Bringing the Effects of Occupational Licensing into Focus: Optician Licensing in the United States

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February 2015

MERCATUS WORKING PAPER

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Edward J. Timmons and Anna Mills. "Bringing the Effects of Occupational Licensing into Focus: Optician Licensing in the United States." Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, February 2015. http://mercatus.org/publication /bringing-effects-occupational-licensing-focus-optician-licensing-united-states.

Abstract

The labor market institution of occupational licensing continues to grow in scope in the United States and abroad. In this paper, we estimate the effects of occupational licensing on opticians using data from the US Census and American Community Survey. The results suggest that opticians earn 0.3–0.5 percent more for each year that a licensing statute is in effect. In addition, tougher licensing provisions (in the form of more exams or longer education requirements) increase optician earnings by 2–3 percent. In an examination of vision insurance and malpractice insurance premiums, we find little evidence that optician licensing has enhanced the quality of services delivered to consumers. By and large, optician licensing appears to be reducing consumer welfare by raising the earnings of opticians without enhancing the quality of services delivered to consumers.

JEL code: J44

Keywords: occupational licensing, occupational regulation

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Bringing the Effects of Occupational Licensing into Focus

Optician Licensing in the United States

Edward J. Timmons and Anna Mills

As of 2006, occupational licensing affected 29 percent of the workforce in the United States, and the percentage of the US workforce directly affected by occupational licensing continues to grow.[1] Generally, an occupation can be regulated in three ways: registration, certification, or licensing. Registration requires individuals to provide some level of information to a government agency, such as their names, addresses, and qualifications. Once they have provided the information to the government, they can begin practicing. The second form of regulation, certification, restricts practitioners from using a professional title. For instance, only individuals who have passed an examination and met additional criteria may use the title "certified financial analyst." The most stringent form of occupational regulation is licensing. Licensing requires any individual who wishes to practice to meet specific standards set by the government.[2] Certification systems allow uncertified professionals to practice, but licensing systems do not permit unlicensed professionals to practice.

Supporters of occupational licensing believe that it protects consumers by improving the quality of service. Occupational licensing has become particularly relevant as the US economy has shifted from manufacturing to service industries. Measuring quality performance is more difficult in service industries, and thus, licensing has become the main method of showing

[1] 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.
[2] Simon Rottenberg, "The Economics of Occupational Licensing," in *Aspects of Labor Economics*, ed. Harold Groves (Princeton, NJ: Princeton University Press, 1962), 3–20.

competency in an occupation.[3] According to economist Kenneth Arrow, occupational licensing has the potential to minimize consumer uncertainty and therefore lead to an increase in overall demand for the service.[4] Other economists argue that requiring a minimum level of training produces positive social payoffs and reduces the asymmetric nature of the market. Thus, occupational licensing is believed to be necessary to promote the public interest of safety and to ensure that the services rendered meet minimum quality standards.

Several economists, however, are skeptical of the benefits of occupational licensing. Adam Smith believed it to be a way to "limit the number of apprentices per master, thus ensuring higher earnings for persons in these occupations."[5] Milton Freidman questioned whether the government and professional organizations were "unbiased gatekeepers" and whether the professional organizations were establishing monopoly rents by creating more difficult barriers to entry, thereby restricting the supply of practitioners and resulting in higher professional earnings.[6] In a related study, economist Alex Maurizi notes that as the demand for an occupation grew, the pass rate on licensure exams for the occupation fell.[7] This result is in line with the views of Adam Smith and Milton Friedman expressed above. Furthermore, in a nationwide study of the effects of occupational licensing, economists Morris Kleiner and Alan Krueger find evidence that licensing increases wages by 15 percent.[8] This result demonstrates the magnitude of the gains to practitioners from policies that create barriers to entry into a profession.

Although measuring differences in quality between licensed and unlicensed individuals is difficult, occupational licensing may even reduce the quality of services delivered to consumers.

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[3] Morris M. Kleiner, "Occupational Licensing," *Journal of Economic Perspectives* 14, no. 4 (2000): 189–202.
[4] Kenneth Arrow, *Essays in the Theory of Risk-Bearing* (Chicago: Markham Publishing, 1971).
[5] Adam Smith, *Wealth of Nations* (New York: Modern Library Edition, 1994 [1776]).
[6] Milton Friedman, *Capitalism and Freedom* (Chicago: University of Chicago Press, 1962).
[7] Alex Maurizi, "Occupational Licensing and the Public Interest," *Journal of Political Economy* 82, no. 2 (1974): 399–413.
[8] Morris Kleiner and Alan Krueger, "The Prevalence and Effects of Occupational Licensing," *British Journal of Industrial Relations* 48, no. 4 (2010): 676–87.

Minimum quality standards may become both a floor and a ceiling as declining competition leads to less incentive to innovate and improve.[9] Another side effect of licensing is that it promotes the idea among practitioners that higher quality will result only if a higher wage is guaranteed.[10] Carl Shapiro points out that licensing imposes certain standards that pass on to all consumers, despite clear differences in consumer valuation of the quality of the service.[11] Thus, imposing quality standards does not guarantee a positive experience for all consumers.

