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ABSTRACT

In the United States, licenses are required for entry into many different occupations. Requirements vary by state and occupation, but many licenses require a minimum number of training or instructional hours. We consider the impact of these hours requirements on students and postsecondary institutions, with a particular focus on cosmetology (also known as hairstyling or beauty). Cosmetology licensing requires extensive training hours (between 500 and 2,100 hours) in every state and typically exceeds the time required for similar licenses. We implement a difference-in-difference design based on state-level changes in required licensing hours for cosmetologists between 2011 and 2019. We ask how and whether changes to hours requirements influence student outcomes and institutional behavior. We find that lowering required hours is likely beneficial for students, as it raises completion, lowers tuition, and expands enrollment among some groups of students. Larger institutions appear to reduce their tuition by less than smaller institutions. We find no detectable effects on the earnings of cosmetologists.

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1. Introduction

In the United States, licenses are required for entry into many different occupations, such as cosmetology, massage therapy, nursing, teaching, construction contracting, social work, medicine, and law. Requirements vary by state and by occupation: common elements include a particular level of schooling, passing an examination, a minimum number of hours of training, on-the-job experience, and/or continuing education. In this paper, we consider the impact of requirements for minimum training hours on students and institutions, with a particular focus on cosmetology (commonly known as hairstyling or beauty) programs -- a field that requires extensive training hours in every state. We ask how and whether these requirements pay off for students and whether they influence institutional behavior.

There are many different types of licensing requirements across fields and states, but training or instructional hours requirements are the most salient for higher education policy and practice. Institutions offering programs in licensed fields must ensure that they provide sufficient hours to meet state-mandated minimums to allow students to practice in that field upon graduation. These types of requirements have important implications for students. All else equal, students in states with higher training hour requirements will need to stay in school longer than their counterparts. They will not only incur more direct costs in terms of tuition and fees, but they will also incur larger indirect costs: they need more time to complete their credential and must delay the start of their career. These additional costs may be reasonable if higher required training hours translate to higher earnings post-graduation, but it is not at all clear that this is the case. Lowering training hours should lower the cost to students and potentially increase demand for training, but there may be wage penalties if the education does not provide students the skills they need to be successful and practice their trade safely.

We assess the relationship between training hours requirements, tuition, and student outcomes in the field of cosmetology. Cosmetology licensing requirements have been the source of recent debates and policy movement at both the federal and state level. In addition to the state-level reductions in required hours we examine here,[1] new federal regulations will

[1] We describe these changes further in Sections 2 and 3.

require that any programs participating in federal student aid programs not exceed the minimum number of hours training hours required by the state.[2] The law, part of the 2023 Gainful Employment regulations, is currently being challenged in a lawsuit by the American Association of Cosmetology Schools (AACS).[3]

Each year, roughly 200,000 students enroll in more than 1,000 cosmetology schools that are eligible for federal student aid programs.[4] Over three-quarters of them are for-profit institutions.[5] Students enrolled in cosmetology programs are disproportionately women, low-income students, students of color,[6] and parents,[7] so policies affecting the sector have critical implications for equity. News reports suggest that state cosmetology boards may be requiring an excessive number of training hours in some states,[8] and data on the debt and earnings of cosmetology graduates suggest disappointing outcomes for students in this field.[9] A better understanding of the role that required licensing hours play in determining student outcomes is essential for developing higher education policy that is both efficient and equitable.

Using data on licensing hours for all 50 states and the District of Columbia, we first undertake a descriptive analysis to assess the correlation between licensing hours and both student debt and earnings. We then implement a dynamic difference-in-difference design based on six states where licensing requirements were lowered between 2011 and 2017. As a robustness check, we re-estimate our models using a synthetic control group. Results are unchanged.

[2] The restriction is part of the 2023 Gainful Employment Program Hours regulations (34 CFR 668.14(b)(26)). Previously, programs could require hours up to 150% higher than those required by state licensing authorities. See https://www2.ed.gov/policy/highered/reg/hearulemaking/2024/certification-q-and-a.html.
[3] Spitalniak (2024).
[4] These figures from Fast, Granville, Moutrie (2022) count only Title IV-elgiblie institutions. Many hundreds, if not thousands, more schools operate without access to student aid programs and therefore outside of the Department of Education's purview, making them (and their students) difficult to count. Cellini and Goldin (2014) report that about 136 non-Title IV cosmetology schools operate in Florida, while Cellini and Onwukwe (2022) find that more than 700 cosmetology and barber schools operate in the state of Texas. Non-Title IV programs are captured in our analyses of ACS data, but not Department of Education data in College Scorecard
[5] Fast, Granville, and Moultrie (2022) document that 77% of Title IV cosmetology schools are for-profit.
[6] Fast, Granville, and Moultrie (2022).
[7] Obatuase, Cheche, and Fishman (2024).
[8] Kolodner & Butrymowicz (2018).
[9] See for example, Cellini and Blanchard (2022). We review the literature in detail in Section 2.

Our descriptive analyses suggest that higher licensing hours requirements are associated with higher levels of student debt, but the additional hours and debt that students incur do not appear to be associated with higher earnings. Our difference-in-difference results based on *reductions* in hours in several states, show a clear increase in the number of program completions in the four years after a state lowers the required hours. We find that the number of cosmetology certificates awarded more than doubles for programs in states that were subject to a trim in licensing hours. We also find a decline in tuition and fees by about 14% in response to a cut, a result that appears to be driven by smaller institutions. Our results for student debt and earnings are less precise, but we find suggestive evidence of lower debt in the post-policy years and we observe no decline in earnings. While there we see no impacts on overall enrollment, we see a sizable increase in the enrollment Hispanic and Latino students. Taken together, our results suggest that cosmetology students benefit from the trimming of mandated licensing hours. Whether or not cutting hours ultimately impacts the profits of institutions or quality of services is left for future research.

Section 2 provides background on the literature and cosmetology licensing, Section 3 describes our data sources. In Section 4, we outline our dynamic difference-in-differences design. Section 5 considers the correlation between licensing hours, debt, and earnings for all states. Section 6 presents our causal results on the impacts of reductions in licensing hours. Section 7 explores heterogenous effects by college and student characteristics. Section 8 provides robustness checks and Section 9 concludes.

2. Background

Occupational licensing has been studied extensively by economists, going as far back as Adam Smith.[10] Theoretical arguments about the efficiency of licensing center around two primary premises. The first is that licensing may ensure quality and protect consumer safety in markets exhibiting asymmetric information or negative externalities. The second is that

[10] As cited by Blair (2022).

licensing may generate barriers to entry, restricting worker supply, and putting upward pressure on wages, potentially resulting in welfare losses in competitive markets.

Empirical work has generated evidence on both of these premises. Overall, the research demonstrates that licensing has had little effect on health and safety but does increase wages for licensed workers.[11] For example, Kleiner and Krueger (2013) estimate the wage premium for licensed occupations to be around 18%. More recent estimates by Gittelman, Klee, and Kleiner (2018) suggest that the premium may be lower—around 7.5%. They also find that licensed workers are more likely to be employed and have employer-provided health insurance than those in unlicensed occupations. Nunn (2018) finds that licensed workers have longer job tenure and lower rates of part-time work, but face higher wage inequality than workers in unlicensed sectors. Blair and Chung (2019) use a boundary discontinuity design to show that licensing drives large reductions in labor supply: between 17 and 27%. In other work, they explore the potential for licensing to reduce gender and racial wage gaps, as it may allow firms to rely less on observable characteristics in determining wages (Blair and Chung 2020a). Empirically testing their model, they confirm that the earnings premium for licensing is higher for Black men, Black women, and White women, relative to White men (Blair and Chung 2020b).[12]

Many studies have focused on specific fields that require licensing. For example, Kleiner and Park (2010) and Dillender et al. (2022) study the easing of licensing requirements for health care assistants, and they find that the assistants' earnings increase with licensure. More relevant for this report, Timmons and Thornton (2019) study changes to licensing laws for barbers in Alabama and find that de-licensing decreased barbers' average annual earnings and increased the number of cosmetologists in the state. Beyond the role of licensing in changing employment and earnings outcomes, Arteaga (2017) studies the impact of education hours more broadly and finds a direct effect of reductions in credit hours on earnings using a

[11] For a helpful summary, see U.S. Department of Treasury Office of Economic Policy, Council of Economic Advisers and Department of Labor, 2015.

[12] A helpful summary of this work is contained in Blair (2022): https://www.nber.org/reporter/2022number1/new-frontiers-occupational-licensing-research.

reduction in graduation requirements for economics and business students at a university in Colombia.

In a study of two related licensed occupations, Deyo (2022) considers makeup artists and shampooers. She compares customer ratings on Yelp for these professions to those of unlicensed pet groomers. She finds that the impact of more rigorous education and experience requirements for licensure has a counterintuitive negative relationship to quality (as measured by ratings), but it is not economically meaningful. Adams, Jackson, and Ekelund (2002) study cosmetology specifically, using an instrumental variables strategy to assess whether licensing requirements have a causal impact on the prices of haircuts and a measure of the quantity of cosmetology services consumed in a state. They find that licensing reduces quantity and raises prices for consumers, while generating no improvement in quality.

