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EDUCATION POLICY INITIATIVE at CAROLINA

A Leak in the Teacher Pipeline? Employment Rates for Initially-Prepared Teachers from UNC System Institutions

In this research brief, the Education Policy Initiative at Carolina (EPIC) examines one and three-year employment rates in North Carolina public schools (NCPS) for individuals initially-prepared to teach at UNC System institutions. While the demographic characteristics of those prepared to teach is largely unchanged over our study period—overwhelmingly white and/or female—the academic competitiveness of initially-prepared graduates is on the rise. Employment rates fluctuate over time, are higher for high-need licensure areas, and vary across UNC System institutions. This indicates that employment rates are influenced by the preferences of graduates and employers, economic conditions, and labor market characteristics. Analyses show that white graduates are more likely to secure a teaching position in NCPS than black graduates and other graduates of color from the same institution. Finally, graduates of minority-serving institutions are much more likely to secure their first teaching position in a high-poverty school.

Introduction

In response to teacher shortage concerns, state and local education officials are considering ways to strengthen North Carolina's teacher pipeline. These efforts are often directed towards early and late time points in the teacher pipeline. For example, the newly established Teaching Fellows program is a way to boost enrollment in teacher education programs; advanced teacher roles may encourage experienced teachers to remain in the profession. Largely overlooked in the teacher pipeline is the transition from formal teacher preparation to beginning teaching. How many individuals who were initially-prepared to teach at one of North Carolina's public institutions of higher education secure a teaching job in North Carolina public schools (NCPS)? To the extent that the pipeline is leaking here—i.e. teacher education graduates are not teaching in North Carolina—this suggests another way for policymakers to address teacher shortage concerns.

With this motivation, the Education Policy Initiative at Carolina (EPIC), in partnership with the UNC System, examined the employment rates of UNC System graduates in NCPS. This work is part of the Educator Quality Research Initiative (EQRI) and updates our previous employment rates analyses from 2015. In this research brief, we present employment rates by graduating cohort, licensure area, and UNC System institution and assess whether academically-competitive graduates and graduates of color are more, or less, likely to secure a teaching position in NCPS. Given the persistent need for teachers in high-poverty schools, we also track the percentage of first-time teachers, by UNC System institution, working at schools in the bottom, middle, and top quartiles of school poverty. Collectively, these data can inform targeted efforts to move teacher education graduates into the next phase (employment) of the teacher pipeline.

Background

To facilitate these analyses, the UNC System provided EPIC with data on all those earning teaching credentials at a UNC System institution from 2008-09 to 2017-18. Within this population, we focus on those who were initially-prepared to teach—in contrast to those earning supplemental graduate degrees or add-on teaching licenses. Here, initial-preparation includes those earning (1) an undergraduate education degree; (2) a graduate level education degree resulting in an initial teaching license (e.g. Master of Arts in Teaching); or (3) an initial teaching license/certificate that was not degree-terminal.

To determine whether initially-prepared graduates secure a teaching position in NCPS, we connect UNC System data to certified salary files from the North Carolina Department of Public Instruction (NCDPI). In connecting these data, we create three employment measures: *Teach Within One*, *Teach Within Two*, and *Teach Within Three*. Teach Within One indicates whether an initially-prepared graduate teaches in NCPS in the school-year immediately following graduation; for example, members of the 2012-13 graduating cohort who teach in the 2013-14 school year.[1] Teach Within Two indicates whether an initially-prepared graduate teaches in NCPS in one of the two school years immediately following graduation. Finally, Teach Within Three indicates whether an initially-prepared graduate teaches in NCPS in one of the three school years immediately following graduation. Results in the following sections focus on the Teach Within One and Teach Within Three indicators. For certain analyses we group initially-prepared graduates by graduating cohort, licensure area, or university.[2] The UNC System data also include demographic and academic credential measures that allow us to compare the characteristics of graduates who do versus do not secure a teaching position in NCPS.

When interpreting results, there are two important points to consider. First, employment rates are for traditional NCPS only and do not capture whether an initially-prepared graduate secures a teaching position in a charter school, private school, or school outside North Carolina. As such, true employment rates in teaching are higher than we report. Second, we cannot isolate the mechanisms explaining differences in employment rates. Many factors may influence employment rates—graduate and employer preferences, labor markets, teacher salaries—and more work is needed to understand the why behind our findings.

