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THE IMPACT OF RIGHT-TO-WORK LAWS

A SPATIAL ANALYSIS OF BORDER COUNTIES

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The Mackinac Center for Public Policy

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By Michael D. LaFaive and Todd Nesbit, Ph.D.

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Executive Summary

There are now 27 states with "right-to-work" laws. These laws prohibit private sector employers from requiring employees to financially support a union. Research by academics and others explores the impact these laws may have on a state's economic performance. The evidence produced so far seems to show that, on balance, adopting such statutes contributes to economic growth and development. This study examines this question anew and finds similar results.

The 2010s saw five states — Indiana, Michigan, Wisconsin, West Virginia and Kentucky — adopt right-to-work legislation, in that chronological order. This provides a type of natural experiment that can be studied to test the impact that this policy change may have had, holding all else equal. While these impacts take time to materialize in the data, enough time has passed to attempt a measurement of the potential impacts on economic growth and development in these states.

This analysis relies on a measuring technique popularized by economist Thomas J. Holmes. It involves measuring employment changes in industrial sectors as a percentage of total employment and comparing these among counties in neighboring states across time. Specifically, Holmes compared counties in states with right-to-work laws to counties they border in states without right-to-work laws. This study uses a modified version of this methodology — a spatial regression model — to test the impact of recently enacted right-to-work laws on state economies.

We chose to specifically analyze the impact involving Michigan and Indiana, as they were the first two in a string of five states to adopt right-to-work laws most recently. The states also share a common border with Ohio, a non-right-to-work state. This allows us to investigate the impact of two states becoming right-to-work in short order against a third that had not. Lastly, Michigan is home to the Mackinac Center, the primary focus of its state policy analysis and work.

 We collected data from counties across the contiguous United States. The information included employment data from 18 industrial sectors of the economy. We also collected data on a host of control variables. These include demographic information on local populations, such as the percentage of the population in poverty, percentage older than 25 with at least a bachelor's degree, percentage that is female, percentage that is nonwhite and the percentage of the population aged 20 to 64.

To control for other state policies that may influence employment growth but are unrelated to right-to-work, we also included the 2017 economic freedom score of each state from the Fraser Institute's Economic Freedom of North America report.

Our output measures the effect of right-to-work laws on employment by sector in 2018. The findings are also divided out and reported separately for states that adopted a right-to-work law before 2000 and those that adopted one after 2000. Throughout this paper, "pre-2000" and "post-2000" are used to refer to this distinction.

Summary Results

We found that counties in states with right-to-work laws had higher employment levels in several industries as a percentage of total private employment in 2018. Furthermore, we found that differences in employment opportunities were starkest among border counties. That is, counties in non-right-to-work states that bordered right-to-work states often had substantially lower employment levels than their nearby counties over the border in right-to-work states. This implies that border counties in states without right-to-work laws lose jobs to their neighbors, though this may not be the only reason for right-to-work states' superior employment growth.

All employment figures below are measured for 2018. Some of these results met the conventional thresholds used to identify statistical significance while others did not. The economic effects were nevertheless often large and worth discussing. Graphic 1 provides more detailed information about the results.

◆ Manufacturing employment as a percentage of total employment increased as a result of right-to-work laws. Border counties in right-to-work states had 12.1% higher employment share in pre-2000 right-to-work states and 20.7% higher in post-2000 right-to-work states. In interior counties, the results were even larger: 15.5% higher employment share in pre-2000 states and 31.5% higher in post-2000 states.

◆ Right-to-work also increased manufacturing industry employment as a percentage of total employment in border counties without this policy. Counties in non-right-to-work states that bordered right-to-work states had a 3.4% and 10.8% higher employment share, respectively, for pre-2000 and post-2000 results. This suggests there are positive spillover effects from right-to-work laws, perhaps due to greater coordination of firm activities and suppliers in regions that cross state lines.

◆ Construction employment gained as a share of total employment in border counties with right-to-work laws: by 14.2% in pre-2000 states and 1.6% in post-2000 ones. By comparison, border counties in non-right-work states had just 0.8% higher construction employment for pre-2000, while those bordering post-2000 states saw an 8.7% decrease.

◆ Construction employment in the interior counties of right-to-work states was mixed, estimated to be 15.0% higher in pre-2000 states but 7.1% lower in post-2000 ones.

◆ The utility and information industries showed similar results: Both saw increased employment share in border counties in right-to-work states but had decreased employment share in interior counties in right-to-work states and in border counties in states without right-to-work. In right-to-work border counties, employment share in the utilities sector increased by 17.6% and 6.1% for pre-2000 and post-2000 states, respectively. Conversely, employment share was 22.5% and 23.6% lower in non-right-to-work border counties, respectively. In interior right-to-work counties, it also decreased, but not as much: by 4.9% and 17.5% in pre-2000 and post-2000 states.

◆ In education services, right-to-work laws were associated with a reduction in employment share, except in post-2000 border counties in non-right-to-work states, where it was associated with a 1.3% increase. In right-to-work border counties, employment share in this industry was 30.8% lower in both pre-2000 and post-2000 states and 39.3% and 29.5% lower, respectively, in interior right-to-work counties.

◆ None of the results in the transportation and warehousing industry were statistically significant, but the estimates were generally positive for employment share in right-to-work states, ranging from 4.0% higher in interior counties in post-2000 right-to-work states to 11.7% for both interior and bordering counties in pre-2000 states. Border counties in post-2000 states had a 3.5% reduction in employment share in this industry, however.

The table below shows these results in full.

Graphic 1: Illustrative Effects Based on Estimation Results from Spatial Error Model, 2018

Industry	Utilities		Construction		Manufacturing		Transportation & Warehousing		Information		Education Services	
Mean Industry Employment Share	1.445%		5.885%		16.146%		4.163%		1.560%		2.323%	
	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean
Pre-2000 RTW												
External Border County	-0.325**	-22.50%	0.048	0.81%	0.554	3.43%	-0.002	-0.05%	-0.216***	-13.84%	-0.197	-8.48%
RTW Border County	0.254	17.55%	0.836*	14.21%	1.950	12.08%	0.487	11.70%	0.045	2.89%	-0.716*	-30.83%
Interior RTW County	-0.071	-4.94%	0.884	15.03%	2.504*	15.51%	0.485	11.65%	-0.171	-10.95%	-0.913*	-39.32%
Post-2000 RTW												
External Border County	-0.341	-23.60%	-0.511*	-8.69%	1.749**	10.83%	0.313	7.52%	-0.165	-10.59%	0.031	1.32%
RTW Border County	0.088	6.07%	0.096	1.63%	3.333*	20.65%	-0.147	-3.54%	0.012	0.77%	-0.715	-30.78%
Interior RTW County	-0.253	-17.53%	-0.416	-7.06%	5.082**	31.48%	0.166	3.98%	-0.153	-9.81%	-0.685	-29.46%

Note: ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.
Illustrative effects calculated on the following assumptions:
1) The typical county borders five other counties.
2) Right-to-work border counties typically border three other right-to-work counties.
3) Border counties in non-right-to-work states border two right-to-work counties.
See the Technical Appendix for more details.

Michigan and Indiana Results

We also analyzed the impact of adopting right-to-work laws in Michigan and Indiana using county-level data from these two states and their surrounding neighbor states. Our analysis found positive results from adoption of right-to-work laws in Michigan, although many of the results did not meet the formal standard for statistical significance. For Indiana, similarly positive results were found and many did meet this standard.

Measures of the statistical significance of findings provides researchers with confidence that their findings are distinct from random fluctuations in the data. We recognize the value of these tests but will nonetheless include some state-specific findings that did not pass these conventional tests for statistical significance.

We also recognize that an increasing number of scholars have made the case that social scientists may place too much emphasis on statistical significance and thus overlook potentially valuable findings in research. The lack of statistical significance in our state-specific example may simply be a function of the limitations in our dataset due to the relatively recent adoption of right-to-work in Great Lake States. The observations in our dataset have only had about six years to be influenced by the adoption of right-to-work. [*]

That said, the model used for this Michigan-specific analysis, including data from Michigan, Indiana, Ohio and Wisconsin, found that adopting right-to-work was associated with an increase in manufacturing employment as a percentage of total private employment by about 26.1% in the typical Michigan county, although it lacks statistical significance.

The spillover effect on counties in non-right-to-work states was to reduce the manufacturing employment share by 30.0%, a result that was statistically significant. This suggests that, while overall manufacturing employment as a share of private employment was statistically unchanged when averaged out across the entire four-state region, the growth that did occur mostly happened in counties in right-to-work states, likely at the expense of counties in non-right-to-work states.

Similar patterns are found in other industrial sectors. Right-to-work increased employment shares in the construction and the transportation and warehousing industries in right-to-work counties: They were 30.0% higher in construction and 42.5% higher in transportation and warehousing. In non-right-to-work counties, right-to-work reduced employment share in these industries, by 32.8% in construction and 68.6% in transportation and warehousing.

Across the entire four-state region, right-to-work decreased employment share in manufacturing by 3.8%, but this was not statistically significant. The total effect on transportation and warehousing from right-to-work was also not statistically significant, however, the magnitude was

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[*]   Some scholars suggest that it may take 10 years' worth of data to detect meaningful differences in statistical outcomes between right-to-work and non-right-to-work states.

large and negative. Our findings suggest that total transportation and warehousing employment share in the region is lower by 26.0% as a result of right-to-work.

Full results for Michigan are shown in table below.

