Bottom-up Diffusion of Policy Attention in the American Federal System

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A persistent question in the study of American federalism is if the states actually serve as "laboratories of democracy" for the country as a whole. This paper argues that political attention to policy areas can diffuse upwards in the American federal system, from state legislatures to Congress. In particular, we should expect to see the diffusion of messaging legislation, or bills that were introduced without the intention of becoming law after members of Congress observe their political effects in the states. Using an original dataset of introduced bills in all 50 state legislatures in 22 policy areas since 1991 drawn from LexisNexis, it shows a positive association between changes in the number of state legislative bills introduced in a policy area and the number of Congressional bills introduced in the next session, which is taken as evidence of "bottom-up" federalism. This relationship is more prevalent on party lines, within state delegations and in issue areas where the interest group community is more likely to lobby in both states and the national government.

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Introduction

Americans have long believed in the promise of the states serving as the "laboratories of democracy," where lessons from a state's policy implementation could later benefit the country at large. For example, President Barack Obama said the ideas in the 2010 Affordable Care Act (ACA) were from a 2006 Massachusetts law.[1] But the ACA may be an exception to the rule, as scholars have found scant evidence of bottom-up diffusion on isolated policies (Weissert and Scheller, 2008; Mossberger, 1999) or across the agenda (Lowery, Gray, and Baumgartner, 2010).

While policy may not often travel up the federal ladder, scholars have argued that *attention* to different policy areas can diffuse upwards (Karch and Rosenthal, 2016). Even if a policy is not

[1] See "Interview With Matt Lauer on NBC's *Today*": 30 March 2010, https://www.presidency.ucsb.edu/documents/interview-with-matt-lauer-nbcs-today-0.

implemented, legislators at one level can learn from the political experience of their counterparts, as the policy debate itself can reveal important political information about public opinion, media coverage and interest group positions. For example, in 2011 Vermont Governor Peter Shumlin signed a single-payer health care plan into law, which demonstrated robust political appetite for the policy in his state. However, the implementation of single-payer later failed on financial grounds, which Shumlin called: "the greatest disappointment of my political life so far."[2] Despite the policy's troubles at the state-level, it provided a platform for Vermont's US Senator Bernie Sanders. In 2013, Sanders added a provision for single-payer "Medicare for All" to an annual health care reform bill that he introduces,[3] and the measure later fueled his insurgent presidential primary campaigns in 2016 and 2020.

I argue that conditions in the United States are ripe for the vertical diffusion of attention, particularly in a bottom-up fashion. The country's politics have become increasingly nationalized (Hopkins, 2018; Rogers, 2016), which makes state politics more relevant to national political actors, and vice-versa. Furthermore, increased party competition in Congress and in many state legislatures has polarized legislatures at both levels on party lines (Hinchcliffe and Lee, 2015), meaning the parties are likely to oppose one another on the same issues. In terms of the direction of this diffusion, since members of Congress will garner far more attention than state legislators working on the same issues, there are incentives for state legislators to attend to an issue before their national counterparts. Therefore, I expect that this diffusion will be bottom-up more than top-down.

To observe the relationship between state and federal attention to policy, I introduce a dataset of state legislation coded by 22 policy areas from 1991-2017. I reproduce and dramatically expand a prior effort at measuring the policy agendas of all 50 states employed by Virginia Gray, David Lowery and a number of their coauthors (Fellowes, Gray, and Lowery, 2006; Kirkland, Gray, and Lowery, 2010). Approximately one million bill citations were exported from LexisNexis, and have been cleaned for analysis. Validation exercises provide confidence in the reliability of the

[2]Goldstein, Amy (2019) "Why Vermont's single-payer effort failed and what Democrats can learn from it." *Washington Post*. URL: https://www.washingtonpost.com/national/health-science/why-vermonts-single-payer-effort-failed-and-what-democrats-can-learn-from-it/2019/04/29/c9789018-3ab8-11e9-a2cd-307b06d0257b_story.html.

[3]See S.1782 - American Health Security Act of 2013. URL: https://www.congress.gov/bill/113th-congress/senate-bill/1782/all-info?r=3&s=9.

estimates, as they closely track estimates of state agendas that were hand-coded using "gold standard" procedures, like the Pennsylvania Policy Agendas Project (McLaughlin et al., 2010). In an extensive appendix, I describe the data collection process, validation exercises and features of the data. The data will be available on the Harvard Dataverse upon publication.

Relating the number of bills introduced in twelve policy areas in Congress and the states, I find that changes in the number of bills introduced about an issue in the states are positively related to changes in bills introduced about that issue in the subsequent Congress. A one standard deviation increase in state legislative bills in a policy area (about two bills per state) leads to approximately five more bills being introduced in that policy area in the following Congress, holding other factors equal with the method proposed by Mummolo and Peterson (2018). I also check if the Congressional agenda affects subsequent state legislative agendas, but when considered together, there is only a positive relationship between state legislative agendas and the subsequent Congressional agenda. I take this as evidence of bottom-up diffusion.

Breaking down this relationship shows the mechanisms underpinning this relationship. For example, bottom-up diffusion is more likely to be found on issues where the state-level interest group population also lobbies in Congress, which Garlick (2017) labels "national policies." There is also a partisan dimension to this diffusion, as the number of bills introduced by Republican members of Congress is associated with the number of bills introduced by Republican state legislators in the previous biennium from 2009-2016. This behavior is typical of messaging legislation, as the sample is drawn entirely during the Obama administration, when the Congressional Republican party was in opposition. Sharing constituents appears to matter, as there is also a positive relationship between the number of bills introduced by members of a state legislative party and their state's partisan congressional delegation.

I conclude with implications of these results. This paper breaks new ground in the study of the nationalization of American politics, as changes in the media and interest group community have established closer links between national and state politics (Darr, Hitt, and Dunaway, 2018; Hopkins, 2018). This analysis also has produced stronger evidence of bottom-up diffusion than a previous paper that investigated it systematically (Lowery, Gray, and Baumgartner, 2010). However, the papers can be reconciled as Lowery, Gray, and Baumgartner operationalized Congressional attention using hearings, not bill introductions, which is less likely to detect mes-

saging behavior by the opposition party or rank-and-file members. Therefore, the results reflect the prominence of the practice of introducing messaging legislation in recent Congresses (Lee, 2016).

Literature Review

The diffusion of policies throughout the American federal system is well documented. In particular, scholars have uncovered many aspects of *horizontal* diffusion, or a policy that is adopted by a number of states (Walker, 1969; Gray, 1973; Shipan and Volden, 2012; Pacheco and Boushey, 2014; Mallinson, 2021). *Vertical* diffusion, between the national and state governments, is a more complicated process, as looking at the national and state governments is not an apples to apples comparison. Notably, the states and national governments often focus on different policy areas and the Constitution stipulates that the national statutes supersede state statutes when in conflict. However, Supreme Court Justice Louis Brandeis popularized the concept of vertical diffusion when he branded the states as the "laboratories of democracy" for their ability to experiment on a policy that could later be applied nationwide.[4]

The evidence for vertical diffusion is mixed. Policy certainly diffuses in a top-down fashion, as the U.S. national government can spur later state activity by statue. For example, the ACA created a heavily subsidized opportunity for states to expand Medicaid or establish health care insurance exchanges, kicking off a flurry of health care policymaking in subsequent years (Barrilleaux and Rainey, 2014; Hertel-Fernandez, Skocpol, and Lynch, 2016). However, there is less evidence to be found of bottom-up policy diffusion. Case studies of health care (Weissert and Scheller, 2008) or tax policy (Mossberger, 1999) found national legislators generally ignored the lessons of policies implemented in the states.

There may be diffusion of state-level policy ideas that do not make it all the way through Congress. For example, after the popular roll-out of recreational marijuana in his home state of Colorado, US Representative Jared Polis introduced the "Regulate Marijuana like Alcohol Act" in 2015 and it died in the Judiciary committee.[5] He also introduced it in the next Congress, where it

[4]In *New State Ice Co. v. Liebmann* (1931), Brandeis wrote: "A single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country."

[5]H.R. 1013 from the 114th Congress: URL https://www.congress.gov/bill/114th-congress/house-bill/1013.

again died in the Judiciary committee.[6] While his bills did not go anywhere, Polis was successful in building his personal profile, as he was elected Governor of Colorado in 2018. While these bills may not have been successful policy instruments, they served a political purpose.

Recent literature has found that *attention* paid by legislators to policy proposals can diffuse vertically. McCann, Shipan, and Volden (2015) found that Congressional anti-smoking hearings and bill introductions later led to anti-smoking policy enactments in the states. These authors noted that national attention to an issue raises its salience and the debate informs state legislators on many aspects of a policy area. Information that state legislators can collect from a national policy debate include the tone of media coverage, public approval sentiment, or interest group mobilization over an issue. As Polis's marijuana bills showed, ideas can also diffuse up the federal ladder. Karch and Rosenthal (2016) found that members of Congress from states that passed internet sales tax policies introduced more bills on the subject; however, they only diffused to the early stages of Congressional process, and were not enacted into law.

However, many of these studies that found vertical diffusion have been of single policy areas. The most systematic treatment of the question of bottom-up diffusion that looked across the agenda, from Lowery, Gray, and Baumgartner (2010) found that patterns of attention to policies, as observed by state legislative bill introductions, did not translate to later Congressional hearings.

Theory

While evidence of bottom-up *policy* diffusion has been scant, there could still be diffusion of attention to issues. Members of Congress can collect similar information from a state policy debate that McCann, Shipan, and Volden (2015) theorized in the other direction, including estimates of public opinion, interest group positions, or how the media treats a policy. This information helps members of Congress reach their goals, including re-election, running for higher office, advancing in their chamber or making good public policy (Fenno, 1973). Specifically, if a policy is popularly received at the state level it can be a good subject for position-taking or to raise funds. The state level debate often concerns the same constituents or interest group members of

[6] H.R. 1841 of the 115th Congress https://www.congress.gov/bill/115th-congress/house-bill/1841.

the party coalition (Bawn et al., 2012), and the problems and policy solutions that are debated can help a member make the case a bill deserves agenda consideration (Kingdon, 1984).

