"One Person, One Vote": The Effect of Direct Elections on U.S. Senators

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Abstract

The 17th Amendment to the U.S. Constitution, ratified in 1913, introduced direct elections for the U.S. Senate, substantially democratizing the existing system of indirect selection by U.S. state legislatures. This paper analyzes the impacts of this reform on measures of each senator's policy priorities constructed from the texts of their floor speeches and records of roll call votes. Using a difference-in-differences strategy comparing Senators with House Members (already directly elected) from the same state as the control group, we find that direct elections move Senators' policy agendas more closely to those associated with the House. The shift in priorities involves an increase in attention to fiscal policy and taxation and reduced attention to infrastructure and immigration, with an overall narrowing in the diversity of topics covered. Consistent with electoral retention motives as a mechanism, the effect is similar when limiting to incumbent Senators and including senator fixed effects. There is no effect of direct elections on the ideological slant of roll call votes, however, suggesting the effect on expressed agendas did not translate into direct effects on enacted policies.

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1. Introduction

Accountability of politicians to the public is a cornerstone of democratic governance. Nonetheless, even within democratic settings, there are differences in institutional frameworks and electoral rules that can lead to diverse outcomes in how public officials conduct themselves. For example, whether elections are majority-based or proportional, or whether there is a runoff system instead of a single-round plurality rule, can significantly affect the types of officials elected and their behavior in office (Alesina, 1995; Persson and Tabellini, 2004; Bordignon et al., 2016). Another key factor influencing politicians' behavior and incentives is whether they are selected through direct or indirect elections. When citizens vote directly for their representatives, it establishes a clear line of accountability, potentially encouraging policies and actions that correspond with public preferences due to stronger electoral pressures. In contrast, indirect elections, where officials are appointed by other elected representatives, can weaken this accountability. This partial separation from voters often reduces the pressure to prioritize citizens' needs and may lead to decision-making influenced by factors such as seniority or party loyalty rather than broad representativeness. While direct elections foster grassroots connections and responsiveness to public demands, the reduced stringency in indirect elections might shift priorities. In this context, the 17th Amendment to the U.S. Constitution, ratified in 1913, represents one of the most significant transitions from indirect to direct elections in American political history. This reform fundamentally altered the dynamics of political accountability by shifting the selection of U.S. Senators from state legislatures to a direct vote by the people.

In this paper, we aim to provide new evidence on the role of the 17th Amendment in shaping representatives' behavior. To analyze this, we use standard techniques in Natural Language Processing (NLP) and quasi-experimental methods to explore how the reform influenced both legislative discourse and voting behavior. Our analysis is based on a comprehensive dataset of approximately 6.5 million speeches delivered by members of Congress from the 46th to the 73rd Congress (1879–1935). To identify the causal effects of the amendment, we employ a difference-in-differences approach that leverages variation across time (before and after the reform) and across chambers (Senate and House). This allows us to isolate the impact of transitioning to direct elections by comparing Senators' behavior to that of House Representatives, who were already directly elected. We use Latent Dirichlet Allocation (LDA), a probabilistic topic modeling technique, to reconstruct legislators' policy agendas over time. LDA identifies thematic structures within speeches, enabling us to analyze shifts in discourse and measure policy agenda similarity between Senators and House Representatives (Blei et al., 2003). By examining textual data (speeches), we assess whether the amendment's effects were affecting Senators' public-facing policy priorities. While previous studies have highlighted associations between the amendment and shifts in senatorial behavior (Bernhard and Sala, 2006; Gailmard and Jenkins, 2009), our analysis builds on this work by employing recent causal inference and NLP methods to provide additional evidence of how the amendment influenced legislative behavior and policy priorities.

Our findings suggest that the 17th Amendment had a significant impact on Senators' behavior, particularly in terms of their policy agendas as expressed in their speeches. Specifically, we show that the reform caused Senators to move their policy focus more closely with that of House representatives, reflecting a shift in their political priorities following the introduction of popular elections. Importantly, our results are not due to the potential selection of "different" politicians following the reform, as the findings remain consistent even when focusing exclusively on incumbent congressmen—those who served both before and after the reform. Furthermore, Senators' policy agendas became more concentrated, with a narrower focus on fewer issues. They increasingly emphasized topics like taxation, economic policy, and democratic representation while reducing attention to areas such as infrastructure and immigration. Finally, we find no discernible effect on their roll-call voting behavior, which we proxy using their ideological alignment DW-NOMINATE (Poole and Rosenthal, 1985). This is coherent with the idea that voting and speeches serve distinct purposes in Congress: speeches allow legislators to flexibly share priorities and connect with voters, while voting is constrained by rules, party dynamics, and negotiation, making it less responsive to direct elections (Gentzkow et al., 2019).

These results are coherent with several theoretical interpretations of the consequences of transitioning from indirect to direct elections. From the perspective of a classical principal-agent model (Ferejohn, 1999), the introduction of direct elections fundamentally altered Senators' accountability. Under the previous system, Senators were primarily agents of state legislatures, adjusting their actions with the preferences of state legislators. After the 17th Amendment, direct elections shifted this accountability to the broader electorate, incentivizing Senators to act more in line with the preferences of the state's voters, thereby becoming more "House-like" in their political priorities. Alternatively, assuming a probabilistic voting model (Lindbeck and Weibull, 1987), which accounts for a multidimensional policy space, the shift could also reflect differences in the preferences of state legislators versus the average voter. Although, in theory, these preferences might converge under equal representation across state districts, malapportionment and the design of state legislative districts prior to the reform often gave disproportionate power to less populous areas. This may explain why Senators, post-reform, reoriented their focus toward broader issues that resonated more directly with a statewide electorate.

This paper contributes to several strands of literature. First, it adds to the broad body of work that highlights how electoral rules can influence the behavior of both politicians and voters. For instance, Besley and Case (1995) explores how gubernatorial term limits influence economic policy decisions. The authors find that governors facing term limits are more likely to implement policies that boost short-term economic performance, potentially at the cost of long-term fiscal health. Similarly, Persson et al. (2003) examines how different electoral systems affect political corruption, finding that systems with greater individual accountability (like personal ballots in plurality elections) see less corruption, while those with higher reliance on party lists see more. In another study, Gagliarducci et al. (2011) uses data from the Italian House of Representatives to compare politicians' behavior in majoritarian and proportional electoral systems. They find that politicians elected in majoritarian systems engage more in geographically targeted activities and exhibit lower absenteeism rates than their counterparts in proportional systems, indicating that electoral systems can significantly influence legislative behavior. Additionally, Bordignon et al. (2016) study the effects of electoral systems on political extremism. They find that runoff elections, compared to single-round elections, increase the number of political candidates and reduce policy volatility by diminishing the influence of extremist parties. This leads to more moderate policies, as the bargaining power of political extremes is reduced. Our study contributes to this literature by demonstrating how a key electoral reform, the 17th Amendment, influenced politicians public-facing policy agendas.

