

# Network Patterns of Legislative Collaboration in Twenty Parliaments

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## Supplementary online material

This appendix contains detailed information on the data and networks briefly documented in the short note “Network Patterns of Legislative Collaboration in Twenty Parliaments”. Section A starts by reviewing the existing literature on legislative cosponsorship as a strategic position-taking device for legislators within parliamentary chambers. Section B then documents the data collection process, Section C summarises its results, and Section D contains the full list of party abbreviations used in the data. Section E fully documents how the cosponsorship networks were constructed and weighted, and lists some derived measures.

The replication material for this study is available at <https://github.com/briatte/parlnet>. The code was written in R (R Core Team, 2015), and the current release of the repository is version 2.6. See the README file of the repository for detailed replication instructions including package dependencies. The raw data up to January 2016 are available at doi:10.5281/zenodo.44440.

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## A. BACKGROUND INFORMATION ON LEGISLATIVE COSPONSORSHIP

Legislative scholarship offers a wealth of studies that stress the importance of collaboration between Members of Parliament (MPs) in the lawmaking process. Cosponsorship frequently features among these collaborative cues: while in office, MPs are often granted the opportunity to support each other by apposing their joint signatures on a piece of legislation, such as an amendment, a bill or a nonbinding resolution. The possibility to nominally cosponsor legislation does not exist in every single representative democracy, but it is fairly common in both parliamentary and presidential settings, and has been for several decades in countries such as the United States (Campbell, 1982), Argentina and Chile (Alemán and Calvo, 2013; Micozzi, 2014), and in several European countries.

There are several ways to explain, however, why MPs decide to cosponsor legislation together. Parliaments are highly strategic environments where multiple goals such as leadership, policy-specific influence or reelection can be pursued all at once, thereby making it implausible to trace down cosponsorship to a single explanatory factor. Accordingly, scholars of legislative behaviour have come up with multiple reasons for cosponsorship to occur, largely out of observations of such behaviour in the U.S. Congress (Schiller, 1995; Kessler and Krehbiel, 1996; Wilson and Young, 1997; Koger, 2003).

Taken as a whole, this segment of the literature broadly conceptualises legislative cosponsorship as a strategic position-taking device that allows a legislator to convey a signal to other legislators or to external constituents. As such, cosponsorship may seem similar to roll call votes, but as several authors have pointed out, many of the constraints that apply to parliamentary votes are less effective when it comes to initiating legislation: specifically, cosponsorship is often less subject to party discipline, insofar as party leaders and party whips exert less influence over it than they do over voting behaviour (Schiller, 1995; Desposato, Kearney and Crisp, 2011; Alemán and Calvo, 2013).

Consequently, while cosponsorship might share some of the properties of floor votes with regards to its ability to shape the legislative agenda, it might also be viewed as akin to the other “non-roll call position taking devices” available to legislators, such as speeches or written communications, which MPs can resort to as “mechanisms to target voters, but also interest groups, party leaders, expected presidential candidates, and even racial or ethnic clusters” (Micozzi, 2014, p. 1188). This definition stresses the importance of electoral incentives and political ambition in the reasoning that might underlie the act of cosponsorship, along other possible goals such as increasing the likelihood of approval of a piece of legislation (Wilson and Young, 1997; Tam Cho and Fowler, 2010) or pursuing a specific policy stance (Koger, 2003; Alemán and Calvo, 2013).

Given the multiplicity of meanings that can be attributed to cosponsorship, it might also be useful to define it negatively, by explaining what it does *not* embody. Specifically, several scholars have raised the issue that cosponsorship might represent little more than “cheap talk” between legislators, since the act of cosponsorship is trivially time-demanding in itself and the cost of cosponsorship is low, with few penalties and possibly high rewards in case of legislative success (Kessler and Krehbiel, 1996; Wilson and Young, 1997; Fowler, 2006a). In practice, however, cosponsorship appears to be much more selective than systematic: existing studies show that MPs cosponsor only a very small fraction of all legislation, which might be explained by the “substantial search cost involved in deciding which bills to cosponsor” (Fowler, 2006a, p. 459), or by the private nature of the interactions that result in legislation to be cosponsored (Micozzi, 2014, fn. 1, p. 1204). In either case,

cosponsorship is much less likely to come out as a generalised, inexpensive signal with little meaning attached to it, than as a proxy for the existence of collaborative relationships – or, from a network perspective, ties – between MPs.

Even if cosponsorship characterises as a non-trivial act, uncertainty yet remains with regards to the decision of legislators *not* to cosponsor a given piece of legislation. This issue severely affects the opportunity to use cosponsorship as an alternative measurement to roll call votes: although some studies report broad agreement between ideal points measured from both sources (Alemán et al., 2009), the decision not to cosponsor legislation is hardly equivalent to voting against it (Desposato, Kearney and Crisp, 2011). A safer course of research might therefore consist in asking broad, descriptive questions about the determinants of legislative cosponsorship, rather than focusing on its potential value as a benchmark of individual ideological positions.

This brief overview of existing research leaves us with a question that seems particularly fit for comparative inquiry: which factors, if any, might explain the act of cosponsorship across parliamentary environments? Since cosponsorship is inherently relational, many studies have begun to answer that question by suggesting that legislators are not simply concerned by *what* they cosponsor, but also *with whom*, thus making it a dual act of position-taking: through the joint sponsorship of selected legislative items, MPs not only express preferential attachment to specific issues, but also preferential attachment to other legislators (Gross, Kirkland and Shalizi, 2012).

This last argument features prominently in recent studies of legislative cosponsorship, which have made use of social network analysis to account for it. In its simplest form, the hypothesis translates into the phenomenon known as homophily (McPherson, Smith-Lovin and Cook, 2001): legislators are more prone to cosponsor the work of other legislators when they share some characteristics, such as ethnicity (Bratton and Rouse, 2011), gender (Clark and Caro, 2013), constituency (Alemán and Calvo, 2013) or committee membership (Kirkland and Gross, 2012). Under more complex assumptions, cosponsorship might also emerge from strategic decisions where dissimilar sponsors ally in order to maximise their legislative success, thereby forming “weak ties” motivated by outcome considerations (Kirkland, 2011).

A further argument of interest about the determinants of legislative cosponsorship has been laid out by Kirkland (2014). Since cosponsorship is essentially a process of partner selection, the structure of legislative assemblies might play an additional role in that operation. As Kirkland (2014, p. 169) explains, “legislators must balance their choices about collaboration with the uncertainty surrounding those relational decisions”; as a consequence, “any institutional structures that alter the level of information, and by extension uncertainty, in a chamber regarding bill outcomes or bill sponsors will affect cosponsorship choices” (Kirkland, 2014, p. 172). In that perspective, the size of the chamber and of its parliamentary committees might respectively hinder or enable learning among legislators, thereby affecting their overall propensity to cosponsor and/or their propensity to cosponsor across party lines.

The literature on legislative cosponsorship therefore contains many empirical puzzles, ranging from the strategic motives that underlie cosponsorship to the individual and institutional factors that might be used to predict its occurrence. Based on a methodological framework that turns several additional parliamentary chambers into candidates for network studies of legislative behaviour, the data presented in this appendix and in the note that it supports offer an opportunity to further explore that puzzle across space and time.

## B. SAMPLE DEFINITION AND DATA COLLECTION

In order to broaden the empirical base for research on legislative cosponsorship to a larger set of parliaments than currently available through existing studies, we surveyed the official websites of 33 parliaments, including all current member states of the European Union and all four members of the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland), to which we added one non-European democracy (Israel). We then used several Web scraping technologies to collect information on private bills and their sponsors from these websites.<sup>1</sup>

Table B1 shows an overview of the data that we have managed to collect so far. The data cover 27 parliamentary chambers in 20 countries, over a total of 558 cumulative years split into 150 legislatures, understood as periods between two nationwide legislative elections.<sup>2</sup> The sample contains a mix of unicameral and bicameral parliamentary systems, including three federal regimes (Austria, Belgium and Switzerland). The country-chamber codes shown in the table are reused at several points in the figures and tables of this document.

### B.1. Bills

This study is focused on the cosponsorship of private bills, defined as law proposals initiated by one or more MPs that become binding if they make it through the legislative process of their country of introduction. This definition is compatible with the theoretical assumptions outlined in Section A on how MPs signal their positions to their constituents or to third parties, and is comparable across countries: it corresponds, for instance, to the definition of *propositions de loi* in Belgium and France, or to *törvényjavaslat* in Hungary and *lagafurmvörp* in Iceland, and in the special case of Denmark, includes both ‘preliminary’ bills (*beslutningsforslag*) and ‘full-fledged’ bills (*lovforslag*).

This definition excludes bills initiated by the executive branch of government, as well as non-binding statements by MPs, such as resolutions (or early day motions in the United Kingdom). We further limited our attention to bills sponsored by individual MPs, i.e. bills for which *nominal* sponsorship information appear in official parliamentary records. This restriction resulted in excluding additional countries from our sample, such as Germany or Spain, where the vast majority of legislation is sponsored by entire parliamentary groups and do not carry individual endorsements (Brunner, 2013, p. 16).

The data collected according to this definition amounts to slightly above 239,000 bills, 60% of which were sponsored by two or more MPs. These statistics are shown in more detail in Figures B1 and B2, which show their breakdown in each country, chamber and legislature. Because the data do not include governmental bills, these figures do not measure overall legislative production, which varies dramatically between countries and chambers; there is, however, an observable trend towards increased levels of legislative productivity and legislative cosponsorship in several cases.

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<sup>1</sup>For an introduction to the technologies that we used, see the chapters on HTML, JSON, SQL and XML files in Munzert et al. (2015), as well as the chapter on XPath syntax.

<sup>2</sup>Although the data for Iceland are exceptionally extensive and range back to 1907, we restricted its presence in the sample to the six most recent legislatures, which covers all elections since the Althing was reformed to sit as a unicameral parliament, and makes the proportion of Icelandic legislatures comparable to that of other countries in the sample. Similarly, the data for the lower chamber of Italy range back to 1948 but are limited to the nine most recent legislatures for comparability.

Table B1: Overview of country-chamber sample.

