

The Wisconsin Institute for Law & Liberty



Land of the Free?

50 state study on how professional licensing laws lead to fewer jobs

Will Flanders, Ph.D.
Research Director
Wisconsin Institute for Law & Liberty

Collin Roth
Research Fellow
Wisconsin Institute for Law & Liberty

October 2017



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.

In 1950 just 1 in 20 workers required a license to work, now close to 1 in 4 do. With more professionals, and aspiring professionals, running into licensing laws, the case for reform has found an increasingly broad and diverse audience. Coalitions of liberal and conservative activists and policy experts, Democrat and Republican governors, and the Obama and Trump administrations have all embraced the cause of licensing reform. And while progress has been made in this reform movement, rigorous research into the effects of licensing on workers and the broader economy are still in their infancy.

This peer-reviewed¹ study examines, for the first time, the impact of licensing requirements across the country on ten low and moderate income professions. For each state we created a Red Tape Index which measures the license requirements, i.e. fees, training hours, exams required, and minimum age, for ten professions. Then we looked at how employment related to a state's score on the Red Tape Index. Our findings include:

1. States with more burdensome licensure requirements (fees, training hours, exams, and age requirements) had significantly lower employment in the ten professional occupations.
2. Our models show that 23 states could see employment growth of 5% or above for these ten professions if they lowered their licensing laws to those of the least burdensome state – Hawaii.
3. Tennessee, Alabama, Nevada, Florida, and Wisconsin are ranked as the most burdensome states for the professions under study.
4. Hawaii, Massachusetts, Connecticut, Rhode Island, and Utah are ranked as the least burdensome states for the professions under study.
5. **We estimate that employment in the U.S. for those ten professions would increase by 4.5%** if licensing regulations were reduced to the level of the least burdensome state (Hawaii).

Our study shows 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.

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)

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).

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.

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.

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)². Our final culling identified professions that were licensed widely throughout the country. Table 1 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 data³. 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.

Formally, for each profession p in state s , let F_s equal the fees, E_s equal the experience requirements, X_s equal the number of exams required, and A_s equal the number of exams required. The Red Tape Index score is calculated as follows:

$$\text{Red Tape Index}_p = \frac{F_{ps}}{\text{Max}(F_p)} + \frac{E_{ps}}{\text{Max}(E_p)} + \frac{X_{ps}}{\text{Max}(X_p)} + \frac{A_{ps}}{\text{Max}(A_p)}$$

To illustrate our methodology, consider the example of veterinary technician licensure, a license for which Alabama has some of the highest scores on the Red Tape Index. We will compare Alabama'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 simultaneously⁴.

Figure 1. Example of Licensure Requirements Between Two States

State	Fees	Experience	Exams	Age
Delaware	\$71	730 days	1	0
Alabama	\$160	730 days	2	18

The Red Tape Index score for Alabama would be:

$$\frac{160}{160} + \frac{730}{730} + \frac{2}{2} + \frac{18}{18} = 4.00$$

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

$$\frac{71}{160} + \frac{730}{730} + \frac{1}{2} + \frac{0}{18} = 1.94$$

In this example, Alabama has more stringent licensure requirements than Delaware for veterinary technicians. Alabama has equal or higher requirements in every category, and thus the Alabama 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 2012⁵. 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 state⁶, 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 exists between professions. For each job *j* in state *s*, the following regression is estimated:

Model (1)

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

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)⁷.

Model (2)

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

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 β_1 in both model (1) and model (2).

RESULTS: NATIONAL

Figure 4 on the following page 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

