

# Measuring Regulation

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# Motivation

Economists tend to argue that many regulations are “captured” by the industry and are therefore ineffective or beneficial to industry...

- Stigler (1971): Regulations tend to erect entry barriers and reduce competition
- Many follow-up studies and debates, such as Peltzman (1976), Becker (1976, 1983)...

However, business leaders and some politicians increasingly criticize regulation for being overly burdensome in recent years

- Code of Federal Regulations grew from 10,000 pages in 1950 to 180,000 pages in 2017 (Regulatory Studies Center) [graph](#)
- Congressional leaders have proposed numerous bills to reduce regulatory burdens
  - Sen. Angus King — *“Regulatory Improvement Act of 2015”*
  - Sen. Rand Paul — *“Executive in Need of Scrutiny Act of 2015”*
  - Sen. Orrin Hatch — *“Searching for and Cutting Regulations that are Unnecessarily Burdensome(SCRUB) Act of 2015”*

# Existing measures of industry regulation

Not many...

- **RegData**: Counting the restrictive words in CFR, such as *shall*, *must*, *may not*, *required*, etc. (Al-Ubaydli and McLaughlin (2017))
- **Others**: Industry-specific federal regulator head-counts, budgets or enforcement action counts

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- Only federal regulation is measured
- Cannot assess the impact of regulation on industry
- Cannot distinguish regulation from deregulation

# Existing measures of industry regulation

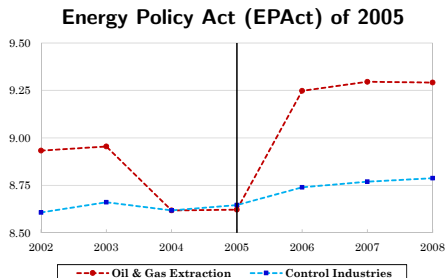
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An example of RegData failing to identify deregulation



# Our measure of industry regulation

Industry's "regulatory burden" may reflect the intensity and effectiveness of regulation

- Assume that firms spend resources on regulation-related tasks to reduce risks of legal liability or penalties from regulatory infractions
- Under this assumption, a profit-maximizing firm responds to regulation by spending resources until the marginal benefit of such spending (in reduced penalties and liability) equals the marginal cost of compliance (Becker (1968))
- Thus, *ceteris paribus*, more stringent regulations with more severe penalties and stricter enforcement will induce firms to spend more on regulation-related tasks

## Propose a new measure — **Regulation Index**

- We propose an indicator of regulation based on industry's labor costs paid for performing *regulation-related* tasks [Why labor costs?](#)
- Regulation Index covers over 270 industries for each year in 1990-2017

## Validate the Regulation Index

- Using case studies, we examine how our Regulation Index changes after three industry-specific regulatory shocks
- We compare the response of our measure with RegData
- We examine the correlation of Regulation Index with outsourced legal spending

# Summary of Findings

## Case study results:

- Regulation Index for oil & gas industry decreases after deregulation in 2005 and increases after re-regulation in 2010
- RegData increases after both deregulation and re-regulation
- Regulation Index for finance industry increases after Dodd-Frank Act
  - Increase concentrated in credit intermediation



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- O\*Net 23.1 Database — a dictionary of occupations
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Other industry-level measures:

- RegData US 3.1 (QuantGov); Outsourced legal spending (BEA Input Table); Lobbying spending (CRP)

# Constructing the Regulation Index: Keyword searches and Manual checks

Step 1: Identify “regulation-related” tasks:

- Initial screening: A task is “regulation-related” if its statement includes the following keywords:
  - **Keywords:** *Compliance, Complied, Complies, Comply, Complying, Safety, Codes, Law, Laws, Lawsuit, Lawsuits, Legal, Legalities, Legality, Legislate, Legislated, Legislates, Legislating, Legislation, Legislature, Ordinance, Ordinances, Regulatory, Regulation, Regulations, Statute, Statutes, Statutory.*
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- Human screening: We ask five USC law students to manually read through them to identify false positives
  - We took a majority vote to rule out false positives
  - This reduces the number of “regulation-related” tasks to 833
  - Example: “*Verify that transportation and handling procedures meet regulatory requirements.*” [task for Agriculture Inspector]

# Constructing the Regulation Index: How much of each occupation is regulation related?

Step 2: Compute regulatory-task intensity (RTI) for each occupation:

- O\*Net database also provides an importance measure for each task for each occupation
- We average regulation-related tasks within occupation, weighted by their importance
- We focus on the RTIs of the top 20 occupations with the highest RTIs

# Top 20 occupations with highest RTIs

Occupation	RTI
<i><u>Legal-Related Occupations</u></i>	
Lawyers	0.45
Paralegals and Legal Assistants	0.51
Law Clerks	0.36
Title Examiners, Abstractors, and Searchers	0.24
Legal Secretaries	0.32
<i><u>Compliance-Related Occupations</u></i>	
Compliance Officers	0.36
Financial Examiners	0.41
Agricultural Inspectors	0.23
Construction and Building Inspectors	0.49
Food Scientists and Technologists	0.33
Health and Safety Engineers, Except Mining	0.43
Urban and Regional Planner	0.22
First-Line Supervisors of Police and Detectives	0.30
Fire Inspectors and Investigators	0.29
First-Line Supervisors of Fire Fighting	0.21
Police and Sheriff's Patrol Officers	0.29
Transit and Railroad Police	0.28
Nuclear Engineers	0.22
Parking Enforcement Workers	0.23
Gaming Surveillance Officers & Gaming Investigators	0.21

# Constructing Regulation Index

Step 3: Compute Regulation Index for each industry:

- OES data provides each industry's labor costs paid to each occupation in each year
- Regulation Index: Percentage of labor costs paid for performing regulation-related tasks

$$\text{Regulation Index}_i = \frac{\sum_j RTI_j \times emp_{i,j} \times wage_{i,j}}{\sum_j emp_{i,j} \times wage_{i,j}} \times 100$$



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## Summary Statistics

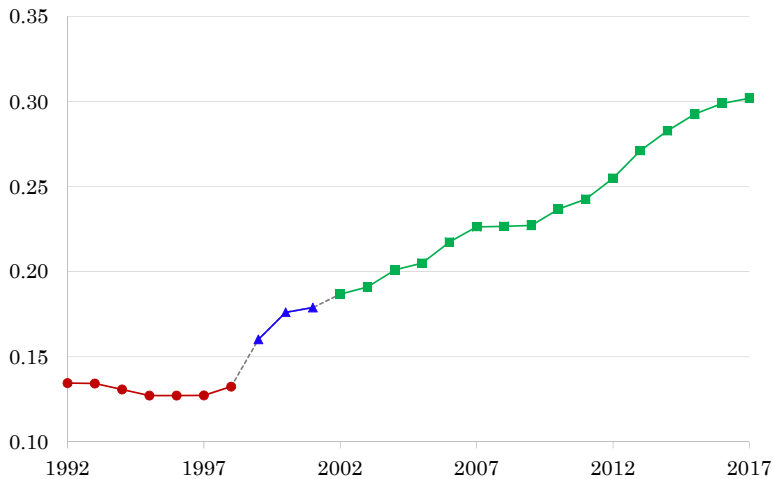
Variable	n	Mean	S.D.	Min	P50	Max
Regulation Index	4371	0.17%	0.33%	0%	0.04%	3.42%

# Top 15 industries with highest Regulation Index in 2016

Rank	Industry	Reg.Index
1	Securities and Commodity Exchanges	3.21
2	Oil and Gas Extraction	1.89
3	Lessors of Nonfinancial Intangible Assets	1.70
4	Insurance Carriers	1.67
5	Management of Companies and Enterprises	1.33
6	Other Financial Investment Activities	1.26
7	Architectural, Engineering, and Related Services	1.16
8	Electric Power Generation, Transmission and Distribution	1.16
9	Natural Gas Distribution	1.15
10	Business, Professional, Labor, Political, and Similar Organizations	1.13
11	Social Advocacy Organizations	1.10
12	Nondepository Credit Intermediation	1.03
13	Scientific Research and Development Services	0.96
14	Pharmaceutical and Medicine Manufacturing	0.89
15	Depository Credit Intermediation	0.86

