Supplemental Material (not copyedited or formatted) for: Elliott Ash, Massimo Morelli, Matia Vannoni. 2025. "More Laws, More Growth? Evidence from US States." Journal of Political Economy 133(7). DOI: https://doi.org/10.1086/734874.

# Online Appendix

## More Laws, More Growth? Evidence from U.S. States

**Elliott Ash, Massimo Morelli, Matia Vannoni**

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# A Data Appendix

Table A.1: List of Variables with Source and Description

| Variable | Data Source | Description |
|---|---|---|
| *Economic Outcomes* | | |
| Log Real GSP | BEA Regional Accounts | Logged gross State Product deflated to 2007 values using state CPI |
| Log Real GSP Growth | BEA Regional Accounts | Biennial growth in log real GSP |
| Log Real GSP Per Capita | BEA Regional Accounts | Log of GSP divided by population |
| Log Real GSP Per Capita Growth | BEA Regional Accounts | Biannial growth in Log Real GSP per capita |
| Growth Number Estabilishments | County Business Patterns | Growth of logged number of establishments |
| Log Establishment Profit Growth | County Business Patterns | Growth of logged establishment profits |
| Log Employment Growth | County Business Patterns | Growth of logged employment |
| *Legislation* | | |
| Shock to Provisions | State session laws | Instrument for logged number of legal provisions in state statutes |
| Shock to Contingent Provisions | State session laws | Instrument for logged contingent legal provisions in state statutes |
| Shock Non-Contingent Provisions | State session laws | Instrument for logged non-contingent legal provisions in state statutes |
| Log Provisions | State session laws | Logged number of legal provisions in state statutes |
| Log State Statute Words | State session laws | Logged number of words in state statutes |
| Log Contingent Provisions | State session laws | Logged number of contingent legal provisions in state statutes |
| Log Non-Contingent Provisions | State session laws | Logged number of non-contingent legal provisions in state statutes |
| Log Share Amend Sentences | State session laws | Logged share of sentences that contain 'amend' |
| Log Share Repeal Sentences | State session laws | Logged share of sentences that contain 'repeal' |
| Log Statute Misspelling Rate | State session laws | Logged OCR error rate in in state statutes |
| *Covariates* | | |
| Log Population | Klarner (2013) | Logged population |
| Urban Population | Ujhelyi (2014) | Logged urban population |
| Democratic Control | Klarner (2013) | Number of bodies under democratic control |
| Log Income | Klarner (2013) | Logged labour income |
| Log Expenses | Klarner (2013) | Logged government expenditures (in 1000s current dollars) |
| Log Legislative Expenses | Klarner (2013) | Logged legislative expenditures (in 1000s current dollars) |
| Log State News Uncertainty | newspapers.com | Logged number of articles mentioning the phrase 'economic uncertainty' |
| Log Real Tax Per Capita | Klarner (2013) | Logged per capita taxation deflated to CPI |
| Log Real General Exp p. Capita | Klarner (2013) | Logged per capita expenses deflated to CPI |
| Log Campaign Contributions | opensecrets.org | Logged dollars spent in campaign contributions |
| Campaign Finance Regulation | Book of the States | Openness of campaign finance contribution regulation |
| *Regulation and Courts* | | |
| Log Federal Regulation | QuantGov | Federal Regulation and State Enterprise (FRASE) index |
| Log State Regulation Words | LexisNexis | Log word count in state regulations, from the Regulation Report database |
| Log State Court Opinion Words | LexisNexis | Log word count in state court opinions, from Court Opinions database |

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Table A.2: Extended Summary Statistics

| **Variable** | N | mean | std dev | min | max |
|---|---|---|---|---|---|
| *Economic Outcomes* | | | | | |
| Log Real GSP | 1,250 | 17.79 | 1.436 | 14.09 | 21.54 |
| Log Real GSP Growth | 1,250 | 0.134 | 0.0701 | -0.0870 | 0.665 |
| Log Real GSP Per Capita | 1,250 | 3.652 | 0.281 | 2.803 | 4.844 |
| Log Real GSP Per Capita Growth | 1,249 | 0.0314 | 0.0502 | -0.174 | 0.332 |
| Growth Number Estabilishments | 823 | 0.0451 | 0.0584 | -0.146 | 0.409 |
| Log Establishment Profit Growth | 550 | 0.163 | 0.109 | -0.403 | 0.818 |
| Log Employment Growth | 823 | 0.0568 | 0.0643 | -0.151 | 0.930 |
| | | | | | |
| *Legislation* | | | | | |
| Shock to Provisions | 1,183 | 0.0131 | 1.025 | -2.191 | 2.563 |
| Shock to Contingent Provisions | 1,183 | 0.00371 | 1.023 | -2.035 | 2.803 |
| Shock Non-Contingent Provisions | 1,183 | 0.0100 | 1.031 | -2.218 | 2.629 |
| Log Provisions | 1,183 | 9.211 | 0.887 | 2.996 | 11.42 |
| Log State Statute Words | 1,183 | 14.03 | 0.833 | 6.912 | 16.29 |
| Log Contingent Provisions | 1,183 | 7.528 | 0.983 | 0.405 | 9.859 |
| Log Non-Contingent Provisions | 1,183 | 8.908 | 0.893 | 2.890 | 11.03 |
| Log Share Amend Sentences | 1,159 | -3.619 | 0.576 | -7.321 | -2.098 |
| Log Share Repeal Sentences | 1,159 | -5.496 | 0.897 | -11.79 | -2.240 |
| Log Statute Misspelling Rate | 1,183 | 0.0306 | 0.00699 | 0.0131 | 0.0649 |
| | | | | | |
| *Covariates* | | | | | |
| Log Population | 1,250 | 14.94 | 1.029 | 12.51 | 17.47 |
| Urban Population | 1,248 | 0.635 | 0.144 | 0.359 | 0.887 |
| Democratic Control | 1,127 | 1.802 | 1.057 | 0 | 3 |
| Log Income | 1,250 | 3.479 | 0.267 | 2.563 | 4.144 |
| Log Expenses | 1,250 | 15.57 | 1.471 | 11.89 | 19.46 |
| Log Legislative Expenses | 1,250 | 9.410 | 1.384 | 5.176 | 12.73 |
| Log State News Uncertainty | 1,208 | -4.628 | 0.348 | -6.044 | -3.479 |
| Log Real Tax Per Capita | 1,250 | 0.721 | 0.370 | -0.466 | 2.715 |
| Log Real General Exp p. Capita | 1,250 | 1.348 | 0.418 | -0.0226 | 2.879 |
| Log Campaign Contributions | 450 | 16.63 | 1.010 | 13.59 | 18.75 |
| Campaign Finance Regulation | 1,199 | 0.990 | 0.712 | 0 | 2 |
| | | | | | |
| *Regulation and Courts* | | | | | |
| Log Federal Regulation | 450 | 13.75 | 0.184 | 13.24 | 14.43 |
| Log State Regulation Words | 444 | 14.55 | 1.757 | 0 | 16.84 |
| Log State Court Opinion Words | 1,300 | 14.86 | 1.092 | 12.34 | 18.27 |

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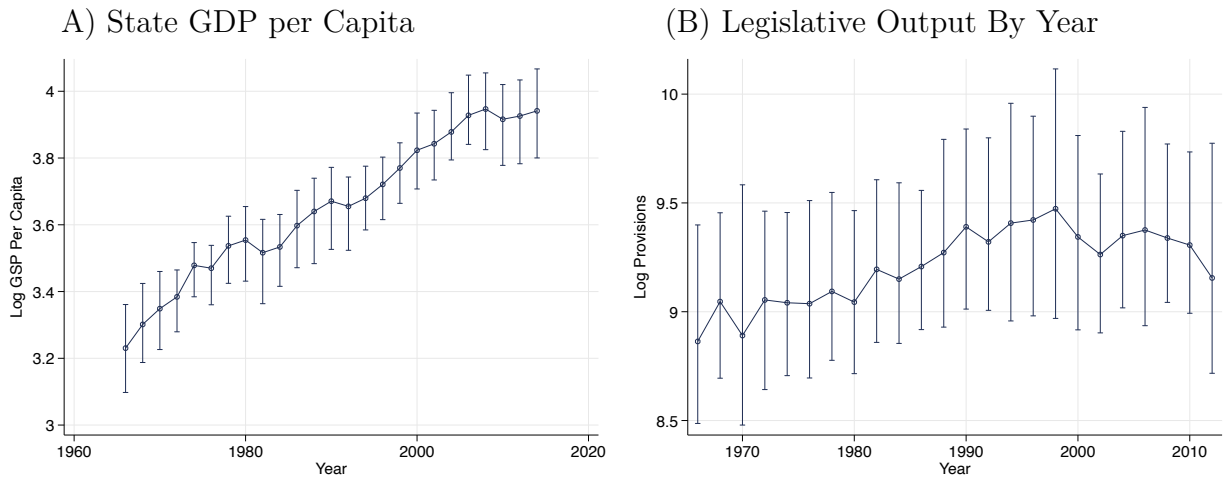
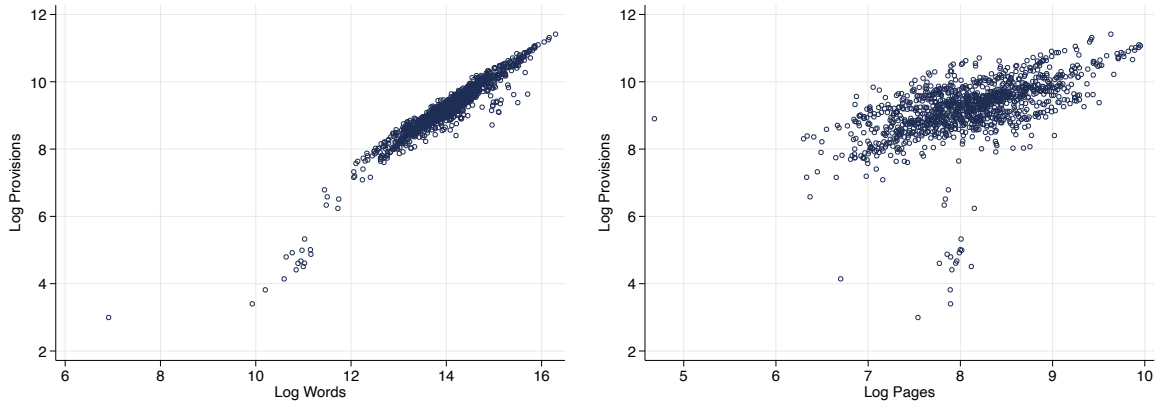
Figure A.1: State-Level Economic Output and Legislative Output By Year




Notes. Line graphs showing the mean of (log) private GDP (Panel A) and (log) provisions (Panel B) across states over time. Error spikes give 90% confidence intervals from standard errors of the mean.

Figure A.2: Scatter Plots of Provisions vs. Word Counts and Page Counts




Notes. The figure shows a scatter plot for the relationship between (logged) words in the left panel and (logged) pages in the right panel and (logged) provisions, respectively.

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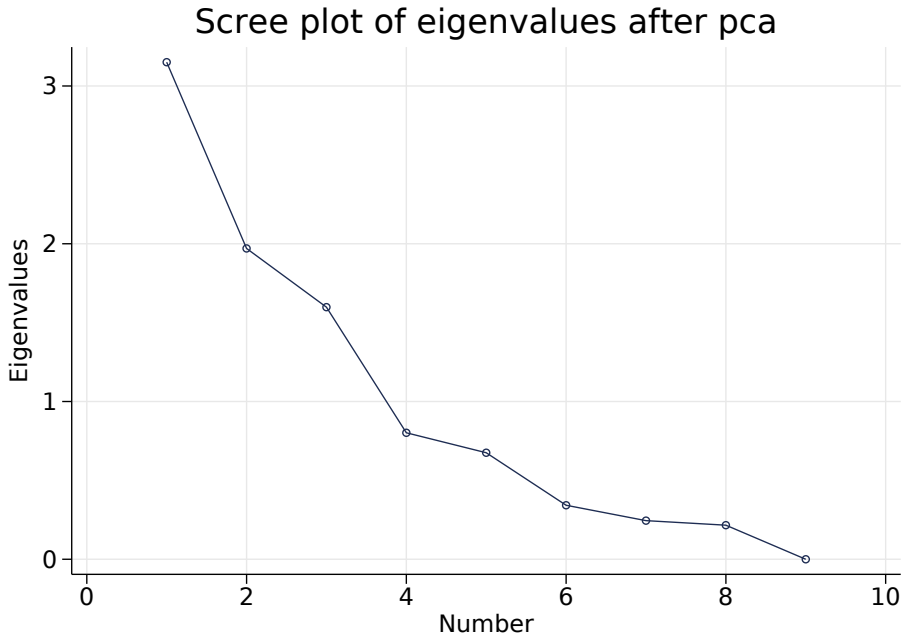
Figure A.3: First Principal Components of Initial Economic Sectors




Notes. Screeplot for the principal components in economic sectors. We include the first four, or first six, components, interacted with year, as exogenous covariates in the regression analysis.

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Table A.3: Relationship Specificity Scores, by Industry

| NAICS Code | Industry Description | Relationship Specificity Score | GSP Share (%) |
|---|---|---|---|
| 112 | Animal Production | 0.601 | 3.08 |
| 331 | Primary Metal Manufacturing | 0.609 | 3.16 |
| 311 | Food Manufacturing | 0.650 | 5.28 |
| 115 | Agriculture/Foresty Support | 0.729 | 0.34 |
| 312 | Beverage/Tobacco Manufacturing | 0.741 | 5.28 |
| 324 | Petroleum and Coal Products | 0.769 | 6.12 |
| 321 | Wood Product Manufacturing | 0.777 | 1.49 |
| 111 | Crop Production | 0.795 | 3.07 |
| 113 | Foresty and Logging | 0.799 | 0.88 |
| 211 | Oil & Gas Extraction | 0.831 | 8.92 |
| 212 | Mining (not Oil/Gas) | 0.838 | 2.75 |
| 313 | Textile Mills | 0.847 | 0.81 |
| 315 | Apparel Manufacturing | 0.856 | 0.69 |
| 325 | Chemical Manufacturing | 0.877 | 3.86 |
| 314 | Textile Product Mills | 0.906 | 0.57 |
| 339 | Miscellaneous Manufacturing | 0.915 | 2.03 |
| 316 | Leather Manufacturing | 0.916 | 0.91 |
| 213 | Mining Support | 0.916 | 1.11 |
| 337 | Furniture Manufacturing | 0.922 | 1.57 |
| 114 | Fishing & Hunting | 0.923 | 0.49 |
| 335 | Electrical Equipment and Appliances | 0.938 | 2.61 |
| 322 | Paper Manufacturing | 0.940 | 3.01 |
| 332 | Fabricated Metal Manufacturing | 0.942 | 3.47 |
| 327 | Nonmetallic Mineral Products | 0.962 | 2.33 |
| 326 | Plastics and Rubber Products | 0.970 | 3.49 |
| 333 | Machinery Manufacturing | 0.972 | 3.07 |
| 336 | Trasportation Equipment Manufacturing | 0.975 | 6.76 |
| 334 | Computers and Electronics | 0.981 | 11.96 |
| 323 | Printing | 0.996 | 2.26 |
| 511 | Publishing | 0.997 | 8.58 |

Notes. List of industries matched from Nunn (2007) to our US BEA data on state-year sectoral output. Rows are 3-digit NAICS 1997 sectors. Sorted by third column – the relationship specificity score from Nunn, measuring the proportion of inputs not sold on an exchange. Fourth column gives the average GSP share (in percent) out of this set of sectors, across all states and years.

