

INTRODUCTION TO FRASE INDEX

Federal regulations can, by design, target some industries more than others. For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 directed federal regulatory agencies to create approximately 400 new regulations mostly targeting the financial services sector. Because financial services matter in all states, these new regulations will have national effects. However, those effects will be felt more acutely in New York than in Virginia, for example, simply because of the relative greater importance of the financial services industry in the former state.

RegData, a data project quantifying various dimensions of regulations, allows us to determine how much federal regulation affects specific industries. RegData counts the number of individual restrictions in the CFR—identified by the words *shall*, *must*, *may not*, *required*, and *prohibited*—and uses machine learning algorithms to assign them to the appropriate industries. Chart 1 shows the top 10 most regulated industries for 2017, as classified by the three-digit North American Industry Classification System (NAICS). The dataset is available at quantgov.org. See the appendix for more details on the RegData project.

Chart 1: Top 10 Most Regulated Industries for 2017

Rank	NAICS Label	Industry Name	Restrictions
1	325	Chemical Manufacturing	102719
2	324	Petroleum and Coal Products Manufacturing	93400
3	522	Credit Intermediation and Related Activities	64249
4	611	Educational Services	57039
5	562	Waste Management and Remediation Services	54574
6	481	Air Transportation	53550
7	221	Utilities	52175
8	112	Animal Production and Aquaculture	44199
9	523	Securities Commodity Contracts, Financial Investments, Related Activities	39155
10	322	Paper Manufacturing	36655

Using RegData, we created the federal regulation and state enterprise (FRASE) index, a measure of the relative impact of federal regulation among the states. To calculate the FRASE index score for each state, we weight the number of restrictions targeting each industry according to its importance to a particular state relative to that industry's importance to the nation as a whole. If an industry contributes twice as much to the state's private sector as it does to the nation's, the restrictions count twice as much. We then sum the result across all industries in the state and scale to the score for the nation overall. See the appendix for more details.

The result is a score that shows the impact of federal regulation on states relative both to the nation and to other states. A FRASE index score of 1 means that federal regulations affect a state to precisely the same degree that they do the nation as a whole. A score higher than 1 means federal regulations have a higher impact on the state than on the nation, whereas a score less than 1 means they have a lower impact on the state. Scores and rankings for all states and the District of Columbia are shown in chart 2. State-level data on industry contributions to the private sector were available from 1997 to 2017 at the time of this writing. See the appendix for a formal explanation of the calculation of the index.

Chart 2: FRASE Index Scores and Rankings for All States and the District of Columbia

State	FRASE Score	Rank	State	FRASE Score	Rank
Louisiana	2.087	1	Pennsylvania	1.010	27
Wyoming	1.761	2	Tennessee	1.007	28
Alaska	1.611	3	Hawaii	1.000	29
Montana	1.413	4	Wisconsin	0.990	30
Mississippi	1.346	5	Washington	0.989	31
Nebraska	1.330	6	Delaware	0.973	32
Indiana	1.328	7	Missouri	0.955	33
West Virginia	1.313	8	Maine	0.947	34
Alabama	1.238	9	Michigan	0.929	35
North Dakota	1.219	10	New York	0.911	36
South Dakota	1.210	11	New Jersey	0.903	37
Kansas	1.192	12	Vermont	0.900	38
Kentucky	1.188	13	California	0.889	39
Texas	1.181	14	Colorado	0.869	40
Oklahoma	1.158	15	Nevada	0.841	41
Iowa	1.147	16	Maryland	0.825	42
Arkansas	1.136	17	Massachusetts	0.825	43
Idaho	1.081	18	District of Columbia	0.823	44
Utah	1.065	19	Florida	0.822	45
North Carolina	1.049	20	Virginia	0.813	46
New Mexico	1.049	21	Arizona	0.809	47
Georgia	1.041	22	Rhode Island	0.809	48
Illinois	1.038	23	Connecticut	0.808	49
Minnesota	1.035	24	Oregon	0.787	50
South Carolina	1.035	25	New Hampshire	0.701	51
Ohio	1.034	26			

FRASE ACROSS TIME: THE CONSTANT-BASIS INDEX

The FRASE index illustrates the relative impact of federal regulation on a state within a given year. Because the FRASE index is calibrated so that the national score is equal to exactly 1 for every year, it ignores the overall trend in federal regulation over time. Thus, the FRASE index cannot be used, for example, to compare the impact of federal regulations on a state in absolute terms across years.