This study specifically examines the effects of occupational licensing on opticians. Opticians are licensed in 21 states in the United States, and Texas requires certification. Opticians have many responsibilities, which include interpreting the prescriptions from optometrists and ophthalmologists, collecting eye measurements, helping individuals select contact lenses and eyeglasses, and ensuring that eyeglasses are adjusted properly.[12] The decision to examine the optician market is partially motivated by the report *License to Work* by the Institute for Justice.[13] In this report, the Institute for Justice ranks opticians as having the sixth most burdensome requirements and the 42nd most heavily regulated occupation of the 102 low- and moderate-income occupations studied. The requirements vary from state to state, but the average requirements for states that license are three exams, two years of education, and $184 in fees.[14]

After a summary of some of the existing literature on the effects of licensing on low-income professions, specifically in the vision care market, we estimate how state licensing of opticians has affected opticians' earnings. The results suggest that opticians earn significantly

[9] Morris Kleiner, *Licensing Occupations: Ensuring Quality or Restricting Competition* (Kalamazoo, MI: Upjohn Institute, 2006).
[10] Walter Gellhorn, "The Abuse of Occupational Licensing," *University of Chicago Law Review* 44 (1976): 6–27.
[11] Carl Shapiro, "Investment, Moral Hazard, and Occupational Licensing," *Review of Economics Studies* 53, no. 5 (1986): 843–62.
[12] "Optician Job Description, Top Requirements That Should Always Be Included in the Optician Job Description," Optician Training, accessed June 9, 2014, http://www.opticiantraining.org/optician-job-description.
[13] Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing* (Arlington, VA: Institute for Justice, May 2012), http://www.ij.org/LicenseToWork.
[14] Carpenter et al., *License to Work*.

more in states that have had optician licensing in effect for longer periods of time and in states that have more rigorous education requirements.

Empirical Literature

Several studies have attempted to estimate the economic effects of occupational licensing. This study focuses on those occupations that do not require a substantial amount of training and those in which practitioners receive low or moderate levels of pay. Existing studies have estimated the effect of cosmetology regulation on prices of services[15] as well as the effect of English proficiency requirements for Vietnamese workers obtaining a license to enter the manicurist profession.[16] In a study analyzing the licensing of barbers, Edward Timmons and Robert Thornton show that tougher licensing requirements increased earnings between 11 and 22 percent.[17] They also find evidence that reductions in the supply of barbers were the primary mechanism for the wage increase. Barbering is an occupation that is licensed throughout the United States. In a separate analysis of an occupation that is not universally licensed and has only recently become subject to regulation, Thornton and Timmons find evidence that licensing increases massage therapist earnings by 16.2 percent.[18] In the small number of states that certify the massage profession, evidence of a similar earnings premium was less convincing. This finding also suggests that licensing generally increases rents rather than the quality of the service provided to consumers. In another study examining the effects of licensing radiologic

[15] Frank Adams, John Jackson, and Robert Ekelund, "Occupational Licensing in a 'Competitive' Labor Market: The Case of Cosmetology," *Journal of Labor Research* 23, no. 2 (2002): 261–78.
[16] 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, Papers and Proceedings* 96, no. 2 (2006): 237–41.
[17] Edward Timmons and Robert J. Thornton, "The Licensing of Barbers in the USA," *British Journal of Industrial Relations* 48, no. 4 (2010): 740–57.
[18] Robert Thornton and Edward J. Timmons, "Licensing One of the World's Oldest Professions: Massage," *Journal of Law and Economics* 56, no. 2 (2013): 371–88.

technologists—an occupation that requires relatively low amounts of training and is not licensed in all states—Timmons and Thornton find that licensing increases the earnings of radiologic technologists by 3.3–6.9 percent.[19] Despite the relatively low barriers to entry of each of these occupations (compared with physicians, for example), there is still evidence of substantial economic effects from occupational licensing. The magnitude of the estimated effects differs—perhaps because of the employment arrangement. Massage therapists and barbers are likely to have more autonomy than radiologic technologists. Other researchers have speculated that the potential for occupational licensing to result in large economic rents for practitioners may depend on the degree of autonomy the professional enjoys (that is, whether the professional is an employee or is self-employed).[20] Before discussing the effects of licensing on opticians, we will provide a brief overview of the profession.

Regulation of the Vision Care Market

The market for vision care is divided into three groups: ophthalmologists, optometrists, and opticians. Ophthalmologists are medical doctors who can diagnose and treat eye diseases as well as perform eye examinations to prescribe and dispense contact lenses and eyeglasses. Optometrists are not medical doctors; they are health care professionals who can also perform eye examinations to prescribe and dispense contact lenses and eyeglasses. Opticians dispense eyeglasses and contact lenses and do not have the authority to diagnose or treat eye diseases or to perform eye examinations. Generally, all three professions have supported expanding licensing of the optician profession. As with nearly all licensing statutes, professional associations (in this

[19] 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.
[20] Morris Kleiner, *Licensing Occupations: Ensuring Quality or Restricting Competition* (Kalamazoo, MI: Upjohn Institute, 2006).

specific case, the Opticians Association of America) are the primary catalyst for licensing legislation. State optician groups have historically lobbied for licensing on the grounds that it would both signal quality to consumers and restrict entry to the profession.[21] Consumers may feel more comfortable purchasing eyeglasses and contact lenses from a licensed practitioner—if one assumes that consumers are aware of licensing legislation.

