



Right-to-Work States Do Not Have Lower Wages

By Christopher C. Douglas

Executive summary

A 2015 study by Elise Gould and Will Kimball of the Economic Policy Institute argued that states with right-to-work laws have lower average wages than states without such laws. The report, titled “Right-to-Work States Still Have Lower Wages,” claims that average wages in right-to-work states are 3% to 9% lower than in non-right-to-work states, depending on the factors controlled for in the statistical model. The Economic Policy Institute highlighted these results early this year in an article about how right-to-work laws supposedly “damage state economies.”¹

This brief demonstrates that the 2015 Economic Policy Institute study was flawed by two methodology problems that affected the results: 1) failure to control for state-level fixed effects, and 2) failure to cluster standard errors properly. I construct an alternative statistical model that improves on the shortcomings of the 2015 EPI study and more accurately captures the impact of right-to-work laws on average state wages. This alternative model, based on the same data as the EPI study, finds that average wages in right-to-work states are higher by modest but statistically significant margins.

ABOUT THE AUTHOR

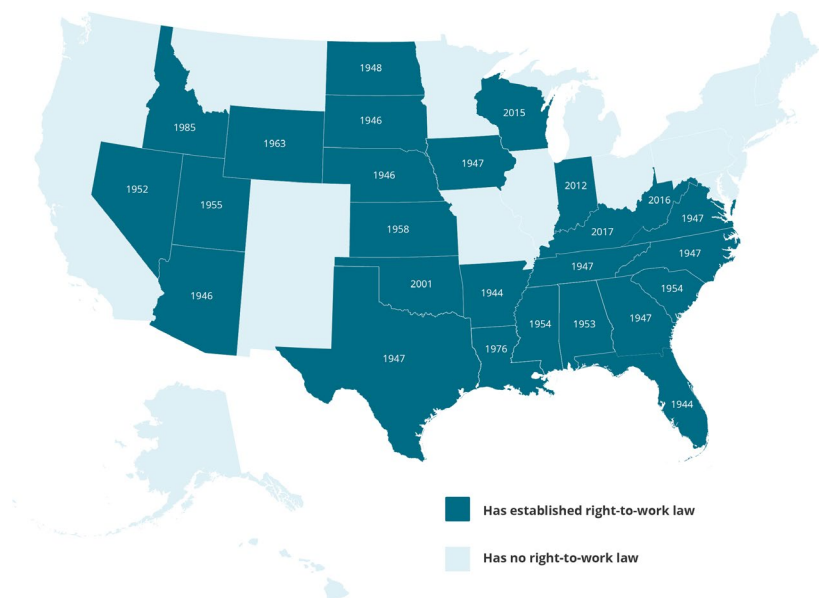
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Introduction and Background

The Labor Management Relations Act of 1947 became law with bipartisan, supermajority support from Congress. Both chambers overrode President Harry Truman’s veto of the bill. Commonly known as the Taft-Hartley Act after its sponsors Robert A. Taft and Fred A. Hartley, Jr., the law forbids closed shops, where employers agree to only hire union members. It also gives states explicit permission to outlaw agency shops, where all employees are forced to pay a union as a condition of employment. Laws prohibiting agency shops are called right-to-work laws. Twenty-six states have such laws as of this writing.

Graphic 1 below illustrates right-to-work states and the year they became enacted this law.

Graphic 1: Right-to-work laws in the states



As Graphic 1 shows, right-to-work states are clustered by geography and across time. Most Southern states adopted right-to-work laws immediately or soon after Taft-Hartley became law in 1947. A handful of Midwestern states, such as the Dakotas, Nebraska and Iowa, as well as Arizona, also enacted these laws during this period. Half a dozen states followed suit in the 1950s, but only four states — Wyoming, Louisiana, Idaho and Oklahoma — passed right-to-work laws between 1955 and 2001. Five more states joined this group in the 2010s, including Indiana, Wisconsin, West Virginia, Kentucky and Michigan. Michigan’s right-to-work law went into effect in 2013 but was repealed in February of this year.

These state-level factors must be accounted for when examining the impact right-to-work laws may have on average wages within states. As just one example, it is well-established that Southern states have lower average wages than Northern states, especially since the Civil War.² A statistical model that does not take into account this fact might inappropriately assign these state-level differences to other factors.

This is what Gould and Kimball’s 2015 study appears to do. It fails to control for these state-level differences and assigns too much weight to the existence of a right-to-work law. The model produces statistically significant results, but these might just be picking up the preexisting condition of lower average wages in Southern states before they passed right-to-work laws. These differences between the states need to be accounted for in order to isolate and estimate the impact of right-to-work laws on state economies.