Trends in Productivity and Graduate Characteristics

Figure 1 displays trends in the number of graduates initially-prepared to teach by UNC System institutions, overall (top panel) and by select licensure group (bottom panel). Generally, the supply of initially-prepared graduates has trended down since the 2011-12 graduating cohort. This is consistent with publicized decreases in teacher education enrollment. Proportionally, decreases in the supply of initially-prepared graduates have been particularly large in social studies, math, science, and elementary education; special education and English/reading have held more constant.

Figure 1: Trends in the Supply of Initially-Prepared Graduates
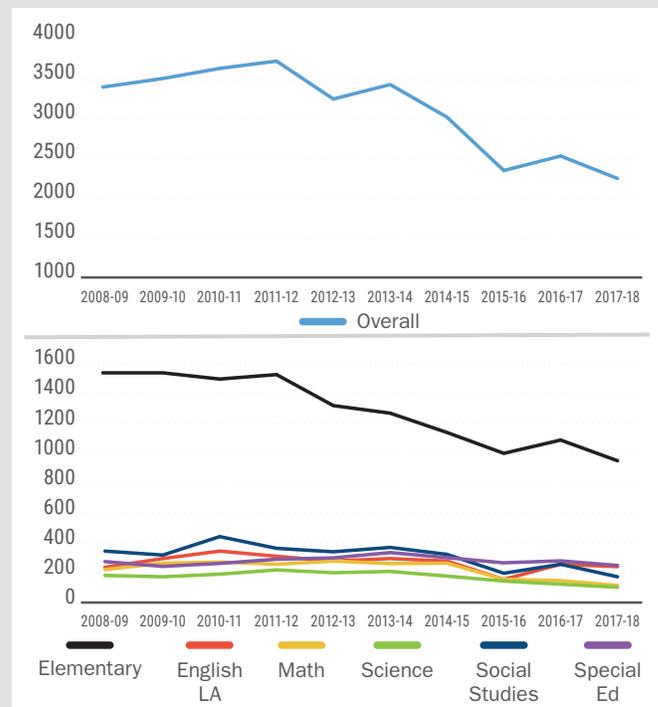
Note: *The top panel in this figure displays the number of initially-prepared graduates from UNC System institutions across the 2008-09 through 2017-18 graduating cohorts. The bottom panel in this figure presents similar information for select licensure groupings.*

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[1] For graduates in the fall academic period (e.g. Fall 2012), Teach Within One is equal to 1 if they teach in either the second semester of the 2012-13 school-year or the 2013-14 school year.

[2] Membership in a particular graduating cohort indicates that the initially-prepared teacher graduated in either the fall, spring, or summer of that academic year (e.g. Fall 2010, Spring 2011, or Summer 2011 for the 2010-11 cohort).

Table 1: Trends in the Characteristics of Initially–Prepared Graduates

Graduating Cohort	% Female	% White	HS GPA	SAT Score	UNC GPA
2008-09	81.60	83.02	3.37	1058	3.42
2009-10	81.22	81.39	3.44	1061	3.42
2010-11	80.46	83.03	3.59	1064	3.45
2011-12	80.66	80.95	3.60	1061	3.45
2012-13	80.28	80.22	3.67	1061	3.47
2013-14	80.12	79.54	3.69	1070	3.53
2014-15	80.35	78.89	3.75	1083	3.52
2015-16	80.71	82.42	3.78	1089	3.55
2016-17	82.28	78.92	3.79	1099	3.56
2017-18	82.34	80.09	3.82	1098	3.59

Note: This table displays trends in the demographic characteristics and academic credentials of initially-prepared graduates from UNC System institutions.

Table 1 presents trends in the demographic characteristics and academic credentials of initially–prepared graduates. Demographic data indicate little change over time—a large majority of the teachers prepared by UNC System institutions are female and white. Conversely, academic credential data suggest that the caliber of initially-prepared graduates is on the rise. On average, high school GPAs are up nearly 0.50 points, SAT scores are up 40 points, and UNC GPAs are up nearly 0.20 points over our study period.

