



Licensure Tests and Teacher Supply in Connecticut

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EXECUTIVE SUMMARY

The Connecticut State Department of Education (CSDE) partnered with researchers from Boston University's Wheelock Educational Policy Center (WEPC) to examine the relationship between the state's teacher licensure policies and the composition and quality of its teacher workforce. This research project focused on understanding the association between performance on Praxis II subject-matter tests, which prospective teachers must pass in order to obtain licensure, and 1) their later effectiveness at improving student test scores, as well as 2) the overall supply of teachers into the workforce. This report summarizes key context, methods, results, and implications for consideration by policymakers. Overall, WEPC researchers found that Connecticut's current set of licensure test requirements are influential in shaping the composition of the teacher workforce. Separately but relatedly, WEPC found a weak link between licensure test performance and teacher impacts on student test score growth.

A Technical Appendix with more detailed information about this research study can be found at wheelockpolicycenter.org/all-research.

STATE AND NATIONAL RESEARCH CONTEXT

If you want to teach in a U.S. public school, chances are you will have to take and pass at least one standardized licensure exam. In fact, all 50 states require prospective teachers to pass one or more subject-matter test to obtain teaching certification, and 15 states require applicants to pass basic skills tests to gain admission into a teacher preparation program. While ubiquitous, these testing requirements are also controversial, and debates about their purpose and impact have sparked anew in recent years given growing concern about teacher shortages and the lack of diversity in the educator workforce.

Like many other states, Connecticut has been evaluating and revising its policies within this national context. In 2016, for example, Connecticut was one of the first states to do away with the requirement that prospective teachers take and pass a basic skills test (Praxis I) for entry into a teacher preparation program. Then, in 2021, amidst continued change efforts underway by CSDE, legislation in Connecticut ([SB 1202](#)) required the department of education to assess requirements governing content-area mastery and consider a multiple measures approach. Aligned with this charge, CSDE engaged with Boston University's WEPC to investigate the relationships between these licensure tests, student achievement, and, to the extent possible, the composition and quality of the teacher workforce.

This research effort builds on and extends studies conducted in several other states by examining the relationships between licensure test performance and student achievement in Connecticut specifically. In states like North Carolina, Washington, and Massachusetts, previous work by other researchers revealed present, though weak, correlations between test scores and later teacher impacts.¹ Replicating these analyses was an important first step for WEPC's research in Connecticut, as it provided insight into the predictive utility of the tests themselves within the state's own context. The next line of inquiry, however, was more novel within the broader research base, shedding new light on the ways in which licensure test requirements affect the entry of prospective educators into the teaching profession.

Licensure tests are not unique to the teaching workforce. About 30% of U.S. workers are employed in an occupation that requires a government license.² Within some of these other professions, there is growing evidence to suggest that increases in licensure requirements may restrict the supply of workers (e.g., physical therapy, accountants, cosmetology).³ This study adds to this research base by providing further information about the effects of occupational licensure requirements on workforce entry within the specific context of education.

DATA AND APPROACH

In this study, the authors examine longitudinal data from Connecticut, including all Praxis II scores beginning in 1995, teacher certification data from 2002 to 2022, staff assignment data from 2002 to 2020, and student achievement data from 2014 to 2021. The study sample consists of about 85,000 individuals with Praxis II scores; about 51,000 of them also have teacher employment records within the state.

There are a few important things to note about the data and analytic approach used in this study:

- Praxis II is **not a single test** but rather a wide range of subject-specific assessments. Each unique subject-area license requires different tests, some requiring one, and others, like elementary, requiring multiple. WEPC's analysis accounts for differences across tests, but many tests have too few participants for the authors to be able to confidently identify their distinct impacts on workforce entry separate from the overall pattern observed for all Praxis II tests.⁴ In the case of Praxis II tests in STEM subjects, however, the authors were able to detect a distinct effect of first-time failure on workforce entry; this STEM-specific finding is highlighted in the Results section below.
- The researchers observe all test-taking attempts (first attempt, best attempt, and any retakes) but **primarily report the results for each test-taker's first attempt**, as they include the largest sample of test-takers and results follow a largely consistent pattern across attempts.
- When examining the relationship between Praxis II subject-matter test performance and teachers' later effectiveness at improving student test scores, the authors **look only at the tests that are directly tied to the grades and subjects in which students take state standardized assessments** (i.e., third-through-eighth grade math and ELA). This means that they do not estimate the predictiveness of Praxis II performance for, e.g., social studies, science, music, art, or high-school math and English teachers, as these roles are not tied to state-tested grades and subjects. Additionally, this analysis does not examine whether licensure test performance predicts teacher effectiveness at improving non-tested outcomes, which are undoubtedly important though less directly tied to the content matter found in Praxis II tests.
- In attempting to establish the relationship between Praxis II performance and later teacher effectiveness, the authors include only individuals that end up teaching in a Connecticut public school in a tested grade and subject area. Thus, the results may not directly apply to those who took a Praxis II test but were never observed as a teacher in a state-tested grade and subject. However, in examining the impact of the licensure tests on the overall supply of the workforce, the authors include all individuals taking any Praxis II test, whether they show up in the workforce or not. Because of this difference in which test-takers are included in each analysis, the researchers **caution against too many generalizations between the two different sets of results identified in this study**.
- Because of data availability limitations, the researchers were **unable to examine variations based on prospective teachers' race/ethnicity or gender**. Future work may be able to incorporate additional data and/or analytic methods to address the critically important question of whether the effects of licensure test requirements on workforce entry differ for teachers from different backgrounds.
- This study focuses on Praxis II assessments and **does not include the Foundations of Reading test** that is also administered as part of Connecticut's teacher licensure process.