Graphic 2: Marginal Effects for Michigan Based on Estimation Results from Spatial Autoregressive Model, 2018

Industry	Construction		Manufacturing		Transportation & Warehousing	
Mean Industry Employment Share	4.798%		22.946%		4.165%	
	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean
Direct Effects	1.440	30.02%	5.993	26.12%	1.771	42.51%
Indirect Effects	-1.574	-32.80%	-6.874	-29.96%	-2.855	-68.55%
Total Effects	-0.133	-2.78%	-0.881	-3.84%	-1.085	-26.04%

The Indiana-specific analysis compares county-level data in the Hoosier State to Michigan, Illinois, Kentucky and Ohio. Of these states, neither Ohio nor Illinois have right-to-work laws, and Kentucky passed such legislation just in 2017. In the industries studied, right-to-work increased employment share in Indiana, but it decreased employment in non-right-to-work counties.

In manufacturing, employment as a percentage of total private employment was 27.3% higher in the typical Indiana county. The economic significance in Indiana is very similar to that of Michigan, but unlike the results from the Wolverine State, this finding is statistically significant. The net impact on manufacturing employment in the five-state region is to increase manufacturing employment by 19.6%. This finding, too, was statistically significant.

The impact in the construction industry of right-to-work in the five-state region was to lift employment share by 19.5% in Indiana counties. This effect swamps industry employment losses in non-right-to-work counties in the region, where employment share was 3.0% lower. These findings were not statistically significant.

In transportation and warehousing all effects were statistically insignificant. Employment share was 6.7% higher in Indiana counties, but significantly lower in non-right-to-work counties: 33.1%, specifically. The total effect across the region was also negative, with total industry employment for the typical county in the five-state region down by 26.4%, nearly identical to the estimate for the Michigan sample.

Full results for Indiana are shown in table below.

Graphic 3: Marginal Effects for Indiana Based on Estimation Results from Spatial Autoregressive Model, 2018

Industry	Construction		Manufacturing		Transportation & Warehousing	
Mean Industry Employment Share	4.762%		21.139%		4.125%	
	% Point Change	Change from Mean	% Point Change	Change from Mean	% Point Change	Change from Mean
Direct Effects	0.930	19.53%	5.769	27.29%	0.277	6.72%
Indirect Effects	-0.145	-3.04%	-1.623	-7.68%	-1.366	-33.11%
Total Effects	0.785	16.49%	4.146	19.61%	-1.088	-26.38%

Right-to-work laws have shown themselves to be useful economic development tools. Our new study combines natural controls of cross-border analysis with other controls to help isolate the jobs impact that right-to-work laws have on 18 industrial sectors, the most notable of which is manufacturing. The results are largely positive, even, in some cases, for non-right-to-work counties just across the border from states with right-to-work protections.

Introduction

The state of Michigan adopted a right-to-work law in 2012. It became effective in 2013. A right-to-work law prohibits employers — as a condition of employment — from forcing workers to join a union or financially support one through compulsory dues. Right-to-work's impact on state economic growth ranks high as a subject of interest.

A great deal of research has been done on this topic by Mackinac Center for Public Policy and university scholars over the years. In 2013 the Mackinac Center, for instance, published "Economic Growth and Right-to-Work Laws," which found, among other items, that from 1947 and through 2011, right-to-work laws boosted inflation-adjusted annual growth in personal income 0.8% points above where it would have been in the absence of the law.[1] That increase may not appear like much, but consider context. If a state's citizens would have otherwise had a 2.0% annual growth rate and that was increased to 2.8% as a result of a new right-to-work law, it would represent a 40% boost in real personal income over that 65-year period.[2]

Our positive findings are not the only results of their kind. Other scholars writing before and after the passage of Michigan's right-to-work law have often found broad positive economic consequences from adopting such laws.

We revisit the broad topic of right-to-work laws and their possible economic impact for two reasons. We want to explore if there are positive impacts from adoption of such laws in more recent periods, such as in the post-2000 period when states like Indiana, Michigan, Wisconsin, Kentucky and West Virginia became right-to-work. Secondly, we would like to differentiate the impacts of right-to-work laws on particular industries and explore if the economic benefits of these laws are concentrated in certain industries.

There are some important limitations to this research. Michigan's law only took effect eight years ago, for example. The impact from adopting a right-to-work law may not appear immediately in economic datasets. There are often lags between when the government or other sources collect and then publish useful data, and there are lags between when a policy goes into effect and when discernible effects become evident in the data. In fact, one scholar asserted that 10 years of data may be needed for estimating effects of right-to-work laws on state economies.[3] Unfortunately, only about six years of data is available to study the impact of right-to-work in states that have recently adopted these laws, such as Indiana and Michigan.

Right-to-Work: A Brief History

The Taft-Hartley Act of 1947 amended the National Labor Relations Act to prohibit particular union activities. Among a suite of changes was a provision that empowered states to pass right-to-work laws, which prohibit union contracts that require employees to financially support a union as a condition of employment.[4] By the end of 1947, 12 states — Arizona, Arkansas, Florida, Georgia, Iowa, Nebraska, North Carolina, North Dakota, South Dakota, Tennessee, Texas and Virginia — had enacted right-to-work laws.[5]

In the 1950s, six more states — Alabama, Kansas Mississippi, Nevada, South Carolina and Utah — joined the fold. From then until 2012, state adoptions of right-to-work laws were rare. Wyoming joined in 1963, followed by Louisiana in 1976, Idaho in 1985 and then Oklahoma in 2001. It was not until 2012 that another spate of adoptions occurred, starting with Indiana in 2012, Michigan a year later, followed by Wisconsin in 2015, and West Virginia and Kentucky in subsequent years. Today, 27 of 50 states have right-to-work laws.[6]

Narrative Statistics

It is common practice for academic and other researchers and writers to offer broad statistics on economic and other performance measures between right-to-work states and non-right-to-work states. Doing so helps scholars identify trends that may be worth greater research and contemplation.

If common measurements yield consistent differences in economic growth or employment in right-to-work states versus non-right to work states, it suggests that right-to-work laws maybe be part of an explanation for those different outcomes. These types of narrative statistics can provide great perspective. They can signal where more detailed analyses may be warranted. This signal is evident in several important economic indicators when comparing right-to-work and non-right-to-work states. For instance:

◆ According to the Bureau of Labor Statistics, total employment in right-to-work states grew 13.0% versus 5.8% for non-right-to-work states from 2010 through 2020.

◆ According to the U.S. Census Bureau, from 2010 through 2020, population grew 11.2% in right-to-work states versus 3.6% in non-right-to-work states.

◆ According to the U.S. Census Bureau, a net of 4.5 million people moved from non-right-to-work states to right-to-work states between 2010-2020.

Population changes — including interstate migration — may make for the most interesting and insightful measure to gage the impact of right-to-work laws. It may be the best proxy for considering the different elements that might contribute to someone's decision to try to improve their overall quality-of-life. Most people cannot move from one state to another easily, as there are significant financial and psychological costs to moving.

The academic literature on the determinants of interstate migration is a rich one, marked by approaches that attempt to isolate specific reasons people move. These include such things as amenities, such as parks, access to bodies of water, etc., violent crime rates, sales taxes on food, welfare spending, weather[*] and even whether or not a state possesses a right-to-work law.

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*   For a terrific paper on interstate migration and weather, see "Moving to Nice Weather" by Jordan Rappaport. According to Rappaport, Michigan's weather worked to decrease population growth by -1.5% to 0.0%, depending on the county, from 1970 to 2000. Jordan Rappaport, "Moving to Nice Weather," *Regional Science and Urban Economics* (2007): 390, Figure 2. Controlling for weather's influence in measures of right-to-work impacts has been important because most of the original right-to-work states were located in the southern U.S.

Professor Richard Vedder's 2010 Cato Journal article titled, "Right-to-Work Laws: Liberty, Prosperity, and Quality of Life," finds a positive relationship between RTW laws and interstate migration. He noted, using descriptive statistics, that the population in right-to-work states from 1970 to 2008 increased by more than 100% while in non-right-to-work states it had only increased by 25.7%. Only about 15% of that change could be explained by new states joining the group of right-to-work states, according to Vedder.[7]

In order to isolate the possible impact of right-to-work on interstate migration, Vedder performed statistical analyses with several different models and controls. He reports that, "Without exception, in all the estimations, a statistically significant positive relationship … was observed between the presence of right-to-work laws and net migration." This research was conducted while incorporating important variables such as "tax, climate, occupational composition of the labor force, unemployment population density, and economic growth variables."[*]

These findings are important to consider, especially with respect to Michigan, which was the only state to lose population from 2000 to 2010.[8]

Seminal Academic Research on Right-to-Work Impact

Researchers have long tried to isolate the impact of right-to-work to measure its influence on a host of possible outcomes. The great challenge is teasing out the effects of right-to-work laws from other confounding factors, which could include everything from a state's climate and topography to citizens' attitudes toward labor unions, the state's economic condition prior to its adoption of a right-to-work law and other state-specific public policies.

In his 1998 paper titled, "The Effect of State Policies on the Location of Manufacturing: Evidence from State Borders," Thomas J. Holmes explored changes in manufacturing employment along state borders where one county operates with a right-to-work law is next door to another one that does not.[9]

Holmes used right-to-work laws to label states either pro- or anti-business. In other words, right-to-work laws served as a proxy for pro-business policies. He found that "on average, there is a large, abrupt increase in manufacturing activity when one crosses a state border from an anti-business state into a probusiness state."[10] Specifically, Holmes showed that manufacturing employment as a percentage of total employed increased by one-third, on average, in border counties in states with right-to-work laws.[11]

The Holmes method acts as a de facto control on the other economic phenomena that might influence manufacturing employment, because there is little to distinguish bordering counties in different states other than state-level policies. There is little difference between the two entities

when it comes to factors like geography, regional market performance, weather, access to trained workers, etc. Scholars have repeatedly validated Holmes' approach — it has been cited more than 1,000 times according to Google Scholar, one measure of the scholarship's influence.