Second, we add to the growing literature examining parliamentary speeches as proxies for politicians' behaviors and preferences. For instance, Gentzkow et al. (2019) investigates the evolution of partisanship in congressional speeches from 1873 to 2016, identifying a significant increase in partisanship beginning in the early 1990s. Additionally, Gennaro and Ash (2022) explores the use of emotional and rational language in U.S. Congressional speeches from 1858 to 2014, demonstrating that emotionality has increased over time, especially during periods of war and televised debates, and varies according to party affiliation and individual characteristics of Congress members. Ash et al. (2024) examines the impact of gender on the reactions to parliamentary speeches in Germany, finding that gender-conforming speeches in German state parliaments typically receive more positive reactions, suggesting that gender stereotypes significantly shape parliamentary dynamics. While our study is not the first to employ NLP methods to analyze politicians' speeches, we propose the idea that LDA topics can be used to proxy for political agenda and to measure the similarity of policy agendas between legislative chambers.

Third, we contribute to the existing research on the effects of direct versus indirect selection of candidates. In the context of the 17th Amendment, Bernhard and Sala (2006) found that the amendment encouraged Senators to moderate their positions to appeal to median state voters, resulting in greater efforts toward reelection, particularly against opposition from antagonistic state legislatures. Similarly, Gailmard and Jenkins (2009) observed that Senators became more responsive to electorate preferences after the amendment, which also granted them increased legislative freedom. Lowande and Peck (2017) highlighted that the amendment led to more Senate investigations of the executive during periods of divided government, as Senators sought to demonstrate their commitment to protecting voters from political misconduct. Beyond the U.S. context, studies have examined similar reforms in other settings. For instance, Micozzi (2013) analyzed the Argentinian Senate and found that directly elected Senators were significantly more active in drafting bills, particularly those addressing the needs of their home provinces.¹ Our analysis extends this body of work by applying rigorous causal inference methods to examine how direct elections altered Senators' responsiveness to voter preferences showing an effect on policy agendas.

The remainder of the paper is organized as follows: Section 2 describe the institutional background. Data and methods are presented in Section 3. Section 4 presents the empirical results, while Section 5 provides additional results and robustness checks. Finally, Section 6 concludes the paper.

¹Research on local governments provides complementary insights on the effect of direct vs. indirect elections of representatives. For example, Hessami (2018) examined the accountability and incentives of appointed versus elected public officials, while Ferlenga (2023) explored the effects of abolishing direct elections in Italian local governments.

2. Institutional Background

2.1. The 17th Amendment and its Institutional Context

The ratification of the 17th Amendment in 1913 marked a transformative moment in American political history, introducing direct elections for U.S. Senators and fundamentally altering the balance of accountability in federal governance. Before this reform, Senators were elected indirectly by state legislatures, a system designed to insulate them from public opinion and emphasize federalism by reinforcing checks and balances (Schiller and Stewart III, 2004; Schiller et al., 2013; Jenkins, 2005). However, this method often led to deadlocks, delays, and vacancies in Senate appointments. Efforts to address these inefficiencies began as early as 1866, when Congress passed a law to regulate Senate elections, but persistent challenges underscored the limitations of the existing system (National Archives, 2023b).

Figure 1 reports the path that ultimately led to the ratification of the amendment. During the Progressive Era, calls for electoral reform gained momentum as a wave of grassroots movements sought to improve government transparency and accountability. In the context of Senate elections, several states pioneered mechanisms to popularize the process. Notably, the "Oregon System," adopted in 1904, required legislative candidates to pledge support for the plurality winner of a popular vote for Senate (Bernhard and Sala, 2006). Similar systems were implemented across other states, albeit with significant variation in design and enforcement.² Despite these reforms, their effectiveness in altering senatorial behavior before the 17th Amendment remains debated (Schiller, 2006; Haynes, 1938; Gailmard and Jenkins, 2009). By 1910, 31 states passed resolutions urging Congress to amend the Constitution to allow for the direct election of senators (Bybee, 1997). In December 1911, the House passed Joint Resolution 39, which mandated the direct election of senators. This resolution included a clause barring federal intervention in case of racial discrimination among voters, the so-called "race-rider" (National Archives, 2023b). In April 1912, the Senate passed an amended joint resolution removing the "race rider" from the bill and the House approved it the following month (National Archives, 2023b). Following the usual process to change the constitution, at least 36 states — i.e. 75% of all 48 US States as of 1913, had to approve the final

 $^{^{2}}$ Appendix Figure A.1 provides a bar chart illustrating the cumulative number of states adopting primary-like reforms over time.



Figure 1: Historical Timeline: Direct Elections of U.S. Senators

Notes: The figure outlines the timeline leading to the 17th Amendment, showing key events from early calls for direct Senate elections in 1903 to the seating of the first senators under the new system in 1915. Major milestones include the "Oregon System" in 1904, passage of resolutions in Congress (1911–1912), and ratification in April 1913. Congress numbers and years (in parenthesis) provide historical context.

resolution. This was reached on April 8th, 1913, when the Amendment was officially ratified, becoming part of the Constitution and shaping all subsequent Senate elections (National Archives, 2023b).³ Notably, discussions on transitioning to direct elections began as early as 1909, during the 61st Congress, showing strong momentum for reform before formal legislative action⁴. By the time of ratification, many Senators likely anticipated the reform, potentially adjusting their strategies and behavior beforehand. We account for this potential anticipation effect in our estimation strategy. It is worth noting that during the Progressive Era, there was a broad consensus, both in the House and in the Senate, on transitioning to the direct election of U.S. Senators, reflecting a nationwide push for greater democratic participation and government accountability. However, significant debate centered on the extent of federal involvement in determining voter eligibility. Many states were concerned about preserving their rights to set voting qualifications without excessive federal interference, as the initial "race-rider" clause in Joint Resolution 39 demonstrates (National Archives, 2023a). To account for this, we consider the beginning of the discussion on the 17th Amendment in our identification strategy.

2.2. Institutional Differences Between the House and Senate

Understanding the impact of the 17th Amendment requires examining the institutional context of the Senate and its relationship with the House of Representatives. While both chambers share legislative responsibilities, their structures and functions differ significantly, reflecting distinct roles within the federal government.

One key difference lies in electoral cycles. House representatives serve two-year terms, fostering immediate accountability to voters, while Senators serve six-year terms with staggered elections to ensure continuity and stability. Representation further distinguishes the chambers: House seats are allocated based on population, with members elected from specific districts, while the Senate provides equal representation for all states, amplifying the influence of smaller states (Congress, 2023).

The legislative roles of the two chambers also diverge. The House holds the exclusive

 $^{^{3}}$ The time spent from 1911 to 1913, i.e., two years, matches the average time required for a constitutional amendment to be ratified.

⁴In that instance, the proposed reform was defeated by a margin of only four votes, largely due to the opposition of Southern Democrats who sought to maintain control over their electorate along racial lines (U.S. Congress, 1911).

power to initiate revenue bills, while the Senate confirms presidential nominations and approves treaties. Both chambers must agree on the same version of a bill for it to become law, but their procedural rules differ: the House prioritizes efficiency with stricter debate rules, whereas the Senate encourages extended deliberation to act as a counterbalance to rapid legislative changes (Congress, 2023).⁵

3. Data and Methods

3.1. Data

The data for this study is derived from the dataset compiled by Gentzkow et al. (2019), which includes transcripts from the U.S. Congressional Record covering the 19th and 20th centuries. Our focus is on the specific period from 1879 to 1935, from the 46th to 73rd Congresses. This time frame allows us to analyze the political discourse both before and after the introduction of the 17th Amendment. The dataset provides not only the text of the speeches but also detailed metadata about the speakers. To ensure the relevance of our findings, we concentrate solely on speeches delivered by voting members of Congress, thereby excluding contributions from non-voting participants. This refined dataset consists of 5,323,076 speeches (from a total number of 6,531,892).

