \rho_1 \cdot \left(\textit{SecretBallot NPO}_{s,t} \times \textit{WoodPulpPotential}_{c,t=1880}\right) \\ &\qquad + \rho_2 \cdot \left(\textit{Secret Ballot NPO}_{s,t} \times \textit{WoodPulpPotential}^2_{c,t=1880}\right) + \epsilon_{c,t}. \end{aligned} \quad (9)$$

In this equation, $\textit{WoodPulpPotential}_{c,t=1880}$ is defined as the number of unimproved acres of woodland and forests in county c in 1880. We use a quadratic specification to capture potential non-linearities in the extraction of the natural resource and, following Dieterle and Snell (2016), to capture the potential heterogeneity of the instrument.

Prior to 1850, paper in the United States was fabricated exclusively using cotton or linen rags. The process was expensive, and it was not until 1854 that the patent of the wood-pulp paper started to present alternatives to the existing papermaking methods.[14] However, as Weichelt (2016) points out:

[14]The reduction in costs driven by this new technology was significant. According to Hamilton (2011, p. 69) the production cost per 100 daily inches of newspaper declined abruptly for all newspapers. For example, "for independent outlets, the figure dropped from 22¢ in 1870 to 14¢ in 1900".

"The switch from rag-based to wood-based paper was slow and uneven. [...] mill owners delayed the switch because of costs. Wood-pulp technology was protected under exclusive patent rights and so did not become widely available until the 1880s." Still, once the technology was available after the patents expired, it was responsible for a significant decrease in the price of paper production, and hence, the cost of publishing (Smith, 1964). For instance, Weeks (1916) explains that, because of the shift from rags to timber, the price of newspapers in the streets dropped steadily from 4¢ in 1869 to 2¢ in 1900.

Paper mills used to be located in places where they could easily acquire the raw material from the immediate vicinity (Smith, 1964; Toivanen, 2004). Therefore, the presence of wood-paper mills, the cost of producing paper, and hence, the likelihood of having more newspapers in a given county, was closely related to the woodland coverage that existed when the new technology was made available.

The exclusion restriction of this instrument requires that, once we control for the election year and county-specific characteristics, the only channel through which the number of unimproved acres of woodland and forests in county c is related to electoral outcomes after the introduction of secret ballots is through its impact on the production of newspapers. This assumption is plausible since the political machines could not easily anticipate the introduction of this new technology and its multiple variants, nor had any obvious influence on the woodland cover composition of farms in 1880.

Tables 4 and 5 report the results, with one panel for each outcome. For comparison, in column 1, we present the OLS estimates for the baseline specification using the sample with information on the instrument. We also include the full set of controls used in Online Appendix Table A3 given that controlling for those variables gives us more precise estimates in the baseline specification. Again, we demean the number of newspapers before interacting with the secret ballot dummy to interpret the coefficients easily. For the same reason, the wood-pulp potential variable is standardized before computing the interaction.

In column 2, we present the IV estimates. These are qualitatively similar to the results in column 1. However, the point estimates for the interaction of newspapers and the secret ballot are twice as large as their OLS counterpart. Measurement error is a likely explanation for this difference. Our variable of media penetration is based only on the number of weekly and daily newspapers per thousand population in a given county, which may capture with some noise true circulation in the population as well as correlated penetration of other types of publications like magazines. Another potential explanation derives from the fact that this IV approach captures a local average treatment effect in those places where the wood-pulp technology fostered the production of

Table 4: Addressing other potential sources of endogeneity of newspaper presence: Voting behavior.

	(1)	(2)	(3)	(4)
Model:	*OLS*	*IV*	*Reduced form*	*First stage*
Panel A: Dependent variable:		Turnout		Secret ballot × newspapers in 1888
Secret ballot NPO	−0.0564*	−0.0657**	−0.0824**	−0.0369**
	(0.0309)	(0.0286)	(0.0375)	(0.0126)
Secret ballot NPO × newspapers in 1888	0.2866**	0.5322**		
	(0.0753)	(0.1233)		
Secret ballot NPO × Wood-pulp potential			−0.0672**	−0.1242**
			(0.0157)	(0.0200)
Secret ballot NPO × (Wood-pulp potential)^2			0.0250**	0.0551**
			(0.0109)	(0.0125)
R-squared	0.7784	—	0.7785	0.3221
F	17.48	—	24.39	84.13
Observations	15,690	15,690	15,690	15,690
Panel B: Dependent variable:		Split ticket voting		Secret ballot × newspapers in 1888
Secret ballot NPO	0.0250**	0.0221**	0.0144*	−0.0411**
	(0.0074)	(0.0071)	(0.0079)	(0.0126)
Secret ballot NPO × Newspapers in 1888	0.0700**	0.1546**		
	(0.0269)	(0.0396)		
Secret ballot NPO × Wood-pulp potential			−0.0187**	−0.1242**
			(0.0063)	(0.0200)
Secret ballot NPO × (Wood-pulp potential)^2			0.0105**	0.0550**
			(0.0037)	(0.0125)
R-squared	0.3215	—	0.3230	0.3158
F	9.735	—	14.17	80.93
Observations	15,505	15,505	15,505	15,505
Panel C: Dependent variable:		Vote share dominant party		Secret ballot × newspapers in 1888
Secret ballot NPO	−0.0224	−0.0163	−0.0064	−0.0375**
	(0.0145)	(0.0158)	(0.0196)	(0.0127)
Secret ballot NPO × Newspapers in 1888	−0.1247**	−0.2928**		
	(0.0504)	(0.1080)		
Secret Ballot NPO × Wood-pulp potential			0.0365**	−0.1231**
			(0.0154)	(0.0194)
Secret ballot NPO × (Wood-pulp potential)^2			−0.0140*	0.0537**
			(0.0082)	(0.0121)
R-squared	0.6018	—	0.6030	0.3204
F	5.752	—	6.551	58.07
Observations	14,745	14,745	14,745	14,745