Employment Rates by Graduating Cohort

Figure 2 displays Teach Within One and Teach Within Three employment rates for each graduating cohort in the study sample. Employment rates were the lowest for the 2008-09 graduating cohort—approximately 57 and 71 percent for Teach Within One and Teach Within Three. With the Great Recession, North Carolina reduced the size of its teacher workforce by nearly 4,000 teachers between 2008-09 and 2009-10 and hired 3,000 fewer first-year teachers in the 2009-10 school year. This suggests that entering the job market at the onset of the Great Recession may have forced graduates to wait longer for a teaching position or pushed graduates to seek employment in other states or professions. Employment rates gradually rose for the 2009-10 through 2013-14 graduating cohorts. Approximately 70 percent of the 2013-14 graduating cohort secured a teaching position in NCPS within one year; nearly 77 percent held a teaching position in NCPS within three years. Since the 2013-14 graduating cohort,
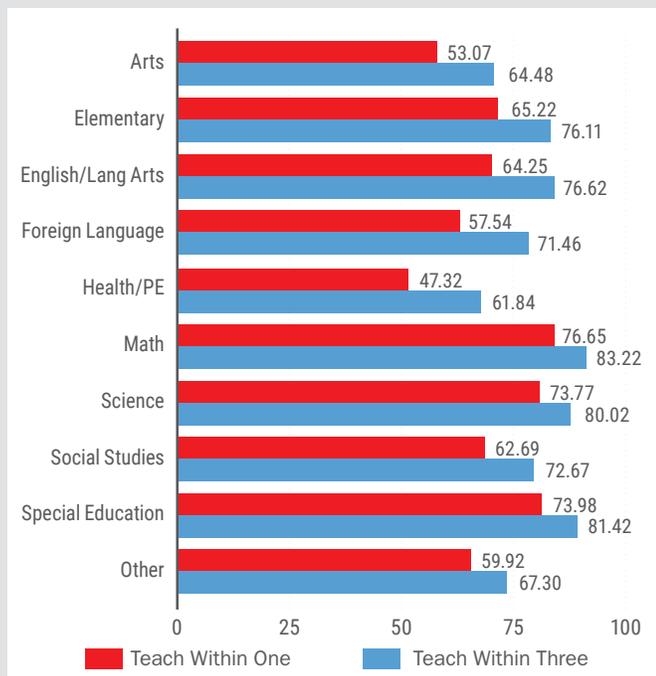
employment rates have decreased—down to 61 percent for Teach Within One for the 2017-18 graduating cohort. This trend deserves continued attention, as it is unclear why employment rates are dropping for recent graduates.

Figure 2: Employment Rates by Graduating Cohort
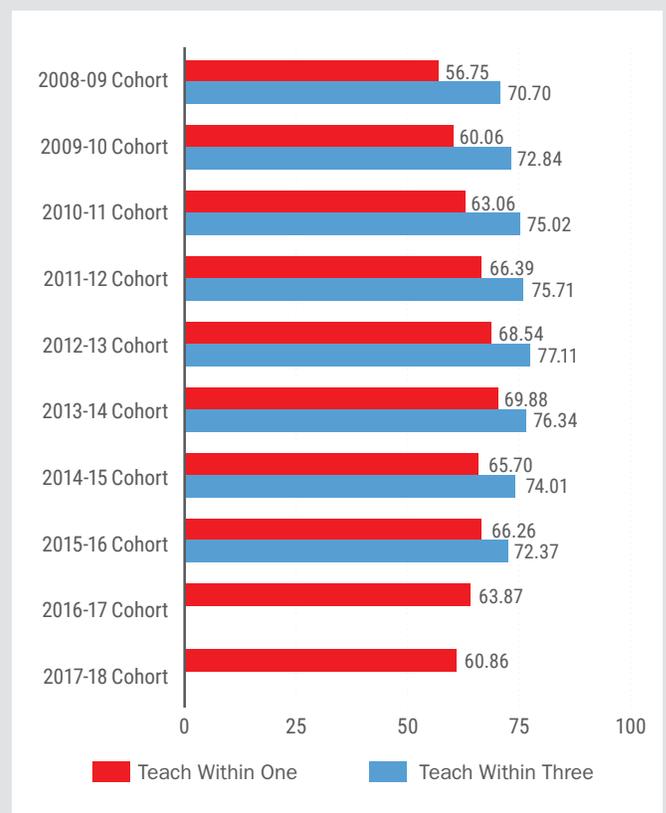
Note: This figure displays the Teach Within One and Teach Within Three employment rates for UNC System initially-prepared teachers in the 2008-09 through 2017-18 graduating cohorts. Teach Within Three data are not yet available for the 2016-17 and 2017-18 graduating cohorts.