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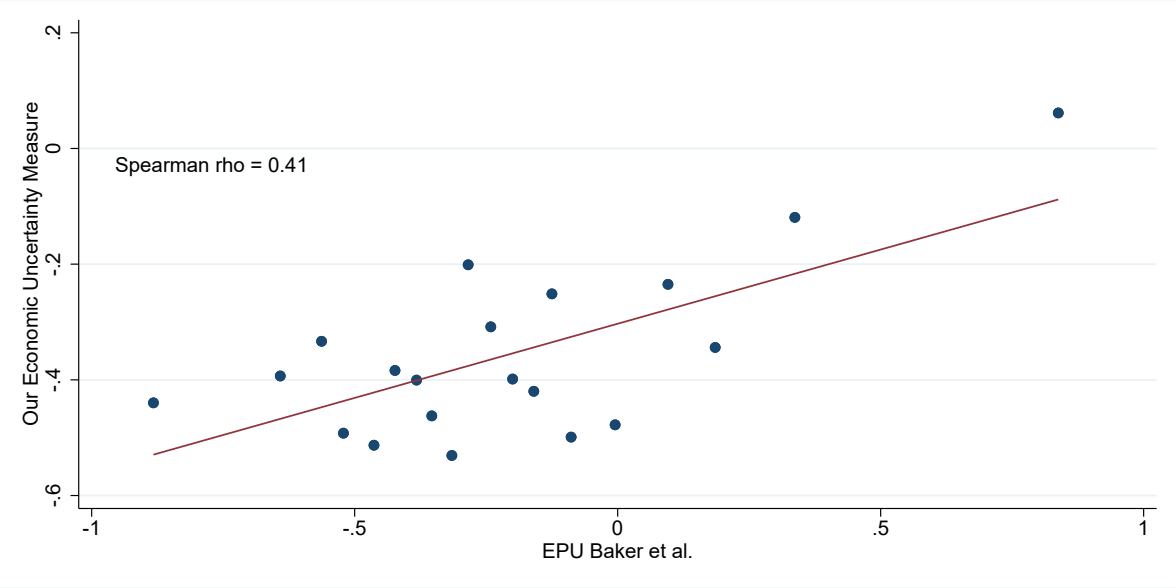
Figure A.4: Economic Policy Uncertainty Index




Notes. Binned scatterplot showing the cross-sectional relationship between our measure of economic policy uncertainty and the state-level one from policyuncertainty.com, available since the 1990s for most states. The regression model represented includes year FE. The Spearman rank correlation coefficient is 0.41 (rejecting the null hypothesis that the ranks of the two variables are independent).

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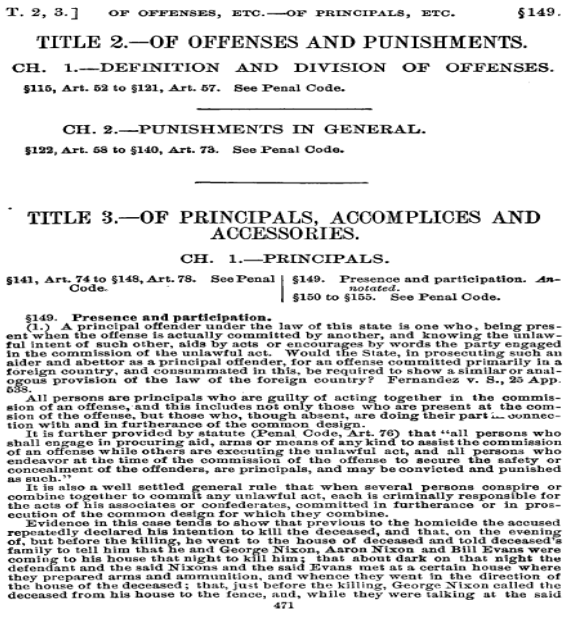
# B Details on Text Features

Figure A.5: State Session Laws Corpus



T. 2, 3.] OF OFFENSES, ETC.—OF PRINCIPALS, ETC. §149.

TITLE 2.—OF OFFENSES AND PUNISHMENTS.

CH. 1.—DEFINITION AND DIVISION OF OFFENSES.

§115, Art. 52 to §121, Art. 57. See Penal Code.

CH. 2.—PUNISHMENTS IN GENERAL.

§122, Art. 58 to §140, Art. 73. See Penal Code.

TITLE 3.—OF PRINCIPALS, ACCOMPLICES AND ACCESSORIES.

CH. 1.—PRINCIPALS.

§141, Art. 74 to §148, Art. 78. See Penal Code.

§149. Presence and participation. *Annotated.*

§150 to §155. See Penal Code.

§149. **Presence and participation.**

(1.) A principal offender under the law of this state is one who, being present when the offense is actually committed by another, and knowing the unlawful intent of such other, aids by acts or encourages by words the party engaged in the commission of the unlawful act. Would the State, in prosecuting such an aider and abettor as a principal offender, for an offense committed primarily in a foreign country, and consummated in this, be required to show a similar or analogous provision of the law of the foreign country? Fernandez v. S., 25 App. 658.

All persons are principals who are guilty of acting together in the commission of an offense, and this includes not only those who are present at the commission of the offense, but those who, though absent, are doing their part ... connection with and in furtherance of the common design.

It is further provided by statute (Penal Code, Art. 76) that "all persons who shall engage in procuring aid, arms or means of any kind to assist the commission of an offense while others are executing the unlawful act, and all persons who endeavor at the time of the commission of the offense to secure the safety or concealment of the offenders, are principals, and may be convicted and punished as such."

It is also a well settled general rule that when several persons conspire or combine together to commit any unlawful act, each is criminally responsible for the acts of his associates or confederates, committed in furtherance or in prosecution of the common design for which they combine.

Evidence in this case tends to show that previous to the homicide the accused repeatedly declared his intention to kill the deceased, and that, on the evening of, but before the killing, he went to the house of deceased and told deceased's family to tell him that he and George Nixon, Aaron Nixon and Bill Evans were coming to his house that night to kill him; that about dark on that night the defendant and the said Nixons and the said Evans met at a certain house where they prepared arms and ammunition, and whence they went in the direction of the house of the deceased; that, just before the killing, George Nixon called the deceased from his house to the fence, and, while they were talking at the said

471

T. 2, 3.] OF OFFENSES, ETC.-OF PRINCIPALS, ETC.

TITLE 2.-OF OFFENSES AND PUNISHMENTS.
CH. 1.-DEFINITION AND DIVISION OF OFFENSES.
§115, Art. 52 to §121, Art. 57. See Penal Code.
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§122, Art. 58 to §140, Art. 73. See Penal Code.
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§150 to §155. See Penal Code.
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471

Notes. Scanned image and associated OCR for example page from State Session Laws corpus.

## B.1 Segmenting Statutes

The first step is to merge and process this raw text. A script serves to append pages, remove headers, footers, tables of contents, indexes, and other non-statute material. Then, it segments the text into individual bills, acts, and resolutions using text markers for the start of new statutes. These include indicators for new Chapters, Articles, or Titles, such as a line with CHAPTER followed by a Roman numeral. Some states have their own standard indicators, such as P.A followed by a number to indicate a new Public Act. The script also uses common text for the beginning of a statute preamble (e.g., An act to...) and for enacting clauses (e.g., Be it enacted that...). Research assistants checked samples of the statute segmenter for each state-year to make sure it worked well.

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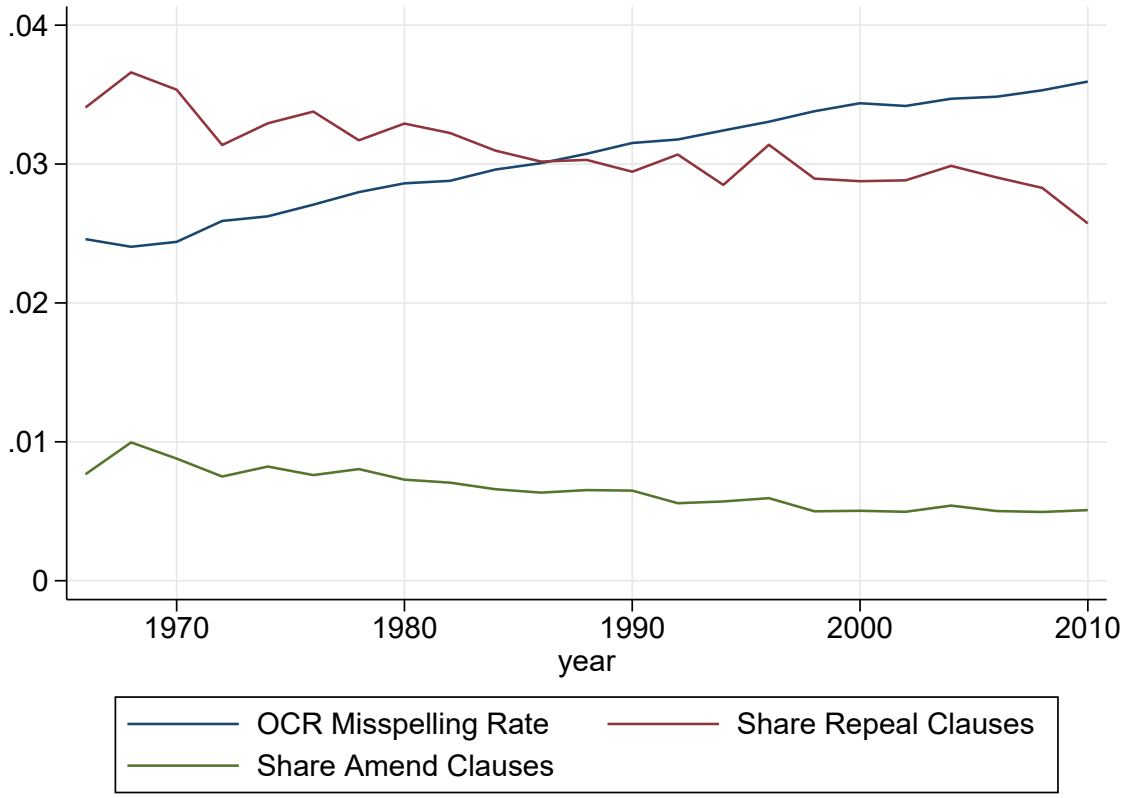
Figure A.6: Time Series: Amend Share, Repeal Share, and OCR Error Rate




Notes. Time series for the share of amending sentences, share of repeal sentences, and the OCR misspelling rate in the state session laws corpus, over the time period of our analysis. OCR error rate computed as share of common nouns (identified with automated POS tagger) that are not in the open-source dictionary WordNet.

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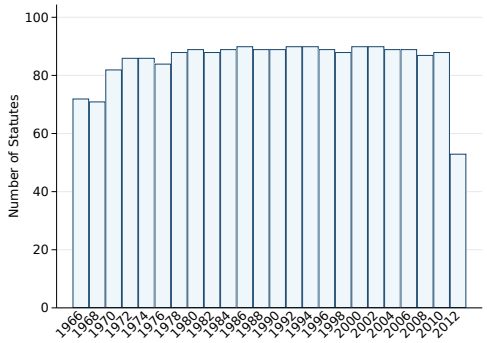
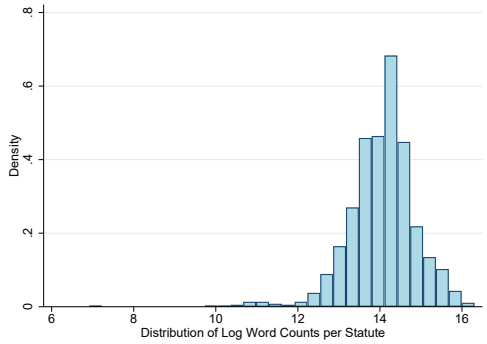
Table A.4: Summary Statistics on Statute Segmentation

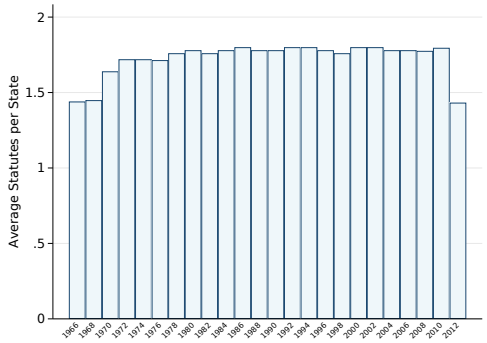
(A) Histogram: Number of Statutes by Biennium



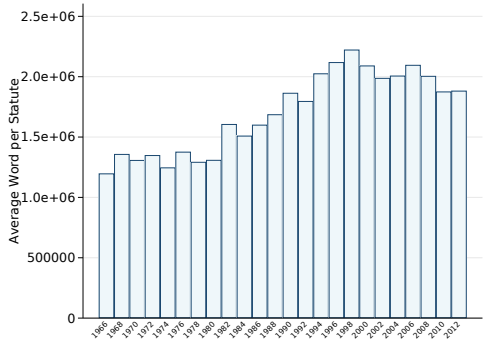

(B) Histogram: Number of Words per Statute




(C) Statutes per State, by Biennium




(D) Average Words per Statute, by Biennium




Notes. These figures provide some details on our corpus. The left panels shows the number of statutes by biennium (top) and state (bottom). The right panels show the number of words by statute (top) and the number of words by biennium (bottom).

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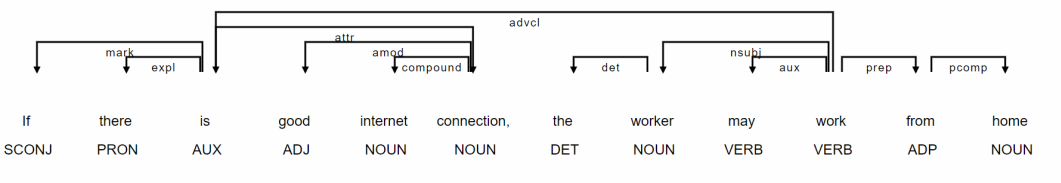
Figure A.7: Syntactic Parsing for Provision Extraction




Notes. The Figure shows an example of a dependency tree. The letters below the words represent the part of speech (POS) tags. A prerequisite of syntactic dependency parsing, indeed, is POS tagging. The latter assigns labels ('tags') to the tokens in a sentence according to their function, such as noun, verb and adjectives. The arcs above the sentence represent the syntactic relations between words. First of all, the parser identifies the head of the sentence, namely the main verb, in this case 'work'. Then, the parser identifies the subject of the sentence and tells the researcher also that it is a nominal subject, in this case 'worker'. Indeed, in some cases, the subject may by a clause. The subject is then associated to a determiner, 'the'. Then, the parser looks at the other side of the sentence and, in this case, identifies a preposition, namely 'from', and the prepositional complement 'home'. It should be noticed that the verb of the contingent part of the sentence, 'is', is related to the main verb and hence the main sentence with the dependency adverbial clause. The latter is one of the most common syntactic relations that allow identifying a contingency.

## B.2 Extracting Legal Provisions

Our information extraction approach relies on two stages: the definition of extraction rules and the syntactic parsing of the text. First, we decide the lexical and syntactic features of the provisions we want to extract. We focus on delegation, constraint, permission, and entitlement. Table A.5 shows the extraction rules, namely the lexical and syntactic rules we expect the main legal provisions above to follow. These are based on large-scale repositories of coded ontologies. These are dictionaries of words and dependencies that have been annotated to serve a theme, such as making a promise. An example of these ontology dictionaries is FrameNet.

Figure A.7 shows the result of the syntactic parser. The dependency parser tells us whether a noun is the subject or the object of the sentence. It tells us rich information about the verb -- whether it is the main verb or just an auxiliary, whether it is active or passive, and so on. Our dependencies are produced using the Python package spaCy (Honnibal et al., 2015). The spaCy parser obtains state-of-the-art performance on the standard computational linguistics metrics. Like most parsers, it is trained on corpora of annotated sentences. A detailed discussion of the process of information extraction can be found in Vannoni et al. (2019).

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Table A.5: Types of Legal Provisions, with Extraction Rules

Lexical Units

Strict modals: 'shall','must','will'

Permissive modals: 'may','can'

Delegation verbs: 'require', 'expect', 'compel', 'oblige' , 'obligate', 'have to', 'ought to'

Constraint verbs: 'prohibit', 'forbid', 'ban', 'bar', 'restrict', 'proscribe'

Permission verbs: 'allow', 'permit', 'authorize'

Extraction Rules

Delegation: strict modal + active verb + not negation OR not permissive modal + delegation verb + not negation

Constraint: modal + not delegation verb + negation OR strict modal + constraint verb + not negation OR permission verb + negate

Permission: permission verb + not negation OR permissive modal + not special verb + not negation OR constraint verb + negation

Entitlement: entitlement verb + not negation OR strict modal + passive + not negation OR delegation verb + negation

Notes. As enumerated in the table, a delegation is characterized by one of two structures: 1) a non-negated strict modal followed by an active verb ("The worker shall act"), or 2) a non-negated non-permissive modal (either a non-modal or a strict modal) followed by a delegation verb ("The worker is expect to act"). Constraints are characterized by 1) a negated modal ("The worker shall no"), a negated permission verb ("The worker is not allowed), or a non-negated constraint verb ("The worker shall be prohibited from"). Permissions are characterized by a 1) non-negated permission verb ("The worker is allowed to"), 2) a non-negated permissive modal followed by a non-special verb ("The may act"), or a 3) negated constraint verb ("The worker is not prohibited from"). Finally, entitlements are characterized by 1) a non-negated entitlement verb ("The worker retains the power to"), 2) a non-negated strict modal followed by a passive verb ("The worker shall be considered"), or 3) a negated delegation verb ("The worker is not obligated to"). By following these rules, we can see that the sentence in A.7is a permission: "The worker may work".