We count a total of 405,078,270 words and 2,276,167,184 characters in these speeches. Figure 2 shows the distribution of the number of speeches per speaker and the word count per speech, broken down by chamber, highlighting differences in participation and verbosity across Congress. Appendix Figure A.2 illustrates how the total number of speeches delivered by legislators has evolved over time.

We included roll-call data for both senators and representatives, obtained from Lewis et al. (2023). This dataset provides comprehensive information on every bill passed during the 46th to 73rd Congresses, including the votes cast by each legislator and their attendance during voting sessions. It also includes details about each legislator's political career, such as whether they were elected or appointed, as well as notable

⁵Regarding individual qualifications, House representatives must be at least 25 years old and have been U.S. citizens for at least 7 years. Senators must be at least 30 years old and have been U.S. citizens for at least 9 years. All members of Congress must reside in the state they represent. During the period of interest, the minimum voting age for both the Senate and the House was 21 years, until it was lowered to 18 in 1971 (Congress, 2023).



Figure 2: Histogram of Speech Length & Number of Speeches

Notes: The figure presents descriptive statistics for our corpus. The top left panel displays the log of speech length, while the top right panel provides a breakdown of speech length by chamber. On the bottom row, the left panel illustrates the log of speech count per speaker, and the right panel shows the same metric distributed across chambers. We only considered speeches with more than 25 words.

events like contested seats, deaths, and resignations. From Wikipedia we could also gather information on whether a legislator was seeking re-election.

Furthermore, we use DW-NOMINATE scores from the same dataset to measure the ideological positions of members of Congress. These scores place legislators on a liberal-conservative spectrum based on their roll-call voting behavior, with negative values indicating more liberal positions and positive values indicating more conservative ones. While the standard DW-NOMINATE scores are not ideal for direct comparisons across chambers, Lewis et al. (2023) also provide "Common Space" DW-NOMINATE scores, which assign a constant ideology score to each legislator and allow comparisons across chambers. Figure 3 shows the evolution of DW-NOMINATE scores by party and chamber. The data reveals a trend of moderation in roll-call behavior (indicated by a positive slope for the blue line and a negative slope for the red line) that begins well before discussions on the 17th Amendment, around the 61st Congress. Notably, while the Democratic Party exhibits clearer signs of moderation, this pattern contrasts with Bernhard and Sala (2006), who finds that Republican moderation was more pronounced.



Figure 3: DW-NOMINATE Scores for the House and Senate

Notes: The figure presents the evolution over time DW-NOMINATE scores by party. Panel a) refers to the House and Panel b) to the Senate

3.2. Text Analysis

Topic model. The primary empirical challenge of this study is to reconstruct the political agendas of Congress members through their speeches. This enables us to identify their policy priorities, classify their speeches by relevant policy areas, and track the evolution of their agendas over their congressional tenure. To achieve this, we employ a topic modeling approach, specifically leveraging Product of Experts LDA (ProdLDA), a variation of the widely-used LDA. LDA is an unsupervised machine learning technique designed to uncover underlying topics within a collection of documents (Hoffman et al., 2010). It assumes that each document is a mixture of topics, with each word attributable to one or more of these topics. This approach provides a structured way to analyze textual data by representing documents in a latent space defined by topics. In this space, each topic is a probability distribution over words.

To better understand the model, let us consider a corpus with D documents and W unique terms. The researcher chooses a latent space of size K: each topic can be represented as a probability of vector over the vocabulary, formally $\beta_k \in \Delta^{W-1}$, where each element $\beta_{k,w}$ refers to the probability of appearing w appearing in topic k (Hansen et al., 2018). We denote the collection of the K random vectors as $\beta_{1:K}$. Similarly, the

topic proportions for the *d*th document are defined as θ_d and $\theta_{d,k}$ represents the "share" of topic *k* is in the *d*th document. Moreover, the topic allocations for the *d*th document is \mathbf{z}_d , where $z_{d,n}$ is the topic assignment for the *n*th word in document *d* (Blei et al., 2003)⁶. The joint distribution for hidden and observed variables is:

$$p(\boldsymbol{\beta}_{1:K}, \boldsymbol{\theta}_{1:D}, \mathbf{z}_{1:D}, \mathbf{w}_{1:D}) = \prod_{i=1}^{K} p(\beta_i) \prod_{d=1}^{D} p(\theta_d) \left(\prod_{n=1}^{W} p(z_{d,n} | \theta_d) p(w_{d,n} | \boldsymbol{\beta}_{1:K}, z_{d,n}) \right).$$
(1)

The marginal distribution makes the posterior calculation intractable and it is usually approximated by either sampling based methods, like MCMC algorithms such as Gibbs sampling, or through variational inference (see Blei et al. (2003); Hoffman et al. (2010); Steyvers and Griffiths (2007) for a more in-depth discussion).

In our study, we employ ProdLDA, a neural topic modeling approach that extends traditional LDA by leveraging the Auto-Encoding Variational Bayes (AEVB) framework (Srivastava and Sutton, 2017). ProdLDA improves the robustness and coherence of topic representations by combining multiple simpler distributions, or "experts," to model the complex patterns within the data. This approach provides a better fit for large and complex datasets like congressional speeches, enhancing interpretability and performance. As shown in Appendix Table A.1, also in our data ProdLDA outperforms standard LDA, delivering more coherent and meaningful topics.

Speech Pre-processing and Model Selection. Topic models like LDA use dictionary methods, where a predefined vocabulary is used to analyze word occurrences across a corpus. Congressional speeches are represented in a document-term matrix, with each row as a speech and each column as a vocabulary term, where an element (d, w) indicates how often word w appears in document d. To ensure interpretability and computational efficiency, we preprocess the speeches to define the vocabulary and reduce dimensionality.

As an initial step, we remove punctuation and special characters. Following this, we tokenize and lemmatize each word. We also identify bigrams within each speech, i.e., collocations of two words that have a specific meaning such as "supreme court" or "income tax". To achieve this, we use a part-of-speech tagger to identify sequences of

⁶Blei et al. (2003) also uses Dirichlet priors for θ and β , which model the concentration of topic proportions, e.g. prior belief on how many topics are discussed in a given document, and on topic distribution, how many words in the vocabulary should characterize a topic.

