

Wisconsin Institute for Law & Liberty



Fencing Out Opportunity

The Effect of
Licensing Regulations
on Employment

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EXECUTIVE SUMMARY

Occupational licensing laws, or state permission slips to work in certain regulated professions, serve as a major barrier to entry for workers in America. For aspiring cosmetologists, manicurists, massage therapists, and aestheticians, licensing requirements can mean thousands of hours of training, tens of thousands of dollars for school, and regular fees to the state. These laws force people with skills and aspirations to take on debt they cannot afford, defer their dreams, or conduct their trade underground with the accompanying threat of fines and prosecution.

Whereas in 1950 just 1 in 20 workers required a license to work, now close to 1 in 4 do.¹ A previous WILL study found an 84% increase over the last 20 years in licenses regulated by the Wisconsin Department of Safety and Professional Services (DSPS).² From 2015 to 2016, DSPS collected more than \$19 million in initial and renewal fees for the more than 240 different regulated credentials.³

This study examines ten low and moderate income professions and measures how the 50-state patchwork of licensing requirements, fees, and training hours impact employment. We ranked each state with a score according to our Red Tape Index, which measures just how burdensome a state's regulations are for these occupations. Then, we looked at how employment related to a state's score on the Red Tape Index. Our findings include:

- States with more burdensome licensure requirements (fees, training hours, exams, and age requirements) had significantly lower employment in these ten occupations (Page 3).
- Wisconsin is the 5th most burdensome state for the ten professions we studied (Page 6).
- Regulation in Wisconsin exceeded the national average for EMTs, aestheticians, veterinary technicians, and cosmetologists (Page 6).
- Wisconsin could increase employment in these professions by 7.06% if regulations matched the least burdensome state, and 2.42% if regulations matched the national average (Page 7).

Our study shows that whatever benefits regulation might bring must be weighed against the cost to those who are trying to make their way in the world and feed their families. Policymakers must consider if the current protections licensing provides are worth the price of lower employment. The results of this report provide opportunity advocates with the statistics to make the case that the current system of licensure has overcorrected and increasingly serves to cripple the dreams and aspirations of real people.

INTRODUCTION

In July 2014, Steve Sleeper, Executive Director of the Professional Beauty Association (PBA) put the beauty and cosmetology industry on notice. In an open letter, Sleeper described the growing reform effort aimed at increasing opportunity and rolling back excessive regulation with regard to occupational licensing (Sleeper 2014). While remaining an unabashed advocate for licensure in the beauty industry (such advocacy is, after all, his job), Sleeper noted that this reform movement had latched on to a valid criticism.

“The vast disparity among state licensing requirements will leave [the beauty] industry vulnerable to legislative attacks and risk deregulation,” wrote Sleeper (Sleeper 2014). He was describing how the state-based system of occupational licensing of cosmetologists has resulted in a patchwork of inconsistent, nonsensical regulation. For instance, Oregon requires cosmetologists to train for 2,300 hours before earning a license, Wisconsin requires 1,550 hours, and Massachusetts requires just 1,000 hours. What is worse, no one can adequately justify these differences. No one seriously contends that salon patrons in Portland are “safer” or “better served” than those in Boston.

These requirements, moreover, seem disproportionate to the state’s interest in regulation. Some states – such as Wisconsin – require hundreds more training hours to become a cosmetologist than a life-saving emergency medical technician.

Cosmetologists are far from the only profession with inconsistent licensure requirements. From manicurists to massage therapists, emergency medical technicians to locksmiths, those working or seeking work in dozens of low and moderate income jobs face tough and inconsistent barriers to employment that often vary dramatically depending on which state they happen to live in.

To advance the case for reform, groups like the Institute for Justice and the Goldwater Institute have compiled valuable information on various regulated occupations, their licensure requirements, and how the laws in different states compare to one another. This research, along with the stories of those impacted by excessive regulation has made occupational licensure reform a top priority for many Republicans and Democrats interested in boosting opportunity, employment, and economic freedom.

States like Michigan, Arizona, and Rhode Island have recently deregulated dozens of professions after reviews found no compelling state interest in regulation. Indiana is experimenting with a state-recognized voluntary certification program, and Texas has sought to eliminate and streamline burdensome licensing fees. Nebraska, Iowa, and Tennessee have all created exemptions and limited licenses for hair braiders, shampooers, and blow-dry salons (Roth and Ramlow 2016).

In Wisconsin, recent reforms include a 250-hour decrease in the required hours to become a cosmetologist (a reform supported by the Professional Beauty Association), a cap on local municipalities creating new occupational licenses like those for photographers, and the elimination of a Timeshare Salesperson license. Following the 2016 election, lawmakers have expressed an interest in further reform.

The 2016 release of a Wisconsin Institute for Law & Liberty report, *Fencing Out Opportunity: Occupational*

Same Game, Different Rules

Cosmetologists are universally licensed. But the requirements to earn a license can differ from state to state.

- ❖ **1,000 Hours** (MA, NY)
- ❖ **1,200 Hours** (FL, NJ)
- ❖ **1,250 Hours** (PA)
- ❖ **1,500 Hours** (AL, AR, CT, DE, DC, GA, IL, IN, KA, LA, ME, MD, MI, MS, MO, NH, NC, OH, OK, RI, SC, TN, TX, VT, VA)
- ❖ **1,550 Hours** (MN, WI)
- ❖ **1,600 Hours** (AZ, CA, NM, UT)
- ❖ **1,650 Hours** (AK)
- ❖ **1,800 Hours** (CO, HI, KY, NV, ND, WV)
- ❖ **2,000 Hours** (ID, MT, WY)
- ❖ **2,100 Hours** (IA, NE, SD)
- ❖ **2,300 Hours** (OR)

(Source: American Institute for Research, *Examination of Cosmetology Licensing Issues*, August 2016)

Licensing in the Badger State, provided a first of its kind, in-depth look at the growth and burdens of occupational licensing in Wisconsin. Over the most recent 20-year period (1996-2016), the number of licenses regulated by the Department of Safety and Professional Services (DSPS) grew by 84%. The number of workers regulated by DSPS grew by 34%. This mirrors national trends in which licensing requirements have expanded from covering about 5% of workers in 1950 to more than 20% today (Kleiner 2008). The state now has regulations for interior designers, dance therapists, sign language interpreters, and X-ray operators, and a series of licenses for those participating in mixed martial arts (MMA). WILL proposed a menu of reforms for interested lawmakers to consider including review commissions, deregulation, and changing the state's philosophy on occupational licensing.