Region	Country	Chamber	Code	Period	Years	Legislatures
East	Bulgaria	Unicameral	BG	2005–2015	11	4
	Czech Republic	Lower	CZ-PO	1996–2015	20	6
		Upper	CZ-SE	1996–2015	20	6
	Estonia	Unicameral	EE	2007–2015	9	3
	Hungary	Unicameral	HU	1998–2015	18	5
	Lithuania	Unicameral	LT	1992–2015	24	6
		Lower	RO-CA	1996–2015	20	5
	Romania	Upper	RO-SE	1996–2015	20	5
		Unicameral	SK	1998–2015	18	5
	West	Austria	Lower chamber only	AT	1994–2015	22
Belgium		Lower	BE-CH	1991–2015	25	7
		Upper	BE-SE	1995–2014	20	5
Switzerland		Lower	CH-CN	1995–2015	21	5
		Upper	CH-CS	1995–2015	21	5
France		Lower	FR-AN	1986–2015	25 <sup>a</sup>	6
		Upper	FR-SE	1986–2015	30	7
Ireland		Lower	IE-DA	1997–2015	19	4
		Upper	IE-SE	1997–2015	19	4
Italy		Lower	IT-CA	1983–2015	33	9
		Upper	IT-SE	1996–2015	20	5
Portugal		Unicameral	PT	1991–2015	25	7
North		Denmark	Unicameral	DK	2001–2015	15
	Finland	Unicameral	FI	1999–2014	16	4
	Iceland	Unicameral	IS	1995–2015	21	6
	Norway	Unicameral	NO	1985–2015	31	8
	Sweden	Unicameral	SE	1988–2015	28	8
Asia	Israel	Unicameral	IL	2009–2015	7	3

<sup>a</sup>Missing legislature 10 (1993–1997) of the French lower chamber.

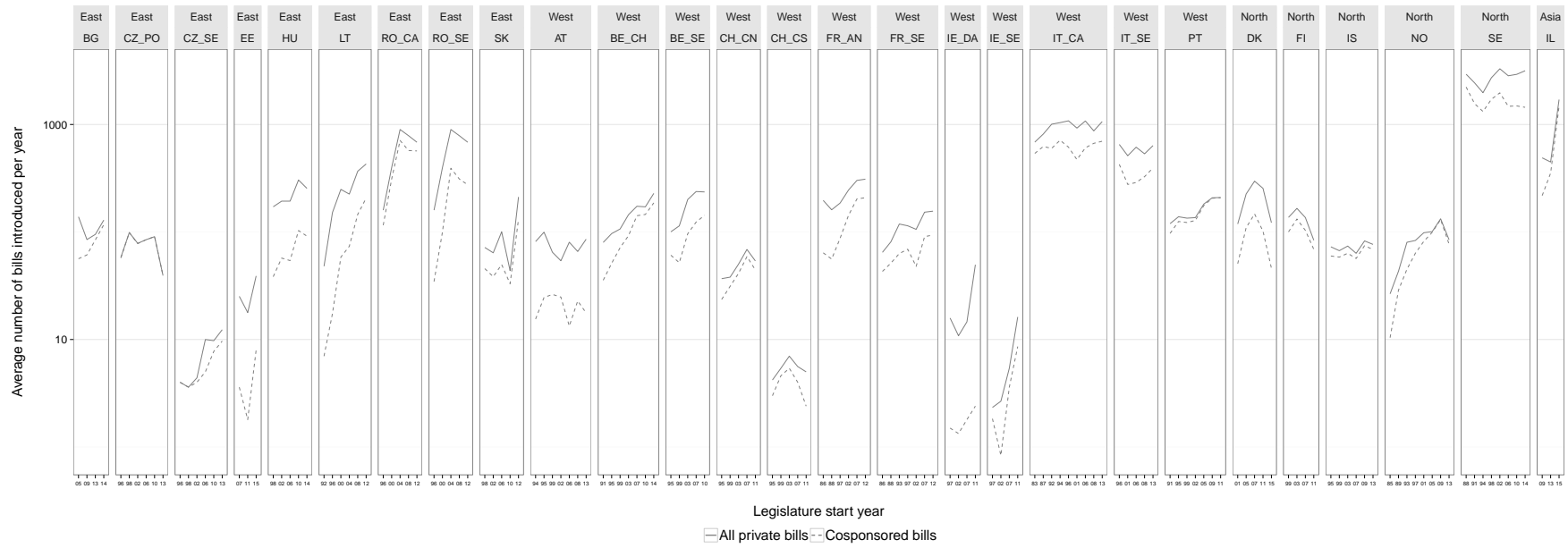


Figure B1: Average number of bills per year in each country, chamber and legislature. Solid lines are measured out of all bills, dashed lines out of cosponsored bills only. The vertical scale is logged.

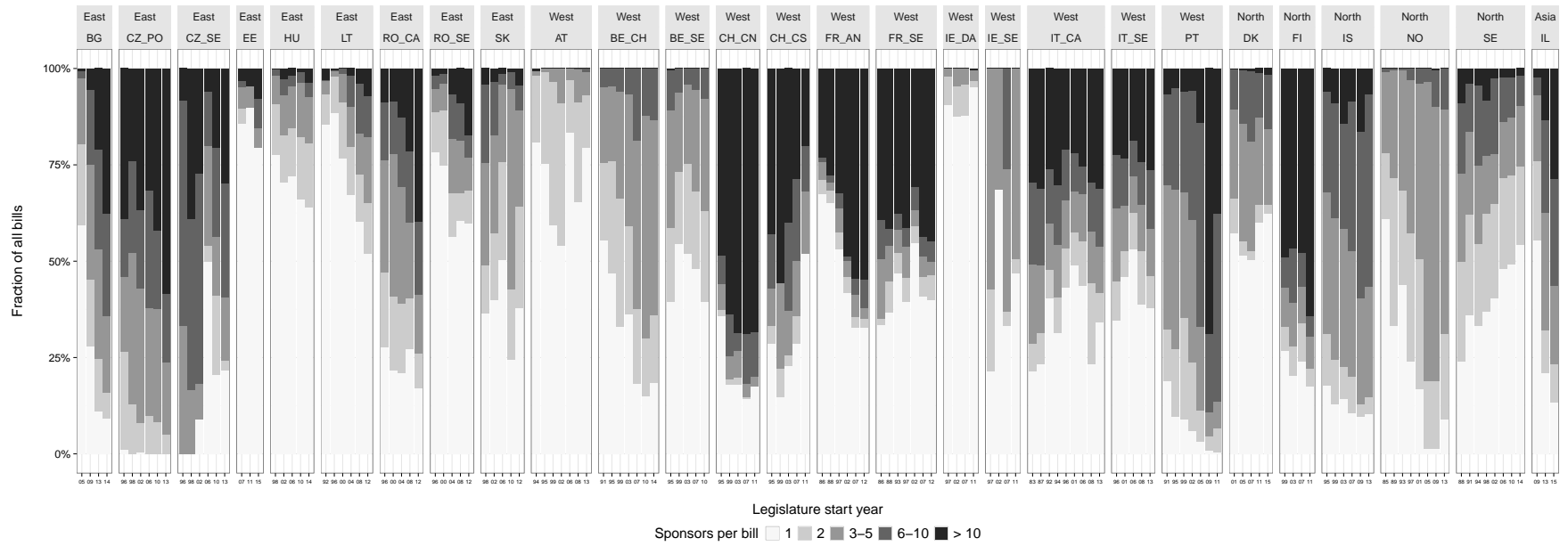


Figure B2: Number of sponsors per bill in each country, chamber and legislature. In some chambers like those of Belgium and Portugal, there is a regulatory limit on the maximum number of sponsors per bill (Mattson 1995, p. 457, cited in Brunner 2013, p. 16).

Table B2 contains some further details about our data sources. In most countries, the data were collected by sending a general query for all bills of a given legislature to the internal search engine of the parliamentary website, and by downloading the bills found by going through the complete pagination of the results. When parliaments maintained open data portals that made it possible to download all bills and/or sponsors, that strategy was preferred.<sup>3</sup> Both strategies had very high success rates that left less than 1% of all bills and sponsors unobserved after a few re-runs of the code to fix occasional network errors.<sup>4</sup>

Private bills are not the only kind of legislation that MPs might consider cosponsoring. Two other types of common legislative items, which Fowler (2006a,b) treats as bills in his research on legislative cosponsorship in the U.S. Congress, are also relevant in that regard:

- In many parliamentary systems, MPs can collectively submit ‘**motions**’, ‘**petitions**’ or ‘**resolutions**’ that, if adopted, can be either non-binding, or binding in a specific way that does not translate into law (such as forcing the parliament to table a plenary debate on a given issue, or in rarer cases, forcing the government to resign).

Examples of such items include early day motions in the United Kingdom, which we already mentioned and which exist in many parliamentary systems inspired by the British one, as well as *Forslag til vedtagelse* in Denmark and *motie* in both chambers of the Dutch parliament.

Despite motions being generally available from the same sources and over the same time period as bills, we refrained from including them in our sample of legislation in order to avoid comparing cosponsorship across legislative items that do not carry the same consequences if adopted, and that might therefore vary in ways that would threaten the comparability of the legislation under scrutiny. For that same reason, our legislation sample does not include bills introduced by popular initiative, even when they can be cosponsored by MPs, as is the case in the lower chamber of Italy.

- It is also highly common for MPs to be able to submit **amendments** to bills submitted by other legislators, such as budget-related bills submitted by the government or private bills submitted by other MPs.

Although we initially considered collecting amendments, these were often available on much shorter time periods than bills. Furthermore, many countries allow MPs to introduce amendments in untraceable legislative environments, such as standing committee meetings for which there is little to no parliamentary record. Last, amendments are, much more often than bills, subject to duplication: several MPs might introduce the same amendment separately, rather than cosponsor the same amendment. For all these reasons, we did not collect amendments for this study.

For every bill that we collected, we extracted sponsorship information on the first author and cosponsor(s) of the bill, as well as other descriptors (such as its title, introduction date, keywords or legislative outcome) when they were available.

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<sup>3</sup>In the unique case of Israel, we also used an open data portal maintained by an unaffiliated third party, Open Knesset, by The Public Knowledge Workshop: <https://oknesset.org/>.

<sup>4</sup>Although the code for this project does not include a self-updating mechanism, it stores all raw data locally in order to skip existing files on re-runs. As a consequence, the data for all countries and chambers can be updated at reasonably high speed as new bills become available.