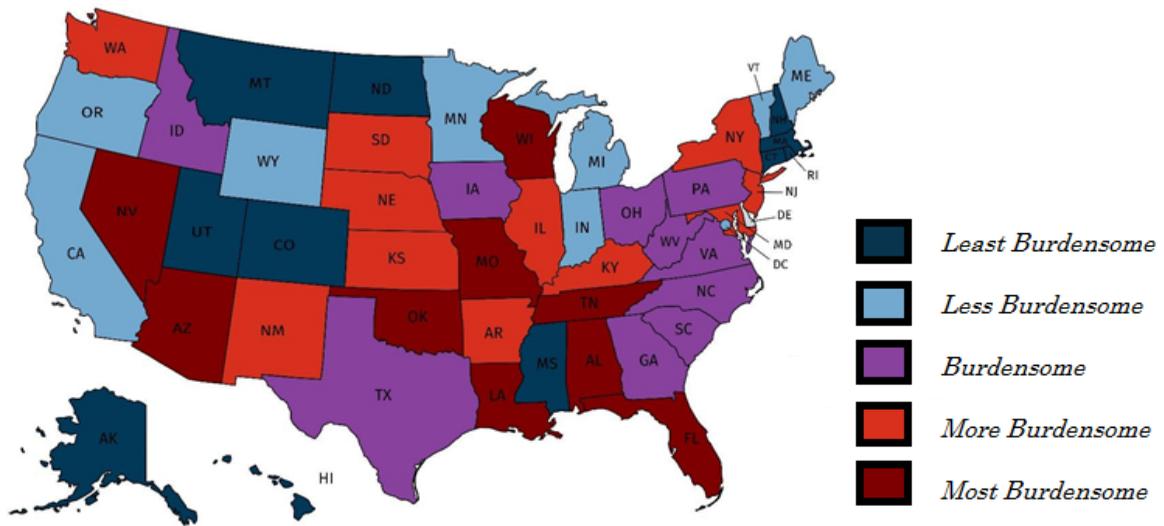


Table 3 below reports the results from two models of licensure relying on 2012 BLS employment data. Model 1 can be called the “national model.” Model 1 does not include fixed effects for each state, but does control for state demographics, the unemployment rate in the state, and the mean annual income 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**	0.164

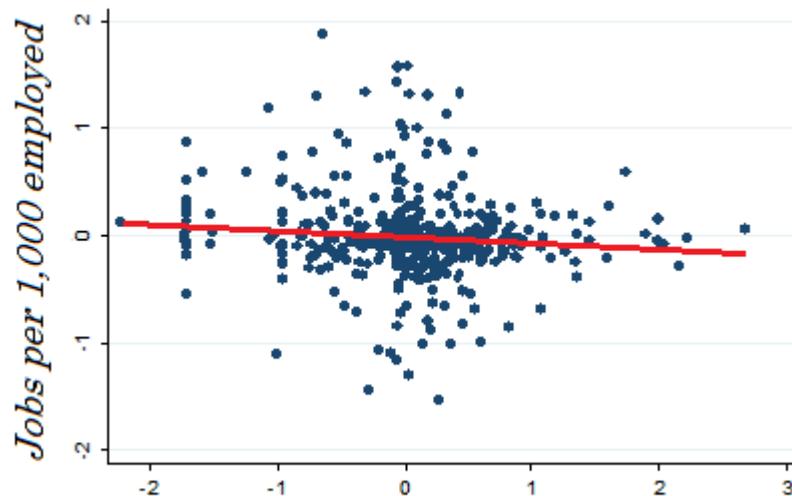
	(0.0974)	(0.101)
<i>Athletic Trainer</i>	-0.00681	-0.0160
	(0.0869)	(0.0876)
<i>Annual Salary</i>	-2.49e-06	-6.49e-06*
	(2.99e-06)	(3.52e-06)
<i>Unemployment Rate</i>	-0.0284	--
	(0.0206)	
<i>African American</i>	-0.000115	--
	(0.192)	
Constant	0.519***	0.502**
	(0.185)	(0.220)
Observations	468	468
R-squared	0.813	0.836

Standard errors in parentheses

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

These results are depicted in Figure 5 below, 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.**

Figure 5. Effect of Red Tape Index on Employment



Best five states

State	Index Score
Hawaii	1.04
Massachusetts	1.17
Connecticut	1.17
Rhode Island	1.38
Utah	1.40