The 2015 Economic Policy Institute report treats right-to-work laws as if they randomly occur at any time and in any state. This inappropriate assumption leads Gould and Kimball to assign the difference in average wages across the two groups of states to the existence of right-to-work laws. But other factors influence whether a

state had a right-to-work law during the period of study, 2010 to 2012. The study’s results are not an accurate interpretation of what these data say about the impact right-to-work laws have on average state wages.

A 2018 study by the Hamilton Project of the Brookings Institution highlights the role that location plays in determining someone’s wage.³ Factors such as a state population’s education level, quality of governance, tax burden, business climate and natural amenities influence state-level average wages. These factors need to be controlled for when examining the role right-to-work laws may have on wages for workers in a state.

Many of these factors are difficult to measure, but economists have tools to account for them. The most common method is to include what are called state fixed effects into the statistical model, such as one used to investigate the influence of right-to-work laws on a state’s average wage. Fixed effects allow researchers to control for the unique characteristics of individual states and better isolate the impact of the variable of study, such as a right-to-work law. Using this method in this case could provide more confidence that the results are driven by a state’s right-to-work status rather than other confounding variables.

Revisiting the Economic Policy Institute’s methodology

The 2015 EPI model used data from the U.S. Bureau of Labor Statistics that covers just three years, 2010, 2011 and 2012.^{*} This short span of data is a major weakness. As Gould and Kimball state in the study, “Most researchers think that whatever the effect of RTW on states’ economies, it takes a relatively long time to manifest.”⁴ Three years is likely too short an amount of time to measure the full effects of these laws.

^{*} The data and documentation for the BLS’s Current Population Survey Outgoing Rotation Group are available from the Natural Bureau of Economic Research at <https://perma.cc/9VYA-XB7K>.

Replication of results

To examine the 2015 model, I downloaded the same data used by Gould and Kimball, a link to which they kindly provided in a footnote. I replicated their results to the best of my ability based on the description of their model provided in the 2015 EPI study. I ran three regressions, and the results are shown in Graphic 2. Column I of the table shows the results of a regression with no control variables; Column II shows the results using the demographic control variables Gould and Kimball used; and Column III shows the results of my alternative model that includes demographic control variables and state fixed effects, plus properly clustered standard errors, as explained below.*

Note: Robust standard errors are in parenthesis for columns I and II. Clustered standard errors are in parenthesis for column III. (***) indicates significance at the 1% level, (**) at the 5% level, and (*) at the 10% level. The “within” r-squared refers to the fraction of the variation of the dependent variable (average wages) within states that is captured by the regression, which is the traditional measure of r-squared. The “within” r-squared in column III is thus comparable to the r-squared in columns I and II. The “between” r-squared refers to the fraction of the variation between states that is captured by the state fixed effects used in the model. The results with no controls (Column I) indicate that states with right-to-work laws have 14.2% lower average wages than non-right-to-work states.† This is statistically significant at the 1% level of significance, meaning if there was no association between these laws and average wages, there is only a 1% chance of seeing this result. The r-squared on this result is 1.1%, meaning that right-to-work laws explain only 1.1% of the differences in average wages across the state. This model does not control for any worker or labor market characteristics that influence a state’s average wage. Without these controls, the model overstates the role right-to-work laws have on the average wage in these states.

Graphic 2: Replication of EPI’s 2015 results

Dependent variable: natural logarithm of hourly wage			
	(I)	(II)	(III)
Variables	Regression with no controls	Regression with demographic and worker-level labor market controls	Regression with demographic and worker-level labor market controls plus state fixed effects and clustered standard errors
RTW indicator	-0.142*** (0.00244)	-0.0839*** (0.00203)	0.0189* (0.00964)
Union indicator		0.160*** (0.00283)	0.153*** (0.00855)
White		0.104 (0.00355)	0.114*** (0.00798)
Hispanic		-0.151*** (0.00283)	-0.187*** (0.0113)
Asian		0.0473*** (0.00587)	0.0198* (0.0107)
Other race		0.0824*** (0.00769)	0.0704*** (0.0116)
Male		0.168*** (0.00199)	0.169*** (0.00534)
Some high school		-0.112*** (0.00432)	-0.111*** (0.00524)
Some college		0.122*** (0.00265)	0.118*** (0.00735)
Associate degree		0.230*** (0.00331)	0.229*** (0.00606)
College degree		0.379*** (0.00304)	0.371*** (0.0113)
Advanced degree		0.572*** (0.00403)	0.559*** (0.0139)
Age		0.0449*** (0.000604)	0.0448* (0.00119)
Age-squared		-0.000456*** (7.24e-06)	-0.000456*** (0.0000126)
Married		0.102*** (0.00654)	0.106*** (0.00802)
Divorced/widowed		0.0547*** (0.00700)	0.0586*** (0.00734)
Separated		-0.00991 (0.00679)	-0.0153** (0.00729)
Hourly worker		-0.194*** (0.00251)	-0.187*** (0.00635)
Full-time worker		0.119*** (0.00235)	0.121*** (0.00365)
Metro area		0.118*** (0.00236)	0.0931*** (0.00797)
Constant	2.915*** (0.00151)	1.381*** (0.0147)	1.365*** (0.0300)
Observations	301,799	301,799	301,799
R-squared	0.011	0.342	Within: 0.316 Between: 0.639