Shining light on the growth and burden of occupational licensure has been critical to raising the issue with the public and encouraging lawmakers to consider reform. But the next step is to analyze the impact occupational licensing has on employment in the regulated professions.

Previous WILL research estimated that excessive regulation could cost Wisconsin consumers as much as \$1.3 billion per year. But what about those who seek to work in licensed occupations? Thanks to publically available data – and research done by the Institute for Justice – this study analyzes how occupational licensing laws and their requirements impact employment for 10 occupations, most of which require less than a four-year college degree. **We find that intensive licensure requirements have a significant, negative effect on employment.** We explore these results, and their implications, for both Wisconsin and the country at large.

EXISTING RESEARCH ON OCCUPATIONAL LICENSURE

In economics, there are two competing explanations for occupational licensure: rent-seeking and public interest (Maurizi 1974). Under the public interest theory, additional licensure is justified to the extent that it protects the public from the danger of unlicensed professionals. Consumers may lack sufficient information to make a proper decision (Arrow 1963), and the negative consequences of those poor decisions may hurt society at large (Svorny 1993). On the other hand, the rent-seeking theory of licensure argues that, more often than not, licensure serves to limit access to occupations, raising the wages of those in the field and increasing costs for consumers (Friedman 1962). A recent literature review of research found little empirical evidence of a relationship between strict licensure requirements and measurable increases in safety and quality (White House Licensing Report 2015). And a study commissioned by the beauty industry was unable to find a conclusive relationship between licensure requirements and safety (Simpson et. al. 2016). There is, however, abundant evidence that it hurts consumers and prospective workers.

There is a significant body of research on whether licensing creates a wage premium, or an artificial increase in wages. Kleiner (2008) examined data from a Gallup survey comparing reported wages between professions that were and were not licensed. He finds that licensure increases wages by approximately 15% relative to those with similar education levels in unlicensed jobs. This finding has been supported by later research using different surveys and methods of measurement (Gittleman, Klee and Kleiner 2014).

Existing research on wage premiums is often attributed to the effect of licensure on employment (White House Licensing Report 2015; Kleiner 2015) but, to our knowledge, this underlying mechanism has been subject to less scrutiny. A few exceptions warrant mention. One of the earliest studies of the impact of occupational licensure was conducted by White (1978). Examining the effect on employment in areas with and without licensure of laboratory personnel, the researcher found that more stringent requirements actually increase employment tangentially by increasing the confidence of the public in the services provided, and thus, the demand for service. More recently, Federman, Harrington and Krynski (2006) theorized that onerous licensure would have a negative effect on the employment opportunities for low-skilled immigrants. They tested their expectations by examining employment opportunities for Vietnamese manicurists in states with and without an English-proficiency requirement. They find that states with such requirements have far fewer Vietnamese manicurists, suggesting a direct impact of the licensure requirements on job opportunities.

A similar study commissioned by the Beauty Industry Working Group investigated the effect of onerous licensure requirements on cosmetologists around the country (Simpson et. al. 2016). This comprehensive

study examined a wide variety of outcomes, including the effect of licensure difficulty on wages, and graduation rates. Among the findings, it revealed “a strong negative and significant relationship between the total number of curriculum hours and employment rates.” In other words, the beauty industry’s own research found a relationship between higher curriculum hours and lower employment.

In another example, Slivinski (2015) theorized that difficulty in obtaining occupational licensure could limit the ability for those of limited means to become entrepreneurs. Combining data from the Institute for Justice (Carpenter et. al. 2012) with data on low-income entrepreneurship from a Kaufman Foundation survey, Slivinski found a significant, negative effect of onerous licensure requirements on entrepreneurship.

This study builds off the existing work to create a better illustration of the effect of onerous licensure on employment. Using extensive data from the Institute for Justice on the licensure burdens in each state, we test the extent to which licensure difficulty fences out opportunity in ten professions.

METHODOLOGY

In order to answer the question of how licensure requirements affect employment, we began by identifying low and moderate income professions, many of which are open to individuals with less than a bachelor’s degree. We then looked for occupations for which licensure data was available from the Institute for Justice (Carpenter et. al. 2012). From that list, we identified a subset for which data on employment was available from the 2012 employment estimates from the United States Bureau of Labor Statistics (BLS)⁴. Our final culling was to identify professions that were licensed in Wisconsin or some of its immediate neighbors. Table 1 below lists the ten professions that will be studied in this paper.

Table 1. List of Professions Analyzed

Aesthetician
Athletic Trainer
Cosmetologist
Manicurist
Veterinary Technician
Emergency Medical Technician
Private Detective
Pest Control Worker
Locksmith
Massage Therapist

Our next step was to identify the factors unique to each state and each profession with regard to obtaining an occupational license. A compilation of licensure requirements from the fifty states from the Institute for Justice (Carpenter et. al. 2012), supplemented by our own research on additional careers provided the licensure data⁵. From existing research, we identified five potential factors for our Red Tape Index: age requirements, grade-level requirements, experiential requirements, initial licensure fees, and criminal background prohibitions. We evaluated the importance of these factors through a preliminary analysis before including experience, exams, fees, and age in the final Red Tape Index.

