Text as Policy

Measuring Policy Similarity through Bill Text Reuse[a]

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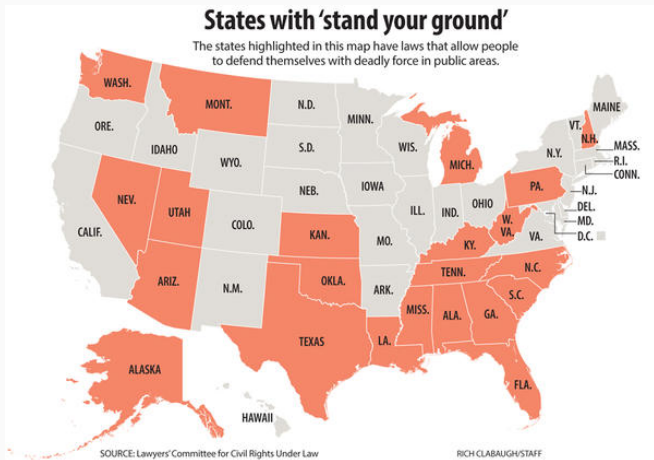
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Motivation

- Policy diffusion research relies on identification of similar bills
- Can we measure similarity of bills automatically?

States with 'stand your ground'

The states highlighted in this map have laws that allow people to defend themselves with deadly force in public areas.

SOURCE: Lawyers' Committee for Civil Rights Under Law

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Text Reuse

MI 2005 HB5153	SC 2005 H4301	WA 2015 HB2712
Section 16 - 11 - 440. (A) A person is presumed to have a reasonable fear of imminent peril of death or great bodily injury to himself or another person when using deadly force that is intended or likely to cause death or great bodily injury to another person if (...)	Sec. 1. (1) A person is presumed to have held a reasonable fear of imminent peril of death or great bodily harm to himself or herself or another when using defensive force that is intended or likely to cause death or great bodily harm to another if (...)	(1) A person is presumed to have held a reasonable fear of imminent peril of death or great bodily harm to himself or herself or another person when using deadly force pursuant to RCW9A.16.050(1)(c) if (...)

- Question: Can text reuse be used to measure policy similarity?

- Measure text reuse in bill dyads

- 3 Validation studies

Detecting Text Reuse

- Smith-Waterman local alignment algorithm

MI 2005 HB5153	SC 2005 H4301
A person is presumed	A person is presumed
to have a reasonable	to have held a
fear of imminent	reasonable fear of
peril of death or	imminent peril of
great bodily injury	death or great bodily
to himself or another	harm to himself or
person when using	herself or another
deadly force that is	when using defensive
intended or likely	force that is intended
to cause death or	or likely to cause
great bodily injury	death or great bodily
to another person if	harm to another if

Detecting Text Reuse

- Smith-Waterman local alignment algorithm

MI 2005 HB5153	SC 2005 H4301
A person is presumed to have **-** a reasonable fear of imminent peril of death or great bodily injury to himself **- -** or another **person** when using deadly force that is intended or likely to cause death or great bodily injury to another person if	A person is presumed to have **held** a reasonable fear of imminent peril of death or great bodily harm to himself **or herself** or another **-** when using defensive force that is intended or likely to cause death or great bodily harm to another if

- Smith-Waterman local alignment algorithm

MI 2005 HB5153	SC 2005 H4301
A person is presumed to have **-** a reasonable fear of imminent peril of death or great bodily **injury** to himself **- -** or another **person** when using **deadly** force that is intended or likely to cause death or great bodily **injury** to another person if	A person is presumed to have **held** a reasonable fear of imminent peril of death or great bodily **harm** to himself **or** **herself** or another **-** when using **defensive** force that is intended or likely to cause death or great bodily **harm** to another if

Measurement approach

- **Data**: $\sim 500{,}000$ US state bills (Burgess et al. 2016)

- **Dyad Selection**: Potential matches based on vocabulary similarity

- **Alignment Calculation**: Split to sections, align sections

- **Scoring**: Downweight boilerplate, aggregate to bill-dyad level

$$S_{A,B} = \sum_{i \in A} \sum_{j \in B} \frac{Score_{i,j}}{Freq_{i,j}} \tag{1}$$

- National Council of State Legislatures Policy Tables
- Test: How well does text-reuse recover same table indicator?

