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POLICY BRIEF

A Snapshot of Regulation in Great Lakes States

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July 2021, revised October 2021

Using RegData, an innovative dataset from the Mercatus Center at George Mason University, this policy brief summarizes and contextualizes the volume of regulatory restrictions in five states constituting the Great Lakes region as classified by the Bureau of Economic Analysis.[1] In 2012, the Mercatus Center created RegData to quantify regulations at the federal level in the United States. RegData was created using text analysis and machine learning algorithms to convert legal text into quantitative data. Using these data, one can quantify the regulations in a jurisdiction. The primary unit of measurement in RegData is a regulatory restriction, or instances of the terms *shall*, *must*, *may not*, *prohibited*, and *required* appearing in administrative laws. Regulations by nature impose restrictions on individuals and businesses, either by requiring or prohibiting activities. These terms approximate the restrictions that regulators impose on a jurisdiction.[2]

In 2019, the Mercatus Center created State RegData, another dataset similar to RegData that quantifies regulations in state administrative codes. State RegData allows for aggregate levels of regulation across the various states to be compared with one another. This policy brief takes a dive into State RegData and other Mercatus datasets to better understand the regulatory landscape in the Great Lakes region of the United States. Specifically, this report summarizes data for five states: Illinois, Indiana, Michigan, Ohio, and Wisconsin. Using data from State RegData version 2.1, as well as other sources, the brief compares these states' regulatory environments along a variety of dimensions, including overall word counts in state codes, restrictiveness of regulations in state administrative codes, complexity of regulatory text, restrictions across industries, federal regulation of the various states, and population-adjusted restrictions.

The analysis presented here provides new insights into the size and scope of regulation across the Great Lakes region, which should prove useful to academics, policymakers, and even the regulators themselves as they seek to understand the consequences of the regulatory state in America.

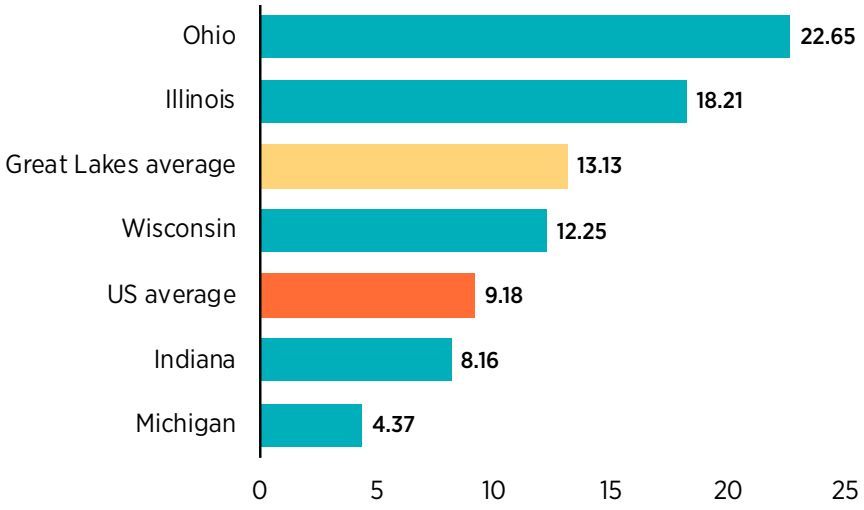
WORD AND RESTRICTION COUNTS AND COMPLEXITY IN STATE REGULATIONS

Almost every state in the country has a regulatory code where its administrative laws are housed.[3] Regulations are distinct from statutes written by legislators in that they are written mostly by unelected officials working at executive branch agencies that are delegated lawmaking powers from elected representatives in a legislature. Executive branch agencies are typically run by political appointees (although sometimes they are run by elected officials), and the staff who work at agencies are career civil servants. Thus, the administrative laws (i.e., regulations) written by these officials are different from statutes written by legislators in that there is generally no direct line of accountability from voters to the authors of these laws.

