Journal Report

More Laws, More Growth? Evidence from US States

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Background

- Empirical evidence shows that states with larger, more complex legal systems also tend to have larger, more productive economies.

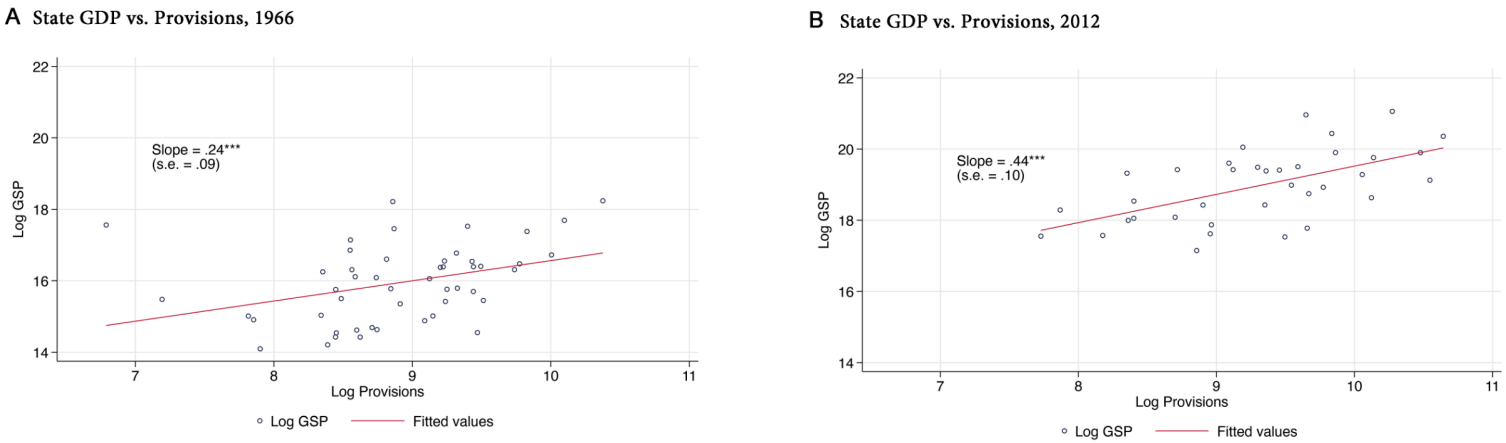


Fig. 1: State GDP and legislative output, 1966 and 2012

- **Whether these correlations reflect causal links?**

Literature Review and Key Findings

Legislation as Catalyst

- Institutions born from law are essential for markets to operate efficiently and thus **directly cause economic growth** (Dam 2007).
- Furthermore, a detailed and reliable "legislative contract" provides the certainty needed to **unleash investment** and drive progress (Williamson 1979; Hart and Moore 1988).