Table B2: Overview of the different kinds of legislation retrieved during data collection. The kinds indicated in **bold** type are those used for network construction. The dots in the second column mark the cases for which we were able to turn to a legislative open data portal to collect either bills or sponsors data (or both).

Country code	Open data	Data coverage
AT		<b>private bills</b> ( <i>selbständige anträge</i> ) <sup>a</sup>
BE-CH		government bills, <b>private bills</b> ( <i>propositions de loi</i> ), amendments, resolutions, reports
BE-SE		government bills, <b>private bills</b> ( <i>propositions de loi</i> ), amendments, resolutions, reports
BG		government bills, <b>private bills</b>
CH-CN	••	<b>private bills</b> ( <i>initiatives parlementaires</i> )
CH-CS	••	<b>private bills</b> ( <i>initiatives parlementaires</i> )
CZ-PO		<b>private bills</b> ( <i>návrhy zákonů</i> )
CZ-SE		<b>private bills</b> ( <i>návrhy zákonů</i> )
DK		government bills, <b>private bills</b> ( <i>lovforslag</i> ), motions ( <i>beslutningsforslag</i> ), resolutions
EE		<b>private bills</b> ( <i>eelnõud</i> )
FI		<b>private bills</b> ( <i>lakialoite</i> )
FR-AN		government bills, <b>private bills</b> ( <i>propositions de loi</i> ) <sup>b</sup> , amendments, resolutions
FR-SE	••••	government bills, <b>private bills</b> ( <i>propositions de loi</i> ) <sup>b</sup> , amendments, resolutions
HU		<b>private bills</b> ( <i>törvényjavaslat</i> ), government bills
IE-DA		<b>private bills</b>
IE-SE		<b>private bills</b>
IL	•	<b>private bills</b>
IS		government bills, <b>private bills</b> ( <i>lagafrumvörp</i> )
IT-CA	•••	<b>private bills</b> ( <i>disegni di legge</i> )
IT-SE		<b>private bills</b> ( <i>disegni di legge</i> )
LT		<b>private bills</b> ( <i>istatymo projektas</i> )
NO	•	<b>private bills</b> ( <i>saker</i> )
PT		<b>private bills</b> ( <i>projete de lei</i> )
RO		government bills, <b>private bills</b> ( <i>propunerilor legislative</i> )
RO		government bills, <b>private bills</b> ( <i>propunerilor legislative</i> )
SE	••	<b>private bills</b> ( <i>motioner</i> )
SK		<b>private bills</b> ( <i>legislatívna iniciatíva</i> )

Open data file formats: • HTML/XML, •• JSON, ••• RDF/SPARQL, •••• PostgreSQL database.

<sup>a</sup>The sponsorship data are limited to the MPs who filed the bill, as it was not possible to collect the names of additional sponsors from the original documents.

<sup>b</sup>Because French bills can be sponsored both by individual MPs and by entire parliamentary factions, we collected but later ignored group signatures when parsing the data.

## B.2. Sponsors

Using the same parliamentary sources as we used for bills, we retrieved as much information as possible on the individual legislators who sponsored the bills. The variables collected across all countries include socio-demographics (age and sex) and parliamentary career information (time in office, constituency, committee membership(s) and party affiliation), for a total of over 18,000 MPs who appeared on at least one cosponsored bill.

Some important simplifications apply to our measures of party affiliation and time in office:

- *Party affiliation* was not necessarily stable across a full legislature: for example, in 2005, several Austrian MPs followed Jörg Haider in defecting from the Freedom Party of Austria (FPÖ) to create the Alliance for the Future of Austria (BZÖ). In such cases, which were particularly frequent in Austria, Iceland and Italy, we recorded only the longest party affiliation of the sponsor over the entire legislature.

Another limitation that applies to party affiliations stems from the difference between partisan and parliamentary factions. This difference is most visible in countries like Italy, where MPs are frequently elected under the banner of a small political party, but then sit in parliament as part of a coalition of these parties. To handle this issue, we proceeded to several recodings based on the composition of parliamentary factions, all of which are documented in detail in Section D.

- *Time in office*, or seniority, was measured as years spent in the same parliamentary chamber, even though some countries like Italy or Romania frequently elect members of their lower chamber to the upper chamber as senators. In order to keep seniority figures comparable across all countries, these chamber transitions are unaccounted for in our measures of time in office.

A further limitation to the measurement of time in office is that many countries do not provide the exact periods of office-holding of their MPs, or do so only since a given point in time, such as the first legislature since independence in the Czech Republic and Slovakia. As a consequence, our seniority measures are sometimes only approximately continuous and comparable to each other. They can, however, be safely used to create dummies that discriminate ‘freshmen’, i.e. newly elected MPs who did not sit in any previously observed legislature, from other MPs.

In order to further identify each MP, we also collected the address of his or her profile page on the website of the corresponding parliamentary chamber, as well as the address of his or her photograph when it was available. The photographs of the bill sponsors were used to verify their gender when that information had to be imputed from first names and/or family names, or from gendered information featured in their profile pages.

Further details on sponsor variables appear in Section E.2, which lists the complete set of attributes assigned to the cosponsorship networks.

### C. DESCRIPTIVE STATISTICS BY COUNTRY, CHAMBER AND LEGISLATURE

In the tables of this section, each row corresponds to a country-chamber-legislature, identified by their country-chamber code followed by the start year of the legislature. Each table reports the duration of the legislature,<sup>5</sup> the total number of bills introduced, the percentage of those bills that were sponsored by two or more MPs, the number of individual MPs who participated into bill cosponsorship, the average number of sponsors per bill, and the number of different political parties found among the sponsors.

- Table C1: Austria
- Table C2: Belgium
- Table C3: Bulgaria
- Table C4: Czech Republic
- Table C5: Denmark
- Table C6: Estonia
- Table C7: Finland
- Table C8: France
- Table C9: Hungary
- Table C10: Iceland
- Table C11: Ireland
- Table C12: Israel
- Table C13: Italy
- Table C14: Lithuania
- Table C15: Norway
- Table C16: Portugal
- Table C17: Romania
- Table C18: Slovakia
- Table C19: Sweden
- Table C20: Switzerland

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<sup>5</sup>The duration of the legislature is shown in brackets when the measure is right-censored because the legislature is still ongoing.

Table C1: Austria

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
AT-2013	(3)	257	21	60	1.4	6
AT-2008	6	395	35	83	1.5	5
AT-2006	3	241	17	51	1.2	5
AT-2002	5	270	46	74	1.6	4
AT-1999	4	259	41	63	1.5	4
AT-1995	5	498	25	67	1.3	5
AT-1994	2	163	19	44	1.3	5

Table C2: Belgium

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
BE-CH-2014	(2)	457	82	138	3.3	10
BE-CH-2010	5	857	85	165	3.5	10
BE-CH-2007	4	694	82	173	3.6	9
BE-CH-2003	5	724	64	163	2.6	9
BE-CH-1999	5	533	67	150	2.4	9
BE-CH-1995	5	483	53	139	2.1	9
BE-CH-1991	5	400	44	153	2.0	10
BE-SE-2010	5	1179	61	82	2.4	9
BE-SE-2007	4	951	52	85	2.2	10
BE-SE-2003	5	1003	48	81	2.0	9
BE-SE-1999	5	570	45	77	2.2	10
BE-SE-1995	5	502	61	71	2.7	9

Table C3: Bulgaria

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
BG-2014	(2)	258	91	245	11.2	6
BG-2013	2	190	89	245	7.4	4
BG-2009	5	425	72	253	5.4	6
BG-2005	5	692	41	209	1.8	7

Table C4: Czech Republic

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
CZ-PO-2013	(3)	118	100	204	16.6	7
CZ-PO-2010	4	362	100	209	15.7	5
CZ-PO-2006	5	424	100	215	13.2	5
CZ-PO-2002	5	392	99	214	11.3	5
CZ-PO-1998	5	494	100	204	9.0	5
CZ-PO-1996	3	174	99	184	12.8	6
CZ-SE-2013	(3)	37	78	85	9.3	11
CZ-SE-2010	4	39	79	80	7.4	7
CZ-SE-2006	5	50	50	66	3.8	10
CZ-SE-2002	5	22	91	74	10.8	11
CZ-SE-1998	5	18	100	73	10.2	7
CZ-SE-1996	3	12	100	49	6.4	5

Table C5: Denmark

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
DK-2015	(1)	122	38	62	2.8	8
DK-2011	5	1273	40	124	2.5	13
DK-2007	5	1485	50	140	3.0	12
DK-2005	3	677	49	120	2.8	11
DK-2001	(4)	475	43	108	2.4	9

Table C6: Estonia

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
EE-2015	(1)	39	21	83	3.4	6
EE-2011	5	89	10	78	2.3	4
EE-2007	5	126	14	99	2.4	6

Table C7: Finland

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
FI-2011	(4)	335	82	202	35.3	10
FI-2007	4	545	76	191	16.0	9
FI-2003	4	663	80	194	19.4	9
FI-1999	4	547	73	190	24.3	8

Table C8: France

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
FR-AN-2012	(4)	1240	67	576	28.2	7
FR-AN-2007	6	1811	67	599	31.0	5
FR-AN-2002	6	1473	58	594	39.6	5
FR-AN-1997	6	1115	47	561	16.5	6
FR-AN-1988	6	965	35	306	13.7	5
FR-AN-1986	3	590	33	325	12.0	6
FR-SE-2012	(4)	625	60	451	15.7	7
FR-SE-2007	6	917	59	496	16.5	7
FR-SE-2002	6	635	45	404	11.8	7
FR-SE-1997	6	685	61	429	15.1	7
FR-SE-1993	5	593	53	393	11.5	6
FR-SE-1988	6	486	63	375	10.8	6
FR-SE-1986	3	194	66	257	8.4	6

Table C9: Hungary

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
HU-2014	(2)	509	36	200	2.8	6
HU-2010	5	1522	34	378	2.0	6
HU-2006	5	968	28	267	2.0	5
HU-2002	5	968	30	297	2.2	5
HU-1998	5	858	22	183	1.4	7

Table C10: Iceland

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
IS-2013	(3)	230	90	70	6.0	6
IS-2009	5	413	90	85	7.2	6
IS-2007	3	190	89	82	5.9	5
IS-2003	5	370	86	88	6.1	5
IS-1999	5	335	87	76	5.5	5
IS-1995	5	364	82	73	4.6	3