Regardless of the outcome (restricted competition or perceived higher quality), consumers would be forced to pay higher prices for eyeglasses. Ophthalmologists and optometrists have also historically supported optician licensing, but purely on the grounds of limiting competition and protecting market share.[22] Ophthalmologists and optometrists fear that unregulated opticians may be able to offer eyeglasses at substantially lower prices. As a further effort to control competition, ophthalmologists and optometrists have tried to limit optician autonomy. Twenty-two states have passed laws that indirectly affect opticians' ability to be independent rather than tied to an ophthalmologist or optometrist. Four of those states do not allow opticians to fit contact lenses, and 16 of them require either an ophthalmologist or an optometrist to be present when fitting lenses.

Why have efforts to license opticians been slow to emerge or renew? Growing competition from online and mail order outlets (1-800 Contacts, for example) may have led to substantial increases in competition, particularly in the contact lens market. In 2004, the Fairness to Contact Lens Consumers Act was signed into law by then president George W. Bush. The law required professionals to provide prescription details to their patients, but also gave states the right to opt out of the law and set their own guidelines (for instance, allowing professionals to refuse to

[21] Deborah Haas-Wilson and Elizabeth Savoca, "Quality and Provider Choice: A Multinomial Logit-Least-Squares Model with Selectivity," *Health Services Research* 24, no. 6 (1990): 791–809.
[22] Alex Maurizi, Ruth Moore, and Lawrence Shepard, "Competing for Professional Control: Professional Mix in the Eyeglasses Industry," *Journal of Law and Economics* 24, no. 2 (1981): 351–64.

provide prescription details if the prescriptions are more than one year old).[23] Lobbying efforts on the part of professional associations have primarily focused on thwarting efforts by 1-800 Contacts to roll back individual state guidelines on refusing access to prescription information.[24]

The Federal Trade Commission conducted a study to observe the quality of eye care provided by licensed versus unlicensed professionals and found that the quality difference between licensed and unlicensed professionals was statistically insignificant.[25] States with bans on optometrist and optician price advertising also have been shown to have significantly higher prices—as much as 16 percent more than states without similar bans.[26] As noted earlier, licensing may serve as a signal to consumers that practitioners have met minimum quality standards. But regulation in the vision care market does not always benefit the consumer. Empirical studies have shown that as the level of professional control increases, such as a requirement for supervision of opticians, the price of eyeglasses increases.[27] These specific examples show that the interests of consumers are not always represented by regulatory intervention in the vision market.

Data and Preliminary Analysis

Correlation between Optician Regulation and Earnings

What is the scope of regulation in the optician market today? Table 1 (page 19) presents specific information on the states that regulate opticians. Figure 1 (page 20) depicts the states with

[23] Bod Tedeschi, "Conflict over Contact Lenses," *New York Times*, June 21, 2004.
[24] Ibid.
[25] Carolyn Cox and Susan Foster, "The Costs and Benefits of Occupational Licensing" (Bureau of Economics, Federal Trade Commission, 1988), http://www.ftc.gov/system/files/documents/reports/costs-benefits-occupational-regulation/cox_foster_-_occupational_licensing.pdf.
[26] Roger Feldman and James Begun, "The Effects of Advertising Lessons from Optometry," *Journal of Human Resources* 13 (1978): 247–62.
[27] Lee Benham and Alexandra Benham, "Regulating through the Professions: A Perspective on Information Control," *Journal of Law and Economics* 18, no. 2 (1975): 421–47.

licensing. Data were gathered from *License to Work* and then confirmed by consulting the annotated statutes and licensing boards of each state.[28] All the states listed in table 1 require opticians to be licensed (excluding Texas, which has a certification law). South Carolina was the first state to require licensing of opticians, in 1917. Connecticut, New York, and Rhode Island passed legislation in the 1930s. A second wave of states (12) adopted licensing legislation between 1949 and 1957. Alaska and Vermont both began to license the profession in 1973, followed by Ohio and Arkansas in 1980 and 1981, respectively. The final state to adopt licensure was California in 1988.

The licensing requirements of the states that require licensure differ substantially. The fees for obtaining an optician license vary from $70 in Vermont to as much as $850 in Florida. Education and experience requirements are as little as no education in California to as much as 1,128 days in Nevada. Every state requires an exam, but the number of exams required varies from only one in North Carolina and Vermont to four in Connecticut. Many states also specify whether applicants are required to complete high school or be a minimum age.

By studying annotated statutes, we identify a handful of states that enacted changes in licensing requirements. In 2002, Alaska substantially reduced optician licensure requirements from 1,400 days of education and experience to 420. New York and Rhode Island, in contrast, made existing requirements stricter: New York added an additional exam in 1973, and Rhode Island substantially increased education and experience requirements from 365 days to 1,095 days.

What are the economic effects of optician licensing? We obtained data from the US Census for 1940–2000 and the American Community Survey for 2000–2012.[29] The focus is on

[28] Carpenter et al., *License to Work*.
[29] Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis, MN: University of Minnesota, 2010).

individuals identifying themselves as opticians and reporting annual earnings above zero.[30] We identify states with licensing by comparing the date the licensing law was passed and the year of the observation. If the statute was passed one year before the survey year, we classify the observation as "licensed." For example, we classify observations from the 1950 Census (the survey was conducted in 1949) in Virginia as "not licensed," but Virginia observations from 1960 to the present are classified as "licensed." Table 2 (page 21) contains a simple comparison of states with and without licensing statutes over the sample period. Texas is excluded from the comparison because it has a certification law.