Number of Words in Regulatory Code

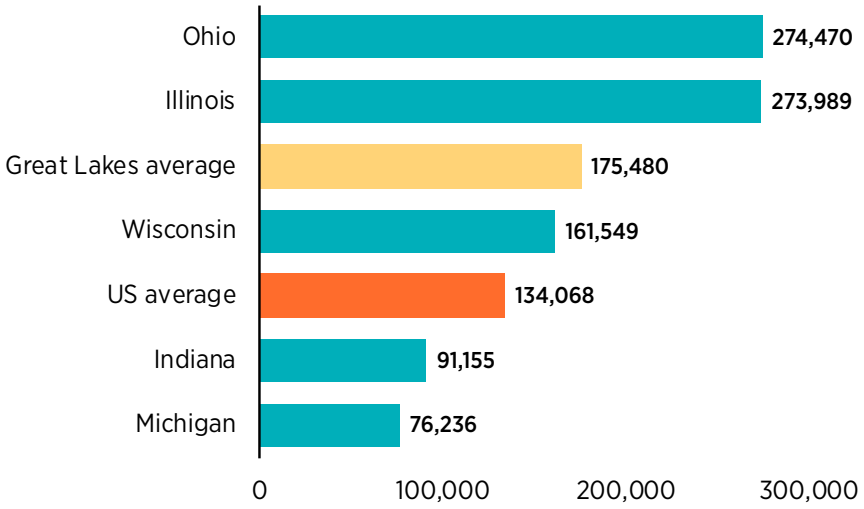
Perhaps the simplest way to compare states' regulatory environments is to count the words in each states' administrative code (figure 1). For example, the *Ohio Administrative Code* contains over 22.6 million words, whereas the *Michigan Administrative Code* contains just 4.4 million words. The average state in the country has about 9.2 million words of regulations, so among the Great Lakes states, only Indiana and Michigan fall below the national average.

Figure 1. Word Counts in Great Lakes State Administrative Codes (Millions)



Source: Patrick A. McLaughlin et al., "State RegData 2.1" (dataset), QuantGov, Mercatus Center at George Mason University, Arlington, VA, 2020, https://quantgov.org/state-regdata/.

Figure 2. State Regulatory Restrictions in the Great Lakes Region



Source: McLaughlin et al., "State RegData 2.1."

Number of Regulatory Restrictions

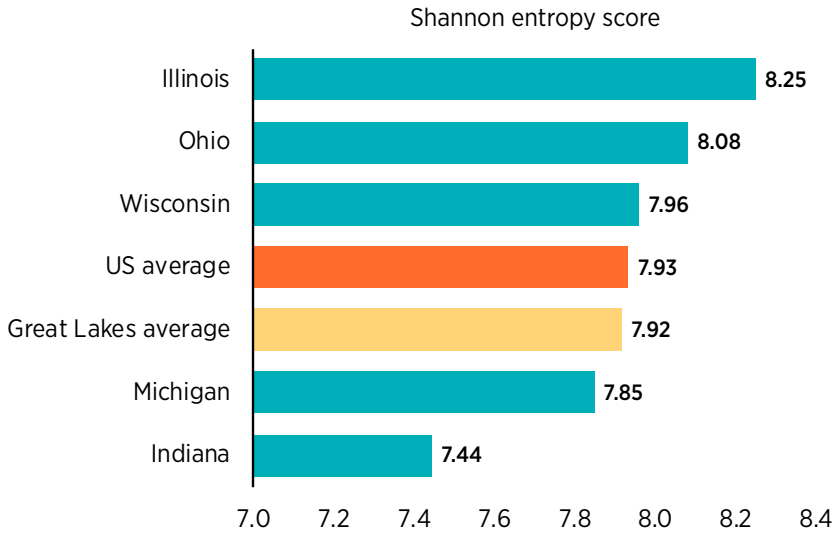
If one instead counts the restrictive terms in administrative codes, then Ohio remains the most regulated Great Lakes state, with 274,470 restrictions, whereas Michigan is still the least regulated, with 76,236 restrictions (see figure 2).

Complexity of Regulatory Text

Highly complex regulations can create confusion and be misunderstood by regulated entities. RegData measures the complexity of regulatory text by borrowing the Shannon Entropy score concept from the field of information theory. Shannon Entropy is a measure of the average information contained in a document. Documents with lower Shannon Entropy scores are less complex and easier to read than those with higher scores. Higher scores mean that the content of a document spans a wider range of topics and concepts. Documents with high entropy scores therefore contain more information and would likely require more mental bandwidth to understand and perhaps be more costly to comply with as well. In other words, documents with higher Shannon Entropy scores are more difficult to read because they introduce more varied information. There is no standard interpretation of the value of this measure. However, as a point of reference, Shakespeare plays typically have a Shannon Entropy score of 9.0 to 9.8.[4]

Using the Shannon Entropy score, we notice that the complexity of the regulatory text varies somewhat across most of the states in the Great Lakes region, though complexity scores remain within a tight range. Illinois has the most complex regulations in the Great Lakes region, whereas Indiana has the least complex regulations (figure 3), but differences are relatively small. States

Figure 3. Complexity of Regulations in the Great Lakes Region



Source: McLaughlin et al., "State RegData 2.1."

regulatory codes tend also to have a greater number of regulatory restrictions and a greater number of words. Illinois and Ohio, which have the most restrictions, also have the most complex codes.