Table C11: Ireland

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
IE-DA-2011	(5)	248	5	32	1.1	7
IE-DA-2007	5	73	12	22	1.2	4
IE-DA-2002	6	65	12	13	1.3	3
IE-DA-1997	6	95	9	19	1.1	5
IE-SE-2011	(5)	81	53	35	2.1	6
IE-SE-2007	5	27	67	25	3.3	5
IE-SE-2002	6	16	31	13	1.7	3
IE-SE-1997	6	14	79	15	2.6	4

Table C12: Israel

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
IL-2015	(1)	1704	87	109	8.1	10
IL-2013	3	1343	79	110	5.5	13
IL-2009	5	2446	45	99	2.3	13

Table C13: Italy

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
IT-CA-2013	(3)	3191	66	655	11.5	10
IT-CA-2008	6	5230	77	663	11.5	8
IT-CA-2006	3	3234	56	619	9.2	13
IT-CA-2001	6	5552	51	609	10.0	8
IT-CA-1996	6	6489	57	636	8.4	10
IT-CA-1994	3	3122	69	632	11.1	10
IT-CA-1992	3	3018	60	635	9.7	13
IT-CA-1987	6	4883	77	660	11.0	12
IT-CA-1983	5	3428	79	636	10.9	11
IT-SE-2013	(3)	1908	62	331	8.6	11
IT-SE-2008	6	3201	61	339	8.1	7
IT-SE-2006	3	1845	47	326	6.3	9
IT-SE-2001	6	3071	54	324	9.1	9
IT-SE-1996	6	3911	65	333	7.5	11

Table C14: Lithuania

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
LT-2012	(4)	1717	48	150	3.8	9
LT-2008	5	1837	40	151	3.3	12
LT-2004	5	1126	33	142	2.4	9
LT-2000	5	1245	23	128	1.4	14
LT-1996	5	758	11	99	1.3	13
LT-1992	5	240	15	113	2.2	11

Table C15: Norway

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
NO-2013	(3)	254	91	122	3.5	8
NO-2009	5	663	98	169	3.8	7
NO-2005	5	504	99	127	3.5	7
NO-2001	5	492	83	142	2.7	8
NO-1997	5	417	76	145	2.4	9
NO-1993	5	401	56	122	2.0	10
NO-1989	5	216	67	120	2.0	7
NO-1985	5	133	39	62	1.7	5

Table C16: Portugal

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
PT-2011	5	1046	100	259	9.5	6
PT-2009	3	624	99	211	12.8	6
PT-2005	5	909	97	271	7.0	6
PT-2002	4	544	94	254	5.2	6
PT-1999	4	538	91	259	4.7	6
PT-1995	5	693	90	274	4.9	5
PT-1991	5	598	81	238	4.7	6

Table C17: Romania

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
RO-CA-2012	(4)	2734	83	414	14.5	10
RO-CA-2008	5	3934	73	339	8.2	7
RO-CA-2004	5	4490	79	356	5.6	8
RO-CA-2000	5	1988	78	349	4.8	8
RO-CA-1996	5	798	72	335	4.5	11
RO-SE-2012	(4)	2734	40	179	6.1	8
RO-SE-2008	5	3934	40	137	4.1	6
RO-SE-2004	5	4490	44	151	3.3	7
RO-SE-2000	5	1988	25	128	1.7	7
RO-SE-1996	5	798	22	109	1.7	10

Table C18: Slovakia

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
SK-2012	(4)	847	62	139	2.8	6
SK-2010	3	131	76	103	2.9	6
SK-2006	5	502	50	135	2.1	6
SK-2002	5	320	60	141	3.2	8
SK-1998	5	359	64	149	3.8	9

Table C19: Sweden

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
SE-2014	(2)	6323	46	368	2.3	8
SE-2010	5	14633	51	387	2.6	9
SE-2006	5	14187	52	390	2.7	8
SE-2002	5	16490	60	395	3.2	8
SE-1998	5	13607	63	380	3.7	8
SE-1994	5	9869	67	398	3.7	8
SE-1991	4	9753	64	375	3.2	9
SE-1988	4	11737	76	379	4.2	7

Table C20: Switzerland

ID	Years	Bills	% cosponsored	Sponsors	Mean sponsors/bill	Parties
CH-CN-2011	5	269	83	226	19.8	11
CH-CN-2007	5	344	86	220	22.0	13
CH-CN-2003	5	251	82	224	23.4	14
CH-CN-1999	5	190	82	211	25.2	15
CH-CN-1995	5	184	64	219	16.3	16
CH-CS-2011	5	25	48	44	5.8	8
CH-CS-2007	5	28	71	50	7.7	8
CH-CS-2003	5	35	77	47	10.1	4
CH-CS-1999	5	27	85	48	14.5	4
CH-CS-1995	5	21	71	51	11.8	6



## D. PARTY ABBREVIATIONS AND LEFT/RIGHT SCORES

To further characterize the positions of bill sponsors relative to each other, we matched their party affiliations with an indication of where the party sits on a standardized Left/Right scale, using the scores available in the latest edition of the ParlGov database (Döring, 2013; Döring and Manow, 2014), which are time-invariant scores ranging from 0 to 10 and computed as the weighted mean values of party positions taken from several expert surveys of political parties.<sup>6</sup>

The tables in this section list the party abbreviations and Left/Right scores used in the data. A few special cases required taking the mean of several scores, and independent or unaffiliated MPs have no Left/Right scores, as do a small number of minor political parties and special categories like ethnolinguistic minorities. All recodings are documented in the notes at the end of each table.

- Table D1: Austria
- Table D2: Belgium
- Table D3: Bulgaria
- Table D4: Czech Republic
- Table D5: Denmark
- Table D6: Estonia
- Table D7: Finland
- Table D8: France
- Table D9: Hungary
- Table D10: Iceland
- Table D11: Ireland
- Table D12: Israel
- Table D13: Italy
- Table D14: Lithuania
- Table D15: Norway
- Table D16: Portugal
- Table D17: Romania
- Table D18: Slovakia
- Table D19: Sweden
- Table D20: Switzerland

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<sup>6</sup>See <http://www.parlgov.org/documentation/party-positions/> for further details.

Table D1: Austria

Abbreviation	Name	ParlGov ID	Left/Right
GRÜNE	Greens – Green Alternative	1429	2.5
SPÖ	Social Democratic Party	973	3.7
L	Liberal Forum	955	4.9
NEOS	The New Austria	2255	6
STRONACH	Team Stronach	2150	6
ÖVP	People’s Party	1013	6.5
FPÖ	Freedom Party	50	8.3
BZÖ	Alliance for the Future of Austria	1536	8.8
IND	Independents / Unaffiliateds	NA	NA

Table D2: Belgium

Abbreviation	Name	ParlGov ID	Left/Right
PT	Worker’s Party	256	1.3
ECOLO	Greens (Ecolo + Agalev-Groen)	161 / 1594	2.6
SOC-F	French Socialists (PS)	1378	2.9
SOC-V	Flemish Socialists (SPa + Spirit)	1113	3.3
CDEM-F	French Christian-Democrats (PSC/CDH)	1192	5.5
CDEM-V	Flemish Christian-Democrats (CVP)	723	5.8
LDD	Libertarian, Direct, Democratic (Dedecker List)	221	6
ROSSEM	ROSSEM (Jean-Pierre Van Rossem)	748	6
CDEM-V/VOLKS	Flemish Christian-Democrats and Volksunie coalition		6.2
VOLKS	Flemish Nationalists	290	6.5
LIB-F	French Liberals (MR + PRL/FDF)	915 / 454	6.8
LIB-V	Flemish Liberals (PVV/[Open] Vld)	1110	7
VLAAMS	Vlaams Blok/Belang	993	9.7
FN	Front National	171	9.7
IND	Independents / Unaffiliateds	NA	NA

Parties are recoded as entities composed of party families and linguistic communities. The few Greens from both linguistic communities share the same score and are coded as a single entity. The coalition of Flemish Christian-Democrats and Flemish Nationalists (CDEM-V/VOLKS), active during legislature 52 (2007–2010), uses the mean score of both its parties, as does the group of French Liberals (LIB-F).

Table D3: Bulgaria

Abbreviation	Name	ParlGov ID	Left/Right
KB	Coalition for Bulgaria	1160	2.9
DPS	Movement for Rights and Freedoms	1286	4.6
A	National Union Attack	535	5.5
NMS	National Movement Simeon the Second	544	5.8
BNS	Bulgarian People's Union	1375	5.8
ODS	United Democratic Forces	784	7
GERB	Citizens for European Development of Bulgaria	1541	7.4
BBZ	Bulgaria Without Censorship	2362	7.4
RB	Reformist Bloc	2363	7.4
SK	Blue Coalition	1254	7.4
DSB	Democrats for a Strong Bulgaria	57	7.9
PF	Patriotic Front	2211 / 2212	8.7
RZS	Order, Lawfulness, Justice	636	8.7
IND	Independents / Unaffiliateds	NA	NA

The score of the Patriotic Front (PF) corresponds to the score of its two parties, the Bulgarian National Movement and the National Front for the Salvation of Bulgaria. The Coalition for Bulgaria (KB) also ran as the Bulgarian Socialist Party and as Leftist Bulgaria.

Table D4: Czech Republic

Abbreviation	Name	ParlGov ID	Left/Right
KSCM	Communist Party	1173	0.7
CSSD	Social Democratic Party	789	3
SPO	Party of Civic Rights	406	3.3
SZ	Greens	196	4.1
KDU	People's Party	1245	5.8
PIR	Pirate Party	2261	5
NEZ	Independents	653	5.5
ANO2011	Action of Dissatisfied Citizens	2263	6
VV	Public Affairs	336	6
SNKED	SNK European Democrats	1532	6.1
4KOAL	Four-Party Coalition	1245 / 1123 / 688	6.7
ODA	Civic Democratic Alliance	1123	7.1
US	Freedom Union–Democratic Union	688	7.2
ODS	Civic Democratic Party	829	7.4
TOP09	Tradition Responsibility Prosperity 09	2	7.4
USVIT	Dawn of Direct Democracy	2262	7.4
SPR	Republicans of Miroslav Sládek	872	9.8
NK	Independents Movement	NA	NA
IND	Independents / Unaffiliateds	NA	NA

The score of the Pirate Party (PIR) is the average of the scores of its electoral partners, the People's Party (KDU) and the Greens (SZ), and the score of the Four-Party Coalition (4KOAL) is the average of the scores of three of its members, the People's Party (KDU), the Civic Democratic Alliance (ODA), and the Freedom Union-Democratic Union (US). For the upper chamber, minor parties with less than three sponsors are coded as independents, as are a few senators endorsed by several parties but affiliated to none.