Conditions in the contemporary American federal system are ripe for vertical diffusion to take place. News consumers are increasingly consuming information about national politics at the expense of local news (Hayes and Lawless, 2015). Technological change has led to a reduction in local media sources, as newspapers close (Darr, Hitt, and Dunaway, 2018) and national television news conglomerates expand in local markets (Martin and McCrain, 2019). One result of these changes is that the American electorate has nationalized, where state partisan behavior is similar to national contests (Hopkins, 2018; Rogers, 2016). Therefore the reception of state bills is more likely to inform members of Congress of what they face getting involved in that issue area.

Attention is more likely to diffuse bottom-up than top-down. State legislators have smaller districts and spend more time in their states, so they are also closer to their constituents, which may alert them to burgeoning issues more quickly. More importantly, if state and national legislators are both involved on an issue, state legislators are likely to be overshadowed in the voter's mind (Hopkins, 2018), so state legislators looking for attention have to move first. For example, there was a flurry of state activity on universal healthcare in the early 1990s, but after the Clinton administration's notable failure on the issue the states dropped the issue too (Gray, Lowery, and Benz, 2013). Immense attention to an issue at the national level seemingly removes the incentives for state legislators to work it.

Therefore, my first prediction is that there will be vertical diffusion of attention, as national and state lawmakers facing an increasingly similar political environment will work on the issues that are more popular with their coalitions. In particular, this attention will diffuse from the bottom-up, as state legislators must move first before being overshadowed by national legislators.

I expect diffusion to be found on "messaging" legislation, which is authored with the goal of scoring political points and not securing compromise (Gelman, 2017). Messaging legislation is a tool to reach the above-mentioned goals, including position-taking for electoral reasons, and it is used to build a party's brand and highlight unpopular aspects of the opposition party's agenda. My next set of predictions refer to where this behavior should be found in the Congressional record. First, the partisan nature of messaging legislation means that Republicans in Congress will be more responsive to same policy areas that Republican state legislators are working on, and

vice-versa. This could follow from state legislative parties establishing "ownership" over an issue (Banda, 2016), or a successful frame to positively affect public opinion of a policy (Stokes and Warshaw, 2017). Second, there should be a geographic dimension to this diffusion, as many state legislators and members of Congress share constituents. Therefore I expect to observe bottom-up diffusion within states, between their respective state legislatures and Congressional delegations.

Certain members should be more likely to issue messaging legislation. It is a particularly potent tool for the opposition party, looking to highlight unpopular issues that the majority would like to avoid. Messaging legislation is also of particular value for rank-and-file members to make a name for themselves. Other channels to build a personal brand, like claiming credit for securing appropriations or headlining major legislation are easier for senior members to access.

This behavior is more likely to take place on the portions of the agenda with tighter linkages between the state and national policy venues. Garlick (2017) measures how "national" state legislative policy areas are by the share of interest groups lobbying on the topic that lobby both in Congress and in the states. Interest groups play an important role in informing legislators about the political considerations of policy positions. For example, they can inform state legislators about how a position would play in a later run for Congress, or tell members of Congress how a policy polls with their shared constituency within a state. Therefore, activity on a highly nationalized issue, like abortion, that has a robust interest group community engaged at both federal stages, is more likely to diffuse vertically than a localized policy like education.

Methods

Studies of vertical diffusion that have focused on specific policy areas have produced inconsistent evidence. To overcome this deficiency, Lowery, Gray, and Baumgartner (2010) argue for a more macro-level view that encompasses the whole state policy agenda. Using that prior work as a departure point, this section describes a broad study of policy attention that puts greater emphasis on changes within policy areas, and less on cross-sectional differences between states.

Dependent variable: Congressional bill introductions

I observe Congressional attention to different policy areas with the number of bills introduced in 12 policy areas.[7] These data are drawn from the Congressional bills project that is fully-coded by the Policy Agendas Project (Adler and Wilkerson, 2015) from 1991-2016. Members of Congress face no limits on bill introductions, so the number of bills they introduce is a fairly unencumbered view of a member's attention.

Lowery, Gray, and Baumgartner (2010) argue that Congressional attention should be observed using hearings, as calling a hearing has more institutional costs than introducing a bill, making it a more valuable signal (Jones and Baumgartner, 2005). Moreover, Congressional bill introductions are fairly consistent from time to time or "sticky"; therefore, hearing data provides more variation which is helpful to observe shifts in attention. While these are both valid reasons, I chose bill introductions for two reasons. First, my theory section focused on the role that messaging legislation may play in diffusion, and this is a practice favored by opposition (or minority) parties and rank-and-file members. Second, it is the closest available comparison to state-level bill introductions, which is how Lowery, Gray, and Baumgartner (2010) measure state-level attention.

Independent variable: State legislative bill introductions

Observing variation in state legislator attention to different policy areas requires a broad view of the state legislative agenda. This is challenging as no central repository maintains a registry of state policy agendas, like which exists for Congress. There are expansive datasets of *enacted* legislation (Sorens, Muedini, and Ruger, 2008; Boehmke et al., 2019), but there are only pockets of data about legislation under consideration. For example, the Pennsylvania Agendas Project has coded that state's legislative agenda since 1979 (McLaughlin et al., 2010). Other studies have either observed a handful of policies across all 50 states, (Bromley-Trujillo and Karch, 2019; Reingold, Widner, and Harmon, 2019; Filindra, 2019; Kreitzer, 2015) or attempted to observe the the whole agenda for all 50 states policy agenda for a period of a few years (Olson, 2019; Kirkland, Gray, and Lowery, 2010; Fellowes, Gray, and Lowery, 2006).

This section describes a procedure to code a sample of bills introduced in every major policy

[7]Drawn from Lowery, Gray, and Baumgartner (2010), they are: Agriculture, Civil Rights, Commerce, Education, Energy, Health, Legal, Real Estate, Social Welfare, Taxes, Telecommunications, and Transportation.

Table 1: Codebook for Lexis Nexis Searches derived from

No.	PAP Code	Full Name	Short Name	Keywords* 1	2	3	Number of bills (1991-2017)
1	G0201	Civil Rights	civilr	civil rights			5,854
2	G0205	Environment	enviro	environment			18,318
3	G0207	Religion	relig	church			14,534
4	G0208	Tax Policy	tax	tax			278,419
5	G0300	Health	health	health			219,722
6	G0400	Agriculture	agric	agriculture			22,767
7	G0600	Education	educ	education			200,721
8	G0701	Utilities	util	utilities			36,963
9	G0702	Natural Resource	resourc	gas	oil	minerals	29,154
10	G1000	Transportation	trans	highways	transit	airports	67,279
11	G1200	Law	law	legal			24,495
12	G1300	Welfare	welf	social services	charities		14,700
13	G1400	Construction	const	construction			57,381
14	G1500	Bank	bank	banking	real estate		64,728
15	G1502	Small Business	smallb	retail			14,197
16	G1503	Sports	sport	sports	recreation		19,350
17	G1510	Insurance	insur	insurance			132,446
18	G1520	Manufacturing	manuf	manufacturing			6,640
19	G1600	Military	mili	military			†
20	G1700	Communication	comm	media	telecommunications		14,664
21	G2400	Local Government	govt	municipality	public employees		105,100
22	G2401	Police and Fire	pfire	police	fire		50,195

*Multiple keywords are separated by "OR" (e.g. the search for G0702 is: "gas OR oil OR minerals").
†Dropped due to data collection error.

area in all 50 states, with a particular focus on changes over long periods of time. To do so, I substantially expand the method employed by Fellowes, Gray, and Lowery (2006) that used LexisNexis for 1995-1999. LexisNexis's database starts in 1991, and, to my knowledge, is the longest running collection of state legislation. However, LexisNexis's data is proprietary, which necessitates that researchers extract data using keyword searches. A further consideration is that LexisNexis limits the number of citations that can exported in each search.[8] Therefore, I conducted thousands of queries of the LexisNexis server to export over approximately one million citations of state legislative activity per policy area. Table 1 lists the search terms for each policy area, derived from Fellowes, Gray, and Lowery (2006, p. 52), for example "Transportation" includes a search of the synopses in bill tracking reports containing the words "highways", "transit", or "airports."

I diverge from the approach described in Fellowes, Gray, and Lowery (2006) in two ways.

[8]LexisNexis limited searches to 1000 citations in its legacy service *State Capital Universe*, and when it replaced that service with *Lexis Nexis Uni* in 2019, it further restricted researchers to only exporting 250 citations at a time. A validation exercise in the appendix show that these services produce essentially identical results.

Table 2: Example citation drawn from an email from LexisNexis

138. 2015 Bill Tracking MN S.B. 2191, 89TH REGULAR SESSION, SENATE BILL 2191, DATE-INTRO: MAY 15, 2015, LAST-ACTION: MARCH 24, 2016; Rereferred to SENATE Committee on FINANCE., Relates to agriculture; establishes a pollinator investment grant program; appropriates money; awards a pollinator investment grant to a person who implements best management practices to protect wild and managed insect pollinators in this state., MINNESOTA BILL TRACKING Copyright 2016 LexisNexis. All Rights Reserved.

First, these authors did full-text searches of the state legislation. This leads to right-censoring issues as LexisNexis limits the number of results in a search to 1,000 citations. Instead, I follow the guidance in Ragusa and Birkhead (2020) and use bill descriptions, which are an apt replacement, especially as there is a great deal of "boilerplate" text in state legislation (Burgess et al., 2016). Therefore, I search LexisNexis "Bill Tracking Reports," which feature paragraph-long synopses of each bill that is introduced, shown in Table 2. Second, each time a bill is updated in a state legislature, LexisNexis creates a citation. Fellowes, Gray, and Lowery (2006) counts each of these updates as a new bill, such that their measure overweighs bills that advance through the process. Since I am observing the introduction of bills, I only count one entry per bill number. I also only include regular bills.