In the economics of education, a few papers have examined cosmetology programs specifically. Cellini and Goldin (2014) document the large number of for-profit cosmetology schools that operate without access to federal student aid programs. They find that these programs have similar pass rates on licensing exams and charge lower tuition than cosmetology schools that participate in federal student aid programs in Florida. Cellini and Onwukwe (2022) build on this work to look at cosmetology schools in Texas and find that the vast majority of cosmetology schools in Texas do not participate in federal student aid programs. Grosz (2022) documents substantial growth in cosmetology awards in the California Community College system in the late 1990s and early 2000s, despite flat labor market demand for cosmetologists.

In a policy report, Mejou, Bednarczuk, and Hunter (2021) of the Institute for Justice, document the variation in licensing requirements and student costs across states. Fast, Granville, and Moultrie (2022) of the Century Foundation build on this work to document the size, scope, student outcomes, and recent policies affecting Title IV-participating cosmetology programs. They contend that high state licensure requirements contribute to the high cost of cosmetology programs and describe how students perform unpaid work while at the same time paying tuition that benefits cosmetology schools. A key question in policy debates surrounding cosmetology programs is whether underreporting of tipped income can explain the low

earnings of cosmetology program graduates. Cellini and Blanchard (2022) explore this question, estimating that earnings are underreported by only about 8%.

Public debate over cosmetology licensing has been ongoing since at least 2012 when a high-profile court case questioned whether Jestina Clayton, a Utah resident who started an African-style hair braiding business, needed a cosmetology license that would require 2,000 hours of schooling (which was unlikely to cover hair braiding) and cost roughly $16,000 in tuition.[13] The federal judge sided with Ms. Clayton, finding that Utah's cosmetology licensing requirement was "irrational and a violation of her constitutionally protected rights."[14]

In 2018, the *New York Times* pointed a spotlight on the high debt incurred by cosmetology students due to high licensing hours requirements in some states.[15] The article noted that many of these programs required students to pay tuition for their hours working in salons—often in excess of 2,000 hours—while at the same time generating revenue from paying customers. In a memorable example in the *Times* report: Iowa, at the time, required 2,100 hours to become a cosmetologist—more than a full year of 40-hour workweeks. In contrast, emergency medical technicians in Iowa required just 132 hours.[16] Hours are set by state boards that often include cosmetology educators and school owners[17] who may have an interest in requiring high minimum hours.

Added to the public scrutiny and generating some tension between state and federal policy, has been interest from the federal government in holding low-performing institutions accountable for student outcomes. If upheld in the current administration, new Gainful Employment regulations will likely result in a high proportion of cosmetology programs losing access to federal student aid, based on the high debt and low earnings of graduates.[18] And the Biden Administration's Department of Education granted debt relief to 28,000 cosmetology

[13] See for example, New York Times and National Public Radio. The case was *Clayton v. Steinagel*, 885 F. Supp. 2d 1212 (D. Utah 2012).
[14] *Clayton*, 855 F. Supp. 2d at 1215-1216.
[15] Kolodner & Butrymowicz (2018).
[16] https://www.nytimes.com/2018/12/26/business/cosmetology-school-debt-iowa.html.
[17] Iowa's Barber and Cosmetology Board includes both and educator and an owner. https://talentbank.iowa.gov/board-detail/f485702c-2ae7-48b1-9d27-22a2ccd43cd9
[18] https://apnews.com/article/private-college-debt-gainful-employment-1aa8f695f75d20f2cc6a5d18654808f6

students at Marinello Beauty Schools on the grounds that, among other things, the schools "failed to train students in key elements of a cosmetology program, such as how to cut hair."[19]

In this paper, we corroborate some of the patterns in licensing hours reported in the media and explore changes that have been made by state cosmetology boards to licensing hours requirements in the last decade. We assess the causal impacts of these changes on institutions and students. Our study is among the first to assess the impact of licensing hours on tuition, enrollment, and student debt and one of only a handful to consider cosmetology licensing, specifically. Our study adds to the literature on licensing and the value and cost of postsecondary credentials, drawing on unique data on cosmetology licensing requirements across the nation. It also generates new evidence to inform ongoing policy debates on accountability in higher education.

3. Data

We combine state-level cosmetology licensing data with data from the College Scorecard, the Integrated Postsecondary Education Data System (IPEDS), National Conference of State Legislatures (NCSL), and the American Community Survey (ACS).

To identify states that changed licensing hours, we collected our own state licensing data from state legislatures and cosmetology board websites. We reviewed web-based resources for all 50 states and the District of Columbia to identify changes in required hours for cosmetology licensing between 2010 and 2020. We cross-checked our data with point-in-time reports of licensing hours in a report published by the Federal Trade Commission and on third-party websites.[20]

Nine states lowered the required hours for cosmetology licenses in the time period we observe: Utah in March of 2013, Wisconsin in April of 2014, Montana and Nevada in 2015, Colorado and Kentucky in 2017, Idaho and Nebraska in 2018, and South Dakota in 2019.[21] However, to ensure sufficient post-treatment years to measure our outcomes and avoid

[19] https://www.ed.gov/news/press-releases/education-department-approves-238-million-group-discharge-28000-marinello-schools-beauty-borrowers-based-borrower-defense-findings

[20] https://www.ftc.gov/system/files/documents/public_comments/2017/07/00020-141087.pdf and BeautySchool.org.

[21] We plan to add Idaho, Nebraska, and South Dakota in future analyses when more post-years are available.

capturing changes related to the COVID-19 pandemic, we focus our difference-in-difference analyses to policy changes before 2018 and measure outcomes until 2019. A limitation of our approach is that the six remaining states are all western or midwestern, so our results may not generalize to other states or parts of the country. In a robustness check, we construct a synthetic control group to more closely match our treatment states on observable dimensions, relative to the full sample of untreated U.S. states.

Table 1 describes the timing, nature, and magnitude of each change. The six states reduced their mandated hours by between 200 (Nevada) and 500 (Montana) hours, with the modal change from 1800 to 1500 hours. Our treatment states have slightly lower tuition and fewer completions than other states, as shown in Appendix Table A2. We have no reason to believe that licensing changes occurred for other occupations simultaneously, as cosmetology is typically governed by its own state board composed of industry stakeholders. Nonetheless, we test for this possibility by running a placebo test for massage therapy programs in Section 8.

For our descriptive analysis, we supplement our state cosmetology data with more general data on state licensing requirements from the National Conference of State Legislatures (NCSL). NCSL collects data on 30 occupations that are commonly licensed in the United States and require less than a bachelor's degree.[22] The data include whether or not each state (and the District of Columbia) requires a license, an exam, minimum training hours, and/or other requirements, as of 2020.

Data on tuition, enrollment, and certificate completion comes from the IPEDS. Wherever possible we use program-level data at the 4-digit Classification of Instructional Program (CIP) code-level for code 1204 for "cosmetology and related personal grooming services."[23] Completions and tuition and fees are listed at the program level. Tuition is measured as sticker price tuition and fees for the complete program, including all training

[22] In our analysis, we drop 3 occupations: private detectives, insurance sales agents, and security guards, because they have low hours requirements (on average less than 50) and many additional requirements. Interviews with NCSL staff at the time of our data access, suggested that the 30 occupations were a convenience sample based on sub-baccalaureate occupations with readily available data. Since then, the sample has been collected more systematically (sub-baccalaureate occupations with licenses in a majority of states and with projected non-zero growth), as described in the documentation for the National Occupational Licensing Database.

[23] In some cases, we aggregate up from 6-digit CIP codes to 4-digit, weighting by the number of students in each 6-digit program.

hours. Our measure of completion (or awards) is based on the number of students completing the relevant program in the academic year. Descriptive statistics for the IPEDS data are reported in Table 2. There are between 1,300 and 1,600 cosmetology programs in our data in any given year from 2011-2019. Median tuition was around $15,000 per year in 2019 with a median of 14 awards given per program, down from 31 in 2011.

Program-level data is not available for enrollment, so we identify "cosmetology schools" based on any institution with cosmetology (code 1204) as its largest degree program, by enrollment.[24] The majority of these institutions' names include the word "cosmetology," "beauty," or "salon," indicating that students at these institutions were most likely cosmetology students and therefore impacted by the changes in licensing hours. We use IPEDS full-year enrollment counts, as cosmetology programs often begin off-cycle, in the spring or summer.[25]

To measure student debt, we turn to the College Scorecard data. We append ten rounds of the institution-level data, keeping only institutions with CIP code 1204 listed as their largest program.[26] As in the IPEDS, this restriction creates an unbalanced panel of about 1,900 institutions, and we observe each institution for seven years on average. Our measure of debt—median original amount of the loan principal upon entering repayment—is pooled across two cohorts and is missing for many small institutions. The pooled nature of the Scorecard data makes the analysis and the assignment of "pre" and "post" years challenging, but since most of these programs are only about one year long, we assume that any cohort that completes a program in a calendar year post policy change would be held to the new, lower hour requirements. We adjust debt values for inflation to bring all values to 2010 dollars.[27] We note that only programs participating in federal student aid programs are counted in IPEDS and the Scorecard[28] and only federal student debt is included in our debt measure, so our analysis

[24] Results are unchanged when we use only the first year of data to identify the largest degree program.
[25] Academic years run from July to June in the IPEDS, so our full-year count for 2018-19 is based on enrollments throughout the year running from July 2018-June 2019. We refer to this year as the later year (2019) in our analyses and discussion.
[26] Program-level scorecard data is not available until the 14/15-15/16 pooled cohort. We keep the same institutions using largest program defined by enrollment in IPEDS.
[27] For each of the rounds of Scorecard data, we take the CPI value from the second year to make this adjustment. For example, for the 2010/11 round, we use 2011 CPIs to make the inflation adjustment.
[28] See Cellini and Goldin (2014) for counts of cosmetology programs not participating in Title IV programs.

represents a lower bound if students take on private debt to cover college expenses. Table 3 reports descriptive statistics for our institution-level College Scorecard data. The vast majority (more than 95%) of our sample are for-profit institutions. By 2019, about 9% of cosmetology schools are in treated states and years in the Scorecard data.