To rectify this problem, we have produced another version of the FRASE index that scales the raw impact scores for each state and year to the level of the nation as a whole in 1997. This constant-basis FRASE index incorporates both changes in the level of federal regulation and changes in the state and national mix of industries.

Chart 3: 2017 FRASE Index Scores, Constant Basis

State	FRASE Score	Rank	State	FRASE Score	Rank
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Louisiana	3.8227	1	Pennsylvania	1.8491	27
Wyoming	3.2259	2	Tennessee	1.8448	28
Alaska	2.9509	3	Hawaii	1.8304	29
Montana	2.5884	4	Wisconsin	1.8135	30
Mississippi	2.4655	5	Washington	1.811	31
Nebraska	2.4362	6	Delaware	1.7817	32
Indiana	2.4314	7	Missouri	1.7486	33
West Virginia	2.4052	8	Maine	1.7334	34
Alabama	2.2681	9	Michigan	1.7018	35
North Dakota	2.2319	10	New York	1.6677	36
South Dakota	2.2156	11	New Jersey	1.6544	37
Kansas	2.1826	12	Vermont	1.6478	38
Kentucky	2.1756	13	California	1.6274	39
Texas	2.1637	14	Colorado	1.591	40
Oklahoma	2.12	15	Nevada	1.54	41
Iowa	2.1007	16	Maryland	1.5113	42
Arkansas	2.0798	17	Massachusetts	1.5103	43
Idaho	1.9806	18	District of Columbia	1.5065	44
Utah	1.9513	19	Florida	1.5051	45
North Carolina	1.9213	20	Virginia	1.4888	46
New Mexico	1.9208	21	Arizona	1.481	47
Georgia	1.9056	22	Rhode Island	1.481	48
Illinois	1.9018	23	Connecticut	1.48	49
Minnesota	1.8961	24	Oregon	1.4416	50
South Carolina	1.8955	25	New Hampshire	1.2835	51
Ohio	1.8941	26			

OTHER APPLICATIONS OF THE FRASE INDEX

The FRASE index can be used as a tool to better understand the distributive impacts of federal regulations on individual states and regions beyond the figures provided in this book. The FRASE index is meant to serve as more than a reference guide of state impacts. Researchers, policymakers, industry representatives, and other interested parties can use the FRASE index to answer questions that address state-specific issues:

- Some states, like Alaska, have high FRASE scores and high activity in industries that have relatively large restriction counts, such as Petroleum and Coal Products Manufacturing. Have these states become more or less sensitive to federal regulations over time? What might that trend imply for those states' federal lobbying efforts beyond 2017?
- Which [legislative acts](#), if any, might explain large portions of the educational services restrictions present in 2017?
- From a political science perspective, is there any causal relationship between the impact of federal regulations on the states and those states' voting tendencies?

Since the first release of the FRASE index, researchers have used the data or its insights for a variety of purposes. Here are some examples of studies that cite FRASE.

- [Federal Regulations and Corruption](#) – Dincer and Gunalp find a positive and statistically significant relationship between federal regulations and corruption, and that it is possible to mitigate the effects of regulations at the federal level by reducing the size and the scope of the government at the state level.
- [Regulation and Income Inequality](#) (Working Paper) – Chambers and O’Reilly find that more federal regulations may explain some of the increase in income inequality over the past 20 years
- [Individualism, Institutional Environment, and Bank Capital Decisions](#) – Bitar and Tarazi examine the effect of informal institutional environment on bank capital decisions worldwide as well as within the United States at the state level.
- [Political Connections and Industry-Level Regulation](#) – Carboni investigates whether listed firms of the most regulated industries in the United States are more likely to be politically connected.
- [Regulation and Poverty](#) – Chambers, McLaughlin, and Stanley find that a 10% increase in the effective federal regulatory burden on a state is associated with an approximate 2.5% increase in the poverty rate.

NOTES

1. Unless otherwise noted, the sources for figures and tables are RegData 3.2, the US Bureau of Economic Analysis, and the authors’ calculations. For more information, see regdata.org.

2. Omar Al-Ubaydli and Patrick A. McLaughlin, “RegData: A Numerical Database on Industry-Specific Regulations for all United States Industries and Federal Regulations, 1997–2012,” *Regulation and Governance*, 11, no. 1 (2017): 109-123. See also George J. Stigler, “The Theory of Economic Regulation,” *Bell Journal of Economics and Management Science* 2, no. 1 (1971): 3–18; Arthur Cecil Pigou, “Money Wages in Relation to Unemployment,” *Economic Journal* 48, no. 189 (1938): 134–38.