To illustrate our methodology, consider the example of veterinary technician licensure, a license for which Wisconsin has some of the highest scores on the Red Tape Index. We will compare Wisconsin’s requirements to Delaware’s, a state with far less onerous licensure for vet techs. Note that this example only compares two states, whereas the full analysis in the results section creates an index based on all 50 states and the District of Columbia simultaneously.⁶

Figure 1. Example of Licensure Requirements between Two States

State	Fees	Experience	Exams	Age
Delaware	\$71	730 days	1	0
Wisconsin	\$352	730 days	3	18

The Red Tape Index for Wisconsin would be:

$$\frac{352}{352} + \frac{730}{730} + \frac{3}{3} + \frac{18}{18} = 4.00$$

And for Delaware, the Red Tape Index score would be:

$$\frac{71}{352} + \frac{730}{730} + \frac{1}{3} + \frac{0}{18} = 1.53$$

In this example, Wisconsin has more stringent licensure requirements than Delaware for veterinary technicians. Wisconsin has equal or higher requirements in every category, and thus the Wisconsin number forms the denominator in the index equations. We use this process for all the licensure numbers in this paper; only the highest value from *all* fifty states is what is used for the denominator. The result is a licensure number for each occupation within each state. A full list of index scores averaged for each state is available in Appendix A to this paper. This licensure difficulty index serves as the key independent variable in our analysis.

To examine the effect on employment, BLS data was gathered on the number of people employed in each profession per 1,000 people employed in each state for 2012.⁷ This variable was chosen over, for example, the total number of people employed in the state, to account for differences in employment patterns and population that exist across the country, as well as the significant variation in the population of each state. To account for other causes of employment variation, data was gathered on the unemployment rate in each state, the percentage of residents who are African-American in each state,⁸ and the annual mean income in each occupation under study in each state. Additional controls were included for each profession under study to account for variations in job availability that exist between professions. For each job *j* in state *s*, the following regression is estimated:

Model (1)

$$Jobs_{j_s} = \beta_0 + \beta_1(Index_{j_s}) + \beta_2(professions) + \beta_3(controls_s)$$

Professions is a “dummy” variable that takes on a ‘1’ or ‘0’ for each profession in the analysis. The coefficient on the pertinent *Index* variable represents the effect of onerous licensure requirements across the professions under study. An additional model was run with control variables for each state to account for any unique characteristics of each state not accounted for by the control variables in model (1). Because the demographic and employment data is collinear with state, those variables could not be included in model (2)⁹.

Model (2)

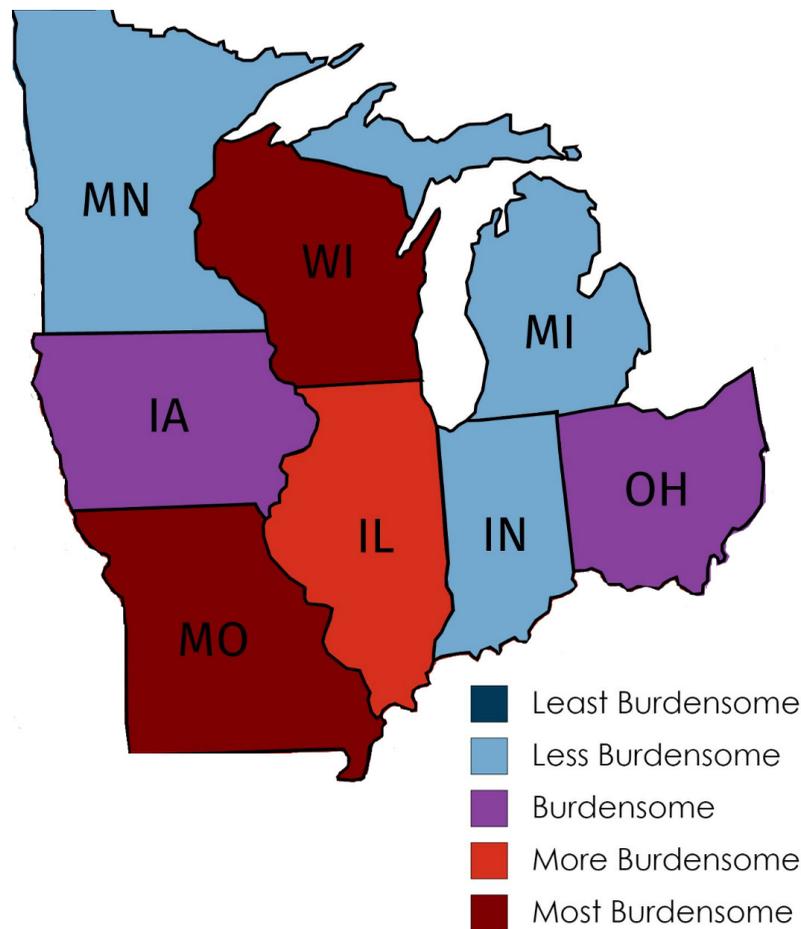
$$Jobs_{j_s} = \beta_0 + \beta_1(Index_{j_s}) + \beta_2(professions) + \beta_3(state_s)$$

Because there is merit in both models, the results from both will be considered. If licensure difficulty has a negative effect on employment, we would expect a negative coefficient on in both model (1) and model (2).

RESULTS: WISCONSIN

We begin with some preliminary results regarding Wisconsin and the Midwest¹⁰. Figure 2 below breaks down the burdensomeness of licensing in Midwestern states relative to the rest of the country. Red indicates the states with the most burdensome licensing laws for the ten occupations we study. Blue indicates states with the lightest burdens. One can see from this chart that Wisconsin, Illinois, and Missouri have the most burdensome licensing laws in the Midwest.