It is this basic methodology and modeling effort that we began an attempt to measure impacts that right-to-work laws have on employment in 18 industry sectors across the country, most notably in manufacturing and in other industries where unions are most prevalent, and to Michigan and Indiana's right-to-work laws specifically.

Literature Review

There is much in the way of scholarly research done on the subject of right-to-work laws and their impacts on everything from union membership to wages and economic impacts on workers and businesses. For this review, we focus on research with findings related to employment outcomes, because that is primarily what this study measures. We also confine the review to papers published since the Mackinac Center's 2013 right-to-work study was published, which contained its own literature review.[12] We further narrowed our review to research that cited the 1998 Holmes study, because that methodology was the largest influence on the modeling used in this study.[*]

There is one exception which involved methodological considerations that fed the construction of our own model and measuring techniques, and which we describe directly below. Economists Charlene Kalenkoski and Donald Lacombe's 2006 paper, "Right to Work Laws and Manufacturing Employment: The Importance of Spatial Dependence," published in the Southern Economic Journal, argued that studies that attempt to measure connections between right-to-work laws and manufacturing employment (among other sectors) "dramatically overstate the positive relationship between RTW legislation and manufacturing employment."[13] This is likely due to omitted variables, a common issue raised in reviews of academic papers, whether related to right-to-work or not. They point to the 1998 paper by Thomas J. Holmes and argue that his use of a particular statistical technique known as "Ordinary Least Squares" may have biased his estimates upward.[14]

In their own analysis, Kalenkoski and Lacombe attempt to better control for omitted variables than other previous scholars. They too find positive impacts from right-to-work on manufacturing employment, though smaller ones than did Holmes.[15] They also found that right-to-work "legislation is positively associated with employment shares in the information and professional, scientific, management, administrative, and waste management services industries" but "negatively associated with "agriculture, forestry, fishing and hunting, and mining industries and some service industries."

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* The review necessitated sifting through many research articles to winnow the list to those that would best inform our research. The list of studies described below is not comprehensive. Our broad research began by sifting through more than 1,000 links to subject-specific academic studies using Google Scholar and refining that search from there.

In March 2020 the Journal of Financial Economics published "The Economic Impact of Right-to-Work Laws: Evidence from Collective Bargaining Agreements and Corporate Policies." This study touched on bargaining influences, wages of unionized workers, investment, profits, compensation for executives and changes in employment in five states with right-to-work laws, including Michigan.[16]

Among its many conclusions is that firms increase investments and employment in states after a right-to-work law is adopted.[17] The authors, however, also found a decline in wage growth among workers covered by collective bargaining agreements over a period of about one year.[18]

"The Long-Run Effects of Right to Work Laws," by Benjamin Austin and Matthew Lilley of Harvard University, is a working paper made public in November 2021 that like this study examines county-level data to measure the impact of right-to-work laws on employment in the manufacturing sector. The authors find that "the manufacturing share of employment is 3.23 percentage points (or approximately 28%) higher on the RTW side of the policy border." This is similar to the findings of this paper, showing manufacturing employment share in 2018 in border counties to be 21% higher than it otherwise would be in right-to-work states. The Harvard scholars also note that right-to-work is associated with population growth and net commuters from non-right-to-work states, as well as higher labor force participation and lower childhood poverty rates.[19]

Published in 2019 in the Journal of Law and Economics, "Do Right-to-Work Laws Work? Evidence from Individuals' Well-Being and Economic Sentiment," examined the passage of right-to-work laws on union workers' economic sentiment as well as their life satisfaction. The author, Christos Makridis, reports increases in both. As part of the analysis, he compared nonunion and unionized employees before and after passage of a right-to-work law and found, "the positive association between RTW laws and well-being is concentrated among union workers."[20]

In this research Makridis asked if "measures of well-being and sentiment reflect genuine changes in real economic activity." Referencing his 2018 working paper, "Sentimental Business Cycles and the Protracted Great Recession,"[21] he writes "a 1-percentage-point rise in employment growth is also associated with a 0.34-percentage-point rise in the probability that an individual reports that their firm is expanding, suggesting that self-reported information about economic sentiment reflects authentic improvements in local economic activity."[22]

As one of several checks on his analysis of the data, Makridis employed a cross-border analysis, citing Holmes, and comparing well-being between workers in right-to-work states with those in non-right-to work states. He found consistent results doing so, though the economic sentiment "is not statistically significant at conventional levels."[23]

In 2018 the consulting firm National Economic Research Associates, Inc. updated its work, "Right-to-Work Laws: The Economic Evidence," an academic literature review focused on economic performance, wage impacts and union density. Some of the research described by NERA is also reviewed here. With respect to the economic development consequences of right-to-work laws, the paper says, "RTW laws directly affect economic performance through their impact on business location decisions, especially in heavily unionized industries such as manufacturing. Other things

equal, businesses are more likely to locate in states with RTW laws. There is also evidence that RTW laws have a direct effect on employment, output and personal income."[24]

The 2017 paper, "Show-Me Right to Work: A Regional Comparison of Right-to-Work and Non-Right to Work States," measures right-to-work's impact based on socioeconomic metrics, including quality-of-life ones. The study is focused in on a specific, nine-state region, including Missouri and eight neighboring states.[25] The authors make comparisons between right-to-work and non-right-to-work states using about 60 different measures.[26]

Only 10 of the indicators used demonstrated a statistically significant different outcome between states with right-to-work protections and those without them. Of those, four measured economic impacts. Closely related, however, were four more on business impacts. The remainder involved quality-of-life issues.[27] The authors found that "both household income and wages grew faster in RTW states in the first few years after the recession ended" (in 2009) and that right-to-work states in the region "tended to have a lower share of long-term unemployed." These were among other findings, not all of which were necessarily positive for right-to-work laws.[28] For instance, the authors found that injuries in right-to-work states happened at rates "slightly higher than in non-RTW states."[29]

The Oklahoma-specific journal article, "What Do Right-to-Work Laws Do? Evidence from a Synthetic Control Method Analysis," was published in 2016 in the Journal of Policy Analysis and Management. The authors found adoption of right-to-work in Oklahoma did not lead to an improved employment rate or average wages in the private sector. It did find a decrease in rates of unionization there, however. Narrowing the analysis to just Oklahoma's manufacturing sector did not change the findings.[30]

The authors note that it is important to remember that Oklahoma had a relatively low unionization rate to begin with, so impacts from adoption of right-to-work there may not translate to states with greater union density.[31] In 1998, the percentage of private union members working in Oklahoma's manufacturing sector was 6.6%. In Michigan, during that same year, it was 17.5%, according to unionstats.com.[32]

Another 2016 study of right-to-work laws was published by the Cato Journal and titled "New Evidence on the Effect of Right-to-Work Laws on Productivity and Population Growth." The three authors — Michael J. Hicks, Srikant Devaraj and Michael LaFaive — have all published work for the Mackinac Center for Public Policy and the latter is co-author of this paper. The authors looked at both productivity and population growth in manufacturing and found that manufacturing in non-right-to-work states was only about 64% of that in right-to-work states.[33] The research also found that "the presence of an RTW law boosted state population growth by 1.1 percent to 1.5 percent," over two time periods, respectively: 1971-1990 and 1991-2003.[34]

In 2014, the Competitive Enterprise Institute in Washington, D.C., published "An Interstate Analysis of Right-to-Work Laws." The authors measure changes in income in right-to-work states from 1977 to 2012 while controlling for economic phenomena that may also affect personal income growth.[35] The authors then use the data to help answer the question: "What would have happened

to income levels over the 35-year period of 1977-2012 in states that did not have an RTW law in 1977 had they, in fact, adopted one by 1977."[36] They estimated that most non-right-to-work states lost per-capita income between $2,500-$3,500. That is, per-capita incomes in non-right-to-work states would be as much as $3,500 higher today. The median figure, according to the authors, was $3,278, which translates into a loss of income of $13,000 for a four-person family annually.[37]

Michigan ranked 10th worst among the 30 non-right-to-work states in this study, authored by Richard Vedder and Jonathon Robe, with $3,460 in per-capita income losses.[38] The authors described this impact for the Great Lake State for the period of their study, writing:

> In 1977, Michigan's per capita income was 7.4% above the national average; by 2012, it was some 12.2% below the national average. According to the statistical estimation in Table 1, about *two-thirds* of the current deficiency in Michigan's actual per capita income relative to the national average would have been eliminated if it had an RTW law. In 1977, Michigan had 14.5% higher income per capita than RTW Texas. By 2012, by contrast, income per capita was more than 10% higher in Texas than in Michigan.[39]

Description of Empirical Model

We empirically test the effects of right-to-work legislation on employment trends by estimating a model to describe county-level industry employment as a percentage of total private employment for 18 industries for the year 2018.

One advantage of examining industry employment as a percentage of total private employment is that the variable is automatically adjusted for ups and downs in the business cycle. That is, both the numerator and the denominator are impacted by general economic trends.

Control variables used in the model include various county-level population demographics obtained from the U.S. Census Bureau, such as total population, percentage of population in poverty, percentage of population aged 25 and older with at least a bachelor's degree, percentage of population who are nonwhite, percentage of population who are female, and percentage of population aged 20 to 64, the typical working age.

While we are interested in the effect of right-to-work legislation, we must also control for each state's general economic and policy environment. A state that has opted for right-to-work legislation might tend to enact other types of policies that may impact employment and economic performance. To control for such policies, we include the 2017 "economic freedom score" from the Fraser Institute's Economic Freedom of North America report. This index ranks states based on how market-friendly their policies are — the higher the ranking, the more market-friendly. We use this in the model to help avoid inappropriately assuming certain economic outcomes are the result of right-to-work laws.[*]

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* From the EFNA, we remove the union density (area 3Aiii) variable and recalculate the economic freedom score to reduce the likelihood that this variable measures similar policy influences as our right-to-work variables.

