Retirees Return to Work: How a North Carolina Policy Helped Staff High-Need Schools[*]

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Abstract: Teacher shortages have been a long-standing issue in U.S. public schools and were recently exacerbated by the COVID-19 pandemic. These shortages tend to be concentrated in high-poverty, high-minority schools and hard-to-staff subjects like special education and STEM. States have implemented various policies to improve retention and decrease turnover, including offering teachers bonuses and salary increases for teaching in high-need schools or shortage subject areas. We study one of these policies, a return-to-work policy in North Carolina that allowed retired teachers to return to work full-time, earning their full-time salary and pension benefits concurrently. We characterize the teachers who returned and the schools that hired them by describing teacher demographics and qualifications, and school-level characteristics like urbanicity and student demographics. Our take-away is that this policy resulted in retirees returning to high-need schools.

Keywords: teacher shortages, retirees, high-need schools, hard-to-staff subjects

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Introduction

Schools have been plagued by teacher shortages for several decades, and the COVID-19 pandemic has only exacerbated the issue. Schwartz & Diliberti (2022) surveyed over 350 district leaders from the American School District Panel about teacher and staff shortages in the fall of 2021. Two-thirds of the leaders said the pandemic led to an unprecedented shortage of teachers in the 2021-2022 school year. A year later, in October 2022, the School Pulse Panel from the National Center for Education Statistics (NCES) found that the average public school in the U.S. had two teacher vacancies (NCES, 2022).

Importantly, both of these sources document that vacancies are not distributed evenly across schools. High-poverty, high-minority, and urban schools were more likely to report teacher shortages during the pandemic; the School Pulse Panel showed that 57% of schools in high-poverty neighborhoods had at least one vacancy compared to 41% of schools in low-poverty neighborhoods. In addition, 60% of schools with a high-minority student population had at least one vacancy compared to 32% of schools with a low-minority student population (NCES, 2022; Schwartz & Diliberti, 2022).[1]

Not only are teacher shortages concentrated in high-poverty, high-minority schools, but they are also concentrated in hard-to-staff subjects like math, science, and special education. Goldhaber & Gratz (2021) describe vacancies and types of job postings in Washington state during the fall of 2021. They find that most job postings are for substitute and special education teachers, and that there are generally more teaching vacancies, especially in special education and ELL, in high-poverty districts. At a national level, in the fall of 2022, 41 U.S. states reported a shortage of special education teachers, 34 a shortage of science teachers, 32 a shortage of math teachers, and over 20 a

[1] "High-minority" and "low-minority" are defined as 75% minority and below 25% minority, respectively.

shortage of teachers in at least one of language arts, world languages, ESL, health and physical fitness, career and technical education, and arts and music education (Teacher Shortage Areas, 2022).

Given that teacher shortages tend to be highly localized (e.g., to a specific state, school-type, and/or subject-type), states have enacted a wide range of policies to address them. In 2017, the National Council on Teacher Quality documented that 23 states offered higher salaries to teachers in high-need schools, and 15 states offered more pay to those who teach in a shortage subject area (National Council on Teacher Quality, 2017). For example, Denver Public Schools gives teachers annual bonuses if they teach hard-to-staff subjects or in Title I schools; and the D.C. IMPACT program gives bonuses to highly effective teachers to incentivize retention, especially in high-poverty schools (Denver Public Schools, 2019; District of Columbia Public Schools, 2019).

In this paper, we analyze a policy in North Carolina that incentivized retired teachers to come back to work. In 1999, North Carolina implemented a return-to-work (RTW) policy to combat a potential shortage of teachers in the labor market caused by the retirement of the large cohort of Baby Boomers. Without such a policy, retired teachers were subject to a salary cap. They could return part-time and earn at most half of their full-time salary while still collecting their pension benefits. The RTW policy raised this salary cap and allowed retirees to work full-time and earn their full-time salary while collecting their pension. We show that this incentivized retired teachers to come back to work.