The LexisNexis method produces a representative sample of bills in a policy area that is consistent over time. The LexisNexis method closely tracks the hand-coded Pennsylvania Policy Agendas Project data. Table 3 shows that from 1991-2016, there is an average correlation of 0.78 between the number of bills introduced in the Pennsylvania legislature as coded the method described by McLaughlin et al. (2010) and the LexisNexis approach for the policies used in this study. One major discrepancy between these methods is that the LexisNexis keyword searches assign some bills to multiple policy areas, while the human coders deduce which policy area is the best fit for each bill in the Policy Agendas Project datasets. The relationship is even more robust when considering that potential source of measurement error.

Validation exercises in the appendix that use data from other published work as a benchmark demonstrate the features of this data. In technical terms, it has strong precision, or confidence that a bill identified by the keyword searches is actually in the named policy area. However, it only has moderate recall, or the share of all bills in that policy area that are identified by

Table 3: Correlation between LexisNexis Keyword Searches and Policy Agendas Project coding of state legislation by policy area in Pennsylvania: 1991-2016

Major Topic Code	Policy	Correlation
2	Civil Rights	0.73
3	Health	0.94
4	Agriculture	0.77
6	Education	0.86
7	Utilities	0.83
8	Natural Resources	0.89
10	Transportation	0.75
12	Law	0.78
13	Social Welfare	0.55
14	Construction	0.83
15	Commerce	0.85
17	Communications	0.59
Total		**0.78**

the keyword. For example, Figure 1 shows the number of "Utility" bills (with a correlation of 0.83, it is the median issue in Table 3) coded by these two methods. The PA PAP found far more bills, however, the relationship between the two measures is strong. In other words, in the years where PAP identified more utility bills, so did the LexisNexis searches. This figure also shows that there are substantially more bills introduced in the first year of two-year sessions in both methods, which is why I aggregate sessions by biennium in the main analysis. The extensive validations in the appendix also suggest the keyword estimates are a fairly representative sample of state agendas, which makes them particularly well suited to observing changes in attention within a policy area over time. These data are available on the Harvard Dataverse.[9]

Modeling vertical diffusion

To observe the upward transfer of policy attention between state and national legislators over time, equation 1 features the number of bill introductions in both houses of Congress (*USBills*) in one of twelve policy areas (p) for each two year period (t) as a dependent variable. For independent variables, it observes the sum of the number of bills in each policy area in the 50 states (*StateBills*) in the two-year period prior to each Congress (t-1). This is a fixed effects model that also includes indicators for each of 12 policy areas (α). Using fixed effects in this

[9]Link to be available when manuscript is unblinded.

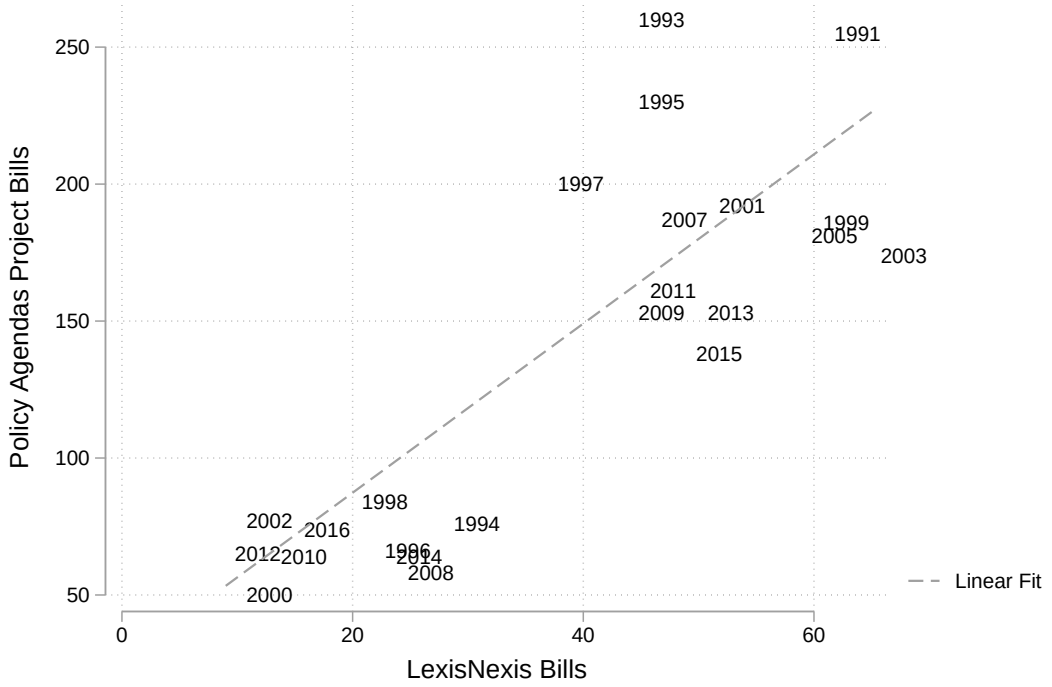

Figure 1: There is a strong correlation between the number of "Utility" bills as coded by the Policy Agendas Project and the LexisNexis keyword searches: Pennsylvania, 1991-2016

model provides a different intercept for each policy area, therefore the coefficients are reflecting changes within the policy area over time. It also includes fixed effects for each Congress (γ), to address temporal changes. The equation also accounts for real world events that may drive the agenda by observing national press attention, drawn from the Policy Agenda Project's sample of *New York Times* articles coded by major policy topic.

$$USBills_{p,t} = \alpha_p + \gamma_t + \beta_1 StateBills_{p,t-1} + \beta_2 NYTStories_{p,t} + \mu \tag{1}$$

In order to observe potential bottom-up and/or top-down diffusion, Equation 2 shows a model that expands on 1 with the number of state legislative bills in all policy areas in the contemporaneous two-year period to each congress (t) and the subsequent two-year period (t+1).

$$USBills_{p,t} = \alpha_p + \gamma_t + \beta_1 StateBills_{p,t-1} + \beta_2 StateBills_{p,t} + \beta_3 StateBills_{p,t+1} + \beta_4 NYTStories_{p,t} + \mu \tag{2}$$

Results

Column (1) of Table 4 shows a positive relationship between the number of Congressional bills introduced in a policy area and the number of state legislative bills introduced in the previous two-year period. This is evidence that state legislative attention can diffuse vertically over time. The magnitude of the effect is meaningful; increasing the number of state legislative bills in a policy area in the previous session by one standard deviation, or just under two bills per state[10] increases the expected number of bills introduced in that policy area in the following Congress by about 5 bills.

Column (4) considers three iterations of the state legislative agenda at once. Not surprisingly, it shows that the strongest relationship across the federal system is during the contemporaneous period, as legislators at both level react to real-time events. However, it shows more evidence of bottom-up diffusion of attention, where changes in a state legislative session have a positive relationship to changes in the subsequent Congressional agenda, than top-down diffusion, which is not distinguishable from zero.

Identifying mechanisms

To identify the mechanisms underlying this relationship, Table 5 breaks out this relationship by the type of policy under consideration. The theory section discussed how policy areas with more nationalized interest group communities should be more likely to experience vertical diffusion. Garlick (2017) measures the nationalization of different policy areas by the share of interest groups in that policy area that lobby in both Congress and the states. For example, 70 percent of health care firms that lobbied in Pennsylvania from 2011-2014 also lobbied in Congress, while only 49 percent of education organizations lobbied in both (Garlick, 2017, p.968). The positive association between the number of state level bills and Congressional bills in the subsequent session is stronger in highly nationalized policies like health care or civil rights than it is in less nationalized policies like education or social welfare. The interaction term in column (3) indicates that the difference between these coefficients is statistically significant.

[10]See Mummolo and Peterson (2018) for a discussion of the need to account for between the variation absorbed by the policy and temporal fixed effects. Following their method, the standard deviation of the residuals of $statebills_{t-1}$ = 88.1, or 1.76 per state.

Table 4: There is a positive relationship between the number of bills introduced in a policy area in Congress and the states during the previous two-year period: 1993-2016.

DV: Congressional bills in policy area		
	(1)	(2)
Policy fixed effects	✓	✓
Session fixed effects	✓	✓
State legislative bills (*t-1*)	0.04**	0.02*
	(0.01)	(0.01)
State legislative bills (*t*)		0.07**
		(0.01)
State legislative bills (*t+1*)		0.00
		(0.01)
NYT (Articles)	-0.74**	-1.06**
	(0.26)	(0.25)
Constant	244.21**	14.07
	(38.27)	(58.88)
Observations	132	132
Absorbed indicators:		
Sessions (2-years)	11	11
Policy Area	12	12

Standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$

Table 5: The relationship between state legislative bill introductions and Congressional bill introductions in the subsequent sessions is concentrated in nationalized policy areas: 1993-2016.

DV: Congressional bills in policy area			
	(1)	(2)	(3)
National Policy Type	Low†	High‡	Both
Policy fixed effects	✓	✓	✓
Session fixed effects	✓	✓	✓
State legislative bills (*t-1*)	0.02*	0.07**	0.03**
	(0.01)	(0.01)	(0.01)
NYT Articles	0.82	-0.99**	-0.80**
	(2.00)	(0.27)	(0.26)
State legislative bills (*t-1*) X High NP			0.03**
			(0.01)
Constant	176.28*	273.28**	231.1**
	(75.20)	(50.38)	(37.17)
Observations	66	66	132
Absorbed Indicators:			
Sessions (2-years)	11	11	11
Policy Areas	12	12	12

†Low: Budget and Taxes, Education, Energy, Real Estate, Social Welfare, Transportation.