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## B.3 Details on Legislative Topics

Table A.6: List of Topics, 42-Topic Specification (with Broader Categories)

| Label | Frequency | Category | Most Associated Words |
|---|---|---|---|
| Licensing | 0.0318 | economic | license fee holder valid such_license card renew proof good age such_person |
| Energy | 0.0267 | economic | director control solid gas site air oil coal environment underground tank mine |
| Partnerships | 0.0267 | economic | agent partnership foreign partner merger case transact mail demand stock |
| Payments | 0.0258 | economic | paid payment pay obligor child_support cost unpaid receipt withheld collect |
| Credit | 0.0241 | economic | interest transfer lien instrument issuer debtor seller holder buyer contract |
| Real Property | 0.0227 | economic | real loan trust mortgage interest broker common sale lender deed condominium |
| Traffic | 0.0211 | economic | motor dealer driver owner plate test vessel trailer weight special accident |
| Banks | 0.0208 | economic | institution bank stock deposit higher credit credit_union branch loan account |
| Insurance | 0.0206 | economic | life contract small premium carrier surplus risk condition benefit minimum pool |
| Contracts | 0.0205 | economic | contract work labor contractor cost repair perform bid job master firm trade |
| Land | 0.0203 | economic | land owner park parish port airport forest parcel lot map easement plat portion |
| Retail | 0.0201 | economic | sale sold retail sell price distributor fuel product milk liquor aircraft supplier |
| Torts | 0.0201 | economic | claim death claimant lieu_thereof loss settlement award case judgment legal |
| Traffic | 0.0182 | economic | highway traffic feet railroad state_highway transit load road space front stop |
| Commodities | 0.0176 | economic | fish food livestock plant game dog farm seed control sale grain wild owner deer |
| Land | 0.0089 | economic | street road feet island run tract river township center_line corner beach |
| Bonds | 0.0336 | fiscal | interest bond sale payment sold debt pay cost pledge paid sell interest_thereon |
| Taxes | 0.0294 | fiscal | tax gross credit return paid net assessor refund case such_tax homestead state_tax |
| Budgeting | 0.0294 | fiscal | budget for_the_fiscal_year so_much_thereof transfer special aid grant biennium |
| Funding | 0.0276 | fiscal | fund account money trust_fund transfer special excess deposit state_general_fund |
| Local Projects | 0.0268 | fiscal | development project local local_government compact zone urban government cost |
| Pensions | 0.0267 | fiscal | age benefit credit paid pension per_cent equal membership death elect final |
| Taxes | 0.0263 | fiscal | rate total equal paid calendar_year maximum strikeout subparagraph base excess |
| Tax Admin | 0.0174 | fiscal | paid sheriff auditor said_board warrant census audit supervisor cabinet travel |
| Miscellaneous | 0.0202 | misc | tile tie sueh lie said_code whieh shal ill supp aid thc tho tle tire aet sha |
| Courts | 0.0390 | procedural | court attorney judgment trial case district_court petition circuit_court circuit |
| Appeals Courts | 0.0389 | procedural | review appeal final complaint case petition civil receipt mail panel subpoena |
| Administration | 0.0301 | procedural | governor chief fire personnel bureau appoint shall_consist volunteer membership |
| Elections | 0.0291 | procedural | ballot petition voter township precinct register tenant cast elector referendum |
| Governance | 0.0285 | procedural | power invalid control proper event thereon hereof art shall_have_the_power |
| Policy Research | 0.0278 | procedural | center data review research staff local access develop implement level task |
| Elect Districts | 0.0217 | procedural | district special petition such_district said_district creation portion district_board |
| Local Govt | 0.0207 | procedural | council charter mayor special government conflict appoint perform oath organ |
| Governance | 0.0162 | procedural | government commonwealth civil attorney_general exempt uniform nonprofit |
| Local Issues | 0.0120 | procedural | local local_law new_matter superior such_law event fair race centum thirty-first |
| Education | 0.0291 | social | school school_district state_board student teacher pupil school_year tuition |
| Family Law | 0.0275 | social | child court parent minor children age guardian placement adult petition youth |
| Public Health | 0.0254 | social | health care home health_care social human children medicaid public_health |
| Healthcare | 0.0242 | social | treatment physician patient mental drug mental_health dental condition care |
| Criminal Law | 0.0205 | social | crime probation fine victim parole jail misdemeanor arrest sex firearm sexual |
| Water | 0.0171 | social | town water town_council sewer said_town lake river san town_clerk town_board |
| Social Issues | 0.0087 | social | sect team great stricken high_school veteran life honor nation first_paragraph |

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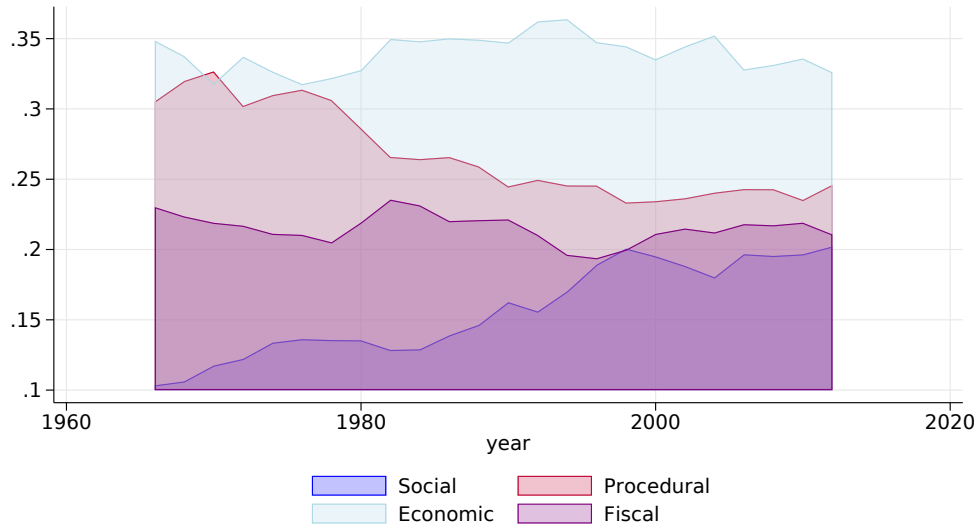
Figure A.8: Shares across Policy Categories over Time




Notes. This Figure shows the shares of topic groups (social, procedural, economic and fiscal) over time. We can see that economic clauses stay relatively stable over time, whereas social clauses increased drastically. Fiscal and procedural clauses, instead, slowly decreased over time.

Table A.6 shows the words associated with each topic for the 42-topic specification. We also include the assigned policy category for each topic: economic regulation, fiscal policy, procedural law, or social regulation.

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## B.4 Details on Contingency

An established literature on policy design and legal linguistics has emphasized the special relevance of contingencies in legal texts. In particular, the so-called "institutional grammar" has been used to study how legislation is written. This approach, which builds on the seminal paper by Crawford and Ostrom (1995), extracts relevant semantic features of the language in legislation. One of these semantic features are contingencies (what some of the literature calls "conditions"), which define the scope of application of the provision.

Take as an example the following sentence from U.S. state organic farming legislation (Frantz and Siddiki, 2022):

> "A certified operation or a person responsibly connected with an operation whose certification has been revoked will be ineligible to receive certification for a period of 5 years following the date of such revocation, except that Secretary may, when in the best interest of the certification program, reduce or eliminate the period of ineligibility."

In this sentence, there is a contingency that signals an exception: "except that Secretary may. . . ". More specifically, this is a so-called activation condition (Frantz and Siddiki, 2022), namely a condition under which the statement activates – e.g., "if X, then Y". Activation conditions specify the context of the provision, thus making legislation more precise. In the example above, the provision operates in a context with two scenarios: one where the Secretary does not do anything, and another where the Secretary takes action and changes the process of certification. The former would be the only scenario if the condition was not present. In conclusion, the presence of this activation condition (what we call a contingency) provides a more detailed, precise set of rules than a situation where there is no contingency.

As discussed in Section 2 on the corpus, our legislative text output measurement does not distinguish statutes that increase regulations or decrease them (deregulate). An example of a "deregulating" law is Texas Utilities Code Title 2.C Ch. 65, "Deregulation of certain incumbent local exchange company markets", enacted in 2005.[15] That statute has many contingent clauses, reflecting that more contingent clauses does not necessarily mean more intense regulation.

[15] See `https://statutes.capitol.texas.gov/Docs/UT/htm/UT.65.htm`.

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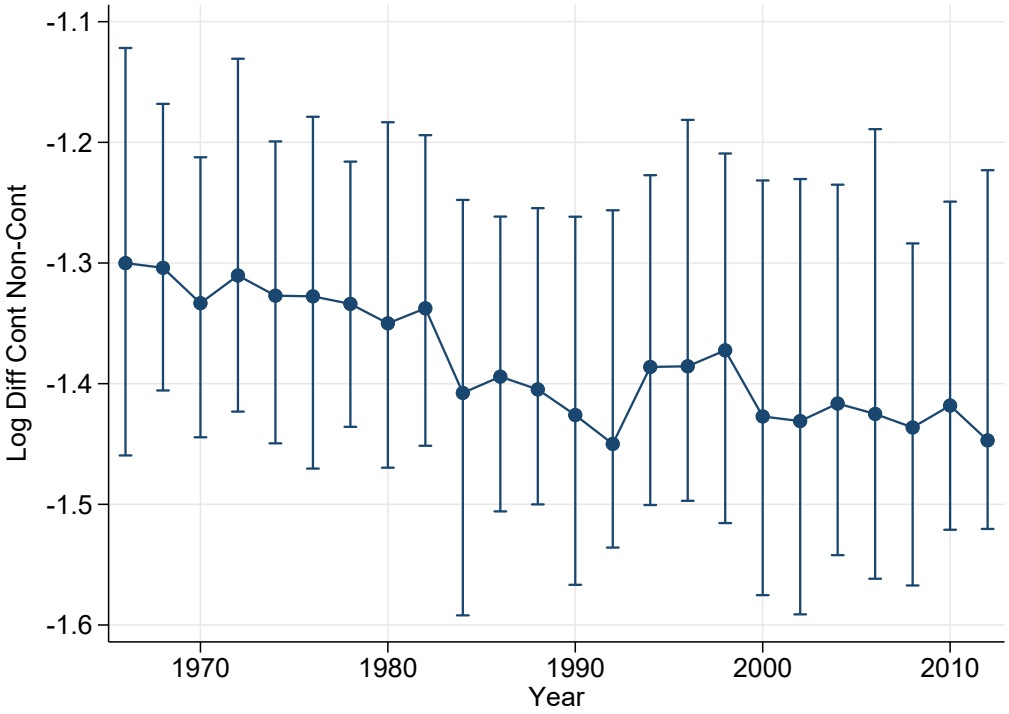
Figure A.9: Net Contingencies by Biennium




This figure shows the difference in log contingencies and log non-contingencies over time in our dataset. Error spikes give the 25th and 75th percentiles.

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Table A.7: Examples of Contingent Provisions

| State | Year | Topic | Provision Text |
|---|---|---|---|
| UT | 2009 | 0 | (iv) if liability under the bond filed by the applicant with the division pursuant to Section 40-10-15 shall be for the duration of the underground mining operations and until the requirements of this Subsection (2) and Section 40-10-16 have been fully complied with. |
| MD | 1992 | 1 | Unless authorized by the Board, the consumer member of the Board may not participate in any activity related to examinations under this subtitle.] |
| TN | 2005 | 2 | The prescribing optometrist must sign the handwritten prescription order on the day it is issued unless it is a standing order issued in a hospital, a nursing home or an assisted care living facility as defined in SS68-11-201. |
| TX | 1985 | 3 | The transcription shall be in narrative form unless a party gives written objection to the use of narrative form not later than the fifth day after receiving notice of the request for a statement of facts. |
| OR | 1985 | 4 | Roadside vehicle emergency lighting must be lighted and placed upon the highway where they are clearly visible to the drivers of approaching vehicles for a distance of 500 feet and according to the following.(A) |
| KS | 1987 | 5 | If any provision or clause of this act or application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of the act which can be given effect without the invalid provision or application, and to this end the provisions of this act are declared to be severable. |
| IL | 1979 | 6 | If the taxpayer's average monthly tax liability to the Department under this Act, the "Use Tax Act", the "Service Occupation Tax Act", the "Service Use Tax Act", the "Municipal Retailers' Occupation Tax Act", the "Municipal Service Occupation Tax Act", the "County Retailers' Occupation Tax Act" and the "County Service Occupation Tax Act" was $25,000 or more during the preceding 4 complete calendar quarters or was $10,000 or more if such 4 quarter period ended on or after Mp-ch 31, 1977, he shall file a return with the Depar t-m-1. |
| CA | 2006 | 7 | With respect to each foreign disappearing other business entity previously registered for the transaction of intrastate business in this state, the filing of the agreement of merger pursuant to subdivision (f) automatically has the effect of a cancellation of registration for that foreign other business entity as of the date of filing in this state or, if later, the effective date of the merger, without the necessity of the filing of a certificate of cancellation. |
| CA | 1996 | 12 | The court shall continue the case only if it finds that there is a substantial probability that the minor will be returned to the physical custody of his or her parent or guardian within six months or that reasonable services have not been provided to the parent or guardian. |
| SD | 1994 | 8 | If a draft is payable at a fixed period after sight and the acceptor fails to date the acceptance, the holder may complete the acceptance by supplying a date in good faith.(d) |
| IN | 2010 | 9 | If the electronic mail address or the fax number provided by the voter does not permit the county voter registration office to send the voter an application not later than the end of the first business day after the county voter registration office receives the communication, the county voter registration office shall send the application to the voter by United States mail. |
| FL | 1976 | 10 | (1) DEFINITION.--"Industry trade products" means all food products having any-nenda~ry-pweduet-wh~eh-as the semblance of milk or a milk product defined in this chapter but which does not come within the definition of milk, a milk product, ea filled milk, or filled milk product.(2) LABELING.--Industry trade products shall be labeled with a fanciful name or any other descriptive name that accurately describes the product, but in no case shall an "industry trade roduct" be labeled as an imitation of any product defined in this chapter. |

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Table A.8: Examples of Non-Contingent Provisions

| State | Year | Topic | Provision Text |
|---|---|---|---|
| UT | 2009 | 0 | these water impoundments will not result in the diminution of the quality or quantity of water utilized by adjacent or surrounding landowners for agricultural, industrial, recreational, or domestic uses. |
| MD | 1992 | 1 | A member may not serve more than [two] 2 consecutive full terms. |
| TN | 2005 | 2 | Nothing in this section shall be construed to prevent a physician assistant from issuing a verbal prescription order. |
| TX | 1985 | 3 | The clerk shall note the payment of the fee on the docket of the court. |
| OR | 1985 | 4 | A rear mounted lighting system shall have a green light, a yellow light and a red light. |
| IL | 1979 | 6 | Such determination shall be subject to review and revision by the Department in the manner hereinafter provided for the correction of returns. |
| CA | 2006 | 7 | The agreement of merger shall be approved on behalf of each other party by those persons authorized or required to approve the merger by the laws under which it is organized. |
| CA | 1996 | 12 | The court shall order that those services be initiated, continued, or terminated.(f) |
| IN | 2010 | 9 | A voter may not submit a registration application by fax or an electronic transmission except. |
| FL | 1976 | 10 | This act shall take effect October 1, 1976. |
| NY | 1992 | 11 | This act shall take effect on the same date as a chapter of the laws of 1992 amending the state law, relating to creating assembly and senate districts, as proposed in legislative bill number S. 7280 - A. 10111 takes effect. |
| NY | 1969 | 13 | Such notes may, among other things, be issued to provide funds t,. |
| CA | 1990 | 14 | The city council shall, within 10 days after the establishment of the district, invite bids for the making of the improvement by ordering a notice of the invitation to be published by two successive insertions in a daily or weekly newspaper published or circulated in the city and designated by the city council for that purpose. |
| IL | 1953 | 15 | Bonds shall be held at their book value. |
| VA | 2002 | 16 | The State Council shall report on the status of the Generalist Initiative to the House Appropriations and Senate Finance Committees at their regularly scheduled meetings in November.2. |

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Table A.9: Descriptive Statistics on Contingency, by Decade

| | Mean | Standard Deviation |
|---|---|---|
| 1960s | | |
| Log Contingent | 7.418 | 1.0050 |
| Log Non-Contingent | 8.779 | .8894 |
| Cont-Noncont Diff | -1.361 | .274 |
| Share of Contingent | .193 | .0406 |
| 1970s | | |
| Log Contingent | 7.374 | .7940 |
| Log Non-Contingent | 8.701 | .7650 |
| Cont-Noncont Diff | -1.326 | .209 |
| Share of Contingent | .1952 | .0324 |
| 1980s | | |
| Log Contingent | 7.490 | .8744 |
| Log Non-Contingent | 8.8693 | .8136 |
| Cont-Noncont Diff | -1.378 | .210 |
| Share of Contingent | .189 | .0331 |
| 1990s | | |
| Log Contingent | 7.707 | 1.087 |
| Log Non-Contingent | 9.111 | .9601 |
| Cont-Noncont Diff | -1.404 | .271 |
| Share of Contingent | .1886 | .0397 |
| 2000s | | |
| Log Contingent | 7.619 | 1.091 |
| Log Non-Contingent | 9.046 | .9599 |
| Cont-Noncont Diff | -1.427 | .296 |
| Share of Contingent | .18640 | .0447 |

Notes. . This table shows the descriptive statistics for the logged number of contingent and non-contingent provisions by decade.