The direct effect of right-to-work legislation on a county is measured through the inclusion of two binary variables. There are roughly two waves of states enacting right-to-work laws — one in the 1940s and 1950s and another in the 2010s. Early adopters of right-to-work legislation may have different employment patterns than those states that more recently adopted right-to-work, and the effects of the enacting the law may diminish over time. We attempt to take these potential differences into account by dividing the analysis and results into two groups: pre-2000 right-to-work adopters and post-2000 adopters.[*]

Six states enacted right-to-work legislation after 2000: Oklahoma in 2001, Indiana and Michigan in 2012, Wisconsin in 2015, West Virginia in 2016 and Kentucky in 2017. It is possible that the full effects of the most recent adopters will not have been observed in the 2018 data. In both instances, however, we expect that counties in right-to-work states will enjoy higher employment share than they would have without a right-to-work law, particularly in industries traditionally represented by higher union membership.

To measure the indirect effect on counties in nearby non-right-to-work states that border a right-to-work state, we include variables indicating whether a given county borders another in a right-to-work state. To the extent that job opportunities move toward right-to-work states, one might expect such counties to observe lower employment share in union-dense industries, especially if employers tend to move from nearby states to ones with new right-to-work laws. However, it is also possible that right-to-work policies create general growth in a region, which could spill over into nearby non-right-to-work counties, potentially leading to increased employment in counties bordering right-to-work states.

The estimation model employed for the analysis is a spatial error model. SEMs control for the influence of spatially correlated omitted variables. While researchers attempt to include the most theoretically important explanatory variables, omitted variables are commonplace in all empirical studies, in part, because of data limitations, but also because throwing in all possible variables (the proverbial kitchen sink) can lead to other empirical issues, such as multicollinearity. Particularly in the case of county-level data, many variables, including omitted ones, will be correlated systematically across space. The spatial correlation of omitted variables can lead the estimated coefficients from a standard regression to be inconsistent — that is, the expected value of the estimated coefficient does not approach the true (yet unknown) value as the sample size increases. The SEM tries to correct for this problem and reduces the potential negative influence from omitted variables. Further details on the SEM can be found in the technical appendix.[†]

We first discuss estimation results employing data for the continental U.S. states. Sample sizes vary across the 18 industries examined due to county-level employment data availability in the

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[*]   The exact year chosen to divide the states into two groups is unlikely to have a large impact on the results. We chose the year 2000 in part because Oklahoma was the first state to change its policy on right-to-work in 16 years when it did in 2001, and within the next several years, more states followed suit, suggesting that a general shift in the political possibility of right-to-work laws kicked off around that time. Further, 2000 is a census year, which means more data is available for this year than others.

[†]   For robustness, we also estimate a spatial autocorrelation model, or SAR, which addresses the spatial correlation in a different fashion. Additional details on this specification and the discussion of the results from the SAR are discussed in the technical appendix.

U.S. Census Bureau's County Business Patterns. Full results can be found in the technical appendix for all industries; however, we limit the discussion here to the six industries with the highest levels of union membership among employees. These include utilities, construction, manufacturing, transportation and warehousing, information, and education services. These industries had a higher than average rate of unionization in 2018, ranging from 9% in manufacturing to 20.1% in utilities, according to the Bureau of Labor Statistics.

Results

In general, we find evidence that counties in states with right-to-work legislation observe higher employment as a percentage of total private employment in union-dense industries than it would have been without right-to-work laws. The most interesting cases concern the border counties between states which differ in their policies regarding right-to-work. In most union-dense industries analyzed, there is a clear indication that border counties in states without right-to-work laws are losing employment share to neighboring border counties in right-to-work states. However, this relocation of employment opportunities to right-to-work counties is not the only source of increased jobs.

To illustrate the effects of right-to-work laws in counties along each side of a border between two states with differing right-to-work policies, we make the following assumptions regarding these border counties: 1) the typical county borders five other counties; 2) right-to-work border counties typically border three other right-to-work counties; and 3) border counties in non-right-to-work states border two right-to-work counties. These assumptions are intended purely for illustrative purposes and results can easily be computed with alternative assumptions. Also worth noting is that not all the results met the conventional thresholds used to determine statistical significance. Many of the economic effects are nevertheless large and worth discussing.

Using these assumptions, the results regarding the manufacturing industry, which accounts for just over 16% of private employment, are particularly interesting and distinct from the other industries analyzed.

We find that right-to-work laws led to increased employment in manufacturing as a percentage of total employment in all types of counties analyzed — both border and interior counties in right-to-work states and border counties in non-right-to-work states. This finding is based on a national analysis of border counties, but it is particularly large for post-2000 right-to-work states, such as Michigan.

Specifically, manufacturing employment as a share of total private employment in interior right-to-work counties was estimated to be 15.5% higher in pre-2000 states and 31.5% higher in post-2000 states.[*] Border counties in pre-2000 states had 12.1% higher employment share and in post-2000 states the figure was 20.7%.

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[*] The estimates discussed here are percentages and not percentage points. The estimated 15.5% to 31.5% increase in industry employment corresponds to 2.5 and 5.1 percentage point increase in manufacturing's share of total private employment, respectively.

The most interesting result regarding the effects of right-to-work on manufacturing employment might be that border counties in states without right-to-work laws also had increased employment share, by between 3.4% (pre-2000) and 10.8% (post-2000). This finding might be the result of increased demand for inputs by manufacturers in the bordering right-to-work states. With some of those suppliers being located across state lines in the non-right-to-work state, the employment benefits to manufacturing can spill over across state borders.

The results in the construction industry, nearly 6% of private employment, are mixed. Construction employment in interior counties is estimated to be 15.0% higher in pre-2000 states. However, in post-2000 states, construction employment in interior counties is lower by 7.1%.

In right-to-work border counties, the employment share of the construction industry was 14.2% higher in pre-2000 states and 1.6% higher in post-2000 states. Border counties in non-right-to-work states are estimated to experience 0.8% higher employment share in pre-2000 states but 8.7% lower in post-2000 states.

The effects of right-to-work laws on the transportation and warehousing industry, which accounts for just over 4% of total private employment, was not found to be statistically significant in any of the groups of counties studied. But we will present the point estimates here.

Interior counties in right-to-work states observe employment share in transportation and warehousing increased by 11.7% higher in pre-2000 states and 4.0% higher in post-2000 states. Border counties in pre-2000 states were estimated to also experience an 11.7% increase in transportation and warehousing share of total private employment. However, in post-2000 states, there was a 3.5% reduction in employment share in border counties.

Border counties in non-right-to-work states had no change for pre-2000 situations but experienced a 7.5% increase in transportation and warehousing employment share when bordering a post-2000 right-to-work state. Like manufacturing, this might be the result of the coordination of firm activities and suppliers across state lines.

Given the smaller industry share of total private employment for the utility industry (1.4%), the information industry (1.6%), and the educational services industry (2.3%), we only quickly highlight the results for these three industries.

In both the utilities and the information industries, right-to-work is estimated to increase employment share in border counties in right-to-work states but decrease it in both interior right-to-work counties and border counties in non-right-to-work states. Right-to-work in the educational services industry is estimated to reduce employment share in all cases except for border counties in non-right-to-work with post-2000 adoption.

Michigan Results

In addition to the estimates based on all counties in the continental U.S., we also estimate our model for the manufacturing, construction and transportation and warehousing industries with smaller samples. These include Michigan and its border states, and separately, Indiana and its border states. We now turn to the discussion of those results.

This sample includes counties from Michigan, Indiana, Ohio and Wisconsin. Of these states, only Ohio did not have right-to-work legislation passed by 2018, the year from which our employment data is collected. Manufacturing accounts for roughly 23% of total private employment in this sample. The direct effect of right-to-work laws on a typical right-to-work county in this sample is to increase manufacturing employment as a percentage of total private employment by roughly 26%, although this finding is not statistically significant.

A brief digression on statistical and economic significance is in order. Some researchers choose to rely only on findings that meet the conventional threshold of statistical significance. In doing so, they discount all results that are not statistically different from zero. Others, including, for example, economist Deirdre McCloskey, argue that economic significance of point estimates matter, too. These should be considered, especially if the effect is large, as is the case with Michigan's results.

We include and emphasize the magnitude of right-to-work's impact on manufacturing in Michigan border counties here. The lack of statistical significance in our state-specific example may simply be a function of the limitations in our dataset due to the relatively recent adoption of right-to-work in Great Lake States. The observations in our dataset have only had about six years to be influenced by the adoption of right to work. Some scholars argue it could take 10 years of data to properly measure the full impact of right-to-work laws on an economy, so inconclusive results may be reasonably expected.[40]

One result that was statistically significant and large was the spillover impact of a right-to-work law on counties in non-right-to-work states, in this sample, Ohio. Our model shows a 30% decline in manufacturing employment share in Ohio counties. While right-to-work laws were not associated with an overall increase in manufacturing employment share in this region of study, these results suggest there was a realignment of manufacturing employment opportunities toward right-to-work counties in the region.

Similar results were observed in both the construction and the transportation and warehousing industries. That is, the direct effect of right-to-work is to increase employment share in right-to-work counties and by a large amount: 30.0% in construction and 42.5% in transportation and warehousing. The indirect effect was also large and predicted: Employment share in Ohio counties was 32.8% lower in construction and 68.6% lower in transportation and warehousing. In the construction industry, the effects across the region cancel each other out such that there is only a small net effect. In transportation and warehousing, the net effect is relatively large in magnitude and negative, suggesting that total employment share in the four-state region is lower by potentially 26%.