Legislation as Impediment

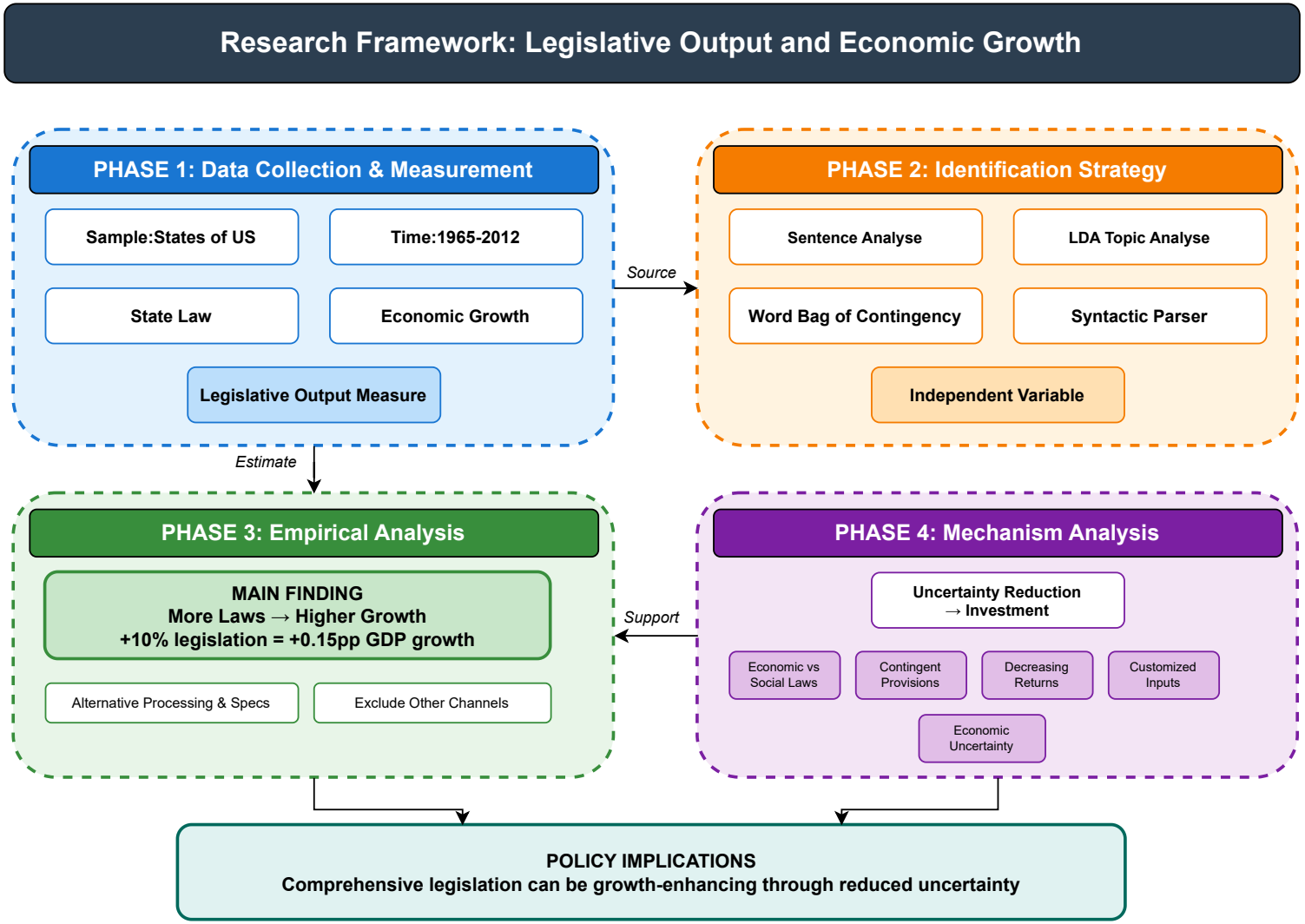
- Legislation can potentially hinder economic progress.
- Laws might primarily **serve special interest groups** (Grossman and Helpman 2001).
- Even with well-intentioned legislators, excessive lawmaking can impose **compliance costs** (Niskanen 1971; Botero et al. 2004).

Proposition and Empirical Findings

Whether and how laws impact the economy?

Key Finding: Increasing legal detail leads to more growth by reducing legal uncertainty.

Big Picture


Research Framework: Legislative Output and Economic Growth
PHASE 1: Data Collection & Measurement
Sample:States of US
Time:1965-2012
State Law
Economic Growth
Legislative Output Measure
Source
PHASE 2: Identification Strategy
Sentence Analyse
LDA Topic Analyse
Word Bag of Contingency
Syntactic Parser
Independent Variable
Estimate
PHASE 3: Empirical Analysis
MAIN FINDING
More Laws → Higher Growth
+10% legislation = +0.15pp GDP growth
Alternative Processing & Specs
Exclude Other Channels
Support
PHASE 4: Mechanism Analysis
Uncertainty Reduction
→ Investment
Economic vs Social Laws
Contingent Provisions
Decreasing Returns
Customized Inputs
Economic Uncertainty
POLICY IMPLICATIONS
Comprehensive legislation can be growth-enhancing through reduced uncertainty

