How Newspapers Reveal Political Power*

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Abstract

Political science is in large part the study of power, but power itself is difficult to measure. We argue that we can use newspaper coverage—in particular, the relative amount of space devoted to particular subjects in newspapers—to measure the relative power of an important set of political actors and offices. We use a new dataset containing nearly 50 million historical newspaper pages from 2,700 local U.S. newspapers over the years 1877–1977. We define and discuss a measure of power we develop based on observed word frequencies, and we validate it through a series of analyses. Overall, we find that the relative coverage of political actors and of political offices is a strong indicator of political power for the cases we study. To illustrate its usefulness, we then apply the measure to understand when (and where) state party committees lost their power. Taken together, the paper sheds light on the nature of political news coverage and offers both a new dataset and a new measure for studying political power in a wide set of contexts.

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1 Introduction

At its core, political science is the study of power. But empirical work on this fundamental subject is hampered by the fact that actually observing power is difficult. In this paper, we propose using newspaper coverage to address this obstacle. We introduce a dataset containing nearly 50 million historical newspaper pages from approximately 2,700 local U.S. newspapers distributed across a thousand counties over the years 1877–1977, and we use it to develop a newspaper-based measure of power. After laying out the measure, we validate it through a series of analyses that leverage historical reforms and other temporal and spatial changes in power across a wide range of political offices, including mayors, governors, members of Congress, and the presidency. The result of these analyses is a plausible indicator of political power that applies to political actors and political offices over a wide time period and across many contexts.

Our idea can be captured with a simple thought experiment. First (if you live in the U.S.), ask yourself: How many official state or local party leaders can I name? How many do I read about regularly in the newspaper? In all likelihood, the answer to both of these questions is "zero." Why? Because these positions are not powerful—that is, they do not play much of a role—in contemporary U.S. politics. Now imagine you were a voter in late 1800s rather than the early 2000s, asking the same questions. If you lived in New York it is likely that you would have read about leaders such as Roscoe Conkling, Thomas C. Platt, John Kelly, or Richard Croker. Similarly, it is likely that you would have read about Simon Cameron or Matthew Quay if you lived in Pennsylvania, Zachariah Chandler if you lived in Michigan, John "Black Jack" Logan if you lived in Illinois, or Oliver P. Morton if you lived in Indiana. Why? Because these people mattered. They were powerful bosses who controlled access to many elected and appointed political offices in their states, and also had a significant impact on which laws were passed and which were defeated, both nationally and at home. As a result, they appeared regularly in newspaper stories.

We are not the first to see this link between newspaper coverage and power. Although media coverage stems from many sources—including the inevitable biases of newspapers themselves (Gentzkow and Shapiro 2010; Groseclose and Milyo 2005; Puglisi and Snyder 2011; Larcinese, Puglisi and Snyder 2007), as well as the demands of readership (Mullainathan and Shleifer 2005; Gentzkow and Shapiro 2006)—previous scholars have observed that media coverage is positively

associated with power. Galtung and Ruge (1965) identified a number of key factors that affect the "news value" of a potential story. Two of these factors are the size or impact of the story and the prominence of the actors involved. Events and actions that have the potential to affect a large number of people have greater news value, as are stories involving elite actors—powerful nations, people, and organizations. Almost by definition, actors with more power have more opportunities to take actions that affect a large number of people, and are therefore more likely to generate newsworthy events.[1] We build on the logic of this previous work in developing our measure.

The paper is organized as follows. First, we provide a conceptual overview of our measurement approach, defining the type of power we believe newspaper coverage can capture, discussing obstacles to the use of newspaper coverage, and explaining the interpretation of the quantitative scale we develop. Following this, in the next section we describe the dataset we have collected and the steps we have taken to process the raw text for analytic purposes. Subsequently, we validate the measure using five disparate cases: (i) comparing the relative coverage of congressional committees to the desirability of committees based on member transfer requests; (ii) examining coverage of members of Congress before, during, and after they are Speaker of the House; (iii) estimating the change in relative coverage of mayors in cities that change from a "strong mayor" (mayor-council) to a "weak mayor" (council-manager) form of government; (iv) investigating the effect of the passage of a reform that stripped the Massachusetts Executive (Governor's) Council of most of its powers on the relative coverage of the Council; and (v) looking at the relative coverage of the President in the context of tariff policymaking authority before and after the Reciprocal Trade Agreements Act. Having validated the measure, we briefly apply it to study the decline of state party organizations in order to showcase its value. Finally, we conclude by discussing how researchers can apply the measure to study a variety of questions in many contexts.

[1] Many others have made this point, even those critical of the media. See, e.g. Roshco (1975: 75): "Big 'names' make news not only because they tend to know more than lesser names but also because they usually do more that concerns many people. Sources thus become newsworthy as they wield more power... the biggest 'name' of all for the American press and its mass audience is the president of the United States, holder of the most powerful, as well as the most visible, office in the United States."

2 A Measure of Political Power From Newspaper Text

In this section, we lay out the idea of using newspaper coverage to measure political power. We explain the logic of our measure, we discuss what kind of power it is likely to tap into, and we discuss its limits and how to interpret it.

2.1 Relative Newspaper Coverage to Measure Relative Power

There are many kinds, and many definitions, of power. Newspaper coverage will only reflect some of these.[2] Shadowy actors who use their influence to avoid media scrutiny, for one obvious example, cannot be directly studied using newspaper coverage.[3] But a simpler kind of political power will inevitably reveal itself in how often newspapers men tion people and offices. In particular, what we will be able to measure is whether, and to what extent, various political actors and offices possess the necessary resources and authority to influence political outcomes, i.e., to "matter" for the political process. To make this idea clearer, consider state party committees in the early 20th century. Many of these committees possessed important resources: they could choose candidates to stand for office, marshal campaign support for candidates, and, once elected, could direct economic resources to loyal party members through patronage. As a result of all these resources, state party committees were, in many cases, "powerful."

A direct consequence of this kind of power is newsworthiness. Though newspapers have latitude to choose what they report on—and a variety of biases may lead them to omit certain stories—economic necessity and the logic of competition, as well as a basic desire to cover the news, compel them to, by and large, report on matters of consequence. Newspaper coverage of political actors and offices therefore reveals who is involved in matters of political consequence.[4]

[2] In this way, the measurement problem is similar to other prominent political science measurements. The survey-based measures of citizen preferences in Tausanovitch and Warshaw (2013) and Tausanovitch and Warshaw (2014), for example, speak only to the types of issues survey respondents are asked and can answer. Roll-call scaling (Clinton, Jackman and Rivers 2004; Poole and Rosenthal 1985), for another example, speaks only to ideology as it relates to bills voted on in the legislature. These approaches have proven incredibly useful despite these natural constraints.

[3] Another example would be the second face of power, as discussed in Bachrach and Baratz (1962).

[4] The newsworthiness of a politician has been shown to be determined in part by political power and influence in studies outside the U.S. (Hopmann, de Vreese and Albaek 2011; Trench 2009; Brants and van Praag 2006). Hopmann, de Vreese and Albaek (2011), in studying the news coverage of national election campaigns in Denmark, find that the more powerful a politician is (e.g., by looking at known changes in political power), the more attention a politician receives by the media. More generally, the communications literature has advanced three explanations about the degree of press coverage of politicians in particular: 1) the media is a "mirror" of the political environment and press coverage of a politician is proportional to the amount of the politician's political activity (e.g., McQuail (1992)), 2) "news factors" and concern over newsworthiness of stories causes more important and prominent politicians

Our measure captures this idea. This is a *relative* measure; its meaning springs from careful comparisons made among relevant actors or offices. To make our idea precise, imagine two members of a state legislature; call them A and B. We can learn something about the relative influence of A and B by making comparisons of the form

$$\textit{Relative Power of } A = \frac{\textit{\# of Newspaper Mentions of } A}{\textit{\# of Newspaper Mentions of } A + \textit{\# of Newspaper Mentions of } B}. \quad (1)$$

Although newspapers will have many reasons to talk about A and B, overall, if A is mentioned more than B, it is likely that A matters more for the political process than B, and is therefore more powerful.

2.2 When Does Press Coverage Fail To Indicate Political Power?

Naturally, many other factors also affect news values. Among these, the entertainment value of the story seems particularly important. Stories that mainly cover subjects because of their special entertainment value will not inform us about political power, even if the subjects are political in nature.[5] This obstacle confines our idea to only an important subset of all political topics. *Using newspaper coverage to measure power is best for actors who are inherently boring to most citizens.* For example, except perhaps to a small number of political junkies, political party organizations and congressional committees are not entertaining. This is probably true even for congressional party leaders and mayors of all but the largest cities.[6]

Supply-side theories of media bias also suggest a possible risk, although one that can be mitigated. The press may favor covering politicians or political groups with whom they share similar editorial and market interests, a process that may stem from the ideological preferences of media outlet elites (Demsetz and Lehn 1985; Bovitz, Druckman and Lupia 2002) or of editors and jour-

to be covered more (Galtung and Ruge 1965), 3) the media will favor covering politicians with whom they share similar editorial and market interests (e.g., supply-side theories as argued by Demsetz and Lehn (1985), Bovitz, Druckman and Lupia (2002), Baron (2006)). For our purposes, the third explanation represents a possible risk in our measurement and is addressed in the next section.

[5] Other factors that Galtung and Ruge (1965) identify are proximity, recency, currency, continuity, uniqueness, simplicity, personality, predictability, exclusivity, and negativity.

[6] Relatedly, using media coverage to measure power is best for the types of actors and events for which "routine" factors dominate coverage decisions, rather than individual, reporter-specific factors. Shoemaker et al. (2001) present evidence that this is the case for the coverage of congressional bills.

nalists (Baron 2006).[7] If this is the case, then a measure based on newspaper coverage cannot be interpreted simply as a measure of power, as the frequency of newspaper mentions may also be driven by the ideological preferences of those producing the news. However, the influence of any present supply-side effects can be reduced by ensuring an adequately balanced representation of newspapers (in our case, of both Democratic- and Republican-leaning newspapers) in the sample.

Issues such as these also constrain the ways researchers can use our newspaper-based measure. Raw counts of the mentions of political actors or offices are likely to be broadly informative—especially when aggregated over long time periods—but because of the many other reasons for coverage they will not be precise. As a result, the newspaper-based measure is likely to be more useful as a dependent variable in analyses where exogenous variation in explanatory variables of interest is present; this exogenous variation will help ensure that findings are not driven by the noise in the measure.