Figure 3: Employment Rates by Select Licensure Groupings

Licensure	Teach Within One	Teach Within Three
Arts	53.07	64.48
Elementary	65.22	76.11
English/Lang Arts	64.25	76.62
Foreign Language	57.54	71.46
Health/PE	47.32	61.84
Math	76.65	83.22
Science	73.77	80.02
Social Studies	62.69	72.67
Special Education	73.98	81.42
Other	59.92	67.30

Legend: ■ Teach Within One   ■ Teach Within Three

Note: *For select licensure groupings, this figure displays the Teach Within One and Teach Within Three employment rates for initially-prepared teachers from UNC System institutions.*

Employment Rates by Licensure

Figure 3 displays Teach Within One and Teach Within Three employment rates for 10 different licensure areas or groups of licensure areas.[3] These data reveal several important points. First, the high-need licensure areas of math, science, and special education have the highest employment rates among these licensure groups. For instance, Teach Within One values are 77, 74, and 74 percent for math, science, and special education, respectively. This suggests that school district demand for qualified teachers in these areas leads to increased hiring rates. Second, elementary education, which is the largest licensure area for the UNC System, has one and three-year employment rates of 65 and 76 percent in NCPS, respectively. Finally, several licensure groupings—arts, foreign language, health/PE, and other—have one-year employment rates below 60 percent.[4] Lower employment rates for these licensure groups may be due to several factors, including graduate preferences, fewer positions becoming available, and/or school districts prioritizing teaching positions in core subject–areas.
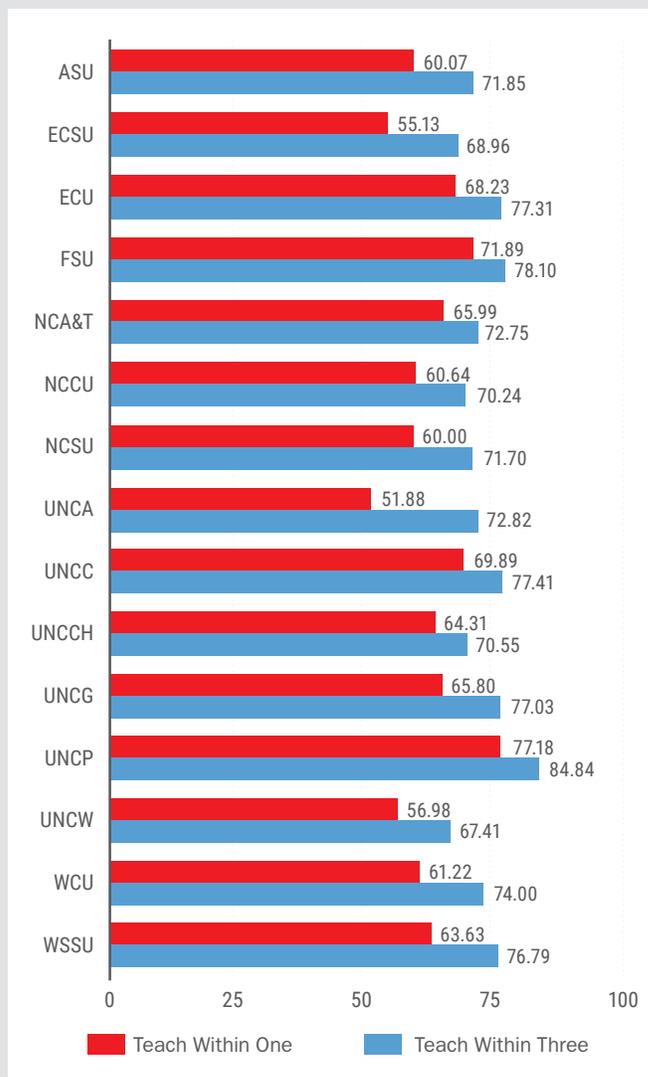
Employment Rates by UNC System Institution