# An overview of Regulation Index

## Regulation Index for Private Industries



# Validation of Regulation Index — Correlations

Regression Spec.:	Pooled OLS	Cross-Section Year FE	Time-Series Ind. FE + Year Trend
<i>Panel A. Outsourced Legal Service</i>			
Reg.Index	1.54*** (0.10)	1.54*** (0.10)	0.19** (0.09)
N	1,005	1,005	1,005
Adj. $R^2$	0.18	0.17	0.94
<i>Panel B. Text-based RegData</i>			
Reg.Index	0.65*** (0.09)	0.62*** (0.09)	0.05* (0.03)
N	1,792	1,792	1,792
Adj. $R^2$	0.03	0.03	0.99
<i>Panel C. Lobbying Spending</i>			
Reg.Index	1.63*** (0.14)	1.59*** (0.14)	-0.54 (0.35)
N	2,267	2,267	2,267
Adj. $R^2$	0.06	0.07	0.71

# Validation of Regulation Index — Case study I

## Deregulation Shock — Energy Policy Act (EPAAct) of 2005

- **Treated:** Oil & Gas Extraction Industry (NAICS 2111)
  - Exemptions from Safe Drinking & Clean Water Act
  - Preempted state and local regulation
  - Exemptions from EPA regulation of hydraulic fracturing (unless using Diesel)
  - Streamlined environmental review of oil & gas leases on federal or Indian lands

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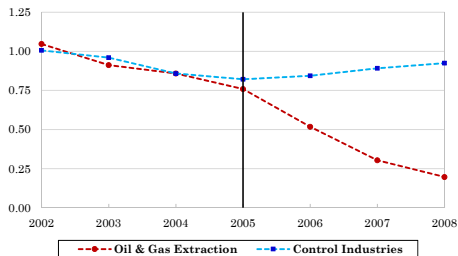
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- **Control:** Use BEA Input-Output Table to find closely-related industries
  - Intuition: The control and treated groups are in the same production chain and are thus likely to be affected by other general regulations applied to the production chain
  - Petroleum and coal products manufacturing (NAICS 3241), natural gas distribution (NAICS 2212), and basic chemical manufacturing (NAICS 3251)

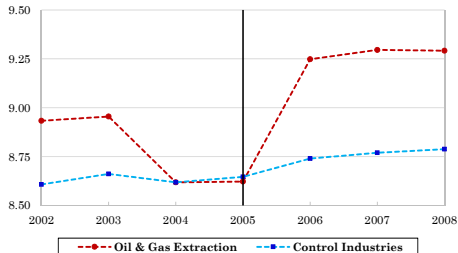
# Validation of Regulation Index — Case study I

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Panel A: Regulation Index



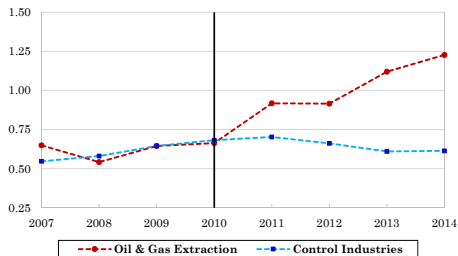
Panel B: RegData Measure



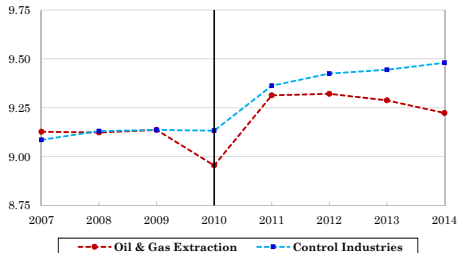
# Validation of Regulation Index — Case study II

## Re-regulation Shock — Deepwater Horizon Oil Spill in 2010

Panel A: Regulation Index



Panel B: RegData Measure

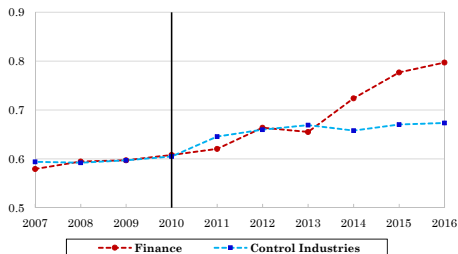




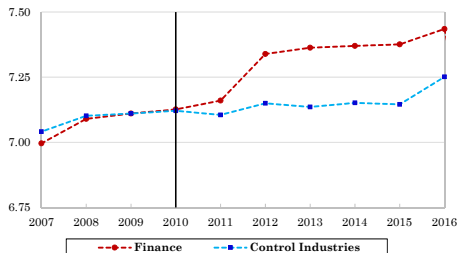
# Validation of Regulation Index — Case study III