	Number of Words	Vocabulary Size	Number of Speeches
Raw Text	457,544,195	2,253,385	6,531,892
Removing Short Speeches	415,644,247	2,183,801	2,634,239
Stopwords, Stemming & OCR adjustment	108,876,306	16,108	2,557,946
Bigrams	94,518,986	$1,\!174,\!329$	2,557,946
Frequency Adjustment	54,681,862	37,746	2,247,690
Final revision	$19,\!198,\!831$	26,407	1,989,923

Table 1: Pre-processing of US Congressional Speeches

Notes: The table shows the pre-processing procedure on the corpus. We consider number of words, vocabulary size and number of speeches

two words such as *noun-noun*, *adjective-noun*, *verb-noun*, and we retain only those that occur more than 50 times throughout the entire corpus. Next, we remove stopwords and stem all words to further reduce vocabulary size.⁷ After this process, we are left with 37,033 words. We then manually revise the final vocabulary and discard words that do not carry a strong semantic connotation, e.g., words like "question", "give", "take", and so forth. In the end, we are left with 26,407 unique terms. Table 1 summarizes the speech pre-processing procedure. It is important to note that the speeches were digitized using Optical Character Recognition (OCR), which often generates misspelled words in older documents. To address this, we compare tokens against an English dictionary to remove incorrect words, reducing noise and controlling vocabulary size.

Once we defined the vocabulary, we can proceed to train the model. We randomly select a third of our corpus and run our LDA for different number of topics.⁸

Appendix Figure A.4 displays the training loss of the best-performing model, while Appendix Table A.1 summarizes the evaluation results using two common topic coherence metrics: NPMI Coherence and CV Coherence. Both metrics assess how well the words within a topic are related, with higher values indicating more coherent and interpretable topics. Based on these evaluations and a manual review of the results, we choose a latent space of 36 topics to represent our corpus.⁹

⁷Stemming is a text normalization technique where words are truncated to their root form. For instance, variants like running," runner," and ran" are all reduced to the base word run."

⁸The model has been trained for 90 epochs, using the ADAM optimizer(Kingma and Ba, 2014) with 0.001 learning rate, a batch size of 64 and a dropout rate of 10%. Using T4 GPU it takes a total of roughly 45 minutes to train a single model.

⁹NPMI Coherence measures the degree of association between words in a topic, with higher values indicating that the words frequently appear together in the corpus. CV Coherence combines several metrics, including NPMI, to evaluate how well the words in a topic form a meaningful concept based on their distribution and semantic similarity in the corpus.



Figure 4: Carter Glass Policy Platform

Notes: The figure illustrates Congressman Carter Glass's policy platform, with each boxplot representing the distribution of a specific topic throughout his tenure as a legislator.

LDA Output and Policy Agenda. From the LDA output and the topic-specific word list, we can label them in a specific set of policy themes that may characterize a congressperson's political agenda. Appendix Table A.2 summarizes the final output of our topic model.¹⁰ Once we have generated a topic distribution for each speech, we can link the LDA output to speaker information and aggregate the data at the speaker-congress level to create a proxy for each speaker's political agenda. For example, Figure 4 outlines the policy agenda of Congressman Carter Glass. Glass was instrumental in shaping banking and financial policies, widely known for his role in creating the Federal Reserve System with the Glass-Owen Act of 1913 (Federal Reserve History, 2021). The model performs well, as the topics extracted from his speeches clearly reflect his significant legislative focus on banking and finance.¹¹

Similarities in the political agenda. One measure of interest is how similar are

¹⁰The labels are generated using OpenAI's GPT-40 model, asking to define a topic label based on the top 10 words for each LDA topic.

¹¹Appendix Figure A.5 provide other examples from notable legislators in the late 19th and early 20th centuries, illustrating the effectiveness of our methodology in tracking politicians' policy priorities.

the political agendas of the House and Senate over time. To do so, we calculate the average policy platform of House representatives and compare it to the policy agenda of individual senators for each state using cosine similarity, as follows:

$$\cos(\theta_{ist}) = \frac{\mathbf{S}_{ist} \cdot \overline{\mathbf{H}}_{st}}{\|\mathbf{S}_{ist}\| \|\overline{\mathbf{H}}_{st}\|} = \frac{\sum_{l}^{K} S_{l,ist} \overline{H}_{l,st}}{\sqrt{\sum_{l}^{K} S_{l,ist}} \sqrt{\sum_{l}^{K} \overline{H}_{l,st}}},$$

which represents the cosine similarity of the political platform for senator i of state s during congress t with respect to the average political platform of House representatives in the same state and during the same period. We use the average as the House serves as a proxy for state-wide political interests rather than district-specific preferences. The K parameter represents the number of topics. Figure 5 displays the evolution over time of platform similarities. There's an evident and sharp increase around the ratification of the amendment which supports the hypothesis of Senators moving their platform closer to the one of House representatives. We also consider similar measures to gauge the level of distance between Senator and House representatives, namely: Jensen-Shannon divergence, Kullback-Liebler Divergence and Bhattacharyya Distance¹².

Finally, we create a measure to capture the degree of focus in legislators' political platforms—whether these platforms are concentrated on a few key issues or spread across a broader range of topics. We do it by using a measure of topic concentration, such as entropy:

$$H_{it} = -\sum_{i=1}^{36} x_{izt} \ln(x_{izt}),$$

for legislator i during congress t. Table 2 summarizes the descriptive statistics for the main variables considered.

3.3. Empirical Strategy

With our estimation strategy, we analyze legislators' actions to examine how they changed before and after the 17th Amendment, focusing on shifts in senators' behavior and speech topics while using the House of Representatives as a control group for comparison. The reform from indirect to direct elections can be expected to influence the political priorities of Senators, moving their policy preferences more closely with those of

¹²As the names suggest, these variables measure dissimilarity, hence lower values would imply a larger degree of similarity between two vectors. To avoid confusion we represent these measures as $\frac{1}{1+\text{Divergence}}$

	Pre-Am	endment	Post-Am	Post-Amendment		rall
	House	Senate	House	Senate	House	Senate
Panel A: Individual Variables						
Cosine Similarity		0.795		0.847		0.826
		(0.137)		(0.109)		(0.123)
KL-Divergence (Inverted)		0.824		0.871		0.852
		(0.113)		(0.088)		(0.102)
Jensen-Shannon Divergence (Inverted)		0.949		0.964		0.958
		(0.041)		(0.029)		(0.035)
Bhattacharyya Distance (Inverted)		0.944		0.962		0.955
		(0.049)		(0.034)		(0.042)
Entropy	3.232	3.392	3.31	3.441	3.28	3.421
	(0.332)	(0.189)	(0.267)	(0.136)	(0.296)	(0.16)
Sought re-election $== 1$	0.907	0.723	0.942	0.804	0.928	0.773
	(0.291)	(0.448)	(0.233)	(0.397)	(0.259)	(0.419)
Reached end of term $== 1$	0.973	0.972	0.972	0.954	0.972	0.961
	(0.162)	(0.164)	(0.164)	(0.209)	(0.165)	(0.193)
Number of Missed Roll-Call Votes	71.706	64.628	52.953	97.117	58.427	81.543
	(58.883)	(64.823)	(53.237)	(89.899)	(55.858)	(80.454)
Number of Speeches	77.298	236.497	119.91	464.204	101.95	368.31
-	(147.823)	(284.223)	(289.616)	(556.776)	(241.582)	(470.99)
Ν	3,102	825	4,568	1,125	8,091	2,051
Panel B: Congressional Variables						
Number of Roll-Call Votes	181.778	197.667	195.727	361.455	185.952	285.619
	(71.683)	(143.993)	(86.619)	(159.752)	(78.178)	(166.7)
Majority Party (D==1)	0.222	0.111	0.364	0.273	0.333	0.19
	(0.441)	(0.333)	(0.505)	(0.467)	(0.483)	(0.402)
Ν	9	9	11	11	21	21

Table 2: Descriptive Statistics

Notes: Descriptive statistics of the main variables. Amendment is coded as the beginning of the 17th Amendment discussion, i.e. 61st Congress. Panel A displays the summary statistics at the individual level and Panel B displays the summary statistics at the Congressional level, e.g. number of bills discussed and majority party by Chamber. Standard deviation in parenthesis.