2.3 Making Valid Comparisons

The many other differences in news coverage also makes comparing the measure across actors and offices tricky. If we were to find, for example, that mayors receive more coverage than governors, we could not immediately conclude that mayors are more "powerful" than governors. Perhaps newspapers cover mayors more because local news is valuable to readers, instead. To be meaningful, any such cross-office (or cross-actor, or cross-time) comparison must hold other factors equal. In general, we do this by making *within-context, within-time* comparisons. Rather than compare mayors to governors, we might compare a mayor to her corresponding city council, for example. These two units occupy the same space at the same time, and as a result, differences in their local newspaper coverage are likely to be informative. While ensuring valid comparisons does limit the applicability of our measure, it can still tell us quite a bit. The relative powers of a variety of actors and offices at the same time and in the same place are at the heart of many of the deepest questions about political institutions.

Another way to make valid comparisons relies on quasi-random variation in an explanatory variable, rather than on directly holding time and context fixed. Imagine for example a randomized

[7] While media practices dictate an impartial press that confines the political views and beliefs of newspaper owners, editors, and journalists to the opinion pages, Kahn and Kenney (2002) find evidence that questions the strength of the "wall" separating the opinion pages and the news pages.

experiment where the outcome is our newspaper-based measure. Though the reasons for newspaper coverage will vary over time and across space, the randomization from the hypothetical experiment would ensure that this variation is unrelated, in expectation, to the treatment we are interested in studying. As a result we can use the measure for a variety of questions even when we cannot hold time and context fixed. Examples of this might include difference-in-differences designs that leverage state-level variation in institutional structure, such as studying the effects of term limits or campaign finance reform on the power of a variety of state political offices and actors.

2.4 Interpreting Relative Coverage: Cardinal or Ordinal?

Even once we have narrowed our focus to a set of comparisons that our newspaper-based measure can examine in a valid manner, we still must understand how to interpret resulting estimates. We think of our measure as being largely ordinal—that is, while we can learn a great deal about the relative power of actors or offices by measuring their relative newspaper coverage, it is not clear that the rate of coverage conveys cardinal information about relative power. Put differently, although in many cases the relationship between coverage and power is *monotonic*, there is no reason to suspect that it is *linear*. If A receives 50% more coverage than B then A is probably more powerful than B, but it is unlikely that A is exactly 50% more powerful than B.

In many cases it is not even clear what the statement "A is 50% more powerful than B" even means. That is, in many cases it will be impossible to generate a widely accepted cardinal measure of power because there is not even a widely accepted *definition* of cardinal power. Almost everyone would agree that the U.S. President is more powerful than any individual U.S. Senator or U.S. House Representative. But how much more powerful? One hundred times as powerful, ten times as powerful, twice as powerful?

Power can sometimes be defined in cardinal terms, but only in particular cases and in the context of a highly stylized model. In weighted voting models, for example, the Shapley-Shubik index (Shapley and Shubik 1954) or the Banzhaf index (e.g., Banzhaf 1968) yield cardinal indices of "power." But these indices focus solely on power that derives from voting—specifically, the probability that a given player will turn losing coalitions into winning coalitions. They ignore considerations such as the power to propose, the ability to bargain or to vote strategically in dynamic settings, or informational asymmetries. They are limited in scope as well, being designed

mainly to study "divide the dollar" politics. Other models, such as the Baron-Ferejohn model, add proposal power and bargaining, but make assumptions that many find unpalatable, e.g., that proposer are chosen randomly. There is even less agreement about how to define and model other sources of power, such as informational rents or the value of the "bully pulpit."

The upshot is that in almost all circumstances, an ordinal measure of power is all we can hope for.

2.5 Summary

In this section, we have laid out our concept of using newspaper coverage to measure the relative power of actors and offices within given contexts and time periods. The measure is not universally applicable—in part because overly salient subjects can accrue large excesses of "entertainment" coverage—but it speaks to the power of many kinds of offices and actors. Having discussed the measure theoretically, we now turn to the data we use to apply it.

3 New Dataset on Newspaper Text

We collected our newspaper text from Newspapers.com. This archive contains the text of millions of newspaper pages generated via optical character recognition (OCR). Currently, the Newspapers.com archive has almost 99 million pages from over 3,500 newspapers (they are constantly adding new material). Of these, Newspapers.com has a large amount of material—at least 10,000 pages covering five or more years—for about 700 newspapers. In this paper we use a stratified sample of 50% from the archive. We focus on the period 1877-1977, which contains the bulk of the data.[8]

The OCR text is messy and requires considerable cleaning. Common errors are: the letter "c" is read but the actual letter is "e" and visa versa; "a" vs. "u"; "t" vs. "l" vs. "i"; "g" vs. "q" vs. "y"; and "m" vs. "rn." Hyphenation is also a serious issue—since newspaper columns are narrow many words must be split and hyphenated. Extra spaces and stray marks are also common.

[8]The Copyright Act of 1976 and Copyright Term Extension Act of 1998 (also known as the Sonny Bono Copyright Term Extension Act, the Sonny Bono Act, or, to critics, the Mickey Mouse Protection Act) extended the life of copyrights significantly. Newspaper articles are typically defined as "works made for hire." The term of copyright protection of a work made for hire is 95 years from the date of publication or 120 years from the date of creation, whichever expires first. As a result, most newspaper articles published after January 1, 1978 will be under copyright protection until most of us are dead.

We deal with these by using regular expressions in our search strings and text processing. Using the cleaned text, we generate counts for a variety of relevant words and terms, depending on the political actor or office under study.[9] Though the remaining text surely contains errors that prevent us from perfectly capturing word frequencies, the validity tests below indicate that the remaining errors are not overly problematic. Table A.3 in the Appendix provides the exact cleaning rules we use to process the text.

4 Validating the Measure Using Powerful Actors and Offices

4.1 Congressional Committees

In this subsection, we evaluate our measure in the context of congressional committees. Committees are not equally powerful. The Committee on Ways and Means, with its responsibility over taxation, tariffs, and other revenue-raising actions, has more jurisdiction, controls more money, and wields greater influence—all in all, more power—than for example the (now defunct) Committee on Merchant Marine. This power differential is also reflected by committee transfer requests. Some committee assignments are more desirable than others, due to committees' differences in power and prestige. As Ray (1982) observes, members typically strive to obtain assignments to committees they regard as stronger, and give up assignments they regard as weaker.

During the time period of our data, both parties deemed the Committees on Ways and Means, Appropriations, and Rules as the "exclusive" committees of the House. In general, members of exclusive committees cannot also serve on nonexclusive committees.[10] The "exclusive" committee designation further reflects the desirability and power of these committees. These three committees, then, should rank at or near the top of any power ranking of Congressional committees.

We use the Groseclose and Stewart (1998) rankings as an alternative measure to validate our power measure. Their method, building on the techniques used by Bullock and Sprague (1969) and by Munger (1988), constructs rankings based on the value members place on committees as reflected by committee transfers. Groseclose and Stewart do not claim to measure power, but instead aim

[9] In counting words we follow the main thrust of the text analysis literature which uses this "bag of words" approach. See for example Grimmer and Stewart (2013), Hopkins and King (2010), and Laver, Benoit and Garry (2003).

[10] Exceptions for Democratic members include the ability to also serve on the Budget or House Administration Committee. Republican members can serve on the Rules committee as well as another standing committee if they take "leave with seniority".

to measure the "value" of committees. We would imagine the two are correlated, but not perfectly (e.g. some members may place a high value on a committee for pork-barreling reasons even through other committees have more "power" due to broader jurisdictions or jurisdictions over policies that affect more people). While their transfer-based ranking is not a direct measure of power, desirability tends to reveal power, and so this is a close measure that we can use to test our coverage-based power measure.

For this analysis we study newspaper coverage of 19 committees across our time period, 1877–1977. These 19 committees are the ones from the set analyzed by Groseclose and Stewart (1998) that are active throughout this period. For each committee, we collect the total number of mentions of each of these committees and standardize by dividing each count by the total number of mentions of all 19 committees.[11] That is, letting $Committee_i$ be the total mentions of committee i, we define:

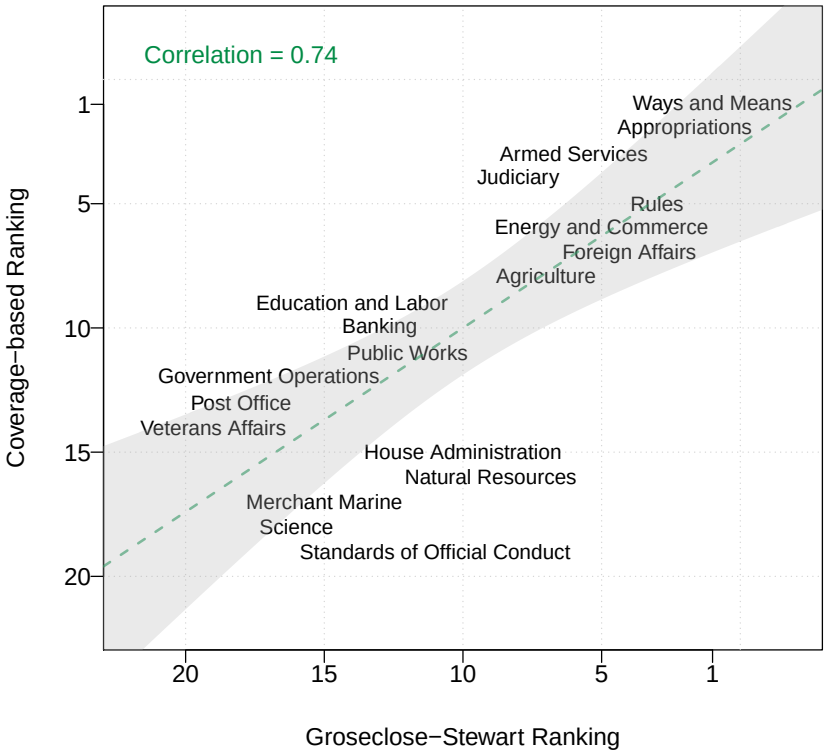
$$Relative\ Coverage\ of\ Committee_i = \frac{Committee_i}{\sum_{j=1}^{19} Committee_j}.$$

Figure 1 shows the Groseclose–Stewart ranking against our coverage-based ranking, calculated for the time period during which the two measures overlap. Most all of the committees lie around the 45 degree line, showing a close match between our ranking and the Groseclose–Stewart ranking. Indeed, the correlation between the two rankings is 0.74. Ways and Means, Appropriations, and Rules are ranked at the top as the top three, confirming their place as the most powerful and valued committees.

Our coverage-based power measure, when applied to Congressional committees, is highly correlated with the Groseclose–Stewart ranking. While we reiterate that the Groseclose–Stewart ranking is based on measuring the desirability of committees, as discussed previously we believe that this is a relevant alternative measure with which we can compare our coverage-based power measure. Furthermore, we believe that several of the "outliers" go in our favor. For example, the Committee on House Administration is ranked higher in the Groseclose–Stewart ranking than in our coverage-based ranking. House Administration is probably quite weak rather than powerful, in the sense that its jurisdiction, revenue-raising ability, and influence over policy outcome is limited, though it may be more "desirable" to members of the House since, after all, it deals with House

[11] In order to accurately capture the number of mentions of each committee, we use regular expressions for every possible naming configuration of each committee, and account for committee name changes across time.