To measure the earnings of cosmetologists, we draw on data from the Census Bureau's American Community Survey (ACS) by occupation and state.[29] We identify cosmetologists using the NAICS code (81211) that most closely matches the 4-digit CIP code for cosmetology (1204).[30] We use hourly wages to capture changes in the cosmetology labor market, as it most accurately reflects cosmetologists' productivity and/or quality, distinct from hours worked.[31] We have about 14 years of ACS wage data, averaging about 6 years in the pre-policy period and 8 years post. In our exploration of mechanisms, we further examine changes in employment and self-employment using ACS data.

4. Methods

To assess the causal impact of changes in state licensure requirements for cosmetologists, we estimate difference-in-difference design with an event study framework following Callaway and Sant'Anna (2021) to address the staggered timing of changes in licensing hours.

The event study specification is as follows:

$$y_{pstj} = \alpha + \sum_{j=-5}^{-1} \gamma_j D_{st} \boldsymbol{I}(j = t - T^*) + \sum_{j=0}^{5} \beta_j D_{st} \boldsymbol{I}(j = t - T^*) + \mu_p + \sigma_t + e_{pstj}$$

where y_{pstj} represents the outcome of interest, such as tuition, enrollment, completion, debt, and wages. We estimate effects on completions and enrollment in levels as well as natural logs to adjust for skewness due to a large number of very small cosmetology programs.[32] Subscripts

[29] The College Scorecard has data on earnings, but it is missing for a large number of institutions and--due to the time lag in measurement--we can only observe changes for the earliest state (Utah), so we rely on the ACS for earnings data instead, but show results for the Scorecard in Appendix Figure 1 as a robustness check.

[30] In an effort to better identify early-career cosmetologists, we limited the sample to cosmetologists age 30 and under. Results were nearly identical (available on request).

[31] We find no effect on hours worked (see Appendix Figure A5).

[32] The median program has 14 graduates and the 95th percentile program has 95. There is less variation in costs across programs. Models based on the natural log of tuition, debt, wages, and cost of books/supplies, and for each of our heterogeneity analyses yielded similar results to those for levels. We omit them for brevity (available on request).

p, *s*, and *t*, represent programs, states, and calendar year, respectively. The binary treatment variable, D_{st}, equals one if the state has introduced licensing reforms and zero otherwise. The index, *j*, indicates time elapsed since the policy change. $\boldsymbol{I}(j = t - T^*)$ represents event-year dummies that represent the years before and after each individual state implemented its reform. Our coefficients of interest, β_j, represent the impact of changes in licensure hour requirements in each post-change year on the outcomes, allowing for heterogeneous effects over time. The parameters, γ_j, indicate pre-treatment effects, allowing for tests of parallel pre-trends. We also include program-by-institution fixed effects (μ_p) to control for time-invariant heterogeneity across programs, and year fixed effects (σ_t) to control for common changes over time. In our analyses of institution-level IPEDS and Scorecard data (for enrollment and debt, respectively), we replace program fixed effects with institution fixed effects.

Our approach addresses concerns that the staggered timing of state licensing changes may cause treatment effects to vary over time and across states in standard difference-in-differences designs. In the standard approach, when already-treated states act as controls in some two-by-two comparisons and as treated in others, the reclassification biases the aggregation of average treatment effects on the treated (ATTs), and some of the ATTs may have negative weights.

We use Callaway and Sant'Anna's approach (2021) to mitigate problems of heterogeneous treatment effects and dynamic effects under staggered timing. The Callaway and Sant'Anna method calculates ATT effects for all possible two-by-two difference-in-difference comparisons between groups of units treated at different points in time. The individual ATTs are estimated by sub-setting the data to only contain observations belonging to either the never-treated group or a given treatment cohort at a given time. It then uses a standard two-way fixed effects design to recover the ATT for that given treatment cohort and time period. These ATTs can be aggregated into further parameters of interest, such as by time period, treatment group, or an overall ATT. We aggregate the ATTs by year relative to the licensing hour reduction to approximate an event study design, using the doubly-robust inverse probability weights based on Sant'Anna and Zhao (2020).[33]

[33] This weighting allows the most robust outcomes to any misspecifications (Sant'Anna and Zhao 2020).

The identifying assumption necessary to support our difference in difference design is that, absent the changes to licensing hour requirements, program enrollment, completion, debt levels, and tuition would have followed the same trajectory for programs in states that changed requirements and in states that did not. To test the plausibility of this assumption we test for parallel pre-trends for states with and without changes, based on parameters, γ_j, using our event study approach. While we cannot test directly whether other policy changes affecting outcomes may have taken place in the same year, we have no reason to believe that the timing of changes to licensing hours would be correlated with changes to other state or federal higher education policies more generally, as licensing boards are separate from higher education systems and cosmetology is just one of many hundreds of higher education programs in any given state. It is, however, possible that these states had high-profile legal battles (such as described above in Utah) or faced other types of scrutiny in the lead-up to the policy change. If these changes were anticipated by students or institutions, we would likely see differential pre-trends in the years leading up to the policy change and we would expect our estimates to be attenuated. We investigate pre-trends and other identifying assumptions further below.

To test whether changes in licensing hours translate to changes in program hours in the first stage, we run our model in equation (1) with program hours from the IPEDS data as the outcome. The results of this analysis are presented in Figure 1. Pre-trends are not significantly different from zero and all are close to zero in magnitude. In the post-policy period, the decline in program hours is evident in nearly all post-reform years, averaging about a 100-hour decline by year five.[34]

We conduct a number of robustness and placebo tests. Most importantly, to address concerns that our six mid-western treatment states may not be representative of the broader country, we implement a synthetic control group design following Arkhangelsky et al. (2022). This approach generates a data-driven combination of comparison states as controls that more closely match our treatment group than the full set of un-treated states, but we lose power due to aggregation of data to the state level. We also conduct a placebo test based on massage

[34] Some programs that exceed the minimum training hours and may choose not to make changes to hours (Kolodner & Butrymowicz 2018), and some shorter programs may be included in our data that do not lead to cosmetology licenses and may not reduce hours (e.g., aesthetician programs).

therapy programs that should not have been affected by the policy changes. The results of our robustness and placebo tests are reported in Section 8.

5. Descriptive Analyses

To understand how cosmetology compares to other fields of study, our previous work documents that among 27 sub-baccalaureate fields requiring occupational licensing in the U.S. as of 2020, cosmetology had the highest mean and median hours at 1,550 and 1,500, respectively (Acevedo, Blanchard, and Cellini 2022, Table 1, reproduced in Appendix Table 1A). Across states, the minimum number of hours required for a cosmetology license is 500 and the maximum is 2,100. All states and the District of Columbia have minimum required hours. Cosmetology contrasts with other occupations that show more variation in the number of states that require licensing and in training hours. For example, 32 states require licenses for electricians with just 7 of them requiring minimum training hours. Plumbers have high mean hours at 1,541 and a maximum of 8,048, but median hours are zero, since more than half of the states that require licensing for these occupations require no training hours.

Following our previous descriptive work, we consider the correlation between required training hours and student outcomes for cosmetology programs in Figures 2 and 3. Figure 2 shows the correlation between mean licensing hours for cosmetology and median debt at the state level. The figure shows a strong upward sloping relationship. Higher licensing hours in a state are associated with higher median debt, with a correlation coefficient of 0.5118.[35] On the low end of licensing hours and debt are Massachusetts and New York, while Oregon, Nebraska, and Iowa are among the states with the highest hours and debt. In Figure 3, we examine whether the higher debt associated with cosmetology licensing hours might generate higher wages, using ACS data by state. Licensing hours do not appear to be correlated with wages. The line of best fit between hours and wages is flat—around just $20 per hour—with a correlation coefficient close to zero, just -0.0047. While we caution that these estimates are not causal, the pattern suggests that high licensing hours requirements in this field may raise debt without

[35] Debt results are nearly identical when using median debt, rather than mean. Available on request.

generating additional productivity gains. We explore whether the relationship between licensing hours and debt and wages are causal in our differences-in-differences analyses.