Figure 5: Cosine Similarity of Political Platforms

Notes: The figure depicts average Cosine similarity over time between individual senators and the average policy platform of House representatives from their respective states.

House representatives, who have always been directly elected. The reasoning is straightforward: if the reform makes Senators more responsive to voter demands, their agendas should naturally converge with the House's. By using this approach, we avoid the need to explicitly define voter preferences or specify actions that reflect them. Instead, the behavior of House representatives offers a practical benchmark for comparison.

In our first set of estimations, the similarity measure between the policy agendas of Senators and House representatives, proxied by the cosine similarity of their speeches, acts as the first difference in a difference-in-differences (DiD) framework. Instead of a traditional DiD strategy that compares values for both chambers before and after the reform, we compute similarity as a single value that captures the relative closeness of Senate agendas with the House, embedding the first difference directly into the response variable. The model specification is as follows:

$$Y_{l,it} = \alpha_i + \beta D(\text{Treatment})_{it} + \epsilon_{it}$$
(2)

where, Y_{it} represents our measure of similarity, for senator l on seat i during Congress t. D(Treatment)_{it} is a binary variable equal to 1 starting with the 61st Congress (i.e., 1909-1911), marking the onset of Congressional debates surrounding the 17th Amendment. α_i denotes the seat-level fixed effects.

We complement this analysis by estimating the effects of the reform on additional dimensions of legislative behavior, employing a standard DiD approach with the following general specification:

$$Y_{l,it} = \alpha_i + \beta D(\text{Treatment})_{it} + \theta_t + \epsilon_{it}$$
(3)

where $Y_{l,it}$ denotes an outcome of interest for legislator l in seat i during Congress t, which may be: (1) the share of speeches dedicated to a specific policy topic, (2) the degree of concentration in policy agendas, or (3) the absolute value of the DW-NOMINATE score. In this case, D(Treatment)_{it} is a binary variable representing the treatment period for Senators, starting from the 61st Congress onward, while α_i denotes seat-level fixed effects and θ_t represents Congress fixed effects. Covariates such as re-election bids, end-of-term status, and Congress-State trends are included when relevant. In addition to the overall effect estimate, we also run event study analyses to evaluate pre-trends and dynamic effects of the reform. We cluster standard errors by state.

As discussed in Section 2, we incorporate an anticipation effect of one Congress to account for Senators potentially adjusting their behavior and strategies before the 17th Amendment's ratification. This accounts for the likelihood that the momentum for reform, which gained traction well before its formal implementation, may have influenced legislative conduct and voting patterns during the transition period.

4. Results

Columns (1) to (3) of Table 3 examine the effect of the reform on the similarity measure between Senators' and House representatives' policy platforms, showing a statistically significant positive effect starting from the 61st Congress. The fully specified model in column (3), which includes seat level, time, and individual fixed effects, as well as additional controls and linear time trends, shows a coefficient of 0.039 (st. error=0.010). This implies an increase in similarity compared to the pre-reform period of 4.8%.

Next, we employ an event study specification to examine the dynamic effects of direct elections on platform similarity and to test for potential pre-trends. Figure 6 displays the results of this analysis. In the regression we use the 60th Congress as the reference

	Platform Similarity					
	(1)	(2)	(3)			
Treatment	$\begin{array}{c} 0.056^{***} \\ (0.005) \end{array}$	$\begin{array}{c} 0.047^{***} \\ (0.009) \end{array}$	$\begin{array}{c} 0.039^{***} \\ (0.010) \end{array}$			
Seat FE Congress FE	\checkmark	\checkmark	\checkmark			
Individual FE Controls Linear Time Trend		\checkmark	\checkmark			
Ν	1,861	1,784	1,784			

Table 3: Platform Similarity Regression Results

Notes: The table shows the results for Equation 2. The dependent variable is Cosine Similarity. Robust standard errors in parentheses, clustered at the state level. *** p < 0.01, ** p < 0.05, * p < 0.1

year, as it was the Congress immediately preceding the extensive discussions of the reform in the 61st Congress, allowing us to account for potential anticipation effects. We find no evidence of pre-trends, as the null hypothesis of no pre-reform effects cannot be rejected (p-value = 0.17). Additionally, the post-reform coefficients are jointly significant, confirming the impact of the reform. Interestingly, the effect begins immediately with the 61st Congress and remains stable across all election cycles following the ratification of the 17th Amendment, suggesting a structural shift in Senators' policy platforms.

Next, we want to study which policy areas played the largest role in bringing Senators' political platforms closer to those of House representatives after the 61st Congress. To achieve this, we estimate Equation (3) separately for each policy area, using the share of speeches dedicated to specific topics as the dependent variable. The results are reported in Figure 7.

The results outline some topics that gained or lost momentum after the 61st Congress. Topics such as Elections and Voting, Labor and Economic Issues, Fiscal Policy, and Textiles and Manufacturing gained significant prominence, reflecting the growing importance of issues that directly impacted the average voter. These areas address economic stability, democratic participation, and the everyday concerns of working- and middle-class citizens, signaling a recalibration of legislative agendas toward broader public interest.

At the same time, topics that lost prominence—such as Infrastructure Building,





Notes: The figure shows the event-study coefficients for legislators' platform similarity along with 95% confidence intervals. The dependent variable is Cosine Similarity. Clustered standard errors at the state level.

Native American Affairs, Immigration, and Debt Settlements—offer insight into the trade-offs introduced by the new electoral dynamic. These issues often require long-term planning, involve specialized constituencies, or resonate less immediately with a broad electorate. For instance, while infrastructure and community development are critical for sustained growth, they lack the immediacy and visibility of economic issues that directly influence voters' lives. Similarly, the diminished attention to Native American Affairs and Immigration reflects a shift away from niche or regional issues toward policy areas that appealed to a larger, more generalized voter base.

5. Additional Results and Robustness Checks

5.1. Political Selection and Senate Primaries

One possible explanation for the observed shifts in the main results is a change in the composition of the political class. The newly elected senators brought into office through the mechanisms introduced by the 17th Amendment may differ significantly in their backgrounds, priorities, and platforms compared to their predecessors. These differences in the senators themselves could directly influence the legislative agenda and the topics emphasized in Congress.

To further investigate this, we focus on understanding the extent to which the observed effects are driven by changes in the behavior of "incumbents"—congressmen who served both before and after being subjected to the new electoral framework—rather



Figure 7: β Coefficient of the Reform on Topic Relevance

Notes: The figure shows the coefficient for Equation (3), where the dependent variable is the relevance of a given topic in legislators' political platforms. Robust standard error clustered at the state level.