Figure 1 – Committee Rankings, 1949–1973. The newspaper-based ranking of Congressional committees corresponds closely to the Groseclose-Stewart ranking based on member preferences.



matters (and people care about themselves). Another outlier worth mentioning is the Judiciary Committee. Judiciary ranks high based on our coverage-based measure, but ranks near the middle in the Groseclose-Stewart ranking. A possible contributor to this divergence is Watergate, which was highly covered in the press. This represents one of the limitations of our measure – since our measure is based on relative press coverage, any "sensational" event that temporarily increases press coverage of a political actor or group even though the underlying power of that actor or group remains the same would result in measurement error. In the case of Judiciary, was the increase in coverage exclusively due to the sensational nature of Watergate, or did the Judiciary Committee at that time truly hold a significant increase in the amount of power, since they were presented with a rare instance in which they could use their power over the impeachment of a president? This example reflects the need to carefully apply our measure and consider possible explanations for sharp fluctuations.

Finally, there is a possible concern that both measures reflect only the behavior of legislators. If members of Congress *seek out* news exposure, then the correlation between the preference-based rankings and newspaper coverage may simply be an artifact of this behavior, regardless of why certain committees receive more coverage. Although we may have good reasons to think that press coverage focuses on more important committees, this concern reflects a general problem in correlating existing measures with our own. As a result, in the subsequent sections, we also investigate a variety of cases in which, rather than comparing measures, we look at observable *de jure* shifts in power and link them to changes in our measure.

4.2 Congressional Party Leaders

In this subsection, we use the news coverage of Speakers of the U.S. House to validate our power measure for political actors. Political leaders not are randomly selected from the pool of legislators. Presumably leaders are selected because of their skills and qualities, and these in turn probably help them attract media attention. A simple comparison of the news coverage of leaders and rank-and-file legislators would pick up many systematic differences between the two groups that are not necessarily reflecting their power.

Instead we use a simple *within-legislator* design to validate our power measure. We focus on the group of legislators who serve as party leaders at some point in their career, and compare how they are covered in the newspapers before, during and after the period in which they are in power. If news coverage is a good measure of power, we would expect to see a substantial increase in the coverage of individual members of Congress in the periods during which they serve as party leaders.

To implement this test, we search our newspaper database for the surnames of Speakers of the House and minority-party leaders from 1877-1977, and count how often they are covered in the news before, during and after their leadership term. To reduce the number of false positives, we only count cases in which the word stem "congress" appear within a window of 5 words from the surname, as well as cases in which one of the words "representative," "rep.", "hon.", "speaker," or "leader" appears immediately before the surname, and cases in which either of the party identifiers "(D" or "(R" appears immediately after the surname.[12]

[12]We only include the first part of the expression when searching for party identifiers because reporting practices vary across newspapers—e.g., some papers refer to Democratic representatives using "(D)" while other newspapers use "(Dem.)" or "(D-Congressional Distict)."

Figure 2 – News Coverage of Speakers of the House, Before, During, and After Speakership. Newspaper coverage increases, often dramatically, while members are in positions of power. Gray lines represent individual Speakers; thicker green line indicates average across all observations.

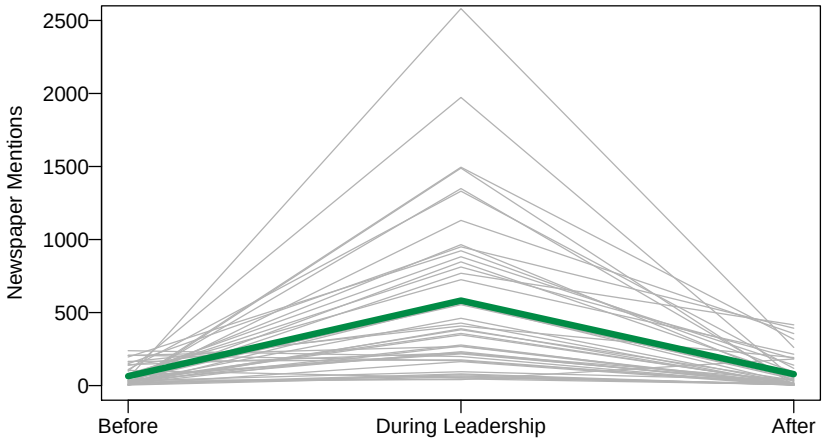


Figure 2 illustrates the main results. The figure plots in gray the the number of mentions each Speaker of the House in our dataset receives before becoming Speaker, while serving as Speaker, and after serving as Speaker. A thicker green line indicates the average across all Speakers. As the figure shows, almost all members see a marked increase in coverage while they are Speaker.

To examine the pattern more systematically, we count the number of hits for all Speakers and minority-party leaders during the period 1877-1977. In Table 1, we report the average yearly number of hits five years before, during and five years after the leadership period.[13] Two things are worth noting. First, similar to the results presented in Figure 2, Panel A shows that on average the news coverage of members of Congress increases by an order of magnitude when they serve as Speakers. Second, we see a similar pattern for minority-party leaders.[14] When a member of Congress is appointed to leader of the minority party, the member receives more coverage in the newspapers. However, the media boost for minority-party leaders is not quite as big as the boost enjoyed by Speakers. This difference probably reflects that Speakers are more powerful than minority-party leaders. Overall, the results presented in Table 1 further supports the idea that power is reflected in the newspaper coverage.

[13]For the party leaders who served in several non-consecutive periods, we classify the hits from the "middle" period (when they were not in power) as belonging to the post-leadership period. None of the results are sensitive to this classification.

[14]We only include minority-party leaders who did not serve as Speaker five years before and after he served as minority-party leader.

Table 1 – News Coverage Before, During and After Leadership Term. Serving as party leader substantially increases the news coverage of members of Congress.

	Before	During	After
Panel A: Speakers			
Hits	42.94	315.31	42.92
	(61.00)	(502.41)	(88.32)
Difference	-272.37		-272.39
P-value	0.00		0.00
N	86	113	98
Panel B: Minority Leaders			
Hits	23.75	139.67	47.74
	(31.96)	(106.14)	(75.72)
Difference	-115.92		-91.93
P-value	0.00		0.00
N	20	30	23

Standard deviations are reported in parentheses. The pre and post-Speaker periods are based on 5 years before and after the Speaker term.

4.3 Strong vs. Weak Mayors

We now turn to the analysis of "strong" vs. "weak" mayors. Traditionally, cities in the U.S. operated under the mayor-council form of government. In this form the mayor and city council are separately elected offices, and the mayor is the head of the executive branch, with broad powers to appoint and dismiss department heads, prepare and administer the city budget, and so on. This is the "strong mayor" form. Beginning in the early 20th century and continuing through today, many cities switched to the council-manager form of government. In this form the city council is the only directly elected body, and it appoints a city manager to oversee the operation of the executive branch. The mayor may be separately elected or selected by the city council from from within its ranks, but has little or no executive authority. Some directly elected mayors have veto power, and some mayors have agenda-setting power inside the city council, but in many council-manager cities

the position is largely ceremonial.[15,16] According to the *Municipal Year Book*, in 1984 about 56% of cities with populations over 2,500 operated under the mayor-council form of government and about 35% operated under the council-manager form.[17]

For this analysis we study newspaper coverage of three local offices: mayor, city council, and city manager. For each newspaper i we collect the total number of mentions of each of these offices in each year t.[18] Denote these by $Mayor_{it}$, $Council_{it}$ and $Manager_{it}$, respectively. We then construct three variables:

$$Relative\ Coverage\ of\ Mayor_{it} = \frac{Mayor_{it}}{Mayor_{it} + City\ Manager_{it} + City\ Council_{it}},$$

$$Relative\ Coverage\ of\ City\ Manager_{it} = \frac{City\ Manager_{it}}{Mayor_{it} + City\ Manager_{it} + City\ Council_{it}},$$

$$Relative\ Coverage\ of\ City\ Council_{it} = \frac{City\ Council_{it}}{Mayor_{it} + City\ Manager_{it} + City\ Council_{it}}.$$

Since the position of city manager position does not even exist in a city prior to the adoption of a council-manager form of government, coverage of this office may "automatically" increase. (Of course, if the position has little actual power, then coverage might not increase, or might increase only slightly. For example, minor bureaucratic positions in national, state, and local governments are constantly be created and eliminated and these changes are not reflected in newspaper coverage because they are too unimportant to be covered.) We therefore also construct a fourth variable that only compares the coverage of the mayor and the city council, both of which exist before and after the reform:

$$Relative\ Coverage\ of\ Mayor\ vs.\ Council_{it} = \frac{Mayor_{it}}{Mayor_{it} + City\ Council_{it}}.$$

We also identify the year in which the home city of each newspaper switched its form of government from the strong mayor (mayor-council) form to the weak mayor (council-manager) form.

[15] The mayor's powers also vary across mayor-council governments, and some are weak relative to others. However, most observers agree that when cities switched to the council-manager form of government, the office of mayor in those cities almost always lost power relative to what they enjoyed under the from the mayor-council form.

[16] According to a 1996 survey by the National Civic League, 61% of council-manager cities have popularly elected mayors, and in 11% of these the mayor is granted veto power. See http://www.citymayors.com/government/council-managers.html.

[17] The main other city government forms are commission, town meeting, and representative town meeting.

[18] Again we searched for regular expressions that take into account some of the errors in the OCR.

Some cities never switched, or switched in a year outside the period for which we have local newspaper coverage. These are not included in the figures, although they can be included in the panel regressions (to help estimate the year fixed-effects).

For each city, define year 1 as the first year the city operated under the council-manager form of government rather than the mayor-council form. Figure 3 shows the average values of the *Relative Coverage* variables over the 20 years before and after the changes in the form of government, pooling over all cities that switched. Two time series are displayed. The first, in green circles, reflects the "treatment path," that is, treated cities before and after they enact the reform. The second series, in gray squares, represents the difference-in-differences "control" series. This is computed as the average, for each year, of all cities that have not enacted the reform yet.