Figure 2. Red Tape Index Scores in the Midwest



In fact, Wisconsin ranks as the fifth most burdensome licensure on these occupations in the entire country. So why does Wisconsin fare so poorly in our study? Among the most regulated professions in the state are aestheticians (makeup artists and skincare specialists), veterinary technicians, emergency medical technicians, and cosmetologists¹¹. In each of these areas, regulation in Wisconsin exceeded the national average.

We next measure the impact on employment within the regulated profession if Wisconsin alleviated some of its excessive licensure requirements to become more in line with the average state. Table 2 below uses the results from model (1) to estimate the change in employment from moving to average licensure across these 10 professions, and from moving to the least burdensome licensure requirements across the

country¹². In this analysis, we hold all other variables constant at their mean values while changing the value of the Red Tape Index to (1) its mean throughout all fifty states and (2) its lowest value across all fifty states.

Table 2. Employment Increases from Reductions in Red Tape, Wisconsin

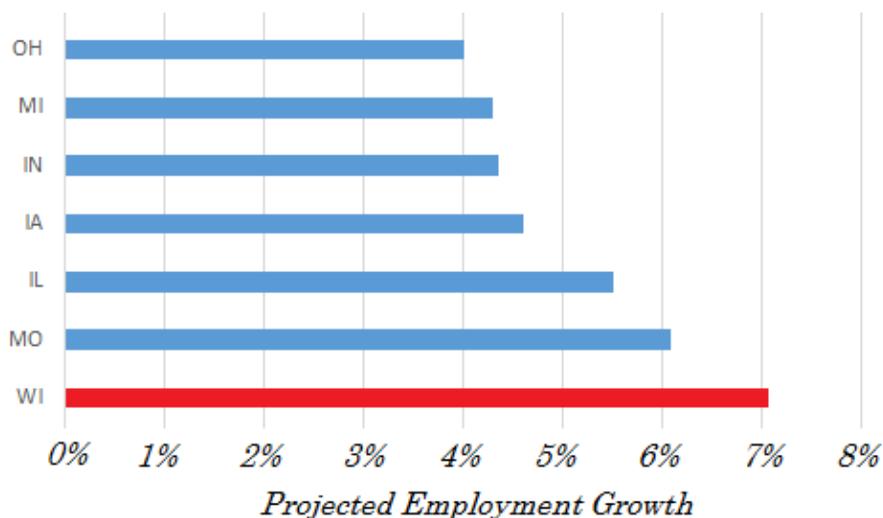
	Current Red Tape Index	Proposed Index Reduction	Change in Employment/ 1,000 jobs	% Change in Employment
Reduction to average requirements	2.06	1.71	.01846	2.42
Reduction to minimum requirements	2.06	1.04	.05382	7.06

The first row of the column predicts the increase in Wisconsin jobs if the Badger State moved to the average burdensomeness of licensure on each of the ten licenses under study here. Such a change would result, on average, in an increase of .01846 jobs per 1,000 jobs in the state. While such a change may not seem that substantial, note that the average number of jobs per 1,000 across our occupations is .76. Consequently, this relatively small increase represents a projected increase in employment of more than 2.42%, as is seen in the final grey column.

The second row of the table predicts the change in jobs in Wisconsin if the state altered its licensure laws to be on par with the most “free” state in our dataset¹³. Making this change would be projected to increase employment by .05382 jobs per 1,000 jobs. Using the average number of jobs per 1,000 in each profession in Wisconsin as the baseline, this translates to a 7.06% increase in employment across the professions under study.

At least among the ten professions under study here, Wisconsin stands to gain significantly from reduced licensure red tape. Figure 3 below shows the projected employment gains across these professions from reducing licensure to that of the least burdensome state. Among this set of Midwest states, Wisconsin is projected to have the best opportunity for increased employment.

Figure 3. Projected Employment Growth from Reduced Licensure Red Tape



RESULTS: NATIONAL

Figure 4 below shows the burdensomeness of licensure around the country using the same Red Tape Index described above. One can see that the index is somewhat regional; with clusters of states with similar licensure requirements throughout the country.