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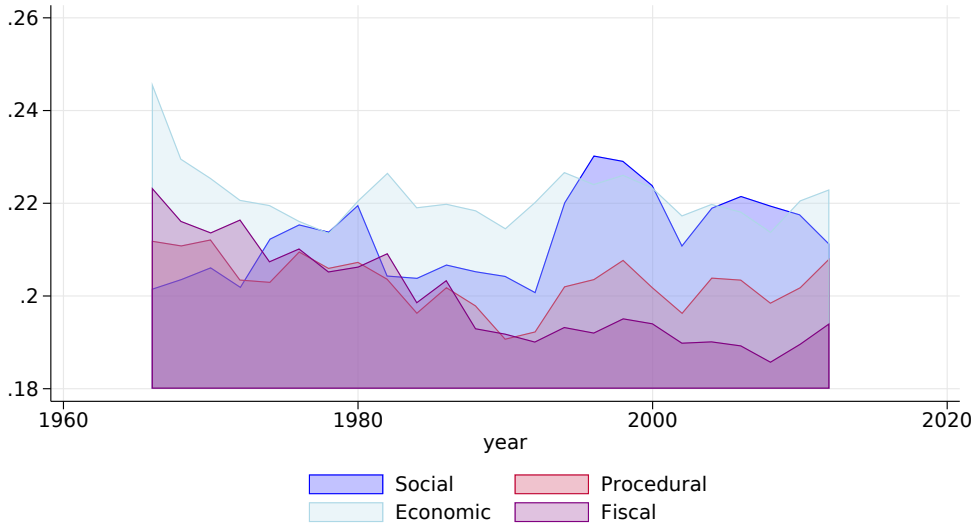
Figure A.10: Evolution of Contingent Language by Policy Category




Notes. This Figure shows the trends in the shares of contingent clauses by topic category (social, procedural, economic and fiscal) over time.

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# C Instrument Checks

Table A.10: Descriptive Statistics on Endogenous Regressor and Instrument, by Decade

| | Mean | Standard Deviation |
|---|---|---|
| 1960s | | |
| Shock to Legislation | .447 | 1.342 |
| Log Provisions | 9.08 | .8867 |
| 1970s | | |
| Shock to Legislation | -.1276 | 1.094 |
| Log Provisions | 9.023 | .7584 |
| 1980s | | |
| Shock to Legislation | .1469 | .875 |
| Log Provisions | 9.173 | .8073 |
| 1990s | | |
| Shock to Legislation | .127 | .7515 |
| Log Provisions | 9.402 | .9554 |
| 2000s | | |
| Shock to Legislation | -.4175 | .872 |
| Log Provisions | 9.334 | .9568 |

Notes. This table shows the descriptive statistics for the instrument and the endogenous regressor by decade.

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Table A.11: First Stage Estimates are Stable Over Time

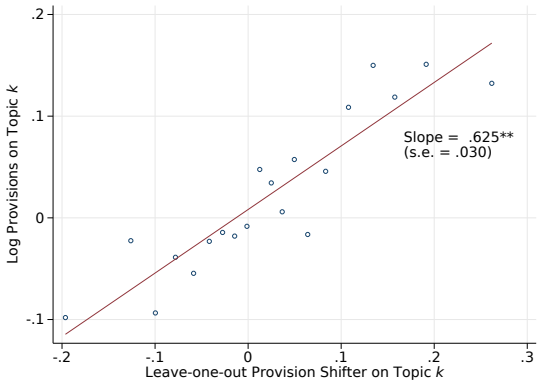
| | (1) | (2) | (3) |
|---|---|---|---|
| | Effect on Provisions | | |
| | 1960s-1970s | 1980s-1990s | 2000s |
| Shock to Legislative Output | -1.153** | -1.292** | -1.591** |
| | (0.391) | (0.0814) | (0.165) |
| Observations | 348 | 500 | 249 |
| State FE | X | X | X |
| Time FE | X | X | X |

Notes. **p<.01; *p<.05; +p<.1. This table shows the first stage regressions separately by time period.

Figure A.11: Decomposing First Stage Effects of Shift and Share Terms

(A) First-Stage Effect of Shifter

$$\Delta W_{st}^k \sim \sum_{r \neq s} \frac{\Delta \log W_{rt}^k}{49}$$




(B) First-Stage Effect of Share

$$\Delta W_{st}^k \sim \frac{W_{s0}^k}{W_{s0}}$$

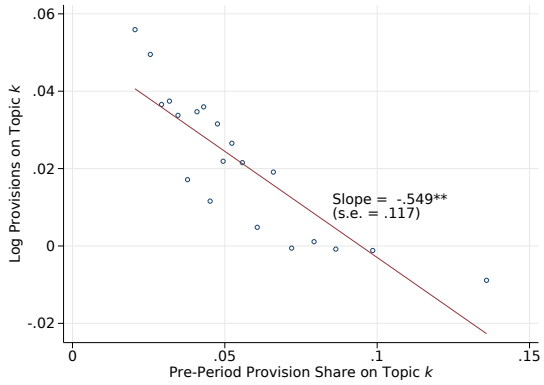


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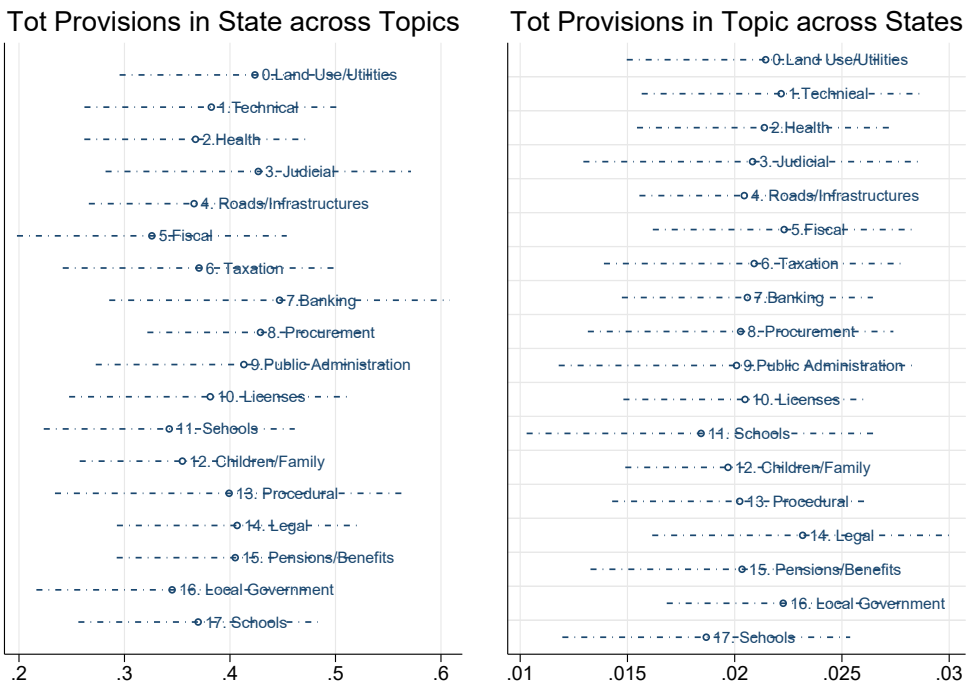
Figure A.12: All Topics Contribute to Instrument




Notes. To check that the relevance of the shift-share instrument is driven by a majority of topics, we regress the increase in provisions related to a topic in a state on the increase in the total provisions related to that topic across states and the increase in the legal provisions in that state, for every topic (including state and year fixed effects and clustering standard errors by state).

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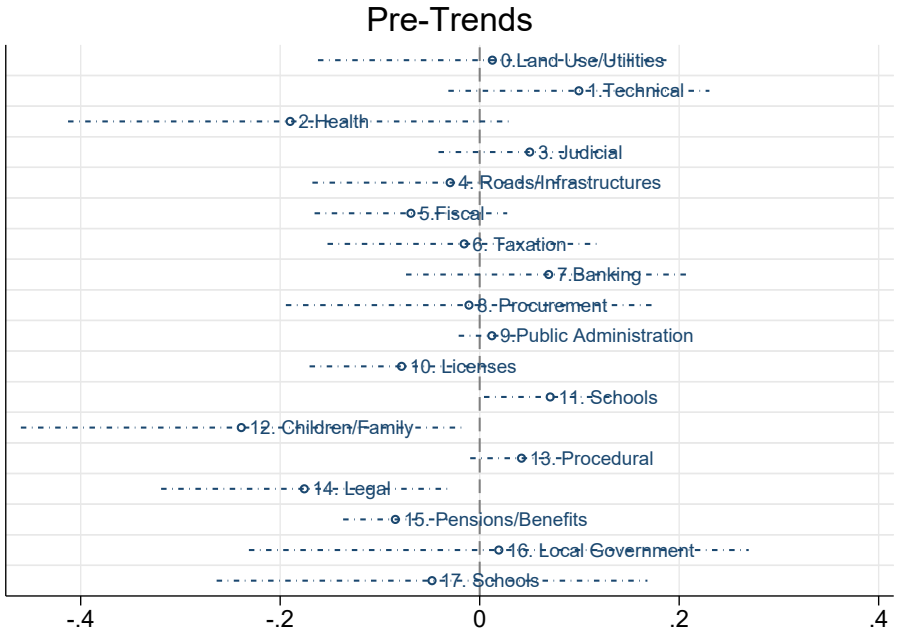
Figure A.13: Pre-Treatment Topic Shares do not predict Growth Trends




Notes. We plot the coefficients that show that pre-treatment topic shares are not correlated with growth trends. All specifications include biennium fixed effects and standard errors clustered at the state level.

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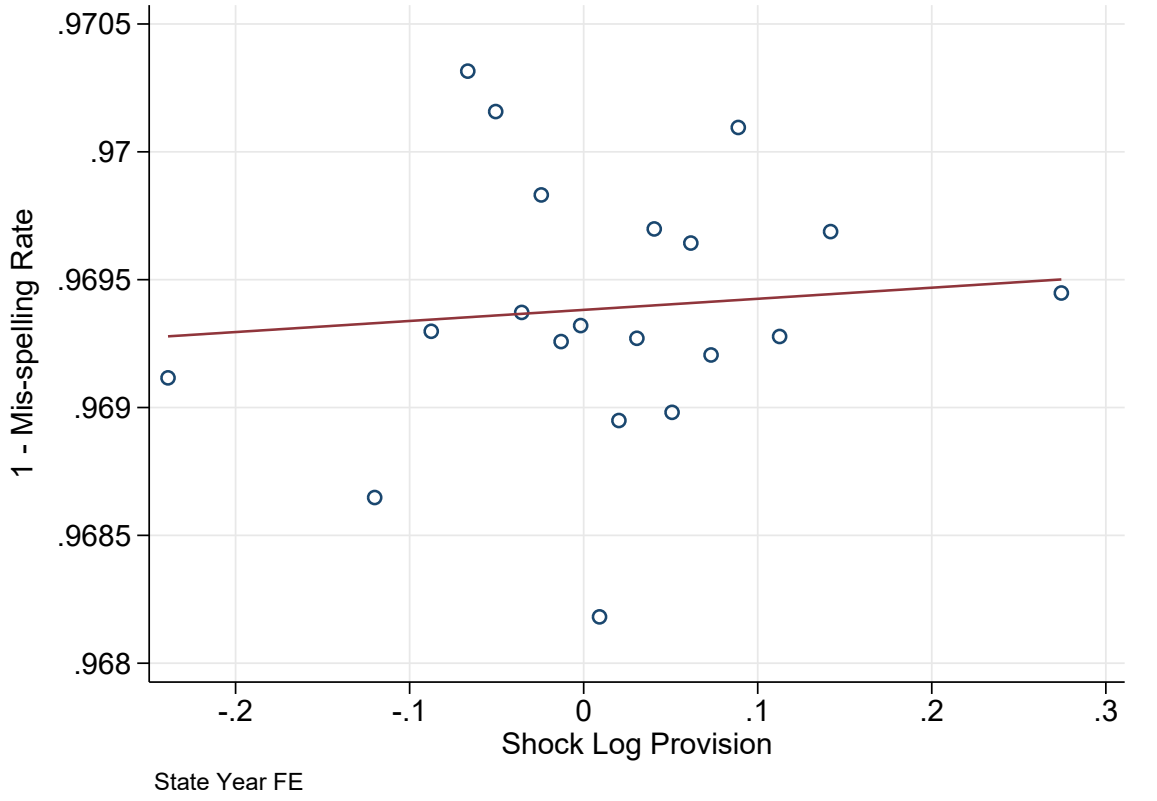
Figure A.14: Instrument is Uncorrelated with OCR Error Rate




Notes. The Figure shows that the correct spelling rate (computed as the proportion of common nouns that are found in the WordNet dictionary) is not correlated with the instrument.

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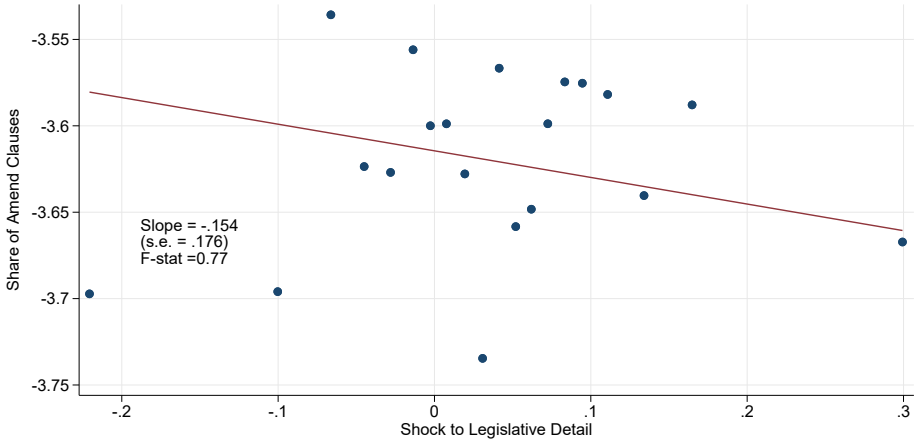
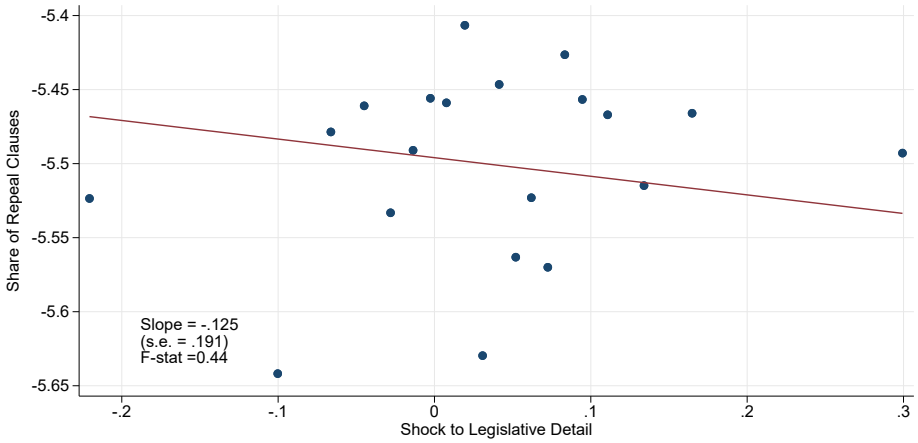
Figure A.15: Instrument is Uncorrelated with Share of Amending / Repealing Clauses

A. RF Effect of Instrument on Amending-Clause Share




B. RF Effect of Instrument on Repealing-Clause Share




Notes. Binned scatter plot of the relationship between the legislative output shock instrument and the share of sentences containing amendment language (Panel A) and the share of sentences containing repealing language (Panel B). These are defined as the presence of the patterns "amend*" and "repeal*", respectively, where * indicates any word suffix.