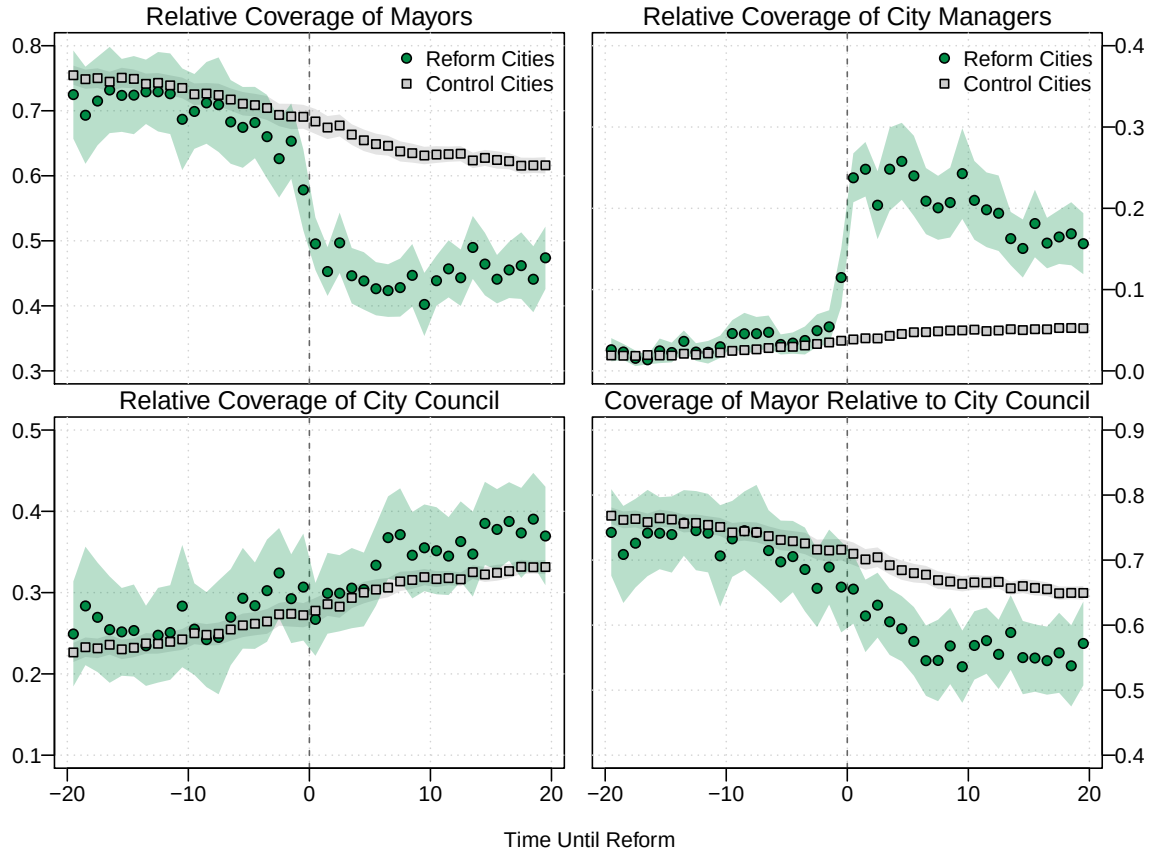
Evidently, there is a dramatic change in coverage due to the change in the form of government. The *Relative Coverage of Mayor* variable, plotted in the top left panel, falls sharply for reform cities, from about 80% of the mentions to only about 50%. This drop is much sharper than that displayed in the control cities over the same time period.

This is a large drop, and we are likely understating its magnitude due to several features of the data. First, some reforms occur earlier or later in the calendar year, so that the last year before "treatment" may be a combination of pre- and post-reform coverage. This is a likely reason why the final pre-reform point in the plot is somewhat lower than those before it. Second, though we have been careful to use contextual words to avoid too many false positive hits for "mayor," we are likely to still be including a fair number, and these are more likely to present a higher proportion of this after reform than before it.

The *Relative Coverage of City Manager* variable, plotted in the top right panel, increases sharply, from only about 5% of the mentions to more than 25%. Again, this change is far sharper than that displayed in the control cities. Again, we are likely understating the magnitude of this increase. The final pre-reform point, like in the previous plot, appears to be anticipating some of the effect of the reform—likely due in part to anticipatory coverage of the reform itself, but also because of the remaining errors of timing and false positives discussed in the previous paragraph.

It is less clear what to expect regarding *Relative Coverage of City Council*, although we might expect to see an increase in coverage since the city council is the body with the power to appoint and dismiss the city manager. The bottom left panel of Figure 3 shows that mentions of the city

Figure 3 – Relative Coverage of City Offices Over Time. City government reforms are seen to reduce the measured power of mayors and increase that of city managers and city council members.



Note: Shaded regions represent 95% confidence intervals. Gray square points reflect annual averages for "control" cities that have not switched to the city manager form of government; green circles reflect annual averages for "treated" cities before and after they switch.

councils trend upward over the years before and after the switch to the council-manager form of government, although there is no discontinuous jump around the year the switch took place.

Finally, the bottom right panel of the figure investigates the coverage of mayors relative only to the city council, excluding discussion of city managers. This addresses the possibility that there is a "mechanical" fall in the relative coverage of mayors, and a concomitant rise in the relative coverage of city managers, simply because the phrase "city manager" enters the public lexicon. Excluding city manager counts to avoid this potential issue, we continue to see a decrease in the coverage of mayors after the reform.

Many of the mentions in a given city's newspaper refer to the mayors, city managers, and city councils of *other* cities. This is one reason that *Relative Coverage of Mayor* remains at a rather high level even after a city switches to the council-manager form of government. Unfortunately, filtering out these mentions is difficult. In the Appendix in Figure A.3, we attempt to improve the analysis. We do so by limiting attention to mentions in which the name of the newspaper's home city appears near the relevant search string ("mayor" or "city manager" or "city council").[19] The basic patterns are the same as above.

Table 2 presents regression results for the full set of cities in our sample (not just those that changed government form).[20] Let $Council-Manager\ Govt\ Form_{it}$ be 1 if city i operated under the council-manager form of government in year t and 0 if city i operated under the mayor-council form. We exploit the panel structure of the data, and the fact that different states adopted the reforms in different years, using a difference-in-differences approach. More specifically, we include city and year fixed-effects in all specifications, and estimate models of the form:

$$Relative\ Coverage\ of\ Mayor_{it} = \alpha_i + \theta_t + \beta\, Council-Manager\ Govt\ Form_{it} + \epsilon_{it}$$

Not surprisingly, the estimates in Table 2 confirm the patterns shown in Figures 3 and A.3, and also show that the estimated changes in *Relative Coverage* are highly statistically significant. The *Relative Coverage* variables appear to capture rather well the clear change in relative power associated with the changes in city government structure. In the Appendix, we also re-estimate these results including city-specific time trends to relax the so-called "parallel-trends" assumption of the diff-in-diff. Results are highly similar. Again we see a large drop in the coverage of the mayor.

[19] Note that this misses a large number of "correct" mentions. For example, newspapers often give the name of the mayor or city manager near the relevant search string, rather than the name of the city. A better idea is to limit attention to mentions in which the name of the newspaper's home city or the name of the mayor (or city manager) appears near the relevant search string. This, however, requires lists of all of the mayors serving during the relevant time periods for all cities in our sample. We are currently compiling these lists, but do not have them yet.

[20] We restrict attention to cities that operated either under the mayor-council or council-manager form of government, and for which we have at least 10 years of newspaper coverage.

Table 2 – Impact of Switch from Mayor-Council to Council-Manager City Government. Results from a difference-in-differences design suggest that the reform causes a large decrease in the relative coverage of mayors.

	All Mentions		Using City Name Filter	
	Relative Coverage of Mayor	Relative Coverage of City Manager	Relative Coverage of Mayor	Relative Coverage of City Manager
Council-Manager Govt Form	-0.26 (0.04)	0.24 (0.06)	-0.27 (0.07)	0.29 (0.05)
N	2601	2601	1721	1721
City Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Standard errors, clustered by city, are in parentheses.

4.4 The Massachusetts Executive (Governor's) Council

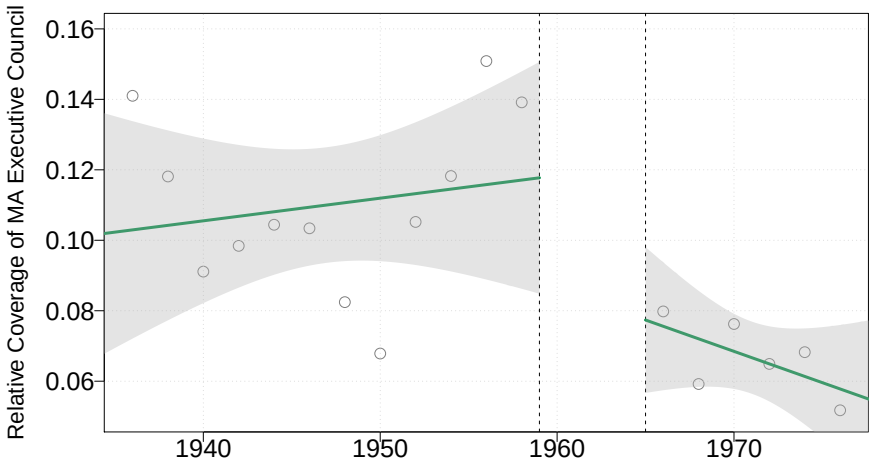
The Massachusetts Governor's Council, also known as the Executive Council, is composed of eight individuals elected from districts (plus the Lieutenant Governor who serves ex officio). The eight councillors are elected from their respective districts every two years.

In 1964, Massachusetts voters passed a ballot question that stripped the Executive Council of its statutory powers (the changes went into effect on December 3, 1964). The reform followed a scandal in the late 1950s and early 1960s involving the sale of judicial positions; five members of the council were eventually indicted on bribery and corruption charges. Prior to this, the governor needed to obtain the Council's approval for almost all gubernatorial appointments, all highway and waterway contracts, all land-taking by eminent domain, all state leases and rentals, to determine which banks could hold state funds in deposit, and to determine which out-of-state insurance companies could operate in the state. Starting in December 1964, the governor did not need Council approval for these actions. The main powers left to the Executive Council were its constitutionally mandated powers, most prominently the power to confirm judicial appointments and pardons.

Most observers viewed the reform as a significant shift in power from the Executive Council to the governor's office. One journalist wrote: "stripping the council of all its statutory powers... effectively gives the governor full and complete rein over the administrative functions of the state government."[21] Another noted that the next governor will have "more power than any since those

[21] S.J. Micciche, "Reform Forces Riding High," *Boston Globe*, Nov. 22, 1964, page A-4.

Figure 4 – Relative Coverage of the Massachusetts Executive Council Over Time. The reform that stripped the Massachusetts Executive Council of its powers appears to decrease the coverage of the Executive Council relative to that of the Governor, who absorbed the power previously held by the council.