‡High: Agriculture, Civil Rights, Commerce, Health, Legal, Telecommunications

* $p < 0.05$, ** $p < 0.01$

Table 6: There is a positive relationship between the number of bills introduced by Republican state legislators and members of Congress in the subsequent biennium: 2009-2016

Column	(1)	(2)	(3)
DV: Congressional bills introduced by:	All	Dem.	GOP
Policy/Party fixed effects	✓	✓	✓
State legislative bills (*t-1*)	-0.00	-0.04**	0.03**
	(0.01)	(0.01)	(0.01)
NYT (Articles)	0.57	0.66	0.45
	(0.43)	(0.55)	(0.52)
Constant	188.32**	269.39**	115.11**
	(23.85)	(30.95)	(28.48)
Observations	96	48	48
Sessions	4	4	4
Absorbed indicators (policy/party)	24	12	12

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$

A partisan pattern of bottom-up diffusion

The theory section discussed a rationale for expecting bottom-up diffusion of messaging legislation. If this were the case, the behavior should fall on partisan lines. This section uses a sample of the legislation from 2009-2016 when the party of each state legislator introducing a bill can be observed with data from the OpenStates project. The unit of analysis in this section is the number of bills introduced by members of a party in a policy sector in a given year. The fixed effects are for each party in a policy sector by year.

Table 6 shows that the bottom-up pattern of diffusion is found on the Republican party line. Specifically, Republican members of Congress introduce more bills in a policy sector following an increase in bills introduced by state legislative Republicans in the previous biennium. Republicans were in opposition to the Obama White House throughout this time period, so this pattern is indicative of bottom-up diffusion being messaging legislation, such as bills to repeal Obamacare that were destined to either fail in the US House or vetoed by President Obama (Gelman, 2017).

In Table 7, the unit of analysis is the two major legislative parties in each state. The dependent variable the number of bills introduced by each state's partisan delegation. There is an uneven number of observations as OpenStates observes 3 sessions for some states, and two for others, and some states (e.g. Massachusetts) do not have two partisan delegations. This model will show

Table 7: There is a positive relationship between the number of bills introduced by state legislators and members of Congress of that state's party delegation in the subsequent biennium: 2009-2016

Column	(1)	(2)	(3)
DV: Congressional bills introduced by:	All	Democratic	Republican
State legislative bills	0.00	-0.01	0.02*
Previous Session	(0.00)	(0.00)	(0.01)
NYT (Articles)	0.02**	0.02**	0.02*
	(0.00)	(0.01)	(0.01)
Constant	3.28**	3.95**	2.51**
	(0.28)	(0.36)	(0.47)
Observations	2784	1392	1392
Sessions (2-years)		2 or 3†	
Absorbed indicators (policy/state/party)	1200	600	600

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$

States with three observations: AZ, CA, IL, LA, MD, MN, MS, NC, ND, NJ, NV, PA, SD, TX, VT, WI

if bottom-up diffusion has a geographic basis, for example, if there is a relationship between the number of bills introduced by Florida state Republicans and the Republican members of Congress that represent Florida in the following biennium. While it appears to be a slight effect, this table does show evidence of bottom-up diffusion when measures are limited to within-state dynamics. Altogether, these results indicate that bottom-up diffusion of attention is happening on partisan lines, and when members of state and national legislatures share constituents.

Discussion

Policy advocates from diverse ends of the ideological spectrum, including the conservative American Enterprise Institute[11] and liberal Center for American Progress[12] have extolled the virtues of the states serving as the "laboratories of democracy" within the American federal system. However, scholars have uncovered little evidence of that process when it comes to policy implementation (Weissert and Scheller, 2008). While policies themselves may not transfer between the different levels of governance, that does not mean there is no political diffusion between the states and national levels. This paper joins a growing literature that asks if *ideas* or attention are diffusing between the levels (Karch and Rosenthal, 2016; McCann, Shipan, and Volden, 2015; Lowery, Gray, and Baumgartner, 2010). Specifically, it theorizes that the practice of messaging legislation, or bills introduced with the goal of political points being scored more so than the bill actually being signed into law, could diffuse upwards. Members of Congress could observe the political results of policy activity in the states before engaging in it themselves.

Using a time-series, cross-sectional dataset of bills that were introduced in twelve policy sectors in the states and in Congress, I find that changes in attention to policy areas by state legislators precede similar changes in behavior at the national level. This bottom-up pattern makes sense as state legislators have smaller districts than their federal counterparts and can be more familiar with the issues and opinions of their shared constituents. Furthermore, since national lawmakers receive more press and public attention than state lawmakers, there is political incentive for state actors to move first, when there is still attention to be gained. The analysis shows where this association is concentrated in the record, as nationalized policies, or policies areas where more members of the state interest groups communities also operate in Congress, are more likely to diffuse upwards. This suggests the mechanisms driving this relationship, as interest groups operating at both levels can use the lessons from the states to encourage national legislators to take subsequent action.

There is a partisan flavor to the policies that are diffusing from the bottom-up. In this sample, Republican members of Congress in particular mirror changes in the Republican state legislative

[11] Greve, M. "Laboratories of Democracy: Anatomy of a Metaphor." (2001), URL https://www.aei.org/research-products/report/laboratories-of-democracy/.

[12] "Bold Ideas for State Action" (2005), URL: https://www.americanprogress.org/issues/general/reports/2018/05/10/450580/bold-ideas-state-action/.

policy agenda, a relationship that holds when only diffusion within a state is considered, from its legislature to its Congressional delegation. This is also consistent with the concept of messaging legislation, and leads to the conclusion that this process ultimately has political ends.

These results are stronger evidence of bottom-up diffusion than a prior systematic study of the topic with mostly null results (Lowery, Gray, and Baumgartner, 2010). These results can be reconciled as the two projects operationalize attention in different ways, which can partially explain the divergence. Lowery, Gray, and Baumgartner measured attention using Congressional hearings, while I measured it using bill introductions. Minority party and rank-and-file members have more ability to introduce bills than call hearings, which are the turf of committee chairs, who skew more senior and to the majority party of the chamber. So ultimately we are looking for different types of attention. However, it is worth noting that this study has greater temporal coverage, and statistical power, than prior efforts.

The prominence of messaging legislation in this model will be no surprise to observers of contemporary Congresses, as this behavior has become more prevalent in recent decades (Gelman, 2017). Lee (2016) argues that as competition for the control of the chamber has intensified in recent years, members look to score political points to gain or maintain control of a chamber instead of sincere efforts to change the status quo in a policy area. This behavior makes one reconsider the concept of attention, as legislators that introduce messaging legislation are spending their time trying to attract the attention of the media or the public instead spending their time trying to fix the problems that ail society.

This paper also reinforces the degree of nationalization that has taken place in the country's politics. With changes in the media environment making the public more likely to pay attention to national politics, it has changed the equation for both state and national politicians. State politicians will look for issues that can reach a national audience, and members of Congress will find value of the work of their state-level counterparts. There can also be specific career incentives to keep in mind, as many state legislators later serve in Congress and members of Congress may want to stave off primary challenges from their co-partisans in the states.

In order to conduct this analysis, this paper introduced a collection of state legislation coded by policy that is unprecedented in its size and breadth. Despite a boom in the amount of information about subnational politics in the United States being made available to scholars by

the digital age, there is no standardized measure of the policy agenda of state legislatures. This is unfortunate as the policy agenda is a useful tool to measure the power of interest groups, legislative branch and executive branch actors. To address this paucity, this paper expanded an ambitious approach to observe the policy agendas of all 50 states for several years using keyword searches in LexisNexis (Fellowes, Gray, and Lowery, 2006; Kirkland, Gray, and Lowery, 2010).

Validation exercises show that this data is a representative sample of the number of bills introduced in these policy areas over time. Therefore, this data could be used in the future to provide a better observation of the state legislative policy agenda. In an ideal scenario, these bills which have been coded could be used to build an automated procedure to deductively code the universe of state legislation. Similar efforts have been taken to code an annual census of the interest group population by their economic sector (Garlick and Cluverius, 2020). A number of political scientists have drawn on the entire corpus of state legislative text (McCrain and Hitt, 2019; Kroeger, 2017), that Legiscan has made available since about 2010,[13] so this scenario could be feasible. This paper shows that what happens in the states has national consequences, so researchers should observe the states as best they can.

While scholars of federalism mark the passage of the ACA as a watershed moment in bottom-up policy diffusion, the opposition to ACA also serves as an exemplar of bottom-up messaging politics. Just five minutes after President Obama signed the bill into law, state policymakers mobilized to undo the law, starting with Virginia Attorney General Ken Cuccinelli (Beland, Rocco, and Waddan, 2016). Stopping the ACA was a major motivation for Republican state legislators for years, such as in Tennessee where state senator Brian Kelsey spearheaded an effort to limit his state's Republican governor from using the ACA's provisions to expand Medicaid.[14] Republican state legislative and Congressional candidates won a number of key victories on an anti-ACA platform, culminating in unified control of Congress and the White House in 2017. However, that electoral success did not translate to policymaking, as the Republican majorities failed to "Repeal and Replace Obamacare," demonstrating the limits of messaging legislation.

[13] See https://legiscan.com/datasets.

[14] Sher, A. (2015) "Bills would Block Tennessee health insurance exchange." *Chattanooga Free Times Press*, 2 March. URL: http://archive.knoxnews.com/news/state/bills-would-block-tennessee-health-insurance-exchange-ep-963645394-353518211.html.

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Appendix

Contents:

1. I survey the literature for different approaches to coding the legislative agendas, and describe the procedure I used featuring keyword searches of LexisNexis Bill Tracking Reports.
2. I validate this measure by comparing it to bills that have been coded by the state legislatures themselves, and by published work that uses the same method.
3. I present descriptive results of the outcome of the coding procedure.

Coding State Legislative Agendas

The policy content of the 50 state legislatures is not consistently measured by scholars or any central agency. After reviewing extant efforts in the literature, this appendix section describes in detail the approach used in this paper that uses keyword searches of LexisNexis Bill Tracking Reports to estimate how many bills were introduced in 22 policy areas since 1991. The measure is validated using data from the states that do code their legislation by topic, showing high levels of agreement.

