Chapter 6

Occupational Licensing: A Barrier to Opportunity and Prosperity

Alicia Plemmons and Edward Timmons

Occupational licensing laws establish mandatory minimum entry requirements that must be met for aspiring professionals to begin working. These requirements include completing minimum levels of education and training, paying various fees, passing examinations, and satisfying "good moral character" standards. In the early 1950s, approximately 5 percent of workers in the United States were required to obtain a license to work.[1] As of 2019, the percentage of workers has grown to almost 22 percent.[2] This is nearly 10 times the fraction of workers (2.3%) receiving the federal minimum wage[3] and more than double the percentage of workers (10.3%) that are union members.[4] Occupational licensing primarily occurs at the state level, but there are some examples of federal licensing, as well as variation at the county and municipal levels.

Some occupations, such as those of physicians, dentists, and registered nurses, are licensed in every state with little variation in licensing requirements. Other occupations, such as barbering and cosmetology, are universally licensed but with significant state-to-state variation. Barbers, for example, must complete 2,100 hours of education in Iowa—more than double the number of hours mandated in New Hampshire (800).[5] Some occupations (such as those of massage therapists and

radiologic technicians) are licensed in most states; others (e.g., lactation consulting and interior design) are licensed in only a few states. There are even examples of occupations that are licensed in only one state—such as florists in Louisiana.

To better understand the costs associated with occupational licensing requirements, we will use barbers as an illustrative example. As of September 2020, barbers require a license in all 50 states and the District of Columbia.[6] Using data provided through the Knee Center for the Study of Occupational Regulation at Saint Francis University, we find that there is a large discrepancy in the fees required to obtain a barber's license across states—from $10 in Pennsylvania to $450 in Alaska. Fees are far from the only requirement prospective barbers must meet to obtain a license. Other costs take the form of time spent on experience and training, different forms of examination, and good moral character requirements.

In the case of barbers, degree requirements range from none at all in some states to proof of graduation from a licensed barbering college in others. These educational programs can vary drastically in cost. In the 2019-2020 academic year, the average cost of tuition, books, and supplies was more than $15,000 per year.[7] This is a comparatively high cost considering that the 2019 median pay for barbers and other hairstylists was approximately $26,270 a year, or just under $13 per hour.[8] In most states, after completing the education or experience requirements (thousands of hours of hands-on experience in some cases), prospective barbers must complete examinations. States vary in their examination requirements, but exams may be written, practical, or theoretical—or a combination of all three. After paying for education expenses and examinations, prospective barbers are also required in most states to demonstrate good moral character by disclosing any criminal history. In many cases, good moral character requirements might bar individuals with non-dangerous records from employment.

Barbers have mixed feelings about the licensing requirements and prospects for future reform. For example, in Arkansas, where there was a senate bill to abolish the State Board of Barber Examiners, barbers protested and noted that the proposal "definitely takes the professionalism,

and it definitely takes the craft out of what we do and it just puts us in layman's terms."[9] Others also struggle with the prospect of what's known as a *transitional gains trap*.[10] If licensing laws are repealed, then the time and money thousands have spent to obtain a license may become obsolete and, in the words of one director of an Arkansas barber college, the repeal "makes the license that they receive pointless."[11]

While these feelings do persist, there is also the long-term situation to consider. When a similar Texas bill that would abolish the requirement that barbers be licensed, Texas state representative Matt Shaheen explains that "the legislation was created to expand employment opportunities. . . . Texans that are willing to join the workforce and compete—especially low-income Texans looking to improve their lives—should face the fewest obstacles possible."[12] Both the Arkansas and Texas bills did not become law.

Why are occupations licensed and why are there such vast differences from state to state? Economists have developed two theories.[13] The first theory focuses on the supply side of the labor market. By making it more difficult for aspiring workers to enter the licensed profession, licensing ensures that fewer individuals have the ability to enter the occupation. This reduction in supply results in the licensed practitioners having the ability to earn higher wages and charge higher prices for their services. Therefore, this theory suggests that welfare declines as a result of occupational licensing. Occupational licensing comes about and is able to persist as a result of concentrated benefits being received by the licensed professionals and individuals that develop a financial stake in the persistence of the regulation (e.g., schools and examining bodies). The costs associated with licensing, on the other hand, are dispersed among a larger number of people, and thus individuals are less passionate about limiting new or eliminating existing occupational licensing legislation. Nobel prize winning economist Milton Friedman advanced this theory specifically in the case of occupational licensing, and the theory was more formally outlined and generalized by economist Mancur Olson.[14] Practitioners will actively attempt to implement licensing as a means of increasing their own benefit.[15] Practitioners' differing abilities to organize into interest groups and influence state

legislators will result in significant differences in licensing legislation from state to state

An alternative theory of occupational licensing instead focuses on the demand side of the labor market. Consumers have less information about the qualifications, reputation, and ability of a professional than the professional has about him- or herself. By establishing minimum quality standards, occupational licensing alleviates this gap in information (known as the *asymmetric information problem*). As a result, occupational licensing may potentially increase welfare. This theory was originally developed by Nobel prize winning economist George Akerlof and later applied specifically to occupational licensing by economist Hayne Leland.[16] Berkeley economist Carl Shapiro also noted that occupational licensing may increase the human capital of licensed professionals by raising training levels, which may help to increase the quality of services that consumers receive.[17]

Shapiro's analysis showed that licensing may enhance welfare if professional qualifications and training are not observable, but will reduce welfare if training is observable. Professionals may use excessive investment into human capital as a signaling device—one that tends to benefit consumers who value high quality, but at the expense of consumers who do not value high quality. In addition, certification may potentially be inferior with respect to welfare than both licensing and market competition if professionals overinvest in training to serve as a signaling device.

Other scholars have further expanded on this public choice theory of licensure by estimating market equilibriums in which licensure restricted the workers' ability to supply their labor but also affected the demand for workers on the basis of quality and selection criteria. They find that licensing raised wages and hours but reduced employment and reduced average welfare.[18] Still other researchers studying the relationship between occupational licensing and public choice argue that practitioners favor licensing to reduce competition and keep inflated wages (which accords with the theory of public choice), but that public choice theory has limitations in capturing all of the potential harms of licensure.[19] The researchers also suggest that public choice theory fails

to theoretically address potential threats to public health and safety and places a disproportionate emphasis on studying professions in which the justification for licensure is the weakest.

Some scholars have argued that advances in technology have significantly reduced the effects of asymmetric information.[20] Consumers can use websites such as Yelp, Angie's List, Google, and Facebook to gather information about the reputation and ability of professionals before completing a transaction. Research suggests that consumers may value and use consumer ratings in place of licensing status.[21] It is also not clear why requirements for occupational licensing would substantially vary from state to state if regulators were primarily motivated by improving welfare. Further, there is little documented evidence of consumers being the primary lobbyists for new occupational licensing—instead, professional associations (and individuals with financial ties to the regulation) are generally the fiercest defenders and supporters of occupational licensing.[22]

The fact that many licensed professionals fear that licenses will be "worthless" if barriers to entry are removed (the transitional gains trap) also seems to be more consistent with the supply-side theory than the demand-side theory. If licensing were primarily operating as a signaling device, the license should still serve an important purpose of signaling quality despite competition from unlicensed professionals.