6. Results

To explore the causal impact of licensing hours on outcomes we draw on reductions to licensing hours within states and over time, as estimated by equation (1) and described in Section 4.

We display the results of the event study analysis on the total number of program completions in Figure 4A. Importantly, there appear to be no significant differences between treated state-years and controls in the six years pre-period and estimates are all very close to zero. In the post-policy period, we see an increase in awards, as predicted. Point estimates are positive and significant, rising to about 30 to 50 more awards granted per-program in states with lower hours in years five and six. The year-five increase represents a doubling of awards over the 2010 control group mean of 30. We show results for the natural log of completions in Figure 4B. Results are similar, showing effect sizes above 50 log points (or 65 percent) for years 3 through 6 after the change.

The impact of reduced licensing hours on required tuition and fees is shown in Figure 5. Here, we again see pre-trends that are very close to zero, with just one significant difference in year j=-2. We see significant changes in tuition three and four years after states lowered required training hours. Point estimates suggest a decline of about $1,000 in year four—or about a 14% decrease relative to the 2010 mean of $7,176. Point estimates remain similar in year five, but less precise as our sample shrinks. Lower tuition likely reflects the lower hours needed for completion in the post-policy period. By year six, although imprecise, the point estimate returns to positive, suggesting that tuition changes may be temporary, as institutions adjust their pricing over the longer run.

We also consider student enrollment as an outcome, using the IPEDS institution-level data, rather than program-level, in Figure 6. Our results are noisier, perhaps in part due to the lack of precision in the data and we find noisy zero estimates on total enrollment in Panel A. The results of the natural log of enrollment are stronger in Panel B, showing an upward trend in

log enrollment, of roughly 0.2 to 0.5 log points (or 22 to 65%) in years 3-5. This difference may be attributed to extreme heterogeneity in institution size with larger institutions expanding enrollment more. We explore enrollment heterogeneity by institution size and student demographics in Section 7 below.

We next use the College Scorecard institution-level data to explore the effect of reductions in licensing hours on debt. In Figure 7 we run the specification in equation (1) on institution-level data for schools with cosmetology as their largest program. First, we observe a positive pre-trend in year *j*=-4 prior to the policy change for the treated states, suggesting that debt was higher in states that changed. The post-policy period shows no significant effects and standard errors are large, although point estimates are consistently negative, suggesting reductions in debt of around $300-500 in years 1-4 post-policy. Although inconclusive, the direction of the estimates is consistent with expectations based on our other findings: with tuition and hours of training declining, students should need to take on less debt.

We turn to the ACS data to study effects of the reduction in licensing hours on cosmetologists' wages in Figure 8. In the post-reform period, we see little impact on wages. The coefficients for years 3 and 5 post-policy reveal small but significant increases, yet the year 6 coefficient indicates a small negative effect. We view these results as evidence that wages do not substantially decrease, as might be expected from the cut in licensing hours. If the productivity or quality of cosmetologists were declining with more lax standards, we would expect to see large negative impacts. The increased supply of cosmetologists as program completions rise would also put downward pressure on wages, but we find no evidence that this is the case—at least in the first 5 years after the policy change, perhaps because the flow of new cosmetologists is small relative to the existing stock of cosmetologists in a state. For example, data from Wisconsin shows that there are currently 24,340 cosmetologists with active licenses in that state alone.[36]

We prefer our event study analyses, but we report average effects pooled across all post-policy years for each of our primary outcomes in Table 4. Only the effects on completions remain significant at conventional levels when considering average effects. Tuition and fees and

[36] Wisconsin License Counts, accessed June 4, 2025. https://dsps.wi.gov/Credentialing/General/LicenseCounts.pdf

debt are both negative, as expected, and remarkably similar in magnitude, despite large standard errors. We explore our results further with several robustness checks in Section 8.

7. Heterogeneity Analyses

Our data allow for some disaggregation by institution and student characteristics to assess heterogeneous impacts. We first consider differences by institution size. Figure 9 shows results for completions among the set of larger and smaller cosmetology schools defined by above- or below-median enrollment in a given state and year. In panel A, larger institutions appear to drive the positive impacts on awards we see in the full sample. Smaller institutions see smaller increases, as might be expected, as completions are measured in levels, but logged completions show the same pattern.

In Figure 10, we assess differences in the tuition adjustment for large and small institutions and our results flip: institutions above median size have only very limited declines in tuition and fees, while smaller institutions show steeper drops, potentially driving the impacts in the full sample. Small institutions show reductions of about $3,000 in tuition five years after the policy change (about a 25% reduction relative to the 2010 mean). Taken together, our results by institution size suggest that larger institutions—with higher awards and fewer tuition cuts—may be more likely to adjust or behave strategically to mitigate revenue losses (e.g., by increasing price per credit hour to keep tuition steady), relative to smaller institutions. Figure 11 shows a similar pattern for the cost of supplies: larger institutions increase the cost of supplies, while smaller institutions tend to reduce it.

Turning to student demographics, the IPEDS data allows us to look at enrollment by race and ethnicity, as well as by gender. While the impact of licensure reductions on total enrollment was null in Figure 6, in Figure 12 we observe some changes in enrollment for students from traditionally marginalized groups. In Panel A of Figure 12, the coefficients on enrollment of Black students are fairly large and positive, although imprecise, two and three years after the policy change. In Panel B, enrollment among Hispanic and Latino students shows sizable significant positive impacts. Our estimates suggest that licensing hour reductions increase the enrollment of Hispanic and Latino students by up to 40 students per institution in

year five. Results for female enrollment (shown in Appendix Figure A1) are nearly identical to results for the full sample, showing no discernable effects of the change. The similarity is expected since women comprise about 90% of enrollment in cosmetology programs.[37]

8. Robustness Checks & Placebo Tests

We run several robustness checks on our main results. First, we implement a synthetic control design to corroborate the results of our difference in difference strategy, using the Arkhangelsky et al. (2022) estimator. The approach is useful given the relatively low number of treated states and their geographical concentration in the Midwest. The results of the synthetic control model are presented in Table 5. We find that the main patterns hold – completions increase, but there is no statistically significant effect on tuition. However, when we differentiate our analysis based on above- or below- median institution size, we find the same pattern as in the difference-in-differences approach: large institutions keep tuition stable, while smaller ones decline.

To further explore the impacts of licensing hours on tuition and institutional behavior, we ask whether the cost of supplies might be impacted by licensing changes. If supplies must be purchased for each semester or get used up (e.g., shampoo, hair color) then students should have lower supply costs as licensing hours decline. On the other hand, institutions may increase the costs of supplies (e.g., scissors, books) to compensate for lost tuition revenue. In Figure 13, we observe a small reduction in the cost of supplies in year 1 and 3 post-policy and a larger drop in year 6. It is possible that the drop in year 6 mediates the impact of the rising tuition we observe in the same year. In general, the pattern aligns with the tuition results in showing lower costs for students in the years immediately following the reduction in hours. In our synthetic control approach in Table 5, we see no significant changes to costs of supplies for large or small institutions.

Next, we return to our preferred event study difference-in-difference design and assess whether licensing changes shifted the composition of programs in our data, which would indicate changes to the market and could potentially drive our outcomes. We proxy for

[37] Fast, Granville, and Moultrie (2022).

program entry and exit based their appearance in the IPEDS program-level data. If a program appears in year *t*, but not in *t-1* or *t+1*, we code it as entering or exiting, respectively.[38] As shown in Appendix Figure A2, we observe no significant impacts on entry or exit in any year. Not only is composition not driving our results, but the licensing changes do not appear to have significant impacts on the openings and closings of cosmetology programs generally.

Another way we control for the composition of institutions and programs is by running our analysis on the sample of schools in which cosmetology was the largest program at the start of the sample period. Although this does not create a fully balanced panel due to data limitations, it does allow us to focus on changes in hours to existing cosmetology schools. Appendix figures A6 and A7 show that our results largely remain consistent when studying this sample.

Next, we limit the sample to the longest cosmetology programs (over one year long) that should be most affected by the change in hours. Results are qualitatively similar, but less precise with the smaller sample. We also limit our sample to for-profit institutions (which constitute more than 95% of our Scorecard sample, as shown in Table 2) and we find nearly identical results. We also run all models on the natural log of each outcome and find similar results.[39]

To assess the robustness of the lack of wage effects in our main estimates, we draw on College Scorecard earnings data and consider other available data in the ACS. We first run our difference-in-difference specification on the College Scorecard earnings data in Appendix Figure A3. The Scorecard includes data on graduates' earnings six years after beginning their cosmetology program, but only for combined two-year cohorts. Due to these limitations, we can only observe post-treatment years for the state with the earliest reductions in licensing hours—Utah in 2013. We find roughly parallel pre-trends and a statistically significant positive impact on earnings in the first year after implementation. Although this estimate is specific to

[38] Our definition cannot distinguish between programs that open or close vs. those that may gain or lose access to federal student aid programs under Title IV (and therefore do not need to report to IPEDS) for various reasons. We run a standard two-way fixed effects model (TWFE), rather than our preferred Callaway and SantAnna approach for entry and exit, as it is not possible to identify program-level ATTs when there are compositional changes. See Remark 8 in Callaway and Sant'Anna (2021).