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Table A.12: Placebo Test: No Lead Effect of Legislative Output on Economic Growth

| | (1) OLS | (2) RF | (3) 2SLS |
|---|---|---|---|
| Lead Log Provisions | 0.00676 | 0.0174 | -0.0135 |
| | (0.00634) | (0.0164) | (0.0124) |
| Observations | 1132 | 1132 | 1132 |
| First Stage F-stat | . | . | 15.14 |
| State FE | X | X | X |
| Time FE | X | X | X |
| State Trends | X | X | X |

Notes. Column 1 shows the OLS estimate with state and biennium fixed effect, and controlling for state specific trends, as well as standard errors clustered by state. Column 2 and 3 shows the same but the reduced form and 2SLS estimates. **p<.01; *p<.05; +p<.1.

Table A.13: Instrument Uncorrelated with Initial Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Instrument | Instrument | Instrument | Instrument | PCA | PCA |
| Initial Share of Urban Pop | -0.021 | -0.0302 | | | | 0.688 |
| | (0.0386) | (0.0547) | | | | (3.277) |
| Initial Share of Foreign Pop | -0.0143 | 0.126 | | | | -12.04 |
| | (0.219) | (0.361) | | | | (18.01) |
| Initial Log Population | 0.079 | 0.165 | | | | 2.103 |
| | (0.0753) | (0.123) | | | | (4.902) |
| Initial Log Population$^2$ | -0.00552 | -0.0113 | | | | -0.159 |
| | (0.00503) | (0.00824) | | | | (0.316) |
| Initial Growth per Capita | | | 0.00559 | 0.0205 | 0.483 | |
| | | | (0.0251) | (0.0342) | (1.710) | |
| Sample (Years) | All | First Ten | All | First Ten | First | First |
| Observations | 1135 | 526 | 1183 | 548 | 50 | 48 |
| Time FE | X | X | X | X | X | X |

Notes. Columns 1 and 3 show the results for the instrument balance test, using the whole sample. Column 2 and 4 show the results using only the first 10 years. Columns 5 and 6 show the results for the balance test for the first principal component of the pre-treatment topic shares. All specifications are with biennium fixed effects, as well as standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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Table A.14: Instrument Balance Checks for Potential Confounders

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Govt Exp | Lagged Govt Exp | Leg Exp | Lagged Leg Exp | Taxes | Lagged Taxes | Party | Lagged Party |
| Instrument ($Z$) | 0.0523* | 0.00789 | 0.0339 | 0.0333 | 0.0318 | 0.0655 | 0.0296 | -0.0438 |
| | (0.0257) | (0.0326) | (0.0734) | (0.0748) | (0.0535) | (0.0797) | (0.187) | (0.256) |
| Observations | 1,183 | 1,133 | 1,183 | 1,133 | 1,183 | 1,133 | 1,123 | 1,110 |
| Time FE | X | X | X | X | X | X | X | X |

Notes. This table show the results for the balance test, regressing the instrument on the respective variables in each column: current general government expenditure, lagged general government expenditure, current legislative expenditure, lagged legislative expenditure, current tax revenue, lagged tax revenue, current Democratic party control of state government, and lagged Democratic party control. Budget variables are in logs. All specifications are with biennium fixed effects, as well as standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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# D Supporting Results

## D.1 Robustness Checks on the Main Results

Table A.15: Effect of Legislative Output on Economic Growth (OLS)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Growth Rate Per capita | | | | | | |
| Legislative Output | 0.0146+ | 0.0152 | 0.0140* | 0.0121* | 0.00401+ | 0.0154+ | 0.00558* |
| | (0.00832) | (0.0123) | (0.00608) | (0.00512) | (0.00237) | (0.00817) | (0.00233) |
| Observations | 1,182 | 1,182 | 1,182 | 1,182 | 1,134 | 1,182 | 1,086 |
| $R^2$ | 0.431 | 0.446 | 0.561 | 0.746 | 0.628 | 0.439 | 0.862 |
| Time FE | X | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X | X |
| State Trends | | X | | | | | X |
| Econ Vars × Time | | | X | | | | X |
| Sector Shares × Time | | | | X | | | X |
| Demog Vars × Time | | | | | X | | X |
| Topic Shares | | | | | | X | X |

Table A.16: Effect of Legislative Output on Economic Growth (Reduced Form)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Growth Rate Per Capita | | | | | | |
| Legislative Shock | -0.0200* | -0.0205* | -0.0169* | -0.0150* | -0.0132* | -0.0216* | -0.0118+ |
| | (0.00883) | (0.00940) | (0.00670) | (0.00660) | (0.00626) | (0.00832) | (0.00627) |
| Observations | 1,182 | 1,182 | 1,182 | 1,182 | 1,134 | 1,182 | 1,087 |
| $R^2$ | 0.420 | 0.440 | 0.552 | 0.739 | 0.629 | 0.430 | 0.855 |
| Time FE | X | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X | X |
| State Trends | | X | | | | | X |
| Econ Vars × Time | | | X | | | | X |
| Sector Shares × Time | | | | X | | | X |
| Demog Vars × Time | | | | | X | | X |
| Topic Shares | | | | | | X | X |

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Table A.17: Effect of Legislative Output on Economic Growth, Leads and Lags

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita (2SLS) | | | | | | | Reduced Form |
| Next Biennium | 0.00664 | 0.00426 | 0.0009 | | | | | |
| (Lead) | (0.468) | (0.613) | (0.859) | | | | | |
| Legislative Output | 0.0173* | 0.0161+ | 0.00834+ | 0.0176* | 0.0302 | 0.0160* | 0.0103* | -0.0238* |
| | (0.0498) | (0.0621) | (0.0620) | (0.0302) | (0.119) | (0.0305) | (0.0385) | (0.0114) |
| Last Biennium | | | | 0.00453 | 0.0146 | 0.00394 | 0.0033 | -0.0123+ |
| (Lag) | | | | (0.515) | (0.280) | (0.541) | (0.270) | (0.00683) |
| Two Bienniums Ago | | | | | 0.0128 | | | |
| (2nd Lag) | | | | | (0.319) | | | |
| First Stage F-stat | 8.596 | 10.17 | 12.06 | 9.026 | 0.962 | 10.68 | 19.94 | |
| Observations | 1,130 | 1,130 | 1,038 | 1,179 | 1,176 | 1,179 | 1,085 | 1,179 |
| State FE | X | X | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X | X | X |
| State Trends | | X | X | | | X | X | |
| Econ Vars × Time | | | X | | | | X | |
| Sector Shares × Time | | | X | | | | X | |
| Demog Vars × Time | | | X | | | | X | |
| Topic Shares | | | X | | | | X | |
| Lagged Govt Expend | | | X | | | | X | |

Notes. Columns 1, 2, and 3 show the results with the placebo lead and the contemporaneous effect together. Columns 4, 6, and 7 include together the lag and the contemporaneous effects. Column 5 includes two lag effects and the contemporaneous one together. Column 8 is the reduced form, where the indicated endogenous regressors are replaced with the associated instruments. Specification include state and biennium fixed effects, state specific trends, and additional covariates, as indicated. All specifications have standard errors clustered by state. **p<.01; *p<.05; +p<.1.

Table A.18: Effect of Laws on Growth (2SLS): Alternative Clustering of Standard Errors

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | | | | | |
| *Clustering* | *None (Robust SEs)* | | *Two-Way: State & Year* | | *Initial Topics (12)* | | *Initial Topics (16)* | | *Initial Topics (20)* | | AKM |
| Legislative Output | 0.0182* | 0.0168* | 0.0182* | 0.0168+ | 0.0182+ | 0.0168+ | 0.0182+ | 0.0168+ | 0.0182* | 0.0168+ | 0.0140* |
| | (0.00872) | (0.00808) | (0.00854) | (0.00879) | (0.00986) | (0.00921) | (0.00873) | (0.00856) | (0.00835) | (0.00804) | (0.00714) |
| First Stage F-stat | . | . | . | . | 19.06 | 19.30 | 20.24 | 19.81 | 19.52 | 19.46 | . |
| Observations | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 | 1,182 |
| Time FE | X | X | X | X | X | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X | X | X | X | X | |
| State Trends | | X | | X | | X | | X | | X | |

Notes. Columns 1 and 2 report the estimates for the effect of legislative output on growth per capita using robust standard errors. Columns 3 and 4 use standard errors clustered at the state and year level. Columns 5 to 10 use standard errors clustered at the initial topic level, with 12, 16 and 20 topics. All specifications include a first column with time and state fixed effects and a second column with the addition of state specific trends. Column 11 uses standard errors from the ivreg_ss command by Adao et al. (2019), using the default settings and initial share of topic 2 dropped due to collinearity and year fixed effects. For columns 1 to 4 the first stage F-stat is not generated because of the alternative clustering. **p<.01; *p<.05; +p<.1.

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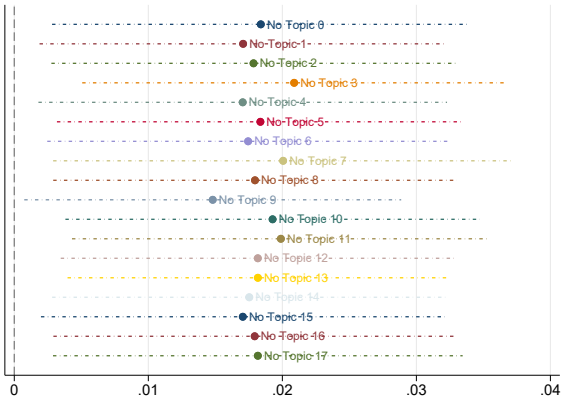
Table A.19: Effect of Legislative Output on Economic Growth - Topic Controls

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Effect on Growth per Capita | | | |
| | 2SLS | 2SLS | 2SLS | 2SLS |
| Legislative Output | 0.0182+ | 0.0168+ | 0.0182* | 0.0168+ |
| | (0.00905) | (0.00864) | (0.00903) | (0.00863) |
| Observations | 1182 | 1182 | 1182 | 1182 |
| First Stage F-stat | 22.78 | 22.11 | 22.84 | 22.17 |
| State FE | X | X | X | X |
| Time FE | X | X | X | X |
| State Trends | | X | | X |
| Frequent Topic Shares | X | X | | |
| PCA | | | X | X |

Notes. The table shows the results for baseline 2SLS estimate controlling for the share of the most frequent topics in columns 1 and 2, and for the first principal component in columns 3 and 4. All specifications have state and time fixed effect, and standard errors clustered by state. Column 2, 4 and 6 also control for state trends. **p<.01; *p<.05; +p<.1.

Figure A.16: 2SLS Results are not driven by any single topic




Notes: This is a coefficient plot showing the results of the main 2SLS model, with the instrument constructed by leaving one topic out at a time. State and time FE and clustered SE

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Table A.20: Effect of Legislative Output on Economic Growth - Different Number of Topics

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | |
| *Topic Number* | *6* | *12* | *24* | *30* | *36* | *42* | *48* |
| Legislative Output | 0.0150+ | 0.0158+ | 0.0168 | 0.0146+ | 0.0142+ | 0.0139+ | 0.0132 |
| | (0.00771) | (0.00823) | (0.0101) | (0.00834) | (0.00825) | (0.00760) | (0.00832) |
| Observations | 1182 | 1182 | 1182 | 1182 | 1182 | 1182 | 1182 |
| First Stage F-stat | 18.43 | 18.87 | 28.63 | 34.23 | 36.75 | 39.2 | 35.77 |
| State FE | X | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X | X |

Notes. The table shows the results for baseline 2SLS estimate where the instrument is constructed using different number of topics. All specifications have state and time fixed effects, and standard errors clustered by state. **p<.01; *p<.05; +p<.1.

Table A.21: Effect of Laws on Growth – Adjusting for Words or Pages

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | |
| Legislative Output | | | 0.0663 | 0.0203+ |
| | | | (0.0632) | (0.0105) |
| Log Word Count | 0.0154 | 0.0146 | -0.0529 | |
| | (0.00933) | (0.00901) | (0.0635) | |
| Log Page Count | | | | -0.0103 |
| | | | | (0.00768) |
| First Stage F-stat | 12.45 | 12.35 | 5.765 | 20.70 |
| Observations | 1,182 | 1,182 | 1,182 | 1,182 |
| State FE | X | X | X | X |
| Time FE | X | X | X | X |
| State-Specific Trends | | X | X | X |

Notes. Columns 1 and 2 report the results for the effect of log of words on growth per capita. Column 3 and 4 report the effect of legislative output on growth per capita controlling for the log of the number of words and pages respectively. All specifications have state and time fixed effect, and standard errors clustered by state. Column 2 to 4 also controls for state trends. **p<.01; *p<.05; +p<.1.

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Table A.22: Main Results, Controlling for Amend/Repeal Share

| | Effect on Growth Rate Per capita | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Legislative Output | 0.0185* | 0.0174* | | | 0.0184+ | 0.0176* | | |
| | (0.00911) | (0.00845) | | | (0.00920) | (0.00844) | | |
| Cont - Non-Cont | | | 0.0663** | 0.0645** | | | 0.0630** | 0.0613** |
| | | | (0.0216) | (0.0211) | | | (0.0202) | (0.0202) |
| First Stage F-stat | 23.09 | 23.97 | 23.49 | 33.50 | 19.91 | 23.10 | 25.13 | 34.97 |
| Observations | 1,156 | 1,156 | 1,156 | 1,156 | 1,156 | 1,156 | 1,156 | 1,156 |
| State FE | X | X | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X | X | X |
| Amend Share | X | X | X | X | | | | |
| Repeal Share | | | | | X | X | X | X |
| State Trends | | X | | X | | X | | X |

Notes. This table shows robustness specifications controlling for the current share of amending clauses (Columns 1-4) and share of repealing clauses (Columns 5-8). All specifications are with state and biennium fixed effects, as well as standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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## D.2 Relevance of Campaign Finance and Interest Groups

Table A.23: Controlling for Campaign Finance Rules

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Effect on Growth Rate Per Capita | | | |
| | 2SLS | 2SLS | 2SLS | 2SLS |
| Legislative Output | 0.0258* | 0.0245* | | |
| | (0.0128) | (0.0104) | | |
| Contingent - Non-Contingent | | | 0.0479* | 0.0616** |
| | | | (0.0230) | (0.0229) |
| Observations | 870 | 870 | 870 | 870 |
| First Stage F-stat | 6.779 | 11.63 | 37.02 | 29.68 |
| State FE | X | X | X | X |
| Time FE | X | X | X | X |
| Camp. Fin. Rules X Time FE | X | X | X | X |
| State-Specific Trends | | X | | X |

Notes. **p<.01; *p<.05; +p<.1. Regression results controlling for an index for limits on campaign contributions to state races, interacted with time. Smaller sample size is due to some missing years with campaign finance rules data.

Interest groups play a crucial role in proposing and implementing legislation (Bombardini and Trebbi, 2020). If the political system is open to more types of interest groups, then more diverse proposals will get to legislators. Moreover, interest groups' pressure might also influence the implementation of legislation.

To check whether our results are driven by interest groups, we gathered data on the legislation regulating campaign finance contributions. We inspected the Book of States for the years 1952-2000 and coded whether contributions are restricted/prohibited for everyone, restricted/prohibited for some organizations (e.g., corporations or labor unions), or unlimited for everyone. We encode this as a categorical variable in our dataset.