Worst five states

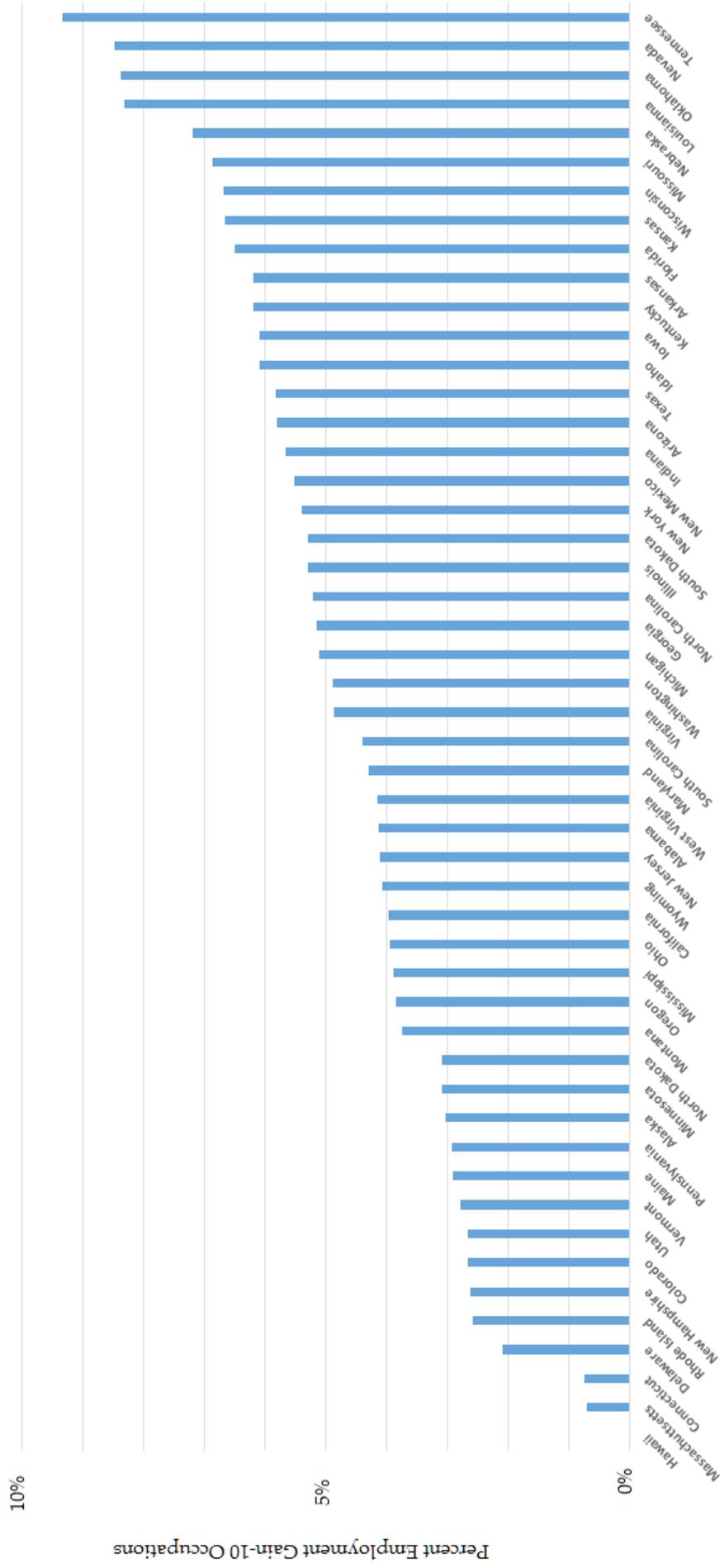
Wisconsin	2.06
Florida	2.12
Nevada	2.19
Alabama	2.21
Tennessee	2.28

Figures 6 and 7 depict the extent to which our model predicts job gains in the 10 professions under study from simply moving to the level of licensure of the best state in the country – Hawaii. The state with the most to gain is Tennessee, where more than 9% job growth would be forecasted from reduced licensure burdens⁸. This state combines a relatively high licensure burden with low levels of employment currently in the fields of study. Other states that could realize significant gains include Nevada, Louisiana, Oklahoma, and Wisconsin. States that currently have low licensure requirements – such as Hawaii and Connecticut – obviously experience the least amount of gains because we are using them as the benchmark for reasonable levels of licensure. That said, it is reasonable to expect that such states could still experience job growth from further reduction of licensure burdens.

Figure 6. Percent Employment Change by State Through Reduced Licensure Requirements

State	% Employment Change	State	% Employment Change
Alabama	4.126	Montana	3.743
Alaska	3.032	Nebraska	7.169
Arizona	5.813	Nevada	8.488
Arkansas	6.194	New Hampshire	2.611
California	3.963	New Jersey	4.120
Colorado	2.657	New Mexico	5.524
Connecticut	0.734	New York	5.396
Delaware	2.083	North Carolina	5.206
District of Columbia	6.190	North Dakota	3.088
Florida	6.505	Ohio	3.953
Georgia	5.161	Oklahoma	8.377
Hawaii	0.000	Oregon	3.841
Idaho	6.089	Pennsylvania	2.929
Illinois	5.286	Rhode Island	2.581
Indiana	5.656	South Carolina	4.408
Iowa	6.089	South Dakota	5.303
Kansas	6.658	Tennessee	9.331
Kentucky	6.185	Texas	5.824
Louisiana	8.309	Utah	2.664
Maine	2.899	Vermont	2.791
Maryland	4.305	Virginia	4.865
Massachusetts	0.703	Washington	4.884
Michigan	5.121	West Virginia	4.160
Minnesota	3.082	Wisconsin	6.687
Mississippi	3.891	Wyoming	4.080
Missouri	6.877		

Figure 7. Estimated Employment Increase Through Reduced Licensure Requirements



We can estimate the overall impact on employment throughout the country by multiplying the percentage gains here times the number of people employed in these occupations in each state. Across the country, we estimate that employment could increase by 4.5% in these ten professions if regulations were reduced to the level of Hawaii in all other states and the District of Columbia.