Certification represents one regulatory alternative to occupational licensing. The state of California, for example, issues certificates to massage therapists. Individuals without a certificate are free to practice massage therapy, but may not use the protected title "certified massage therapist." Unfortunately, public perception often equates "regulation" with "licensing." In reality, occupational licensing represents the strictest form of occupational regulation—an outright ban on practice unless individuals meet entry requirements. In *Capitalism and Freedom*, Milton Friedman defines less stringent forms of regulation that he refers to as *certification* and *registration*. Certification protects a title but does not prohibit practice. Registration refers to the state collecting contact information from applicants and maintaining a list of practitioners. Each of these less-stringent types of occupational regulation is much

less prevalent than licensing. Only 2.3 percent of workers are certified, and registration is likely even less prevalent.[23] Adding to public confusion, states often use all three terms interchangeably in statutes and administrative code—most often states use the terms *certification* and *registration* in place of *licensing*.[24]

The Institute for Justice has identified additional alternatives to occupational licensing besides certification and registration.[25] Figure 1 shows the "inverted pyramid" depicting alternative forms of regulation—beginning with the least-restrictive option at the top (market competition) and the most-restrictive option at the bottom (occupational licensing). The shape of the inverted pyramid represents the restrictiveness of a form of occupational regulation—a larger area within the pyramid corresponds with more freedom for the market to function without restriction.

Market competition is at the top of the pyramid and represents the least intrusive means of regulating the market. At the other extreme, licensure represents the most restrictive government-intervention approach to regulating an industry, in that it does not allow an individual to provide a good or service without the express consent and permission of a government organization. The menu of options shown in figure 1 provides regulators with nine less-costly and less-intrusive means of addressing possible market failures. As noted previously, advances in technology have likely reduced the potential for market failure, and the case that can be made for occupational licensing has weakened over time.

In the sections that follow, we trace the history of licensing and the origins of occupational licensing, before turning to a summary of the existing empirical literature on its effects. We then provide some important visualizations of the scope and effects of licensing before offering a framework for reform.

History of Occupational Licensing

Occupational licensing has a rich and expansive history. Rules governing occupations can be traced back to the Babylonian Code of Hammurabi, circa 1700 BC. These early rules outlined expectations

Figure 1. Alternatives to Occupational Licensing

Source: John K. Ross, "The Inverted Pyramid: 10 Less Restrictive Alternatives to Occupational Licensing" (report, Institute for Justice, November 2017).

about prices for medical services and punishments for negligent practitioners. There is evidence that occupational regulation also existed quite early in China: competency examinations were used as a determinant of job proficiency in small, wealthy circles as early as the Han dynasty, and were expanded in the late seventh century AD by Wu Zetian of the Tang dynasty. These occupational regulations were known as the Imperial Examination. Members of any socioeconomic class in the country could pay an application fee and take a civil service examination; those who passed met the requirements to become a candidate for the state bureaucracy.[26] Later, during the Song dynasty, the program was regularized into a three-tiered system that included local, provincial, and court exams. Over the following few hundred years, the Chinese government expanded rudimentary licensing systems for dentists, physicians, and acupuncturists.[27]

Eventually, the idea of restricting entry into occupations to maintain a standard of performance, ensure quality and safety, and limit competition began to appear in Europe in the 13th and 14th centuries with the popularization and expansion of medieval guilds.[28] Guilds were found within Germany, Naples, Sicily, and Spain. These were often made up of artisans or merchants who oversaw the entry into and practice of

their craft or trade within a particular geographic region. These guilds often enforced their authority as a rudimentary professional association through grants of letter patents from monarchs. Gaining entry into these exclusive organizations often involved paying fees and dues and meeting competency requirements.

The foundations of occupational regulation in the United States were laid in the early colonies. Some later developments can be traced to the ideas of Scottish author Adam Smith, commonly regarded the father of modern economics. Smith discussed early forms of occupational regulation in his most well-known work, *An Inquiry into the Nature and Causes of the Wealth of Nations*, such as regulations that limited the number of apprentices a skilled craftsman could undertake and regulations that limited the length of apprenticeship programs.[29] Many of these ideas were incorporated into US state-level regulation concerning apprentices and property rights for many categories of workers such as bakers, leather merchants, lawyers, and innkeepers. During the 19th century some states and localities chose to progress from industry regulation to early forms of licensure that granted the right to practice to approved individuals only; examples can be found applying to barbers, embalmers, farriers, pawnbrokers, and a selection of other professionals.[30] These examples of occupational licensing were rare and hotly debated until a Supreme Court ruling in 1889 upheld the constitutionality of state efforts to regulate the medical profession for the purpose of promoting and maintaining health and safety.[31]

Within the United States, occupational licensing was sparse until early in the Progressive Era (1890–1920)[32] and was often undertaken by national professional organizations—most notably the American Medical Association (AMA) for physicians, which was established in 1847. The publicly stated mission of the AMA was to advance scientific research, improve public health, and create a consistent set of standards for medical education. The AMA also serves as a form of trade union by restricting the number of people who can enter a medical occupation, and therefore indirectly affects wages and limits potential competition by restricting the practice of medicine to exclude other professionals such as chiropractors and barbers.[33] In 1908, the Council on Medical

Education within the AMA contracted the Carnegie Foundation for the Advancement of Teaching to survey the American medical education system with regard to public health and safety. Abraham Flexner was chosen to survey the 155 medical schools that existed at the time within North America, and found substantial differences in curriculum, assessment, and requirements for graduation.[34]

In 1910, Flexner published his findings in a report, titled *Medical Education in the United States and Canada*, that outlined specific recommendations for creating a single model of medical education. Direct consequences of this report included the closure or consolidation of many inefficient or understaffed medical schools, a series of rules stating that a new medical school cannot be created without the permission of the state government, and a set standard of education for those intending to be considered medical practitioners. Flexner's report laid the groundwork for modern licensing, in that it established that all physicians receive at least six years of postsecondary formal instruction in order to practice medicine—instruction that adheres closely to the scientific method and maintains the protocols of scientific research.

The medical doctor field, though the most notable example, was not the only field that adopted a form of occupational regulation and licensure during the Progressive Era. Many states introduced licensing requirements for professionals including accountants, architects, chiropractors, engineers, nurses, optometrists, and plumbers.[35] By the mid-20th century, there were nearly 1,200 state licensing statutes and approximately 5 percent of jobs in the United States required an occupational license.[36]

The Progressive Era marked the beginning of modern occupational licensing systems in the United States. Occupational licensing underwent rapid expansion between 1950 and the late 2010s. There are many views about why this expansion occurred, two of which are referenced in the previous section. In summary, technological advances and increased professional specialization had made it increasingly difficult for consumers to judge differences between service providers.

Proponents of occupational licensing have often argued that they decrease consumer uncertainty and increase demand for licensed

services while also providing a wage premium to incentivize individuals to invest in education and experience.[37] Opponents have often argued in response that these laws create unnecessary barriers to entry, limit competition by reducing the equilibrium labor supply, drive firms to locate inefficiently, reduce economic mobility, and raise prices—all while having negligible effects on the quality of products.[38]

The expansion of occupational licensing laws since the mid-20th century can be partially attributed to the structure of the economy. In 1950, when 5 percent of jobs required an occupational license, the US economy primarily consisted of manufacturing.[39] At the time, a large portion of manufacturing did not require specialized college-level education, and many employees were hired directly out of high school and gained training and experience on the job. These manufacturing jobs relied on unions to enact collective bargaining to maintain employee standards, employer-employee relations, and wages. In recent decades, there has been a shift as the US economy has become service-oriented. As service-oriented jobs have expanded in scope, so have the number of jobs with occupational licensing requirements.

