

Inferential Analysis of the Supreme Court Citation Network

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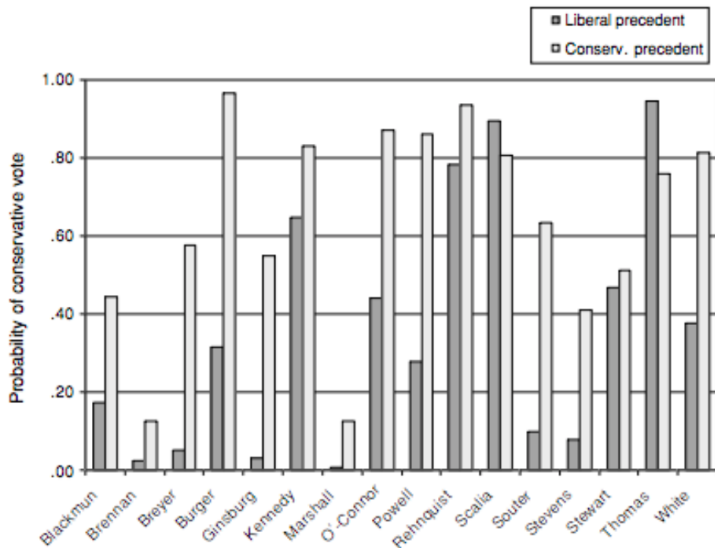
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CISE-1320219)



Does Legal Doctrine Matter? Unpacking Law and Policy Preferences on the U.S. Supreme Court

MICHAEL A. BAILEY *Georgetown University*

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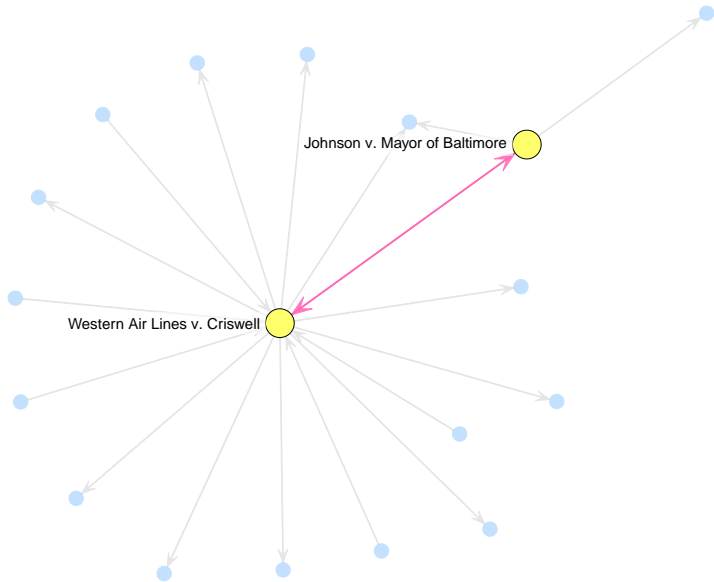


Two Limitations to Case-Level Analysis

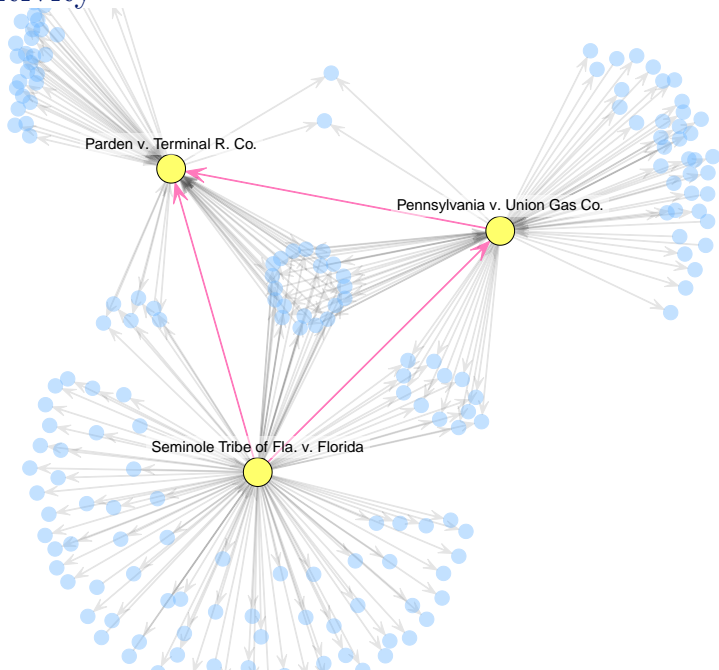
1. **Theoretical:** Cannot learn about relational processes
2. **Methodological:** Risk bias from omitted structure