Figure 4. Red Tape Index Scores by State

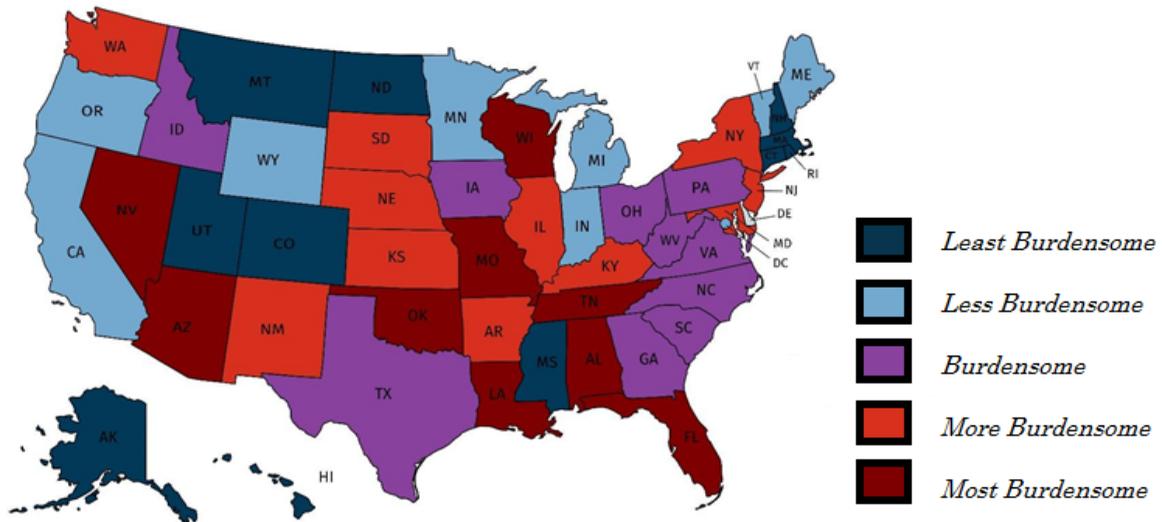


Table 3 below reports the results from two models of licensure relying on 2012 BLS employment data. Model 1 can be called the “national model.” Model 1 does not include fixed effects for each state, but does control for state demographics, the unemployment rate in the state, and the mean annual income for people in that occupation in each state. Model 2 includes fixed effects controlling for each state in the country in recognition that there are myriad factors beyond unemployment and racial composition that may impact employment.

Table 3. Effect of Red Tape Index on Employment: Nationwide

VARIABLES	National Model	States Model
	Jobs per 1,000 Employed	Jobs per 1,000 Employed
<i>Red Tape</i>	-0.0570** (0.0271)	-0.0735** (0.0290)
<i>Aesthetician</i>	0.0493 (0.103)	0.00768 (0.109)
<i>Manicurist</i>	0.146 (0.120)	0.0470 (0.131)
<i>Massage Therapist</i>	0.307*** (0.0891)	0.284*** (0.0904)
<i>Locksmiths</i>	-0.150 (0.0971)	-0.196** (0.0983)
<i>Cosmetologist</i>	2.389*** (0.109)	2.333*** (0.119)

<i>Veterinary Tech</i>	0.453*** (0.100)	0.405*** (0.106)
<i>Emergency Medical Tech</i>	1.742*** (0.101)	1.716*** (0.106)
<i>Pest Control</i>	0.210** (0.0974)	0.164 (0.101)
<i>Athletic Trainer</i>	-0.00681 (0.0869)	-0.0160 (0.0876)
<i>Annual Salary</i>	-2.49e-06 (2.99e-06)	-6.49e-06* (3.52e-06)
<i>Unemployment Rate</i>	-0.0284 (0.0206)	--
<i>African American</i>	-0.000115 (0.192)	--
Constant	0.519*** (0.185)	0.502** (0.220)
Observations	468	468
R-squared	0.813	0.836

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Consistent with our hypotheses, more burdensome licensure requirements have a statistically, and substantively, significant impact on employment across both versions of the model. The results are remarkably similar across the national and state fixed effects models. In Model 1, a one-unit shift along the Red Tape Index leads to a decrease in the number of people employed in a particular profession by .053 per 1,000 jobs. In Model 2, a unit shift on the Red Tape Index leads to a decline in jobs of approximately .056.

These results are depicted in Figure 5 on the following page, which contains an added variable plot of the number of jobs per 1,000 employed across the states and professions in our analysis against the index score of those professions. Points on the graph represent the number of people employed in a particular profession in a particular state, as well as the Red Tape index score for that profession in the state. The line in the figure represents the overall effect of the Red Tape Index across the dataset. **The line is negative across the values of the Index, indicating higher Red Tape Index scores hurt employment.**

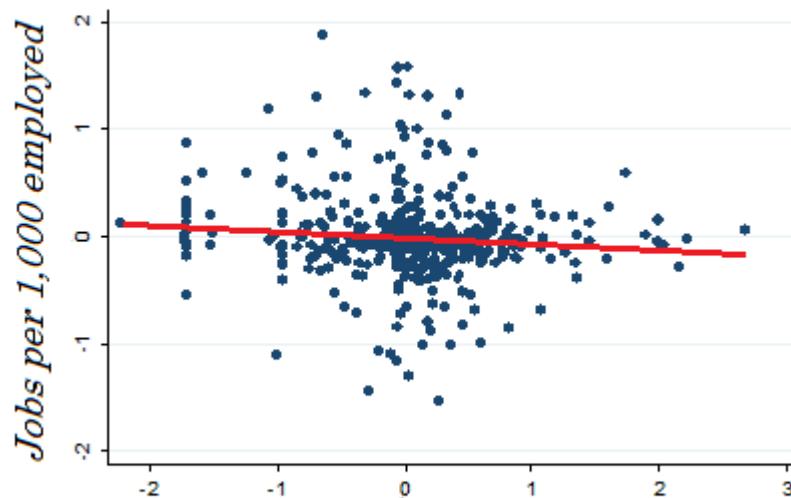
Least Burdensome States

1. Hawaii
2. Massachusetts
3. Connecticut
4. Rhode Island
5. Utah

Most Burdensome States

1. Tennessee
2. Alabama
3. Nevada
4. Florida
5. Wisconsin

Figure 5. Effect of Red Tape Index on Employment



LIMITATIONS

As with any study, there are several limitations to the analysis. First, the primary analyses in this paper are based on 2012 licensure data and 2012 BLS employment data. While we present a lagged model with 2015 data in Appendix Table A4, our findings do not account for any changes in licensure requirements by any state since 2012. As more up-to-date licensure data becomes available, updates to this research can be conducted.

Secondly, because our data is at the state-level – meaning that we have only 51 observations per profession at most – we do not have a big enough sample size to draw conclusions about a specific profession or specific requirements that may exist between professions. This is why our conclusions are at the aggregate level. A richer dataset with data at a lower level of aggregation (for instance, county-level data) does not currently exist.

A final limitation is that we are unable to examine cause and effect when a change in licensure law occurs. While we believe we have accounted for factors that could otherwise impact employment in these professions, all analyses short of experimental designs are subject to the potential for omitted variable bias.