During the expansionary period of occupational regulation, the percentage of jobs that require a license has grown substantially—nearly 22 percent of workers require an occupational license as of 2019.[40] In the early 20th century, most licensing requirements were set by state legislatures or by professional organizations. As service-based occupations have become more specialized and diverse, many states have elected to appoint a board of individuals familiar with the industry to review and set the requirements for entry. Almost all the time, individuals on these boards currently work within the industry and have an incentive to limit competition. In addition, the board members may work within institutions that train and educate applicants, giving them a financial incentive to increase education and training requirements. Also, many states do not have sunsetting procedures whereby potentially inefficient or outdated occupational licensing requirements can be reviewed to determine whether they are still necessary for the promotion of public health and safety.[41]

Literature

The appendix provides a list of studies divided by subject category. The first category focuses on how occupational licensing affects quality or the demand for goods and services. In general, these studies have been limited owing to data unavailability and the difficulty associated with measuring quality. The most common profession examined from the mid-1970s to shortly after the turn of the century was the dental industry. One study finds that the likelihood of adverse outcomes is reduced when licensing is present.[42] Two others, however, find little to no evidence of an effect on outcomes in dental hygiene.[43]

Quality studies have also been conducted in some other industries. A study that analyzed seven widely varying licensed occupations finds that licensing has either a negative impact or no impact on the quality of the services provided to consumers.[44] Carl Shapiro provides a comprehensive theoretical model of the quality impacts stemming from occupational licensing and concludes that wealthier consumers who value high-quality goods and services greatly benefit from licensing, but lower-income individuals lose from tougher licensing standards through reductions in access.[45]

Occupational licensing is also likely to have an effect on the wages of professionals. One study finds evidence that licensure generally increases rents for massage therapists rather than affecting the quality of the service provided to consumers.[46] These rents are most commonly depicted through wage increases, for which estimates vary drastically across industries. Significant evidence of wage premiums has been documented for barbers, radiologic technologists, construction workers, dental hygienists, childcare professionals, opticians, and veterinary technicians.[47] Survey data on government-issued occupational licensing are associated with an 11 percent differential in wages after controlling for other differences among of the applicants.[48] These wage premiums and barriers to entry reduce the equilibrium labor supply by an average of 17–27 percent.[49]

Since occupational licensing inspires diametrically opposed reactions among citizens, such regulations often become the topic of political

campaigns. A researcher who used data on political spending in state-level elections finds that greater political spending by healthcare interest groups, mainly physicians and nurses, increased the probability that a state would maintain licensing laws that restrict practice.[50] This is interesting because it raises the question of why an organized group of individuals already inside a profession would actively seek regulatory barriers to the entry of new professionals. A part of the rationale for this behavior may be related to a paternalistic argument, according to which those already in the profession and government seek to keep out, in the best interest of the public, those attempting to enter the profession—though what constitutes the public's best interest is hotly debated.[51]

Occupational regulation also commonly has spillover effects on other areas of interest such as student loans. Though these connections remain understudied, they imply a larger problem that needs to be addressed. Recently, the *New York Times* investigated and found that 19 states have begun suspending people's professional licenses for unpaid student loans[52]—loans that students are taking out to meet ever-increasing licensing education and experience requirements.

Licensing can be viewed not only as assurance that services meet quality and safety standards, but also as a signal that the licensed workers themselves offer a threshold level of quality and competence. This signal affects workers' employment opportunities and employers' willingness to hire a diverse set of workers. One 2018 study finds that the information and human capital content supplied by licenses enable firms to rely less on race and gender as predictors of worker productivity.[53] The researchers find that licensing reduces the racial wage gap between white men and black men by 43 percent and the gender wage gap between white men and white women by 36–40 percent. Examining licensing regimes that include good moral character criteria, they find that a license tends to be a positive indicator of nonfelony status, particularly for black men.

It should be noted that additional work by the same authors agrees with previous literature about the costs associated with occupational licensing.[54] It is important to always weigh the potential benefits of

occupational licensing against its associated costs, which are well documented and understood. From a policy standpoint, there are likely less costly ways for black men to signal nonfelony status.

Visualization and Discussion

In light of the growing presence of occupational licensing within the US labor force, it is important to be able to visualize how licensing requirements have changed during recent decades. Since many occupational licensing conditions are set at the state level, the fees, education requirements, and examinations can vary drastically among states. Some occupations are subject to multiple levels of regulation. In addition to state-level requirements, there are also a variety of federal requirements, and individual municipalities may maintain their own standards and requirements that apply to workers who practice or operate in their territory. For example, the Federal Aviation Administration maintains federal-level licensing requirements for aviation maintenance technicians, which apply on a national scale.[55] On the other end of the scale, tour guides are required to obtain a license in New York City, but there is no statewide requirement.[56]

This section considers only occupations that are subject to licensing, meaning that workers require government authorization to provide their services legally, in all or a subset of states. As an illustrative example, consider emergency medical technicians (a universally licensed occupation) and bartender. In every state, emergency medical technicians must have government permission to practice emergency medical response and to transport patients by ambulance to medical facilities, and it would be illegal for someone to perform these actions without authorization. On the other hand, in 38 states bartenders may obtain a voluntary certification to serve alcohol, but this certification is not required in any state and individuals can operate in this capacity without the certification.

Visualizing changes in occupational licensing requirements over time is difficult because, until recently, there was no consistent collection of state-level data that asked whether a person was subject to an occupational license or that surveyed known occupations for their entry

requirements. Therefore, the discussion of data will be divided into three subsections. The first subsection identifies the growth in occupational licensing for low- and moderate-income professions between 1993 and 2012.[57] The second subsection examines the growth in the frequency and cost of occupational licensing for low- and middle-income professions between 2012 and 2017. Finally, the third subsection discusses current and future data sources and how changes in the Current Population Survey will affect how researchers and policymakers are able to address and analyze the effects of occupational licensing moving forward.

It is important to note that in this discussion of occupational licensing there is often a focus on low- and medium-income occupations. This focus reflects a limitation of the current literature due to data availability constraints. It is often argued, though, that these occupations are the ones that are most important to focus on, since licensing costs constitute a larger percentage of household income for lower- and middle-income households, and losing time to fulfill training and experience requirements can potentially disadvantage or harm households that rely on lower-paying occupations.

1993–2012

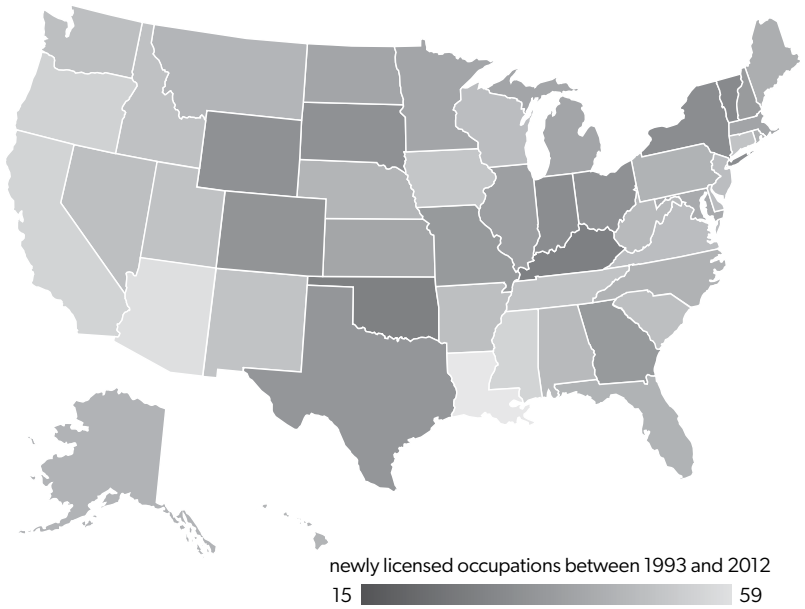
The study of occupational licensing drastically changed with the introduction of a publication from the Institute for Justice, titled *License to Work* (*LTW*). *LTW* presents the state-level occupational licensing requirements for 102 professions across all states and the District of Columbia.[58] It provided a benchmark for researchers to use as they sought to compare occupational licensing requirements at the state level. Before *LTW* was published in 2012, very little data about licensing at the national level was readily available.