* I define the hourly wage as weekly earnings divided by hours worked, as recommended by NBER’s documentation. Following the EPI study, I use the natural logarithm of wages as the dependent variable in the regression. I also drop observations where earnings are imputed rather than directly observed, as the imputation does not include union status and thus biases the relationship between union status and wage. Barry T. Hirsch and Edward J. Schumacher, “Match Bias in Wage Gap Estimates Due to Earnings Imputation,” *Journal of Labor Economics* 22, no. 3 (July 2004): 689–722, <https://perma.cc/2B25-K7FB>.

† Note there are slight differences between my results and Gould and Kimball’s in columns I and II. I have 301,779 observations while they have 304,157. The likely explanation for this difference is how the “Hispanic” dummy variable is generated. The Current Population Survey data has a variable entitled “ethnic” that takes a value 1-5 if the respondent is Hispanic. I generate the “Hispanic” indicator variable as being equal to 1 if “ethnic” has a 1-5 value and 0 otherwise. Gould and Kimball do not describe how they generate this variable. My estimated coefficient on “Hispanic” is -0.151 in contrast to -0.0194 in the 2015 EPI study. All my other estimated coefficients are very similar to theirs, including the coefficient on the RTW dummy variable, which is the coefficient of interest. My results are robust even if removing the “Hispanic” variable. Thus, the slight differences between my results and theirs are not consequential.

Gould and Kimball also include industry and occupational indicators in their regression Column II. There are 263 industries and 570 occupations in the CPS data set, though they do not state how many industry and occupational indicators they used or how these were generated. Including this many indicator variables will increase the r-squared value by explaining a large portion of the variation of the dependent variable. But including these indicators does not substantially change the estimated coefficients, so I do not include them in my regressions.

Column II includes the same worker and labor market controls used in the EPI study from 2015. These control variables include factors such as the racial makeup of the state's population, its education level, average age, marriage rates and other characteristics that impact its average wage. These controls reduce the effect of right-to-work laws on average wages in states from -14.2% to -8.4%, which remains significant at the 1% level. This suggests that even after controlling for worker and labor market characteristics, right-to-work laws are still associated with 8.4% lower average wages. These results are similar to EPI's, which were -13.9% in a regression with no controls and -9.4% in a regression with worker and labor market controls.

State fixed effects

While these demographic control variables produce a stronger model, it could be improved further by adding other state-level fixed effects that also impact average wages. Gould and Kimball do modify their regression to control for two state-level fixed effects: a state's unemployment rate and its cost of living.* Including just those two state-level fixed effects reduces the 2015 model's estimated negative impact of right-to-work laws on average state wages by about two-thirds, decreasing from -9.4% to -3.2%. That adding just two state-level fixed effects produced such a substantial reduction in the result illustrates the importance of controlling for these effects when modeling the impact of right-to-work laws on wages.

The way to control for the myriad effects that influence a state's average wage is to include state fixed effects in the regression.⁵ This means generating an indicator variable for each state and including these indicators as control variables in the regression. The indicator variable captures the idiosyncratic characteristics in a state that influence the average wage statistic. There are

many more state-level factors that impact average wages than the two included by Gould and Kimball.

Consider the indicator variable for the state of Michigan. The coefficient on this variable estimates the effect of being located in Michigan has on a worker's wage. The larger this coefficient, the stronger the Michigan-specific factors impact wages in the state.

Standard error clustering

There is another methodological issue with Gould and Kimball's model that can also be easily improved upon. The authors of the 2015 Economic Policy Institute study do not cluster their standard errors at the state level. Since there are state fixed effects that correlate with the average wage, the standard errors for the regression coefficient should be clustered at the state level. Failing to do this leads to incorrect standard errors, which then gives the results incorrect statistical significance.

Standard errors of a regression coefficient state how precisely the coefficients are measured. For instance, a small standard error means that if you used a different sample of data from the same population and re-ran the regression, the estimated coefficients would not change much. Standard errors are also used to determine statistical significance, meaning whether the estimated coefficient is different from zero. When it is, this means the independent variable is statistically related to the dependent variable. Getting the standard errors correct is crucial for knowing statistical significance and whether a statistical relationship between two variables exists.