Pooling data from the 2008–09 through 2017–18 graduating cohorts, Figure 4 presents Teach Within One and Teach Within Three employment rates for each UNC System institution. Before examining employment rates for specific UNC System institutions, there are two broad points to stress. First, teacher labor markets are generally local, meaning most graduates work in close

Figure 4: Employment Rates by UNC System Institution

Institution	Teach Within One	Teach Within Three
ASU	60.07	71.85
ECSU	55.13	68.96
ECU	68.23	77.31
FSU	71.89	78.10
NCA&T	65.99	72.75
NCCU	60.64	70.24
NCSU	60.00	71.70
UNCA	51.88	72.82
UNCC	69.89	77.41
UNCCH	64.31	70.55
UNCG	65.80	77.03
UNCP	77.18	84.84
UNCW	56.98	67.41
WCU	61.22	74.00
WSSU	63.63	76.79

Legend: ■ Teach Within One   ■ Teach Within Three

Note: *This figure displays the Teach Within One and Teach Within Three employment rates for initially-prepared teachers from each UNC System institution.*

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[3] For example, 'math' is a combination of middle grades mathematics and high school mathematics licenses.

[4] Arts includes visual arts, theater/drama, dance, and music/band. Other includes licensure areas such as technology, agriculture, family/consumer sciences, etc.

proximity to their preparation program.[5] This means that a given institution's employment rates may be influenced by local economic conditions (e.g. open teaching positions, amount of salary supplements, proximity to a bordering state). Second, there is a substantial amount of variation, across institutions, in employment rates for initially-prepared graduates. The institutions with the highest Teach Within One employment rates are UNCP, FSU, and UNCC. These institutions also have the highest Teach Within Three values. Conversely, the institutions with the lowest one-year employment rates are UNCA, ECSU, and UNCW. UNCW and ECSU also have the lowest Teach Within Three employment rates. UNCA's three-year employment rate rose to the middle of the UNC System distribution. Sharp increases between one and three-year employment rates suggest that graduates are pursuing additional education or waiting for a teaching position to open in a preferred district/school.

Comparing Graduates Who Do Versus Do Not Secure a Teaching Position in NCPS

Beyond basic employment rates is the question of which graduates teach in NCPS. Does the state keep those who are more academically-competitive or those who contribute more to the diversity of the teacher workforce? Table 2 shows that those employed as teachers in NCPS one-year post graduation have slightly higher high school

Table 2: Measures of Academic-Competitiveness by Teach Within One Status

	Teaches Within One Year	Does Not Teach Within One Year
High School GPA	3.68	3.60
SAT Score	1071.31	1080.32
UNC GPA	3.51	3.45

Note: This table displays average academic credential measures for initially-prepared graduates who do versus do not teach in NCPS within one year of graduation.

and collegiate GPAs than peers who are not teaching in NCPS. Conversely, those who are not teaching in NCPS have slightly higher SAT scores. Results from more rigorous regression analyses, controlling for graduating cohort, licensure group, university, and minority status return similar findings.[6]

Figure 5: Employment Rates by Graduate Race/Ethnicity
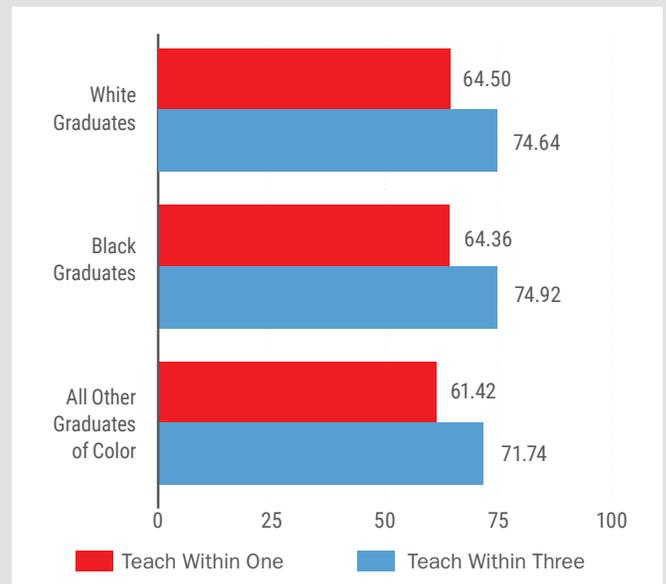
Legend: Teach Within One | Teach Within Three

White Graduates: 64.50 / 74.64
Black Graduates: 64.36 / 74.92
All Other Graduates of Color: 61.42 / 71.74

Note: This figure displays the Teach Within One and Teach Within Three employment rates for white, black, and all other initially-prepared graduates from each UNC System institution.