In 2018, one of us (Edward Timmons) coauthored a study that used *LTW* to study economic mobility.[59] We used 1993 data from the *Professional and Occupational Licensing Directory*[60] and compared these data to the data for occupations that were listed in the 2012 *LTW*. Our study became one of the first analyses of growth in low-income occupational licensing. Though it does not provide an exhaustive list of all licensed

professions, our study's comparison serves as an important basis point, offering a perspective from which to track the growth of licensing regulations over time.

Figure 2 reproduces the original map of growth in licensed occupations from that 2018 study. Growth in the 1990s and shortly after the turn of the century was not limited to a single geographic region, and states differed drastically in the number of new occupational licenses they enacted—from a low of 15 in Kentucky to 59 in Louisiana. We also found that within the 1993–2012 period occupational licensing is associated with substantial negative effects on economic mobility within states.

Figure 2. Newly Licensed Occupations Between 1993 and 2012



Sources: Created using data from table 1 in Edward Timmons et al., "Assessing Growth in Occupational Licensing of Low-Income Occupations: 1993–2012," *Journal of Entrepreneurship and Public Policy* 7, no. 2 (2018): 180. Data from 2012 are from Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing*, 1st ed. (Arlington, VA: Institute for Justice, May 2012); 1993 data were collected from David P. Bianco, ed., *Professional and Occupational Licensing Directory: A Descriptive Guide to State and Federal Licensing, Registration, and Certification Requirements* (Detroit: Gale Research, 1993).

2012–2017

License to Work was updated and rereleased in 2017.[61] Since the data collection and definition methodologies changed slightly between the 2012 and 2017 editions, there are limitations to the comparability of the aggregate state measures within these reports over time. Therefore, this subsection will discuss an overview of occupational licensing in 2017, as well as some observations about occupations for which data were collected consistently over this five-year period.

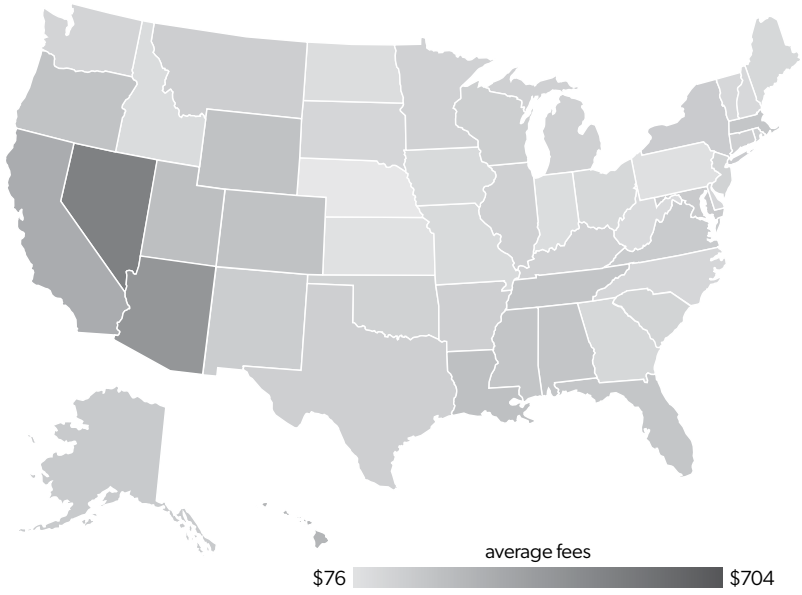
Table 1 presents summary statistics for occupational licensing costs across states for the 102 occupations included in the 2017 *LTW* update. One of the most notable and well-known costs of occupational licenses are fees. Comparing average fees is not the perfect way to capturing state variation, but it does provide a rough sketch of the regulatory environment. Figure 3 depicts the average fees to acquire a license in each state, and these vary drastically. Nevada is the most expensive state—on average, an occupational license costs $704. In Nebraska, the least expensive state, the average fee is $76. The average cost of a license across all states is $268.14; approximately two-thirds of states have averages within $113.77 above or below this average.

Table 1. Summary Statistics of 2017 Occupational Licensing Requirements

Requirement	Mean	Standard deviation	Minimum	Maximum
Number of 102 occupations licensed	54.12	15.21	26	77
Average fees	$268.14	$113.77	$76.00	$704.00
Average days to complete education and experience	373.69	199.54	117.20	987.70
Average number of exams	1.84	1.01	0	4

Source: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing*, 2nd ed. (Arlington, VA: Institute for Justice, November 2017).

Figure 3. Average Fee to Obtain an Occupational License, 2017

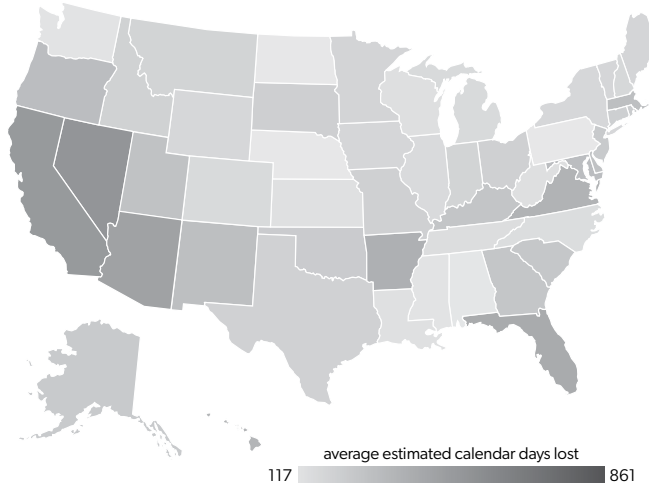


Source: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing*, 2nd ed. (Arlington, VA: Institute for Justice, November 2017).

Table 1 also contains information on the number of the 102 occupations that are licensed within each state, the number of exams required to obtain a license, and the days required to complete mandated training and experience.

Figure 4 is a map depicting the length of time mandated to fulfill licensing requirements. One of the first interesting things to note is the similarities between average fees (figure 3) and education requirements (figure 4), since these measures tend to be correlated and if a state has a high cost in one, it often has a high cost in both. The amount of time needed to complete the education and experience requirements for a license in the United States, in 2017, averaged 373.69 days, or slightly over a year. The length of time necessary to fulfill these requirements can vary widely, from 117.20 days on average in Pennsylvania to 987.70 days in Hawaii (almost three years).

Figure 4. Average Number of Days to Complete Education and Experience Requirements for an Occupational License, 2017



Source: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing*, 2nd ed. (Arlington, VA: Institute for Justice, November 2017).

Professions that require licensing vary from state to state. For example, table 2 lists some of the many professions that require an occupational license. Some occupations are licensed in every state, such as those of bus drivers and emergency medical technicians. But many other licenses exist in only a selection of states. A few licensing regimes are entirely unique, in that only one state has enacted legislation to subject that profession to an occupational license. Some interesting examples include florists in Louisiana and home entertainment installers in Connecticut.