[39] Available upon request.

this state, the results support the findings of our ACS earnings analyses: that cosmetologists' earnings did not decline and may have increased in the first few years after the policy change.

We next turn back to the ACS to consider other labor market impacts of the change in cosmetology licensing that might mask or drive changes in wages. In Appendix Figure A4, Panel A, we see no discernable pattern in employment of cosmetologists after the policy change. In Panel B, we see no impact on the percentage of cosmetologists who are self-employed. Appendix Figure A5 considers changes to the hours worked by cosmetologists. We find no impacts in years 1-4, but sizable negative and positive effects in year 5 and 6, respectively. We consider these results inconclusive. Like the College Scorecard data, the year 5 and 6 estimates in the ACS are likely driven by changes in a single state (i.e., Utah) that has sufficient post-policy data for identification.

Finally, we conduct a placebo test on massage therapy programs. Massage therapy programs tend to have similar student demographics, similar program lengths, and a similar mix of for-profit and not-for-profit institutions, yet they should not be affected by changes to cosmetology licensing hours. We draw on the program-level IPEDS data to run our test on our two main outcomes with significant effects: completions and tuition. Figure 14 shows the results of our placebo tests. The results for completions in Panel A are noisy, with one post-policy coefficient positive, but small in magnitude. Tuition and fees for massage programs in Panel B, show a tightly-estimated zero in the post-period, making us more confident that the changes we observe for cosmetology programs are indeed effects of the policy change.

9. Discussion & Conclusion

This paper explores the role of minimum training hours requirements for cosmetology licensure on students and institutions. We implement a difference-in-differences design based on six states that lowered the number of hours required for licensing between 2011 and 2017.

Our difference-in-difference analysis reveals striking patterns and suggests that lowering required training hours requirements has significant benefits for students. Lowering hours results in more program completions, likely due to the lower time cost of certificate completion. We also find that cutting licensing hours lowers tuition, so students also benefit

from a reduction in out-of-pocket monetary costs—at least in small institutions. Large institutions may behave strategically to increase the per-credit price to mitigate revenue losses, as total tuition remains relatively stable.

Our results on enrollment are suggestive of positive effects and we see large positive enrollment effects for Hispanic/Latino students, in particular. While more research is needed to understand reasons for this pattern, it may be that Latino students are more sensitive to the lower time cost of education, as ethnographic research has documented that Latina students are sensitive to family obligations in the college choice process (Dache-Gerbino, Kiyama, and Sapp 2018). Moreover, Hispanic/Latino students may be disproportionately recruited into vocational proprietary institutions (Dache-Gerbino, Kiyama, and Sapp 2018) and targeted by advertising (Cellini and Chaudhary 2022), which may make the hours changes more salient for this group.

Our results on student debt and wages are noisy. However, we find suggestive evidence that student debt declines, with average treatment effects similar in magnitude to the declines in tuition. We would expect that the reduction in licensing hours would cause wages of cosmetologists to decline as more workers enter the market. Moreover, if additional training hours improve the quality or productivity of cosmetologists, then cuts to training hours should lower productivity or quality. In the first five years after the change, we observe no reduction in hourly wages for cosmetologists, and perhaps an increase. We find a small negative effect in year 6, which may be driven by one state. We find no evidence that hours worked, employment, or self-employment are impacted. Better data is needed to more accurately assess the impacts of licensing-hour changes on these outcomes.

It is not clear how institutions fare with the change in hours. Institutions reduce their tuition for cosmetology programs in the short run and do not appear to compensate for those reductions by increasing the costs of books and supplies. However, we find some evidence that reductions dissipate in the longer run. Larger institutions generate more completions than smaller institutions, while holding tuition relatively stable. Smaller institutions lower tuition more while seeing less growth in completion. More research needs to be done to fully

understand impacts on institutional revenue, but our analysis suggests that large institutions experience less harm from licensing reductions, relative to small schools.

More research is needed to understand longer-run impacts of licensing hour reductions in cosmetology. It is possible that reductions in licensing hours could reduce salon safety. Still, we note that even with the reductions in required training hours that we document, the hours required to become a licensed cosmetologist remain higher than many fields for which safety may be a bigger concern, such as emergency medical technicians and electricians. Data limitations kept us from assessing the causal impacts on safety, but we suggest this as a fruitful avenue for future research. More research is needed to explore the causal relationship between licensing hours and student outcomes in other fields, states, and time periods.

We recommend that policymakers concerned about student outcomes in higher education carefully consider the role of state-mandated training hour requirements in cosmetology. We find clear evidence that students benefit from lower hours requirements. These benefits may ultimately generate welfare gains if earnings stay stable in the long run and safety is not compromised. By lowering the time and monetary cost of certification and bringing down student debt without generating declines in wages, cuts to required hours may also help cosmetology programs pass new accountability metrics based on debt-to-earnings ratios of graduates. If increasing credential completion and lowering tuition are goals of state and federal policymakers, then trimming cosmetology licensing hours appears to be a promising strategy.

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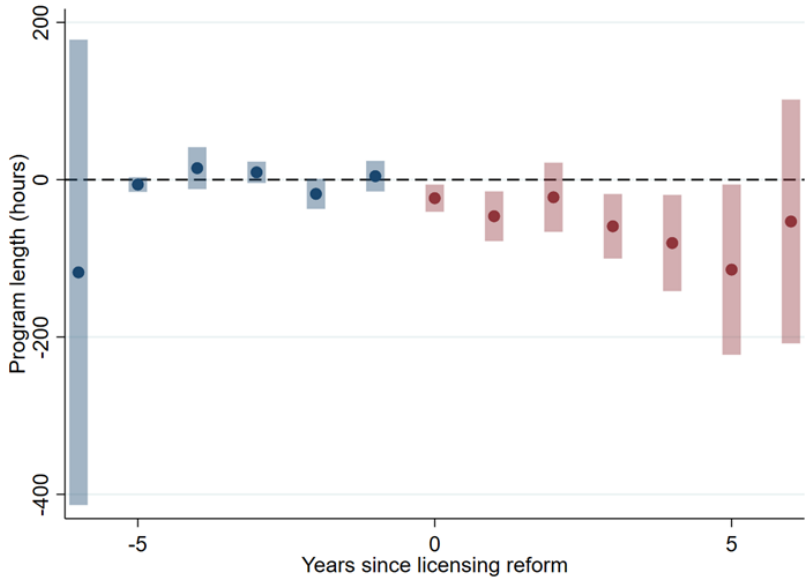
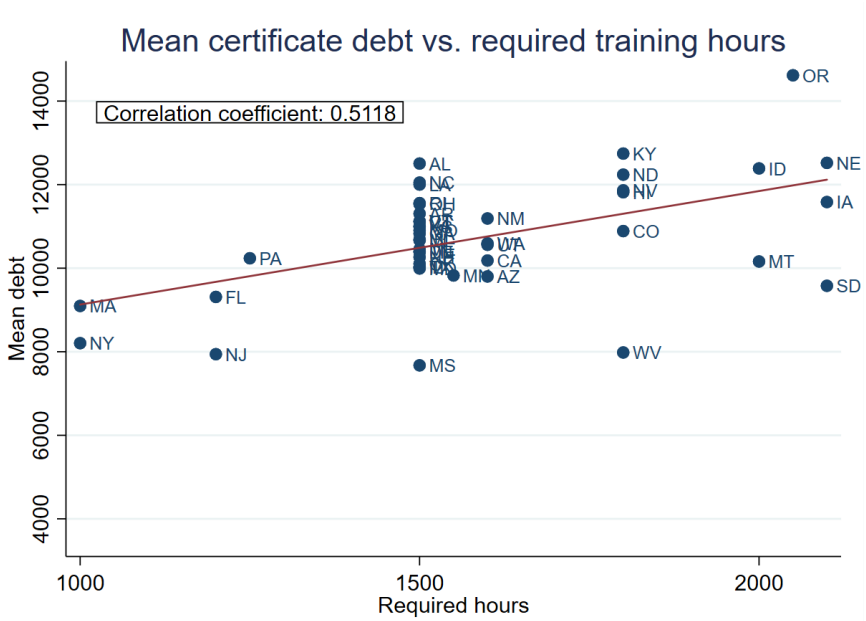
Figures & Tables

Figure 1. Impact of Reduction of Licensing Hours on Program Length (in hours)



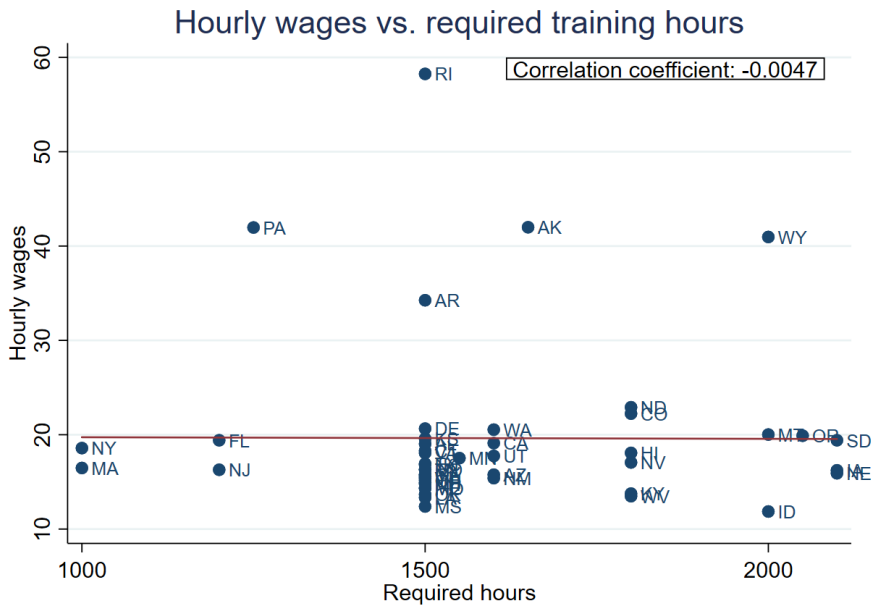
Notes: IPEDS program-level data 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 2. State-Level Correlation Between Licensing Hours and Mean Debt, Cosmetology Certificate Programs, 2019



Notes: State-level data from the NCSL merged with IPEDS debt data. See Cellini, Acevedo, Blanchard (2022).