We propose a dyadic, network-analytic approach

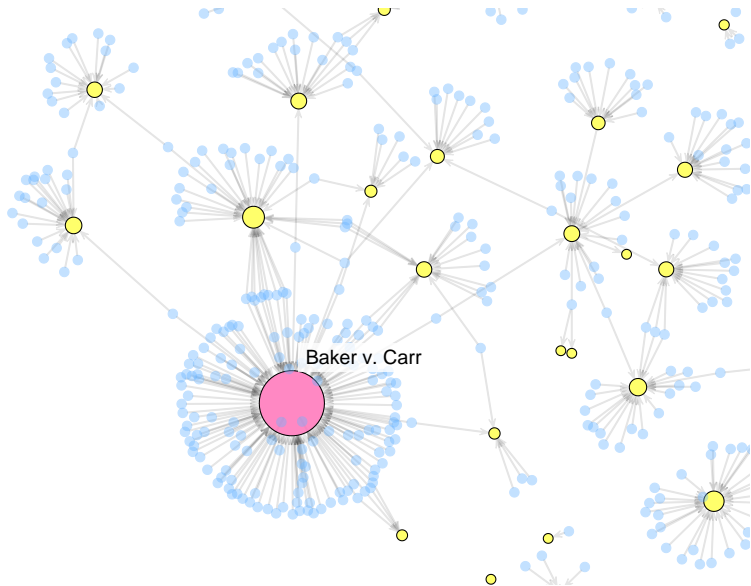
Reciprocity



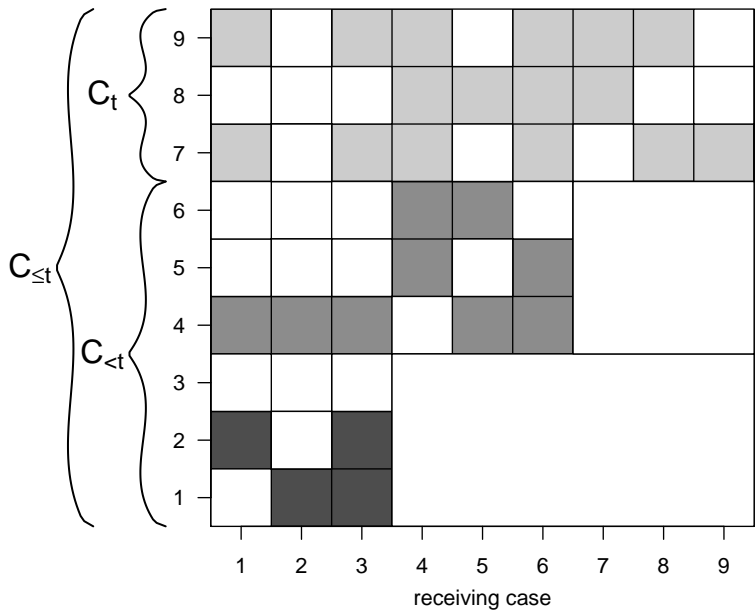
Transitivity



Popularity and Activity

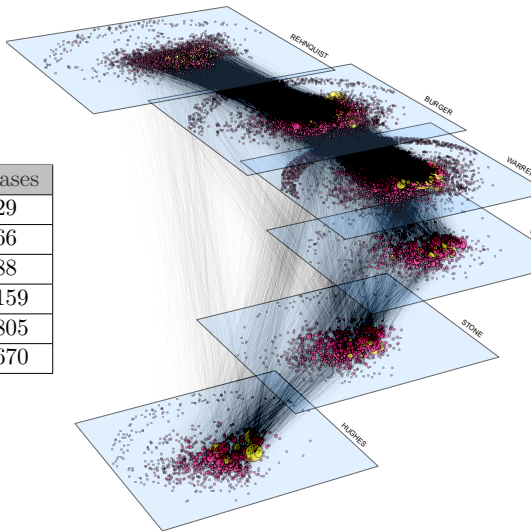


The Citation TERGM: $C_t|C_{<t}$ via $h(C_{\leq t})$



Data

	Terms	Cases
CE Hughes*	1937 - 1941	629
HF Stone	1942 - 1946	766
FM Vinson	1946 - 1953	788
E Warren	1954 - 1969	2159
WE Burger	1970 - 1986	2805
W Rehnquist**	1987 - 2001	1670



Model Specification

Exogenous Effects

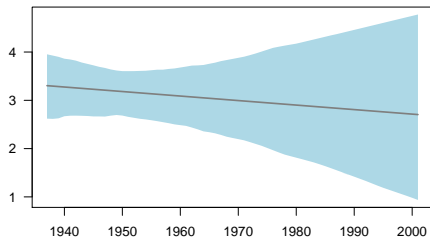
- ▶ Ideological Distance
- ▶ Ideological Breadth
- ▶ Same issue
- ▶ Majority size
- ▶ Issue area dummies

