

# The unequal impacts of teacher certification exams on prospective teachers and students

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## Motivation and research questions

Improving teaching quality has been a longstanding concern due to the importance of teachers for students' long-term outcomes (Chetty et al., 2014b; Koedel et al., 2015; Jackson, 2018). But in many U.S. schools there is an equally pressing issue: Finding enough teachers. School districts have struggled to hire full-time qualified teachers for decades (Aragon, 2016; García and Weiss, 2019), and shortages are particularly acute in schools with minority student populations (Sutcher et al., 2019). Teacher shortages can hinder student learning by forcing schools to fill vacancies with teachers who have less experience or who are teaching subjects outside their areas of expertise.

Teacher certification exams are a key policy lever that can influence both the quality and the supply of teachers. Most U.S. states require that teachers pass certification exams that measure knowledge of academic content and pedagogical practices. These exams are intended to prepare and screen candidates to ensure that only well-qualified individuals enter the teaching profession. At the same time, certification exams are a barrier that prevents people from pursuing teaching careers. Black and Hispanic teaching candidates are disproportionately likely to fail certification exams, which has prompted lawsuits alleging that the exams are racially biased (Green, 2023). A key question, therefore, is whether the benefits of certification exams for ensuring teacher quality are worth the costs of reducing teacher supply.

Our project will use comprehensive data from Texas to examine the *net* implications of teacher certification exams for student outcomes. We ask three main research questions:

1. How do certification exams impact access to the teaching profession for individuals? Does this vary heterogeneously across demographics?
2. How does certification exam performance relate to teaching quality? Does this vary heterogeneously across demographics?
3. What are the net impacts of this supply/quality trade-off for students? Do these net impacts vary for students across demographics?

Our preliminary analyses suggest that certification exams disproportionately prevent non-white individuals from entering the teaching profession, and that certification exam performance is at best weakly related to teaching quality. Thus we hypothesize that certification exams have a net

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negative impact on schools with minority student populations, where the prospective teachers who are screened out by certification exams would have been more likely to work.

## Literature contributions

We make two main contributions to the literature on teacher certification exams. First, our project will provide a more complete picture of the total impacts of certification exams on student outcomes. Existing work has examined the predictive power of certification exam scores for teacher quality, with mixed results (e.g., Darling-Hammond, 2000; Boyd et al., 2007; Clotfelter et al., 2007, 2010; Shuls and Trivitt, 2015). There is less evidence on how exams impact the supply of teachers, although related work finds that more stringent licensing requirements can reduce teacher supply (e.g., Hanushek and Pace, 1995; Angrist and Guryan, 2008; Larsen et al., 2020; Law et al., 2023; Orellana and Winters, 2023; Chung and Zou, 2024). We are not aware of other work that examines the net effect of these supply/quality factors on students, which is made possible by our comprehensive data and a unique certification exam reform (see below).

Our second main contribution is to shed light on potential racial disparities in the effects of teacher certification exams. Although the education literature has discussed how certification exams may create different entry barriers for white and minority teachers (e.g., Goldhaber et al., 2017; Rucinski and Goodman, 2019; Cowan et al., 2023), there is limited evidence on racial differences in the long-term effects of these exams for individuals' careers, primarily due to a lack of data. Our comprehensive data allows us to identify the race/ethnicity of certification exam takers and the long-run impacts of these exams on their teaching and labor market outcomes. Additionally, we will ask whether certification exams have disproportionate effects on minority *students*, which could arise because individuals on the margin of passing certification exams are more likely to teach in disadvantaged schools and because students benefit from having same-race teachers (Dee, 2004).

## Data

We use restricted-access data from the Texas Education Research Center (ERC). The ERC has linked individual-level administrative datasets that allow us to follow individuals along the path to teaching and measure the outcomes of their students. Specifically, we use three ERC datasets:

1. **Teacher certification exams.** Texas administers its own teacher certification exams that test knowledge of both educational content and pedagogy. The ERC provides data on all individuals who took the state's certification exams, known as the TExES (formerly EXCET) exams, from the 1990s to present. Importantly, we can link this data to the ERC's K–12 and college datasets to identify exam takers' race, SES, and ability as measured by 10th grade test scores. These variables are rarely observed in other research on teacher certification.
2. **Employed teachers and student outcomes.** ERC provides data on all K–12 public schools from 1995–present, including records on teachers. This allows us to measure which individuals ended up teaching in Texas public schools and student outcomes such as standardized test scores, attendance, and disciplinary incidents. Importantly, ERC also provides classroom ID variables that link students to teachers for 2012–present, which allows us to compute teacher value-added—the standard measure of teacher quality in the literature.
3. **Earnings and employment.** The ERC data is also linked to records from the Texas Workforce Commission (TWC), which measures quarterly earnings and employment for all Texas workers from 1992–present. The TWC data allows us to measure how certification

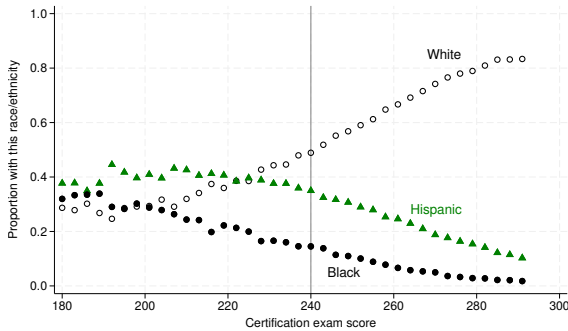
exams affect individuals' careers because we can observe wages and employment regardless of whether individuals end up in a teaching career. We are not aware of other research that examines the impact of certification exams on wages and employment.

## Methodology

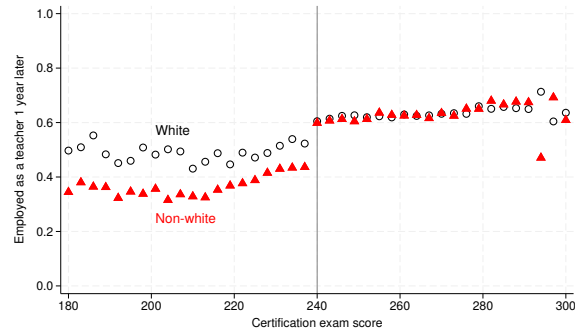
Our analysis will have three parts that examine how teacher certification exams impact: 1) teacher supply; 2) teacher quality; and 3) student outcomes.

**Impacts on teacher supply.** Our first analysis asks how teacher certification exams impact the supply of teachers and teachers' careers. Our empirical strategy is a Regression Discontinuity (RD) design, which compares the outcomes of individuals who marginally fail or marginally pass the certification exams. Since these individuals are likely to be comparable on average, any observed discontinuity in their outcomes at the threshold for passing the certification exam is likely to be attributable to a causal effect of passing the certification exam.

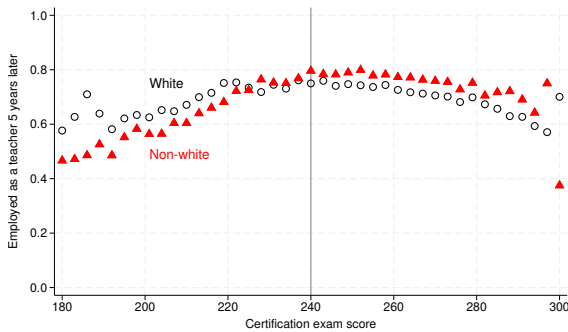
Preliminary results show that certification exams have a disproportionate negative impact on Black and Hispanic teaching candidates. The below figure plots average outcomes ( $y$ -axes) against scores on individuals first attempt at the TExES certification exam ( $x$ -axis), where 240 is a passing score. Black and Hispanic exam takers are much more likely to fail than white exam takers (Panel A). Among individuals who fail, non-white individuals are less likely to be employed as a teacher one year later, and this persists up through five years later for individuals with the lowest scores (Panel C). Failing also reduces individuals' earnings measured one year later, with particularly negative earnings impacts for non-white individuals (Panel D). In sum, certification exams are a significant barrier to entry for non-white teaching candidates, which sets them back in their careers.