	Platform Similarity		
	(1)	(2)	(3)
Panel A: Incumbents, serving both before and after the reform			
Treatment	0.047^{***} (0.008)	0.048^{***} (0.009)	0.038^{**} (0.027)
N	721	718	718
Panel B: States without pre-reform Senate primaries			
Treatment	0.051^{***} (0.006)	0.049^{***} (0.010)	0.039^{**} (0.036)
N	1,339	1,281	1,281
Seat FE Congress FE Individual FE	\checkmark	√ (√ (
Controls Linear Time-trend		\checkmark	\checkmark
Panel C: All States prior to 61st Congress			
Primaries	0.016 (0.015)	0.012 (0.016)	0.012 (0.017)
N	1,129	1,082	1,082
Seat FE Congress FE Individual FE Controls	\checkmark	$\begin{array}{c} \checkmark \\ \checkmark \\ \checkmark \\ \checkmark \\ \checkmark \end{array}$	$\begin{array}{c} \checkmark \\ \checkmark \\ \checkmark \\ \checkmark \\ \checkmark \end{array}$
Linear Time-trend			\checkmark

Table 4: Heterogeneity Analysis - TWFE Results for Platform Similarity

Notes: The table shows the results of regression 2 including only senators that were in Congress before and after the 61st Congress (Panel A) and excluding states that had primaries for Senate's election prior to the 61st Congress (Panel C). The dependant variable is Cosine similarity. Panel C also includes Congress fixed-effects, using states that di not have primaries until the 61st Congress. Robust standard errors in parenthesis, clustered at the state level. *** p < 0.01, ** p < 0.05, * p < 0.1

than the entry of entirely new senators. While newly elected senators, brought in during or after the process leading to the 17th Amendment, may have inherently different platforms, it is critical to assess whether the shifts in legislative priorities can also be attributed to incumbents adapting their strategies to the new political dynamics.

As shown in Table 4 (Panel A), there is a significant effect on platform similarity even when limiting the sample to congressmen who served across both the pre-and postreform systems, indicating that the changes occurred besides the possible changes in the composition of the senate due to the arrival of newcomers. This result strongly suggests that senators who experienced both systems have adapted their original platform to be closer to the one of the House of Representatives. In Appendix Figure A.8, the event-study for this model specification illustrates this adaptation. The absence of pre-trends, the joint significance of post-event coefficients at the 1% confidence level, and the clear pattern of change confirm that even long-serving senators altered their policy platforms to accommodate the expectations of their new constituencies under the direct election framework.

A potential concern is that the observed effects might be primarily driven by states that had already implemented some form of primaries for Senate elections prior to the 61st Congress, as highlighted in Figure A.1. This raises the question of whether the early adoption of primaries played a significant role in driving the changes in platform similarity, potentially confounding the broader impact of the 17th Amendment. To address this, we run the main analysis by excluding states that had adopted primaries before the 61st Congress and re-estimate Equation (2). As reported in Table 4 (Panel B), and graphically in Appendix Figure A.9, the results remain consistent with our central findings, indicating that the presence of early primaries is not a significant driver of the observed effects.

Furthermore, we investigate whether using the implementation of primaries as the treatment itself would yield similar results. The analysis for this specification, presented in Table 4 (Panel C) and Appendix Figure A.10, shows no discernible effect when primaries are used as the treatment variable. This suggests that primaries, on their own, are not sufficient to explain the observed shifts in platform similarity. Instead, the changes appear to be tied more fundamentally to the broader institutional reform brought about by the 17th Amendment.

5.2. Topic Concentration

We provide evidence of the reform's effect on the concentration of Senators' policy agendas. To examine these shifts, we use a measure of topic entropy to determine whether policy platforms became more focused on a few key issues or more evenly distributed across a broader range of topics after the reform. One possible reason for such changes is that, under the pre-amendment regime, significant malapportionment within state legislative electoral districts gave less populated districts disproportionate influence in Senate elections. With the adoption of direct elections, this over-representation ceased to play a role, potentially reshaping Senate campaigns and leading to broader or more concentrated policy platforms.

	Entropy					
	(1)	(2)	(3)			
Treatment	-0.027^{*} (0.015)	-0.046^{**} (0.022)	-0.048^{**} (0.023)			
Seat FE Congress FE Individual FE Controls Linear Time Trend	√ √	\checkmark	\checkmark			
Ν	$9,\!573$	8,709	8,709			

Table 5: Additional Results: Concentration of Policy Platform

Notes: The table shows the results of Equation 3 for concentration of the policy platform, measured by entropy. Robust standard error in parenthesis, clustered at the state level. *** p < 0.01, ** p < 0.05, * p < 0.1

Table 5 reports the results of estimates based on Equation (3), where we use as a dependent variable a measure of the entropy of the LDA. Across all specifications, the treatment coefficient is negative and statistically significant, suggesting that Senators narrowed their focus to fewer policy areas after the reform. These results could indicate that direct elections moved Senators to adjust their platforms to reflect the priorities of a more evenly distributed electorate, reducing the influence of over-represented districts.

In Appendix Figure A.7, we report the event-study analysis. It shows that since the 61st Congress, there has been a long-lasting effect on how Senators focused on fewer policy issues in their policy platforms and reject the null hypothesis of pre-trends (p-value 0.44).¹³

	DW-NOMINATE					
	(1)	(2)	(3)			
Treatment	-0.003 (0.006)	-0.000 (0.004)	-0.000 (0.001)			
Seat FE Congress FE Individual FE Controls	\checkmark	√ √ √	√ √ √			
Linear Time Trend N	0 520	0 520	√ 0.520			

Table 6: DW-Nominate Regression Results

Notes: The table shows the results for Equation 3. The dependent variable is the absolute value of the DW-Nominate score. Robust standard errors in parentheses, clustered at the state level. *** p < 0.01, ** p < 0.05, * p < 0.1

5.3. Roll-call Behavior

Table 6 presents the regression results for 3, offering further evidence on the reform's impact on roll-call behavior. The dependent variable is the absolute value of legislators' DW-NOMINATE scores, used to test the moderation hypothesis proposed by Bernhard and Sala (2006) and to provide additional insights into the reform's effects. These results do not reveal statistically significant effect of direct elections on roll-call behavior, suggesting that Senators' voting patterns were less affected by the reform than their policy agendas. Appendix Figure A.6 illustrates the event study for this outcome, corroborating the overall null effect. This finding contrasts with Bernhard and Sala (2006), who argued that the 17th Amendment moderated Senators' ideological stances. The discrepancy in findings may arise from our use of a different identification strategy.¹⁴ This is consistent with findings from Gentzkow et al. (2019), which indicate that voting and speeches in Congress fulfill different functions: speeches offer legislators a flexible

 $^{^{13}}$ In unreported analysis, we follow Rambachan and Roth (2019) and perform a sensitivity analysis on our event-study to allow for a weak violation of the parallel trends assumption, as we notice a negative coefficient just before the discussion of the 17th Amendment. This test confirms the robustness of the results.

¹⁴Interestingly, Figure 3 shows some convergence of ideological scores toward zero, but this trend appears to have begun prior to the 61st Congress, suggesting that other factors may have shaped legislators' voting behavior during this period.

way to convey their priorities and connect with voters, whereas voting is shaped by procedural constraints, party dynamics, and negotiations, making it less directly influenced by electoral pressures.