Note: The plot omits the years 1959–1965, during which discussion of the council spiked because of the scandal.

of Colonial times... wide appointive and contractual powers previously controlled by the Executive Council – and a four-year term in which to exercise them.[22]

The variables and analysis are analogous to those in the previous subsection. Summing over all available Massachusetts newspapers, we collect the total number of mentions of Executive Council or Governor's Council and the total mentions of Governor in each year t.[23] Denote these by $Executive\ Council_t$ and $Governor_t$. We then construct the variable:

$$Relative\ Coverage\ of\ Executive\ Council_t = \frac{Executive\ Council_t}{Executive\ Council_t + Governor_t},$$

We drop the years of the scandal since some of the coverage of the Executive Council was about the scandal itself. In fact, *Relative Coverage of Executive Council* is higher during those years than during the 1957-1958 period.

[22] In 1964 Massachusetts voters also passed a ballot question that increased the governor's term from two to four years. Some observers argued that this also increased the power of the governor.

[23] Again we searched for regular expressions that take into account some of the errors in the OCR,

Figure 4 presents the results. In the figure, we plot the relative coverage using the full universe of newspapers in our dataset. We see that there is a notable drop in the relative coverage of the council after the reform.[24]

4.5 The Reciprocal Trade Agreement Act

In 1934 Congress passed and President Roosevelt signed the Reciprocal Trade Agreement Act (RTAA). This law gave the President the authority to negotiate reciprocal tariff agreements with other nations. These agreements could increase or a decrease import duties by up to 50 percent, and did not require congressional approval.

There is widespread agreement that this act represented a substantial transfer of power over tariff policy, from Congress to the President. For example, Haggard (1988: 112) writes that in passing the RTAA "the most important issues at stake in 1934 were institutional, centering on the transfer of authority from Congress to the executive." Irwin (1998: 325) writes: "From the Civil War up to the Smoot-Hawley tariff of 1930, Congress retained exclusive authority over U.S. tariffs, which for the most part consisted of a single-column schedule of nonnegotiable, nondiscriminatory import duties... [With the RTAA], Congress granted the president the authority to reach tariff reduction agreements—agreements that did not require congressional approval—with foreign countries." Kaplan (1996: 45) writes: "the RTA Act would significantly reduce the power of Congress in the tariff-making process.'[25,'26]

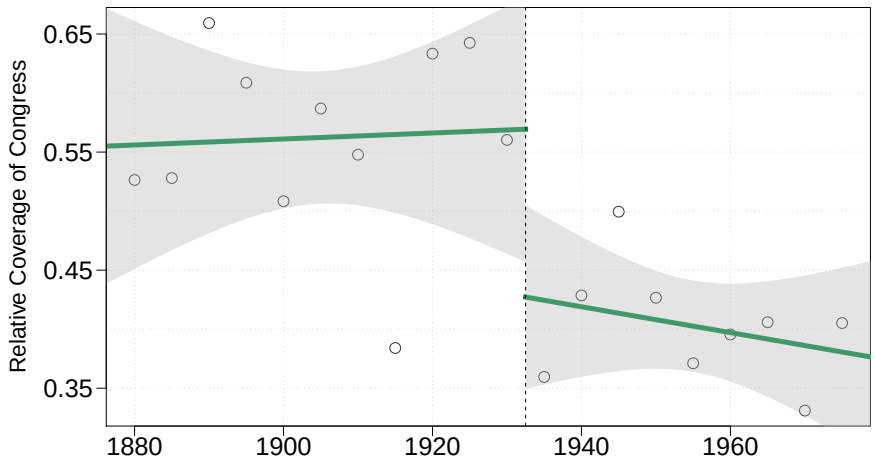
As another check on the idea that media coverage can be used to measure power, we examine whether coverage of tariff policymaking shifted away from Congress and toward the President after the passage of the RTAA. More specifically, to measure the coverage of Congress in tariff policymaking we include all cases where "congress" or "house" or "senate" appeared within five words of "tariff"—call this *Congress*. Similarly, to measure the coverage of the President in tariff

[24] In the Appendix, we employ a robustness check in which we focus on coverage only in the Boston Globe, the largest newspaper in the state. We find the same pattern—perhaps stronger—in this second case. See Figure A.4.

[25] For more such quotes, see: Shoch (2001: 56); Schnietz (2000: 417); Boudreaux (2008: 121); and Irwin (2009: 221).

[26] Congress did not cede permanent authority to negotiate tariffs to the President, but set the RTAA to expire every three years or less. However, as many scholars point out, extending the RTAA was quite different than passing bills containing the entire schedule of tariffs for all imported goods across the entire country. The RTAA was renewed in 1937, 1940, 1943, 1945, 1948, 1949, 1951, 1953, 1954, 1955, 1958. In 1962 Congress passed the Trade Expansion Act of 1962, granting the President authority for five years to enter into agreements that negotiated the reduction or elimination of tariffs. That act also expanded Congress's role in the negotiating process, by requiring the President to submit for congressional review a copy of each concluded agreement and a presidential statement explaining why the agreement was necessary." See, e.g., Fergusson (2015) and Bailey, Goldstein and Weingast (1997).

Figure 5 – Relative Coverage of Congress in Tariff Policymaking. The measured power of Congress in the realm of tariff policy decreased abruptly after the passage of the RTAA.



policymaking we include all cases where "president" or "administration" appeared within five words of "tariff"—call this *President*. We then make the share of coverage devoted to Congress in each time period t:

$$Relative\ Coverage\ of\ Congress_t = \frac{Congress_t}{Congress_t + President_t}.$$

Figure 5 shows a graph of *Relative Coverage of Congress* over time. We average over 5-year periods, so the point labeled 1930 covers the years 1930-1934, the point labeled 1935 covers 1935-1939, etc. The figure shows clearly that newspaper coverage of Congress relative to the President fell sharply after 1934. Before the RTAA Congress had about about 55% of the mentions, while after the RTAA this fell to only about 40% of the mentions. This is what we expect if relative newspaper coverage is a reasonable proxy for the relative power of the two branches over tariff policy.

The outlier in the pre-1935 period, covering the years 1915-1919, covers the years in which the U.S. was directly involved WWI and during which the Wilson administration fought for the League of Nations. It is possible that these events contributed to the exceptionally high relative coverage of the president during this period. Finally, we should note that an OLS regression shows that the change is highly significant statistically as well as substantively.

4.6 Summary

In this section, we have presented a variety of analyses that suggest that we can use newspaper coverage to measure the relative power of political actors. First, newspaper coverage of Congressional committees appears to offer an accurate view of which committees are more powerful, and more sought after by members of Congress, than others. Second, newspaper coverage of members of Congress increases markedly when those members become Speaker of the House, and falls when they stop being Speaker. Third, city government reforms that reallocate power from the mayor to the city manager and city council appear to cause a sharp decrease in newspaper coverage of mayors and a simultaneous rise in the coverage of the newly empowered actors. Fourth, a reform to the MA Executive Council that stripped it of many of its powers appears to produce a marked decrease in newspaper coverage of the council. Finally, we also showed that the passage of the RTAA appears to correspond with a sharp decrease in newspaper coverage of Congress in tariff-related discussions. Taken together, these five validity tests suggest, first, that newspaper coverage is a meaningful indicator of political power and, second, that it is applicable to a broad set of political offices and contexts.

5 When Did State Party Committees Decline? A Brief Example Application

Having validated our newspaper-based measure of power, we now offer a brief example of its value by applying it to study the power of state and local party committees across U.S. history. There is a pervading sense that these committees were once powerful but no longer are, but it is difficult to identify the precise timeframe over which this decline occurred (if, indeed, it did).

To measure the relative power of state and local party committees, we proceed as follows. First, for each state i and year t, define $\textit{Party Mentions}_{it}$ as the total number of times, summing across all newspapers in the state, that the following occurs: the word "committee" appears after either the word "Democratic" or "Republican" or "GOP" (within 5 words), and after one of the words "state" or "county" or "district" or "local" or "central" or "executive" or "regular" or "organization" (within 5 words).[27] This is designed to capture all references to committees such

[27] Also, we drop all cases where the word "national" appears in the 5 words prior to the word "committee."

as the Illinois Democratic state central committee, the Montgomery county Republican executive committee, the 7th congressional district Democratic committee, and so on.

Next, for each state i and year t, define *Election Word Mentions*$_{it}$ as the total number of times at least two words from the following list appears in a newspaper in the state, within 5 words one another: "Democrat" "Democratic," "Republican," "GOP," "vote," "election" "elected," "campaign," "incumbent," "ballot," "turnout," and "party." We include common variants—e.g., for "vote" we also include "voter" and "voted."

We then define:

$$\textit{Relative Party Mentions}_{it} = \frac{\textit{Party Mentions}_{it}}{\textit{Election Word Mentions}_{it}}.$$

For some purposes (e.g. making figures) we further normalize this measure so that it has a mean of 1 in each state.[28]

5.1 Correlation with Mayhew TPO Scores

On the basis of an exhaustive reading of secondary sources, Mayhew (1986) assigns "traditional party organization" (TPO) scores for each state on a scale from 1 (weak) to 5 (strong). As he notes, these scores are meant to capture the organizational strength "in the late 1960s" (Mayhew 1986: 6). If we consider the period 1966-1970, the correlation between *Party Mentions* and TPO is 0.56. If we focus just on the years 1968-1970 the correlation is even better, 0.63. This gives us some initial confidence in applying our measure to state party organizations.

[28] Since our premise is that newspaper coverage should generally be used to measure *relative* power, we believe a better measure would be the following: Let *Candidate Mentions*$_{it}$ be the total number of times, summing across all newspapers in the state, candidates for major offices (governor, U.S. senator, and U.S. representative) are mentioned. Then, define:

$$\textit{Relative Party Mentions}_{it} = \frac{\textit{Party Mentions}_{it}}{\textit{Party Mentions}_{it} + \textit{Candidate Mentions}_{it}}$$

We have not yet constructed this measure, because we have not yet figured out how to accurately make *Candidate Mentions*. Many candidates have very common names. We are currently working on ways to eliminate false positives for such names, by requiring that words such as "election," "vote" or "campaign" appear near the name.

5.2 Patterns of Party Committee Power Over Time

Most scholars argue that state party organizations were especially powerful in the late 19th century. For example, Reichley (1992, 129-130) notes that in the late 1800s: (i) under the leadership of Matthew Quay, the Pennsylvania Republican state party committee received 2% of the salaries of all patronage workers, giving the organization a budget of about $24 million per year to pay about 20,000 full-time and part-time party workers; (ii) similarly, the state Republican organization built by Thomas C. Platt raised about $20 million per year and funded about 10,000 workers; (iii) similar state Republican organizations were built in Illinois, Michigan, Ohio, and Wisconsin; (iv) smaller organizations were also maintained in some of the great plains states.