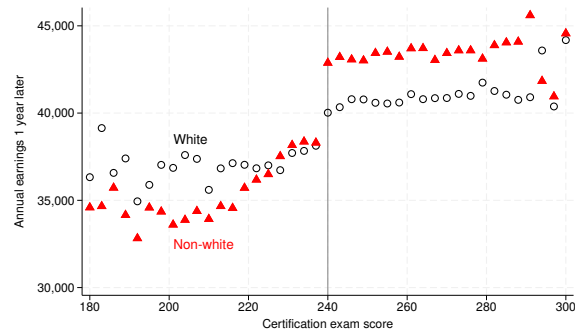
Panel A. Proportion with this race/ethnicity



Panel B. Employed as a teacher 1 year later



Panel C. Employed as a teacher 5 years later

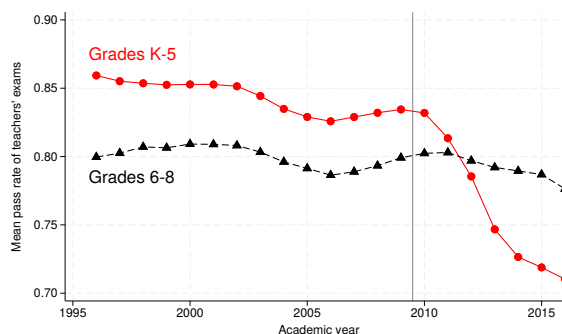


Panel D. Annual earnings 1 year later

**Impacts on teacher quality.** Our second analysis asks how certification exam scores and race/ethnicity relate to teaching quality. We follow the education literature in using value-added as our main measure of teacher quality (e.g., Chetty et al., 2014a). Value-added is a data-driven way to determine how effective a given teacher is at improving student test scores.<sup>1</sup> We will also use other measures of teacher quality such as teacher effects on behavioral outcomes (e.g., Jackson, 2018).

In preliminary results, we find that non-white teachers are slightly *better* at improving student achievement than white teachers on average. Further, certification exam scores have little predictive power for teacher value-added; scoring one standard deviation better on a certification exam is associated with only a 0.004 standard deviation gain in student achievement. Overall, our initial results suggest that certification exams are not significant predictors of teaching quality.

**Net impacts on students.** Our final analysis examines the net impacts of certification exams on student achievement. We exploit a reform that made the TExES exam significantly harder for prospective elementary teachers. Prior to 2009, the main test for individuals who wished to teach early childhood (EC) through 4th grade was the Generalist EC-4 exam. In 2009, this exam was replaced by the Generalist EC-6 exam, which covered material up through 6th grade and was thus more difficult. This reform reduced the average pass rate (on the first attempt) for early-career K–5 teachers from 83 percent in 2009 to 72 percent by 2016 (see figure). There was little change in the difficulty of grade 6–8 teachers’ exams over this time period.



We will use a difference-in-differences design that asks whether the TExES reform changed outcomes in grades K–5 relative to outcomes in grades 6–8.<sup>2</sup> We will first ask how the switch from the Generalist EC-4 to the Generalist EC-6 affected the characteristics of teachers, including their race/ethnicity and their quality as measured by value added. We will then ask how the exam reform impacted student performance on standardized tests and other behavioral outcomes. This analysis will capture the net impact of increasing the difficulty of a certification exam, which include its potential effects on both teacher supply and teacher quality.

## Implications

For many individuals who are on the margin of passing certification exams, teaching is a relatively good-paying job that would significantly increase their earnings (see Figure 1, Panel D above). Certification exams exacerbate existing racial/ethnic gaps in earnings because they disproportionately screen out minority teachers. It is important to understand whether the potential benefits of certification exams for teaching quality are worth these impacts on inequality. Further, our project examines how certification exams affect inequality in the next generation by examining their impacts on students from different racial and socioeconomic groups. Recently, states like New York

<sup>1</sup>An important consideration is that value-added is not observed for individuals who are screened out by certification exams. We will use several approaches to address this selection concern, including: 1) examining the relationship between value-added and certification scores among individuals who pass and projecting the effects to individuals who fail; 2) examining the relationship between certification scores and pre-determined measures of teacher ability such as high school test scores; and 3) exploiting the fact that many teachers take additional certification exams *after* they begin teaching, which allows us to correlate prior value-added with certification scores in related subjects.

<sup>2</sup>We will also use a “triple-difference” strategy that additionally compares changes in outcomes between less- and more-experienced teachers (because the effects of the reform should be concentrated among less-experienced teachers).

and North Carolina have taken steps to eliminate teacher certification exam requirements. It is critical to have high-quality evidence on the implications of such policies for students.

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