Table A.23 shows the results for our baseline specification and for contingencies when controlling for the campaign finance index fixed effects, interacted with biennium fixed effects. This specification controls flexibly and allows our effects to be different over time depending on these rules. Results are robust and estimates are similar to

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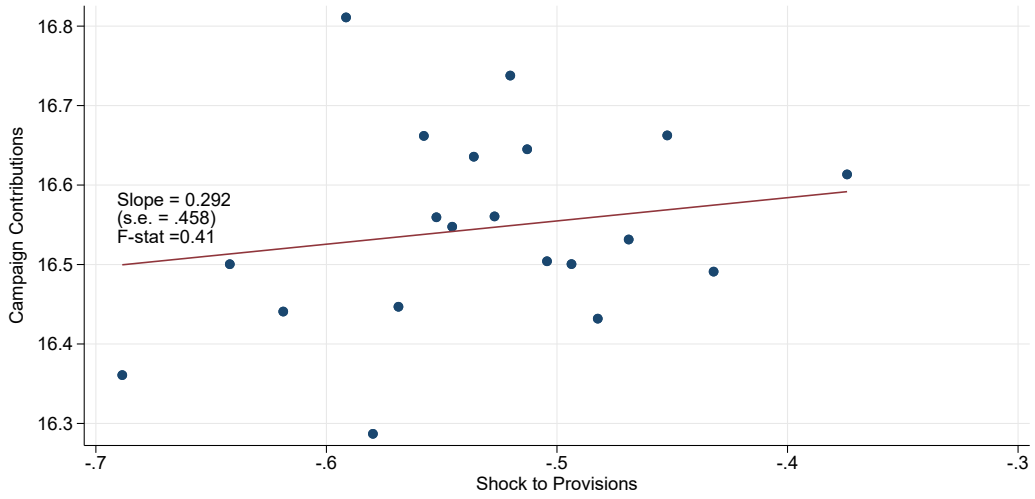
Figure A.17: Legislation Instrument Does Not Affect Campaign Contributions




Notes. Binscatter diagram of campaign donations to state politicians with the legislative-shock shift-share instrument, for the years 2000-2010 (years for which the campaign donations data is available).

those from the main models, suggesting that our results are not driven by lobbying efforts.

As an additional check, we collected information on campaign contributions to candidates for state government offices. This data is available on a set of web pages at `followthemoney.org`, for elections since the year 2000. We built a programmatic web scraper to collect all of these data and summed them by state and biennium. We then linked it to our main dataset for 2000-2010. Figure A.17 shows that our instrument has no linear effect on these contributions, suggesting that they are not an important mediator for the estimated effects on growth.

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## D.3 Effects of Legislative Output on Other Outcomes

Table A.24: Effect of Legislative Output on Additional Economic Variables

| | (1) GDP (Total) | (2) Population | (3) Employment | (4) Profits | (5) Labour Inc | (6) Establishments |
|---|---|---|---|---|---|---|
| Legislative Output | 0.0199+ | -0.00193 | 0.00481 | 0.0486+ | 0.0106+ | -0.00877+ |
| | (0.0102) | (0.00240) | (0.0119) | (0.0244) | (0.00536) | (0.00485) |
| First Stage F-stat | 22.81 | 22.81 | 14.84 | 181.3 | 22.81 | 14.84 |
| Observations | 1183 | 1183 | 821 | 549 | 1183 | 821 |
| State FE | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X |

Notes. Results for the 2SLS model (Second Stage 1 and First Stage 3) but with different outcome variables. Column 1 explores the effect on state GDP (not per capita). Column 2 shows there is no effect on population. Column 3 uses employment while column 4 looks at firm profits (value added) within the state. Column 5 looks at labour income and Column 6 establishment growth. All specifications include state and biennium fixed effects. Standard errors clustered by state. **p<.01; *p<.05; +p<.1.

Table A.25: Effect of Legislative Output on Additional Economic Variables II

| | (1) Small Est | (2) Med Est | (3) Large Est | (4) Profit / Worker | (5) Large Est Ratio | (6) Large/Small Est Ratio |
|---|---|---|---|---|---|---|
| Legislative Output | -0.00465 | 0.00896 | 0.0172 | 0.0296 | -8.49e-06 | -4.78e-06 |
| | (0.00486) | (0.00993) | (0.0315) | (0.0188) | (0.000137) | (0.000429) |
| First Stage F-stat | 14.84 | 14.84 | 14.84 | 181.3 | 14.84 | 14.84 |
| Observations | 821 | 821 | 821 | 549 | 821 | 821 |
| State FE | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X |

Notes. This table reports 2SLS estimates on a range of additional outcomes, showing that new provisions do not not affect the average firm size or profit per worker. All specifications include state and biennium fixed effect in the first column with the addition of state trends in the second column. Standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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Table A.26: Legislative Output Shocks Do Not Affect Spending, Taxes, or Political Control

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Govt Spending | | Legis Spending | | Taxes | | Dem Control | |
| Model | RF | 2SLS | RF | 2SLS | RF | 2SLS | RF | 2SLS |
| Legislative Output | 0.0408 | -0.0371 | 0.0339 | -0.0309 | 0.0272 | -0.0248 | 0.0296 | -0.0268 |
| | (0.0354) | (0.0326) | (0.0734) | (0.0620) | (0.0587) | (0.0524) | (0.187) | (0.172) |
| Observations | 1183 | 1183 | 1183 | 1183 | 1183 | 1183 | 1123 | 1123 |
| First Stage F-Stat | . | 22.81 | . | 22.81 | . | 22.81 | . | 21.85 |
| State FE | X | X | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X | X | X |

Notes. RF and 2SLS effects on other outcomes. There is no effect on government spending, legislative spending, taxes, or political control. All specifications include state and biennium fixed effects and have standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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## D.4 Relevance of Regulations and Caselaw

The analysis in this paper has focused on the state session laws – the legislation or statutes enacted by state legislatures to be added to the statutory code. There are two major additional sources of rules for governing the state economy: state regulations and state caselaw.

First, there are the regulations that bureaucratic agencies enact to help implement statutes. These are often much more detailed than statutes. For example, Davis (2017) documents that in the case of the U.S. federal government, regulatory texts dwarf the legislative texts in volume and complexity. McLaughlin and Sherouse (2017) look at the particular case of the Dodd-Frank Act, which by itself resulted in tens of thousands of provisions to be added to the corpus of federal regulations. Federal regulations could be having an important economic impact at the state level, and the states themselves also issue regulations.

Second, the judiciary has an important role in economic governance. First, legislation and regulations have to be interpreted by judges for enforcement. When a regulator challenges a company action, or companies file suit against each other, the state courts are there to adjudicate and also to issue opinions clarifying legal rules. In a common law system like the United States, moreover, judges are often responsible for the rules themselves (e.g. Gennaioli and Shleifer, 2007). For example, Autor et al. (2007) shows that common-law rules on wrongful discharge had effects on employment and firm structure in U.S. states (see also MacLeod and Nakavachara, 2007).

It could be that our main approach, focusing on legislation, leaves out some growth-relevant legal features in these other legal domains. In particular, it could be that our instrument affects growth not just through its effect on legislation, but also through its effect on regulations or caselaw. That would be a violation of the exclusion restriction and call into question the causal interpretation of the 2SLS regressions.[16]

To address these issues, we collected three additional measures of state-level legal output. We built two new corpora on state laws – a corpus of recent state regulations, and a corpus of state appellate court cases, both from Lexis Nexis. Third, we have a measure of the intensity of federal regulations across states from McLaughlin and Sherouse (2016).

**State Regulations.** We gained access to the proprietary State Net Regulatory

[16]The reduced-form regressions would still be causal, but difficult to interpret since it is a shift-share instrument whose units do not have a clear economic meaning.

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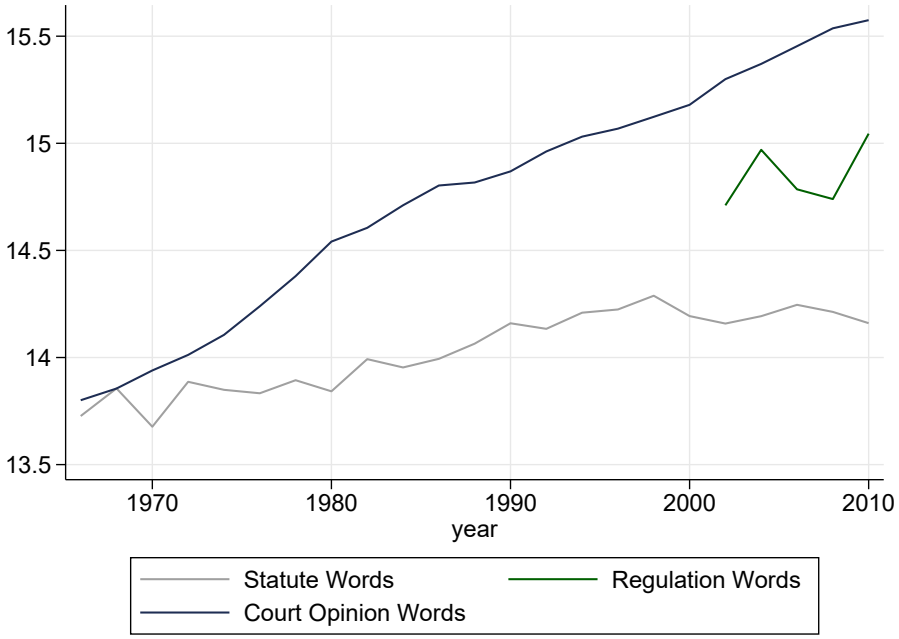
Figure A.18: Comparison of Legal Volume in U.S. States: Statutes, Regulations, and Court Opinions




Notes. This figure shows the time series of the log word counts (average across states by biennium) for statutes (gray), regulations (green) and court opinions (black). See text for additional details on data sources.

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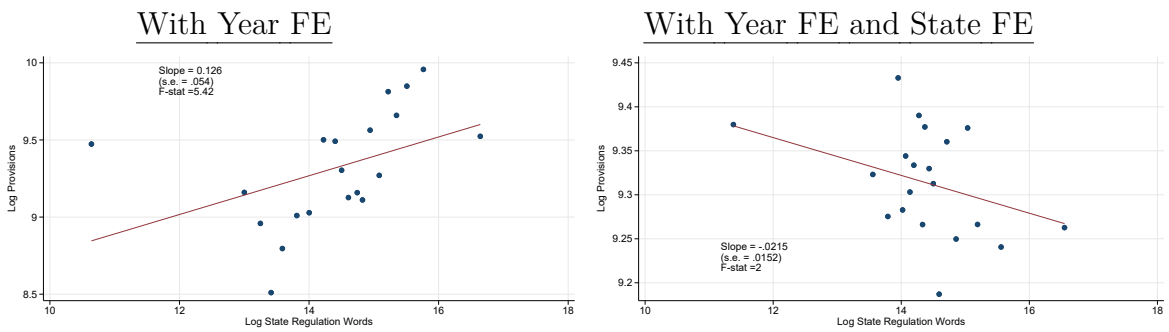
Figure A.19: State Legislation and State Regulations




Notes. The relationship between logged number of provisions and logged state regulation words, controlling for year FE (left panel) and state and year FE (right panel). SE clustered at state level.

Text corpus from Lexis Nexis. This is a corpus of regulatory activity by state, available for some states starting in 1998 and most states starting in 1999, with complete coverage starting in 2002, up until 2017. It contains a rich collection of records corresponding to regulatory actions, for example new tax rules issued by state tax agencies. The database contains 20GB of XML files, which we processed to extract the regulatory text content. The processed corpus contains 642 thousand documents, adding up to 1.8 billion words. We computed the log word counts in regulations by state-biennium and merged them to our main dataset (through 2010). Figure A.18 plots the average log biennium word counts in regulations across states in the green time series. In the gray time series, we have for comparison the average log biennium word counts in statutes (the state session laws) across states. The regulation word count is about .7 to .9 higher in log scale, reflecting that the volume of regulations is about double the volume of statutes.

Figure A.19 shows binscatter plots relating regulatory output to legislative output. In the cross section (left panel), there is a positive and statistically significant effect. Intuitively, states with more complex legislation also have more complex regulations. When adding in state fixed effects and looking at within-state changes in legislative / regulatory flows, the slope flips sign and is no longer significant.

Table A.27 shows the reduced-form effect of our legislative shock on state regulations. Reassuringly, there is no effect. This means that regulatory detail is likely not a major mediator between our instrument and economic growth. Further, adding recent regulatory detail, averaged by state, and then interacted with time FE, does not change our results (Table A.28).

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Table A.27: Reduced Form Effect of Legislation Instrument on State Regulatory Output

| | (1) | (2) |
|---|---|---|
| | Effect on State Regs | |
| Shock to Legislation | -0.256 | 0.116 |
| | (1.053) | (0.949) |
| Observations | 329 | 329 |
| State FE | X | X |
| Time FE | X | X |
| State-Specific Trends | | X |

Notes. The table shows the results of regressing the logged state regulation word count on the instrument. **p<.01; *p<.05; +p<.1.

Table A.28: Controlling For State Regulation, Interacted with Time FE

| | (1) | (2) |
|---|---|---|
| | Effect on Growth per Capita | |
| | 2SLS | 2SLS |
| Legislative Output | 0.0190+ | |
| | (0.0103) | |
| Contingent - Non-Contingent | | 0.0778** |
| | | (0.0256) |
| Observations | 1,182 | 1,182 |
| First Stage F-stat | 20.06 | 22.35 |
| State FE | X | X |
| Time FE | X | X |
| State Reg x Time | X | X |

Notes: Main 2SLS results controlling for a state's state regulation in 2002-2010, interacted with time.

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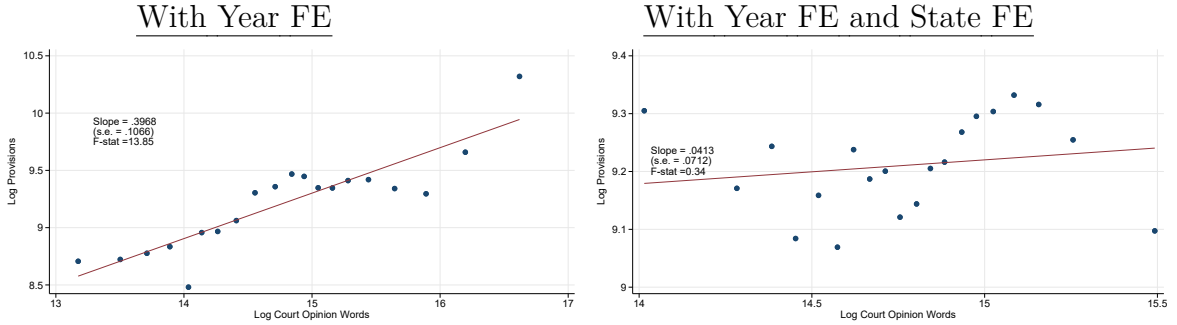
Figure A.20: Log Provisions and Log Court Opinion Words




Notes. The relationship between logged number of provisions and logged state court opinion words, controlling for year FE (left panel) and state and year FE (right panel). SE clustered at state level.

**Case Law.** The second part of the legal process to explore is the judiciary. We gained access to the corpus of state appellate court opinions from LexisNexis. This corpus contains opinions from state intermediate and high courts from their inception, with the earliest opinion from 1658 and the latest in 2017. These cases are common-law decisions which can interpret statutes/regulations, apply precedents to new cases, or make new precedents. The raw dataset is 230GB of XML files, which we processed to extract the opinion texts. The processed corpus contains 9.7 million written opinions, adding up to 10.5 billion words. We computed the log word counts in cases by state-biennium and merged them to our main dataset. Figure A.18 plots the average log biennium word counts in court opinions across states in the black time series. We can see that at the beginning of the sample, the volume of text was similar between statutes (gray series) and caselaw. But over the last decades, the volume of caselaw has increased more rapidly, such that in recent years the caselaw word count is about 1.3 higher on a log scale.

Figure A.20 shows the descriptive relationship between legislative volume and the volume of laws from courts. As with regulations, in the cross-section there is a positive and statistically significant relationship. This reflects that states with more legislation also have more published court opinions. In the panel, there is still a positive relationship but it is no longer statistically significant. Changes in legislative text flows are not strictly related to changes in judicial text flows.