REGULATION OF INDUSTRY AT THE STATE AND FEDERAL LEVELS

Another way to analyze the regulatory systems in these states is to look at how their industries are targeted by state and federal regulation. RegData was created using machine learning algorithms that are trained to assign a probability that a portion of text is relevant to particular industries.[5] When the probability that a certain piece of legal text applies to a particular industry is combined with regulatory restriction data, one can produce an estimate of the regulatory restrictions targeting particular sectors of the economy. Figure 4 shows the number of state regulatory restrictions for select industries across the region.[6] These industries are the five most regulated in each of the five states (excluding duplicates) in terms of the number of industry-relevant regulatory restrictions.[7] It shows clearly that the number of regulatory restrictions varies widely both within and across states. In other words, for some industries, some states regulate far more than others. And within some states, some industries are far more regulated than others.

A few interesting observations can be made about the data in figure 4. Illinois and Wisconsin stand out for regulating their chemical and petroleum manufacturing industries more than the other states. Waste management is the most regulated industry in Illinois and Indiana, with a regional average of 9,041 restrictions. However, the number of restrictions targeting this industry varies widely across states. Illinois's waste management industry faces 17,610 industry-relevant restrictions, whereas Michigan's faces 3,620 restrictions.

Figure 4. State Regulatory Restrictions for Select Industries in the Great Lakes States

Source: McLaughlin et al., "State RegData 2.1."

The variation in the number of restrictions targeting industries across this region could be explained by the relative importance of each sector to each state's economy, though this may not always be the case. Without assuming any direct causal relationship between the volume of regulations that falls on an industry and that industry's contribution to GDP, in figure 5 we present the percentage of state GDP associated with each of these industries for the five states.

In Illinois and Wisconsin, again, petroleum and chemical manufacturing represent a small proportion of each state's GDP, even though they tend to be relatively heavily regulated industries. Meanwhile, real estate is very important in all the states' economies and is lightly regulated in all states, too.

Impact of Federal Regulations

States also vary in terms of the degree to which their economies are targeted by federal regulation. For example, the average number of regulatory restrictions of the seven states reviewed here is 175,480. By comparison, there are approximately 1.09 million regulatory restrictions in the US

Figure 5. Contribution to State GDP of Select Industries

Note: The Bureau of Economic Analysis data combines the crop production and animal production and aquaculture industries into the farms industry.
Source: "GDP by State," Bureau of Economic Analysis, accessed May 4, 2021, https://www.bea.gov/data/gdp/gdp-state.

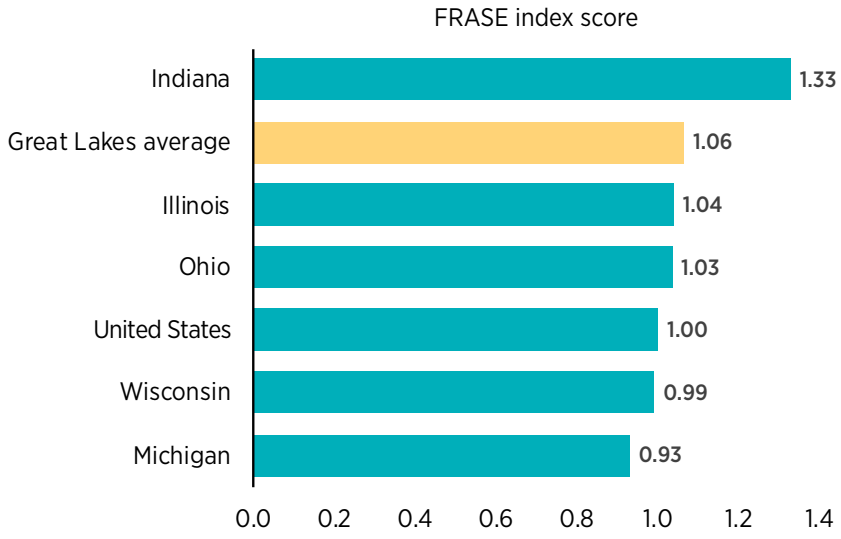
Code of Federal Regulations.[7] Therefore, it is quite possible that federal regulations have a larger impact on these states' economies than do the states' own regulatory restrictions.