Figure 5 displays Teach Within One and Teach Within Three employment rates for white, black, and all other initially-prepared graduates of color.[7] Pooling across all graduating cohorts (2008-09 through 2017-18) and UNC System institutions, employment rates are very similar for white versus black graduates. All other graduates of color have one and three-year employment rates approximately three percentage points lower. To extend these analyses, we estimated regression models where Teach Within One was the outcome and we controlled for graduating cohort, licensure group, and university. Comparing within institutions, we find that black graduates are three percentage points less likely

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[5] See the UNC System Educator Quality Dashboard (http://eqdashboard.northcarolina.edu/) for information as to where UNC System institution graduates work.

[6] In these analyses a one standard deviation increase in high school and collegiate GPA is associated with a 2.2 and 4.9 percentage point increase in the probability of teaching in NCPS within one year. A one standard deviation increase in SAT scores is associated with a 3.6 percentage point decrease in the probability of teaching in NCPS.

[7] We do not further disaggregate all other graduates of color (e.g. Hispanic, American Indian, Asian) given the small sample sizes for these groups.

than their white peers to teach in NCPS within one year; all other graduates of color are 5.6 percentage points less likely to teach in NCPS within one year. Multiple factors may contribute to these differences, including the preferences of graduates and employers. Whatever the explanation, these differences are noteworthy given an interest in diversifying the teacher workforce.

School-Poverty Level for First-Time Teachers

As an extension of the university-level employment rates, Figure 6 examines the poverty level of the P–12 schools in which UNC System graduates secure their first teaching positions. In particular, Figure 6 displays the percentage of first-time teachers[8] working in low-poverty (Quartile 1), middle-poverty (Quartiles 2 and 3), and

high-poverty schools (Quartile 4).[9] If teachers from each UNC System institution were evenly distributed, we would expect 25 percent of first-time teachers to be in each school-poverty quartile. Instead, we find that graduates of minority-serving institutions in the UNC System (ECSU, FSU, NCA&T, NCCU, UNCP, and WSSU) are much more likely to secure initial-teaching positions in high-poverty schools. For example, 61 percent of WSSU's first-time teachers are working in high-poverty schools; nearly 40 percent of ECSU's first-time teachers are in high-poverty schools. Conversely, first-time teachers from NCSU and UNCCH are concentrated in low-poverty schools. These concentrations in high- and low-poverty schools may be attributable to multiple factors, including the mission of the institution, preferences of program graduates and employers, and the characteristics of P–12 schools in close proximity to the UNC System institution.