Note: The unit of observation is a county-presidential-election-year. All controls and notes from Table A3 are applied to this table as well. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 5: Addressing other potential sources of endogeneity of newspaper presence: Electoral strategies.

	(1)	(2)	(3)	(4)
Model:	*OLS*	*IV*	*Reduced Form*	*First Stage*
Panel A: Dependent variable:	Gerrymandering index			Secret ballot × newspapers in 1888
Secret ballot NPO	−0.6863**	−1.6211**	−0.0722	2.8627**
	(0.1862)	(0.4182)	(0.1172)	(0.1043)
Secret ballot NPO × newspapers in 1888	0.2255**	0.5479**		
	(0.0640)	(0.1405)		
Secret ballot NPO × (Wood-pulp potential)			−0.2197**	−0.3969**
			(0.0556)	(0.0527)
Secret ballot NPO × (Wood-pulp potential)^2			0.0359	0.0440
			(0.0449)	(0.0440)
R-squared	0.0234	—	0.0265	0.938
F	309.4	—	4696	348.2
Observations	5,276	5,276	5,276	5,276
Panel B: Dependent variable:	Voter intimidation			Secret ballot × newspapers in 1888
Secret ballot NPO	−0.0103	−0.0230	−0.0232**	2.8945**
	(0.0303)	(0.0396)	(0.0106)	(0.1052)
Secret ballot NPO × newspapers in 1888	−0.0030	0.0013		
	(0.0099)	(0.0120)		
Secret ballot NPO × (Wood-pulp potential)			−0.0009	−0.3997**
			(0.0044)	(0.0562)
Secret ballot NPO × (Wood-pulp potential)^2			0.0024	0.0474
			(0.0030)	(0.0449)
R-squared	0.0192	—	0.0193	0.937
F	16.33	—	29.71	451.9
Observations	5,444	5,444	5,444	5,444

Notes: The unit of observation is a district-congressional-election-year. All controls and notes from Table A3 are applied to this table as well. Robust standard errors are clustered at state level in parentheses; $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

printed media because of the exogenous potential of the region in terms of available woodland.

The first stage, presented in column 4, reveals that the instrument is a substantial and meaningful predictor of the endogenous regressor. The estimated parameters are highly significant and follow the expected signs. Besides, the F-statistic for the excluded instruments in all panels is comfortably above 20, suggesting a robust first stage.

Southern vs. Non-Southern States

We end by examining the implications of the fundamental differences between southern and non-southern states before the introduction of the electoral reform on the effects of the secret ballot. Online Appendix Table A7 shows that counties in the South were 47% less likely to have at least two partisan media outlets and 6.3 percentage points less literate than the non-southern regions. Given these differences, the media in the South was less effective and, if sufficiently biased, perhaps potentially harmful in the post reform period.

Moreover, as only one-tenth of southerners lived in urban areas during this period, and transportation between cities was difficult (McPherson, 2003), civil mobilization was harder to consolidate against political machines in the South and, thus, less likely to occur in this part of the country. Finally, southern voters faced many more restrictions other than simply a lack of vote secrecy, and as Engstrom and Kernell (2014, p. 6) point out,

> From the late 1880s on, a regime of highly restrictive electoral rules disenfranchised whole blocs of the electorate, turning the South into a one-party region that was non-responsive to national political forces.

In short, in the South a number of obstacles decreased the likelihood that the media could mobilize voters and that the new ballot could effectively increase voter freedom. Bearing all these elements in mind, we explore the heterogeneous effects of our baseline specification by the location of the constituencies between South and non-South states. Online Appendix Table A8 presents the results. We verify that the media's positive effects are mostly driven by non-southern counties, where the newspapers were less captured and the population was more literate and arguably better able to mobilize against the political machines (Gentzkow *et al.*, 2014).

Altogether, these results support the hypothesis that the mechanism through which media mattered was the diffusion of information and the generation of political accountability in areas where civil mobilization was a real threat to the political machine.

Discussion

The role of the media in the success of institutional reforms goes beyond the dissemination of information. In this section, we explore six channels through which content in the media matters for the success of institutional reforms and its particular interaction with the adoption of the secret ballot in the United States.