CONCLUSION

The debate over occupational licensing, economic opportunity, and the proper role of government to regulate and protect the public from clear and substantiated threats to health and public safety is increasingly at the forefront of state politics. After decades of near uninterrupted growth, policymakers, activists, and the public are turning an interested eye to the role that licensing and its attendant burdens are inflicting on the economy – especially those at the bottom end of the economic ladder.

This study adds an important statistical analysis to an already robust body of research on the burdens of occupational licensing. By analyzing licensing requirements for ten occupations across all 50 states and the District of Columbia, this study concludes that states with more rigorous licensure burdens will see lower employment in these regulated professions. In many cases, such as cosmetologists, the question is not whether a profession will be licensed at all (cosmetologists are universally licensed), but the adverse impact on workers from licensing schemes that vary from the average or minimum set of regulations. Without evidence that more regulation results in more quality or safety (e.g., that people's hair in Madison is better protected than those in Cambridge), it is unclear why these very real burdens should be placed on those who want to work.

For policymakers, this new analysis represents a challenge. When considering reforms to occupational licensing in their respective states, lawmakers are responsible for balancing concerns about public safety with the maintenance of an economic environment that ensures opportunity for all. Protected interests in regulated occupations will, almost universally, oppose reductions in the burdensome of licensure. It is often in their interest to maintain, and even raise barriers to entry. But policymakers are now armed with statistical evidence that rigorous licensing burdens result in less employment in certain regulated professions. If protected interests cannot offer clear and substantiated proof that current licensing regulations are critical to protecting the public, policymakers must consider the forgotten men and women that those lower employment figures represent. They must consider the individuals who, perhaps, considered a new career and then had their dreams deferred in the face of burdensome rules, requirements, and fees.

Occupational licensing is ultimately a balancing act. For too long, licensing advocates have been able to convince lawmakers that the current system needed more regulation, typically under the guise of public safety. It is now time for opportunity advocates to make their case that the current system has overcorrected, and is now serving to cripple the dreams and aspirations of real people. This study provides critical evidence that it is. Policymakers now must consider if the current protections that licensing provides are worth the price of lower employment.

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Appendix A1. Red Tape Index Score of All 50 States

Rank #	State	Red Tape Index	Rank #	State	Red Tape Index
1	Hawaii	1.044405	27	South Carolina	1.741815
2	Massachusetts	1.169601	28	Texas	1.749033
3	Connecticut	1.173962	29	Georgia	1.750431
4	Rhode Island	1.384619	30	Virginia	1.754386
5	Utah	1.402429	31	Maryland	1.757128
6	Montana	1.445378	32	Pennsylvania	1.764796
7	Mississippi	1.455353	33	Nebraska	1.766377
8	New Hampshire	1.4806	34	Washington	1.768684
9	North Dakota	1.4957	35	New Mexico	1.815361
10	Colorado	1.534271	36	Kentucky	1.820784
11	California	1.554846	37	Illinois	1.836317
12	Maine	1.566557	38	Arkansas	1.852814
13	Oregon	1.566702	39	Kansas	1.854864
14	Delaware	1.569356	40	South Dakota	1.86542
15	DC	1.573037	41	New York	1.87886
16	Montana	1.579455	42	New Jersey	1.88287
17	Wyoming	1.586645	43	Oklahoma	1.917593
18	Vermont	1.602727	44	Missouri	1.929777
19	Ohio	1.627711	45	Louisiana	1.981195
20	Michigan	1.661265	46	Arizona	2.034026
21	Alaska	1.670734	47	Wisconsin	2.065427
22	Indiana	1.675456	48	Florida	2.127959
23	West Virginia	1.69595	49	Nevada	2.191227
24	Iowa	1.704345	50	Alabama	2.206953
25	Idaho	1.727471	51	Tennessee	2.279366
26	North Carolina	1.737121			

A Word on Alternative Models: There are a number of different methods of conceptualizing the data here and running the analysis. Most of these methods deal with different ways of accounting for the effects of states on licensure. Table A2 uses bootstrapping with replacement to eliminate assumptions about the normality of the distribution that underlie regression. Table A3 clusters standard errors, accounting for state variation in a different way than with the fixed effects in model (2).

Appendix Table A2. Alternative Model with Bootstrapped Resampling by State

VARIABLES	jobs_1000
index	-0.0626*** (0.0225)
aes	-0.157*** (0.0434)
mas	0.0758 (0.0552)
cos	2.197*** (0.141)
man	-0.0396 (0.0605)
vet	0.248*** (0.0576)
athl	-0.241*** (0.0413)
lock	-0.381*** (0.0389)
emt	1.538*** (0.0967)
priv	-0.255*** (0.0396)
Constant	0.525*** (0.0409)
Observations	469
R-squared	0.812

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A3. Alternative Model with Standard Errors Clustered by State

VARIABLES	(1) jobs_1000
index	-0.0592** (0.0248)
aes	0.0409 (0.0518)
man	0.121 (0.0799)
mas	0.305*** (0.0579)
lock	-0.160*** (0.0454)
cos	2.375*** (0.141)
vet	0.442*** (0.0680)
emt	1.740*** (0.0928)
pest	0.204*** (0.0565)
athl	-0.00535 (0.0323)
a_mean	-3.51e-06 (2.20e-06)
black	-0.147 (0.232)
urbancity	0.00231 (0.00166)
Constant	0.279 (0.184)
Observations	468
R-squared	0.814

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Note on Table A4: Table A4 looks for the potential for lagged effects of licensure on employment by using the 2015 BLS data and 2012 Red Tape Index. The results are smaller than those reported in the main paper, though still significant. This is potentially due to changes that have occurred in state licensure over the time frame.