Our analysis focuses on two main questions. First, we ask who these teachers are in terms of their demographics, qualifications, and subject matter expertise. Second, we ask which schools hired them. We look at school-level student characteristics, focusing specifically on economically disadvantaged and Black students.

We find that RTW teachers are generally White females, which is true for most North Carolina teachers, but Black teachers are overrepresented in the pool of RTW teachers relative to

the distribution of all full-time teachers during the policy period. RTW teachers are less qualified than the average teacher in terms of where they went to school (college competitiveness) but are more qualified in terms of their degree level (bachelors, masters, etc.). As would be expected with retirees, they have more years of experience than the average teacher. Additionally, RTW teachers are most likely to teach classes with no specific discipline (elementary classes), communication classes, and math classes. This generally reflects average teaching assignments.

In terms of the schools that hired these teachers, it appears that most schools rehire their own retirees. About 60% of RTW teachers return to the school they retired from. Many RTW teachers are elementary school teachers but compared to all teachers they are more likely to teach high school. We also observe that RTW teachers are more likely to teach in rural schools than in town/suburban and city schools, relative to the average teacher. Additionally, and perhaps most importantly, RTW teachers were overrepresented in schools with many economically disadvantaged and Black students. In other words, these teachers helped fill vacancies at high-need schools, schools where there are generally more teacher shortages.

While this policy ended over a decade ago, it is still relevant to study for three reasons. First, shortages still exist, both nationally and in North Carolina. Nguyen, et al. (2022) calculate that about 55% (1,700) of teaching positions in North Carolina vacant at the start of the 2020-2021 school year remained unfilled during the year. This is about 1.7 vacancies per 100 teachers and 11 vacancies per 10,000 students. Second, the question of how a RTW policy impacts the school system is relevant to current policy discussions. North Carolina adopted a new version of a RTW policy from 2019 through 2021 and lawmakers introduced a bill in March 2023 that would bring the policy back until 2027.[2] Finally, retired teachers are being called back to work in other states. New Jersey Senate Bill

[2] We do not assess the newer versions of the policy because of data availability and because it significantly overlaps with the pandemic.

3685, passed in January of 2022, allowed teachers and other professional staff to return after retirement and earn both their full-time salary and their pension benefits for a two-year period. This policy targeted schools in "critical need" of teachers.

Related Literature

Economics literature consistently documents teacher shortages in economically disadvantaged schools, high-minority schools, rural schools, and hard-to-staff subject areas. Garcia & Weiss (2020) describe how high-poverty schools have higher attrition and turnover than low-poverty schools. Carver-Thomas & Darling-Hammond (2019) find that teacher turnover is higher in Title I schools and schools with many minority students. Goldhaber, Krieg, et al. (2015) and Cowan, Goldhaber, Hayes, & Theobald (2016) show shortages in STEM and special education. Ingersoll (2003) and Goldhaber & Gratz (2021) find that shortages are primarily in rural areas as opposed to cities, suburbs, and towns.

The literature also shows that, even if a school has enough teachers, there are shortages of *high-quality* teachers in disadvantaged schools. Empirical economics research suggests that, in the absence of differential pay, teachers sort across schools such that teachers with more qualifications (e.g., experience, National Board Certified Teachers) teach more affluent, higher performing students while less qualified teachers are disproportionately matched with more economically disadvantaged students who are traditionally lower performing (Lankford, et al., 2002; Clotfelter, Ladd, & Vigdor, 2005; Goldhaber, Choi, & Cramer, 2007; Garcia & Weiss, 2019). Ingersoll (2004) concludes that the teacher shortage in high-poverty schools is not due to the lack of overall teacher labor supply, but rather that these schools have trouble retaining the teachers they hire. Hanushek, et al. (2004) concurs, showing that teachers with more experience generally migrate from schools with lower student achievement, which are typically those with higher need, to schools with higher

student achievement. They estimate that experienced teachers would need a 40 percent salary increase to stay in a large urban district instead of moving to a small suburban district.