Estimating the relationship between licensure scores and later teacher effects on student achievement. Similar to prior studies, the researchers apply a value-added model to estimate for each teacher the difference in the average test scores of students they instruct and the score that these students would be predicted to achieve based on their prior year test scores and other observed

characteristics. They then examine the correlation between these value-added scores in either math or ELA and a teacher's relevant licensure test scores.

Estimating the causal effect of failing the licensure test on becoming a teacher. An important feature of this study is the ability to measure the causal link between a prospective teacher's success or failure on a licensure test and their eventual entry into the profession. The researchers used a regression discontinuity design to exploit the similar attributes of candidates right above and below the passing cut-score for each test and examine the differences in their trajectories into or away from the profession.

Full details on the study design, sample, and methodology are available in the Technical Appendix at wheelockpolicycenter.org/all-research.

RESULTS

Overall, the research team found that:

- Consistent with other studies from other states, there is a positive but very small relationship between teacher candidates' performance on Praxis II subject-matter tests and their later impacts on student achievement, as measured by test score value-added in ELA and math.
- In Connecticut, failing a first attempt at a Praxis II subject-matter test significantly and substantially reduces a candidate's likelihood of becoming certified to teach in a public school.⁵
 - Among individuals who *just pass* a Praxis II test, 82% go on to obtain a teaching certification, compared to 74% of those who *just fall short* of receiving a passing score.
 - In a scenario where passing cut-scores are reduced slightly (by approximately 4 points or 0.5 standard deviations), the number of Praxis II takers obtaining certification would likely increase by about 25 individuals each year. This estimate is based on various assumptions, which may not hold true in reality, but it provides a sense of the scale of test-takers affected by the Praxis II requirement.
- The deterrent effect of first-time Praxis II failure appears to be stronger for those pursuing a STEM certification.⁶
 - Among individuals who *just pass* a Praxis II test in a STEM subject, 75% go on to obtain a STEM teaching certification, compared to 67% of those who just fall short of receiving a passing score.
 - In the same scenario described above, where passing cut-scores are reduced slightly, the number of Praxis II takers obtaining STEM certification would likely increase by about 6 individuals each year.

FUTURE WORK

These results do not suggest an obvious path forward. There is a lot we are continuing to learn about the forces that move the teacher labor market, and more we must understand about the role licensure tests play in a complex policy environment. In most cases, states use licensure tests as a way to ensure that teachers entering the profession possess the minimum content knowledge needed to teach specific grades and subjects. The question policymakers are continually seeking to understand, however, is whether these tests are serving this intended purpose and whether there are unintended consequences associated with them.

The findings in this report shed some light on the potential trade-offs at play in requiring prospective teachers to pass licensure tests. On the one hand, the study finds that Connecticut's Praxis II requirement is deterring some prospective teachers who fail their first attempt at a subject-matter licensure test from persisting into the profession. On the other hand, there is ambiguity associated with predicting what would happen to the overall supply and entry of teachers into the workforce if these requirements were changed or removed. It is also important to consider that, in at least some grades and subjects, these tests are not highly pre-

dictive of teachers' later impacts on student test score growth. State and local leaders in Connecticut and other places will need to make judgment calls about whether and how to adapt existing licensure requirements to account for this evidence alongside their broader goals for increasing teacher supply, diversity, and quality. As policymakers consider these potential policy changes, there are several points worth bearing in mind:

1. **We cannot fully predict the impact of changing licensure or testing requirements on the composition of the teacher workforce.** Based on the results of this study, we cannot say with certainty what would happen if testing requirements were significantly reduced or altered. There are still too many unknowns about the various conditions that influence and intersect in an individual's decisions to enter and persist in the teacher pipeline. For example, our analysis does not consider the extent to which the presence of a testing requirement alters the pool of individuals who decide to pursue teacher licensure. That said, in the context of the pandemic, many states have significantly altered their licensure requirements, particularly around testing, creating natural experiments in some areas that researchers are seeking to document and understand. WEPC is one such entity, partnering with Massachusetts, for instance, to understand the impacts of their pandemic-induced emergency license. So, while we don't yet have solid evidence on the counterfactuals of licensure exams as they have traditionally been used, we should have new insights to lend to this understanding within the coming months and years.
2. **Where you set the passing cut-score likely matters.** There is immense discretion in where states decide to set the pass/fail bar for these tests. In the case of the Praxis suite, most states have adopted the ETS-recommended cut score, and in so doing have also helped to maintain consistency across state borders for the purposes of licensure reciprocity. The results of this study, however, suggest that even small changes in where states set the passing score are likely to affect the number of individuals entering the teacher workforce. Thus, states should closely evaluate whether their chosen licensure test cut-scores truly represent their minimum content knowledge expectations for novice teachers.
3. **All tests are not created equal,** and licensure policies that differentiate across subject areas are probably worth exploring. This is especially important given that some of the results in this study vary by subject area—notably that the deterrent effect of first-time Praxis II failure appears to be stronger for STEM subjects, which are a known shortage area in many districts.
4. **It is worth continuing to question whether we have the right measures in place to assess teacher and student knowledge.** The premise behind licensure test requirements is that teachers' content knowledge matters for their ability to effectively help students learn that content, and that licensure tests are an accurate predictive tool for measuring this content knowledge. If we believe these two things to be true, we would expect to see a relatively strong relationship between licensure test performance and student test score growth in aligned subjects. Since in this case we don't observe this strong relationship, it may mean we should be interrogating the underlying assumptions behind what licensure tests measure and how. To this point, several states have begun exploring other ways to assess teachers' baseline content knowledge—for example requiring a degree in the subject area or a portfolio review—but not enough evidence exists to date to suggest that these alternatives are any better aligned with later impacts on student learning. Unfortunately, until better options become available, states are in the unenviable position of weighing the tradeoffs between the current system, a lack of other viable alternatives, and the unknowns about what happens without a clear requirement in place.

ENDNOTES

- 1 Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2006). Teacher-student matching and the assessment of teacher effectiveness. *Journal of Human Resources*, 41(4), 778-820; Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. *Economics of Education Review*, 26(6), 673-682; Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2010). Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects. *Journal of Human Resources*, 45(3), 655-681; Goldhaber, D., & Hansen, M. (2010). Race, gender, and teacher testing: How informative a tool is teacher licensure testing? *American Educational Research Journal*, 47(1), 218-251.
- 2 Kleiner, M. M., & Krueger, A. B. (2013). Analyzing the extent and influence of occupational licensing on the labor market. *Journal of Labor Economics*, 31(S1), S173-S202.
- 3 Adams, A. F., Jackson, J. D., & Ekelund, R. B. (2002). Occupational licensing in a “competitive” labor market: The case of cosmetology. *Journal of Labor Research*, 23(2), 261-278; Cai, J., & Kleiner, M. M. (2020). The labor market consequences of regulating similar occupations: The licensing of occupational and physical therapists. *Journal of Labor Research*, 41, 352-381; Jacob, J., & Murray, D. (2006). Supply-side effects of the 150-hour educational requirement for CPA licensure. *Journal of Regulatory Economics*, 30, 159-178.
- 4 The following Praxis II tests were included: English Language, Literature, and Composition: Content Knowledge (41); English Language, Literature, and Composition: Essays (42); English Language, Literature, and Composition: Content and Analysis (44, 5044); Middle School English and Language Arts (49, 5047, 5049); Elementary Education: Multiple Subjects—Reading and Language Arts Subtest (5002, 5032); English Language Arts: Content and Analysis (5039); Mathematics (60); Mathematics: Content Knowledge (61, 5061, 5161); Middle School Mathematics (69, 5169); Elementary Education: Multiple Subjects—Mathematics Subtest (5003, 5033).
- 5 Teacher certification is defined as being associated to a teaching endorsement (i.e., discarding endorsements such as driver education, licensed practical nurse, librarian, speech and language pathologist, school psychologist, etc.) plus having any of the following certifications: “Initial Educator”, “Permanent Teaching”, “Professional Educator”, or “Standard Teaching”.
- 6 The following endorsement codes are defined as STEM subjects: Mathematics, 7-12 (29); Biology, 7-12 (30); Chemistry, 7-12 (31); Physics, 7-12 (32); Earth Science, 7-12 (33); General Science, 7-12 (34); Mathematics, Middle School, 4-8 (229); Biology, Middle School, 4-8 (230); Chemistry, Middle School, 4-8 (231); Physics, Middle School, 4-8 (232); Earth Science, Middle School, 4-8 (233); General Science, Middle School, 4-8 (234); and Integrated Science, Middle School, 4-8 (235).

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