Appendix A4. Effect of Lagged Red Tape Index on Employment, 2015

VARIABLES	National Model	State Fixed Effects
	jobs_1000	jobs_1000
index	-0.0511* (0.0263)	-0.0555** (0.0276)
mas	0.168** (0.0816)	0.169** (0.0790)
cos	1.999*** (0.0874)	2.010*** (0.0851)
man	0.0152 (0.0868)	0.0214 (0.0802)
vet	0.242*** (0.0790)	0.248*** (0.0777)
aes	-0.166** (0.0830)	-0.154* (0.0824)
athl	-0.260*** (0.0858)	-0.260*** (0.0784)
lock	-0.395*** (0.0880)	-0.379*** (0.0870)
emt	1.489*** (0.0839)	1.499*** (0.0837)
priv	-0.254*** (0.0951)	-0.270*** (0.0837)
black	-0.275 (0.167)	
a_mean	-1.52e-07 (3.00e-06)	
urbancity	0.00421*** (0.00131)	
Constant	0.259* (0.141)	0.459*** (0.143)
Observations	470	473
R-squared	0.794	0.819

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Appendix B: Bureau of Labor Statistics Descriptions of Occupations

Aesthetician (Skincare Specialist)¹⁴

Wages: \$30,040 per year, \$14.47 per hour

Job Outlook 2014-2024: 12% growth (faster than average)

BLS Description: “Skincare specialists give facials, full-body treatments, and head and neck massages to improve the health and appearance of the skin. Some may provide other skin care treatments, such as peels, masks, and scrubs, to remove dead or dry skin.

In addition to working with clients, skincare specialists create daily skincare routines based on skin analysis and help clients understand which skincare products will work best for them. A growing number of specialists actively sell skincare products, such as cleansers, lotions, and creams.

Those who operate their own salons have managerial duties that include hiring, firing, and supervising workers, as well as keeping business and inventory records, ordering supplies, and arranging for advertising.”

Athletic Trainer¹⁵

Wages: \$44,670 per year

Job Outlook 2014-2024: 21% (much faster than average)

BLS Description: “Athletic trainers work with people of all ages and all skill levels, from young children to soldiers and professional athletes. Athletic trainers are usually one of the first healthcare providers on the scene when injuries occur. They work under the direction of a licensed physician and with other healthcare providers, often discussing specific injuries and treatment options or evaluating and treating patients, as directed by a physician. Some athletic trainers meet with a team physician or consulting physician regularly.

An athletic trainer’s administrative responsibilities may include regular meetings with an athletic director or another administrative officer to deal with budgets, purchasing, policy implementation, and other business-related issues. Athletic trainers plan athletic programs that are compliant with federal and state regulations, such as laws related to athlete concussions.”

Cosmetologist (Barbers, Hairdressers, and Cosmetologists)¹⁶

Wages: \$23,710 per year, \$11.40 per hour

Job Outlook 2014-2024: 10% (faster than average)

BLS Description: “Barbers, hairdressers, and cosmetologists provide hair and beauty services to enhance clients’ appearance. Those who operate their own barbershop or salon have managerial duties that may include hiring, supervising, and firing workers, as well as keeping business and inventory records, ordering supplies, and arranging for advertising.”

Emergency Medical Technician (EMT’s and Paramedics)¹⁷

Wages: \$31,980 per year, \$15.38 per hour

Job Outlook 2014-2024: 24% (much faster than average)

BLS Description: “Emergency medical technicians (EMTs) and paramedics care for the sick or injured in emergency medical settings. People’s lives often depend on the quick reaction and

competent care provided by these workers. EMTs and paramedics respond to emergency calls, performing medical services and transporting patients to medical facilities.

A 911 operator sends EMTs and paramedics to the scene of an emergency, where they often work with police and firefighters.”

Locksmith (Locksmiths and Safe Repairers)¹⁸

Wages: \$41,270 per year or \$19.84 per hour.

Job Outlook 2012-2022: 7% (Average)

BLS Description: “Repair and open locks; make keys; change locks and safe combinations; and install and repair safes.”

Manicurist (Manicurist and Pedicurist)¹⁹

Wages: \$20,820 per year or \$10.01 per hour

Job Outlook 2014-2024: 10% (Faster than average)

BLS Description: “Manicurists and pedicurists work exclusively on the hands and feet, providing treatments to groom fingernails and toenails. A typical treatment involves soaking the clients’ hands or feet to soften the skin in order to remove dead skin cells. Manicurists and pedicurists apply lotion to the hands and feet to moisturize the skin. They also may shape and apply polish to artificial fingernails.

Manicurists and pedicurists use a variety of tools, including nail clippers, nail files, and specialized cuticle tools. They must be focused while they perform their duties, because most of the tools they use are sharp. Keeping their tools clean and sanitary is important.”

Massage Therapist²⁰

Wages: \$38,040 per year or \$18.29 per hour

Job Outlook 2014-2024: 22% (Much faster than average)

BLS Description: “Massage therapists treat clients by using touch to manipulate the muscles and other soft tissues of the body. With their touch, therapists relieve pain, help heal injuries, improve circulation, relieve stress, increase relaxation, and aid in the general wellness of clients.”

Pest Control Worker²¹

Wages: \$32,160 per year or \$15.46 per hour

Job Outlook 2014-2024: -1% (Little or no change)

BLS Description: “Unwanted pests that infest buildings and surrounding areas can pose serious risks to the health and safety of occupants. Pest control workers control, manage, and remove these creatures from homes, apartments, offices, and other structures to protect people and to maintain the structural integrity of buildings.

To design and carry out integrated pest management plans, pest control workers must know the identity and biology of a wide range of pests. They must also know the best ways to control and remove the pests.”