Indiana Results

This sample includes counties from Indiana, Michigan, Illinois, Kentucky and Ohio. Of these states, neither Ohio nor Illinois had right-to-work legislation passed by 2018, and Kentucky had just passed such legislation in 2017. Manufacturing accounts for roughly 21% of total private employment in this sample. The direct effect of right-to-work in a given county is estimated to increase manufacturing employment as a percentage of total private employment by 27.3%, a result that is similar to the one found in Michigan.

The indirect effect — that is, the collective spillover effect on other non-right-to-work counties — is estimated to reduce manufacturing employment share by a comparatively modest 7.7%. The net effect on manufacturing employment is to increase the manufacturing employment share by 19.6% across the five-state region.

In the construction industry, a similar effect was found. Indiana's right-to-work law was associated with a 19.5% increase in employment share in the right-to-work counties, but a 3% decrease in non-right-to-work counties. The total effect is an overall increase in construction employment share of 16.5% for this region. In transportation and warehousing, the total effect is large and negative, similar to the Michigan results. Specifically, total transportation and warehousing employment share across the five-state region is lower by 26.4%.

Conclusion

Right-to-work laws have shown themselves to be useful economic development tools. Research by academics and other scholars generally show positive economic gains from adoption of right-to-work laws. In this study we investigated the impact by examining changes in county-level employment as a percentage of total private employment and report findings across the six most union-dense industrial sectors. The effects of right-to-work adoption on these employment shares were measured using data from 2018.

By employing a border county analysis, this study controls for many economic phenomena that might otherwise influence these employment data. Adding variables to control for such things as county population, poverty, different age groups, race, gender and education and a state's economic freedom score from the Fraser Institute's "Economic Freedom of North America" attempts to further isolate the impact of right-to-work laws on county and state economies. The effects of right-to-work were measured for 2018 but the impacts are divided into two categories based on whether the policy adoption occurred before or after the year 2000.

The results are generally positive and significant. Border counties in right-to-work states had higher employment share as a percentage of total private employment in most industries studied. In addition, these employment gains appear to come from losses suffered in border counties in states that did not have right-to-work laws in place. For instance, in the largest single industry studied — manufacturing — border counties in right-to-work states experienced 12.1% higher manufacturing employment share in 2018 if they adopted right-to-work before 2000 and 20.7% higher employment in 2018 if they adopted after 2000.

More narrowed analyses of Michigan and Indiana found similar results. Counties in right-to-work states in these Midwest regions saw employment share increase, while counties situated in non-right-to-work states generally saw employment share declines. This suggests that employment opportunities in the industries studied tended to shift from counties in non-right-to-work states to those in right-to-work states.

Policymakers interested in maintaining or encouraging job opportunities in their states would be wise to protect or adopt right-to-work laws. This study adds to the evidence that shows largely positive economic gains from doing so.

Technical Appendix

The results of this study build upon the existing literature. The first notable study is Soffer and Korenich (1961) in which the authors conclude that right-to-work laws do not contribute to the growth of nonagricultural employment and industrial development within a state. However, in reaching this conclusion, the authors employ a rather simple analysis of variance methodology that ignores the influence of widely accepted confounding factors on state employment. Newman (1983) employed multiple regression to control for many of these other factors commonly thought to influence employment and found that right-to-work laws exert a statistically significant and positive impact on changes in employment, a result that is particularly strong in labor-intensive industries, the focus of this study. Newman (1984) extends the earlier work and offers evidence that the impact of right-to-work laws diminish over time and eventually disappear. Despite improvements in the employed methodology, both of Newman's (1983 and 1984) analyses continue to suffer from omitted variable bias due to the exclusion of unmeasurable geographic characteristics and neither study addresses spatial dependence in any way.[*]

Holmes (1998) made what many have argued to be the first significant attempt to address the omitted variable bias due to unmeasurable geographic characteristics. Holmes relied on county-level analysis at the state borders between states with differing right-to-work policies. Geographic characteristics are likely to be similar across contiguous border counties. Thus, Holmes explains, the issue involving distinguishing the effects of state policy from the unmeasurable geographic characteristics is mitigated.

Holmes' expectation is that we should observe distinct changes in manufacturing activity at state borders where the policy differs. He uses two measures for manufacturing activity at the county level: 1) manufacturing employment as a percentage of total private nonagricultural employment in 1992, and 2) the growth rate in manufacturing employment from 1947 through 1992.

In his primary model explaining the manufacturing share of total private nonfarm employment, Holmes included a right-to-work binary variable and two distance functions to control for a county's proximity to a right-to-work policy border and on which side of that border the county fell. Holmes determined that controlling for geography impacts the estimated coefficient on the right-to-work binary variable. The average cumulative increase in the manufacturing share of private nonfarm employment on the right-to-work side of the border is roughly 6.6%. This is about a third larger than the estimated increase when geography is not controlled for.

While Holmes' attempt to control for unmeasured geographic factors was an improvement upon the status quo at that time in the right-to-work literature, the use of the ordinary least squares estimator is likely not appropriate. The dependent variable — the manufacturing share of nonfarm employment — may be spatially correlated due to agglomeration economies or measurement error. In such a cases, OLS produces coefficient estimates that are biased and inconsistent. Further, it is possible that the OLS residuals are spatially correlated; this is, in part,

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because the ad hoc distance functions are likely to result in correlation in the error terms across counties. In such cases, OLS estimates are unbiased but inefficient.

While limited in scope due to focusing on only one right-to-work state, namely Idaho, Wilbanks and Reed (2001) and Dinlersoz and Hernandez-Murillo (2002) are noteworthy in that they attempt to address the omitted variables bias and correlated errors in ways that differ from Holmes (1998). Using a treatment and control group comparison approach and controlling for a host of demographic and geographic characteristics such as educational attainment, race, population growth prior to right-to-work adoption, industry composition, and urban-rural status, Wilbanks and Reed (2001) find that manufacturing employment growth in Idaho was greater than that of the control groups. Dinlersoz and Hernandez-Murillo (2002) employ a similar methodology and find that Idaho counties experienced higher annual growth in manufacturing employment than the nearly stagnant growth in the neighboring states. Further, the improvement between the pre- and post-right-to-work law growth rates in manufacturing employment was larger in Idaho than in neighboring states.

None of the aforementioned studies adequately addresses the potential for spatial correlation in the dependent variable or in the residuals. Arguably, the first paper to do so is Kalenkoski and Lacombe (2006). They separately address spatial correlation in the dependent variable and residuals by estimating the spatial autoregressive model, or SAR, and the spatial error model, or SEM. Kalenkoski and Lacombe (2006) also argue that they better control for the demographic characteristics that influence demand for and supply of labor or to explain public attitudes toward state policy. Specifically, they include measures of age distribution, race and gender composition, educational attainment, and degree of urbanization. The authors also examine a larger number of industries rather than just focusing on manufacturing.

The approach employed by Kalenkoski and Lacombe (2006) serves as a primary guide to the empirical approach employed in this study. The primary findings of their study indicate that right-to-work legislation is associated with a 2.12% increase in the manufacturing share of private employment. This finding is nearly 30% lower than their estimate from their specification that does not control for the spatial correlation. Right-to-work is found to reduce the share of private employment in the agriculture, forestry, fishing and hunting, mining and some service industries. However, right-to-work is positively associated with employment share in the information and professional, scientific, management, administration and waste management industries.

Model Estimation Technique

We empirically test the effects of right-to-work legislation on employment trends by estimating a model to describe county-level industry employment as a percentage of total private employment for each of the 18 two-digit, NAICS industries for the year 2018. One advantage of examining industry employment as a percentage of total employment is that the variable is automatically adjusted for ups and downs in the business cycle. That is, both the numerator and the denominator are impacted by a downturn in the economy. Of course, economic downturns can

still affect specific sectors more than others, such as housing construction during the Great Recession and restaurants and similar service sectors during the COVID-19 recession.

Control variables used in the model include various county population demographics obtained from the U.S. Census, such as total population, percentage of population in poverty, percentage of population aged 25 and older with at least a bachelor's degree, percentage of population who are nonwhite in race, percentage of population who are female, and percentage of population aged 20 to 64. While we are interested in the effect of right-to-work legislation, we must also control for each state's general institutional environment, as one might expect that a state which has opted for right-to-work legislation might also tend to enact certain other types of policies that may be considered "market friendly" or aim to promote economic growth. To control for such policies, we include the 2017 "economic freedom score" from the Fraser Institute's Economic Freedom of North America report. We remove the union density (area "3Aiii") element of the ranking and recalculate the score to reduce the likelihood that this variable measures similar policy influences as our right-to-work variables.

The direct effect of right-to-work legislation on the home county is measured through the inclusion of two binary variables. Following Newman's (1984) finding that the effects of right-to-work tend to diminish over time, early adopters of right-to-work legislation may observe different employment patterns than those states which more recently adopted the policy. To permit such variation in the effects of right-to-work laws, we distinguish whether such a law was enacted before or after the year 2000.

The most recent right-to-work enactments prior to year 2000 include Texas in 1993, Idaho in 1985 and Louisiana in 1976. Six states enacted right-to-work legislation after 2000: Oklahoma in 2001, Indiana and Michigan in 2012, Wisconsin in 2015, West Virginia in 2016 and Kentucky in 2017. It is possible that the full effects of the most recent adopters will not appear in the 2018 data. However, we expect that counties in right-to-work states will observe higher relative employment share growth in industries traditionally represented by higher union membership regardless of the adoption year.[*]

To measure the indirect effect of a right-to-work law on nearby counties, particularly in non-right-to-work states, we interact the right-to-work binary variables with a spatial weight matrix. This interaction variable indicates for each individual county the percentage of bordering counties which have enacted right-to-work laws (pre- and post-2000 enactment). To the extent that job opportunities move toward right-to-work states, we might expect non-right-to-work counties bordering right-to-work counties to observe lower employment in traditionally high-union density sectors. However, it is also possible that right-to-work policies create regional industry economies of scale, which could spill over in nearby non-right-to-work counties, potentially leading to increased employment.