Table A.29 shows the reduced form effect of the legislative instrument on judicial opinion text volume. Unlike with the regulations, there is a small positive effect of the instrument on court output, but only when including state trends. However, we

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Table A.29: Reduced Form Effect of Legislation Instrument on Judicial Opinion Output

| | (1) | (2) |
|---|---|---|
| | Effect on Growth per Capita | |
| | State Court Opinion Words | State Court Opinion Words |
| Shock to Legislative Output | -0.00632 | 0.0676+ |
| | (0.0807) | (0.0353) |
| Observations | 1,183 | 1,183 |
| State FE | X | X |
| Time FE | X | X |
| State-Specific Trends | | X |

Notes. The table shows the results of regressing the logged state court case word count on the instrument. **p<.01; *p<.05; +p<.1.

ran our main specifications controlling for the measure of judicial text output (Table A.30) and the results are identical. Further, we found that results are similar when we control for number of cases, number of opinions, and average number of words per opinion. Overall, these results suggest that caselaw is not an important mediator for our economic-growth results.

Finally, we would like to net out any influence of the federal judicial system. For this purpose, we allow for separate trends by federal judicial circuit – groups of 3-7 states that share a federal circuit court (the intermediate court below the U.S. Supreme Court). Table A.31 shows the main results after adding circuit-year interacted fixed effects. Results are robust and estimates are very similar to those from the main models.

**FRASE Index for Federal Regulation.** We add in information on the FRASE index from McLaughlin and Sherouse (2016). FRASE (Federal Regulation and State Enterprise) measures the impact of federal regulation on the private-sector industries in each state's economy. Cross-state variation is given by the differences in industry composition. Hence, a state's FRASE score represents the degree of impact federal regulations have on a state's economy relative to federal regulations' impact on the national economy.

FRASE is available only for recent years. Figure A.21 shows a positive relationship between state statutory legislation and FRASE in these overlapping years, but that relationship is not statistically significant. Table A.32 shows that the shift-share instrument for legislation has no effect on FRASE, suggesting that federal regulations

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Table A.30: Controlling for Legal Detail in State Court Opinions

| | (1) | (2) |
|---|---|---|
| | Effect on Growth per Capita | |
| | 2SLS | 2SLS |
| Legislative Output | 0.0166+ | |
| | (0.00864) | |
| Contingent - Non-Contingent | | 0.0695** |
| | | (0.0230) |
| Observations | 1,182 | 1,182 |
| First Stage F-stat | 22.18 | 36.57 |
| State FE | X | X |
| Time FE | X | X |
| Court Opinion | X | X |
| State Trends | X | X |

2SLS results when controlling for logged state court opinion words. Notes. . **p<.01; *p<.05; +p<.1.

Table A.31: Federal Judicial Circuits

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Effect on Growth per Capita | | | |
| | 2SLS | 2SLS | 2SLS | 2SLS |
| Legislative Output | 0.0110* | 0.0163* | | |
| | (0.00446) | (0.00792) | | |
| Contingent - Non-Contingent | | | 0.0495+ | 0.0576* |
| | | | (0.0274) | (0.0259) |
| Observations | 1,180 | 1,180 | 1,180 | 1,180 |
| First Stage F-stat | 17.78 | 67.95 | 9.349 | 14.44 |
| CircuitxTime FE | X | X | X | X |
| State FE | | X | | X |

Notes. 2SLS results when controlling for circuit-year fixed effects. **p<.01; *p<.05; +p<.1.

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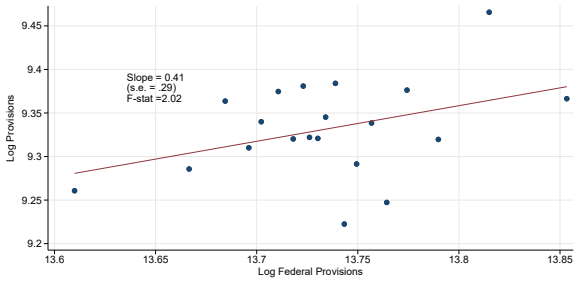
Figure A.21: Statutory Legislation and FRASE Federal Regulation Index




Notes. The relationship between logged number of provisions and logged state regulation words, controlling for year FE (left panel) and state and year FE (right panel). SE clustered at state level.

Table A.32: Effect of Legislative Shock on FRASE Federal Regulation Index

| | (1) | (2) |
|---|---|---|
| | Fed Reg | Fed Reg |
| Shock to Legislation | -0.0182 | 0.000935 |
| | (0.0218) | (0.0225) |
| Observations | 385 | 385 |
| State FE | X | X |
| Time FE | X | X |
| State-Specific Trends | | X |

Notes. The table shows the results of regressing the (logged) FRASE index on the instrument. All models include standard errors clustered at state level. **p<.01; *p<.05; +p<.1.

are not an important mediator for the main effects.

To control for FRASE in the whole sample, we average it by state across years and interact it with time fixed effects. Table A.33 shows the main results of the paper, controlling for FRASE interacted with time effects. Results are robust and the coefficient estimates are very similar to those from the main model.

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Table A.33: Adjusting for FRASE Federal Regulation Index

| | (1) | (2) |
|---|---|---|
| | 2SLS | 2SLS |
| Legislative Output | 0.0143+ | |
| | (0.00765) | |
| Contingent - Non-Contingent | | 0.0638** |
| | | (0.0214) |
| Observations | 1,182 | 1,182 |
| First Stage F-stat | 21.67 | 29.50 |
| State FE | X | X |
| Time FE | X | X |
| Fed Reg x Time | X | X |

Notes. 2SLS results when controlling for a state's FRASE index interacted with year FE . **p<.01; *p<.05; +p<.1.

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## D.5 Additional Material for Contingency

Table A.34: Effect of Contingency, Additional Specifications

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | |
| Contingent - | 0.0617* | 0.0677** | 0.120** | 0.0637* | 0.0642 |
| Non-Contingent | (0.0230) | (0.0215) | (0.0377) | (0.0275) | (0.0390) |
| First Stage F-stat | 31.67 | 38.33 | 22.6 | 33.61 | 15.24 |
| Observations | 1133 | 1122 | 1182 | 1132 | 1086 |
| Time FE | X | X | X | X | X |
| State FE | X | X | X | X | X |
| State Trends | X | X | X | X | X |
| Lagged Govt Exp | X | | | | X |
| Democrat Control | | X | | | X |
| Topic Shares | | | X | | X |
| Control for Lagged y | | | | X | X |
| Econ Vars × Time | | | | | X |
| Sector Shares × Time | | | | | X |
| Demog Vars × Time | | | | | X |

Notes. Effect of the difference in contingent and non-contingent clauses – 2SLS estimates. All specifications include time and state fixed effects, control for state trends and use standard errors clustered at the state level. Column 1 controls for lagged government expenditure. Column 2 controls for democratic control over the state. Column 3 includes the topic shares among the controls. Column 4 includes the lagged dependent variable. Column 5 includes all the aforementioned controls, adding the trends of economics variables, sector shares and demographic variables. **p<.01; *p<.05; +p<.1.

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Table A.35: Effect of Contingencies on Additional Economic Variables

| | (1) GDP (Total) | (2) Population | (3) Employment | (4) Profits | (5) Labour Inc | (6) Establishments |
|---|---|---|---|---|---|---|
| Contingent | 0.0771** | 0.0192* | 0.00445 | 0.186 | 0.0517+ | -0.00516 |
| | (0.0240) | (0.00944) | (0.0312) | (0.119) | (0.0271) | (0.0131) |
| Non-Contingent | -0.0694** | -0.0240+ | -0.000140 | -0.181 | -0.0480+ | -0.00201 |
| | (0.0256) | (0.0121) | (0.0315) | (0.137) | (0.0283) | (0.0159) |
| First Stage F-stat | 22.27 | 22.27 | 36.52 | 16.24 | 22.27 | 36.52 |
| Observations | 1183 | 1183 | 821 | 549 | 1183 | 821 |
| State FE | X | X | X | X | X | X |
| Time FE | X | X | X | X | X | X |

Notes. Results for the 2SLS model with contingent and non-contingent clauses but with different outcome variables. Column 1 explores the effect on state GDP (not per capita). Column 2 shows there is no effect on population. Column 3 uses employment while Column 4 looks at firm profits (value added) within the state. Column 5 looks at labour income and Column 6 establishment growth. All specifications include state and biennium fixed effects. Standard errors clustered by state. **p<.01; *p<.05; +p<.1.

Table A.36: Effect of Contingent and Non-Contingent Clauses by Themselves

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | |
| Contingent Provisions | 0.0199* | 0.0185* | 0.0443 | | | 0.0018 |
| | (0.00797) | (0.00771) | (0.0575) | | | (0.0970) |
| Non-Contingent Provisions | | | -0.0326 | 0.0166+ | 0.0153+ | 0.0133 |
| | | | (0.0705) | (0.00839) | (0.00794) | (0.110) |
| First Stage F-stat | 43.2 | 26.34 | 20.51 | 22.26 | 22.12 | 6.318 |
| Observations | 1182 | 1182 | 1182 | 1182 | 1182 | 1182 |
| Time FE | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X |
| State Trends | | X | X | | X | X |
| Contingency Control | | | X | | | |
| Non-Contingency Control | | | | | | X |

Notes. Additional contingency 2SLS specifications. There is an effect for contingent clauses by themselves, and a weaker effect of non-contingent clauses by themselves.

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## D.6 Additional Material on Concavity and Uncertainty

Table A.37: Concavity: Effect of Provisions on Growth by Recent Detail Level

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | |
| Recent Legal Detail | *Low* | | | *Medium* | | *High* | |
| 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 |

Notes. Results for the 2SLS model (Second Stage 1 and First Stage 3), splitting up the data by terciles in recent legislative output (previous five biennia). Columns 1 through 3 report results for states with lower tercile recent legislative output. Columns 4 and 5 report results for those with average recent legislative output and Columns 6 and 7 states with recent legislative output in the higher tercile. All specifications include a first column with time and state fixed effects and a second column with the addition of state specific trends. **p<.01; *p<.05; +p<.1.

Table A.38: Cross-Tabulation: Terciles in Recent Detail and Economic Policy Uncertainty

| | Terciles in Economic Uncertainty | | | |
|---|---|---|---|---|
| Terciles in Recent Detail | 1st | 2nd | 3rd | Total |
| 1st | 83 | 125 | 164 | 372 |
| 2nd | 107 | 121 | 142 | 370 |
| 3rd | 179 | 130 | 79 | 388 |
| Total | 369 | 376 | 385 | 1130 |

Notes. This table shows that recent detail (concavity) and economic policy uncertainty recover different dimensions in the dataset.

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Table A.39: Concavity Effects, with Residualized Previous Detail Ranking

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | |
| *Recent Detail* | *Low* | | | *Medium* | | *High* | |
| Legislative Output | 0.0220+ | 0.018 | | 0.0141 | 0.0211 | 0.00703 | 0.0173 |
| | (0.0121) | (0.0113) | | (0.0122) | (0.0168) | (0.0178) | (0.0237) |
| Contingent - Non-Contingent | | | 0.0889* | | | | |
| | | | (0.0403) | | | | |
| First Stage F-stat | 54.34 | 55.89 | 12.68 | 37.54 | 35.24 | 77.57 | 109.2 |
| Observations | 389 | 389 | 389 | 389 | 389 | 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 |

Notes. The main concavity results, but the previous detail variable is residualized on state and year fixed effects before making the ranking. Columns 1, 2 and 3 report results for states with lower tercile recent legislative output. Columns 4 and 5 report results for those with average recent legislative output and Columns 6 and 7 states with recent legislative output in the higher tercile. All specifications include a first column with time and state fixed effects and a second column with the addition of state specific trends. **p<.01; *p<.05; +p<.1.

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## Table A.40: Uncertainty Effects, with Residualized Uncertainty Ranking

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | | | | |
| Economic Uncertainty | Low | | Medium | | High | | | | | |
| Legislative Output | 0.0201 | | 0.0146 | | 0.0191 | 0.0199+ | | | | |
| | (0.0152) | | (0.0211) | | (0.0132) | (0.0102) | | | | |
| Contingent Provisions | | | | | | | 0.0624 | 0.0637 | | |
| | | | | | | | (0.0561) | (0.0759) | | |
| Non-Contingent Provisions | | | | | | | -0.0508 | -0.0522 | | |
| | | | | | | | (0.0676) | (0.0857) | | |
| Contingent - Non-Contingent | | 0.0275 | | 0.0613 | | | | | 0.0847+ | 0.113+ |
| | | (0.0613) | | (0.0547) | | | | | (0.0470) | (0.0588) |
| First Stage F-stat | 39.95 | 3.998 | 2.42 | 9.512 | 6.721 | 257.2 | 3.578 | 4.873 | 6.87 | 9.285 |
| Observations | 362 | 362 | 381 | 381 | 355 | 355 | 355 | 355 | 355 | 355 |
| Time FE | X | X | X | X | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X | X | X | X | X |
| State Trends | | | | | | X | | X | | X |

Notes. The main economic policy uncertainty results, but the uncertainty variable is residualized on state and year fixed effects before making the ranking. Columns 1-2 show results for states with lowest tercile uncertainty. Columns 3-4 report results for those with median uncertainty while Columns 5-10 states with uncertainty in the higher tercile. All specifications include state and biennium fixed effects, while for High Uncertainty states, results controlling for state specific trends are also included (as indicated). **p<.01; *p<.05; +p<.1.

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Table A.41: Uncertainty Effects, with Lagged Economic Growth Control

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | | |
| Economic Uncertainty | Low | Medium | High | | | | |
| Legislative Output | -0.0136 | 0.00796 | 0.0445* | | | | |
| | (0.0115) | (0.0112) | (0.0169) | | | | |
| Contingent Provisions | | | | 0.142* | 0.151* | | |
| | | | | (0.0567) | (0.0703) | | |
| Non-Contingent Provisions | | | | -0.126+ | -0.131 | | |
| | | | | (0.0641) | (0.0804) | | |
| Contingent - | | | | | | 0.185** | 0.202** |
| Non-Contingent | | | | | | (0.0463) | (0.0601) |
| Lagged Growth P.C. | 0.454** | 0.443** | 0.186** | 0.190** | 0.172** | 0.206** | 0.172** |
| | (0.0840) | (0.0616) | (0.0616) | (0.0511) | (0.0588) | (0.0588) | (0.0625) |
| First Stage F-stat | 48.45 | 3.599 | 24.33 | 8.971 | 8.198 | 9.488 | 9.484 |
| Observations | 335 | 348 | 363 | 363 | 363 | 363 | 363 |
| Time FE | X | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X | X |
| State Trends | | | | | X | | X |

Notes. The main uncertainty results, but adding lagged growth per capita as a control. Columns 1-2 show results for states with lowest tercile uncertainty. Columns 3-4 report results for those with median uncertainty while Columns 5-10 states with uncertainty in the higher tercile. All specifications include state and biennium fixed effects, while for High Uncertainty states, results controlling for state specific trends are also included (as indicated). **p<.01; *p<.05; +p<.1.

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Table A.42: Effects when Splitting by Terciles in Recent Growth

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Effect on Real GDP Growth Per Capita | | | | | |
| Recent Growth in State | Low | | Medium | | High | |
| Legislative Output | 0.0409* | | -0.00129 | | 0.00924 | |
| | (0.0157) | | (0.00964) | | (0.00878) | |
| Contingent - | | 0.113* | | 0.00672 | | 0.0812+ |
| Non-Contingent | | (0.0456) | | (0.0391) | | (0.0431) |
| First Stage F-stat | 30.39 | 7.111 | 6.480 | 11.43 | 3.658 | 8.572 |
| Observations | 347 | 347 | 370 | 370 | 408 | 408 |
| Time FE | X | X | X | X | X | X |
| State FE | X | X | X | X | X | X |

Notes. 2SLS estimates separating out by recent growth. Columns 1-2 show results for states with lowest tercile of recent growth. Columns 3-4 report results for those with median growth while Columns 5-6 states with recent growth in the higher tercile. All specifications include state and biennium fixed effects and use standard errors clustered by state. **p<.01; *p<.05; +p<.1.

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# E Two Models of Legislative Detail and Growth

This appendix outlines two formal models for how legislative detail could influence economic growth. The main result of the paper is that increasing legislative detail in U.S. states has been good for growth. And that is particularly strong when new laws and rules contain relatively more legislative contingencies, in topics and industries with a relatively small stock of existing laws and rules (concavity), and in periods and states with a relatively higher level of economic policy uncertainty. In the main text we focused on the standard hold-up model, where more complete legislation increases specific investments by reducing the threat of ex post hold-up. In this appendix we offer two formal models to undergird and complement the hold-up model, and in particular to derive predictions for the mechanisms analysis in Section 6. First, in Section E.1 we present a model based on writing costs. Second, Section E.2 uses a concise decision theory framework for understanding the legislator's choice when to legislate. Both models provide microfoundations for the broader view that greater detail enhances relationship-specific investments by producing a more complete – and thus more enforceable – contract.