1. *Voter empowerment:* The media acts as a crucial conduit of information, providing voters with insights into the benefits and implications of institutional reforms. In areas with high media penetration, voters are empowered through civic education, understanding the significance of the secret ballot in enhancing voter freedom and democratic representation. By disseminating unbiased information, the media enabled citizens to make informed choices, fostering a sense of ownership and responsibility in their participation. Consequently, an empowered electorate was more likely to engage actively in the democratic process and embrace the adoption of the secret ballot. The anecdotal evidence about this mechanism during the Gilded Age is vast (Smythe, 2003). As an example, we present in Online Appendix Figure A7 the cover page of The Frank Leslie's Weekly — a magazine established in 1855 and discontinued in 1922 —. The figure pictures an upwardly mobile workingman contemplating the Australian ballot on the Election Date of 1912, with the Caption: "The man who will elect the next president."

2. *Check on political misconduct:* The media's role as a watchdog for political misconduct played a pivotal role in the success of institutional reforms. In regions with an active and independent press, instances of electoral manipulation and voter suppression were brought to light and subjected to public scrutiny. By exposing such practices, the media enhanced transparency and accountability in the electoral process, making it more challenging for political machines to operate unchecked. As a result, the adoption of the secret ballot was more effective in areas with a less monopolized press, where the media acted as a check on partisan interests and safeguarded the integrity of electoral outcomes. Online Appendix Figure A8 presents an example of the coverage of corruption and misconduct of Tammany Hall and his political machine by Leslie's Weekly and Thomas Nast, a cartoonist who was eventually one of those responsible for the fall of Tammany Hall's political machine.[15]

3. *Mobilization of political parties and shift in campaign strategies or electoral manipulation:* The media's influence on the success of institutional reforms can also be observed through its impact on political parties. In regions with a vibrant press, political parties had to adapt their strategies to appeal to an informed and engaged electorate. The media's role in discouraging partisan attachment and promoting issue-based discussions compelled political parties to focus on transparency, responsiveness, and accountable governance. Consequently, the media contributed to a shift in campaign strategies. This realignment fostered a political landscape

[15] https://www.mcny.org/story/thomas-nast-takes-down-tammany-cartoonists-crusade-against-political-boss

that was more responsive to the needs and aspirations of the electorate, enhancing the effectiveness of the secret ballot in promoting democratic representation. For instance, the role of the media in denouncing the manipulation of electoral boundaries — a detrimental strategy for democracy — is exemplified by the origin of the word "gerry-mander". Online Appendix Figure A1 illustrates its first appearance in a cartoon of the Boston Gazette in 1812.

4. *Shaping public discourse and deliberative democracy:* The media plays a central role in shaping public discourse around institutional reforms. In regions with high media penetration, various media outlets presented diverse perspectives on the benefits and drawbacks of the secret ballot. These discussions influenced public sentiment and political decision-making, creating an environment conducive to deliberative democracy. By facilitating a more nuanced understanding of the reform's implications, the media encouraged constructive debates, leading to well-informed and thoughtful decision making processes. As a result, the adoption of the secret ballot was grounded in a robust public consensus, reinforcing the reform's long-term success.

5. *Regional disparities and contextual factors:* The success of media-driven mechanisms in enhancing institutional reforms is not uniform across all regions. Our study highlights that the media's impact on the adoption of the secret ballot was more pronounced in non-southern states, where media penetration was higher, and literacy rates were elevated. Contextual factors, such as urbanization, transportation accessibility, and historical civil mobilization, also shaped the media's effectiveness in these regions. Understanding these regional disparities provides valuable insights into tailoring media interventions and reforms to specific contexts for greater success in the long run.

Conclusions

This paper contributes to understanding the role of the media in the effectiveness of institutional reforms and the selection and response of politicians facing those changes.

We focus our analysis on the introduction of secret voting in the United States and how the newspapers were fundamental to achieving the positive consequences of the electoral reform at the end of the nineteenth century.

We present a simple conceptual framework and test its theoretical expectations with a difference-in-differences approach exploiting variation in the adoption of vote secrecy and the levels of media penetration across states and

time. Our results indicate that the press helped to foster the democratic process by promoting partisan detachment and decreasing support for dominant parties. Furthermore, it undermined the manipulation of electoral boundaries, and the declines in turnout unintentionally incentivized with the reform. We do not find statistical evidence in favor of the role of the media in reducing voter intimidation.

We show that our results are not likely driven by omitted time-varying factors or anticipation, nor are they explained by state-specific time trends or initial outcome conditions. The results are also robust to accounting for three alternative explanations: modernization, urbanization, and the immigrant-disenfranchisement hypothesis. Moreover, they are qualitatively similar when addressing the potential endogeneity of newspaper presence using an instrumental variable approach.

Confirming the idea that these findings are explained by a better-informed and mobilized citizenry, our effects are mostly concentrated in non-southern states, places with less monopolized media, and areas with high literacy rates.

Our analysis highlights the importance of institutional complementarity. Democratic institutions are complementary to each other and improvements in one dimension require other functional dimensions to be fully effective. In our study, electoral reform increasing voter freedom at the polls improves the quality of democracy, especially if an active press is present as a reinforcing input. This complementarity is particularly relevant when losers of the reform actively seek to counteract its effects.

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