Main Variables

- **Data Scope:** The dataset includes 50 US states, covering the period from 1965 to 2012, with observations at 2-year intervals.
- **Dependent Variable:** Economic growth
  - **Source:** Bureau of Economic Analysis Regional Accounts, County Business Patterns, Klarner (2013), and Ujhelyi (2014)
  - **Measurement:** Change in log per capita GSP in state s between year $t-2$ and year t
- **Independent Variable:** State session law corpus
  - **Source:** Printed state session laws(scanned with OCR)
  - **Measurement:** Full text of the law by 2-year intervals

Control Variables and Other Variables

- **Population**
- **Government Finances**
- **Uncertainty**
  - **Measurement:** Using EPU index developped by Baker, Bloom, and Davis (2016).
- **Politics**
  - **Measurement:** Number of governing bodies (lower chamber, upper chamber, and governor) controlled by Democrats.
  - **Explanation:** Showing the level of Democratic control in state politics.
- **Relationship Specificity:**
  - **Measurement:** The percentage of goods in a given industry not sold on organized exchanges
  - **Explanation:** Indicates the industry's reliance on dedicated supply chains.

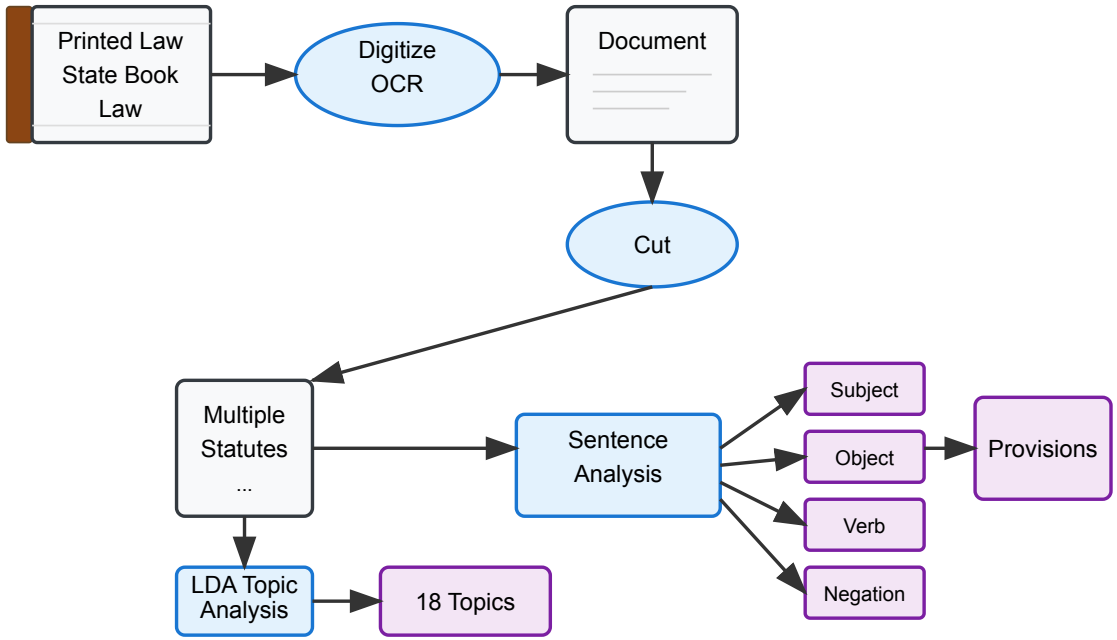
Text Analysis Methods

The construction of the independent variable is made by two parts:

- w_i is the number of provisions (sentences in law for real use) extracted from statute i.
- v_i^k is the percentage of a certain topic k in statute i, such that $\sum_k v_i^k = 1$.