Annual optician earnings are substantially higher (by approximately $7,000) on average in states that have optician licensing statutes than in states that do not regulate the profession. Does the strictness of the licensing statute have any discernible economic effects? Table 3 (page 21) depicts the comparison of states, grouped by the number of exams required. The table suggests a positive correlation between the number of exams that prospective opticians must pass to practice and opticians' annual earnings.

Are there other possible explanations for these differences in earnings besides regulations? A larger percentage of opticians are males in states that require licensing than in states without licensing. This may partially explain the discrepancy in wages between the two groups. In addition, opticians in states that require licensing have more education than those in states that do not. It is also possible that the states that require licensing have other unobservable differences from the states that do not require licensing. To investigate this possibility further, we

[30] Imputed hourly wages were examined through self-reported hours worked and weeks worked. Some of the data on weeks worked were gathered in intervals, so the medium of the range was used. The results do not substantially change if wages are used as opposed to annual earnings. Also, any changes in the sample (for instance, restricting the analysis to the period 1940–2000) made no material difference in the results.

focus on states that have adopted licensing legislation and then compare earnings before and after licensing legislation was adopted (see table 4, page 22).

Once again, there is evidence of higher earnings (more than $4,300 greater) after a state has adopted licensing legislation. State-specific variables might explain a portion of the difference in opticians' earnings, but a large difference remains. To further investigate the effects of licensing on earnings, we plot relative wages over time in groups of states that adopted optician licensing. States are grouped by the decade in which they passed an optician law, and wages are relative to states that do not license opticians. As a comparison, we also plot earnings in Texas. A relative wage of 1 would suggest that earnings in the group of states with optician regulations are the same as those in states without optician regulations. One would expect to see relative earnings higher than 1 in states that have passed licensing.

Figure 2 (page 23) shows an increase in relative earnings either immediately or soon after the passage of licensing legislation. The figure shows no evidence of a similar effect in Texas after the passage of certification (in 1976); in fact, optician earnings in Texas fell after certification. Given opticians' low percentage of participation in the certification process, the Texas finding is not surprising. If the primary mechanism whereby licensing legislation increases earnings was a higher-quality service, one would expect to see certification having a similar effect on earnings. Of course, this comparison assumes that the majority of Texas opticians obtain certification and also that consumers can distinguish between different levels of quality in optician services.

The Texas Opticians' Registry[31] provides data on the current number of certified opticians. Comparing this to the total number of opticians currently practicing in Texas shows

[31] Texas Department of State Health Services, last modified December 3, 2014, https://www.dshs.state.tx.us /optician/opt_roster.shtm.

that only 107 of the 3,761 opticians practicing in Texas are certified (roughly 2.8 percent). Thus, one can presume that opticians in Texas do not feel that certification is worthwhile—and this suggests that consumers may not be able to distinguish between differing levels of quality in optician services.

Table 5 (page 24) presents further exploration of the special case of Texas, illustrating a similar comparison of optician earnings. Again, there is no evidence of an increase in optician earnings following the adoption of certification legislation in Texas. In fact, there is evidence that earnings fell. Although the reason for this decline in optician earnings in Texas cannot be precisely identified, increasing competition from online eyeglasses and contact lens retailers may be the primary culprit.

As noted previously, a handful of states made changes in the requirements for optician licensing. Alaska made it easier to become an optician in 2002 (reducing education requirements from 1,400 days to 420 days), and New York and Rhode Island made it more difficult to practice as an optician. New York required an additional licensing exam beginning in 1973, and Rhode Island tripled its education requirements from 365 days to 1,095 days in 1974. Table 6 (page 24) compares mean annual optician earnings in each state before and after a change in licensing requirements. Although the sample sizes (n) for Alaska and Rhode Island are quite small, the differences are consistent with the previous tables.

Alaska shows a large decline in optician earnings after it substantially reduced the number of days of education and experience required to practice as an optician; for comparison, average annual earnings (in 2012 dollars) for all Alaskan workers rose from $50,675 in 2001 to $51,641 in 2002. In contrast, optician earnings seem to have increased substantially in New York and Rhode Island after each state created a further challenge for aspiring opticians to practice by

either adding an exam or increasing education requirements (average real earnings in each state rose by less than 1 percent during the same period).

Correlation of Optician Licensing and Quality of Service

Measuring the quality of service delivered to consumers is difficult. Quality can be subjective and difficult to measure precisely. The fact that opticians in Texas decide to forgo obtaining certification suggests that consumers may not be able to distinguish differences in quality levels of services provided by practitioners. Is there any additional evidence that this is the case? We obtained data on insurance premiums for 2014 on vision insurance for consumers. Using the website eHealth,[32] we obtained price quotes for vision insurance for a 35-year-old male nonsmoker located in the largest city in each state and in Washington, DC (a total of 51 price quotes). If the quality of optician services provided to customers in licensed states was higher than in unlicensed states, one might suspect that opticians would be able to charge higher prices. As a result, insurance premiums for vision insurance could plausibly be higher in licensed states. In fact, we found the opposite—the average premium in unlicensed states is $14.34 compared with $14.16 in licensed states.