Previous coding efforts

There is a great deal of information available about the Congressional agenda, which scholars have prepared for applied research. The Library of Congress maintains a useful search engine of Congressional legislation, but the best resource for scholars is the Congressional Bills Project, which sorts bills by the Policy Agendas Project codebook from 1947 to the present, using a combination of hand-coding and automated coding procedures (Purpura and Hillard, 2006). A number of other efforts have coded *enacted* legislation by its content, dating back to 1877 (Lapinski, 2013), primarily using research assistants to code bills by hand, although Ragusa and Birkhead (2020) used keyword searches of bill descriptions to code legislation according to the Policy Agendas Project codebook.

In terms of the states, there have been efforts to code *enacted* policies in all 50 states (Sorens, Muedini, and Ruger, 2008; Boehmke et al., 2019), but no such dataset exists for policies under consideration. This is is despite most of the raw data being on the internet. The digital era has led to an explosion in the amount of data of American state legislatures is available to researchers. However, even though researchers have access to the full text of every bill and nearly every roll call vote taken in state legislatures, this data is not prepared for applied research. 36 states report the policy content of their legislation, albeit in an inconsistent fashion. The OpenStates project has collected and standardized these codes; however, there are no policy codes for 14 states, data collection has only begun in 2009, and the data has not been validated.

Before setting out on a coding expedition, it's worth knowing what type of route one will take. There are essentially two approaches to coding a legislature's policy agenda: inductive and deductive. An inductive scheme starts with a topic (e.g. abortion) and identifies each bill within a legislature that addresses a topic. For example, Bromley-Trujillo, Holman, and Sandoval (2019) downloaded the bill titles, sponsors, and history of approximately 527,000 bills from 2010-2016 from Legiscan. They then used keyword searches of the bill titles to identify climate change legislation, which they validated using a list of climate change legislation maintained by the National Conference of State Legislatures (NCSL).[15] A deductive approach starts with a coding scheme, and assigns each bill to one or more of those categories. McLaughlin et al. (2010) has adapted the Congressional Policy Agendas Project codebook for state politics by adding a handful of categories, notably to address intergovernmental relations.

Table 8 shows a sample of papers using state legislative data coded by content.[16] There is impressive coverage of all 50 states, as well as a variety of temporal periods. The inductive papers listed are the tip of the iceberg, as there is much more work that has focuses on a handful of policy areas. However, these works do not necessarily aggregate easily.

The decision to use an inductive or deductive approach depends on the research question of the project. For example, if one is interested in which states are considering legalizing marijuana, the appropriate coding scheme would be inductive, starting with keywords relating to marijuana.

[15]The NCSL often identifies legislation across states addressing unique policy trends (e.g. the states that require restaurants to place labels with calorie counts on menus, such as https://www.ncsl.org/research/health/trans-fat-and-menu-labeling-legislation.aspx), but it does not maintain a central directory of legislation.

[16]Thanks go out to the scholars on Twitter who responded for my request looking for these papers.

Table 8: Selcted scholarly work that has coded state legislation by its policy content.

Authors	Policies	Years	States	
Deductive coding schemes				*Taxonomy*
Fellowes, Gray, and Lowery (2006)	22	1995-1999	50	Economic sectors
Gamm and Kousser (2010)	3	1880-1997	13	Statewide, local or district
Kirkland, Gray, and Lowery (2010)	10	2000, 2004	50	Economic sectors
McLaughlin et al. (2010)	PAP*	1979-2012	1	Policy agenda
Garlick (2017)	31	2011-2014	26	National or state
Olson (2019)	PAP	1879-1916	2	Policy agenda
Inductive coding schemes				*Policies targeted*
Kreitzer (2015)	1	1973-2013	50	Pro and anti-abortion
Reingold, Widner, and Harmon (2019)	5	1997, 2005	15	Women, black, latinx, poverty
Filindra (2019)	1	2005-2011	50	Immigration
Bromley-Trujillo and Karch (2019)	3	1993-2015	50	GMO food, HPV, tanning beds
Bromley-Trujillo, Holman, and Sandoval (2019)	1	2010-2016	50	Climate change
Reingold et al. (2020)	1	1997-2012	21	Anti-abortion

*The Policy Agendas Project has 20 major topic codes, and 229 minor topic codes.

However, if one is interested in how much attention is paid to marijuana legalization in different states, the appropriate coding scheme would have to account for the other bills under consideration, as a legislator's attention span is a zero-sum game. In this case a deductive approach is more appropriate.

Combining inductive approaches will lead to bills fitting in multiple issue areas, which could pose a conceptual challenge. The Congressional Bills Project codes each bill into a single policy area, just as the larger Comparative Agendas Project does for State of the Union speeches, newspaper articles and many other political documents (Baumgartner, Breunig, and Grossman, 2019). However, this decision could be challenged for a number of reasons. One of the most consequential state legislative bills in recent decades was the 2006 Massachusetts bill "Providing Access to Affordable, Quality, Accountable Health Care" which became known as "Romneycare" and later served a template for the federal Affordable Care Act of 2010. This bill is obviously about health care, but it also instituted an individual mandate to hold health insurance, making it the most consequential insurance bill in Massachusetts history as well. It also changed the tax code to pay for a massive slice of the Commonwealth's budget, making it a consequential tax bill. Scholars need to take care when dealing with multiple issue codes, but from a substantive perspective, it is a defensible position. An emerging best practice in the automated text classification literature is for scholars not to "solve" these difficult coding decisions, but rather to estimate the uncertainty of such decisions with a bootstrap procedure (Garlick and Cluverius, 2020).

Sampling state legislative bills by subject area using LexisNexis

To address this lack of data availability, I reproduce and dramatically expand a prior effort at measuring the policy agendas of all 50 states employed by Virginia Gray, David Lowery and a number of their coauthors (Fellowes, Gray, and Lowery, 2006; Kirkland, Gray, and Lowery, 2010). The measure is a hybrid of inductive and deductive approaches, as it appends 22 inductive searches, by using keyword searches of bill descriptions provided by LexisNexis. Using 22 policy areas covers all of the relevant categories, and is a more than suitable proxy of the Policy Agendas Project approach for the states.[17]. Approximately one million bill citations were exported from LexisNexis via email, and have been cleaned for analysis.

The goals of this procedure are to replicate a deductive coding procedure of state legislative agendas with as much geographic and temporal coverage as possible. While many state governments have made their legislation available online in the 21st century, LexisNexis maintains a database of legislation for all 50 states dating back to 1991. The LexisNexis *State Capital Universe* product allows for keyword searches of "bill tracking reports" that feature a short description of legislation, as well as the full-text of legislation for some years.[18]

A notable drawback is that using LexisNexis as a source of data is that their bill tracking reports are proprietary and only available to researchers through a search function (hence the keyword-based approach). *State Capital Universe* offers several means of searching their underlying database, including a search by "synopsis", which appears to be the bill descriptions shown in Table 2 and a search by "subject" function. However, the subject coding procedure is proprietary and not transparent.[19] Moreover, LexisNexis redesigned their search portal in 2019 as it transitioned from *LexisNexis Academic* to *LexisNexisUni* and while the procedure can be replicated,[20]

I followed the approach Fellowes, Gray, and Lowery (2006) used to estimate the collect the agenda for 1995-1999 with only minor modifications. Table 1 shows the keyword that were used to search LexisNexis State Capital Universe (SCU) using the "Bill Tracking by Keyword" function.

[17] In the main text, I compare to estimates favorably with the Pennsylvania Policy Agendas Project's estimates of the legislative agenda since 1991 (McLaughlin et al., 2010)

[18] During original data collection, the full-text search of legislation ended in 2012.

[19] During data collection, search by subject was not available after 2012.

[20] I successfully replicated the 2017 collection of Bill Tracking reports for three policy areas.

For each policy, I input the keywords (e.g. “education”) in the “Synopsis only" box, as well as the session (“2011"), state (“Illinois") and a temporal limitation. SCU will only return a search with less than 1000 entries. This can be a challenge as some searches would return more than 1000 results for a year. In some extreme cases, certain searches, like “tax” in New York, would exceed the 1000 limit even if the search were limited to a single day. My understanding is that SCU returns all of the bills under consideration for a given time period, so even though there wouldn't be 1000+ bills introduced in New York on those days, there would be that many bills in the process. Therefore, I would conduct overlapping searches (sometimes on a day by day basis) to ensure temporal and geographic coverage, in the hopes of capturing bills that were may have excluded by the search limit. This can create redundant entries in the dataset. This process required tens of thousands of search queries, so I automated this process using iMacros[21] or Kantu.[22] When LexisNexis transferred its process to *Uni* (LNU), my automation methods failed. However, I was able to replicate the above procedure in LNU by searching for each term with the phrase (e.g., for Energy the term was "summary(oil) OR summary(gas) OR summary(minerals)"), and manually exporting those results in batches of 250.

SCU allows users to export up to 1000 citations from a search via e-mail. Table 2 in the main text features a single citation. I imported this unformatted text into Stata, and using regular expressions, pulled out the 1) session of introduction, 2) bill prefix (which indicates which chamber the bill was introduced in), 3) bill number. For LNU, I exported the bill headings, which only indicate the session, bill prefix and number (in other words, no synopsis).

These two procedures allow me to create a registry of all the bills introduced across sessions for each individual policy in each state legislature by a “bill code” formed by its state, session, prefix and bill number (e.g. "Colorado 2011 HB 1001"), while ignoring redundant copies. These are not exclusive categories, so a bill can be assigned to more than one subject. I only include conventional house, assembly and senate bills introduced during regular sessions. Table 9 shows how bills in states with one year sessions are aggregated into two-year sessions. In most states, I start with the odd-year, except in New Jersey and Virginia, which hold off-cycle state legislative elections, in those states a two-year session starts with the even year.

[21] A free browser plugin is available at http://imacros.net/overview.
[22] A free browser plugin is available at https://ui.vision/.