Formally, let L_{st} represent the set of laws in state s at time t. Each statute $i \in L_{st}$ has a provision count w_i and a distribution over topics $\mathbf{v}_i = \{v_i^k\}_{k=1}^K$, where $v_i^k \geq 0$ and $\sum_k v_i^k = 1$. Then define legislative flows for topic k in state s during t as:

$$W_{st}^k = \sum_{i \in L_{st}} v_i^k w_i$$



Linear Regression Model

The paper specifies the following linear regression model:

$$\Delta \log Y_{st} = \alpha_s + \alpha_t + \alpha_s \cdot t + \rho \log W_{st} + X'_{st}\beta + \epsilon_{st} \quad (1)$$

Where:

- $\Delta \log Y_{st}$: The log change in real per capita GDP in state s during biennium t. This is the dependent variable representing economic growth.
- W_{st}: The number of legal provisions enacted in state s during biennium t.
- α_s: State fixed effects, capturing time-invariant characteristics specific to each state.
- α_t: Time (biennium) fixed effects, accounting for common shocks or trends affecting all states in a particular biennium.
- $\alpha_s \cdot t$: State-specific time trends, allowing for different linear trends over time for each state.
- X'_{st}: A vector of additional covariates used for robustness checks.

Shift-Share Instrument for Legislative Diffusion

- The paper uses a shift-share instrument to address the potential endogeneity (reverse causality) of legislative diffusion.
- The instrument is constructed based on the idea that states tend to borrow laws rather than draft from scratch.
  - **shifter**: nationwide growth in topic-specific legislating
  - **shares**: a state's preperiod stock of legislative output on each topic

Shift-Share Instrument for Legislative Diffusion

- **shifter**: Nationwide growth in topic-specific legislating. Formally: $\frac{1}{49}\sum_{r\neq s}\Delta \log W_{rt}^{k}$
- **shares**: A state's preperiod stock of legislative output on each topic. Formally: $\frac{W_{s0}^{k}}{W_{s0}}$

The instrument is constructed as:

$$Z_{st}=\sum_{k=1}^{K}\underbrace{\frac{W_{s0}^{k}}{W_{s0}}}_{\text{shares}}\underbrace{\sum_{r\neq s}\frac{\Delta \log W_{rt}^{k}}{49}}_{\text{shifts}} \tag{2}$$

The first-stage equation for legislative output is:

$$\log W_{st}=\alpha_s+\alpha_t+\alpha_s\cdot t+\psi Z_{st}+X_{st}'\beta+\eta_{st} \tag{3}$$

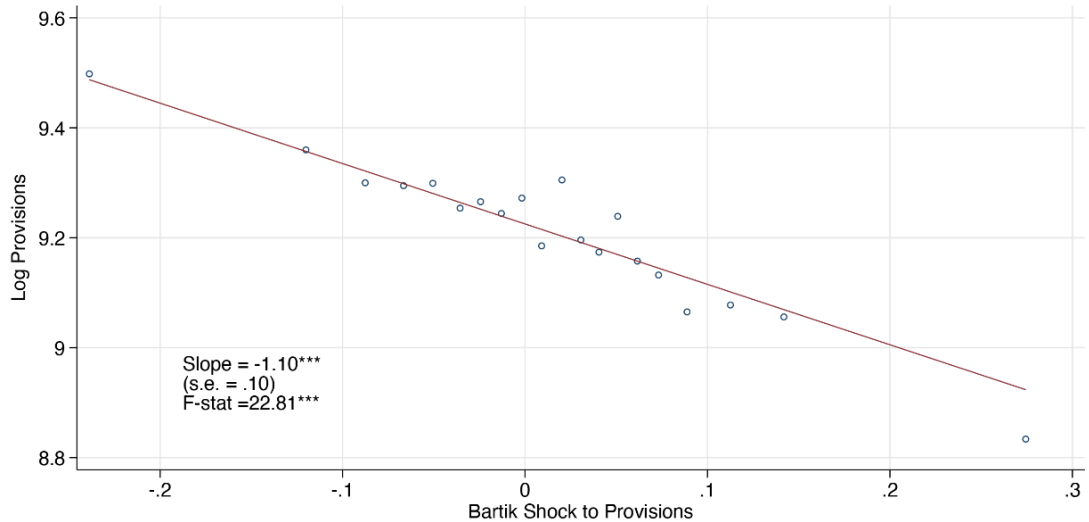
Reduced-form estimates are produced by:

$$\Delta \log Y_{st}=\alpha_s+\alpha_t+\alpha_s\cdot t+\gamma Z_{st}+X_{st}'\beta+\epsilon_{st} \tag{4}$$

First Stage Regression

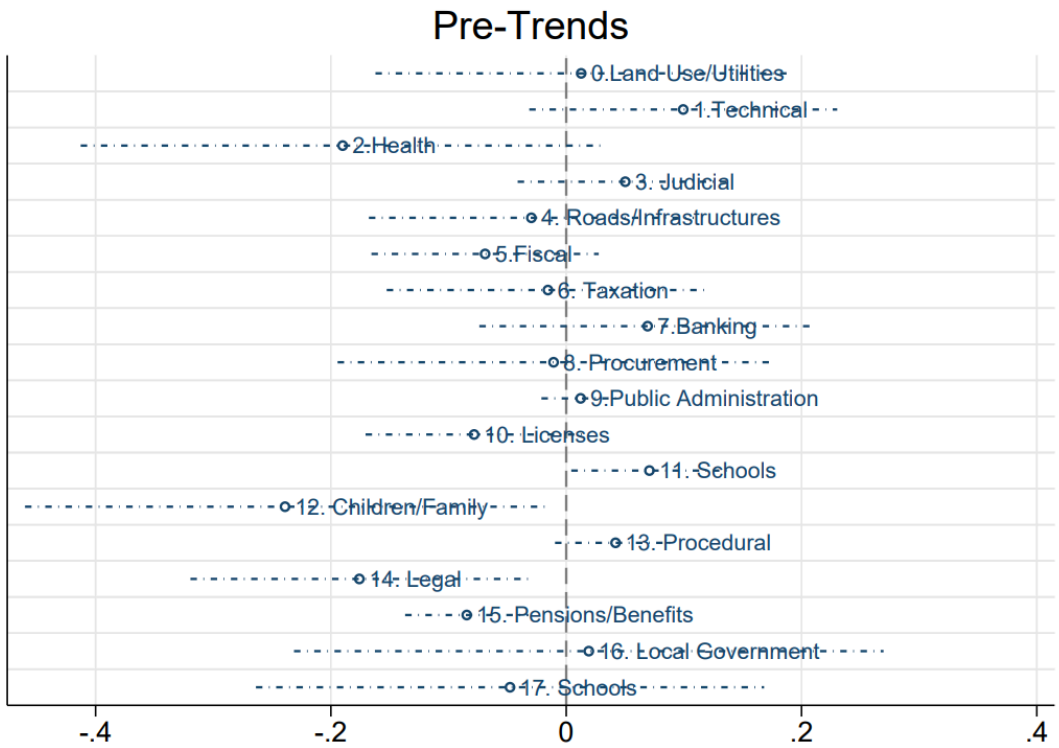
$$\log W_{st} = \alpha_s + \alpha_t + \alpha_s \cdot t + \psi Z_{st} + X'_{st}\beta + \eta_{st} \quad (3)$$

- In classic shift-share instruments (e.g., employment) having high previous shares of sectors that are increasing nationally will tend to get pulled upward.
- In this paper, the effect of Z_{st} however, is **negative**, as states having lower previous shares of topics will be more likely to increase to national trends.