Vision insurance rates may not be the best measure of quality, however. To further investigate the effects of licensing on quality, we gathered data on malpractice insurance premiums in 2014 from Lockton Affinity Health.[33] We obtained quotes for each state for employed opticians with three or more years of experience working 40 hours per week. The quotes for licensed and unlicensed states were exactly the same (Virginia's rate was $25 more per year, but this was the only exception); malpractice insurance providers did not appear to

[32] eHealth Insurance Services website, http://www.ehealthinsurance.com/vision-insurance/find-coverage.
[33] Lockton Affinity Health, https://secure.locktonmedicalliabilityinsurance.com/application/quote1?AHPLA_RevOrg=80050&AHPLA_OriginPage=optc.

consider a lack of licensing a risk factor. A rough examination of quality does not indicate that consumers or malpractice insurance providers can distinguish between the quality levels of services by licensed and unlicensed opticians. We cannot fully ascertain whether this inability results from a lack of sufficient information about the quality of service or simply the fact that the quality of service provided by licensed and unlicensed opticians is essentially the same. For malpractice insurance in particular, however, the latter may be more likely.

Regression Results

To reach a better understanding of the economic effects of optician licensure, we estimate earnings regressions of the following type:

$$ln\ (\text{earnings}_{ist}) = \alpha + \beta_s\ (L) + \lambda_i\ (I) + \mu_{st}(FE) + \varepsilon_{ist}$$

where earnings are reported by individual *i* living in state *s* at time *t*. *I* represents a vector of individual control variables (such as age, gender, race, Hispanic origin, and education). Each of these variables is known by economists to be correlated with earnings.[34] We also include real personal income per capita in each state at time *t* as an additional control variable to avoid capturing any spurious increase in earnings that results from state economic factors not related to licensing. *FE* represents a vector of time and state fixed effects. Fixed effects allow us to control for time- or state-specific differences in optician earnings. Regressions that include time and state fixed effects produce difference-in-difference (DID) estimates of the effects of optician licensing. DID estimates are similar to the comparison presented in table 4. Rather than comparing states that have licensing with those that do not have licensing, DID estimation allows us to focus on states that have enacted licensing legislation and to compare earnings before and

[34] Jacob Mincer, "Investment in Human Capital and Personal Income Distribution," *Journal of Political Economy* 66, no. 4 (1958): 281–302.

after the passage of legislation. DID estimates are more reliable estimates of the effects of occupational licensing. They allow us to more accurately measure the effects of occupational licensing by controlling for differences in optician earnings across states and over time.[35]

Our main variable of interest, *L*, represents a vector of variables used to measure the effects of licensing. The simplest measure is a binary variable equal to 1 if a state has licensing in effect at time *t* and zero otherwise. We also measure licensing by the number of exams required to obtain a license and by the number of days of education and experience required (coding those states without licensing as zero). Finally, we measure the effects of licensing by using the number of years that the statute has been in effect (a variable that we call licensing duration). It is possible that the effects of licensing may take some time to be realized or that the effects of licensing may simply change over time. For example, many licensing statutes include grandfather provisions for opticians already practicing when a new licensing statute is passed. If a large number of practitioners can forgo the licensing process, the effects of licensing may be significantly delayed.

We estimate our regressions first using only licensing variables to establish a baseline estimate of the effects of licensing. We then progressively add additional control variables to establish the stability and robustness of the estimated coefficients. If state fixed effects are not included, the estimated coefficients are effectively comparing states that have licensing with states that do not (similar to table 2). When including state fixed effects (and performing DID regression), we focus on the states that adopted licensing legislation and compare optician earnings before and after adoption (similar to table 4).

[35] Each regression also includes person weights (representing the number of persons represented by each observation in the sample) provided by the Minnesota Population Center's Integrated Public Use Microdata Series (http://www .ipums.org).

Table 7 (page 25) contains the results of the estimation of the effects of optician licensing. Columns 1–3 contain estimates using a binary licensing variable (equal to 1 if licensing is in effect, zero otherwise). We find evidence that optician licensing is associated with substantially higher earnings in states with licensing (14–24 percent), but the DID estimates in column 3 suggest that the premium is much smaller (4 percent, but measured imprecisely). The estimated effect is very much in line with previous estimates of the return to occupational licensing at the national level. In columns 4–6, we use license duration (or the number of years that the licensing statute has been in effect) as the measure of licensing. Here, evidence consistently shows a positive association between optician licensing and optician earnings. For each year that a licensing statute is in effect, opticians receive an earnings premium of between 0.3 and 0.5 percent. This effect is measured precisely across specifications and suggests that optician licensing may indeed operate with a lag. This makes sense given that new licensing statutes include grandfather provisions that allow existing practitioners to avoid the process of licensing—it may take several decades for the full effect of licensing to be realized. With regard to specific requirements of the licensing statute, in columns 7–12 we estimate the effects of licensing on optician earnings on the basis of the number of exams and the number of days of education and experience required (in hundreds of days).[36] There is evidence of a premium in a comparison of licensed and unlicensed states. Each exam appears to increase optician earnings by 3–8 percent (the DID estimate is not precise), and each 100 days of experience and education required increases earnings by between 2 and 3 percent. In a measurement of the effects of

[36] The procedure described in the appendix of *License to Work* was used to transform education requirements into days. In licensing statutes, education requirements are often reported as "hours" or "clock hours." For the conversion, hours were divided by 30 (reflecting a six-hour school day and assuming five days of school per week) to convert education requirements into weeks. Weeks were then converted into days by multiplying by 7. If licensing requirements are expressed as years, the number is multiplied by 365. If expressed in terms of degrees, the standard completion time of two years is assumed for an associate's degree and then multiplied by 365.

licensing by the strictness of the law (effectively the height of the barrier), evidence consistently shows that optician licensing has increased earnings.