5.4. Robustness checks

In this section, we apply robustness checks to assess the validity of our results. First, we examine whether our findings are influenced by the choice of LDA parameters, specifically the number of topics. To test this, we select the best-performing models with comparable performance, considering three additional models with 30, 33, and 39 topics, respectively. We re-estimate Equation (2) using topic concentration measures as response variables, and the results are presented in Table A.4. Similarly, Figure A.12 illustrates the event-studies for platform similarity across these specifications. Both the table and the graphical analysis confirm the robustness of our results: the estimates remain consistent with the original specification, all post-treatment coefficients are statistically significant, and there is no evidence of pre-trends. These findings suggest that our conclusions are stable across different LDA configurations.

Second, we check whether our results hold using alternative measures of platform similarity, namely Jensen-Shannon divergence, Kullback-Leibler divergence, and Bhattacharyya distance. As mentioned in Section 3.1, to avoid confusion, we employ the following transformation to ensure that these measures represent similarity rather than dissimilarity: $\frac{1}{1+\text{Divergence}}$. Table A.3 presents the results, showing a consistent positive and significant effect on platform similarity. Additionally, Figure A.11 illustrates the event-study results for each similarity measure, further confirming the robustness of our findings.

Finally, we examine whether our results are driven by any specific state. To test this, we run the main regression multiple times, each time excluding one state from the analysis. This leave-one-out approach allows us to assess the stability of our findings across the sample. The results reported in Appendix Figure A.13 indicate that our findings remain consistent and robust, showing no significant variation regardless of which state is excluded. This confirms that our conclusions are not disproportionately influenced by any single state.

6. Conclusion

In this paper, we study how the 17th Amendment, which introduced direct elections for U.S. Senators, influenced their behavior and priorities. Using a comprehensive dataset of over 6.5 million congressional speeches and roll-call votes from 1879 to 1935, we employ NLP techniques and a difference-in-differences approach to isolate the causal effects of the reform. This analysis allows us to assess changes in both public-facing political discourse and legislative behavior by comparing Senators to House Representatives, who were already directly elected during this period.

Our results reveal that the shift to direct elections significantly changed Senators' political agendas, bringing them closer to the focus of House Representatives. Specifically, we find increased emphasis on fiscal policy, taxation, and voting issues, coupled with decreased attention to infrastructure and immigration. Importantly, this effect is not driven by new Senators alone; incumbents also adjusted their priorities. Additionally, we observe that Senators' agendas became narrower following the reform, reflecting a sharper focus on specific policy areas. While existing research highlights how electoral systems influence voter accountability and legislative decision-making, our findings add to this literature by showing that reforms like direct elections primarily impact publicfacing discourse without significant changes in roll-call voting behavior as proxied by legislator ideology.

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A. Appendix

A.1. Figures



Figure A.1: Direct Primaries

Notes: The figure shows the adoption of Senate primaries by state legislatures (see 2). The vertical axis indicates the cumulative number of states that adopted primaries. The analysis distinguishes states based on whether they implemented Jim Crow laws to disenfranchise voters. Southern states include Alabama, Arkansas, Florida, Georgia, Louisiana, Missouri, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. Data on Senate primaries is sourced from Lapinski (2003).



Figure A.2: Speech Counts by Chamber

Notes: The figure depicts the average number of speeches by speaker over time. The solid line refers to the Senate and dashed one refers to the House



Figure A.3: Time Series of Alternative Policy Platform Similarity Measures

(a) Time Series of Jensen-Shannon Divergence (Inverted)

Notes: The figure shows the time series of our alternative measures of similarities. The measures have been transformed to depict similarity rather than divergence. Panel a) refers to $\frac{1}{1+\text{Jensen-Shannon Divergence}}$, Panel b) to $\frac{1}{1+\text{Kullback-Liebler Divergence}}$ and Panel c) to $\frac{1}{1+\text{Bhattacharyya Distance}}$.





 $\it Notes:$ The figure illustrates the training loss for ProdLDA with 36 topics, evaluated over 90 training epochs



(a) Morris Sheppard



Topics

Notes: In Panel (a), we present the policy platform of William Borah, a Republican Senator known for his staunch isolationist stance. Borah opposed the League of Nations and championed anti-imperialist policies, reflecting his commitment to limiting international entanglements. In Panel (b), the policy platform of Morris Sheppard, a Democratic Congressman from Texas. Famously referred to as the "Father of National Prohibition", he sponsored the 18th Amendment, which prohibited alcohol in the United States, and supported Prohibition laws throughout the 1920s and 1930s.



Figure A.6: Event-study: Absolute Value of DW-NOMINATE

Notes: The figure shows the event-study of Equation 3 with DW-NOMINATE as the dependant variable. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.7: Event-Study: Entropy of Political Platform

Notes: The figure shows the event-study of Equation 3 with concentration of the policy platform, i.e. entropy, as the dependant variable. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.8: Cosine Similarity of Policy Platform for Incumbents

Notes: The figure shows the event-study of Equation 2. The dependent variable is cosine similarity. The estimation only considers incumbents, i.e. Senators that were present before and after the the discussion of the 17th Amendment. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.9: Cosine Similarities excluding states with Senate primaries

Notes: The figure shows the event-study of Equation 2. The dependent variable is cosine similarity. The estimation only considers states that did not adopt Senate primaries prior to the 61st Congress. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.10: Event-Study: Cosine Similarities with Staggered Adoption.

Notes: The figure shows the event-study of Equation 3. The dependent variable is cosine similarity. Here we consider the adoption of a Senate primary for a given state as the treatment time, using states that did not adopt primaries prior to the 61st Congress as control. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.11: Event Studies: Alternative Measures for Platform Similarity



(c) Bhattacharyya Distance (Inverted)

Notes: The figure shows the event-study of Equation 2, cosidering alternative measures of similarity. The dependent variable is inverted Jensen-Shannon divergence in panel a), inverted Kullback-Liebler Divergence in panel b) and Inverted Bhattacharyya Disatnce in panel c). Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.



Figure A.12: Event Studies: LDA models, Platform Similarity

Notes: The figure shows the event-study of Equation 2, cosidering alternative topic models with different choice of the number of topics parameter. The dependant variable is cosine similarity. Panel a) displays the result for 30 topics, panel b) for 33 topics and Panel c) for 39 topics. Coefficients are displayed along with 95% CI. Robust standard error, clustered at the state level.

1913 19 Years 1915 1917 1919 . 1921 1923 1925 1927 1929 1931

(c) 39 Topics

Post Coefficients p-value: 0.0023

0.05 0.025 0.00 (0.77) -0.025 -0.05 -0.075 1897 1899

Pre-trends p-value: 0.2948

1903 1905 1907 1909 1911

190



Figure A.13: Cosine Similarity, Leave-One-Out Estimates

Notes: The figure presents the coefficients from Equation 2, iteratively re-estimating the regression by excluding one state at a time. The dependent variable is cosine similarity. Coefficients are shown alongside 95% confidence intervals. Robust standard errors clustered at the state level..