Exogeneity and Exclusion

- **Approach 1: Conditional Exogeneity of Preperiod Shares**
  - Assumes preperiod topic **shares** are not related with economic growth afterwards.



Exogeneity and Exclusion

- **Approach 2: Conditional Exogeneity of Current-Period Shifters**
  - Assumes global shocks (shifters) are uncorrelated with exposure-weighted average of potential outcomes (conditional on fixed effects, controls, and state-time trends).
  - *Validation Checks:*
    - **Relevance test 议题相关性检验**: Instrument relevance driven by a majority of topics.
    - **Weak instrument test 弱工具变量检验** (Olea and Pflueger 2013): Effective F-statistic = 132.8 (strong).
    - **Placebo test 安慰剂检验**: Economic growth not correlated with future instrument values (Table A.12).
    - **Balance test 混淆变量检验**: Instrument not correlated with current/lagged state characteristics (Table A.14).

Main Regression Results

Tab. 1: First Stage (FS), OLS, and Reduced Form (RF) Estimates

	Effect on Provisions		Effect on Real GDP Growth per Capita			
	FS	FS	OLS	OLS	RF	RF
	(1)	(2)	(3)	(4)	(5)	(6)
Legislative output			0.0146*	0.0152		
			(0.00832)	(0.0123)		
Instrument (Z_{st})	-1.099***	-1.221***			-0.0200**	-0.0205**
	(0.230)	(0.259)			(0.00883)	(0.00940)
Observations	1,183	1,183	1,182	1,182	1,182	1,182
R^2	0.813	.9	0.431	0.446	0.420	0.440
State fixed effects	X	X	X	X	X	X
Time fixed effects	X	X	X	X	X	X
State-specific trends		X		X		X

Note: Table shows OLS estimates. Standard errors are in parentheses.
Significance levels: * $p < .10$, ** $p < .05$, *** $p < .01$.

Main Regression Results (2SLS)

Tab. 2: Effect of Legislative Output on Economic Growth (2SLS)

	Effect on Growth Rate per Capita						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Legislative output	.0182**	.0168*	.0152**	.0134*	.0116*	.0222**	.0094*
	(.00903)	(.00863)	(.00704)	(.00687)	(.00602)	(.0106)	(.00507)
First-stage F-statistic	22.86	22.19	23.11	22.92	44.51	19.69	27.30
Observations	1,182	1,182	1,182	1,182	1,134	1,182	1,086
Time fixed effects	X	X	X	X	X	X	X
State fixed effects	X	X	X	X	X	X	X
State trends		X					X
Economic variables × time			X				X
Sector shares × time				X			X
Demographic variables × time					X		X
Topic shares						X	X
Lagged government expenditures							X
Lagged dependent variable							X

Note: Table shows 2SLS estimates. Standard errors are in parentheses.
Significance levels: * $p < .10$, ** $p < .05$, *** $p < .01$.

Robustness Checks

- Leads and Lags Analysis
- Topic-Related Checks
- Alternative Measures of Legislative Detail
- Alternative Outcomes
  - GDP growth
  - Profits
  - Labor income
- Checks on Other Government Activities
- Investigation of Alternative Legal Sources
- Alternative Clustering of Standard Errors

Mechanisms:Framework

The conceptual framework is based on the **holdup model**:

- **Core Idea:** More complete legislation can increase location- and relationship-specific investments by reducing the risk of ex post holdup.
- **Mechanism for Growth:** Increased completeness in legislation reduces uncertainty, encouraging fuller investment and thereby promoting economic growth.

Mechanisms:Framework

- **Additional Predictions:**
  - **Policy Topics:** Effects are expected to be stronger for laws regulating business compared to other policy areas.
  - **Contingent Clauses:** Clauses that specify actions based on the state of the world (contingencies) are predicted to be more effective in promoting growth, as they reduce ambiguity.
  - **Concavity in Existing Legal Detail:** The marginal benefit of additional legal clauses is expected to be higher in areas with initially less legal detail (concavity).
  - **Relationship Specificity:** Growth effects of laws should be more pronounced in sectors relying heavily on relationship-specific inputs.
  - **Economic Policy Uncertainty (EPU):** The positive impact of increased legal detail (especially contingent clauses) on growth is expected to be larger when EPU is high.