Conclusion

This paper presents the estimated effects of optician licensing on optician earnings. We find consistent evidence that opticians earn more in states that have had licensing statutes in effect for longer periods of time (about 0.5 percent more per year of statute) and in states that have more exams (about 3.0 percent more per exam required) and more stringent education and training requirements (about 2.0 percent more per 100 days of education and training required). In the only state with certification, Texas, we find no evidence of a similar increase in earnings. Taken together, the results indicate that optician licensing is increasing the earnings of professionals at the expense of consumers. Of the 50 US states and one jurisdiction, 30 do not license opticians and appear to have well-functioning markets that provide quality care to consumers, as measured by the comparison of quality of service using vision and malpractice insurance premiums. The best interests of consumers would be served by eliminating optician licensing or, at the very least, scaling back existing licensing statutes to certification statutes.

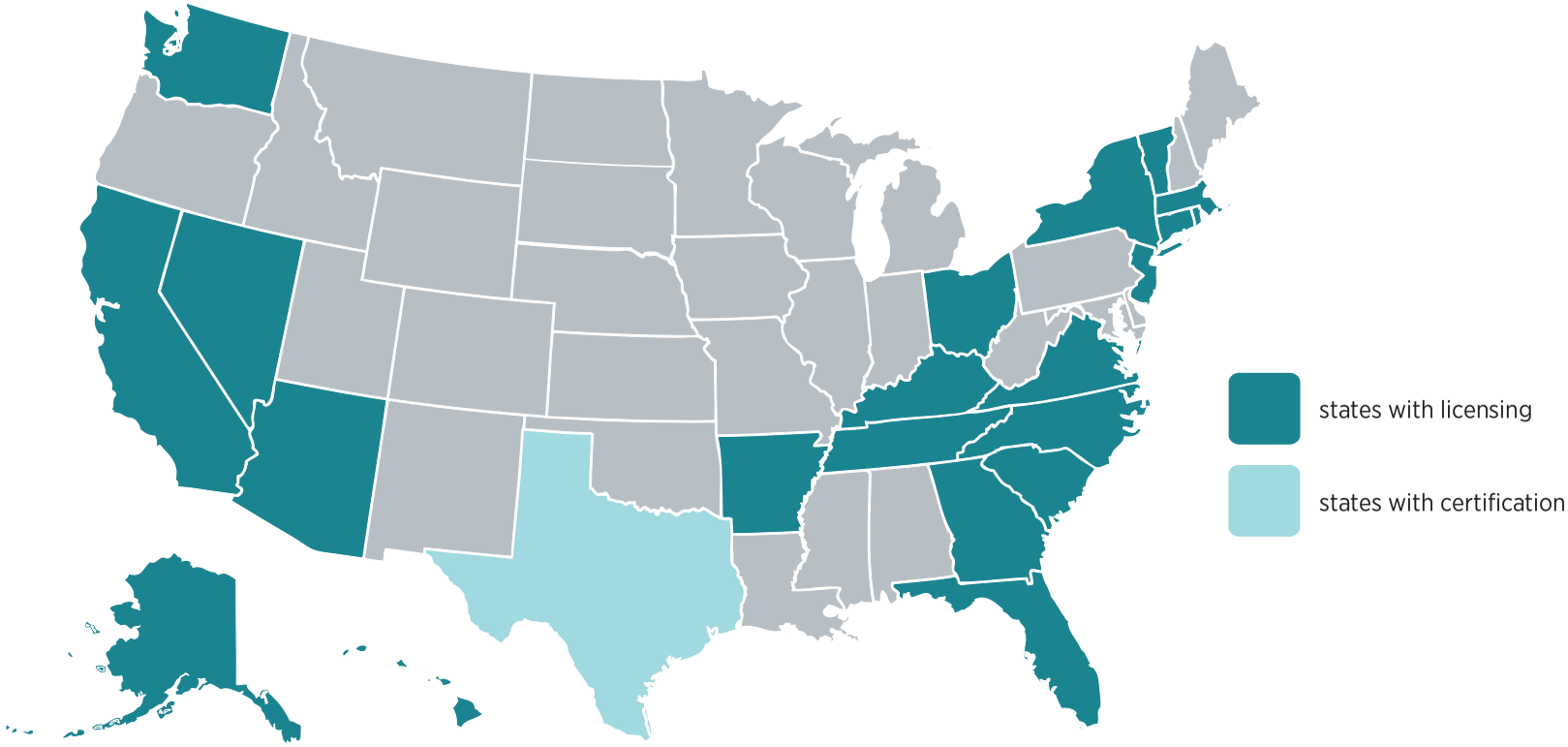
Table 1. State Regulation of Opticians

State	Year licensing was introduced	One-time fee ($)	Experience or education (days)	Number of exams	Minimum years of education	Age (years)
Alaska[a]	1973	275	420	2	12	0
Arizona	1956	200	1,095	3	12	0
Arkansas	1981	200	1,120	2	12	21
California	1988	141	0	2	12	18
Connecticut	1935	100	730	4	0	0
Florida	1949	850	730	3	12	18
Georgia	1956	115	700	3	12	18
Hawaii	1949	75	700	2	12	18
Kentucky	1954	50	730	3	12	18
Massachusetts	1955	54	730	3	0	0
Nevada	1951	350	1,128	3	12	18
New Jersey	1952	25	857	2	12	0
New York[b]	1936	100	560	3	12	18
North Carolina	1951	250	910	1	12	18
Ohio	1980	96	467	2	12	18
Rhode Island[c]	1937	70	1,095	2	12	18
South Carolina	1917	150	730	3	12	0