Table D5: Denmark

Abbreviation	Name	ParlGov ID	Left/Right
E	Unity List	306	0.9
SFP	Socialist People's Party	1644	2.1
SD	Social Democrats	1629	3.8
RV	Radical Left	211	4.9
KD	Christian Democrats	1331	5.7
LA	Liberal Alliance	376	6
KFP	Conservative People's Party	590	7.2
V	Liberal Party	1605	7.3
DFP	People's Party	978	9
IND	Independents / Unaffiliateds	NA	NA
<i>Greenland</i>			
IA	Community of the People	1891	1.3
S	Forward	74	3.3
<i>Faroe Islands</i>			
JF	Social Democratic Party	1894	3.3
SF	Union Party	1892	7.4

The single member of centre-left party The Alternative is coded as independent, as is the single member of the Faroese Republic Party.

Table D6: Estonia

Abbreviation	Name	ParlGov ID	Left/Right
K	Estonian Centre Party	1137	4
SDE	Social Democratic Party	1448	4.2
ERL	People's Union of Estonia	417	4.6
EER	Estonian Greens	219	5.6
EV	Free Party	2409	7.4
EKRE	People's Party of Republicans and Conservatives	1395	7.4
RE	Estonian Reform Party	113	7.9
IRL	Union of Pro Patria and Res Publica	1597	8.5

Table D7: Finland

Abbreviation	Name	ParlGov ID	Left/Right
VR	Left Group	NA	2.2
VAS	Left Alliance	1292	2.2
VIHR	Green League	1062	3.6
SD	Social Democratic Party	395	3.6
KESK	Centre Party	94	5.8
R	Swedish People's Party	585	6.4
PS	[True] Finns Party	200	6.6
KD	Christian Democrats	1463	7.2
KOK	National Coalition Party	1118	7.2
M11	Change 2011	NA	NA

The two MPs who split from the Left Alliance (VAS) to form their own parliamentary group in 2011 (VR) are assigned the same score as their initial formation.

Table D8: France

Abbreviation	Name	ParlGov ID	Left/Right
COM	Communists (PCF + GDR)	686	1.4
ECO	Greens (Verts)	873	3.2
SOC	Socialists (PS + SRC)	1539	3.2
RAD	Radicals (RCV + PRG/RRDP/RDSE)	1492	4.1
CEN	Centrists (UDF/MODEM/UDI)	509	6.1
DRO	Conservatives (DL + RPR/UMP)	138 / 658	7.5
FN	Front National	270	9.7
IND	Independents / Unaffiliateds	NA	NA

Parties are recoded as entities that cover the political parties and parliamentary groups from both parliamentary chambers. The 'Mixed Left' group (RCV) of legislature 11 (1997-2002) is coded as Radicals (RAD).

Table D9: Hungary

Abbreviation	Name	ParlGov ID	Left/Right
LMP	Politics Can Be Different	403	2.6
MSZP	Socialist Party	1591	2.9
SZDSZ	Alliance of Free Democrats	1426	4
FIDESZ	Fidesz - Civic Union	921	6.5
MDF	Democratic Forum	546	6.5
KDNP	Christian Democratic People's Party	434	7.4
JOBBIK	Jobbik Movement for a Better Hungary	600	8.7
FKGP	Independent Smallholders, Agrarian Workers and Civic Party	870	9
MIÉP	Justice and Life Party	95	9.6
IND	Independents / Unaffiliateds	NA	NA

Table D10: Iceland

Abbreviation	Name	ParlGov ID	Left/Right
VG	Left-Green Movement	210	1.2
P	Pirate Party	2205	2.6
SF	Social Democratic Alliance	1006	4.1
F	Progressive Party	1455	5
BF	Bright Future	2204	6
HR	The Movement	587	6
FL	Liberal Party	506	6.2
S	Independence Party	1342	7.5
IND	Independents / Unaffiliateds	NA	NA

The entity for the Social Democratic Alliance (SF) includes its forming parties before 2000: the Social Democratic Party, the People's Alliance, the Women's List and National Awakening. The entity for The Movement (HR) also codes for its predecessor, the Citizens' Movement.

Table D11: Ireland

Abbreviation	Name	ParlGov ID	Left/Right
AAA	Anti-Austerity Alliance	NA	1.3
SOC	Socialist Party	1014	1.3
SF	Sinn Féin	2217	1.3
DL	Democratic Left	1580	1.9
GP	Green Party	1573	2.4
LAB	Labour Party	318	3.6
FF	Fianna Fáil	280	6.1
FG	Fine Gael	1393	6.4
RENUA	RENUA Ireland	NA	6.4
PD	Progressive Democrats	651	8
IND	Independents / Unaffiliateds	NA	NA

The Anti-Austerity Alliance (AAA) is assigned the same score than the Socialist Party (SOC) because its candidates were members of that party. RENUA Ireland (RENUA) is assigned the same score as Fine Gael (FG) because its members come from that party.

Table D12: Israel

Abbreviation	Name	ParlGov ID	Left/Right
BALAD	Balad	805	0.7
JL	Joint List	NA	1
HADASH	Hadash	732	1.3
MERETZ	Meretz	1419	1.8
INDEP	Independence	NA	3.3
LAB	Labour Party	244	3.3
ZU	Zionist Union	NA	4.7
HATNUAH	Hatnuah	2320	6
KADIMA	Kadima	1870	6
KULANU	Kulanu	2410	6
YA	Yesh Atid	2321	6
LIKUD	Likud	678	6.7
UTJ	United Torah Judaism	1303	6.9
SHAS	Shas	788	7
JH	The Jewish Home	214	8.6
YB	Yisrael Beiteinu	1816	8.7
NU	National Union	1357	9.6
UAL	United Arab List	NA	NA

The Joint List (JL) is coded at mid-distance from two of its founding entities, Hadash (HADASH) and Balad (BALAD). The Independence list (INDEP) is assigned the same score than the Labour Party (LAB), from which it split. The Zionist Union (ZU) is coded at mid-distance its founding entities, the Labour Party (LAB) and Hatnuah (HATNUAH).

Table D13: Italy

Abbreviation	Name	ParlGov ID	Left/Right
DP	Proletarian Democracy	1424	0.5
PRC	Communist Refoundation Party	1321	0.9
PDCI	Party of the Italian Communists	1661	1
SEL	Left Ecology Freedom	465	1.3
PCI	Italian Communist Party	1088	1.6
SIN	Independent Left	(1088)	1.6
VERD-PDCI	Greens and Communists (coalition)	1661 / 910	1.7
VERD	Greens Federation	910	2.4
DEMSIN	Democrats of the Left	809	2.6
M5S	Five Star Movement	2155	2.6
PD	Democratic Party	1048	2.6
AP	Alliance of Progressives	1048	3.3
ULIVO	The Olive Tree	1048	3.3
PSI	Italian Socialist Party	1475	3.8
RAD	Radicals	1296	4
RNP	Rose in the Fist	1278 / 1296	4
MARGH	Daisy – Democracy is Freedom	1005	4
ID	The Democrats	961	4.1
PPI	People’s Party	142	4.6
PSDI	Italian Democratic Socialist Party	242	4.6
IDV	Italy of Values	693	4.9
PRI	Italian Republican Party	93	5
RINNOV	Italian Renewal	630	5
UDEUR	Union of Democrats for Europe – Populars	399	5.3
DC	Christian Democrats	1633	5.7
CCD	Christian Democratic Centre	99	5.9
CCD-CDU	White Flower (coalition)	627	5.9
SC	Civic Choice (with [Mario] Monti)	2156	6
CD	Democratic Centre	2153	6
UDC	Union of the Centre	226	6.1
UDC-TP	Union of the Centre (Third Pole coalition)	226	6.1
CDU	United Christian Democrats	128	6.2
MPA	Movement for Autonomy	1040	6.2
PPP	Populars for [Romano] Prodi	840	6.2
PT	People and Territory	(1040)	6.2
RETE	Movement for Democracy – The Net	366	6.2
GAL	Large Autonomy and Freedom (coalition)	NA	6.5
PLI	Italian Liberal Party	487	6.5
NCD-UDC	New Centre-Right and Union of the Centre (coalition)	2268 / 226	6.8
FI-PDL	Go Italy – The People of Freedom	596	7.1
FLI-TP	Future and Freedom for Italy (Third Pole coalition)	1477	7.4
NCD	New Centre-Right	2268	7.4
FLD	Federalists and Liberal-Democrats	(1436)	7.8
LN	League of the North	1436	7.8
AN	National Alliance	373	8.1
MSI-DN	Italian Social Movement–National Right	831	9.2
IND	Independents / Unaffiliateds / Minor lists	NA	NA

Parliamentary coalitions are coded at mid-distance between their forming parties, and three groups are coded in reference to a related party whose ParlGov ID is indicated in brackets. Minor lists sitting as independents (such as those representing Italians from abroad) are coded as independent.

Table D14: Lithuania

Abbreviation	Name	ParlGov ID	Left/Right
LSDP	Social Democratic Party	1277	3.2
LDDP	Democratic Labour Party	519	3.3
LVZS	Peasant and Greens Union	191	3.3
NDP	New Democratic Party	1261	3.3
DP	Labour Party	581	3.9
LLRA	Election Action of Lithuania's Poles	28	3.9
NS	New Union (Social-Liberals)	856	4.3
LCS	Centre Union of Lithuania	887	4.9
TT	Order and Justice	1421	5.3
LKDP	Lithuanian Christian Democrats	675	6.2
KDS	Christian Democratic Union	493	6.2
LLIS	Liberal Union of Lithuania	378	6.8
NKS	Moderate Conservative Union	709	7.4
SK	Sajudis coalition	1045	7.4
TS-LKD	Homeland Union (Conservatives)	1045	7.4
LLAS	Lithuanian Liberty Union	1562	7.8
LS	Liberals' Movement	482	7.8
LICS	Liberal and Centre Union	983	7.8
LTS	Lithuanian National Union List	432	8.7
TPP	National Resurrection Party	1502	8.7
JL	Young Lithuania nationalists	383	9.8
LPKTS	Union of Lithuanian Political Prisoners and Deportees	1447	9.8
DK	Way of Courage	2121	NA
IND	Independents / Unaffiliateds	NA	NA

The score of the Homeland Union (TS-LK) is also used for the Moderate Conservative Union (NKS), which has left the Union, and for the Sajudis coalition (SK), which the Union largely absorbed. Two minor parties with only one member (the Independence Party and the 'LRPCH' party) are coded as independents.