APPENDIX

REGDATA IN BRIEF

RegData uses text analysis and machine-learning algorithms to produce two novel data series. The first series counts the number of restrictions (words such as *must*, *shall*, etc.) in each part of the *Code of Federal Regulations* (CFR), and the second measures the relevance of those CFR parts to the hundreds of industries defined in the North American Industrial Classification System (NAICS). These two metrics have been combined into a single index that measures, at the national level, the degree to which each sector (two-digit NAICS code) and each industry (three- or four-digit NAICS code) are regulated in a particular year.¹ RegData has been applied in numerous research contexts, many of which are catalogued on the website RegData.org. Because RegData is a free and publicly available database, other interested parties are encouraged to download, experiment with, and apply the data in different contexts.

CALCULATION OF THE FRASE INDEX

Among the many applications of RegData, the federal regulation and state enterprise (FRASE) index considers the importance of industries in a particular state to calculate the impact of federal regulation on that state. The nature of this construction means that a state in which the largest industries are heavily regulated will tend to have a high FRASE index score.

We have calculated the FRASE index using the latest version of RegData (3.2).² The FRASE index is the ratio of the impact of federal regulations on a state's private sector to the impact of federal regulations on the nation's private sector in a given year. A value of 1 would indicate that the state's private sector is affected by federal regulations to precisely the same degree as is the national private sector.

Calculating the FRASE index requires a few steps. First, we calculate the importance of each industry to the private sector in a particular state. To do this, we divide the value added to the state's gross domestic product (GDP) from each private-sector industry i in year t by the entire state's private-sector production in year t .³ We abbreviate contributions to the state's GDP from private-sector production as PSP (private-sector product). Because all calculations described here occur in year t , we omit time subscripts. Thus, the importance of industry i to state s is simply the fraction of the state's PSP produced by industry i :

$$(y_{s,i}/y_s) = \text{industry } i\text{'s fraction of state } s\text{'s PSP,} \quad (1)$$

where $y_{s,i}$ is the value added to state s 's PSP from industry i (observed, from Bureau of Economic Analysis) and y_s is state s 's PSP = $\sum_{i=1}^I y_{s,i}$.

Second, we calculate the importance of each industry i to the national economy. This step involves calculating the fraction of the country's PSP produced by industry i :

$$(Y_i/Y) = \text{industry } i\text{'s fraction of national PSP,} \quad (2)$$

where Y_i = the national value added to PSP from industry i = $\sum_{s=1}^S y_{s,i}$, and Y = the sum of national value added to PSP from all industries = national PSP, or $\sum_{i=1}^I Y_i$.

Third, we combine these two fractions to calculate the importance of industry i to state s relative to the industry's importance to the national economy. This relative importance of industry i to state s serves as a weighting term in later steps:

$$\frac{(y_{s,i}/y_s)}{(Y_i/Y)} = w_{s,i} = \text{importance of industry } i \text{ to state } s \text{ relative to} \\ \text{the industry's importance to the national economy =} \\ \text{weighting term.} \quad (3)$$

Next, we multiply the level of federal regulation of each industry by the weighting term for state s :

$$w_{s,i} r_i = \text{national regulation of industry } i \text{ weighted by its importance to state } s, \quad (4)$$

where r_i = regulation of industry i (observed from RegData). We then sum across all industries in the private sector in state s :

$$\sum_{i=1}^I w_{s,i} r_i = \text{industry-weighted regulation index for state } s. \quad (5)$$

Finally, we scale the industry-weighted regulation index for each state by the total level of regulation summed across all industries in the private sector in the nation:

$$FRASE_s = \frac{\sum_{i=1}^I w_{s,i} r_i}{\sum_{i=1}^I r_i} \quad (6)$$

To account for changes in the level of national regulation, we have also produced a 1997-basis FRASE index by dividing the industry-weighted regulation index for a state in the current year by the industry-weighted regulation index for the United States overall in 1997. This index is referred to as the constant-basis FRASE index and is further explained in the introduction.

NOTES

1. For a full explanation of RegData 3.2, see Omar Al-Ubaydli and Patrick A. McLaughlin, "RegData: A Numerical Database on Industry-Specific Regulations for all United States Industries and Federal Regulations, 1997–2012," *Regulation and Governance*, 11, no. 1 (2017): 109-123.. See also Patrick A. McLaughlin and Oliver Sherouse, "RegData 2.2: A Panel Dataset on US Federal Regulations." *Public Choice*, 180 no. 1-2 (2019): 43-55.
2. Specifically, RegData 3.2 unfiltered.
3. By examining only private-sector industries, we excluded only the industry called *government*.