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 burdens 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.

REFERENCES

- Arrow, Kenneth. 1963. "Uncertainty and the Welfare Economics of Medical Care." *American Economic Review* 53: 941-973.
- Bureau of Labor Statistics. 2015. "Occupational Employment Statistics Survey." Retrieved from bls.gov.
- Carpenter, Dick M., Knepper, Lisa, Erickson, Angela and Ross, John. 2012. "License to Work: A National Study of Burdens from Occupational Licensing." Institute for Justice.
- Federman, Maya N., Harrington, David, and Krynski, Kathy. 2006. "The Impact of State Licensing Regulations on Low-Skilled Immigrants: The Case of Vietnamese Manicurists." *American Economic Review* 96: 237-241.
- Friedman, Milton. 1962. "Capitalism and Freedom." Chicago: University of Chicago Press.
- Gittleman, Maury, Klee, Mark, and Kleiner, Morris. 2014. "Analyzing the Labor Market Outcomes of Occupational Licensure." Research Staff Report 504. Federal Reserve Bank of Minneapolis.
- Kleiner, Morris P. 2015. "Reforming Occupational Licensing Policies." The Hamilton Project.
- Kleiner, Morris P. and Krueger, Alan. 2010. "The Prevalence and Effects of Occupational Licensing." *British Journal of Industrial Relations* 48: 651-54.
- King, Gary, Tomz, Michael, and Wittenberg, Jason. 2000. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44: 347-61.
- Maurizi, Alex. 1974. "Occupational Licensing and the Public Interest." *Journal of Political Economy* 82: 399-413.
- Department of Treasury Office of Economic Policy, Council of Economic Advisers, and Department of Labor. 2015. "Occupational Licensing: A Framework for Policymakers."
- Privateinvestigatoredu.org, "How to Become a Private Investigator." Accessed 3/14/2017.
- "Regulation of Occupations by the Department of Safety and Professional Services", Wisconsin Legislative Reference Bureau, January 2017.
- Roth, Collin and Ramlow, Elena. 2016. "Fencing Out Opportunity: Occupational Licensure in the Badger State." Wisconsin Institute for Law & Liberty.
- Sleeper, Steve, "An Open Letter to the Industry." Professional Beauty Association, September 11, 2014.
- Slivinski, Steve. 2015. "Bootstraps Tangled in Red Tape: How State Occupational Licensing Hinders Low-Income Entrepreneurship." Goldwater Institute.
- Simpson, Kaila M., Hendrickson, Cheryl, Norris, Dwayne, Vander Molen, Randy, Vestal, David, Kavanaugh, Kathryn, Lilly, Samantha, Rege, Gauri, and Smith, Deeza-Mae. 2016. "Examination of Cosmetology Licensing Issues: Data Report." American Institutes for Research.
- White, William D. 1978. "The Impact of Licensure on Clinical Laboratory Personnel." *Journal of Human Resources* 13: 91-102.
- Wilson, Valerie. 2015. "Black Unemployment significantly higher than white unemployment regardless of educational attainment." Economic Policy Institute.

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)⁹

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 Trainer¹⁰

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)¹¹

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)¹²

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)¹³

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)¹⁴

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 Therapist¹⁵

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 Worker¹⁶

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 Investigators¹⁷

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)¹⁸

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.”

Endnotes

- 1 This study was peer-reviewed by two university professors using a double-blind process.
- 2 An alternative, lagged model using 2015 BLS data is included in Appendix Table A3.
- 3 We conducted our own research on private detective requirements.
- 4 Thus, Alabama's index score in the full analysis is 3.06 rather than 4.00 because there are a few states with more onerous requirements.
- 5 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.
- 6 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).
- 7 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.
- 8 The percentage employment change for each state is included in Figure 6.
- 9 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.
- 10 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.
- 11 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.
- 12 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.
- 13 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
- 14 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.
- 15 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.
- 16 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.
- 17 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.

18 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.