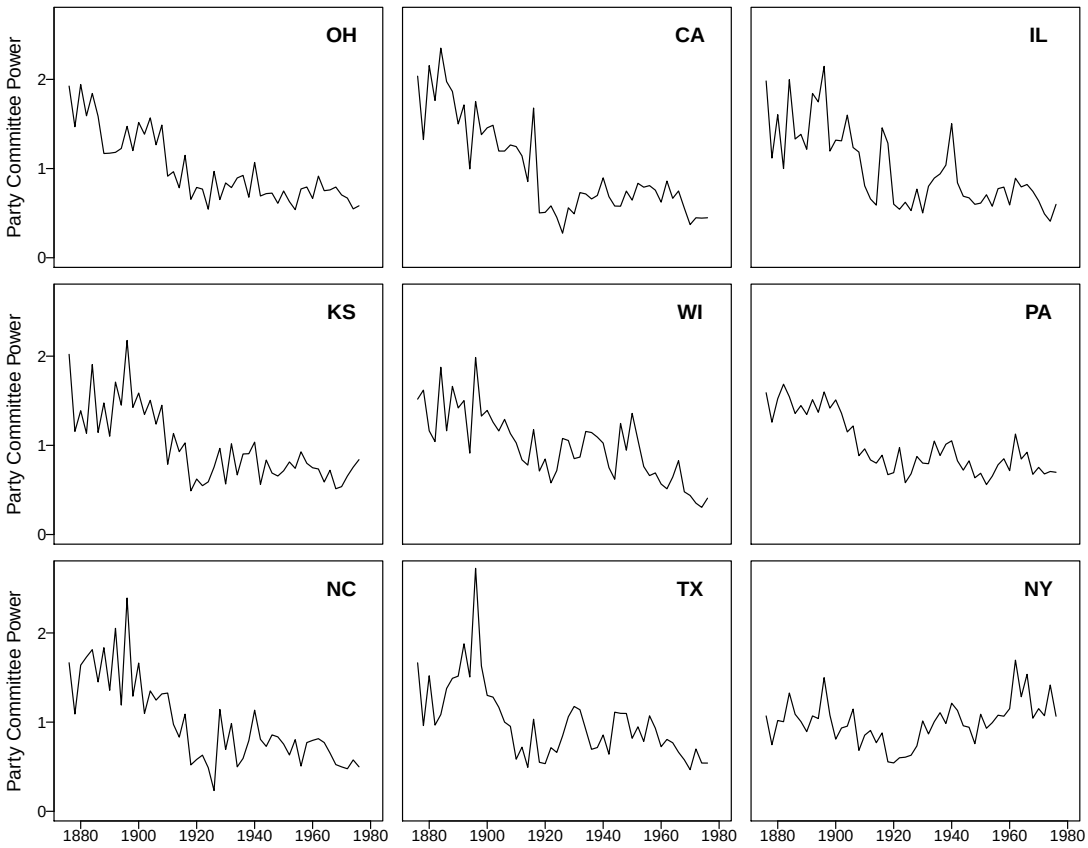
Many city and county-based organizations continued as powerful patronage machines much longer—in some cases through the 1950s and even into the 1960s. Powerful urban party organizations existed in New York City, Chicago, Philadelphia, Pittsburgh, St. Louis, Baltimore, Cleveland, Memphis, New Orleans, Albany, Pittsburgh, Kansas City (MO), Jersey City, Hartford, New Haven, and a host of others; strong suburban organizations existed in Nassau and Suffolk counties (NY), Bucks, Delaware and Montgomery counties (PA), and elsewhere.[29]

Some states had powerful state or local organizations in the late 19th and early 20th centuries that collapsed during or shortly after the progressive era. In California, for example, the Southern Pacific Railroad controlled both of the major state parties in the late 1800s, and Abe Rouf ran a powerful party machine in San Francisco in the early 1900s (by far the largest city in the state at the time). As (Macy 1918: 198) put it, "California has long been classed with Pennsylvania as a State ruled by the Republican machine."[30] By the late 1960s, however, the situation had changed dramatically. Mayhew (1986: 185) could confidently write: "There is no point in dwelling on California's well-known Progressive tradition, which is demonstrated in its hostility toward parties,

[29] See, e.g., Josephson (1963), Kehl (1981), (Mayhew 1986).

[30] (Macy 1918: 198) continues as follows: "In both states the machine developed according to the highly efficient one-man type, the type originated by corporation business experience. In both the unit of local government is the county, and county party committees are prominent. But the California machine was never a mere copy of that in the older State. In Pennsylvania the Republican party, organized and managed like a business corporation, has made all other corporations and the general public subject to its dictations. In California the political machine was originally created as auxiliary to the one controlling corporation, the Central, later the Southern Pacific Railroad. The railroad here has dominated political parties, other corporations and the general public. The machines of both parties in San Francisco and the State have been ruled from the political office of the Southern Pacific and have been so operated as first of all to guard its interests."

Figure 6 – Party Committee Power Over Time in Nine U.S. States. Plots our coverage-based measure of state party committee power over time for Ohio, California, Illinois, Kansas, Wisconsin, Pennsylvania, North Carolina, Texas, and New York.



lack of patronage, nonpartisan city elections in form and ordinarily in fact, week or nonexistent precinct and ward organizations, and assertive individual candidacies."

Figure 6 shows scatterplots of *Relative Party Mentions* over time in 9 states. Overall, the measure seems consistent with many salient patterns identified in the literature. The general decline over time is clear, but in some states—e.g. New York, Ohio, and Illinois, three states with Mayhew (1986) TPO scores of 5 in the late 1960s—the decline is much less pronounced. Our analysis thus suggests that there has indeed been a steady decline in the power of state party organizations, but that this decline has been uneven across states.

6 Conclusion

In this paper, we have argued that we can use newspaper coverage of relevant political actors as a measure of their political power, under certain conditions. We have introduced a dataset of over 50 million historical U.S. newspaper articles, and we have validated our resulting measures of political power in a variety of ways. We have shown that newspaper coverage of political actors decreases in times when they hold less powerful positions and increases when they hold more powerful ones, and we have shown that the measure correlates well with several existing measures of particular forms of political power.

We believe the measure has several strengths that will make it valuable for future work. First, the measure is historically comprehensive, covering an important 100-year period of American history. This period covers all manner of reform and upheaval in the American political process, including two world wars, the expansion of suffrage, Prohibition, the progressive reforms, McCarthyism, the Voting Rights Act, and Watergate, among many others. The study of all these events, and many more, concerns fundamental questions about who holds power, when they hold it, and why they are able to do so.

Second, the measure is broadly applicable; in our validity tests, we apply it to Congressional committees, to Congressional leaders, to the president, and to local municipal governments—a set that spans a variety of offices as well as individual actors. There is no reason to think it could not be extended further, to other political actors and other offices in other contexts. The measure can therefore facilitate further research in well-developed fields (e.g., Congress, the bureaucracy), and also encourage new research in contexts that have received less scholarly attention (e.g., local government).

Of course, the measure is not without its limitations. While in many instances coverage may indicate political power, it also results from other sources, such as "celebrity" coverage. In many applications this may mainly add noise to the measure, which is not overly problematic when it is used as a dependent variable in an analysis. In cases where the political actor or office in question has significant personal appeal or celebrity status, however (e.g., the U.S. president) the measure is likely to break down. Researchers who apply our measure in other contexts must always take care to validate its use and consider alternative explanations for how the measure fluctuates.

Because power is at the core of political science, measuring it in data is an important task for empirical researchers. The newspaper-based measure we have put forward in this paper offers researchers a chance to study power in American politics in a variety of ways. In addition, the arguments we have made, and the validity tests we have performed, should aid researchers in constructing similar newspaper-based measures for other countries and other time periods. Though newspapers have many reasons to publish what they do, the overall frequency with which they cover political actors indicates who is powerful.

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A. 1 Information on Dataset

In this section, we describe in detail the dataset on newspapers that we have compiled.

A. 1.1 Summary of Data

The dataset consists of a stratified sample of pages printed in U.S. local newspapers initially published during the period 1877-1977 and later reproduced by Newspapers.com. The stratification works as follows. As new pages are added to the dataset, they are assigned a number based on the newspaper issue in which they belong. We sample all pages that end with the integers 1, 2, ..., 7. At any given moment in time, we thus sample 70% of the existing newspaper data, but because new data is added all the time, we cannot offer a precise percentage for future dates.

Each page in our dataset is a string of characters and spaces extracted by Newspapers.com from scanned copies of the original newspaper pages using OCR techniques, and each page is connected to the following meta data: name of newspaper, publication date, page number, state, county and city of publication. In total, the dataset contains approximately 50 million unique pages from 2700 newspapers distributed across approximately a thousand counties in the US.

A. 1.2 Geographical Coverage

Using this metadata we count the number of pages and newspapers in each state and report this in the map in Figure A.1. The dataset geographically covers all states, and approximately a third of all counties appear in the dataset at some point during the studied period. The dataset roughly reflects the population density over the studied period. The states that most frequently appear in the dataset are PA, TX, CA, IL, OH (ranging from 3-6 million pages), whereas less populated states such as WY, ME, RI, VT each contribute with approximately 100,000 pages. Table A.1 reports the exact number of pages for each state.

A. 1.3 Temporal Coverage

Using the publication dates obtained from the meta data, we count the total number of pages published each year in the four Census regions. These numbers are reported in Figure A.2. The graph illustrates that the number of newspaper pages increase over the first 30-40 years, then stagnates until the late 1940s and then rapidly grow over the rest of the studied period. The temporal patterns are fairly consistent across regions.

Figure A.1 – Geographical Distribution of Pages and Newspapers in Dataset. Darker shaded areas reflect more pages. The digits on the map report the total number of unique newspapers in the state that appear in the sample.

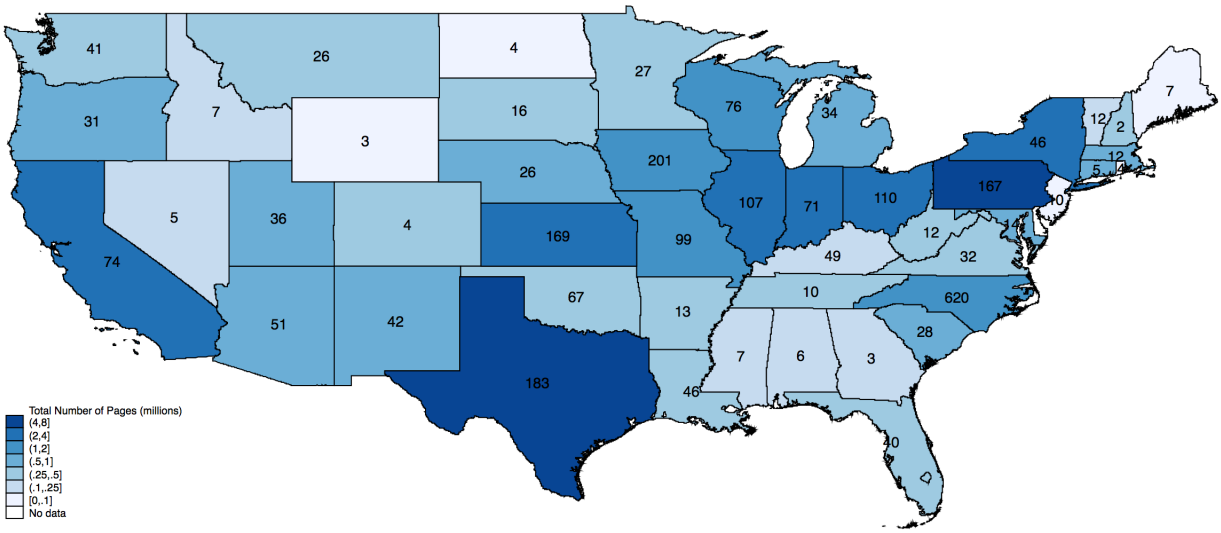


Figure A.2 – Yearly Number of Pages in Sample by Region.