Figure 3. State-Level Correlation Between Licensing Hours and Hourly Wages, Cosmetology Certificate Programs, 2019

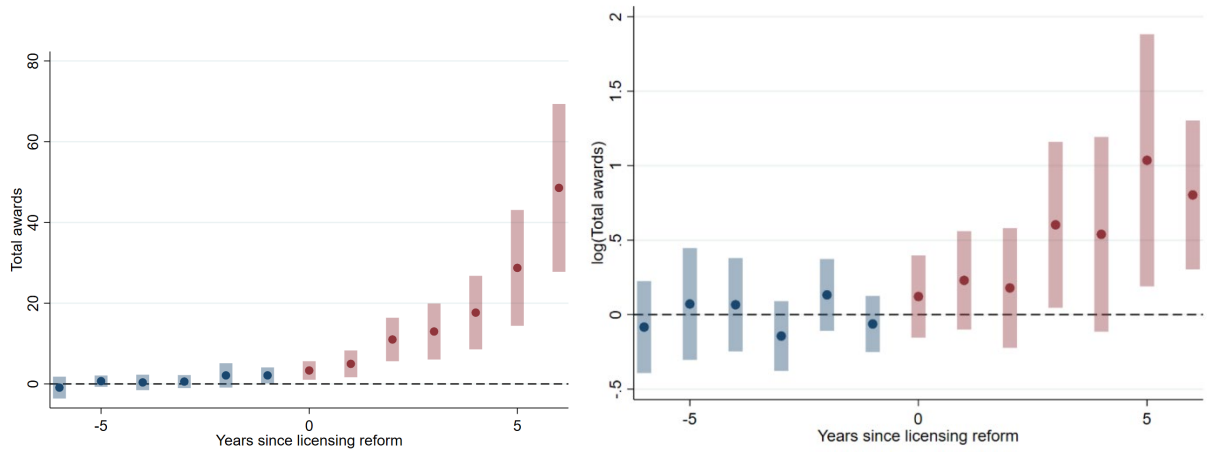


Notes: State-level data from the NCSL merged with ACS wage data. See Cellini, Acevedo, Blanchard (2022).

Figure 4. Difference-in-difference Estimates of the Effect of Reductions in Licensing Hours on Cosmetology Program Completions

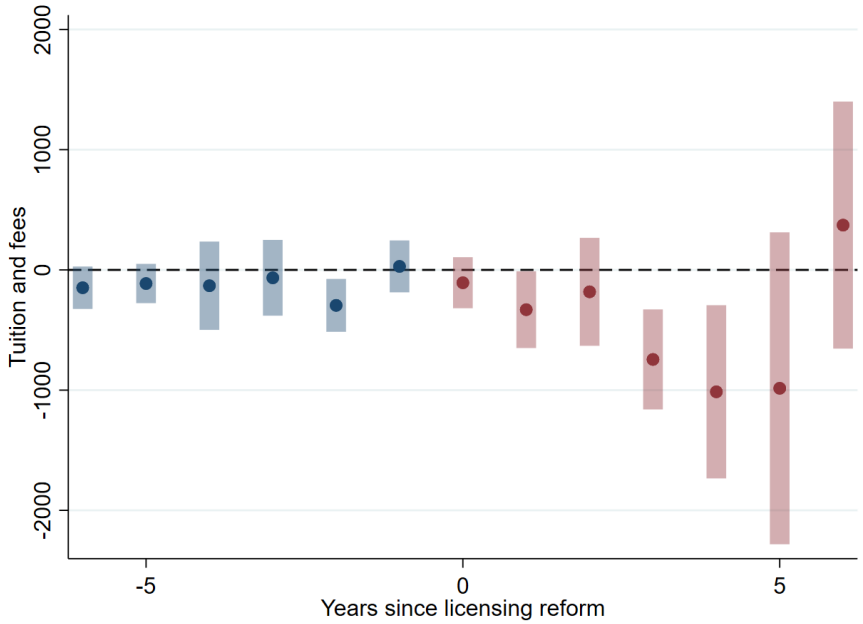
A. Total Completions

B. Log Completions



Notes: IPEDS program-level data 2010-2019 on the number of certificate or associate's degree completions (CIP code #1204) and the natural log of completions. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 5. Difference-in-Difference Estimates of the Effect of Reductions in Licensing Hours on Tuition and Fees ($)

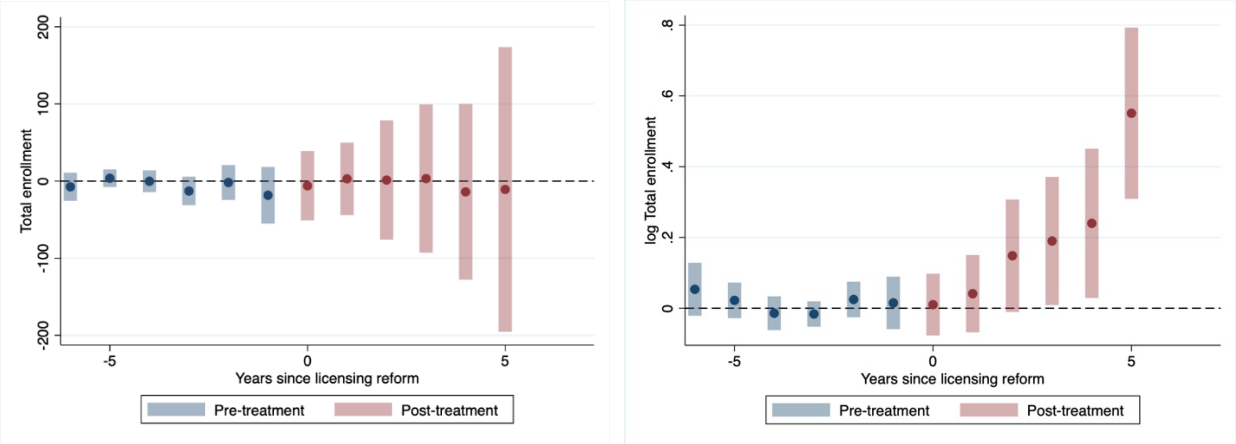


Notes: IPEDS program-level data 2010-2019 on program-level listed tuition and fees in dollars. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 6. Difference-in-Difference Estimates of the Effect of Reductions in Licensing Hours on Enrollment