Dependence Effects

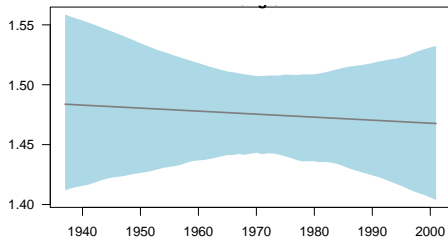
- ▶ # Mutual Dyads
- ▶ # Transitive Ties
- ▶ # In-two-stars
- ▶ # Out-two-stars

Results: Dependence

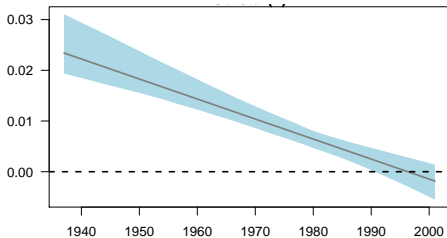
Reciprocity



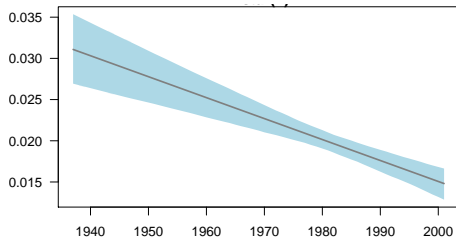
Transitivity



Activity

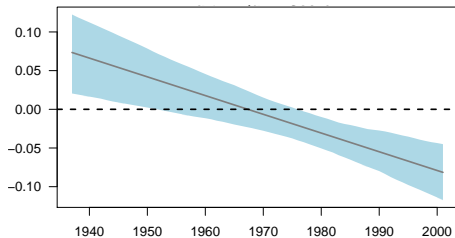


Popularity

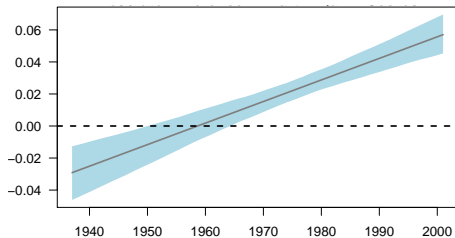


Results: Covariates

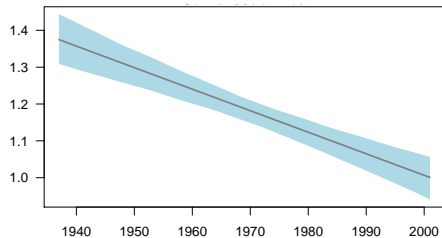
MQ Score Difference



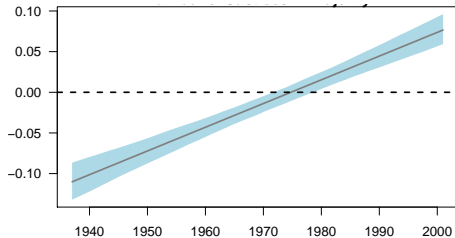
Ideological Breadth



Same Issue



Majority Size



Predictive Performance

- ▶ Randomly split dyads 80/20 into training and test
- ▶ Estimate models using training, predict test
- ▶ Repeat 10 times

	Independent Model		Full Model	
	mean	range	mean	range
precision	0.5499	(0.5384, 0.5619)	0.8605	(0.8526, 0.8666)
recall	0.0827	(0.0811, 0.0843)	0.5858	(0.5817, 0.5891)
F1 score	0.1438	(0.141, 0.1463)	0.6971	(0.6941, 0.7008)

Conclusion

Key Findings

1. Citation is characterized by reciprocity and transitivity
2. Dependence effects improve models of citations
3. c-TERGM represents comprehensive method

Limitations

1. Do not consider the signs of the citations
2. We miss recent terms
3. Case emergence considered exogenous

Citation Temporal Exponential Random Graph Model

The probability of observing the $N_t \times N_{\leq t}$ adjacency matrix C_t given past citations $C_{<t}$, where $C_{\leq t}$ is the network up to time t

$$\mathcal{P}(C_t|C_{<t}, \boldsymbol{\theta}) = \frac{\exp\{\boldsymbol{\theta}'\mathbf{h}(C_{\leq t})\}}{\sum_{C_t^* \in \mathcal{C}_t} \exp\{\boldsymbol{\theta}'\mathbf{h}(C_{\leq t}^*)\}}$$

Decomposition:

$$\underbrace{\mathbf{h}(C_{\leq t})}_{\text{Net Stats}} \quad \underbrace{\boldsymbol{\theta}}_{\text{Effects}} \quad \underbrace{\exp\{\boldsymbol{\theta}'\mathbf{h}(C_{\leq t})\}}_{+ \text{ Weight}} \quad \underbrace{\sum_{C_t^* \in \mathcal{C}_t} \exp\{\boldsymbol{\theta}'\mathbf{h}(C_{\leq t}^*)\}}_{\text{Normalizer}}$$

Flexible: \mathbf{h} can capture virtually any form of interdependence among the edges + covariates

Normalizing constant can make estimation difficult