Table 9: Two-year sessions

Year2	48 states	NJ + VA
1991	1991-1992	
1993	1993-1994	1992-1993
1995	1995-1996	1994-1995
1997	1997-1998	1996-1997
1999	1999-2000	1998-1999
2001	2001-2002	2000-2001
2003	2003-2004	2002-2003
2005	2005-2006	2004-2005
2007	2007-2008	2006-2007
2009	2009-2010	2008-2009
2011	2011-2012	2010-2011
2013	2013-2014	2012-2013
2015	2015-2016	2014-2015
2017	2017-2018	2016-2017

My approach departs from Fellowes, Gray, and Lowery (2006) in two key ways. First, they include each version of a bill, whereas I collapse all of the versions down by bill code. Therefore, their measure lists multiple versions for bills that advance through the legislative process, in essence it is measuring the "action agenda" and not what is introduced. The method I employ is more similar to the Congressional Bills Project in that each bill gets a single entry. The second major difference is that they reported using LexisNexis's "Subject" search, and I used a "Synopsis" search. In both SCU and LNU, LexisNexis lists subject information that is a percentage, and it includes the top several subjects. This is a proprietary measure with no information on how it is assessed. In practice, their measure found more bills. However, I have grave concerns about the transparency and replicability of using LexisNexis Subject scores.

Comparing State Capital Universe to LexisNexis Uni

In about 2019, LexisNexis apparently phased out academic use of SCU in favor of LNU, although it still provides access to the same underlying population of Bill Tracking Reports that date back to about 1991. The major change for researchers relates to access, as SCU allowed for automated retrieval of documents, which LNU has mostly shut off. Where researchers could export up to 1000 bill descriptions via email in SCU, they can only export up to 100 in LNU or 250 bill titles at a time. Table 10 shows that about 98 percent of the bills that are retrieved by

Table 10: There is high agreement between searches of State Capital Universe and LexisNexis Uni: 2017 Bill Tracking Reports for selected policy areas.

Policy	Matches	LNU only	SCU only	Share of matches
Agriculture*	1,238	1	1	99.8%
Energy†	600	6	38	93.2%
Communications‡	1,398	35	1	97.5%
			Total	**97.5%**

*Search terms: summary(agriculture) .
†Search terms: summary(gas) OR summary(oil) OR summary(minerals).
‡Search terms: summary(media) OR summary(telecommunications).

one method are found in the other. Furthermore, the bills that do not demonstrate agreement often have unusual codes (e.g. "2017 Bill Tracking WV S.B. 1007A" was only an Energy bill in SCU.). While laborious, this replication shows that this method will be able to be extended into the future using LNU.

Validations

Validation exercises provide confidence in the reliability of the estimates produced by the LexisNexis keyword search procedure. An external validation using the universe of legislation from 36 states that have reported the content of their legislation in recent years, I find that there is an 83% chance that the state identifies it in that same category. However, while the precision of the method is high, its recall of potential documents is not as strong. The LexisNexis procedure assigns less than half of all bills to a policy area. An internal validation using aggregate counts reported in Fellowes, Gray, and Lowery (2006) and Kirkland, Gray, and Lowery (2010) produces mixed results, however, the discrepancies mentioned in the previous section explain this lack of agreement.

External validation

This section evaluates how the LexisNexis keyword search procedure codes legislation. To draw this comparison, I use data from the OpenStates project. OpenStates scrapes state government websites to collect the universe of state legislation since about 2011. Many states have categorized their own legislation by its policy area, which OpenStates has collected for up to 36

states and aggregated to 44 policy areas (see Garlick, 2017, p. 966).[23] In addition to being a fairly direct measure of policy content of legislation, the OpenStates codes reflect a deductive coding process, which should give a more complete view of the agenda.

The OpenStates data allows for an individual-bill level validation of the estimates drawn from LexisNexis using an F1-score, which is the weighted harmonic mean of precision (P) and recall (R) shown in equation 3 (Schütze, Manning, and Raghavan, 2008). Precision is the share of estimations that are "correct." Since both of these procedures assign individual bills to multiple policy areas, an estimation is deemed to be "correct" if each bill's policy area has also been recognized in the OpenStates version of the bill for the 15 policy areas shows to be matches in Table 11. Recall is the share of possibly relevant documents that are retrieved. The precision is 0.806 (n = 100,914), and the recall is 0.617 (n = 122, 719), which leads to an F1 score of 0.698. This is an impressive association considering the degree of measurement error in these comparisons. For example, a LexisNexis bill about "Women's issues" is compared to OpenStates bills about "Sexual Orientation and Gender Issues." Therefore a bill about discrimination against homosexuals that is not about women's issues would be coded as a failure of a potentially relevant document in the recall exercise.

$$F1 = \frac{2PR}{P + R} \tag{3}$$

Figure 2 shows the raw count of bills for the "Agriculture" and "Health" policy areas under these coding schemes. It presents a similar pattern to the Pennsylvania Policy Agendas Project validation in the main text. OpenStates identifies many more bills. However, these measures do closely track each other. Aggregating the bills by year, there is a strong relationship for the number of bills introduced across all 50 states for both health (r = 0.96, n= 6) and agriculture (r = 0.75, n= 6). So while the method is wanting in terms of potential coverage, the validity of the Lexis codes that are reported is high. In practice, researchers can have confidence the keyword searches produce representative sample of legislation in different policy areas, as coded by the state legislatures themselves. The following section contains technical details for this comparison.

[23] The 36 states are listed in Table 12, and demonstrate a representative sample of states across geographic, ideological and professionalization dimensions.

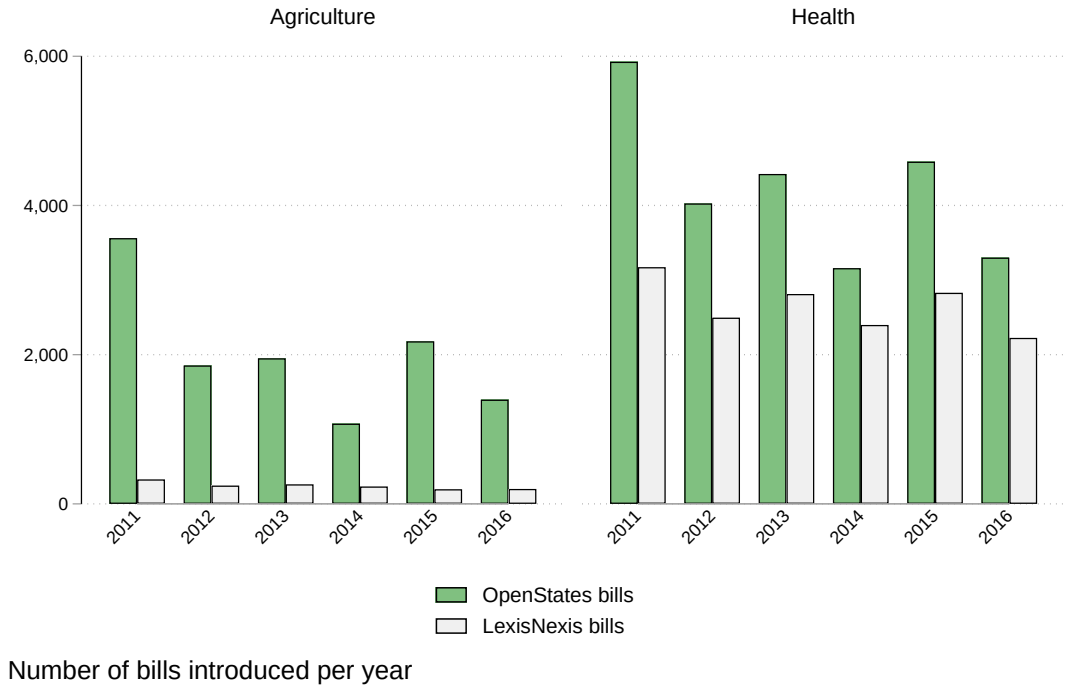

Figure 2: Number of bills in the states in the OpenStates validation sample by year.

Codebook for the OpenStates validation

Table 11 relates the LexisNexis search terms from Table 1 with the 44 Open States codes. This alignment is meant to fit the LexisNexis terms within corresponding OpenStates subject, in order to minimize Type I errors. For example, see G0201, where a bill being coded as Civil Rights should be a necessary condition to fit "Civil Liberties and Civil Rights", even though the inverse would not be true. Table 12 shows that states that report the subject of their legislation, which has been standardized by the OpenStates project. These 36 states demonstrate a useful amount of variation on geographic, ideological and professionalization dimensions who provides confidence that the validation sample is not based by the states which choose to code their legislation. However, the subject matter of legislation in these states is taken at face value. Future work may look to validate these codes as well.