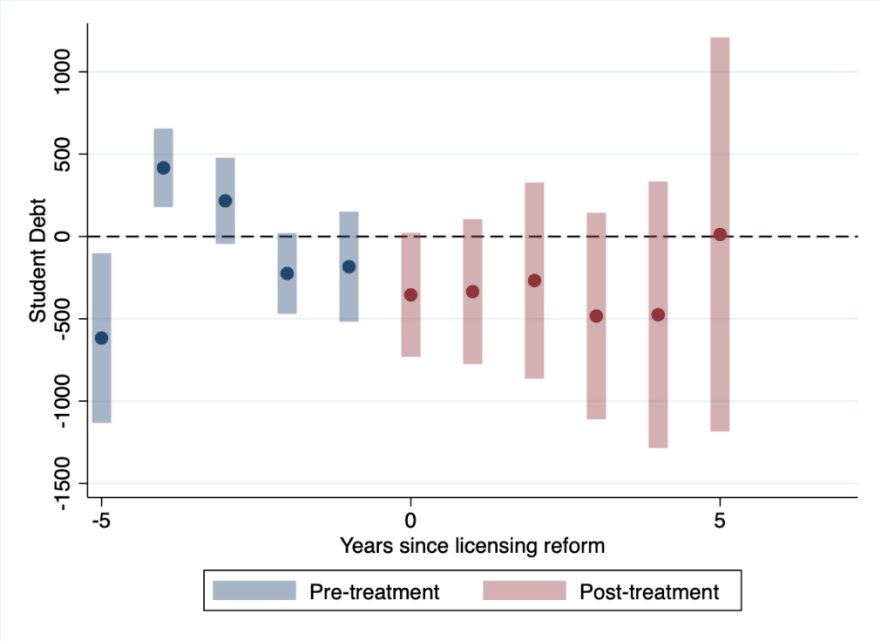
A. Total Enrollment

B. Log Enrollment



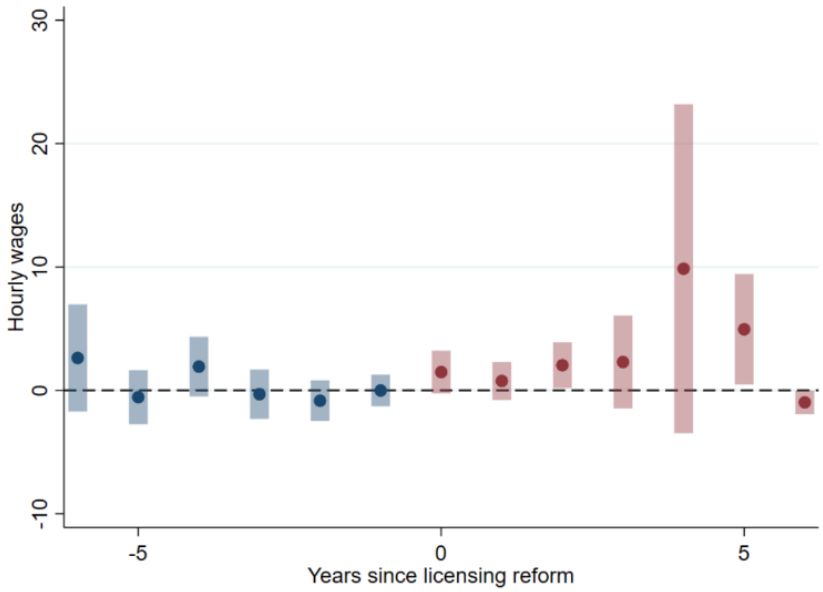
Notes: Institution-level IPEDS data, 2010-2019 on full-year enrollment and the natural log of enrollment. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 7. Difference-in-Difference Estimates of the Effect of Reductions in Licensing Hours on Student Debt ($)



Notes: College Scorecard data on median student debt at the time of exit 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

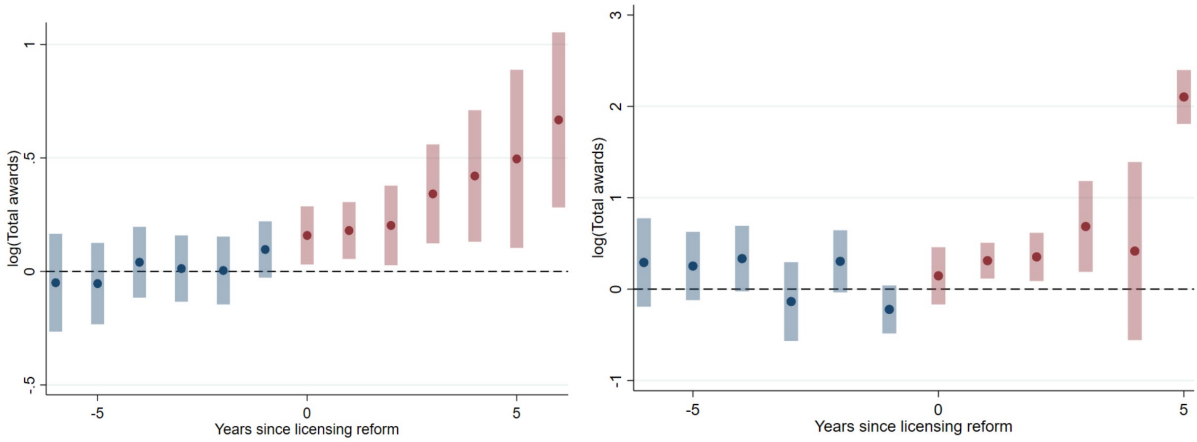
Figure 8. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on Hourly Wages of Cosmetologists ($)



Notes: American Community Survey (ACS) data hourly wages in dollars of cosmetologists (NAICS code #81211). Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 9. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on Completions, by Institution Size

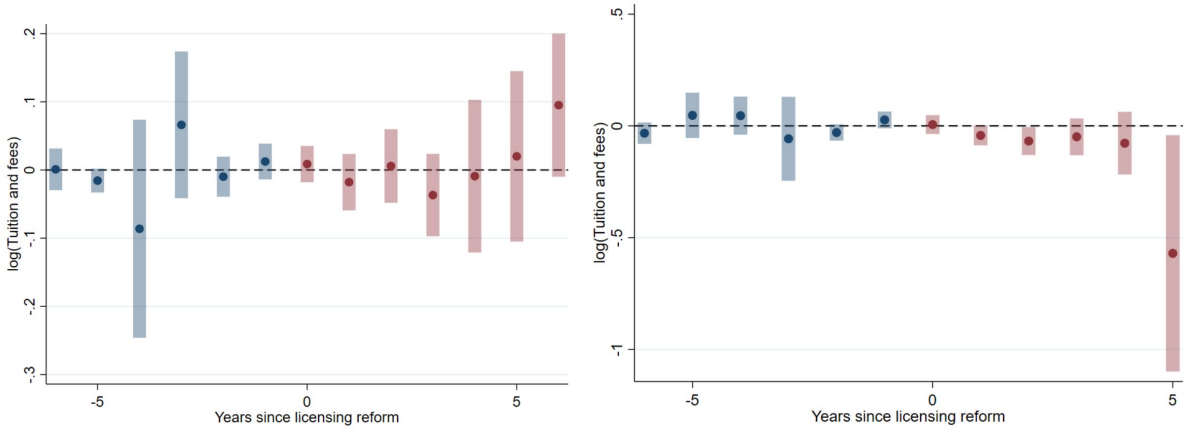
A. Above Median **B. Below Median**



Notes: IPEDS program-level data 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation. Large institutions are those with enrollment above the median of 14 students.

Figure 10. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on Tuition & Fees ($), by Institution Size

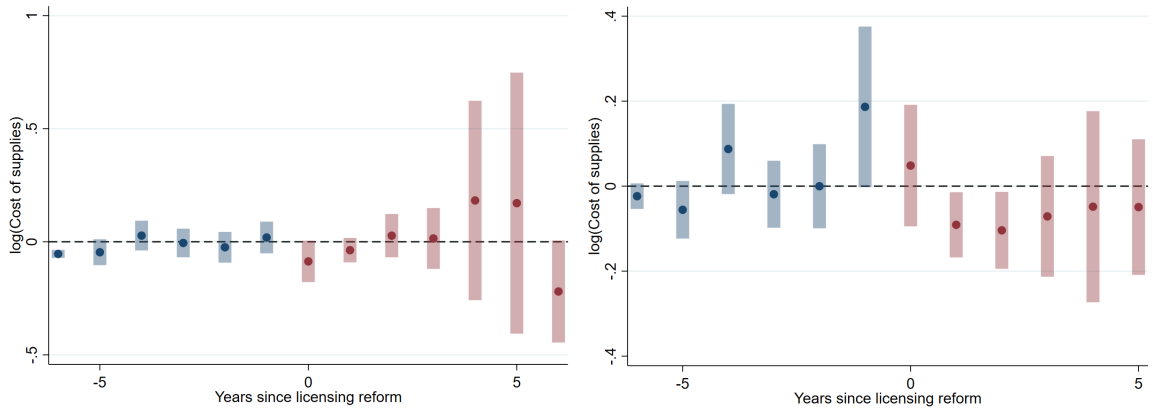
A. Above Median **B. Below Median**



Notes: IPEDS program-level data 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation. Large institutions are those with enrollment above the median of 14 students.

Figure 11. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on the Cost of Supplies ($), by Institution Size

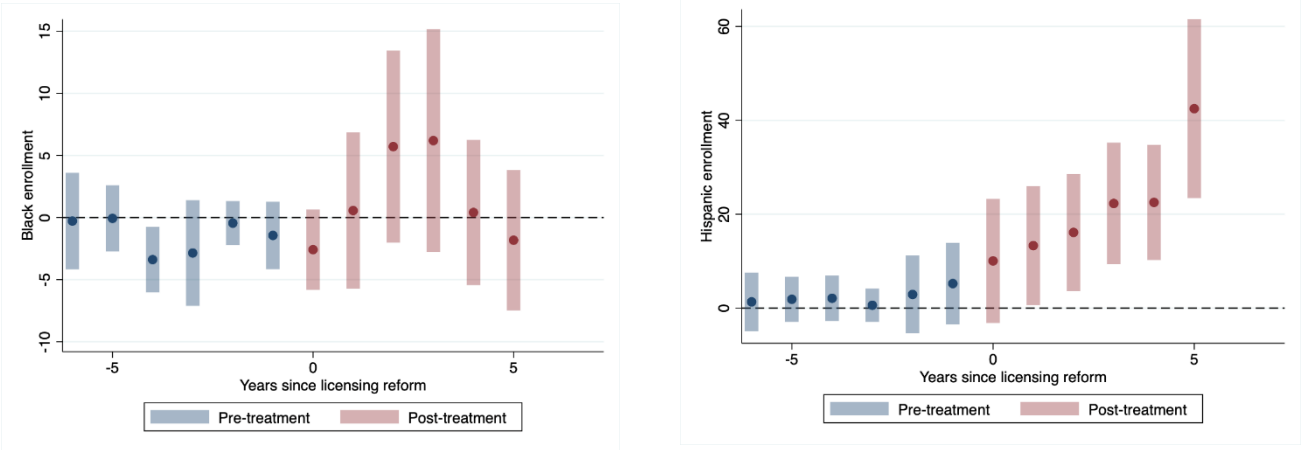
A. Above Median **B. Below Median**



Notes: IPEDS program-level data 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation. Large institutions are those with enrollment above the median of 14 students.