Since the 2012 edition of *LTW* differs in collection methodology from the 2017 edition, we can't make direct comparisons of the state averages in fees or education requirements. It can be observed, however, that many professions saw an increase in the number of states that required occupational licensing between 2012 and 2017. For example, childcare workers now require a license in an additional 11 states, crane operators now require a license in an additional 14 states, and earth drillers are now required to obtain a license in every state—a license that involves costs ranging from $50 to $1,000 and up to six years of education requirements.

Table 2. Examples of Licensing Prevalence

Licensed in all states	Licensed in 26–49 states	Licensed in 2–25 states	Licensed in only one state
barber	animal breeder	animal control officer	conveyor operator
bus driver	athletic trainer	animal trainer	florist
cosmetologist	auctioneer	bartender	forest worker
earth driller	worker who runs bill collection agency	carpenter, commercial	home entertainment installer
emergency medical technician	carpenter, residential	cement finishing contractor, commercial	psychiatric aide
pest control applicator	cement finishing contractor, residential	crane operator	social and human service assistant
school bus driver	childcare home operator	dental assistant	
truck driver	high school head coach	dietetic technician	
vegetation pesticide applicator	door repair contractor, residential	door repair contractor, commercial	
	drywall installation contractor, residential	drywall installation contractor, commercial	
	fire alarm installer	electrical helper	
	fisher, commercial	farm labor contractor	
	floor sander contractor, residential	floor sander contractor, commercial	
	gaming cage worker	funeral attendant	
	gaming dealer	insulation contractor, commercial	
	gaming supervisor	interior designer	
	glazier contractor	interpreter, sign language	
	HVAC contractor	locksmith	
	insulation contractor, residential	log scaler	
	iron/steel contractor	nursery worker	
	landscape contractor	optician	
	makeup artist	packer	
	manicurist	painting contractor, commercial	
	mason contractor	paving contractor, commercial	
	massage therapist	psychiatric technician	
	midwife	still machine setter	
	milk sampler	taxi driver	
	mobile home installer	teacher assistant	
	painting contractor, residential	terrazzo contractor	
	paving contractor, residential	title examiner	
	pharmacy technician	worker who runs travel agency	
	pipeline contractor	tree trimmer	
	preschool teacher	upholsterer	
	security alarm installer	weigher	
	security guard	wildlife control operator	
	shampooer		
	sheet metal contractor		
	skin care specialist		
	slot supervisor		
	taxidermist		
	travel guide		
	veterinary technician		

Source: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing*, 2nd ed. (Arlington, VA: Institute for Justice, November 2017).

Looking Forward

As of September 2020 there are a few great resources available that supply further information on occupational licensing. The Knee Center for the Study of Occupational Regulation at Saint Francis University, founded in 2016, provides insight and data about the occupational licensing requirements for a variety of occupations across socioeconomic classes. Likewise, as noted previously, the Institute for Justice has published the *License to Work* study, which provides summary statistics about the licensing costs of 102 occupations across all states. Additionally, since 2015 the Current Population Survey has incorporated questions meant to identify individuals with professional certifications or occupational licenses. For instance, the survey asks respondents whether they currently have an active professional certification or a state or industry license, whether the certification or license was issued by a government agency (and at which level of government), and whether the certification or license is required for their job.

There are also a range of new federal data sources beyond the Current Population Survey available to students and policymakers.[62] These include the Survey of Income and Program Participation, which in 2008 asked questions regarding professional certification and the Baccalaureate and Beyond which conducts four-year follow-up surveys on these 2008 degree recipients. The National Center for Education Statistics (within the US Department of Education) also provides the Beginning Postsecondary Students Longitudinal Study for 2012 and 2014. And the 2012 Education Longitudinal Study provides eight-year follow-ups on high school graduates from 2004.[63] These growing sources of data will assist legislatures to develop efficient policies and improve economic welfare.

Pathways for Reform

Momentum for reform of occupational licensing began to build up following the publication of Benjamin Shimberg, Barbara Esser, and Daniel Kruger's *Occupational Licensing* in 1972.[64] The book reports the findings of a five-year study examining occupational licensing and notes a litany of problems with the status quo. Interest continued into 1980, when a

conference organized by the American Enterprise Institute led to the publication of an edited volume on licensure.[65] Interest from the academic community and the public policy community mostly languished for the next 20 years. Owing to a number of published works by economist Morris Kleiner (including three books), interest resumed in 2000. On the public policy front, the publication of the Obama White House report on licensing was also key.[66]

From 1973 to 2013, only eight occupations were successfully delicensed.[67] From 2011 to 2016, twelve states attempted to delicense groups of occupations.[68] Perhaps the occupation for which deregulation efforts have been most successful is hair braiding. In 2005, twenty-nine states required hair braiders to obtain a full cosmetology license. As of September 2020, only seven states still maintain this requirement.[69]

Instead of devoting efforts to delicensing individual occupations or groups of occupations, several states have successfully implemented comprehensive reforms. These reforms can be separated into three broad categories: (1) the Right to Earn a Living Act, (2) executive oversight, and (3) mandatory sunset review.

The Right to Earn a Living Act (passed in Tennessee in 2016 and in Arizona in 2017)[70] recognizes that citizens have a fundamental right to work that takes precedence over existing occupational licensing law. It gives citizens the opportunity to sue the state if they believe that licensing laws are infringing on this fundamental right. In March 2017, the law resulted in a change in licensing requirements for behavioral health specialists in Arizona.[71] As of September 2020, there have been no successful lawsuits in either state that have led to the complete removal of licensing laws.[72]

Executive oversight initiates a review process by a state's executive branch. Mississippi passed this type of reform in 2017.[73] An executive oversight law grants review power for all licensing rules to the state's governor, attorney general, and secretary of state. If two of these three individuals object to a new licensing rule, the rule can be blocked or vetoed. As of September 2020, we are not aware of any instances in which Mississippi's executive branch exercised this new authority to block licensing legislation.[74]

A number of states have instituted, by either legislation or executive order, a mandatory sunset review model. Under this type of reform, a mandatory review process is established that subjects existing occupational licensing to reviews. The frequency of these reviews varies depending on the state. Louisiana, Nebraska, and Oklahoma implemented this type of reform in 2018. Both Idaho and Ohio implemented it in 2019.[75]

There is a fourth type of reform that, as of early 2020, has not been implemented in any state. In October 2018, Governor Susana Martinez of New Mexico issued an executive order permitting consumers to seek service from unlicensed professionals.[76] Essentially, the order would transform existing occupational licenses into voluntary certification. Courts made the determination that legislation would be needed to make the change, and no such legislation has yet been proposed in New Mexico.[77] Legislation has been put forward in West Virginia,[78] but (as of September 2020) has not been approved.

It is too early to surmise what type of reform is most effective. Up until the past five years, the general trend nationwide has been an increase in the scale and scope of occupational licensing. A number of states are currently engaged in reform efforts and soon there will be data available to evaluate the effectiveness of these different types of reform to inform policymakers and provide a template for implementing future reform.