Table 11: Subject coding scheme from LexisNexis to OpenStates

No.	PAP code	LexisNexis Subject	OpenStates Subject
1	G0201	Civil Rights	Civil Liberties and Civil Rights
2	G0202	Women	Sexual Orientation and Gender Issues
3	G0205	Environment	Environmental
4	G0209	Good Government	Campaign Finance and Election Issues
5	G0300	Health	Health
6	G0400	Agriculture	Agriculture and Food
7	G0600	Education	Education
8	G1000	Transportation	Transportation
9	G1200	Law	Legal Issues
10	G1500	Bank	Housing and Property
11	G1503	Sports	Recreation
12	G1510	Insurance	Insurance
13	G2400	Local Government	Municipal and County Issues
14	G2401	Police and Fire	Public Services
Unmatched codes			
x1	G0207	Religion	Animal Rights and Wildlife Issues
x2	G0208	Tax Policy	Arts and Humanities
x3	G0701	Utilities	Budget, Spending, and Taxes
x4	G0702	Natural Resource	Business and Consumers
x5	G1300	Welfare	Commerce
x6	G1400	Construction	Crime
x7	G1502	Small Business	Drugs
x8	G1504	Business Services	Energy
x9	G1520	Manufacturing	Executive Branch
x10	G1700	Communication	Family and Children Issues
x11			Federal, State, and Local Relations
x12			Gambling and Gaming
x13			Government Reform
x14			Guns
x15			Immigration
x16			Indigenous Peoples
x17			Judiciary
x18			Labor and Employment
x19			Legislative Affairs
x20			Nominations
x21			Other
x22			Reproductive Issues
x23			Resolutions
x24			Senior Issues
x25			Social Issues
x26			State Agencies
x27			Technology and Communication
x28			Trade
x29			Welfare and Poverty

Table 12: States that report the subject of their data, as aggregated by OpenStates

State	First report	Last report
AK	2011	2018
AL	2011	2018
CA	2010	2018
CT	2011	2018
HI	2011	2018
IA	2011	2012
ID	2011	2018
IN	2011	2018
KY	2011	2015
LA	2010	2012
MD	2010	2018
ME	2011	2018
MI	2011	2018
MN	2010	2018
MO	2012	2018
MS	2011	2018
MT	2012	2017
NC	2011	2018
ND	2011	2017
NJ	2010	2018
NM	2011	2018
NV	2011	2018
NY	2011	2013
OK	2012	2016
OR	2011	2012
RI	2012	2018
SC	2011	2016
SD	2011	2018
TN	2012	2018
TX	2010	2017
UT	2011	2018
VA	2010	2018
VT	2013	2014
WA	2011	2018
WI	2011	2018
WV	2014	2018

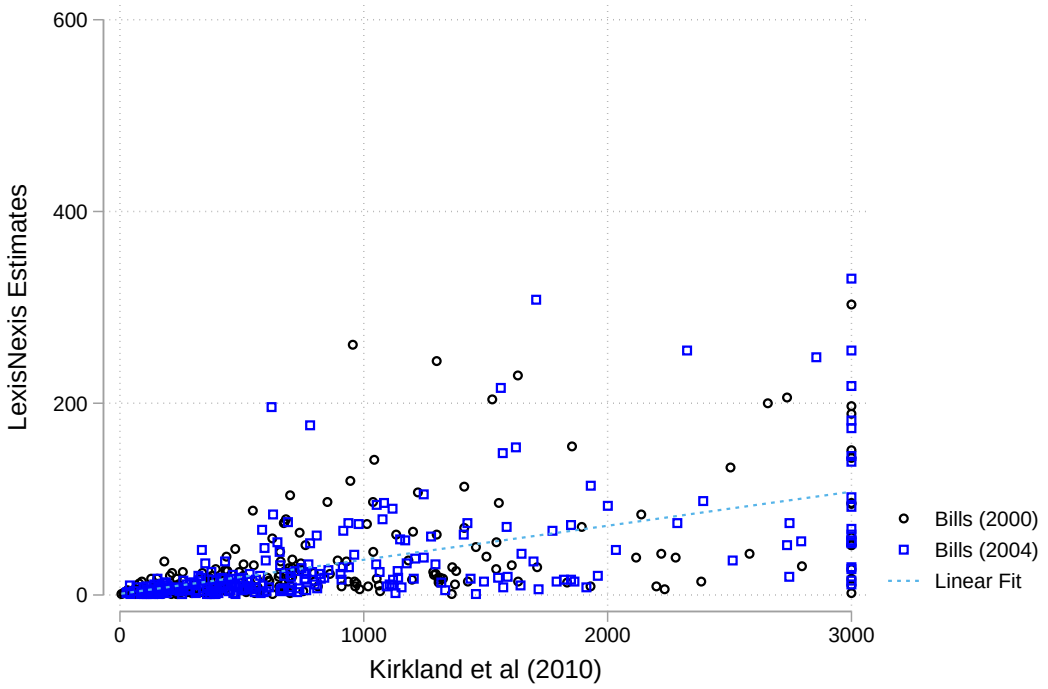

Figure 3: Correlation between the estimated number of bills per policy area and Kirkland, Gray, and Lowery (2010) estimates, aggregated by policy/state: 2000, 2004 (n=505)

Internal validation

To assess how this method compares to previous efforts to estimate the agenda using LexisNexis keyword searches, I compare the measure to aggregate counts of groups reported by Fellowes, Gray, and Lowery (2006) and Kirkland, Gray, and Lowery (2010). The search terms for my measure were drawn from these sources, so it is an appropriate comparison to make. Kirkland, Gray, and Lowery (2010) collect the number of bills introduced in eight policy areas in 2000 and 2004 using the same keywords as my search,[24] and there is a moderately strong relationship between the data at this level of aggregation (r = 0.57, n = 505). This relationship is shown in Figure 3.

Fellowes, Gray, and Lowery (2006, p. 40) report the total number of bills across all 22 policy areas for 1995-1999,[25] and Figure 4 shows the relationship between these estimates and the keyword estimates. There are about 2.5 times more bills in each session in their data compared to

[24] Agriculture, Bank, Communication, Construction, Health, Manufacturing, Natural Resources, Transportation.
[25] The original replication data de-aggregated by policy was not available from the authors.

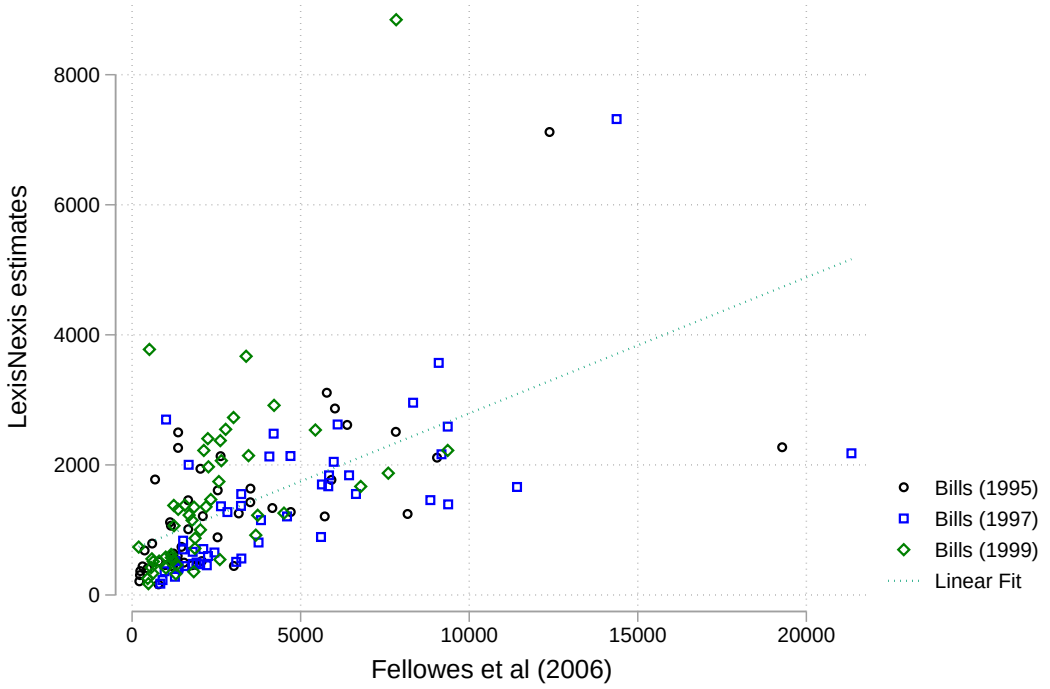

Figure 4: Correlation between the estimated number of bills per policy area and Fellowes, Gray, and Lowery (2006) estimates, aggregated by state: 1995, 1997, 1999 (n=147)

my estimates, which is likely a function of their coding decision to use each version of a bill as a unique bill.[26] With these caveats in mind, there is again a moderate relationship between these data, whether they are aggregated by each year (r 0.56, n = 204) or aggregated into two-year sessions (r = 0.57, n = 147). The mixed nature of these results suggests that the LexisNexis search procedure is highly sensitive to researcher decisions.

Descriptive Results

Figures 5 - 8 show the number of bills introduced with all the states aggregated to two-year sessions. In reference to Table 1, it combines G2400 and G2401 into a single category. I also collected "Military" bills, but had a critical collection error after 2004, so that code was dropped that from further analysis beyond the validation of Fellowes, Gray, and Lowery (2006).

[26] I tried to re-run the comparison using each unique version of the LexisNexis "description" as a unique bill but it did not improve this association. However, I do not think this is the appropriate approach to this data, as changes to the underlying text may or may not be reflected in the LexisNexis description of the bill, and vice-versa. My measure codes bills as unique by their bill id (All "HB 1001" observations are coded as a single bill).