Table D15: Norway

Abbreviation	Name	ParlGov ID	Left/Right
RV	Red Electoral Alliance	1638	0.4
SV	Socialist Left Party	81	1.6
MDG	Green Party	2254	2.6
A	Labour Party	104	3.4
SP	Centre Party	702	4.7
V	Liberal Party	647	5.1
KRF	Christian Democratic Party	1538	5.9
KP	Coastal Party	780	7.4
H	Right	1435	7.9
FRP	Progress Party	351	8.8
FFF	Future for Finnmark	NA	NA
IND	Independents / Unaffiliateds	NA	NA



Table D16: Portugal

Abbreviation	Name	ParlGov ID	Left/Right
BE	Bloc of the Left	557	1.6
PEV	Greens	1535	1.7
PCP	Communist Party	514	2.2
PS	Socialist Party	725	4
PSD	Social Democratic Party	1273	6.3
CDS-PP	Democratic and Social Centre – People’s Party	251	8
PSN	National Solidarity Party	82	NA

Table D17: Romania

Abbreviation	Name	ParlGov ID	Left/Right
PP-DD	People’s Party - Dan Diaconescu	2130	1.3
VERZII	Greens	792	2.6
PER	Ecologist Party	792	2.6
FER	Ecologist Federation	792	2.6
PSD	Social Democratic Party	1120	3.2
UNPR	National Union for the Progress of Romania	2002	3.3
PC	Conservative Party	5	4.8
PD-L	Democratic Liberal Party	958	5.4
PNTCD	Christian-Democratic National Peasants’ Party	888	5.5
PUNR	National Unity Party	648	5.6
UDMR	Democratic Union of Hungarians in Romania	948	6
PNL	National Liberal Party	1015	6.1
PRM	Greater Romania Party	713	6.7
MIN	Ethnolinguistic minorities	425	NA
IND	Independents / Unaffiliateds	NA	NA

Table D18: Slovakia

Abbreviation	Name	ParlGov ID	Left/Right
KSS	Communist Party	44	0.5
SDL	Party of the Democratic Left	1415	3.2
SOP	Party of Civic Understanding	1016	3.3
SMER-SD	Direction – Social Democracy	220	3.4
HZDS	Movement for a Democratic Slovakia	1142	4.9
SAS	Freedom and Solidarity	1460	6
SMK-MKP	Hungarian Coalition	559	6.5
SNS	National Party	1072	7
KDH	Christian Democratic Movement	1432	7.1
ANO	Alliance of the New Citizen	1200	7.2
SDKU-DS	Democratic and Christian Union – Democratic Party	131	7.3
MOST-HID	Most-Hid	1620	7.4
OLANO	Ordinary People and Independent	1759	7.4

Table D19: Sweden

Abbreviation	Name	ParlGov ID	Left/Right
V	Left Party	882	1.5
MP	Green Party	1154	3.4
S	Swedish Social Democratic Party	904	3.4
C	Centre Party	1461	5.8
FP	Liberal People's Party	892	6.3
KD	Christian Democrats	282	7.2
M	Moderate Party	657	7.9
SD	Sweden Democrats	1546	8.7
NYD	New Democracy	951	9
IND	Independents / Unaffiliateds	NA	NA

Table D20: Switzerland

Abbreviation	Name	ParlGov ID	Left/Right
PDT	Labour Party	1167	0.5
FRAP	Frauen Macht Politik!	569	1.3
PES	Green Party	141	1.7
PSS	Socialist Party	35	1.8
PVL	Green Liberal Party	308	2.6
ADI	Alliance of Independents	1264	3.3
PDC	Christian Democratic People's Party	531	4.7
PEV	Evangelical People's Party	602	4.9
PCS	Christian Social Party	1012	6.2
PLR	Free Democratic Party	26	6.3
PLD	Liberal Party	458	7.3
UDC	Swiss People's Party	750	7.4
PBD	Conservative Democratic Party	1213	7.4
FPS	Freedom Party	1602	8.1
UDF	Federal Democratic Union	1318	8.1
LEGA	Ticino League	1500	8.7
MCG	Geneva Citizens Movement	2599	8.7
DS	Swiss Democrats	628	9.4
IND	Independents / Unaffiliateds	NA	NA

Party abbreviations are based on the French party names. Three small parties are grouped with larger formations: the single MP for the Left Alternative in Geneva is grouped with the Labour Party (PDT), Green MPs from Bern and Zoug are grouped with the Green Party (PES), and the branches of the Christian Social Party (PCS) in the Obwalden and Wallis cantons are grouped with their main party.

## E. COSPONSORSHIP NETWORK CONSTRUCTION

In order to build comparable cosponsorship networks in each country, chamber and legislature, we proceed by matching the definition of cosponsorship ties used in network analyses of the U.S. Congress (Fowler, 2006a,b; Gross, Kirkland and Shalizi, 2012). We rely on a similar constructor, namely a two-mode edge list of the form

$$\begin{array}{l} \{b_1, a_8\}, \{b_1, a_{31}\}, \dots \\ \vdots \\ \dots \{b_{n-1}, a_{36}\}, \{b_n, a_{120}\} \end{array}$$

with bills denoted  $b_n$  and MP sponsors denoted  $a_n$ . To focus on collaboration between legislators, we then collapse the  $b \times a$  two-mode network to a one-mode network containing strictly MPs, by connecting the first author of each bill to all other sponsors on that bill. The resulting adjacency matrix  $A$  of directed ties between MPs ( $i, j$ ) is an asymmetric matrix with elements

$$A_{ij} = \begin{cases} 1 & \text{if MP } i \text{ cosponsored a bill authored by MP } j, \\ 0 & \text{otherwise.} \end{cases}$$

and where all diagonal elements (MPs hypothetically cosponsoring legislation with themselves) are discarded. As a result, the resulting cosponsorship networks do not contain any self-loops.

This network construction routine has two important limitations. First, because we focus on interactions between MPs, we do not account for many of the differences that might exist between bills. This is a consequence of our comparative research design: in a more restricted observational context, it would have been useful to keep that information, as suggested by Gross, Kirkland and Shalizi (2012), in order to account for temporal or thematic variance at the bill-level. Unfortunately, most countries in our sample do not provide extensive bill details: less than half of them, for instance, provide bill keywords.

A second limitation comes from our decision to focus solely on the ties between the first author of each bill and his or her cosponsor(s), thereby reflecting only some of the interactions that occur when MPs decide to cosponsor legislation together. This is because, like Fowler (2006a,b), we might reasonably assume that all cosponsors on a bill know who they are ‘connecting to’ with regards to the first author, but not that they also know every cosponsor on that same bill.

Last, while almost all countries give some importance to the first author of a bill in their parliamentary rules (for instance, by making them the default speaker for the bill), some also apply a distinction between ‘first authors’ and ‘cosponsors’ in their official records. By ignoring that distinction, we effectively treated a small number of ‘first authors’ (beyond the first one) in Belgium and Italy as ‘cosponsors’. To make sure that this simplification could be made, we compared the networks built out of all first authors in these countries with their ‘simplified’ counterparts, and observed only minor differences in terms of network structure.

### E.1. Edge weights

Since cosponsorship between two MPs  $i$  and  $j$  can occur more than once during a legislature, the ties of their network must be valued to reflect their different strength. To do so, we follow Gross, Kirkland and Shalizi (2012) by weighting all cosponsorships in inverse proportion to the overall number of cosponsors on the bill, and by normalizing the sum of these weights to the maximum number of possible cosponsorships between MP cosponsor  $i$  and MP author  $j$  during the legislature.

The equation that we implement is given in Gross, Kirkland and Shalizi (2012, eqn. 1, p. 8). Letting  $c_{j(k)}$  denote the number of cosponsors on MP  $j$ 's  $k^{\text{th}}$  bill, the strength of the tie between MP  $j$  and every cosponsor  $i$  on the bill is first weighted to  $1/c_{j(k)}$ , in order to downplay the influence of bills that are cosponsored by large numbers of MPs. At that stage, each first author is connected to each of his or her cosponsors by the sum of these weights, defined as

$$W_{ij} = \sum_{k=1}^{n_j} \frac{Y_{ij(k)}}{c_{j(k)}} \quad (\text{E1})$$

where  $Y_{ij(k)} = 1$  if MP  $i$  is a cosponsor of MP  $j$ 's  $k^{\text{th}}$  bill (Gross, Kirkland and Shalizi, 2012, p. 8). We refer to this weighting scheme as ‘Newman-Fowler weights’, because it is used both by Newman (2001a,b) in undirected networks of scientific coauthorship, and by Fowler (2006a,b) in directed networks of legislative cosponsorship. Figure E1a shows the distribution of these weights, which have no upper boundary.