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[*] Varying this watershed year should not have a significant impact on the estimated results. Selecting an earlier watershed year by up to six years would have no impact on the classification of early or late adopters, and varying the year by up to 11 years later would cause only Oklahoma to switch from a late to an early adopter.

The estimation model employed for the analysis is a spatial error model. SEMs control for the influence of spatially correlated, unobservable omitted variables. Particularly in the case of county-level data, many variables, including omitted ones, will be correlated systematically across space. The spatial correlation of omitted variables can lead the estimated coefficients from a standard regression to be inconsistent — that is, the expected value of the estimated coefficient does not approach the true (though unknown) value as the sample size increases. The SEM corrects for this problem and reduces the potential damage from omitted variables. Anselin (1988) and Lesage and Pace (2009) have defined the SEM as follows:

$$y = X\beta + u,$$

$$u = \lambda W u + \varepsilon,$$

$$\varepsilon \sim N(0, \sigma^2 I_n),$$

where y represents industry employment as a percentage of total private employment, X is the vector of independent variables, β is defined as the vector of linear slope coefficients, and the error term (u) is spatially correlated when λ is nonzero. W represents the row-normalized spatial weight matrix. In this case, we use first-order contiguity to determine neighbors. OLS estimates of β are unbiased but inefficient; as such, maximum likelihood is used.

To better understand the construction of the spatial weight matrix, consider the selected Michigan counties in Figure 1. For the purposes of this discussion, we will assume that only the eight red-highlighted counties are relevant (i.e., none of the eight counties border any other relevant county). However, we include in the full analysis all counties in the contiguous U.S. for which data are available.

Graphic 4: Select Michigan Counties
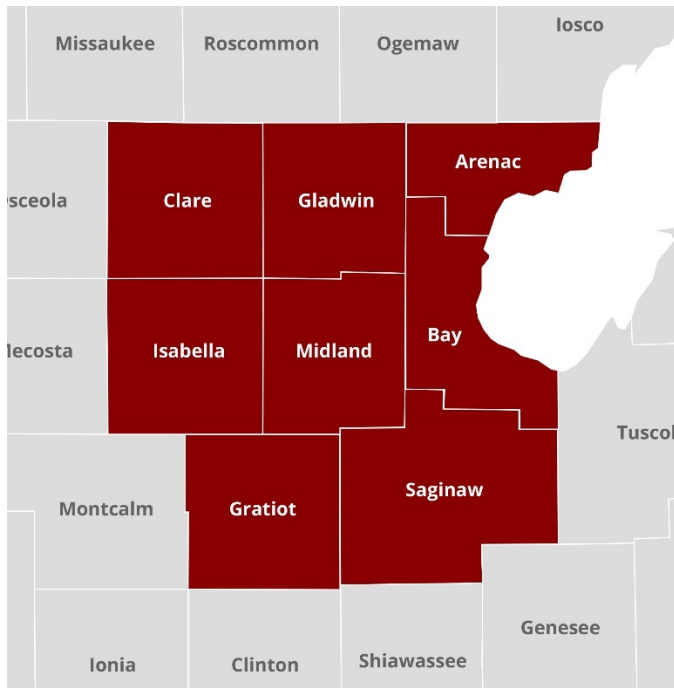
The first step in creating the weight matrix is to determine the border counties for each county. Consider Clare and Midland Counties, for example. Limited to just the counties shown in red, Clare County borders Gladwin, Isabella and Midland. Midland County shares borders with all the included counties except Arenac.

Figure 2 displays the numerical representation of the contiguous neighbors (left-hand side) and the row-normalized spatial weight matrix (right-hand side). Each row is interpreted as the "home" county and each column as the contiguous neighbor. If a home county is contiguous with another county, it is coded "1" and if not, "0." Thus, for Clare County (third row from the top), there are ones in the columns corresponding to Gladwin, Isabella and Midland. For Midland County (second to last row), there are ones in every column except those corresponding to Arenac and Midland. Since a county cannot border itself, the diagonal will only contain zeros.

To create the row-normalized weight matrix, the matrix of zeros and ones must be row normalized such that each row sums to one. Since Clare County borders three other counties, the row normalization can be accomplished by dividing each element of the Clare County row by three such that in the right-hand side of Figure 2 the Clare County row now includes only cells of value 0 and 0.33. For Midland County with six contiguous neighbors, the row normalization involves dividing all elements of the row by six such that the respective row in the weight matrix includes cells of value 0 and 0.17 only.

Graphic 5: Weight Matrix Construction Example

	Arenac	Bay	Clare	Gladwin	Gratiot	Isabella	Midland	Saginaw
Arenac	0	1	0	1	0	0	0	0
Bay	1	0	0	1	0	0	1	1
Clare	0	0	0	1	0	1	1	0
Gladwin	1	1	1	0	0	1	1	0
Gratiot	0	0	0	0	0	1	1	1
Isabella	0	0	1	1	1	0	1	0
Midland	0	1	1	1	1	1	0	1
Saginaw	0	1	0	0	1	0	1	0

	Arenac	Bay	Clare	Gladwin	Gratiot	Isabella	Midland	Saginaw
Arenac	0.00	0.50	0.00	0.50	0.00	0.00	0.00	0.00
Bay	0.25	0.00	0.00	0.25	0.00	0.00	0.25	0.25
Clare	0.00	0.00	0.00	0.33	0.00	0.33	0.33	0.00
Gladwin	0.20	0.20	0.20	0.00	0.00	0.20	0.20	0.00
Gratiot	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33
Isabella	0.00	0.00	0.25	0.25	0.25	0.00	0.25	0.00
Midland	0.00	0.17	0.17	0.17	0.17	0.17	0.00	0.17
Saginaw	0.00	0.33	0.00	0.00	0.33	0.00	0.33	0.00

The row-normalized spatial weight matrix is used to minimize the econometric issues stemming from spatial correlation that is problematic for much of the prior academic literature on the effects of right-to-work laws. This is accomplished first through the use of the SEM in which the spatial weight matrix controls for spatial correlation in the error term due to spatially correlated omitted and otherwise unmeasurable variables. We further control for spatial influences specifically related to right-to-work policy by interacting the spatial weight matrix with the binary right-to-work variables. The interpretation of this interaction term is the weighted average of the county's contiguous neighbors that are in right-to-work states (pre- or post-2000 enactment) with the elements of the row-normalized spatial weight matrix serving as the weights.

Results

The impact of right-to-work on county-level employment share is estimated in each of 18 different industries, as defined using 2-digit, NAICS codes. Sample sizes vary across the industries examined due to county-level employment data availability in the County Business Patterns. We limit the discussion here to the six industries for which union membership is high, including utilities, construction, manufacturing, transportation and warehousing, information, and education services. These industries have unionization rates that exceed the private sector average, ranging from 9% in manufacturing to 20.1% in utilities, according to the Bureau of Labor Statistics.

These results from SEM estimation can be found in Table 1. The results with respect to the impacts of right-to-work are color coded. Dark green is for results that have the expected sign and are statistically significant. Light green is for the expected sign but not statistically significant. The dark red is for results with a different sign and that are statistically significant. The light red is for results with a different sign than was expected without statistical significance. A mix of positive and negative results across the industries must be observed given that we are measuring shares of total private employment. That is, if employment share is rising in one industry, it must be falling in at least one other industry.

Table 1: Regression Results, Six Union-Dense Industries

NAICS	22			23			31			48			51			61		
Industry	Utilities			Construction			Manufacturing			Transportation & Warehousing			Information			Education Services		
Total Population	-0.02769		0.020853	-0.036		0.026	-0.161	**	0.066	0.026384		0.025144	0.0652813	***	0.00902	0.008154		0.021177
Percentage of Population in Poverty	-0.03757	*	0.020261	-0.211	***	0.020	-0.442	***	0.054	-0.1187	***	0.019398	0.0227996	***	0.007286	0.143586	***	0.019912
Percentage of Population 25 and older with at least a Bachelors Degree	-0.0369	***	0.011334	-0.027	**	0.011	-0.565	***	0.029	-0.10032	***	0.011154	0.0466502	***	0.004151	0.086792	***	0.010606
Percentage of Population Nonwhite	0.034025	***	0.007262	0.023	***	0.007	0.029		0.021	0.03039	***	0.007179	-0.0054981	**	0.002706	-0.0004		0.007465
Percentage of Population Female	-0.22868	***	0.045212	0.115	***	0.039	0.533	***	0.108	-0.11455	***	0.039569	-0.0274915	*	0.016261	0.057149		0.053859
Percentage of Population Aged 20-64	-0.16138	***	0.033343	-0.030		0.030	0.297	***	0.084	0.07169	**	0.030658	-0.0291384	**	0.012091	-0.09433	***	0.035397
Economic Freedom Score	0.026359		0.112904	0.182		0.121	-1.034	***	0.359	-0.12338		0.117966	-0.026621		0.043264	0.038375		0.11375
Right-to-Work pre-2000	0.741059	**	0.303092	0.765	*	0.401	1.118		1.007	0.489877		0.381278	0.3690193	***	0.130406	-0.42071		0.310059
Right-to-Work post-2000	0.599116		0.443267	0.863		0.591	0.710		1.408	-0.61691		0.563271	0.2598457		0.203186	-0.76124		0.464981
Constant	22.75477	***	3.575242	15.198	***	3.217	-4.353		8.905	9.772011	***	3.239575	3.431203	***	1.28526	0.890572		3.932539
W*Right-to-Work pre-2000	-0.81246	**	0.3717	0.120		0.440	1.386		1.123	-0.00476		0.425909	-0.5398965	***	0.156022	-0.49277		0.384179
W*Right-to-Work post-2000	-0.85231		0.657128	-1.278	*	0.716	4.372	**	1.810	0.782711		0.695913	-0.4129435		0.260066	0.07672		0.664774
Lambda	0.188757	***	0.056392	25.956	***	2.965	51.703	***	2.559	0.235279	***	0.033452	0.2024344	***	0.043362	0.180193	***	0.045408
Pseudo R-square	0.0663			0.060			0.2001			0.0493			0.105			0.0656		
Wald test of Spatial Terms (Chi-square)	17.79	***		80.400	***		450.37	***		50.58	***		37.15	***		17.35	***	
Observations	1785			3045			2858			2949			2584			1814		