A.2. Tables

	Prod	LDA	LDA		
Topics	NPMI	CV	NPMI	CV	
20	0.094	0.652	-0.114	0.365	
25	0.120	0.649	-0.096	0.393	
27	0.098	0.631	-0.101	0.421	
30	0.125	0.667	-0.142	0.388	
33	0.126	0.657	-0.141	0.366	
35	0.113	0.643	-0.137	0.385	
36	0.116	0.639	-0.155	0.388	
39	0.125	0.667	-0.163	0.387	
40	0.112	0.635	-0.166	0.395	
45	0.115	0.629	-0.195	0.381	
50	0.122	0.646	-0.208	0.392	

Table A.1: Combined NPMI and CV Scores for Different Topic Models

Notes: The table shows scores for *ProdLDA* (columns 1 and 2) and plain-vanilla *LDA* columns 3 and 4, for different numbers of topics.

Table A.2: Topic Labels and Words from Congressional Speeches (1879-1935)

	Label	Word List
1	Litigation and Judiciary	litig, plaintiff, attorney, circuit, suit, equity
2	Military Affairs and Veterans	war_depart, troop, regiment, enlist, command, camp
3	Agriculture and Farming	plant, animal, expert, farm, quantity, crop
4	Competition Regulation and Antitrust	interest_commerce, antitrust, common_carrier, penalty,
5	Elections and Voting	ballot, voter, legislature, elector, cast, ticket
6	Public Buildings and Infrastructure	public_building, avenue, architect, erect, rent, block
7	Waterways and Maritime Infrastructure	harbor, channel, project, engineer, navigate, dam
8	Land Use and Settlements	acre, settler, tract, homestead, area, public_domain
9	Marine Corps and Military Personnel	marine corp, enlist men, retire list, lieutenant, corp,
10	Labor and Economic Issues	wage, factory, competition, american_labor,
11	Postal Services	postmaster, mail, postal_service, postmaster_general,
12	Finance and Banking Regulation	loan, stock, asset, director, borrow, deposit
13	Criminal Justice and Law Enforcement	newspaper, testify, dare, kill, accuse, crime
14	Debt Settlements and War Finances	budget, program, world_war, unemploy, owe, bonus
15	Veterans and Healthcare	hospital, doctor, treatment, patient, public_health, physician
16	Food and Drug Regulation	bottle, alcohol, gallon, liquor, oleomargarine, drug
17	Community Development and Education	community, educate, contribute, school, born, devote
18	Federal Governance and Regulation	custom, revise_statute, expire, assign, collector, transact
19	Native American Affairs and Schooling	indian_school, superinted, tribe, pupil, teacher indian_affair
20	Taxation	deduct, taxable, refund, personal_property, exempt, income
21	Congressional Procedures	unfinish_business, manual, parliamentary_inquiry
22	Tributes and Memorials	decease, dead, tribute, widow, die, son
23	Maritime and Shipping	vessel, marine, crew, sail, foreign_trade, american_ship
24	Fiscal Policy and Redistribution	prosper, democrat_party, evil, debt, tax, wealth
25	Textiles and Manufacturing	wool, yarn, iron, sheet, thread, rag
26	Communication and Transport	telephone, telephone_company, telegraph_company, omaha
27	International Relations and Foreign Policy	philippin, great_britain, alli, liberty, sovereignty, ratify
28	Navy and Naval Infrastructure	navy_yard, yard, naval, navy_depart, naval_affair,
29	Railways and Transportation	car, rail, railroad_company, distance, railway, director
30	Appropriations & Miscellaneous Expenses	contingent_fund, travel_expense, necessary_expense, seed, nitrate,
31	Immigration and Census	quota, alien, immigr, chinese, census, italian
32	Monetary Policy and Minting	silver, circulate, redeem, coin, mint, denomination
33	Agriculture and Trade Policy	wheat, bale, corn, flour, grower, agriculture_product
34	Diplomacy and Foreign Relations	consular_service, ambassador, embassy, canal_zone,
35	Political Reform and Platforms	reform, membership, platform, democrat_platform
36	Party Politics and Debates	distinguish_friend, teller, lecture, lobby, untrue,

 $\overline{Notes:}$ The table shows topic numbers and associated labels. Most important keywords for each topic in the third column

	Platform Similarity		
	(1)	(2)	(3)
Panel A: Jensen-Shannon Divergence (Inverted)			
Treatment	$\begin{array}{c} 0.017^{***} \\ (0.001) \end{array}$	$\begin{array}{c} 0.015^{***} \\ (0.002) \end{array}$	$\begin{array}{c} 0.013^{***} \\ (0.0028) \end{array}$
Panel B: Kullback-Liebler Divergence (Inverted)			
Treatment	0.049^{***} (0.009)	$\begin{array}{c} 0.045^{***} \\ (0.014) \end{array}$	$\begin{array}{c} 0.039^{***} \\ (0.017) \end{array}$
Panel C: Bhattacharyya Distance (Inverted)			
Treatment	0.038^{***} (0.008)	0.019^{***} (0.001)	$\begin{array}{c} 0.015^{***} \\ (0.0044) \end{array}$
N	1,861	1,784	1,784
Seat FE	\checkmark	\checkmark	\checkmark
Congress FE Individual FE Controls Linear Time-trend		\checkmark	\checkmark \checkmark

Table A 3.	Robustness	Checks -	Platform	Similarity	under	alternative	mossurement
Table A.5.	nobustness	Checks -	r lation in	Similarity	under	anernative	measurements

Notes: The table shows the results of Equation 2 with our alternative measures of similarity: Jenesen Shannon Divergence (Panel A), Kullback-Liebler Divergence (Panel B) and Bhattacharyya Distance (Panel C). All variables have been transformed as follows for clarity: $\frac{1}{1+\text{Divergence}}$. Robust standard error in parenthesis, clustered at the state level *** p < 0.01, ** p < 0.05, * p < 0.1

	Platform Similarity			
	(1)	(2)	(3)	
Panel A: ProdLDA 30 Topics				
Treatment	$\begin{array}{c} 0.048^{***} \\ (0.0048) \end{array}$	$\begin{array}{c} 0.042^{***} \\ (0.015) \end{array}$	$\begin{array}{c} 0.035^{***} \\ (0.011) \end{array}$	
Panel B: ProdLDA 33 Topics				
Treatment	$\begin{array}{c} 0.051^{***} \\ (0.00499) \end{array}$	0.036^{***} (0.009)	$\begin{array}{c} 0.031^{***} \\ (0.0106) \end{array}$	
Panel C: ProdLDA 39 Topics				
Treatment	0.053^{***} (0.0051)	0.048^{***} (0.094)	$\begin{array}{c} 0.045^{***} \\ (0.0112) \end{array}$	
N	1,861	1,784	1,784	
Seat FE Congress FE Individual FE Controls	\checkmark	\checkmark	\checkmark	
Linear Time-trend			\checkmark	

Table A.4: Robustness Checks - Platform Similarity Regressions: LDA with 30, 33 & 39 Topics

Notes: The table shows the results of Equation 2 LDA models with different number of topics. The dependent variable is Cosine-Similarity. Robust standard error in parenthesis, clustered at the state level *** p < 0.01, ** p < 0.05, * p < 0.1