Mechanisms:Policy Topics

Tab. 3: What Policies Are Driving the Effect of Lawmaking on Growth?

	EFFECT ON REAL GDP GROWTH PER CAPITA			
POLICY CATEGORY	Economic Regulation	Social Regulation	Fiscal	Procedural
	(1)	(2)	(3)	(4)
Legislative output	.0125*	-.0006	.0220**	.0009
	(.00697)	(.0097)	(.0107)	(.009)
First-stage *F*-statistic	42.53	13.42	18.68	49.12
Observations	1,182	1,182	1,181	1,182
Time fixed effects	X	X	X	X
State fixed effects	X	X	X	X

Note: Significance levels: * $p < .10$, ** $p < .05$.

Mechanisms:Contingent Clauses

- **Analyses of Contingency:** Research applied a contingency dictionary to divide the corpus into two parts: contingent provisions (W_{st}^{C}) and noncontingent provisions (W_{st}^{N}).
- **Model with Joint Endogenous Regressors:**
  - The second stage is:

$$\Delta \log Y_{st} = \alpha_s + \alpha_t + \alpha_s \cdot t + \rho_C \log W_{st}^{C} + \rho_N \log W_{st}^{N} + X_{st}'\beta + \epsilon_{st}$$

  - Two instruments are used, Z_{st}^{C} (contingency instrument) and Z_{st}^{N} (non-contingency instrument). The first-stage equations are:

$$\log W_{st}^{C} = \alpha_s + \alpha_t + \alpha_s \cdot t + \psi_C Z_{st}^{C} + \psi_N Z_{st}^{N} + X_{st}'\beta + \eta_{st}^{C}$$
$$\log W_{st}^{N} = \alpha_s + \alpha_t + \alpha_s \cdot t + \psi_C Z_{st}^{C} + \psi_N Z_{st}^{N} + X_{st}'\beta + \eta_{st}^{N}$$

Mechanisms:Contingent Clauses

- **Analyses of Contingency:** Research applied a contingency dictionary to divide the corpus into two parts: contingent provisions (W_{st}^{C}) and noncontingent provisions (W_{st}^{N}).
- **Alternative Specification (Log Difference):**
  - The second stage, with $\log W_{st}^{C} - \log W_{st}^{N}$ as a single endogenous regressor:

$$\Delta \log Y_{st} = \alpha_s + \alpha_t + \alpha_s \cdot t + \rho_{CN}(\log W_{st}^{C} - \log W_{st}^{N}) + X_{st}'\beta + \epsilon_{st}$$

  - The first stage for this specification:

$$(\log W_{st}^{C} - \log W_{st}^{N}) = \alpha_s + \alpha_t + \alpha_s \cdot t + \psi_C Z_{st}^{C} + \psi_N Z_{st}^{N} + X_{st}'\beta + \eta_{st}$$

Mechanisms:Contingent Clauses

Tab. 4: Effect of Contingent and Noncontingent Clauses on Economic Growth

	EFFECT ON REAL GDP GROWTH PER CAPITA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Contingent provisions	.0638***	.0590***					
	(.0226)	(.0215)					
Noncontingent provisions	-.0559**	-.0511**					
	(.0242)	(.0228)					
Contingent − noncontingent			.0752***	.0697***	.0501**	.0379**	.0773***
			(.0242)	(.0229)	(.0219)	(.0158)	(.0219)
First-stage *F*-statistic	22.27	36.82	22.83	36.60	15.13	31.68	23.86
Observations	1,182	1,182	1,182	1,182	1,182	1,182	1,134
Time fixed effects	X	X	X	X	X	X	X
State fixed effects	X	X	X	X	X	X	X
State trends		X		X			
Economic variables × time					X		
Sector shares × time						X	
Demographic variables × time							X

Note: Significance levels: * $p < .10$, ** $p < .05$, *** $p < .01$.