Appendix: Table of Occupational Licensing Studies

Quality Studies

Study	Outcome	Study Group	Results
Morris Kleiner and Robert Kudrle, "Does Regulation Affect Economic Outcomes? The Case of Dentistry," *Journal of Law and Economics* 43, no. 2 (2000): 547–82.	quality, prices, wages	dentists	There is no improvement in outcomes associated with licensing, prices are raised for consumers, and wages are raised for practitioners.
Hayne Leland, "Quacks, Lemons, and Licensing: A Theory of Minimum Quality Standards," *Journal of Political Economy* 87, no. 6 (1979): 1328–46.	quality	multiple	Licensing requirements are not the best way to increase quality, but do result in some improvement. When industry sets licensing standards, they are too high.
Daniel Hogan, "The Effectiveness of Licensing," *Law and Human Behavior* 7, no. 2–3 (1983): 117–38.	quality	multiple	Licensing does not increase quality. Boards fail to discipline practitioners with action against unlicensed members. Possible negative side effects result from limited supply.
Dick M. Carpenter II, "Testing the Utility of Licensing Evidence from a Field Experiment on Occupational Regulation," *Journal of Applied Business and Economics* 13, no. 2 (2012): 28–41.	quality	florists	Regulation does not result in a significant difference in quality.
Edward Timmons and Anna Mills, "Bringing the Effects of Occupational Licensing into Focus: Optician Licensing in the United States," Eastern Economic Journal 44, no. 1 (2018): 69–83.	quality, wages	opticians	Licensing results in as much as 16.9% in increased wages. No increase in quality based on observed malpractice insurance premiums.
John Barrios, "Occupational Licensing and Accountant Quality: Evidence from the 150-Hour Rule" (Research Brief No. 136, Cato Institute, 2018).	quality, wages, labor supply	accountants	An increase in education requirements does not result in higher quality, does lower supply of accountants, and increases wages.
Sidney Carroll and Robert Gaston, "Occupational Licensing and the Quality of Service: An Overview," Law and Human Behavior 7, no. 2–3 (1983): 139–46.	quality	several	There is a strong negative association between occupational licensing and quality of service received.

Study	Outcome	Study Group	Results
James Shilling and C. Sirmam, "The Effects of Occupational Licensing on Complaints against Real Estate Agents," Journal of Real Estate Research 3, no. 2 (1988): 1–9.	quality, competition	real estate agents	Restrictions on entry improve the quality of services but have significant anticompetitive effects.
Joshua Angrist and Jonathan Guryan, "Does Teacher Testing Raise Teacher Quality? Evidence from State Certification Requirements," Economics of Education Review 27, no. 5 (2008): 483–503.	quality, wages, demographics	teachers	State-mandated teacher testing is associated with higher wages; there is no evidence of quality improvement. Hispanics have lower test scores, resulting in a lower ratio of Hispanic teachers.
A. Frank Adams, "Occupational Licensing of Cosmetologists and Midwives: Two Empirical Studies on the Effects of Regulation" (PhD diss., Auburn University, 1996).	prices, quantities consumed, consumer welfare	midwifes and cosmetologists	Regulation increases prices and decreases quantity consumed; this results in detrimental consumer welfare effects.
Roger Feldman and James Begun, "The Welfare Cost of Quality Changes Due to Professional Regulation," Journal of Industrial Economics 34, no. 1 (1985): 17–32.	profits, quality, consumer welfare	optometrists	Increased regulation increases profits and quality.
Robert Jackson, "Post-graduate Educational Requirements and Entry into the CPA Profession," Journal of Labor Research 27, no. 1 (2006): 101–14.	quality, labor supply	accountants	Increasing education requirements for a license results in higher entrance exam scores but fewer exam takers.
Adriana Kugler and Robert Sauer, "Doctors without Borders? Relicensing Requirements and Negative Selection in the Market for Physicians," Journal of Labor Economics 23, no. 3 (2005): 437–65.	quality, wages	physicians	Relicensing requirements increase wages but decrease quality of service.
Carl Shapiro, "Investment, Moral Hazard, and Occupational Licensing," Review of Economic Studies 53, no. 5 (1986): 843–62.	quality, moral hazard, investment	multiple	Licensing benefits consumers who value quality highly, not those who do not. Licensing may raise total surplus if sellers' investments are not observable, but is Pareto-worsening if training levels are observable.

Study	Outcome	Study Group	Results
Marcus Dunn and Thomas Hall, "An Empirical Analysis of the Relationship between CPA Examination Candidate Attributes and Candidate Performance," Accounting Review 59, no. 4 (1984): 674–89.	licensing exams, quality	accountants	Scholastic aptitude test scores, accounting GPA, accounting hours completed, school attended, hours of self-study, and completion of CPA review course are significantly associated with CPA exam performance.
Chi-Wen Lee, Chiawen Liu, and Taychang Wang, "The 150-Hour Rule," Journal of Accounting and Economics 27, no. 2 (1999): 203–28.	quality, wages, consumer welfare	auditors	An increase of licensing requirements results in higher wages; quality may decrease; more grandfathered CPAs elect to enter audit market.
Deborah Haas-Wilson, "The Effect of Commercial Practice Restrictions: The Case of Optometry," Journal of Law and Economics 29, no. 1 (1986): 165–86.	quality, consumer welfare, prices	optometrists	Increased commercial practice restrictions increased prices for eye exams and eyeglasses by 5%–13%, with no change in quality.
Ronald Bond et al., "Staff Report on Effects of Restrictions on Advertising and Commercial Practice in the Profession: The Case of Optometry," Federal Trade Commission, Bureau of Economics, 1980.	quality	optometrists	Looser restrictions do not decrease quality.
Morris Kleiner, Licensing Occupations: Ensuring Quality or Restricting Competition? (Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2006).	quality	multiple	Overview of quality related occupational licensing studies and the theoretical foundations of licensure
Darwyyn Deyo, "Licensing and Service Quality: Evidence Using Yelp Consumer Reviews" (working paper presented at San Jose State University, 2017).	quality	barbers, cosmetologists, manicurists, massage therapists	In states with licensing exams there is less competition, diminishing returns from licensure, and lower overall quality.

Wage Studies

Study	Outcome	Study Group	Results
Edward Timmons and Robert Thornton, "The Effects of Licensing on the Wages of Radiologic Technologists," *Journal of Labor Research* 29, no. 4 (2008): 333–46.	wages	radiologic technologists	Licensed radiologic technologists earn 3.3% more than those where licensing is not needed. The gap increases to 6.9% when controlling for endogeneity.
Morris Kleiner and Alan Krueger, "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market," *Journal of Labor Economics* 31, no. 2 (2013): S173–S202.	wages	entire labor force	Licensees earn 18% higher wages, but government certification has a smaller effect.
Mario Pagliero, "The Impact of Potential Labor Supply on Licensing Exam Difficulty," *Labour Economics* 25 (2013): 141–52.	exam difficulty, wages	lawyers	A 1.0% increase in exam difficulty implies a 1.7% increase in median entry-level salaries.
Morris Kleiner and Alan Krueger, "The Prevalence and Effects of Occupational Licensing," *British Journal of Industrial Relations* 48, no. 4 (2010): 1–12.	wages, unions	all	Licensing increases wages by 15%; licensing and union membership increase wages by 24%; licensing does not reduce wage dispersion.
Robert Thornton and Edward Timmons, "Licensing One of the World's Oldest Professions: Massage," *Journal of Law and Economics* 56, no. 2 (2013): 371–88.	wages, labor supply	massage therapists	Licensing increases wages by 16.2% and reduces market size; there is less evidence that certification has such effects.
Edward Timmons and Robert Thornton, "The Licensing of Barbers in the USA," *British Journal of Industrial Relations* 48, no. 4 (2010): 740–57.	wages	barbers	Licensing provisions may increase wages for barbers by between 11% and 22%.
Peter Blair and Bobby Chung, "Job Market Signaling through Occupational Licensing" (NBER Working Paper No. 24791, National Bureau of Economic Research, Cambridge, MA, 2018).	wages, discrimination	multiple	When a profession is licensed, characteristics such as race and gender have less influence on wages and result in smaller wage gaps than in unlicensed areas.
Beth Redbird, "The New Closed Shop? The Economic and Structural Effects of Occupational Licensure," *American Sociological Review* 82, no. 3 (2017): 600–24.	competition, wages	multiple	Licensing does not limit competition, does not increase wages, creates institutional mechanisms that increase entry into occupation, and causes quality to stagnate.