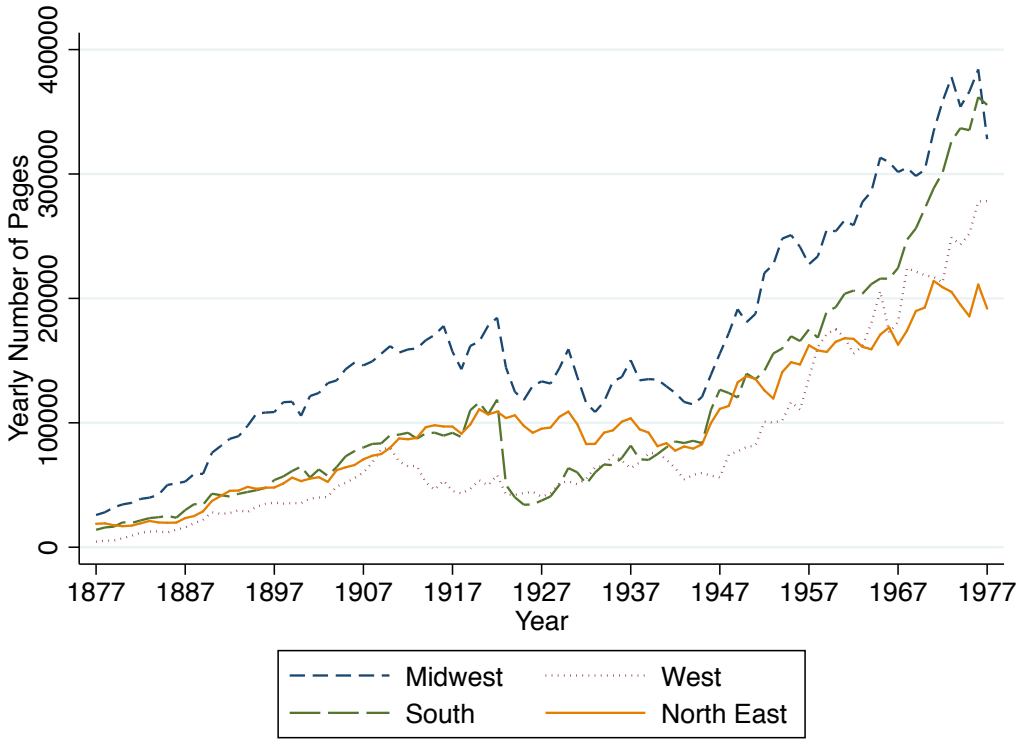


Table A.1 – Number of Pages, Newspapers and Counties in Dataset by State

	1877-1902			1903-1927			1928-1952			1953-1977			Total		
	Pages (1000s)	Papers	Counties	Pages (1000s)	Papers	Counties	Pages (1000s)	Papers	Counties	Pages (1000s)	Papers	Counties	Pages (1M)	Papers	Counties
AK	0.0	1	1	4.0	5	2	17.4	3	3	80.9	2	2	0.1	8	4
AL	0.0	1	1	4.4	1	1	66.3	4	3	127.5	2	2	0.2	6	4
AR	0.4	2	1	4.5	2	1	83.9	8	5	208.2	9	5	0.3	13	6
AZ	40.8	29	11	92.6	23	11	96.1	9	7	443.0	11	7	0.7	51	12
CA	244.0	25	12	607.5	34	15	653.9	28	16	2136.7	43	18	3.6	74	24
CO	4.9	2	2	2.9	2	2	40.1	1	1	251.1	3	2	0.3	4	3
CT	3.1	1	1	33.5	1	1	25.2	3	2	480.3	5	3	0.5	5	3
DC	180.1	17	1	449.1	10	1	0.0	0	0	0.0	0	0	0.6	21	1
FL	5.2	12	11	33.4	34	19	16.4	3	2	216.1	5	5	0.3	40	21
GA	56.8	2	2	90.8	2	1	0.0	0	0	0.0	0	0	0.1	3	2
HI	49.0	13	3	68.8	10	4	0.0	0	0	0.0	0	0	0.1	16	4
IA	100.9	79	29	135.3	40	18	379.1	104	61	628.7	114	65	1.2	201	78
ID	12.9	1	1	0.4	1	1	48.1	5	3	131.0	3	3	0.2	7	5
IL	323.3	47	19	579.0	48	15	599.0	45	18	1338.3	56	19	2.8	107	30
IN	249.6	37	15	657.3	37	16	480.0	29	20	981.2	31	17	2.4	71	23
KS	576.8	133	50	944.4	100	48	122.3	13	11	446.9	13	12	2.1	169	58
KY	109.4	35	25	101.3	39	28	16.0	1	1	17.8	3	2	0.2	49	31
LA	80.7	30	21	42.0	28	21	60.4	4	2	167.3	4	3	0.4	46	27
MA	55.5	9	4	82.5	7	3	130.7	5	3	248.6	6	3	0.5	12	4
MD	23.0	8	5	43.7	8	6	238.8	9	6	627.6	11	7	0.9	14	7
ME	15.4	2	1	0.0	0	0	10.0	2	1	28.4	3	2	0.1	7	4
MI	20.5	21	5	54.3	9	4	233.1	15	10	511.7	14	9	0.8	34	11
MN	79.9	19	14	93.6	17	13	24.2	4	4	148.0	8	5	0.3	27	17
MO	136.6	49	26	345.1	67	27	448.0	39	17	865.2	27	14	1.8	99	33
MS	0.0	0	0	5.3	4	2	34.1	4	2	83.7	1	1	0.1	7	2
MT	21.2	11	7	70.5	13	12	151.6	9	6	255.2	8	6	0.5	26	16
NC	388.4	490	80	845.8	234	75	149.4	36	24	415.8	12	10	1.8	620	84
ND	18.6	4	1	41.6	2	1	28.7	1	1	8.9	1	1	0.1	4	1
NE	52.5	19	13	137.5	19	14	214.1	6	3	305.1	5	3	0.7	26	16
NH	5.2	1	1	28.4	1	1	48.5	2	2	177.7	2	2	0.3	2	2
NJ	16.7	8	4	47.1	4	3	7.8	2	2	16.9	3	3	0.1	10	5
NM	28.6	19	12	38.5	23	15	135.8	9	9	556.6	16	13	0.8	42	23
NV	18.7	3	1	30.5	2	1	51.8	2	1	54.4	3	1	0.2	5	1
NY	291.4	22	10	660.6	24	11	549.2	22	15	701.6	18	13	2.2	46	17
OH	230.9	63	32	524.6	58	26	762.4	37	23	1262.5	47	28	2.8	110	42
OK	29.3	25	12	169.6	35	15	72.9	22	9	163.2	13	7	0.4	67	21
OR	49.4	16	11	205.2	26	15	199.8	8	5	105.2	6	5	0.6	31	16
PA	481.2	101	50	1332.0	89	42	1705.2	73	36	2547.3	69	33	6.1	167	55
RI	8.4	2	1	9.1	2	1	16.8	3	1	64.8	3	1	0.1	4	1
SC	25.3	22	15	88.5	19	13	127.0	5	4	268.1	4	4	0.5	28	16
SD	28.6	10	4	66.7	8	3	71.7	8	5	152.1	6	4	0.3	16	5
TN	3.5	6	5	6.9	1	1	69.9	4	1	198.2	3	1	0.3	10	5
TX	143.8	44	30	472.5	82	45	1100.2	85	53	2917.8	106	61	4.6	183	72
UT	94.8	18	7	169.1	28	10	231.3	4	3	460.1	5	4	1.0	36	11
VA	97.3	25	18	51.2	21	17	49.4	2	1	217.3	4	3	0.4	32	22
VT	22.0	12	9	12.1	6	6	0.0	0	0	67.0	1	1	0.1	12	9
WA	15.2	16	10	53.3	29	16	16.8	5	4	217.0	5	3	0.3	41	21
WI	70.9	38	20	221.2	27	20	226.6	29	18	708.3	21	15	1.2	76	32
WV	0.9	2	1	20.4	6	4	58.2	4	3	310.3	8	5	0.4	12	6
WY	0.0	0	0	0.8	3	3	0.9	1	1	1.5	1	1	0.0	3	3
All States	4511.9	1552	615	9779.6	1291	630	9869.1	717	428	22320.9	744	434	46.5	2700	916

Table A.2 – The 50 Most Common Newspapers in Dataset.