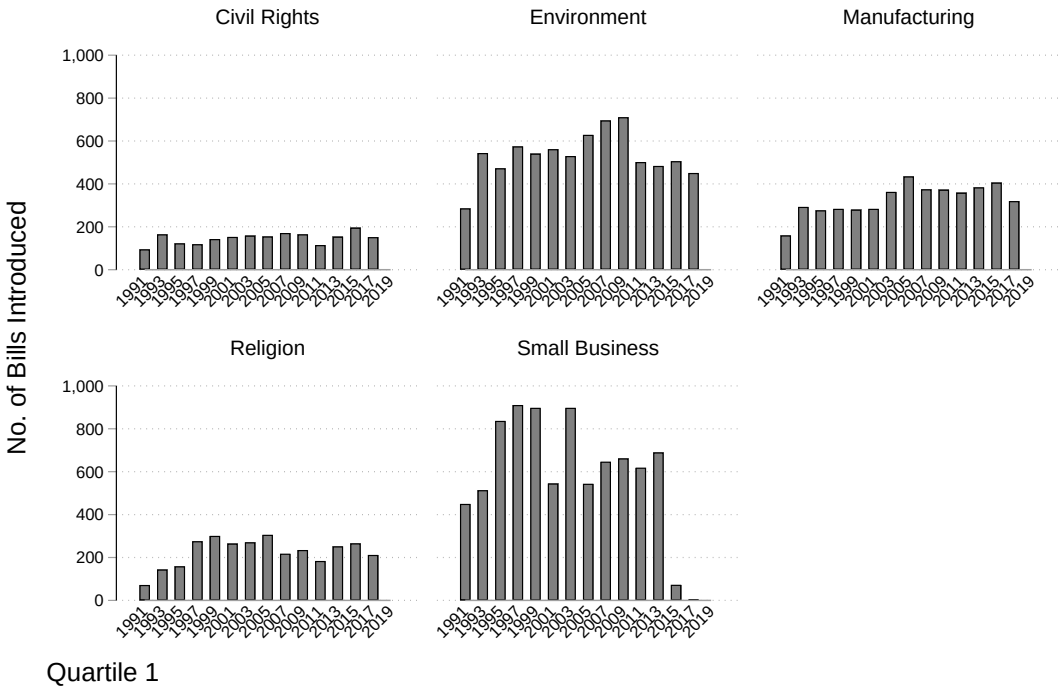

Figure 5: Number of bills in each 2-year period

These agendas are fairly "sticky," in the sense that the amount of attention paid to a topic from one session to the next is relatively consistent. Table 13 shows the average biannual change in the number of bills in a policy area is less than 5 percent. There are exceptions to this rule: communication policy spiked in 1999-2002, around the period of the first ".com" boom. Natural resources had an increase after the implementation of fracking in 2013-2014. But generally this pattern fits a punctuated equilibrium model, where the number of bills about a policy topic are relatively static, with exceptions (Baumgartner and Jones, 1993). Table 13 also shows dramatic differences in the levels of attention to the different policy areas. On average, the keyword method detects about 100 times as many health and tax policy bills as it does religion or civil rights per two-year session.

Table 13: Average number of bills (and change) introduced in each two-year session

Policy Name	Bills per session	SD	Change	SD
Tax Policy	306.2	99.65	-0.01	0.40
Health	210.6	70.65	-0.01	0.33
Education	188.4	67.90	0.01	0.36
Insurance	137.3	21.91	0.02	0.18
Local Government	109.9	53.46	0.03	0.42
Transportation	65.0	9.74	0.04	0.16
Construction	56.1	18.20	-0.03	0.33
Police and Fire	49.7	48.29	-0.01	0.39
Utilities	38.9	6.68	0.06	0.23
Natural Resources	26.6	9.20	-0.03	0.31
Bank	26.0	4.63	-0.00	0.18
Law	25.1	3.34	0.04	0.18
Agriculture	21.8	2.81	0.04	0.14
Sports and Recreation	18.2	2.74	0.06	0.20
Small Business	17.4	8.39	0.12	0.46
Welfare	17.1	3.08	0.05	0.21
Communication	14.0	4.95	-0.01	0.32
Environment	12.6	2.24	0.04	0.20
Manufacturing	7.5	1.29	0.05	0.15
Religion	6.8	1.54	0.10	0.20
Civil Rights	4.8	0.92	0.05	0.24
Total	64.7		0.028	

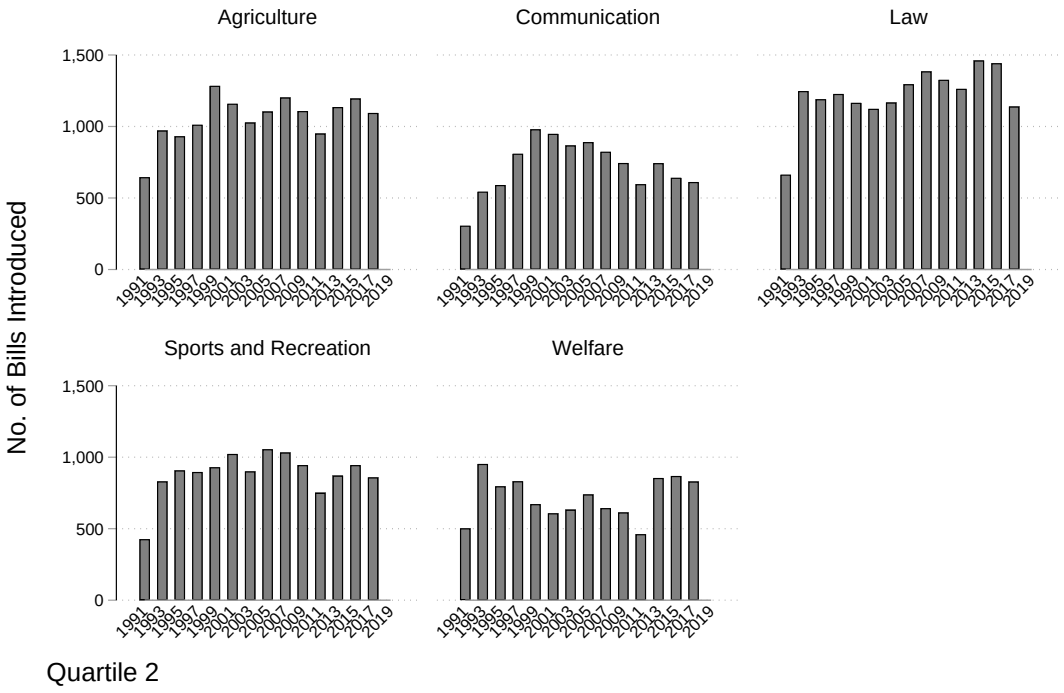

Figure 6: Number of bills in each 2-year period

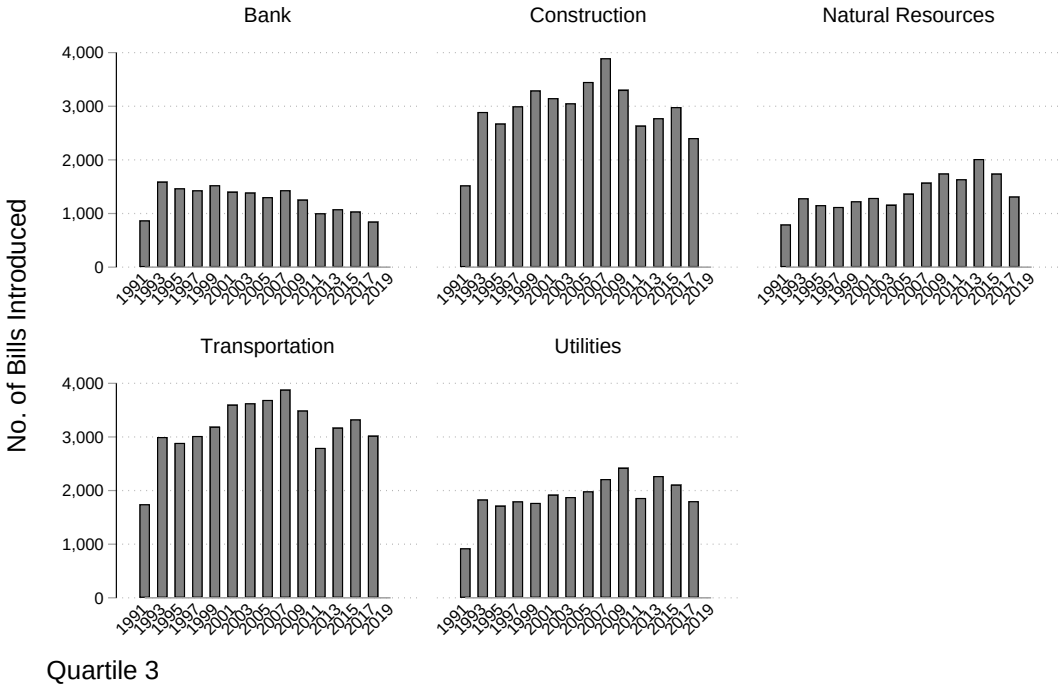

Figure 7: Number of bills in each 2-year period

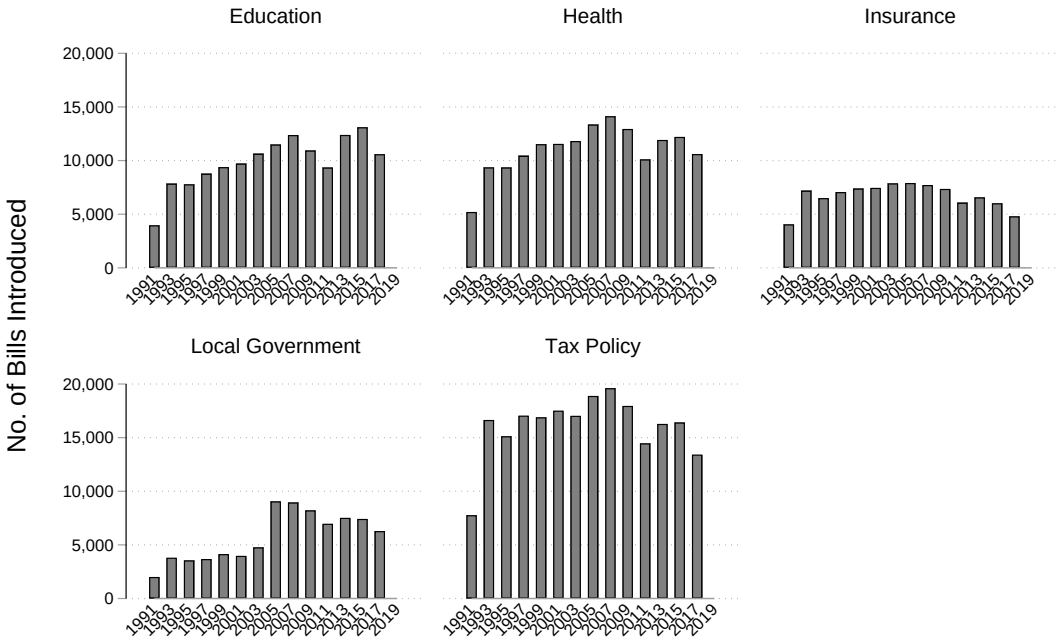

Figure 8: Number of bills in each 2-year period