Private Detectives and Investigators²²

Wages: \$45,610 per year or \$21.93 per hour

Job Outlook 2014-2024: 5% (Average)

BLS Description: “Private detectives and investigators offer many services for individuals, attorneys, and businesses. Examples are performing background checks, investigating employees for possible theft from a company, proving or disproving infidelity in a divorce case, and helping to locate a missing person.

Private detectives and investigators use a variety of tools when researching the facts in a case. Much of their work is done with a computer, allowing them to obtain information such as telephone numbers, details about social networks, descriptions of online activities, and records of a person’s prior arrests. They make phone calls to verify facts and interview people when conducting a background investigation.”

Veterinary Technician (Veterinary Technologists and Technicians)²³

Wages: \$31,800 per year or \$15.29 per hour

Job Outlook 2014-2024: 19% (Much faster than average)

BLS Description: “Veterinarians rely on technologists and technicians to conduct a variety of clinical and laboratory procedures, including postoperative care, dental care, and specialized nursing care.

Veterinary technologists and technicians who work in research-related jobs do similar work. For example, they are responsible for making sure that animals are handled carefully and treated humanely. They also help veterinarians or scientists on research projects in areas such as biomedical research, disaster preparedness, and food safety.”

Appendix C: Occupational Licensure in Wisconsin, 2012

Occupation	License	Training Days	Fees	Age Requirement	Exams
Athletic Trainer	X	1,460	\$353	0	1
Vet Tech	X	730	\$352	18	3
Cosmetologist	X	420	\$193	18	3
Massage Therapist	X	57	\$140	18	2
Manicurist	X	70	\$174	0	2
Aesthetician	X	105	\$202	18	2
EMT	X	28	\$70	18	2
Pest Control Applicator	X	0	\$99	16	1
Security Guard	X	0	\$69	18	0
Locksmith	not licensed	not licensed	not licensed	not licensed	not licensed

Sources: *License to Work, Institute for Justice, 2012* and *Privateinvestigator.org*

*Wisconsin passed Act 356 in 2013 that dropped the required number of training hours for a cosmetology license from 1,800 to 1,550. The law went into effect in 2014.

Endnotes

- 1 Kleiner, Morris M. and Krueger, Alan B. 2013. "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market." *Journal of Labor Economics* 31, no. 2: S173-S202.
- 2 Roth, Collin and Ramlow, Elena. 2016. "Fencing Out Opportunity", Wisconsin Institute for Law & Liberty.
- 3 "Regulation of Occupations by the Department of Safety and Professional Services, Wisconsin Legislative Reference Bureau, January 2017.
- 4 An alternative, lagged model using 2015 BLS data is included in Appendix Table A3.
- 5 We conducted our own research on private detective requirements.
- 6 Thus, Wisconsin's index score in the full analysis is 3.93 rather than 4.00 because there is a state with higher fees (New York).
- 7 The BLS data on employment was gathered from six waves of nationwide surveys conducted during the three years prior to its release in May, 2009. See BLS "Technical Notes for May 2012 OES Estimates" for more information.
- 8 Race is controlled for here because studies have shown that African Americans have a higher unemployment rate even when factors like education level are accounted for (Wilson 2015).
- 9 An alternative model to alleviate concerns about the independence of states and job numbers is included in appendix table A1. Another alternative with standard errors clustered by state is included in table A3. This table shows similar results to the main results in the analysis.
- 10 Appendix C lists all of the requirements for Wisconsin according to *IJ*'s 2012 report.
- 11 Act 356, signed in 2013, reduced the training hour requirements for cosmetologists from 1,800 to 1,550. The law went into effect in 2014.
- 12 Estimates were derived using Clarify suite of commands for STATA (King, Tomz, and Wittenberg 2000).
- 13 The state with the least burdensome licensure in our analysis is Hawaii. This is different from the rankings that have previously been put out by the Institute for Justice (Carpenter et. al. 2012). The primary reason for this discrepancy is that we do not focus on the construction-related occupations that tend to drive up Hawaii's burdens, and include a number of professions that the state does not license.
- 14 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Skincare Specialists, on the Internet at <https://www.bls.gov/ooh/personal-care-and-service/skincare-specialists.htm>. Accessed 3/14/2017.
- 15 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Athletic Trainers, on the Internet at <https://www.bls.gov/ooh/healthcare/athletic-trainers.htm>. Accessed 3/14/2017.
- 16 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Barbers, Hairdressers, and Cosmetologists, on the Internet at <https://www.bls.gov/ooh/personal-care-and-service/barbers-hairdressers-and-cosmetologists.htm>. Accessed 3/14/2017.
- 17 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, EMTs and Paramedics, on the Internet at <https://www.bls.gov/ooh/healthcare/emts-and-paramedics.htm>. Accessed 3/14/2017.
- 18 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Employment Statistics*, 49-9094 Locksmiths and Safe Repairers, on the Internet at <https://www.bls.gov/oes/current/oes499094.htm>. Accessed 3/14/2017

- 19 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Manicurists and Pedicurists, on the Internet at <https://www.bls.gov/ooh/personal-care-and-service/manicurists-and-pedicurists.htm>. Accessed 3/14/2017.
- 20 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Massage Therapists, on the Internet at <https://www.bls.gov/ooh/healthcare/massage-therapists.htm>. Accessed 3/14/2017.
- 21 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Pest Control Workers, on the Internet at <https://www.bls.gov/ooh/building-and-grounds-cleaning/pest-control-workers.htm>. Accessed 3/14/2017.
- 22 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Private Detectives and Investigators, on the Internet at <https://www.bls.gov/ooh/protective-service/private-detectives-and-investigators.htm>. Accessed 3/14/2017.
- 23 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Veterinary Technologists and Technicians, on the Internet at <https://www.bls.gov/ooh/healthcare/veterinary-technologists-and-technicians.htm>. Accessed 3/14/2017.