In general, we find evidence that counties in states with right-to-work legislation observe higher employment share in certain industries as a percentage of total private employment — what we call the direct effect. Much of this increase could be the result of the relocation of employers from nearby non-right-to-work counties — what we call the indirect effect. The direct effects of right-to-work legislation can be observed from the estimated coefficients on the *Right-to-Work pre-2000* and *Right-to-Work post-2000* variables, displayed in Table 1. While not always statistically significant, they are positive in sign, with the exception of education services and transportation and warehousing. The indirect effects are observed from the estimated coefficients on the two interaction terms: *W*Right-to-Work pre-2000* and *W*Right-to-Work post-2000*. The signs of the indirect effects are more mixed in these higher union density industries but tend to be negative more often than positive. This indicates that having neighboring counties in right-to-work states reduces the industry employment share in the bordering non-right-to-work county.

With some exceptions, the direct and indirect effects largely cancel out for interior counties. The more interesting cases concern the border counties between states which differ in their policies regarding right-to-work. There is a clear indication that, in most but not all high union density industries, border counties in states without right-to-work laws lose industry employment share while border counties in states with such laws gain employment share. It is possible that border counties in non-right-to-work states are losing jobs in some industries to neighboring counties in right-to-work states. However, this relocation of employment opportunities to right-to-work counties is not the only source of increased jobs for these counties.

To illustrate the effects of right-to-work policy in counties along each side of a border between two states with differing state policies on right-to-work, we make the following assumptions regarding our representative border counties: 1) the typical county borders five other counties; 2) right-to-work counties along the state boundaries in question typically border three other right-to-work counties; and 3) border counties along the state boundaries in question and in the non-right-to-work state border two right-to-work counties.

It is necessary to make such assumptions in order to interpret the effect of the interaction terms. Recall that the interaction of the weight matrix and the right-to-work variables is interpreted as the percentage of bordering counties in right-to-work states (pre- or post-2000 enactment); as

such, a percentage must be imposed for interpretation purposes. These assumptions are intended purely for illustrative purposes and results can easily be computed with alternative assumptions.[*]

The results regarding the manufacturing industry (two-digit NAICS code 31), which accounts for just over 16% of private employment, are distinct from the other industries highlighted here. We find that right-to-work passage leads to increased manufacturing employment as a percentage of total employment in all counties of interest: interior right-to-work, border right-to-work, and border non-right-to-work, a finding that is particularly large for post-2000 adoption states, such as Michigan. Specifically, manufacturing employment share for interior right-to-work counties is estimated to be between 15.5% (pre-2000 adoption) and 31.5% (post-2000 adoption) higher. Border counties in right-to-work states experience between 12.1% and 20.7% higher manufacturing employment.[†]

The most interesting result regarding the effects of right-to-work on manufacturing employment might be from border counties in states without right-to-work laws. These counties also observe increased manufacturing employment, by between (pre-2000) 3.4% and 10.8% (post-2000). This finding might be the result of increased demand for inputs by manufacturers in the right-to-work state. With some of those suppliers being located across state lines in the non-right-to-work state, the employment benefits to manufacturing can spill over across state borders.

The results from an analysis of the construction industry (two-digit NAICS code 23), nearly 6% of private employment, differ from those of manufacturing as the results are more mixed. Construction industry employment share in interior counties is estimated to be 15% higher in states that established right-to-work before 2000. However, in those states which have more recently adopted right-to-work, construction employment share in interior counties is lower by 7.1%. Right-to-work border counties observe between 1.6% (post-2000 adoption) and 14.2% (pre-2000 adoption) higher employment share for the construction industry. Border counties in non-right-to-work states are estimated to experience between 0.8% higher (pre-2000 adoption) and 8.7% lower (post-2000 adoption) construction industry employment. Also of note: The pre-2000 effect of right-to-work laws appears especially strong for the construction industry.

Consider next the effect on the transportation and warehousing industry (two-digit NAICS code 48), which accounts for just over 4% of private employment. While the effect of right-to-work is not found to be statistically significant due to large standard errors, we will discuss the point

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[*]   Given our assumption of the typical county, the estimated effect of right-to-work on RTW border counties is computed as the product of the coefficient on *Right-to-Work pre-2000* and 0.6**W*Right-to-Work pre-2000.* Likewise, the estimated effect of right-to-work on external border counties is computed as the product of the coefficient on *Right-to-Work pre-2000* and 0.4**W*Right-to-Work pre-2000.* The same calculation was done for the coefficients on *Right-to-Work post-2000* terms. Appropriate t-statistics were then computed in order to carry out the test of statistical significance.

[†]   The 15.5% increase in manufacturing employment share for interior counties is found by the following calculation: 1.118 + (1.386*1) for a 2.5 percentage point increase in manufacturing employment as a share of total private employment. We then divide this figure by the industry market share of 16.146 for a percentage change of 15.51%. In this calculation, the coefficient on the interaction term, 1.386, is multiplied by 1 because 100% of all contiguous neighbors for interior right-to-work counties are in a right-to-work state. The 12.1% figure for representative border counties in right-to-work states instead multiplies that coefficient by 0.6 because we assume 60% of its bordering counties are in right-to-work states: [1.118+(1.386*0.6)]/16.146 = 12.08%.

estimates. Interior counties in right-to-work states observe industry employment that is between 4% (post-2000) and 11.7% (pre-2000) higher than would be otherwise as the result of the policy. Right-to-work border counties in states which adopted the policy prior to 2000 are estimated to also experience an 11.7% increase in employment share, yet the equivalent counties in post-2000 adoption states are estimated to observe a 3.5% reduction in transportation and warehousing employment. Interestingly, bordering counties from non-right-to-work states were unaffected if bordering a pre-2000 right-to-work state, but experienced a 7.5% increase in employment share in the industry if bordering a post-2000 right-to-work state. Like manufacturing, this might be the result of the coordination of firm activities and suppliers across state lines.

Given the smaller industry share of total private employment for the utility industry (1.4%), the information industry (1.6%) and the educational services industry (2.3%), we only quickly highlight the results for these three industries. In both the utilities industry (two-digit NAICS code 22) and the information industry (two-digit NAICS code 51), right-to-work is estimated to increase industry employment share for border counties in right-to-work states and decrease industry employment share in both interior right-to-work counties and border counties in non-right-to-work states. Right-to-work in the educational services industry (two-digit NAICS code 61) is estimated to reduce employment share in all cases except for border counties in non-right-to-work states, when right-to-work in the bordering state was passed post-2000.

Table 2 presents the SEM estimation results for the remaining twelve less union-dense industries. For conciseness, we only highlight the qualitative effects across a selection of the industries, particularly those with greater statistical significance. Before dividing the counties into border and interior categories to analyze the results, some interesting findings pop out of the spatial-based analysis. For instance, right-to-work laws are estimated to increase the accommodations and food services industry employment share for counties within a right-to-work state. Nearby counties, particularly those in non-right-to-work states, experience employment losses in this industry.

While exerting statistically insignificant direct effect on the mining industry employment share, right-to-work is estimated to benefit mining employment in neighboring counties, again, particularly for the nearby non-right-to-work counties. The finance and insurance industry is similarly affected; however, the direct effect of right-to-work laws passed prior to year 2000 is to reduce the employment share slightly. Right-to-work is estimated to reduce the industry employment share for health care and social services in right-to-work counties but has no statistically significant effect on neighboring counties. Results concerning the remaining industries are more sporadic and largely statistically insignificant and can be viewed in Table 2.