The Mercatus Center has also produced data to better understand the degree to which federal regulation targets states. By weighting estimates of industry-relevant federal restrictions according to how important various industries are to states' gross state product, the Federal Regulation and State Enterprise (FRASE) index ranks the states in terms of how regulated they are by the federal government (figure 6). Indiana receives a score of 1.33 in 2017. This ranking is scaled relative to the nation as a whole, which receives a score of 1.00, so a score of 1.33 means that Indiana's industries are targeted by federal regulation 33 percent more than industries across the nation as a whole are.

REGULATION AND POPULATION

There are also reasons to believe that more populous states might tend to have more regulation than less populous states.[8] For example, more populous states might have more industries, so some

Figure 6. Relative Federal Regulatory Burden by State in the Great Lakes Region



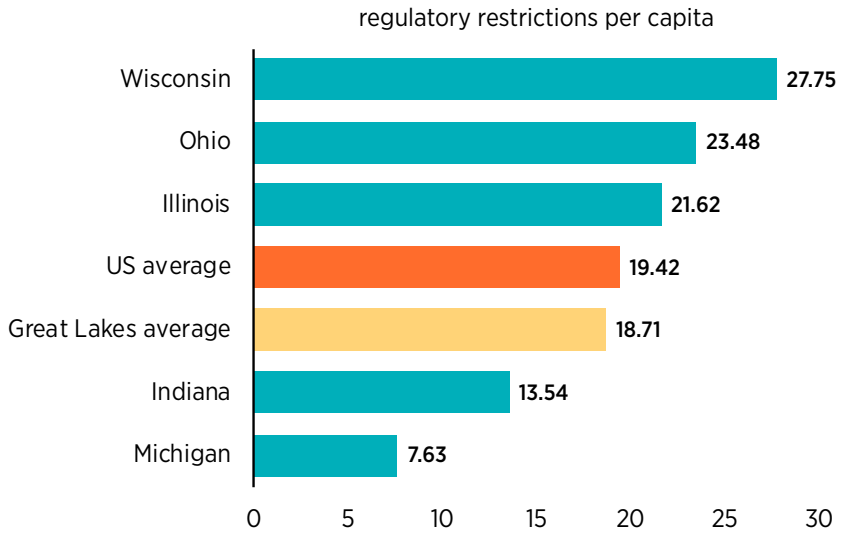
Note: Scores are for the year 2017. The score for the United States is set to one.
Source: McLaughlin and Warlick, "2021 FRASE Index" (dataset).

forms of regulation may not be necessary in less populous states. It may be that there are fixed costs associated with regulating and that larger populations are able to absorb these fixed costs more easily by spreading them across a greater number of people.[9] With more people, it might also be more difficult for the population to organize and lobby against regulations that bestow benefits on special interest groups at public expense.

For these reasons, it could make sense to adjust for population when reporting regulatory restrictions. Figure 7 shows the number of regulatory restrictions for each thousand residents in each of the Great Lakes states. Wisconsin (27.8 restrictions per 1,000 residents) is the most regulated state in the Great Lakes region, adjusting for population. Michigan (7.6) is the least regulated state in the region. Only Indiana and Michigan fall below the national average (19.4) and regional average (18.7).