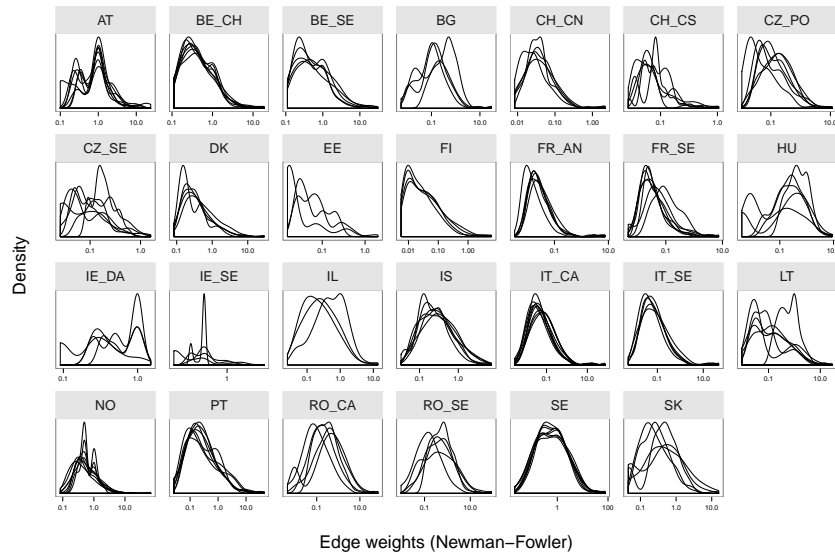
The next step consists in dividing these weights, which Fowler (2006a, p. 468) calls the “weighted quantity of bills cosponsored”, by the maximum value that they reach when MP  $i$  is a cosponsor on every  $k^{\text{th}}$  bill by MP  $j$ . The resulting weights, which Gross, Kirkland and Shalizi (2012, p. 8) call the “weighted propensity to cosponsor” and which we refer to as ‘Gross-Shalizi weights’ in reference to an earlier version of the manuscript by the two authors, are defined as

$$WPC_{ij} = \frac{\sum_{k=1}^{n_j} \frac{Y_{ij(k)}}{c_{j(k)}}}{\sum_{k=1}^{n_j} \frac{1}{c_{j(k)}}} \quad (\text{E2})$$

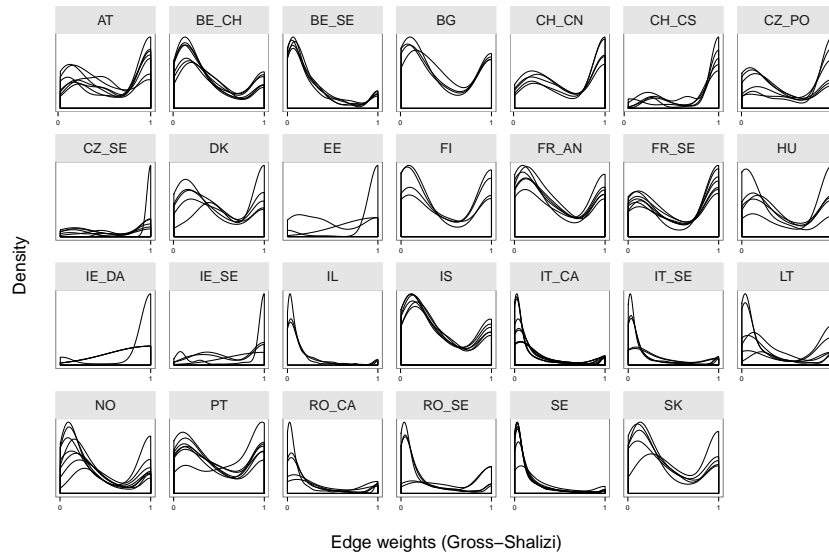
Figure E1b shows the distribution of these weights, which are bounded between 0 and 1, and which are particularly useful to understand the kind of cosponsorship activity occurring in the networks. In effect, these weights often penalize the majority of cosponsorship ties found in the network by bringing them close to a null weight value, while leaving a minority of cosponsorship ties at a weight value of 1.

The networks that we provide carry all three kinds of edge weights: ‘raw’ cosponsorship counts, ‘Newman-Fowler weights’, and ‘Gross-Shalizi weights’. Since the cosponsorship networks are directed, all edge weights are also asymmetrical: the edge weight from MP  $i$  to MP  $j$  might and usually will differ from the edge weight from MP  $j$  to MP  $i$ .

Each of these weighting schemes might also be used to compute and compare weighted network measures (Opsahl and Panzarasa, 2009; Opsahl, Agneessens and Skvoretz, 2010), or to model the likelihood of cosponsorship between sponsors against different distributions of reference (see in particular Krivitsky, 2012).



(a) Distribution of 'Newman-Fowler' edge weights (Equation E1).



(b) Distribution of 'Gross-Shalizi' edge weights (Equation E2).

Figure E1: Distribution of 'Newman-Fowler' and 'Gross-Shalizi' edge weights in all networks. Each line corresponds to the network of a legislature.

## E.2. Network objects

The `par1net.rda` file available from the repository for this study contains the complete series of networks presented in the rest of this document:

- objects starting with `net` are legislative cosponsorship networks
- objects starting with `conet` are committee co-membership networks

The former networks are constructed were constructed as explained in the previous subsection. The latter networks are based on the committee membership(s) of all sponsors present in the legislative cosponsorship network to which they correspond. Committee co-membership networks are undirected, as required for their use as an edge covariate in exponential graph models written with the `ergm` package (Hunter et al., 2008). Committee co-memberships are available only for a subset of the entire sample of countries, chambers and legislatures, and are entirely missing for the (very small) cosponsorship networks of both Irish chambers.

All network objects are formatted in the R network class (Butts, 2008). The legislative cosponsorship networks carry the following attributes:

- **Network-level attributes**

- `country`: country name, in English
- `ipu`: chamber identifier in the IPU-PARLINE database (Inter-Parliamentary Union, 2015)
- `seats`: statutory chamber size, sourced from the database above
- `lang`: Wikipedia language version used for chamber name and constituencies<sup>7</sup>
- `chamber`: chamber name, as a Wikipedia handle
- `type`: chamber type (lower, upper or unicameral)
- `n_cosponsored`: number of cosponsored bills
- `n_sponsors`: number of sponsors per bill, as a table object<sup>8</sup>

- **Vertex-level attributes**

- *Socio-demographics*
  - \* `born`: year of birth of the sponsor, when available<sup>9</sup>
  - \* `sex`: gender of the sponsor (coded as ‘F’ for females and ‘M’ for males)<sup>10</sup>

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<sup>7</sup>Network-level chamber names and vertex-level constituencies are coded as Wikipedia handles to the corresponding entry on the Wikipedia language version indicated by the `lang` network-level attribute, which is usually the official language of the country, except for Bulgaria and Romania, in which case Wikipedia English constituency names are used. See also footnote 12, p. 31.

<sup>8</sup>This table also contains the number of single-sponsored private bills that were collected but later ignored during network construction.

<sup>9</sup>This variable was imputed from Wikipedia entries when possible but is occasionally missing in several networks, and is entirely missing for Hungary.

<sup>10</sup>As explained in Section B.2, p. 10, this variable was sometimes imputed from first names, family names, a combination of both, and verified through visual inspection of sponsor photographs.

- *Descriptive information*
  - \* `nyears`: sponsor seniority, in years (see Section B.2, p. 10)
  - \* `url` and `photo`: URL to the online profile of the sponsor and, when available, to a photograph of him or her<sup>11</sup>
  - \* `constituency`: sponsor constituency, generally as a Wikipedia basename<sup>12</sup>
- *Party information*
  - \* `party`: party abbreviation (see Section B.2, p. 10, and Section D)
  - \* `lr`: Left/Right party score (see Section B.2, p. 10, and Section D)
- *Other measures*
  - \* `n.au`: number of cosponsored bills on which the sponsor is a first author
  - \* `n.co`: number of cosponsored bills on which the sponsor is a cosponsor
  - \* `n.bills`: sum of `n.au` and `n.co`

- **Edge-level attributes**

- `raw`: ‘raw cosponsorship counts’, i.e. the number of cosponsorship ties between two sponsors
- `nfw`: ‘Newman-Fowler weights’, i.e. the weighted quantity of bills cosponsored (see Section E.1)
- `gsw`: ‘Gross-Shalizi weights’, i.e. the weighted propensity to cosponsor (see Section E.1)
- `committee`: number of parliamentary committees listing both sponsors as their members

The committee co-membership networks carry only the `committee` vertex attribute, as well as a network-level attribute called `committees`, which contains a table object listing all parliamentary committees found for the country/chamber, and their number of sponsor members (which is sometimes equal to zero).

Last, all networks carry vertex names corresponding to the full names of the sponsors, with duplicate names usually ending either with `-1` or `-2`. These names are not standardized across countries, but they are identical across all legislatures of a same country/chamber, in order to make the data potentially useful for longitudinal analysis.

### E.3. Network descriptors

The `par1net.csv` file available from the repository for this study contains a set of descriptive variables measured at the country-chamber-legislature level, as well as summary measures related to the bills and sponsors featured in the networks.

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<sup>11</sup>The `photo` variable is coded as local file paths to JPG, GIF or PNG images, which are used in the interactive visualizations of the data available at <http://f.briatte.org/parlviz>. An empty file path indicates that no photograph of the sponsor was found on the website of his or her parliament.

<sup>12</sup>Lithuanian districts or district municipalities are not mapped to any Wikipedia entries. There are no constituencies in the electoral system of Israel and in the Belgian and Irish Senates (although the latter uses ‘vocational panels’ instead, which are therefore coded as constituencies). Due to a redistricting reform, many constituencies are missing for Sweden prior to 2002. Not all constituencies are geographic, as several chambers elect or nominate members at the national level in order to represent special constituencies (such as citizens abroad or ethnolinguistic minorities).

The following variables were coded manually:

- network: name of the corresponding network object
- country: country name, in English
- ipu: IPU-PARLINE chamber identifier (Inter-Parliamentary Union, 2015)
- region: European region (East, North, West, or 'Asia' for Israel)
- type: parliamentary chamber type (Lower, Unicameral, Upper)
- size: statutory chamber size (Inter-Parliamentary Union, 2015)
- cty: country-chamber code (see Table B1, p. 5)
- start: legislature start year
- end: legislature end year
- duration: legislature duration, in years
- censored: whether the legislature is ongoing (0/1)
- government: type of government coalition (see note below)
- coalition: composition of government coalition (see note below)

*Note* – the government variable indicates 'single' or 'stable' if either a single party or a stable coalition of parties governed throughout the entire legislature, and 'mixed' otherwise. When the government variable is equal to either 'single' or 'mixed', the coalition variable contains the party abbreviation(s) corresponding to the governing coalition, separated by semicolons. Both variables are based on information retrieved from the ParlGov database (Döring and Manow, 2014).