Tennessee	1955	278	730	3	12	18
Texas (certification)	*1976*	*105*	*1*	*2*	*0*	*0*
Vermont	1973	70	730	1	12	18
Virginia	1950	300	730	3	12	18
Washington	1957	200	731	3	12	18

Sources: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing* (Arlington, VA: Institute for Justice, May 2012), http://www.ij.org/LicenseToWork; and each state's licensing board and licensing statutes.

(a) Dropped education requirement from 1,400 days to 420 days in 2002.
(b) Added an exam in 1973.
(c) Increased education requirements from 365 days to 1,095 days in 1974.

Figure 1. State Regulation of Opticians



Sources: Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing* (Arlington, VA: Institute for Justice, May 2012), http://www.ij.org/LicenseToWork; each state's licensing board and licensing statutes.

Table 2. Summary Statistics of the 1940–2012 US Census and American Community Survey Optician Sample

Item	States without optician licensing (% except where otherwise noted)		States with optician licensing (% except where otherwise noted)	
	Mean	Median	Mean	Median
Annual earnings (2012$)	29,765	26,316	36,782	33,316
Age (years)	38.4	37.0	40.1	39.0
Male	37.8		43.6	
African American	3.9		4.5	
Other minority	4.1		9.0	
Hispanic	1.6		5.4	
Associate degree	8.2		10.8	
Bachelor's degree	2.1		3.3	
n	6,203		7,374	

Source: Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis: University of Minnesota, 2010).

Table 3. Comparison of Annual Optician Earnings (2012$) in the 1940–2012 US Census and American Community Survey by the Number of Exams Required for Licensure

Item	Number of exams required				
	0	1	2	3	4
Mean annual earnings	$29,765	$35,166	$36,143	$37,005	$43,137
Median annual earnings	$26,316	$33,333	$32,000	$33,333	$40,000
n	6,203	342	2,555	4,284	193

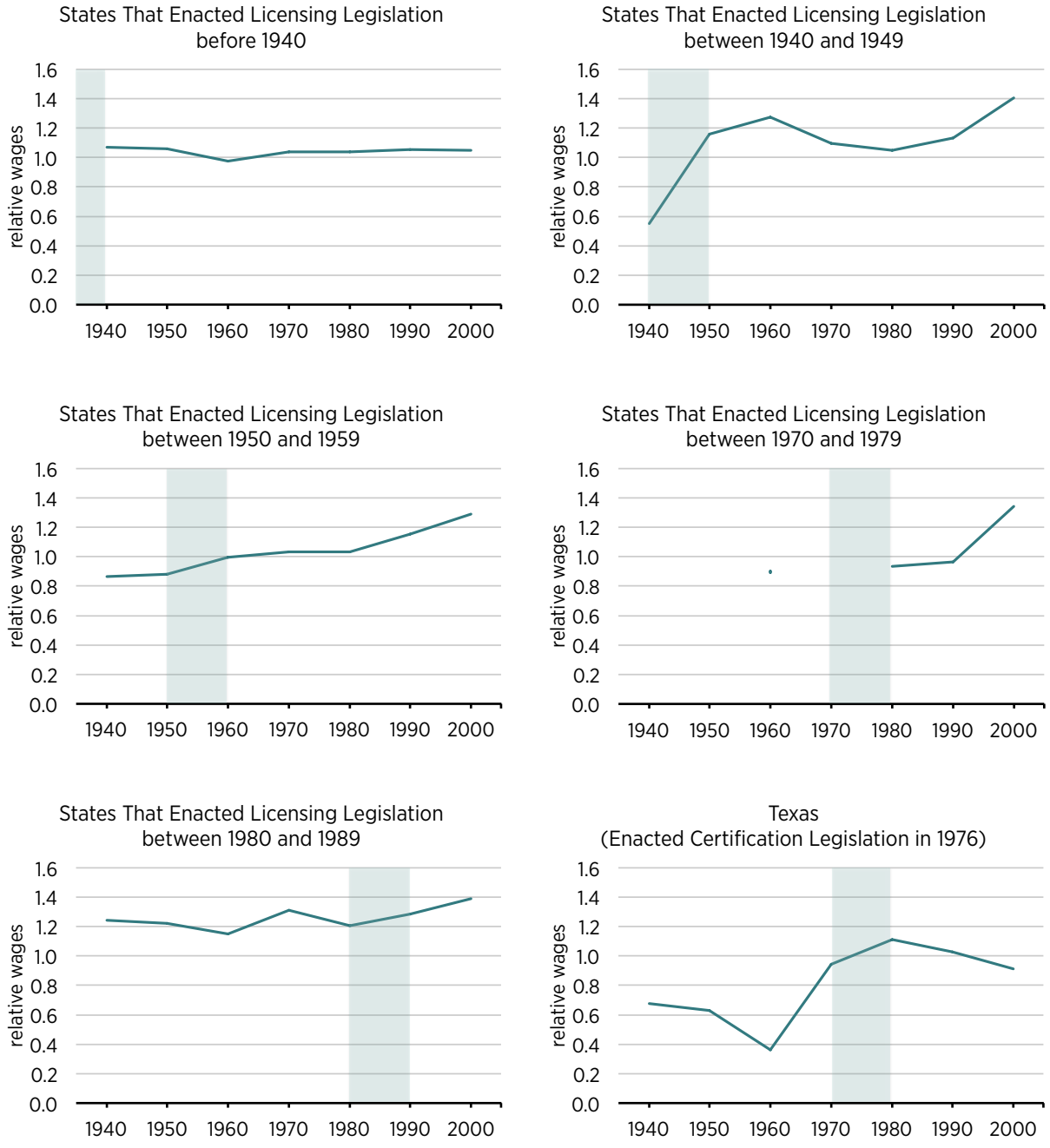
Source: Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis, MN: University of Minnesota, 2010).