## Dodd-Frank Act of 2010 (Finance vs. Real Estate)

Panel A: Regulation Index

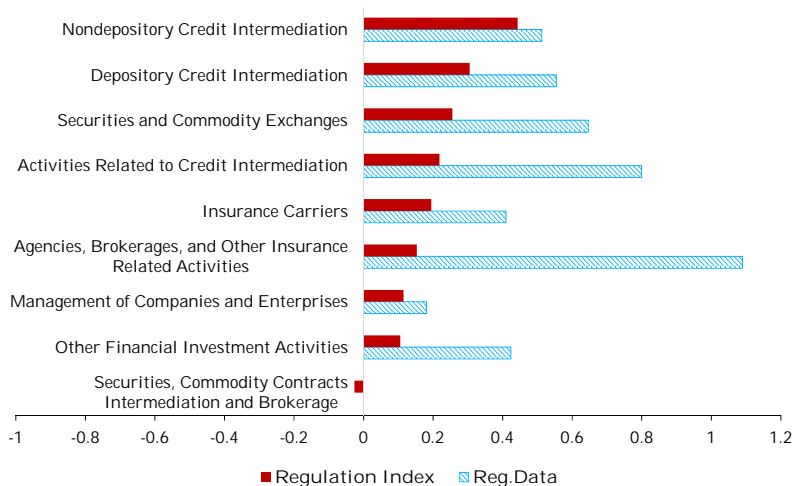


Panel B: RegData Measure



# Validation of Regulation Index — Case study III

## Dodd-Frank Act of 2010 (Impact on Sub-sectors of Finance)



# How to interpret Regulation Index

The Regulation Index is an indicator of Regulatory intensity for an industry.

It is not a comprehensive measure of costs of regulation. It may not capture:

- Regulation mandating capital expenditures, for example for new pollution abatement equipment
- Prohibitions that lead to a business line being completely eliminated rather than regulated or modified
- Barriers to entry and licensing requirements

# Conclusion

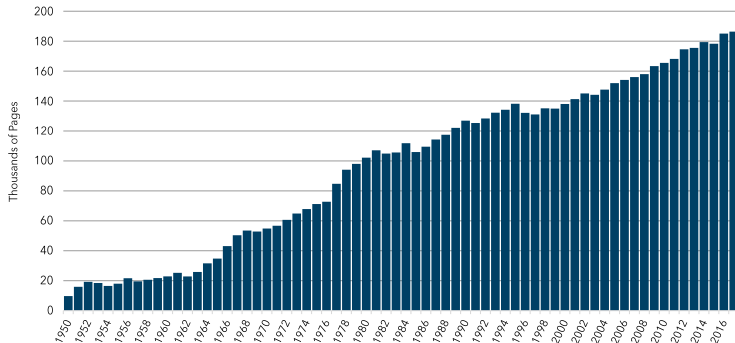
We propose a new measure of regulation at the industry level

Our measure improves the current measures by

- ① reflecting broader sources of regulation
  - e.g., federal, state, local and industry privately-enforced regulations
- ② better identifying the impact of regulation on industry
- ③ better distinguishing regulation from deregulation

# Total Pages in the CFR

Total Pages Published in the Code of Federal Regulations  
(1950-2017)



Regulatory  
Studies Center

THE GEORGE WASHINGTON UNIVERSITY

Source: [Federal Register Statistics](#)

Updated: January 30, 2019

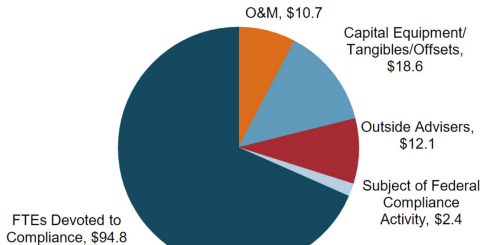
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# Measuring regulation through industry's "burden"

We measure regulation through industry's labor costs

- Why labor costs?
  - Labor costs can be a good indicator: A survey of direct regulatory costs by National Association of Manufacturers (NAM) in 2014 shows that 68% of the total costs are from labor costs devoted to compliance

**Estimates of Direct Regulatory Costs on Manufacturers**  
(in Billions of 2014 Dollars)



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