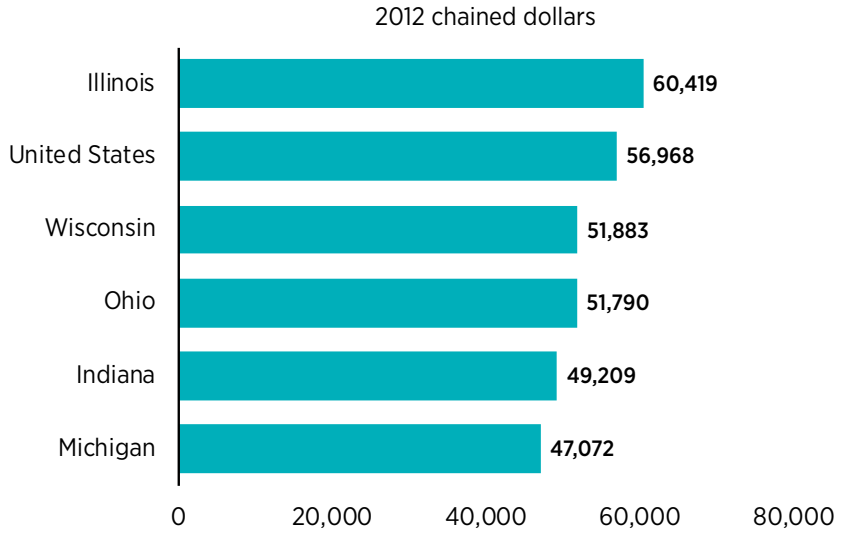
Figure 8 shows the GDP per capita for each of these states. Whereas Michigan has the fewest restrictions per capita, it also has the lowest GDP per capita. Again, we stress that we are not attempting to establish a causal relationship between regulation and GDP, but merely putting the volume of regulatory restrictions in the context of the local economies.

Figure 7. Population-Adjusted Regulatory Restrictions for Great Lakes States



Source: McLaughlin et al., "State RegData 2.1"; Census Bureau, "2018 ACS 1-Year Estimates" (dataset), Summary File Data, American Community Survey, https://www.census.gov/programs-surveys/acs/data/summary-file.html.

Figure 8. Per Capita GDP for Great Lakes States in 2020



Source: "GDP & Personal Income," Bureau of Economic Analysis, accessed May 4, 2021, https://apps.bea.gov/iTable/index_regional.cfm.

CONCLUSION

There are a variety of ways in which one can compare the regulatory environments across states, as this policy brief has done for states in the Great Lakes region of the United States. In state administrative codes, we have examined word counts, regulatory restriction counts, complexity, counts of regulatory restrictions targeting industries in these states, and the population-adjusted

volume of state regulation. We have also examined the extent to which federal regulation targets each state's industries.

Each of these metrics has its own advantages and disadvantages. All told, the amount of regulation in the states is considerable. Further research will help gauge how levels of regulation are evolving in these states over time and what this evolution means for the welfare of state residents. This snapshot of state regulations, however, provides a glimpse into the reach of various kinds of regulation in the Great Lakes region.

ABOUT THE AUTHORS

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ACKNOWLEDGMENT

Luke Ashton provided research assistance including data analysis, data visualization, literature search, and initial drafts.

NOTES

1. We use the Bureau of Economic Analysis's definition here. However, in previous research, Mercatus scholars have included some Canadian provinces when analyzing the regulatory environment in the Great Lakes region. See Patrick A. McLaughlin and Laura Jones. "A Snapshot of Regulatory Restrictions in the Great Lakes Region" (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, May 2019).
2. Restrictions can also occur in legal text for other purposes, such as for definitional purposes. At times, restrictions may relate to government employees rather than to the private sector.
3. Arkansas does not yet have an administrative code, but the state is actively working on compiling one. See H.B. 1429, 92nd Gen. Assemb., Reg. Sess. (Ark. 2019), which establishes the Code of Arkansas Rules.
4. Marcin Lawnik, "Shannon's Entropy in Literary Works and Their Translations," *Journal of Computer Science* 1, no. 3 (2012): 1–3.
5. For more information about the machine learning algorithm used to construct RegData, see Patrick A. McLaughlin and Oliver Sherouse, "RegData 2.2: A Panel Dataset on US Federal Regulations," *Public Choice* 180, no. 1 (2019): 43–55.
6. We use the three-digit North America Industry Classification System to delineate industries. Not all industries are shown here.

7. A previous version of this policy brief mistakenly said that the industries shown in figure 4 comprise the biggest contributors to GDP in each state. This revised version corrects that error.

8. "Visualize QuantGov Data," QuantGov, accessed May 12, 2021, https://www.quantgov.org/visualize-data.

9. James Bailey, James Broughel, and Patrick A. McLaughlin, "Larger Polities are More Regulated," *Journal of Public Finance and Public Choice* (forthcoming).

10. Casey Mulligan and Andrei Schleifer, "The Extent of the Market and the Supply of Regulation," *Quarterly Journal of Economics* 120, no. 4 (2005): 1445–73.