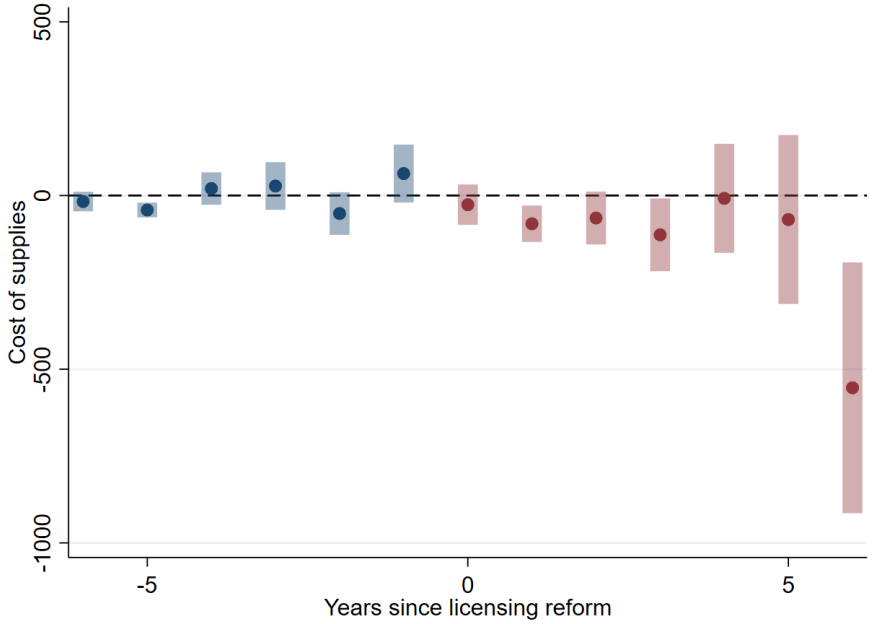
Figure 12. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on Enrollment, by Student Demographics

A. Black Students B. Hispanic/Latino Students



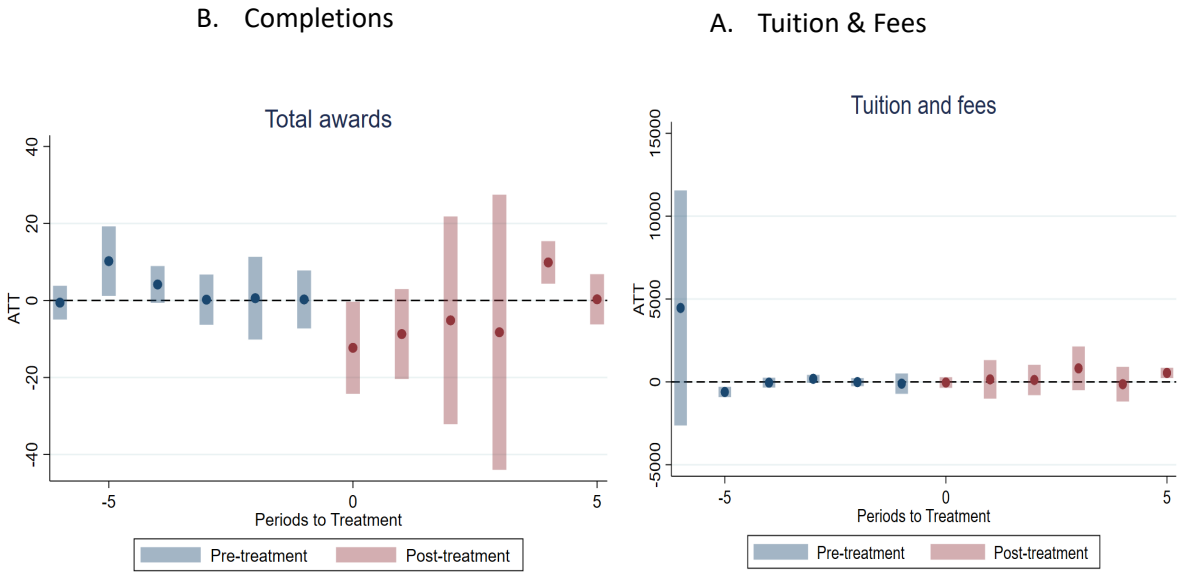
Notes: IPEDS institution-level data 2010-2019 on number of students enrolled. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 13. Difference-in-Difference Estimates of the Impact of Reductions in Licensing Hours on Cost of Supplies ($)



Notes: IPEDS program-level data 2010-2019 on the cost of books and supplies. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Figure 14. Placebo Test: Effect of Reductions in Cosmetology Licensing Hours on Massage Therapy Completions & Tuition & Fees



Notes: IPEDS program-level data 2010-2019. Estimates based on equation (1). Bars show 95% confidence intervals. Time is in years relative to the year of policy implementation.

Table 1. Cosmetology Licensing Changes, Treated States

State	Year of Change	Hours Changed	Change
Utah	2013	2000 to 1600	-400
Wisconsin	2014	1800 to 1550	-250
Montana	2015	2000 to 1500	-500
Nevada	2015	1800 to 1600	-200
Colorado	2017	1800 to 1500	-300
Kentucky	2017	1800 to 1500	-300
Idaho*	2018	2000 to 1600	-400
Nebraska*	2018	2100 to 1800	-300
South Dakota*	2019	2100 to 1500	-600

Notes: Author's data collected from state cosmetology board and legislature websites 2010-2020. See text for details. States with * are not included in our difference-in-difference design, as we do not have sufficient post-policy data.

Table 2. Descriptive Statistics, IPEDS Program-Level Data

		Tuition & Fees		Completions	
Year	Programs	Mean	Median	Mean	Median
2010	1,315	11,723	11,995	47	31
2011	1,403	12,200	12,600	49	33
2012	1,479	12,441	13,100	46	30
2013	1,511	12,703	13,498	41	29
2014	1,576	13,078	13,864	39	25
2015	1,473	13,135	13,800	34	22
2016	1,477	13,472	14,300	33	22
2017	1,501	13,847	14,475	32	21
2018	1,537	14,139	14,860	30	20
2019	1,537	14,435	15,000	26	17

Notes: Author's tabulations of program-level data for CIP code = 1204 (cosmetology).

Table 3. Descriptive Statistics, Institution-Level College Scorecard Data

Year	All	Percent For-Profit	Treated	Percent Treated
2011	1,278	98%	0	0%
2012	1,378	98%	0	0%
2013	1,465	98%	33	2%
2014	1,472	98%	61	4%
2015	1,505	98%	77	5%
2016	1,465	98%	73	5%
2017	1,296	97%	113	9%
2018	1,259	98%	110	9%
2019	1,229	97%	106	9%
2020	1,208	97%	105	9%

Notes: Author's tabulations of College Scorecard data based on largest program by enrollment in CIP code 1204 (cosmetology).

Table 4. Average Treatment Effects: Impact of Reducing Cosmetology Licensing Hours

	Completions	Log Completions	Tuition & Fees ($)	Debt ($)	Enrollment	Log Enrollment	Hourly Wages
Average Effects	7.211***	0.212**	-316.3	-334.5**	-0.605	0.055	2.024*
(St. Error)	(1.803)	(0.072)	(176.1)	(159.4)	(21.48)	(0.040)	(0.933)
N	22,295	22,295	22,295	11,114	14,288	14,288	510

Notes: Estimates are based on the average of all post-treatment years and separate regressions for each outcome, with controls as described for equation (1). Hourly wage estimates are based on aggregated ACS data, aggregated at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Synthetic Control Group Approach: Impact of Reducing Cosmetology Licensing Hours

	Completions	Log Completions	Tuition & Fees ($)	Cost of Supplies ($)
Average Effects	7.093***	0.318***	940.1	-11.2
(St. Error)	(1.774)	(0.103)	(667.9)	(153.5)
Large Institutions	13.25***	0.312***	2619.6***	325.1**
(St. Error)	(3.191)	(0.111)	(785.1)	(128.8)
Small Institutions	1.574**	0.622***	-842.6	-200.5
(St. Error)	(0.757)	(0.216)	(906.5)	(181.3)
N	450	450	450	450

Notes: IPEDS program-level data 2010-2019 aggregated at the state level. Estimates based on the Arkhangelsky et al (2022) synthetic difference in difference approach. Large institutions defined as awards above the median in a given state and year and small institutions as below the median. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.