Table 4. Summary Statistics of the 1940–2012 US Census and the American Community Survey Optician Sample in States That Enacted Licensing Legislation

Item	Before optician licensing (% except where noted otherwise)		After optician licensing (% except where noted otherwise)	
	Mean	Median	Mean	Median
Annual earnings (2012$)	32,447	27,792	36,782	33,316
Age (years)	36.0	32.0	40.1	39.0
Male	67.8		43.6	
African American	2.8		4.5	
Other minority	5.7		9.0	
Hispanic	3.0		5.3	
Associate degree	8.7		10.8	
Bachelor's degree	3.0		3.3	
n	575		7,372	

Source: Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis: University of Minnesota, 2010).

Figure 2. Trends in Relative Optician Wages, 1940–2000



Sources: Licensing data are from Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing* (Arlington, VA: Institute for Justice, May 2012), http://www.ij.org/LicenseToWork, and each state's licensing board and licensing statutes. All other data are from the 1940–2000 US Census.

Note: Relative wages are wages in the selected states divided by wages in states that do not license opticians. Data are not available for states that enacted licensing legislation during the 1960s or for years 1940, 1950, and 1970 for states that enacted licensing legislation during the 1970s.

Table 5. Summary Statistics of the 1950–2012 Census and American Community Survey Optician Sample in Texas

Item	Before certification (% except where otherwise noted)		After certification (% except where otherwise noted)	
	Mean	Median	Mean	Median
Annual earnings (2012$)	31,105	30,294	27,220	23,625
Age (years)	34.6	33.0	37.8	35.0
Male	68.9		30.1	
African American	2.2		4.9	
Other minority	0.0		11.4	
Hispanic	0.0		4.4	
Associate degree	6.7		7.2	
Bachelor's degree	11.1		9.9	
n	45		871	

Source: Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis, MN: University of Minnesota, 2010).

Table 6. Comparison of Mean Annual Optician Earnings (2012$) in the 1940–2012 US Census and American Community Survey in Alaska, New York, and Rhode Island

State	Before licensing change	After licensing change
Alaska	$53,205 (*n* = 2; 2001)	$47,403 (*n* = 1; 2002)
New York	$30,819 (*n* = 67; 1970)	$32,985 (*n* = 226; 1980)
Rhode Island	$32,888 (*n* = 7; 1970)	$38,106 (*n* = 17; 1980)

Source: Steven Ruggles et al., *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database] (Minneapolis, MN: University of Minnesota, 2010).

Note: Number of optician earnings and the year of earnings are in parentheses.

Table 7. Estimates of the Effects of Optician Licensing on the Natural Logarithm of Optician Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Optician license	0.218* (0.0371)	0.132* (0.0230)	0.0388 (0.0370)									
Licensing duration				0.00523* (0.000650)	0.00295* (0.000489)	0.00515* (0.00140)						
Number of exams required							0.0787* (0.0116)	0.0462* (0.00728)	0.0266 (0.0186)			
Days of education required (100s)										0.0261* (0.00584)	0.0166* (0.00333)	0.0224* (0.00904)
Individual controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
State and time fixed effects	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
R^2	0.02	0.19	0.2	0.02	0.19	0.2	0.03	0.19	0.2	0.02	0.19	0.2
n	13,577	13,577	13,577	13,577	13,577	13,577	13,577	13,577	13,459	13,459	13,459	13,459

Source: All licensing data are from Dick M. Carpenter II et al., *License to Work: A National Study of Burdens from Occupational Licensing* (Arlington, VA: Institute for Justice, May 2012), http://www.ij.org/LicenseToWork, and each state's licensing board and licensing statutes. All other data are from the 1940–2000 US Census and 2000–2012 American Community Survey.

Note: Standard errors are adjusted for state clustering. Observations from the state of Texas (which has a certification law) are excluded from the analysis. Individual controls include real personal income per capita, age, and dummy variables for race, gender, Hispanic origin, and education.

* Significant at the 1% level.