## E.1 Legislating as Incomplete Contracting

Here we describe how the writing costs approach of Battigalli and Maggi (2002, 2008) can be adapted to the legislative process in order to derive a set of hypotheses on the causes and consequences of legislative output. We start by using the logic of Battigalli and Maggi (2002) to describe the law as an incomplete contract; we will then describe how some insights can also be derived from Battigalli and Maggi (2008), where the focus is not on the degree of completeness of a law but on the type of clauses (contingent or spot) and on their evolution over time. We will derive from this framework a set of hypotheses that motivate the mechanisms analysis from Section 6.

### E.1.1 What can we learn from the writing costs approach?

A law can be viewed as an incomplete contract between the legislator (the principal) and the citizens (agents), with an efficiency objective. Incompleteness can take the form of rigidity (non-contingent clauses) or discretion (empty clauses). The chosen degree of incompleteness depends on writing costs, which could include for example the cost of figuring out the relevant legal requirements, the cost of thinking how to describe them, and the cost of time needed to draft and enact the laws. These are all costs related to

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the details and precision of the language of the law.

The language of the law consists of primitive sentences that describe (1) elementary events and (2) elementary actions, plus logical connectives (e.g., "not," "and," "or"). This language can be used to describe state- dependent constraints on behavior, or in other words, a correspondence from states to allowable behaviors. Each primitive sentence has a cost and the total cost of writing the contract is a function of the costs of its primitive sentences about events and actions. It follows naturally that contingent clauses are more costly than non-contingent clauses.

A contingency is a formula about the environment. It could include different events with different logical connectives, so one contingency might be conditioned on event 1 or event 2, while another contingency could be conditioned on event 1 and event 3. An instruction is a formula for behavior – i.e., a set of actions with some logical connectives, such as action 1 and/or action 2. Omitting from the text of a law an elementary sentence about the possible events or situations that could occur saves on the cost of describing contingencies, but makes the contract rigid. Omitting from the contract an elementary action saves on the cost of describing behavior, but gives discretion to the agent.

We can adapt the main characterization of Battigalli and Maggi (2002) to our context. Informally, we restate their Proposition 1 as saying that optimal legislation should have contingent clauses for the most important decisions regulated by the law, while less important decisions can be regulated by rigid or non-contingent clauses, and the least important decisions can be left to discretion.

According to Proposition 2(II) in Battigalli and Maggi (2002), in more uncertain environments, the optimal law contains more contingent clauses and fewer rigid clauses, and it leaves more discretion to the agent. When uncertainty is higher the efficiency cost of ignoring low-probability events and writing rigid clauses is higher.

In Battigalli and Maggi (2008), agent discretion is regulated by informal contracts or spot clauses, which become possible with repeated play. Further, when the cost of describing contingencies is low relative to the cost of re-negotiation after unregulated events, then contingent clauses are optimal to begin with. A spot approach is optimal when this relative cost is high. Under intermediate values, an enrichment approach – where when a new unregulated contingency occurs it induces an enrichment of the contingent clauses in the law – may be optimal.

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### E.1.2 Deriving testable predictions

Now we use these ideas to derive a set of testable predictions.

**Completeness.** The first aggregate prediction coming out of the optimal contract framework is that if more legislation is added by a benevolent principal, it must be because the clauses are beneficial – that is, specifying more enforceable rules rather than giving hand-outs to lobbyists. Then more complete rules increase investment due to reduction in hold-up opportunities. In other words:

**H0:** If legislators are benevolent, then the greater the completeness of law, the better the economic outcomes to be expected.

**Contingency.** The second prediction that we can derive from the Battigalli and Maggi (2002, 2008) framework is related to contingent clauses. Suppose that for each issue or topic there are plenty of contingencies that one could potentially differentiate, but each contingency requires a constant marginal writing cost. Even if the marginal writing cost of an extra contingency is constant, the marginal benefit depends on many things that could vary a lot from place to place and from year to year, as well as some common component that relates to technological changes or other exogenous transformations of the topic to be regulated.[17] As a result, given a fixed marginal writing cost but wide variation in the benefit function, the state legislators choose different levels of contingent laws across states.

The optimal level of completeness of contracts is increasing in the marginal benefit of adding contingencies. Hence we should expect the relation between contingent clauses and growth to be stronger than for other clauses. That is, clauses along these lines: "if a worker has such characteristics... then a firm with such other characteristics could employ him or her with a special tax treatment, transfer, labor law relaxation, etc..." should be expected to have a positive effect given that it more precisely describes the economic environment, leaving less for subsequent renegotiation. These clauses are more costly to write and hence a rational legislator who has decided to introduce it must have anticipated a higher marginal benefit from it. The testable hypothesis that

[17] For example, in a state where all employees are in one or two sectors without many differentiations of skills, the marginal benefit from new contingent statements related to different sectors, seniority, education or other observables would be low. Hence, that state might have relatively simple labor laws and tax laws with non-contingent statements. On the other hand, in a state where skill differentiation matters, there is a higher marginal benefit from more clauses as, for example, the planner might find it important to give incentives to workers to switch from one sector to another.

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corresponds to this reasoning is:

**H1:** The changes in legislative output that most contribute to growth prospects are contingent, rather than non-contingent, clauses.

Say that at some point a shock arises, such as the advent of the internet, where new elementary events and actions arise. The existing legislation is not optimal, so legislators should write more clauses, and more specifically write more contingent clauses based on the new set of events. Now clauses like: "if there is a good internet connection, the worker has the right to work from home" could be added and support more economic activity. A side prediction would be that contingent clauses would be even more beneficial in states with greater economic complexity – more sectors, more levels, more segmentation, more strategic incentives to be given, etc.

**Concavity.** We now turn to a third implication of the Battigalli and Maggi (2002) framework. Assume for simplicity that each contingent clause has the same cost $c$. Thus, a law that includes $l$ contingent clauses has cost $cl$. The state $j$'s marginal benefit from adding a contingent clause is a function $B(l, t, w_j)$, where $t \in R_+$ is a parameter capturing a common factor (like technological change) and $w_j \in R_+$ is a state specific parameter capturing the degree of complexity of the economy to be regulated in state $j$. Let $\frac{\partial B}{\partial t} > 0$, $\frac{\partial B}{\partial w_j} > 0$, and $\frac{\partial B}{\partial l} < 0$ (the latter capturing a concavity assumption).

In state $j$ with a low $w_j$, prescribing a rigid clause to always be at the office from 9 to 5 could be optimal. In state $k$ with $w_k > w_j$, however, there may already be a contingent clause that working from home is possible when some condition on traffic or weather is met. In other words, state $k$ with high $w_k$ may optimally have $l_k^* > l_j^*$. Suppose that this is the case at time 0 with common technology $t_0$. Consider an exogenous shock at time 1 determining $t_1 > t_0$ (like the invention of internet), such that $l_k^*(t_1) = l_k^*(t_0) + 1$ and $l_j^*(t_1) = l_j^*(t_0) + 1$. It follows naturally, given the concavity assumption, that the effects must be bigger in state $j$. When a change in $t$ makes it convenient for both states to add a contingent clause like "if there is good internet connection, the worker shall work from home" then this addition benefits relatively more state $j$.

**H2:** An exogenous increase in legislative completeness will have a greater growth differential in the states with lower initial level of legislative stock.

**Uncertainty.** The fourth implication of the Battigalli and Maggi (2002) framework concerns the role of uncertainty. That is, it is plausible that the marginal benefit of contingent clauses is higher in states that are exposed to greater uncertainty. Under low uncertainty, a rigid clause that follows the likely state works best. The more

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uncertain are the relevant situations, the more valuable will it be to account for different possible contingencies and state a context-dependent action. The functional form for the marginal benefit of an additional contingent clause could be enriched by adding an additional parameter $u_j \in R_+$ capturing the degree of uncertainty in state $j$. The simple hypothesis to be tested is that indeed the marginal benefit of more contingent clauses is higher when $u_j$ is higher.

**H3:** The greater or the more frequent the sources of **uncertainty** in a state, the greater will be the growth benefit from higher legislative completeness, and especially from more contingent clauses.

## E.2 A model of optimal legislating under uncertainty

Now we present an alternative model based on legislative decision-making. A decision maker (DM henceforth) has to decide every period whether to adopt a legislative reform regulating an industry. The proposal arriving to the DM's desk every period can be complex or simple, $y_c$ or $y_s$, and let's assume that the arrival of one or the other is governed by an exogenous process. A proposal $y_c$ involves a large number of contingent clauses and/or exemptions, while $y_s$ has no clauses or exemptions to check, hence has a lower implementation cost: $c(y_c) > c(y_s)$. These different costs for the bureaucracy also have cost implications for the DM, since a reform that takes longer to be fully implemented yields reputation benefits for the DM with lower probability by re-election time. Given that we do not want to introduce the bureaucracy as an explicit additional player, let's consider that $c(y)$ is directly the cost for the DM.

The implementation costs of the reform are known at the time of the decision, but the benefits are uncertain. If the reform passed at time $t$ is good, it adds $b_t = 1$ to growth, while if the reform is bad it subtracts 1 ($b_t = -1$). The growth potential metric can be any increasing function of the likelihood of good reforms being passed. In our overall intuition for state economic legislation, we understand good legislation as increasing the completeness of the legislative contract and thereby increasing investment. Bad legislation is just adding costly boilerplate, or else making suboptimal rules.

The DM receives a signal (from experts, from her understanding, or from the relevant staff) on the potential benefits of the reform, and decides whether to adopt it or not. The DM's calculus requires the expected benefits of the reform to outweigh her cost, even though only the expected benefit matters for growth potential.

Formally, there are two states of the economy, one where the reform considered, $y$,

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is *good* ($\theta^G$) and one where it is *bad* ($\theta^B$). The state $\theta$ is unknown to the DM, who has to appraise the effect of the reform on the basis of her prior $\kappa \in (0,1)$ that the reform is good and on the basis of her signal $s$, which can be either good ($s^G$) or bad ($s^B$). The signal identifies the true state with precision $1-z$, where $z \in [0, \frac{1}{2}]$ captures the difficulty of appraising the benefits of the reform on the basis of the signal.[18] The likelihood of the good state is updated by Bayes' rule as follows:

$$\kappa(s^G) = \frac{(1-z)\kappa}{(1-z)\kappa + z(1-\kappa)}, \qquad \kappa(s^B) = \frac{z\kappa}{z\kappa + (1-z)(1-\kappa)}.$$

If the DM rejects the reform, the status quo is maintained, and his payoff is normalized to zero. If she adopts the reform, the realized benefits and the cost $c > 0$ of its implementation determine a DM utility depending on the state. The utility is $u(y|\theta^B) = -1 - c$ if it is a bad reform, while $u(y|\theta^G) = 1 - c > 0$ if it is a good reform.

Obviously the DM adopts the reform if she expects positive effects on the economy net of her costs relative to the status quo, that is, if and only if

$$\mathbb{E}[u|s] = \kappa(s)u(y|\theta^G) + (1-\kappa(s))u(y|\theta^B) > 0 \quad \Leftrightarrow \quad \kappa(s) > \frac{1+c}{2}.$$

We can thus characterize the decision of the DM as a function of her signal, as follows:

**Lemma 1:** *The reform $y$ is adopted under $s^G$ when*

$$\mathbb{E}[u|q^G] > 0 \quad \Leftrightarrow \quad (1-z)\kappa v - z(1-\kappa)\ell > c$$

Note that the noise $z$, which correlates with the complexity of the stock of legislation, depresses the expected benefits of reforms adopted on the basis of the signal $q^G$. In words, when signals are noisy, the DM puts a lower weight on positive signals received in her updating.

**Lemma 2:** *Under the bad signal $q^B$, the reform is adopted only when*

$$\mathbb{E}[u|q^B] > 0 \quad \Leftrightarrow \quad z\kappa v - (1-z)(1-\kappa)\ell > c.$$

Together, the two lemmas imply that if the proposal is a simple one with $c(y_s) = 0$ it passes the scrutiny of the DM for any signal she might get when $\kappa > z > (1-\kappa)$.

[18] When $z = \frac{1}{2}$, the signal is uninformative, while when $z = 0$, the signal is perfect.

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Thus, assuming $\kappa \geq 1/2$ throughout, only the second inequality matters, $z > (1-\kappa)$. Otherwise, for $z < (1-\kappa)$, a simple proposal passes only after a good signal.

When the cost is positive, the condition for passing a proposal after a bad signal becomes

$$z > \hat{z} \equiv \frac{(1-\kappa)(c+\ell)}{\kappa(v-c)+(1-\kappa)(c+\ell)} \text{ and } \hat{z} < 1/2. \tag{12}$$

$\hat{z} < 1/2$ requires that $(1-\kappa)(l+c) < \kappa(v-c)$, i.e.,

$$c < \kappa v - (1-\kappa)l. \tag{13}$$

In contrast, the reform is accepted under signal $q^G$ if and only if

$$z < z^* \equiv \frac{\kappa(v-c)}{\kappa(v-c)+(1-\kappa)(c+\ell)}. \tag{14}$$

Thus:

**Proposition 1:**

1. *If (13) is violated (high enough c), then the reform is adopted if and only if the DM receives a good signal and $z < z^*$.*

2. *If (13) holds, then: (a) the DM adopts the reform under both signals for $z \in (\hat{z}, 1/2]$; and (b) the DM adopts the reform only under a good signal when $z \leq \hat{z}$.*

For a given implementation cost $c$, the prediction is that when $\kappa$ is sufficiently high then there exists a range of $z$ under which the signals are noisy enough that the DM makes the reform regardless of the signal. On the other hand, if $z$ is low enough, then the DM approves only after a good signal, and it is in such cases that the expected benefit of the reform is higher conditional on the reform passing. In other words, the cases in which the DM follows her signal and hence carefully selects proposals are when $c$ is high, $\kappa$ is low (closer to 1/2, hence high uncertainty), and $z$ is low (low stock of existing regulations). These are exactly the three conditions highlighted respectively as contingency, uncertainty, and concavity.

**Proposition 2:**

1. **Contingencies prediction:** When the reform considered is more complex, it is more likely that (13) does not hold, and hence that the DM adopts the reform only after a good signal. In other words, conditional on being adopted, a reform with more contingent clauses yields higher benefits.

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2. **Concavity prediction:** When a topic or an industry is not heavily regulated yet and hence the evaluation of the merits of a reform is easier (low $z$), then again the DM approves only in case of a good signal, and hence conditional on passing, the reforms have a higher chance to be beneficial.

3. **Uncertainty prediction:** In contexts with high uncertainty about economic policies, $\kappa$ must be tending to $1/2$, and in such cases, like for the above contingencies prediction, (13) is unlikely to hold, and hence once again the DM applies the good signal filter, implying that conditional on passing, the reform is likely to be beneficial.

Proposition 2 highlights how the three parameters $c, \kappa, z$ capture in the most concise manner the three predictions we made and tested about heterogeneity in the results. This parsimony is obtained at the cost of strong assumptions. One implicit assumption is that a law or rule with more contingencies and exemptions has higher implementation costs, but (1) such higher costs do not matter for growth, and (2) the difficulty of evaluation for the DM, captured by $z$, is not impacted. We instead consider it intuitive that $z$ depends on the existing stock of laws and rules already in place. It is ultimately an empirical question whether a law or rule with lots of contingencies and exemptions is harder or easier to evaluate for the DM, and it could even be the case that evaluation is actually easier with more contingencies. So both the above strong assumptions seem reasonable. A third strong assumption of this simple model is that simple or complex proposals arrive to the DM as an exogenous process, unmodeled. However, Foarta and Morelli (2022) show that when the choice to go for a simple or complex proposal is endogenized, it remains true that complex proposals are more likely in a world with greater uncertainty, and that produces good outcomes when the relevant DM is benevolent. In our settings, benevolence comes from the context of state legislators, who work in a competitive legal environment with potential learning from other states. Hence the simplification made in this simple model does not seem too problematic.

The value of the simple decision theory rationalization model is, in any case, the robustness and generality that it could give to our findings. The fact that our findings are consistent with both a standard hold-up reduction model, the Battigalli-Maggi writing costs framework, and this simple decision theory model gives us confidence that these uncovered empirical relationships are not coincidental. These empirically validated theoretical results could guide future research, for example on E.U. allocation of legislative and regulatory jurisdictions.