Study	Outcome	Study Group	Results
Morris Kleiner and Evgeny Vorotnikov, "Analyzing Occupational Licensing among the States," *Journal of Regulatory Economics* 52, no. 2 (2017): 132–58.	wages, wage inequality, regional analysis	all	There are no regional patterns in the distribution of occupational licensing, and there is considerable variation across states in licensing's influence on earnings. There is a nationwide increase in wages of 11% when an occupation is licensed.
Maury Gittleman, Mark Klee, and Morris Kleiner, "Analyzing the Labor Market Outcomes of Occupational Licensing," *Industrial Relations: A Journal of Economy and Society* 57, no. 1 (2017): 57–100.	wages, employment levels, health	multiple	Licensing results in higher pay, a greater likelihood of being employed, and a higher probability of receiving employer-sponsored health insurance.
Edward Timmons, Jason Hockenberry, and Christine Durrance, "More Battles among Licensed Occupations: Estimating the Effects of Scope of Practice and Direct Access on the Chiropractic, Physical Therapist, and Physician Labor Market" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, 2016).	wages, hours worked	chiropractors	An expansion of chiropractic scope caused in increase in chiropractors' wages and a slight reduction in their hours worked.
Morris Kleiner and Kyoung Park, "Battles among Licensed Occupations: Analyzing Government Regulations on Labor Market Outcomes for Dentists and Hygienists" (NBER Working Paper No. 16560, National Bureau of Economic Research, Cambridge, MA, 2010).	wages, employment growth	dentists and dental hygienists	In states that allow hygienists to be self-employed, they have 10% higher earnings and dentists have lower earnings and employment growth.
William Moore, Douglas Pearce, and R. Mark Wilson, "The Regulation of Occupations and the Earnings of Women," *Journal of Human Resources* 16, no. 3 (1981): 366–83.	wages	women	Licensing increases women's earnings by 20% per hour. Certification is not associated with a premium for women.
Maury Gittleman and Morris Kleiner, "Wage Effects of Unionization and Occupational Licensing Coverage in the United States," *ILR Review* 69, no. 1 (2015): 142–72.	unions, wages	multiple	Unions provide greater wage increases than licensing.

Study	Outcome	Study Group	Results
William White, "The Impact of Occupational Licensure of Clinical Laboratory Personnel," *Journal of Human Resources* 13, no. 1 (1978): 91–102.	wages, labor supply	laboratory personnel	Recent licensure laws have no effect on wages or employment, but older laws increase both.
Dean Lueck, Reed Olsen, and Michael Ransom, "Market and Regulatory Forces in the Pricing of Legal Services," *Journal of Regulatory Economics* 7, no. 1 (1995): 63–83.	wages, consumer welfare	attorneys	Licensing restrictions for attorneys do not increase the price of services or incomes for attorneys; market forces are more significant.
James Schaefer and Michael Zimmer, "Occupational Licensure in the Accounting Profession Effects of Public Regulation on Accountants Earning," *Journal of Applied Business Research* 11, no. 2 (1995): 9–16.	wages	accountants	Additional licensing requirements raise wages; decreased requirements lower wages.
U.S. Department of the Treasury Office of Economic Policy, Council of Economic Advisers, and the Department of Labor. "Occupational Licensing: A Framework for Policymakers". The White House (2015)	number of licensed professions, wages, prices	all	There has been a fivefold increase in the rate of US workers requiring a license since the 1950s. Licensing results in higher wages and higher prices. There are great variation in licensed professions among states; fewer than 60 occupations are covered by all states.
Maya Federman, David Harrington, and Kathy Krynski, "The Impact of State Licensing Regulations on Low-Skilled Immigrants: The Case of Vietnamese Manicurists," *American Economic Review* 96, no. 2 (2006): 237–47.	immigration, wages	Vietnamese immigrant manicurists	Greater language proficiency requirements increase the difficulty of assimilation, lower wages for the unlicensed, and raise wages for the licensed.
Morris Kleiner, "Occupational Licensing," *Journal of Economic Perspectives* 14, no. 4 (2000): 189–202.	policy, wages	multiple	Licensing may increase income inequality.
Mark Gius, "The Effects of Occupational Licensing on Wages: A State-Level Analysis," *International Journal of Applied Economics* 12, no. 20 (2016): 30–45.	wages	multiple	Licensing increases state-level wages for childcare workers, opticians, and veterinary technicians; no other studied occupations show statistically significant increases.

Study	Outcome	Study Group	Results
Edward Timmons and Robert Thornton, "There and Back Again: The De-licensing and Re-licensing of Barbers in Alabama," *British Journal of Industrial Relations* 57, no. 4 (2019): 764-790.	deregulation, wages, labor supply	barbers and cosmetologists	After deregulation, barbers' and cosmetologists' wages and labor force numbers shrank. Deregulation results in a small increase in barbershops and a decrease in cosmetology shops.
Alex Maurizi, "Occupational Licensing and the Public Interest," *Journal of Political Economy* 82, no. 2 (1974): 399–413.	wages, pass rates, excess demand	multiple	Increases in excess demand generates a decrease in the pass rate set by licensing boards, prolonging high incomes.
Jeffrey Perloff, "The Impact of Licensing Laws on Wage Changes in the Construction Industry," *Journal of Law and Economics* 23, no. 2 (1980): 409–28.	wages	workers in manufacturing and construction	There is evidence of inequalities resulting from regulation between manufacturing and construction wages.

Labor Supply Studies

Study	Outcome	Study Group	Results
Morris Kleiner and Evan Soltas, "A Welfare Analysis of Occupational Licensing in U.S. States" (NBER Working Paper No. 26383, National Bureau of Economic Research, Cambridge, MA, 2019).	labor supply	483 occupations	Licensing raises wages but reduces employment on the margin. There is an average welfare loss of 12% of occupational surplus.
Robert Thornton and Andrew Weintraub, "Licensing in the Barbering Profession," *ILR Review* 32, no. 2 (1979): 242–49.	labor supply	barbers	Minimum education requirements, barber school hours required, and months of apprenticeship required have had little or no significant effect on the number of entrants.
Joshua Hall and Shree Pokharel, "Barber Licensure and the Supply of Barber Shops: Evidence from U.S. States," *Cato Journal* 36, no. 3 (2016): 647–57.	labor supply	barbers	The number of exams required for a license is negatively related to the number of barbershops; no other state-level regulations are associated with fewer barbershops.
Edward Timmons and Catherine Konieczny, "Untangling Hair Braider Deregulation in Virginia," *Cato Journal* 38, no. 3 (2018): 679–99.	labor supply	hair braiders	Deregulation increased labor supply growth by 7%.