My alternative model

Column III in Graphic 1 above presents the results from the wage regression that includes state fixed effects plus clustered standard errors. There are two interesting results to note. First, the coefficient on the right-to-work variable becomes positive and remains

* This is shown in columns III and IV in Appendix Table A1. Elise Gould and Will Kimball, "Right-to-Work' States Still Have Lower Wages" (Economic Policy Institute, April 22, 2015), 3, <https://perma.cc/E2NN-URGT>.

statistically significant.* This suggests that when controlling for state-level fixed effects as described above, right-to-work states have 1.9% higher average wages than non-right-to-work states. States with these laws tend to have certain characteristics that make them different in many ways from states without such laws. State fixed effects control for these differences the result shows that right-to-work laws have modestly positive impact on average state wages.

Second, there are no substantial differences in any of the other estimated coefficients between my alternative model (Columns III) and Gould and Kimball's from 2015 (Column II). The signs all match, whether positive or negative, and there is relatively little difference in the values. This suggests that the negative impact of right-to-work laws on a state's average wage found in the 2015 EPI study resulted from the lack of state-level fixed effects, which is a type of omitted variable bias.

Omitted variable bias, is when a variable not included in the regression is correlated with one that is, and the regression incorrectly assigns the effect of the omitted variable to the variable that is included. Several variables impact whether a state has a right-to-work law and state's average wages. It is not possible to eliminate omitted variable bias completely but including state-level fixed effects that are correlated with these variables are an improvement over the 2015 EPI model.⁶

By leaving out most state fixed effects, the 2015 EPI study's results likely assign to right-to-work laws effects that results from these omitted variables. There are several factors that influence wage rates, such as when right-to-work was adopted, the political and economic climate of the state, and the degree of unionization in the state.⁷ Gould and Kimball's model overstates the impact right-to-work laws have on average wages in a state by excluding these other factors. Failing to control

for these factors leads to the erroneous finding that right-to-work laws cause lower wages.

Conclusion

When examining the impact right-to-work laws might have on average wages in a state, it is important to conduct an apples-to-apples comparison. Because states differ in numerous ways, we must account for these differences to isolate as much as possible the effect of having a right-to-work law. Including state fixed effects into a regression neutralizes many of these differences and compares states' average wages as if the presence of right-to-work laws were the only difference between them. Failing to control for state-level differences makes the comparison between states apples-to-oranges, and it is impossible to determine if wage differences are due to these laws or one of the other uncontrolled-for differences.

When state fixed effects are used to conduct a more apples-to-apples comparison of the relationship between right-to-work laws and average wages in the states, I find that right-to-work states have slightly higher (2%) average wages than their counterparts.

Despite being based on the same data, this conclusion contrasts significantly with the results presented in a 2015 Economic Policy Institute report. Gould and Kimball find a large and negative impact of these laws on wages. But they fail to control for most state-level differences. When more of these state fixed effects are included in a similar model, based on the same data, I find that right-to-work laws are modestly but positively associated with higher average wages.

* The test statistic is 1.96, which is exactly the 5% critical value for a standard normal distribution. However, a standard normal distribution assumes an infinite sample size and while the sample size is large, it is not infinitely large. Thus, the p-value is 0.055, which is slightly above the 5% level of significance but is below the 10% level.

Endnotes

- 1 Jennifer Sherer and Elise Gould, “Data Show Anti-Union ‘Right-to-Work’ Laws Damage State Economies: As Michigan’s Repeal Takes Effect, New Hampshire Should Continue to Reject Right-to-Work Legislation” (Economic Policy Institute, February 13, 2024), <https://perma.cc/64R8-KRQT>.
- 2 Robert Margo, “The North-South Wage Gap, Before and After the Civil War” (National Bureau of Economic Research, February 2002), <https://perma.cc/6WMX-CQXF>.
- 3 Lauren Bauer et al., “Where Work Pays: How Does Where You Live Matter for Your Earnings?” (Brookings Institution, July 2018), <https://perma.cc/4R24-NWX6>.
- 4 Elise Gould and Will Kimball, “‘Right-to-Work’ States Still Have Lower Wages” (Economic Policy Institute, April 22, 2015), 3, <https://perma.cc/E2NN-URGT>.
- 5 William J. Moore, “The Determinants and Effects of Right-to-Work Laws: A Review of the Recent Literature,” *Journal of Labor Research* 19, no. 3 (June 1, 1998): 445–69, <https://doi.org/10.1007/s12122-998-1041-z>.
- 6 William J. Moore, “The Determinants and Effects of Right-to-Work Laws: A Review of the Recent Literature,” *Journal of Labor Research* 19, no. 3 (June 1, 1998): 445–69, <https://doi.org/10.1007/s12122-998-1041-z>.
- 7 William J. Moore, “The Determinants and Effects of Right-to-Work Laws: A Review of the Recent Literature,” *Journal of Labor Research* 19, no. 3 (June 1, 1998): 445–69, <https://doi.org/10.1007/s12122-998-1041-z>.

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