Mechanisms:Concavity in Existing Legal Detail

Tab. 5: Concavity: Effect of Provisions on Growth by Recent Detail Level

	Effect on Real GDP Growth Per Capita						
Recent Legal Detail	Low			Medium		High	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Legislative Output	0.0404*	0.0425*		0.00640	0.000205	0.0002	-0.0109
	(0.0167)	(0.0158)		(0.0104)	(0.0107)	(0.00743)	(0.00935)
Contingent - Non-Contingent			0.117**				
			(0.0351)				
First Stage F-stat	66.18	59.26	25.29	48.65	47.87	86.59	67.12
Observations	392	392	392	385	385	382	382
Time FE	X	X	X	X	X	X	X
State FE	X	X	X	X	X	X	X
State Trends		X	X		X		X

Note: Significance levels: * $p < .10$, ** $p < .05$.

Mechanisms:Sectoral Relationship Specificity

Tab. 6: Heterogeneous Effects by Relationship-Specific Investments

	Effect on Real GDP Growth by Sector Group								
	Low Relationship Specificity			High Relationship Specificity					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Legislative output	.000231			.0488**	.0414*				
	(.0221)			(.0225)	(.0211)				
Contingent provisions		−.00659				.217*	.177*		
		(.0979)				(.109)	(.104)		
Noncontingent provisions		.00864				−.204∗	−.164		
		(.117)				(.117)	(.113)		
Contingent − noncontingent			−.00342					.237**	.197**
			(.0795)					(.103)	(.0952)
First-stage *F*-statistic	22.83	18.2	19.26	22.83	21.74	18.2	34.4	19.26	33.42
Observations	1,133	1,133	1,133	1,133	1,133	1,133	1,133	1,133	1,133
Time fixed effects	X	X	X	X	X	X	X	X	X
State fixed effects	X	X	X	X	X	X	X	X	X
State trends					X		X		X

Mechanisms:Economic Policy Uncertainty (EPU)

Tab. 7: Effect of Laws on Growth by the Level of EPU

	Effect on Real GDP Growth Per Capita									
	Low Economic Uncertainty		Medium Economic Uncertainty		High Economic Uncertainty					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Legislative output	.00448		.00699		.0373**	.0391**				
	(.0111)		(.0111)		(.0153)	(.0176)				
Contingent provisions							.145**	.170**		
							(.0560)	(.0672)		
Noncontingent provisions							−.137 ∗ ∗	−.163 ∗ ∗		
							(.0624)	(.0775)		
Contingent − noncontingent		.0823		.000182					.164***	.189***
		(.0692)		(.0310)					(.0465)	(.0568)
First-stage *F*-statistic	65.92	4.251	5.389	12.03	46.50	108.2	10.24	9.433	10.65	10.34
Observations	345	345	373	373	377	377	377	377	377	377
Time fixed effects	X	X	X	X	X	X	X	X	X	X
State fixed effects	X	X	X	X	X	X	X	X	X	X
State trends						X		X		X

Standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$ (assumed).

Conclusion

Key Findings

- More legislation tends to boost economic growth
- Impact is driven by *economic* rather than social regulations
- Effect is stronger for:
  - Contingent clauses (vs. non-contingent)
  - Sectors with high relationship-specificity
  - States with lower initial legislative detail
  - Periods of greater economic policy uncertainty

Methodological Contributions

- Novel use of legal text data in causal framework
- New measure of legislative output using computational linguistics
- Text-based shift-share instrumental variables strategy

Future Directions

- Explore spillover effects on neighboring states
- Test external validity in other federal systems
- Examine varying institutional frameworks

Thank You!

2025-05-20