Newspaper	Pages	First Year	Last Year	State
Abilene Reporter-News	452,252	1926	1977	TX
Albuquerque Journal	312,826	1882	1977	NM
Alton Evening Telegraph	235,141	1853	1972	IL
The Bridgeport Post	273,910	1947	1977	CT
The Bridgeport Telegram	227,785	1918	1977	CT
The Brooklyn Daily Eagle	457,294	1841	1955	NY
Chicago Daily Tribune	257,688	1849	1922	IL
The Chillicothe Constitution-Tribune	224,239	1890	1988	MO
The Cincinnati Enquirer	195,487	1841	1923	OH
The Corpus Christi Caller-Times	241,515	1912	1977	TX
The Daily Herald	429,998	1886	2006	UT
The Daily Times	205,312	1865	1977	NJ
Delaware County Daily Times	286,222	1876	1977	IN
El Paso Herald-Post	193,431	1931	1977	TX
The Evening News	194,214	1899	1974	MI
The Evening Review	231,344	1885	1977	OH
The Galveston Daily News	319,238	1865	1999	TX
The Gettysburg Times	213,953	1909	2009	PA
The Index-Journal	396,147	1919	2010	SC
The Indiana Gazette	323,554	1868	1981	PA
Indiana Gazette	201,415	1890	2008	PA
The Indianapolis News	193,653	1869	1932	IN
The Kansas City Star	340,728	1881	1976	MO
The Kokomo Tribune	347,354	1868	1999	IN
Lebanon Daily News	247,459	1872	1977	PA
Lincoln Evening Journal	230,925	1912	1976	NE
The Lincoln Star	300,099	1913	1977	NE
Logansport Pharos-Tribune	205,433	1890	2006	IN
Lubbock Avalanche-Journal	316,812	1927	1977	TX
The Morning Herald	427,066	1907	1977	MD
New Castle News	363,846	1891	1978	PA
The New York Times	259,388	1851	1922	NY
News-Journal	198,110	1891	1977	OH
The News-Palladium	229,649	1896	1978	MI
The Ogden Standard-Examiner	309,659	1888	1977	UT
The Oil City Derrick	201,981	1885	1977	PA
Oshkosh Daily Northwestern	219,797	1872	1975	WI
The Ottawa Journal	510,633	1885	1980	PA
The Pantagraph	250,388	1954	2013	IL
The Paris News	237,867	1933	1999	TX
The Post-Crescent	195,471	1861	1976	WI
The Salina Journal	287,177	1951	2009	KS
The Salt Lake Tribune	334,311	1890	1977	UT
The San Bernardino County Sun	698,155	1894	1998	CA
Santa Ana Register	214,518	1906	1977	CA
Santa Cruz Sentinel	482,474	1884	2005	CA
The Sedalia Democrat	219,671	1891	1987	MO
Standard-Speaker	232,882	1961	2000	PA
The Times	742,550	1785	1998	NY
Tucson Daily Citizen	234,102	1941	1977	AZ

A. 1.4 Commands Used to Process Text

It is impossible to extract large amounts of text from old newspapers without any errors. Smeared ink, pictures, poor paper quality, variation in font types, dirty scanners as well as typos in the original articles are among the sources of errors. Most of these errors will be random and add noise to the word counts. To reduce this noise, we follow the common approach of using regular expressions when we search for words. We carefully read through a large number of newspaper pages and compared the OCR text with the original newspaper page. Based on this material, we identified a number of common errors and use the regular expressions outlined in Table A.3 to catch these errors. Before searching in the string, we substitute all upper case characters to lower case.

Table A.3 – Regular Expressions.

Error Type	Correct Character	OCR	Regex	Example
1:1 Substitution	e	c	[ec]	s[ec]nate
	v	y	[vy]	executi[vy]e
	o	c	[oc]	c[oc]mmittee
	i	l	[il]	comm[il]ttee
	t	l	[tl]	commi[tl][tl]ee
	b	h	[bh]	[bh]udget
	g	y,j,q	[gyjq]	bud[gyjq]et
	f	t	[ft]	o[ft][ft]ice
	a	u,o	[auo]	sen[auo]te
1:2 Substitution	m	rm	[m(rn)]	co[m(rn)][m(rn)]ittee

A. 2 Additional Analyses

In this section we offer follow-up analyses and robustness checks to extend the estimates presented in the paper.

A. 2.1 Additional Results on Mayoral Reforms

In this subsection, we perform two additional analyses on the effects of city reforms that stripped the mayor of powers and reallocated them to the city manager. First, in Figure A.3, we replicate Figure 3 from the body of the paper but employing city name filtering. Specifically, we limit the mentions of the word "mayor" to only those that appear near the mention of the mayor's home city. This removes false positives that occur when newspapers discuss *other* cities' mayors. As the plot shows, we continue to find the same pattern of results; in fact, if anything, the decrease in the coverage of mayors and the increase in the coverage of city managers is even more pronounced than before.

Second, we also re-do the formal diff-in-diff estimation from Table 2. The diff-in-diff relies on the so-called "parallel trends" assumption. Here, we assess the robustness of our results by relaxing this assumption. Specifically, we include linear, city-specific time trends. Table A.4 displays the results. As it shows, the results are nearly identical to those in the paper.

A. 2.2 Additional Results on MA Council Reform

In Figure 4, we showed how the coverage of the MA executive council changed after a reform stripping it of many of its powers. In that figure, we used all available newspaper data. Now, we replicate the analysis but only using the Boston Globe, to make sure the results are not driven by our dataset. We thus re-calculate our relative coverage measure using only mentions in the Boston Globe. Figure A.4 presents the results. We continue to see a sharp drop after the reform.

Table A.4 – Impact of Switch from Mayor-Council to Council-Manager City Government. Results from a difference-in-differences design suggest that the reform causes a large decrease in the relative coverage of mayors.

	All Mentions		Using City Name Filter	
	Relative Coverage of Mayor	Relative Coverage of City Manager	Relative Coverage of Mayor	Relative Coverage of City Manager
Council-Manager Govt Form	-0.26 (0.08)	0.26 (0.08)	-0.30 (0.07)	0.34 (0.06)
N	2601	2601	1721	1721
City Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
City-Specific Time Trends	Yes	Yes	Yes	Yes

Standard errors, clustered by city, are in parentheses.

Figure A.3 – Relative Coverage of City Offices Over Time: Filtering Results by City Name. Here we replicate the analysis from Figure 3, but we filter mentions of mayors to only include those where the name of the mayor's city is mentioned nearby in the text. Again, city government reforms are seen to reduce the measured power of mayors and increase that of city managers and city council members.

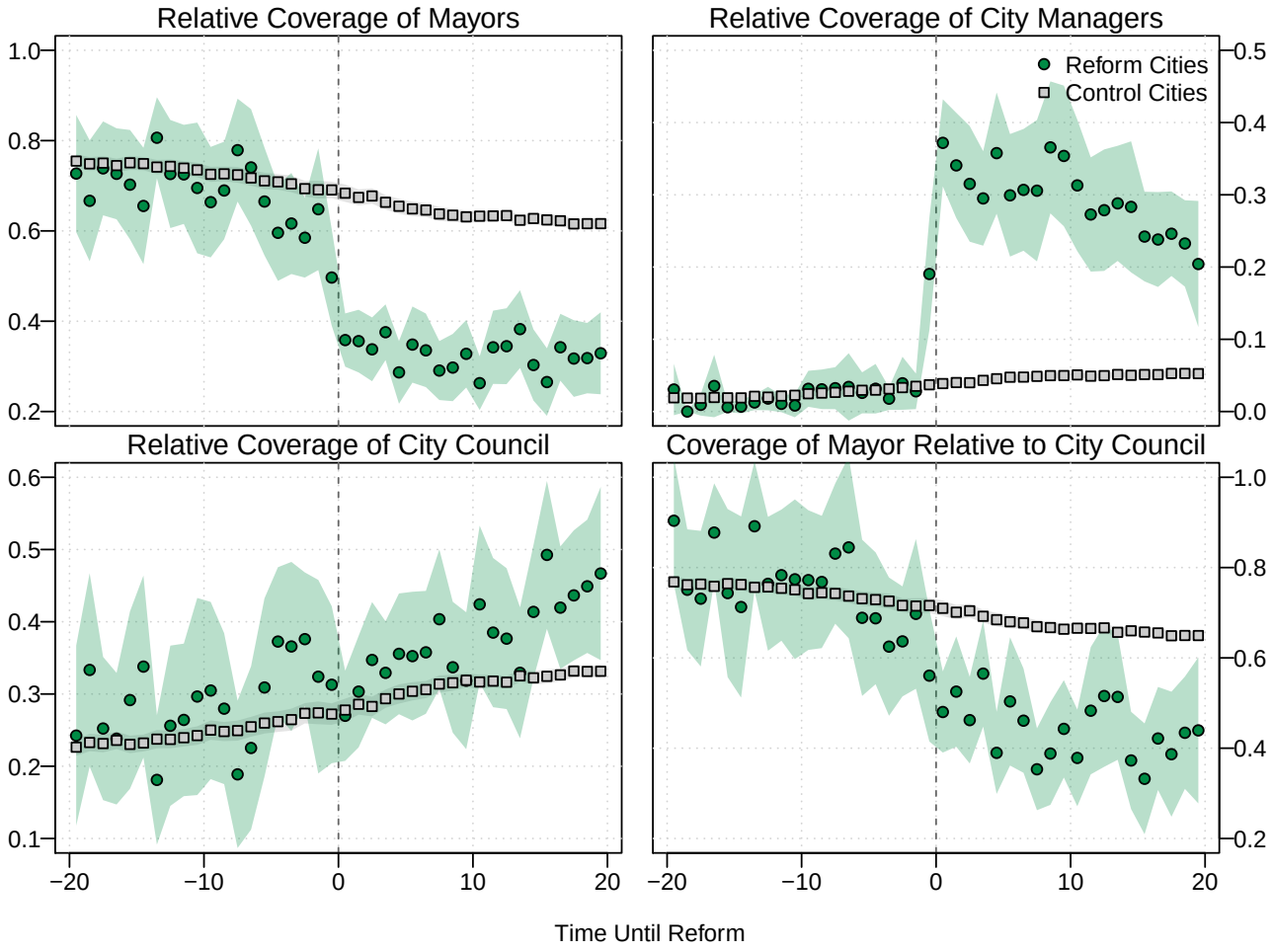
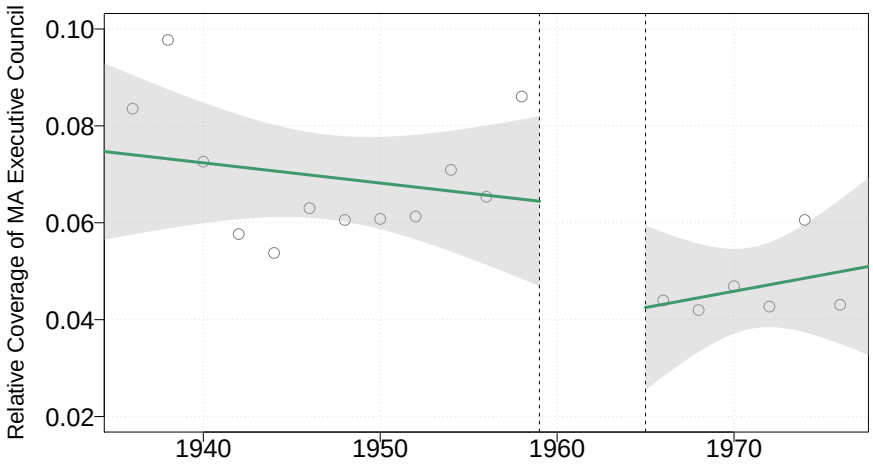


Figure A.4 – Relative Coverage of the Massachusetts Executive Council Over Time: Boston Globe Coverage. The reform that stripped the Massachusetts Executive Council of its powers appears to decrease the coverage of the Executive Council relative to that of the Governor, who absorbed the power previously held by the council.



Note: The plot omits the years 1959–1965, during which discussion of the council spiked because of the scandal.