Table 2: Regression Results, Non-Union-Dense Industries

NAICS	11		21		42		44		52		53	
Industry	Agriculture		Mining		Wholesale Trade		Retail Trade		Finance & Insurance		Real Estate Rental & Leasing	
Total Population	-0.01292	0.013756	-0.02696	0.04167	0.076 ***	0.022	-0.100 ***	0.028	0.083977 ***	0.013992	0.017793 ***	0.005911
Percentage of Population in Poverty	0.04099 ***	0.013316	-0.07591 *	0.045317	-0.083 ***	0.018	0.194 ***	0.021	0.04457 ***	0.010677	0.011167 **	0.004807
Percentage of Population 25 and older with at least a Bachelors Degree	-0.01757 **	0.007226	-0.10551 ***	0.024313	-0.027 ***	0.010	0.015	0.012	0.064591 ***	0.006114	0.030725 ***	0.002661
Percentage of Population Nonwhite	0.017794 ***	0.005101	0.00407	0.017642	0.000	0.007	-0.065 ***	0.008	-0.01158 ***	0.004029	-0.00101	0.001856
Percentage of Population Female	-0.27619 ***	0.028582	-0.5365 ***	0.092	-0.170 ***	0.038	-0.008	0.041	-0.0609 ***	0.021399	0.00075	0.010273
Percentage of Population Aged 20-64	-0.17048 ***	0.021925	-0.19201 ***	0.071314	-0.125 ***	0.028	-0.140 ***	0.032	-0.11287 ***	0.016902	0.006822	0.00783
Economic Freedom Score	0.017749	0.076449	0.401417	0.285716	0.011	0.125	0.304 **	0.136	0.118304 *	0.069538	0.106244 ***	0.031817
Right-to-Work pre-2000	-0.17726	0.208224	-0.62949	0.654465	0.184	0.338	-0.787 *	0.425	-0.5431 **	0.213377	-0.1213	0.086907
Right-to-Work post-2000	-0.51649	0.336111	-1.31496	0.91254	-1.092 **	0.468	-0.714	0.617	-0.4735	0.308152	-0.09206	0.128678
Constant	23.964 ***	2.334619	41.03923 ***	7.548129	21.715 ***	3.076	20.113 ***	3.410	10.28221 ***	1.793856	-0.71543	0.838104
W*Right-to-Work pre-2000	0.44874 *	0.248808	3.803798 ***	0.893621	0.389	0.384	0.632	0.463	0.937971 ***	0.234684	0.101362	0.096846
W*Right-to-Work post-2000	0.284606	0.459825	4.227987 ***	1.452367	0.368	0.625	-0.496	0.755	0.776541 **	0.380682	-0.08964	0.162117
Lambda	0.311667 ***	0.035085	0.621179 ***	0.032956	0.575 ***	0.023	0.355 ***	0.029	0.375735 ***	0.025479	0.449297 ***	0.027295
Pseudo R-square	0.166		0.1972		0.0699		0.089		0.0683		0.108	
Wald test of Spatial Terms (Chi-square)	82.98 ***		467.43 ***		612.83 ***		156.58 ***		233.11 ***		273 ***	
Observations	1890		1374		2885		3086		3013		2698	

NAICS	54		56		62		71		72		81	
Industry	Professional, Scientific, & Tech Services		Admin & Support & Waste Management		Health Care & Social Services		Arts, Entertainment, & Recreation		Accommodation & Food Services		Other Services (excluding Public Admin)	
Total Population	0.094516 ***	0.019042	0.086098 ***	0.017034	0.029778	0.044268	-0.02136	0.016823	-0.16149 ***	0.037036	-0.01083	0.013426
Percentage of Population in Poverty	-0.009	0.014527	-0.02309 *	0.013324	0.523413 ***	0.033141	-0.01172	0.01483	0.134202 ***	0.029262	-0.03391 **	0.010056
Percentage of Population 25 and older with at least a Bachelors Degree	0.165854 ***	0.008385	0.035639 ***	0.007681	0.098102 ***	0.019253	0.068193 ***	0.007762	0.180904 ***	0.01632	0.014739 **	0.005815
Percentage of Population Nonwhite	0.010766 **	0.005354	0.024582 ***	0.004792	-0.06209 ***	0.012431	0.013103 **	0.005492	-0.00409	0.011039	-0.00586	0.003729
Percentage of Population Female	-0.11253 ***	0.031015	0.070504 **	0.029734	0.03276	0.066509	-0.1602 ***	0.033167	-0.06131	0.055914	-0.0126	0.019862
Percentage of Population Aged 20-64	0.013552	0.023104	0.200653 ***	0.021659	-0.328 ***	0.052045	-0.10213 ***	0.023107	0.059458	0.044397	-0.06681 ***	0.015568
Economic Freedom Score	0.004791	0.088156	0.331181 ***	0.074962	-0.5199 **	0.213003	0.192343 **	0.089557	0.362317 *	0.197675	0.161741 **	0.064312
Right-to-Work pre-2000	0.251187	0.289192	-0.02405	0.252611	-1.98588 ***	0.673733	-0.96644 ***	0.24589	0.01462	0.57375	0.035994	0.204315
Right-to-Work post-2000	0.520723	0.431598	0.90214 **	0.392264	-2.47385 **	0.98448	0.815308 **	0.359853	1.641016 **	0.816449	-0.07957	0.298091
Constant	4.544355 *	2.484174	-14.3871 ***	2.331205	30.40155 ***	5.527843	13.077 ***	2.546944	3.947036	4.715814	8.279503 ***	1.653053
W*Right-to-Work pre-2000	-0.23167	0.321001	0.3913	0.283461	-0.1179	0.741205	0.418349	0.295653	-1.18529 *	0.631539	0.141854	0.223745
W*Right-to-Work post-2000	-0.42932	0.525319	-0.43961	0.478258	1.147909	1.202321	-1.36567 ***	0.473342	-2.32621 **	1.022081	-0.27327	0.362928
Lambda	0.242109 ***	0.03289	0.092856 **	0.036509	0.326469 ***	0.028534	0.361143 ***	0.033444	0.467989 ***	0.024657	0.304332 ***	0.030294
Pseudo R-square	0.2401		0.147		0.1399		0.0743		0.0634		0.0397	
Wald test of Spatial Terms (Chi-square)	55.49 ***		9.79 **		131.63 ***		128.94 ***		368.5 ***		101.79 ***	
Observations	2967		2761		3033		2452		3041		3064	

In addition to the estimates based on all counties (for which data is available) in the continental U.S., we also estimate our model for the manufacturing, construction, and transportation and warehousing industries with restricted samples to include Michigan and its border states and, separately, Indiana and its border states. We now turn to the discussion of those results. As was conducted for the full sample, we estimate the model using both the SAR and the SEM. The SAR takes the form as follows with the spatially lagged dependent variable included as an independent variable:

$$Y = \rho WY + X\beta + \varepsilon$$

where Y is once again defined as industry employment share, ρ is the spatial autoregressive parameter to be estimated, W is the previously discussed spatial weight matrix, X is the vector of independent variables, β is the vector of coefficients on the independent variables, and ε is the well-behaved error term. The SAR estimator appears to be a better fit for these smaller samples; as such, it is the direct, indirect, and total effects from the SAR estimation that are discussed below. With that said, the qualitative results are generally consistent across the two spatial estimators.

Michigan Region Results

This sample includes counties from Michigan, Indiana, Ohio and Wisconsin. Of these states, only Ohio did not have right-to-work legislation passed by 2018, the year from which our employment data is collected. Manufacturing accounts for roughly 23% of total private employment in this

sample. While not statistically significant (p-value of 0.118) due to a large standard error, the direct effect of right-to-work on a given county in this sample is to increase manufacturing employment as a percentage of total private employment by 5.99 percentage points, or roughly 26%. The collective spillover effect on other counties is to reduce manufacturing employment share by 30%, a result that is statistically significant. These two effects largely cancel each other out, leaving manufacturing employment as a share of private employment statistically unchanged across the entire four state region. However, these results do tend to support a realignment of manufacturing employment opportunities toward right-to-work counties.

The same qualitative pattern is observed in both the construction and the transportation and warehousing industries. That is, the direct effect of right-to-work is to increase these industries employment share in right-to-work counties, while the indirect effect is to reduce employment share collectively across non-right-to-work counties. In the case of the construction industry, the effects cancel each other out such that there is a near zero total effect across the region. In transportation and warehousing, the total effect is statistically insignificant due to a large standard error; however, it is relatively large in magnitude and negative, suggesting that total industry employment in the four-state region is lower by potentially 26%.

Indiana Region Results

This sample includes counties from Indiana, Michigan, Illinois, Kentucky and Ohio. Of these states, neither Ohio nor Illinois had right-to-work legislation passed by 2018, and Kentucky had just passed such legislation in 2017. Manufacturing accounts for roughly 21% of total private employment in this sample. The direct effect of right-to-work in a given county in this sample is estimated to increase manufacturing employment as a percentage of total private employment by 5.85 percentage points, or roughly 27%, a result that is statistically significant at the 5% level. The indirect effect — that is, the collective spillover effect on other counties — is estimated to reduce manufacturing employment by a modest and statistically insignificant 7.7%. The net effect is to increase manufacturing employment as a share of private employment by a statistically significant 19.6% across the five-state region.

We once again observe the same qualitative pattern in both the construction and the transportation and warehousing industries. That is, the direct effect of right-to-work is to increase industry employment share in the right-to-work county while the indirect effect is to reduce industry employment collectively across other counties. In the case of the construction industry, the direct effect (19.5% increase in the right-to-work county) dominates the indirect effect (3% industry employment reduction across the region) such that the total effect is a statistically significant (at the 1% level) increase in construction employment by 16.5%. In transportation and warehousing, all effects are statistically insignificant; however, the total effect is large in magnitude and negative, suggesting that the industry employment share in the five-state region is lower by potentially 26.4%, nearly identical to the estimate for the Michigan sample.

Endnotes

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2   Michael LaFaive, "Right-to-Work, Tax Rates Paint Interesting Picture Right-to-Work, Tax Rates Paint Interesting Picture" (Mackinac Center for Public Policy, Aug. 27, 2014), https://perma.cc/SX55-EXJM.

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13   Charlene M. Kalenkoski and Donald J. Lacombe, "Right-to-Work Laws and Manufacturing Employment: The Importance of Spatial Dependence," *Southern Economic Journal* 73, no. 2 (2006): 402.

14   Charlene M. Kalenkoski and Donald J. Lacombe, "Right-to-Work Laws and Manufacturing Employment: The Importance of Spatial Dependence," *Southern Economic Journal* 73, no. 2 (2006): 404.

15   Charlene M. Kalenkoski and Donald J. Lacombe, "Right-to-Work Laws and Manufacturing Employment: The Importance of Spatial Dependence," *Southern Economic Journal* 73, no. 2 (2006): 402.

16   Sudheer Chava, Andras Danis and Alex Hsu, "The Economic Impact of Right-to-Work Laws: Evidence from Collective Bargaining Agreements and Corporate Policies," *Journal of Financial Economics* 137, no. 2 (2020): 451–452, https://perma.cc/4VPR-M2ER.

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