The following variables were derived from the networks:

- nodes: number of sponsors
- edges: number of cosponsorship ties
- density: network density
- n\_bills\_au: number of sponsored bills
- n\_bills\_co: number of cosponsored bills
- n\_sigs\_au: number of bill signatures
- n\_sigs\_co: number of bill signatures on cosponsored bills
- s\_min: minimum number of sponsors per bill
- s\_max: maximum number of sponsors per bill
- s\_med: median number of sponsors per bill



- s\_mu: mean number of sponsors per bill
- mu\_au: mean number of bill authored per sponsor
- mu\_co: mean number of bill cosponsored per sponsor
- n\_au: number of sponsors who authored at least one bill
- n\_co: number of sponsors who cosponsored at least one bill
- n\_both: number of sponsors who authored *and* cosponsored at least one bill
- n\_fem: number of female sponsors
- n\_new: number of ‘freshmen’ sponsors first elected in the last year (i.e. who did not serve any mandate in past legislatures; see Section B.2, p. 10)
- n\_ind: number of independent sponsors with no party affiliation
- ysio\_n: sponsor seniority (number of distinct values)<sup>13</sup>
- ysio\_min: minimum sponsor seniority (past years in office; see Section B.2, p. 10)
- ysio\_max: maximum sponsor seniority (past years in office; see Section B.2, p. 10)
- ysio\_med: median sponsor seniority (past years in office; see Section B.2, p. 10)
- ysio\_mu: mean sponsor seniority (past years in office; see Section B.2, p. 10)
- ysio\_cor: Pearson correlation between sponsor age and sponsor seniority
- born\_p: sponsor age (percentage of nonmissing values)
- born\_min: minimum sponsor age (year of birth)
- born\_max: maximum sponsor age (year of birth)
- born\_med: median sponsor age (year of birth)
- born\_mu: mean sponsor age (year of birth)
- constituency\_p: sponsor constituency (percentage of nonmissing values)
- constituency\_n: sponsor constituency (number of distinct values)
- pg\_n: sponsor parties (number of distinct values)
- pg\_min: minimum size of parties
- pg\_max: maximum size of parties
- pg\_med: median size of parties
- pg\_mu: mean size of parties
- pg\_sd: standard deviation of party group sizes

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<sup>13</sup>This variable is used to detect the absence of variance in the seniority measures at the level of a specific network. This issue currently affects the earliest legislatures/networks of the Belgian Senate, the Czech Senate, Lithuania and Portugal, which have been used as baselines to measure sponsor seniority in all of the other legislatures/networks of these chambers.

- n<sub>gov</sub>: number of sponsors in government (see previous note, p. 32)
- n<sub>opp</sub>: number of sponsors in opposition (see previous note, p. 32)
- pc<sub>n</sub>: parliamentary committees (number of distinct values)
- pc<sub>min</sub>: minimum size of parliamentary committees
- pc<sub>max</sub>: maximum size of parliamentary committees
- pc<sub>med</sub>: median size of parliamentary committees
- pc<sub>mu</sub>: mean size of parliamentary committees
- pc<sub>sd</sub>: standard deviation of parliamentary committee sizes
- cc<sub>min</sub>: minimum number of shared committee memberships
- cc<sub>max</sub>: maximum number of shared committee memberships
- cc<sub>med</sub>: median number of shared committee memberships
- cc<sub>mu</sub>: mean number of shared committee memberships
- cc<sub>p</sub>: percentage of cosponsorship ties between sponsors sharing at least one committee membership
- lr<sub>n</sub>: Left/Right party scores (number of distinct values)
- lr<sub>min</sub>: minimum Left/Right party score
- lr<sub>max</sub>: maximum Left/Right party score
- lr<sub>med</sub>: median Left/Right party score
- lr<sub>mu</sub>: mean Left/Right party score
- lr<sub>sd</sub>: standard deviation of Left/Right party scores
- raw<sub>min</sub>: minimum edge weight, based on raw cosponsorship counts
- raw<sub>max</sub>: maximum edge weight, based on raw cosponsorship counts
- raw<sub>med</sub>: median edge weight, based on raw cosponsorship counts
- raw<sub>mu</sub>: mean edge weight, based on raw cosponsorship counts
- nfw<sub>min</sub>: minimum 'Newman-Fowler' edge weight
- nfw<sub>max</sub>: maximum 'Newman-Fowler' edge weight
- nfw<sub>med</sub>: median 'Newman-Fowler' edge weight
- nfw<sub>mu</sub>: mean 'Newman-Fowler' edge weight
- gsw<sub>min</sub>: minimum 'Gross-Shalizi' edge weight
- gsw<sub>max</sub>: maximum 'Gross-Shalizi' edge weight
- gsw<sub>med</sub>: median 'Gross-Shalizi' edge weight
- gsw<sub>mu</sub>: mean 'Gross-Shalizi' edge weight

## REFERENCES

- Alemán, Eduardo and Ernesto Calvo. 2013. "Explaining Policy Ties in Presidential Congresses: A Network Analysis of Bill Initiation Data." *Political Studies* 61:356–377.
- Alemán, Eduardo, Ernesto Calvo, Mark P. Jones and Noah Kaplan. 2009. "Comparing Cosponsorship and Roll-Call Ideal Points." *Legislative Studies Quarterly* 34:87–116.
- Bratton, Kathleen A. and Stella M. Rouse. 2011. "Networks in the Legislative Arena: How Group Dynamics Affect Cosponsorship." *Legislative Studies Quarterly* 36:423–460.
- Brunner, Martin. 2013. *Parliaments and Legislative Activity. Motivations for Bill Introduction*. New York, NY: Springer.
- Butts, Carter T. 2008. "network: A Package for Managing Relational Data in R." *Journal of Statistical Software* 24:1–36.
- Campbell, James E. 1982. "Cosponsoring Legislation in the US Congress." *Legislative Studies Quarterly*.
- Clark, Jennifer Hayes and Veronica Caro. 2013. "Multimember Districts and the Substantive Representation of Women: An Analysis of Legislative Cosponsorship Networks." *Politics & Gender* 9:1–30.
- Desposato, Scott W., Matthew C. Kearney and Brian F. Crisp. 2011. "Using Cosponsorship to Estimate Ideal Points." *Legislative Studies Quarterly* 36:531–565.
- Döring, Holger. 2013. "The Collective Action of Data Collection: A Data Infrastructure on Parties, Elections and Cabinets." *European Union Politics* 14:161–178.
- Döring, Holger and Philip Manow. 2014. "Parliaments and Governments Database (ParlGov): Information on Parties, Elections and Cabinets in Modern Democracies." Stable version 14-12.  
URL: <http://www.parlgov.org/>
- Fowler, James H. 2006a. "Connecting the Congress: A Study of Cosponsorship Networks." *Political Analysis* 14:456–487.
- Fowler, James H. 2006b. "Legislative Cosponsorship Networks in the U.S. House and Senate." *Social Networks* 28:454–465.
- Gross, Justin H., Justin H. Kirkland and Cosma Shalizi. 2012. "Cosponsorship in the U.S. Senate: A Multilevel Two-Mode Approach to Detecting Subtle Social Predictors of Legislative Support." Unpublished manuscript.  
URL: [http://justinhgross.web.unc.edu/files/2012/03/Multilevel-2mode-cosponsorship\\_main.pdf](http://justinhgross.web.unc.edu/files/2012/03/Multilevel-2mode-cosponsorship_main.pdf)
- Hunter, David R, Mark S Handcock, Carter T Butts, Steven M Goodreau and Martina Morris. 2008. "ergm: A Package to Fit, Simulate and Diagnose Exponential-Family Models for Networks." *Journal of Statistical Software* 24.
- Inter-Parliamentary Union. 2015. "PARLINE database of national parliaments."  
URL: <http://www.ipu.org/parline-e/parlinesearch.asp>
- Kessler, Daniel and Keith Krehbiel. 1996. "Dynamics of Cosponsorship." *American Political Science Review* 90:555–566.

- Kirkland, Justin H. 2011. "The Relational Determinants of Legislative Outcomes: Strong and Weak Ties between Legislators." *Journal of Politics* 73:887–898.
- Kirkland, Justin H. 2014. "Chamber Size Effects on the Collaborative Structure of Legislatures." *Legislative Studies Quarterly* 39:169–198.
- Kirkland, Justin H. and Justin H. Gross. 2012. "Measurement and Theory in Legislative Networks: The Evolving Topology of Congressional Collaboration." *Social Networks* 36:97–109.
- Koger, Gregory. 2003. "Position-Taking and Cosponsorship in the U.S. House." *Legislative Studies Quarterly* 28:225–246.
- Krivitsky, Pavel N. 2012. "Exponential-Family Random Graph Models for Valued Networks." *Electronic Journal of Statistics* 6:1100–1128.
- Mattson, Ingvar. 1995. Private Members' Initiatives and Amendments. In *Parliaments and Majority Rule in Western Europe*, ed. Herbert Döring. Frankfurt: Campus pp. 448–487.
- McPherson, Miller, Lynn Smith-Lovin and James M Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415–444.
- Micozzi, Juan Pablo. 2014. "Alliance for Progress? Multilevel Ambition and Patterns of Cosponsorship in the Argentine House." *Comparative Political Studies* 47:1186–1208.
- Munzert, Simon, Christian Rubba, Peter Meißner and Dominic Nyhuis. 2015. *Automated Data Collection with R: A Practical Guide to Web Scraping and Text Mining*. New York: Wiley.
- Newman, Mark E.J. 2001a. "Scientific Collaboration Networks. I. Network Construction and Fundamental Results." *Physical Review E* 64:016131.
- Newman, Mark E.J. 2001b. "Scientific Collaboration Networks. II. Shortest Paths, Weighted Networks, and Centrality." *Physical Review E* 64:016132.
- Opsahl, Tore, Filip Agneessens and John Skvoretz. 2010. "Node Centrality in Weighted Networks: Generalizing Degree and Shortest Paths." *Social Networks* 32:245–251.
- Opsahl, Tore and Pietro Panzarasa. 2009. "Clustering in Weighted Networks." *Social Networks* 31:155–163.
- R Core Team. 2015. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing.  
URL: <http://www.r-project.org/>
- Schiller, Wendy J. 1995. "Senators as Political Entrepreneurs: Using Bill Sponsorship to Shape Legislative Agendas." *American Journal of Political Science* 39:186–203.
- Tam Cho, Wendy K. and James H. Fowler. 2010. "Legislative Success in a Small World: Social Network Analysis and the Dynamics of Congressional Legislation." *Journal of Politics* 72:124–135.
- Wilson, Rick K. and Cheryl D. Young. 1997. "Cosponsorship in the U.S. Congress." *Legislative Studies Quarterly* 22:25–43.