Study	Outcome	Study Group	Results
Marek Zapletal, "The Effects of Occupational Licensing: Evidence from Business-Level Data," *British Journal of Industrial Relations*, forthcoming.	labor supply, prices, mobility, training facilities and instructors	cosmetology	Licensing regulation does not reduce the number of practitioners or consumer prices, but lowers individual rates of entry and exit. States with more stringent licensing requirements regarding the number of instructors and the size of training facilities increase barriers to entry for training schools, but no with effect on instructor pay.
Dick M. Carpenter II and E. Frank Stephenson, "The 150-Hour Rule as a Barrier to Entering Public Accountancy," *Journal of Labor Research* 27, no. 1 (2006): 115–26.	labor supply	accountants	Increased licensing requirements result in a 60% decrease in candidates seated.
Jeff Boone and Teddy Coe, "The 150-Hour Requirement and Changes in the Supply of Accounting Undergraduates: Evidence from a Quasi-experiment," *Issues in Accounting Education* 17, no. 3 (2002): 253–68.	labor supply	accountants	38% of the decrease in accounting graduates can be attributed to the increase of education requirements to 150 course hours.
A. Frank Adams, John Jackson, and Robert Ekelund, "Occupational Licensing in a 'Competitive' Labor Market: The Case of Cosmetology," J*ournal of Labor Research* 23, no. 2 (2002): 261–78.	labor supply, consumer welfare, wages	cosmetologists	An increase in licensing regulation results in a smaller workforce, greater wages, and additional deadweight losses.
Alicia Plemmons, "Occupational Licensing Effects on Firm Entry and Employment" (Working Paper no. 2019.008, Center for Growth and Opportunity at Utah State University, 2019).	labor supply, employment	low- and moderate-income occupations	States with greater occupational licensing requirements have decreased employment and firm presence.

Migration and Mobility Studies

Study	Outcome	Study Group	Results
Janna Johnson and Morris Kleiner, "Is Occupational Licensing a Barrier to Interstate Migration?" *American Economics Journal: Economic* Policy 12, no. 3 (2020): 347-373	interstate migration	multiple	Individuals are less likely to migrate across states when they face high relicensure costs. Costs.

Study	Outcome	Study Group	Results
Peter Pashigian, "Occupational Licensing and the Interstate Mobility of Professionals," *Journal of Law and Economics* 22, no. 1 (1979): 1–25.	mobility	lawyers	Lower mobility of lawyers is likely due to licensing, not investment in state-specific law.
Arlene Holen, "Effects of Professional Licensing Arrangements on Interstate Labor Mobility and Resource Allocation," *Journal of Political Economy* 73 (1965): 492–92.	labor supply, mobility	multiple	Licensing results in less interstate mobility and lowers the supply of workers in field.
Brian Meehan, "The Impact of Licensing Requirements on Industrial Organization and Labor: Evidence from the U.S. Private Security Market," *International Review of Law and Economics* 42 (2015): 113–21.	mobility	security guards	Increases in licensing requirements for individual private security guards and for security firms reduced the number of firms and increased the size of existing licensed firms.

Entrepreneurship Studies

Study	Outcome	Study Group	Results
Susanne Prantl and Alexandra Spitz-Oener, "How Does Entry Regulation Influence Entry into Self-Employment and Occupational Mobility?," *Economics of Transition and Institutional Change* 17, no. 4 (2009): 769–802.	self-employment levels, occupational mobility	German workers	Entry regulation reduces self-employment and occupational mobility.
Stephen Slivinski, "Weighing Down the Bootstraps: The Heavy Burden of Occupational Licensing on Immigrant Entrepreneurs" (Policy Report No. 2017-01, Center for the Study of Economic Liberty at Arizona State University, 2017).	immigrants, entrepreneurship	immigrant vs. native-born entrepreneurs	States with lighter licensing burdens had 14% higher immigrant entrepreneurship rates, while states with greater burdens had 11% lower rates.
Andrew van Stel, David Storey, and Roy Thurik, "The Effect of Business Regulations on Nascent and Young Business Entrepreneurship," *Small Business Economics* 28, no. 2–3 (2007): 171–86.	entrepreneurship, regulations	39 countries	Labor market regulations and minimum capital requirements lower entrepreneurship rates, while other administrative factors do not.

Summary Literature

Study	Type of Research	Occupations Studied	Contribution
Alex Bryson and Morris Kleiner, "Re-examining Advances in Occupational Licensing Research: Issues and Policy Implications," *British Journal of Industrial Relations* 57, no. 4 (2019): 721–31.	history	all	Available data set post-2010 and surveys eight papers.
Ryan Nunn and Gabriel Scheffler, "Occupational Licensing and the Limits of Public Choice Theory," *Administrative Law Review Accord* 4, no. 2 (2019): 25–41.	theory	all	Comparative analysis of public choice arguments of licensure.
Robert Thornton and Edward Timmons, "The De-licensing of Occupations in the United States," *Monthly Labor Review*, May 2015.	examining delicensing movements	various	Comparative overview of delicensing movements.
George Stigler, "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science* 2, no. 1 (1971): 3–21.	theory	all	Theoretical background.
Edward Timmons et al., "Assessing Growth in Occupational Licensing of Low-Income Occupations: 1993–2012," *Journal of Entrepreneurship and Public Policy* 7, no. 2 (2018): 178–218.	number of occupations licensed	low- and moderate-income occupations	States licensed an average of 32 additional low- or moderate-income occupations in 2012 than in 1993. The high was 59, the low was 15.
Morris Kleiner, "Reforming Occupational Licensing Policies" *Discussion Paper 2015-01,* The Hamilton Project, (2015).	licensing reforms	multiple	Theoretical background.
Morris Kleiner, "Life, Limbs, and Licensing: Occupational Regulation, Wages, and Workplace Safety of Electricians, 1992–2007," *Monthly Labor Review* (United States Bureau of Labor Statistics), January 2014.	labor safety	electricians	Regulation's impact on deaths and injury is statistically significant.
Jeffrey Pfeffer, "Administrative Regulation and Licensing: Social Problem or Solution?," *Social Problems* 21, no. 4 (2014): 468–79.	review of studies: price, labor supply, wages	multiple	Licensing increases prices, restricts entry, and increases wages.

Study	Type of Research	Occupations Studied	Contribution
Marc Law and Sukkoo Kim, "Specialization and Regulation: The Rise of Professionals and the Emergence of Occupational Licensing Regulation," *Journal of Economic History* 65, no. 3 (2005): 723–56.	history	multiple	Empirical clarification of recent literature.
Morris Kleiner, "The Influence of Occupational Licensing and Regulation" *IZA World of Labor* (Institute of Labor Economics), October 2017.	literature review	all	Licensing may increase wages and benefits but also reduces access to work without providing clear benefits for consumers.
Paul Larkin Jr., "Public Choice Theory and Occupational Licensing," *Harvard Journal of Law and Public Policy* 39, no. 1 (2016): 209–331.	policy and law	all	Legal justifications for occupational licenses and criticisms.
Elizabeth Graddy and Michael Nichol, "Structural Reforms and Licensing Board Performance," *American Politics Quarterly* 18, no. 3 (1990): 376–400.	policy review	4 health occupations	Review of relevant literature.
Robin Roberts and James Kurtenbach, "State Regulation and Professional Accounting Education Reforms: An Empirical Test of Regulatory Capture Theory," *Journal of Accounting and Public Policy* 17, no. 3 (1998): 209–26.	policy	accountants	The adoption of a 150-hour accounting education requirement is related to individual states' CPA lobby strengths.
Simon Rottenberg, "The Economics of Occupational Licensing," *Aspects of Labor Economics* 1962, 3–22.	theory	multiple	Theoretical foundation.
Milton Friedman, *Capitalism and Freedom* (Chicago: University of Chicago Press, 1962).	policy, theory	multiple	Theoretical foundation.
Jason Jensen, "An Examination of the Burdens Faced by Entrepreneurs at Start-Up and Five Years Later," *Journal of Entrepreneurship and Public Policy* 4, no. 2 (2015): 152–70.	business success rates	multiple	Regulatory factors and taxes matter little early on, but taxes become a larger burden later. Capital and labor supply matter a lot early on; permitting and licensing matter later on.