Figure 6: Initial Teaching Positions by School Poverty Quartile
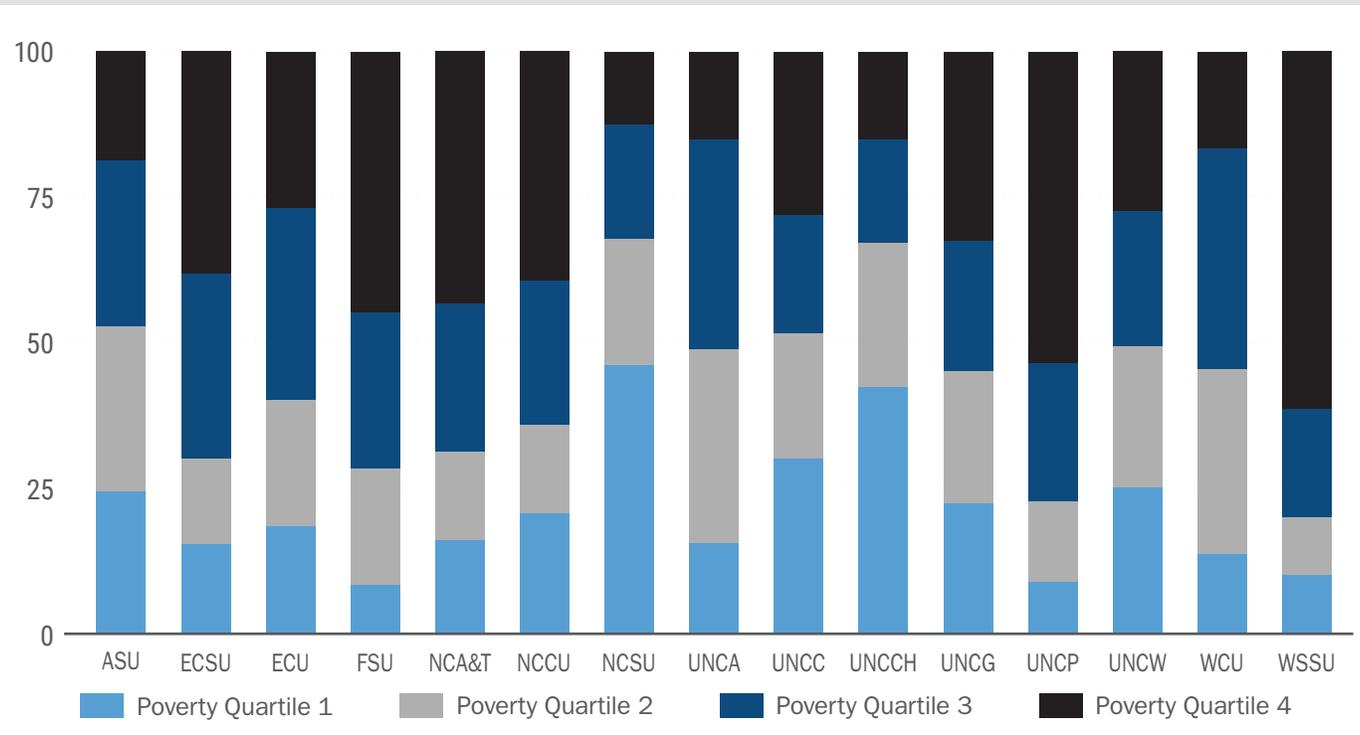
Note: For each UNC System institution, this figure displays the percentage of initially-prepared teachers whose first teaching position was in a school in the bottom, middle, and top quartile of school poverty.

[8] Unlike employment rates, which consider all initially-prepared graduates, these percentages only consider those securing a teaching position in NCPS.

[9] Information on school-level poverty comes from NCDPI's Title I schools information. See the following: http://www.dpi.state.nc.us/program-monitoring/titleIA/. With these data we identify the percentage of economically-disadvantaged students at a given school and place schools into quartiles based on that percentage.

Discussion

There are many points at which policy may influence the number and composition of individuals in the teacher pipeline. Often overlooked among these policy possibilities is the transition from preparation to teaching and the extent to which graduates secure a teaching position. If teacher education graduates are not teaching, this suggests another place for policymakers to address teacher shortage concerns.

To provide evidence on this issue, we examined employment rates in NCPS for initially-prepared graduates of UNC System institutions. These analyses have several limitations, including an inability to track graduates into charter, private, or out–of–state schools and an inability to pinpoint mechanisms behind our findings. This means that true employment rates in teaching are higher than we report. Likewise, it means that additional work is needed to understand the why behind our findings to better inform policy.

Nevertheless, these analyses reveal several noteworthy findings. First, while demographic characteristics have remained constant, the academic competitiveness of UNC System initially–prepared teachers is on the rise. This is encouraging since research shows that, on average, teachers with higher GPAs are more effective. Second, we find that employment rates fluctuate over time, are higher for high–need licensure areas, and vary across UNC System institutions. This is not surprising, since employment rates are influenced by preferences of graduates and employers, economic conditions, and labor market characteristics. Research should continue to track employment rates, especially as a lower percentage of initially–prepared graduates have secured a teaching position in NCPS in recent years. Third, after adjusting for cohort and licensure group, analyses show that white graduates are more likely to secure a teaching position in NCPS than black graduates and other graduates of color from the same institution. Understanding the mechanism(s) behind this difference may help efforts to diversify the state's teacher workforce. Finally, data show that graduates of minority-serving institutions are much more likely to secure their first teaching position in a high–poverty school. This is an important contribution to North Carolina and challenges other institutions to spread more graduates to high–need schools.

For more research on this topic

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Ronfeldt, M., Kwok, A., & Reininger, M. (2016). Teachers' preferences to teach underserved students. *Urban Education, 51*(9), 995-1030.

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