			ENACTED PLASTIC BAG STATE LEGISLATION
State	**Citation**	**Status**	**Summary**
Arizona	2015 Ariz. Sess. Laws, Chap. 271 (2015 SB 1241)	*Enacted	Prevents a city, town or county from regulating the sale, use or disposition of plastic bags and other "auxiliary containers" by an owner, operator or tenant of a business, commercial building or multifamily housing property. The law does not prevent a city, town or county from continuing a voluntary recycling and waste reduction program.
California	2014 SB 270	Put to Referendum	As of July 1, 2015 certain large stores are prohibited from providing a single-use plastic carryout bag to a customer, unless the retailer makes that bag available for $0.10 and certain conditions are met.
California	2011 CA S 567	Enacted	Prohibits the sale of plastic products labeled as compostable, home compostable, or marine degradable unless it meets standard specifications. Provides for a civil penalty for a violation.
California	Cal. [Public Resources] Code § 42357.5 (2010 SB 228)	Enacted	Requires manufacturers of compostable plastic bags to ensure that the bag is readily and easily identifiable from other bags. Prohibits a compostable plastic bag sold in the state from displaying a chasing arrow resin identification code or recycling symbol in any form.
California	2006 AB 2449	Enacted	Retail stores must adopt an at-store recycling program. Plastic bags used at retailers must have clearly printed "Please Return to a Participating Store for Recycling" on the bag.
Delaware	2009 HB 15; Amended by 2014 HB 198	Enacted	Encourages the use of reusable bags by consumers and retailers. Requires a store to establish an at-store recycling program that provides an opportunity for customers of the store to return plastic bags and requires all plastic carryout bags to display a recycling message.
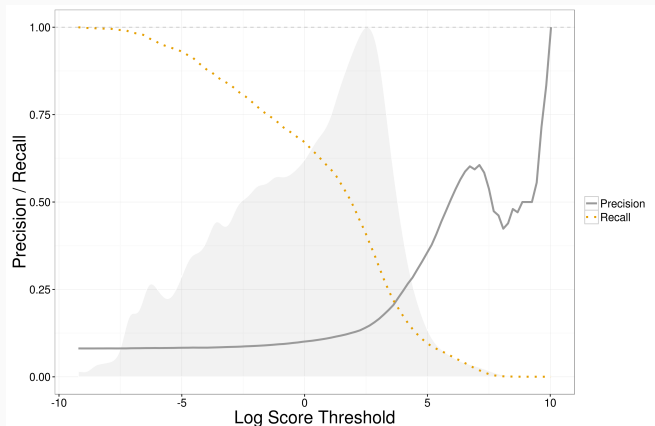
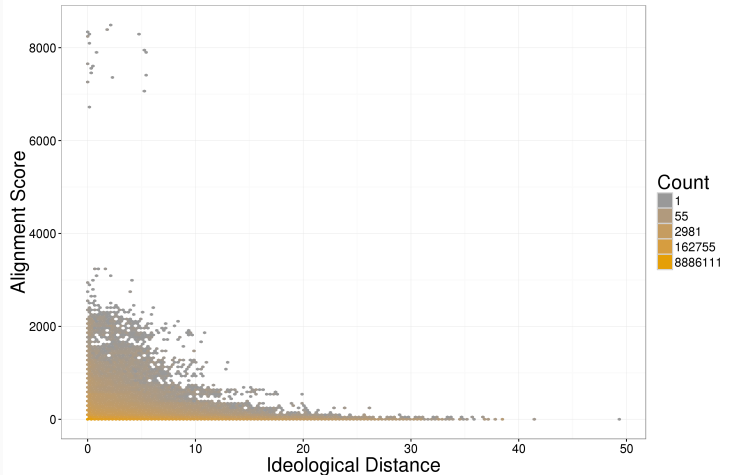|	Coefficient	Std. Error	p-value
same table	1.25	0.09	< 0.001

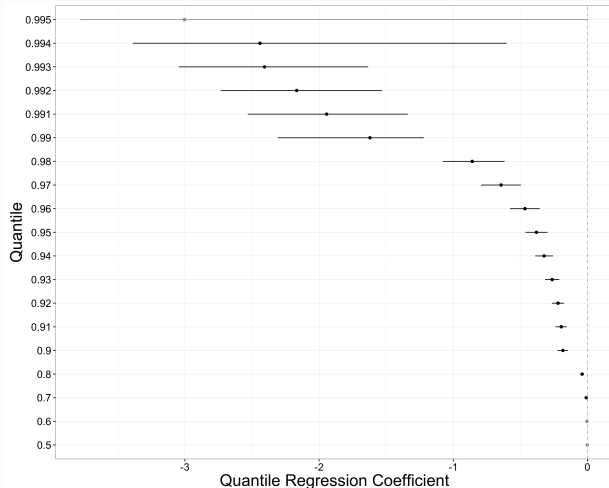**Table 1:** Log linear model. Standard errors based on blocked bootstrap.

Validation - Ideological Distance

- Shor and McCarty (2012) ideology scores
- Bill ideology - Primary sponsor's ideology

Validation - Ideological Distance

- High alignment scores only for ideologically close bills
- Strong correlation on high percentiles

- Alignment score: "high precision - low recall" on large amount of data

- Hand coding: "high precision - high recall" on small amount of data

- Potential applications: Policy diffusion, policy networks in state legislatures, resource constraints of legislators, ... ?

Appendix

Smith-Waterman Algorithm

	'	bodily	harm	to	himself	or	herself	or	another	when	using	Alignment Result	
-	0	0	0	0	0	0	0	0	0	0	0	bodily	bodily
bodily	0	3	2	1	0	0	0	0	0	0	0	injury	harm
injury	0	2	1	0	0	0	0	0	0	0	0	to	to
to	0	1	0	4	3	2	1	0	0	0	0	himself	himself
himself	0	0	0	3	7	6	5	4	3	2	1	-	or
or	0	0	0	2	6	10	9	8	7	6	5	-	herself
another	0	0	0	1	5	9	8	7	11	10	9	or	or
person	0	0	0	0	4	8	7	6	10	9	8	another	another
when	0	0	0	0	3	7	6	5	9	13	12	person	-
using	0	0	0	0	2	6	5	4	8	12	16	when	when

Smith-Waterman Algorithm

- Alignment
- Parameters: Match 3, Mismatch -2, Gap -1

Bill A	bodily	injury	to	himself	-	-	or	another	person	when
Bill B	bodily	harm	to	himself	or	herself	or	another	-	when
Match Type	Match	Mismatch	Match	Match	Gap	Gap	Match	Match	Gap	Match
Score	6	4	7	10	9	8	11	14	13	16

Validation - Diffusion Networks

- Desmarais et al. (2015): Diffusion ties between states
- Based on 160 hand coded policies
- Aggregated alignment scores correlate with diffusion ties

	Identity Link		Log Link	
	Coefficient	p-value	Coefficient	p-value
Intercept	-6760712.2	0.005	8.21	< 0.001
Diffusion Tie	498466.2	0.05	0.27	0.1
Coverage	2199070.8	< 0.001	1.43	< 0.001

Table 2: Coefficients calculated with OLS regression. *p*-values based on 5,000 QAP permutations.