There are several potential reasons why it is difficult for disadvantaged schools to keep their teachers. Garcia & Weiss (2020) highlight a few possibilities. They show that teachers in high-poverty schools make less than their peers in low-poverty schools. They also find that more teachers in high-poverty schools report threats to their physical safety, fewer supportive relationships, and less classroom autonomy than teachers in low-poverty schools. Finally, they find that teachers who quit are more likely to be those who did not receive training, professional support, or mentorship while teaching – all things a high-poverty school is less able to provide its teachers than a low-poverty school. Similarly, Garcia, Han, & Weiss (2022) show that teacher retention would be higher if teachers received better pay (especially for mid-career teachers), had a stronger voice, more support and fewer problems at school, and greater morale.

States and districts have implemented a variety of policies to persuade teachers to stay, especially teachers in disadvantaged schools and hard-to-staff subjects. Previous literature suggests that increasing teacher pay in disadvantaged and low-performing schools or giving bonuses to teachers of hard-to-staff subjects increases teacher retention in these high-demand areas. For example, Clotfelter, Glennie, et al. (2008) study a policy North Carolina adopted in the early-2000s that gave annual bonuses of $1,800 to math, science, and special education teachers working in low-performing, high-poverty schools. They find there is less turnover, especially for experienced teachers, with this bonus program in place. Cowan & Goldhaber (2018) examine a policy in Washington State, the Challenging Schools Bonus, which gave $5,000 bonuses to teachers who received their National Board Certification and worked in schools with a high proportion of kids receiving free or reduced-price lunches. They find that, in schools eligible for the policy, more teachers with the certification were hired, more current teachers received their certification, and

more teachers with the certification kept teaching in those schools. Like these papers, many others find that teacher retention in high-need schools and hard-to-staff subjects increases when teachers receive bonuses, salary bumps, loan forgiveness, fellowships, etc. Some also estimate effects on student achievement and find that students in disadvantaged schools do better when they experience less teacher turnover and have access to high-quality teachers. See Steele, et al., 2010; Clotfelter, Ladd, & Vigdor, 2011; Glazerman, et al., 2013; Dee & Wyckoff, 2015; Feng & Sass, 2018; Springer, et al., 2016; Adnot, et al., 2017; and Morgan, et al., 2023.

As Carver-Thomas & Darling-Hammond (2019) highlight, retirements constitute a sizeable fraction of teacher exits or moves (18% in their data), so it is not only important to examine policies that address teacher retention generally, but also those that focus specifically on retaining teachers near retirement. There are a few such studies that analyze policies specifically related to experienced teachers and retirees. First, using data from Tennessee, Ni, et al. (2022) find that high-quality teachers are less likely to retire than low-quality teachers at the same age and experience levels. Teacher quality is determined by classroom evaluations, student test-score growth as measured by value added, and student achievement. They simulate how high- and low- quality teachers would react to different pension changes, including late-career bonuses. They find that bonuses given to high-quality teachers in high-poverty schools would incentivize these teachers to postpone retirement, which would benefit high-need students at a relatively low cost. Second, Kim, et al. (2021) simulate the effects of late-career bonuses and deferred retirement plans on teacher retirement decisions. Their findings suggest that both policies would increase the number of years senior teachers work. The authors argue that the benefits of delayed retirement outweigh the costs if these teachers work in STEM classes or low-performing schools.

We contribute to this literature by studying a distinct policy aimed at curbing the teacher shortage. Instead of getting senior teachers to stay by offering bonuses and deferred retirement

plans, the policy we study targets teachers who have *already* retired and incentivizes them to return to work. While the policy was not specifically targeted at high-need schools and hard-to-staff subjects, we show that these are the positions most often filled by RTW teachers.

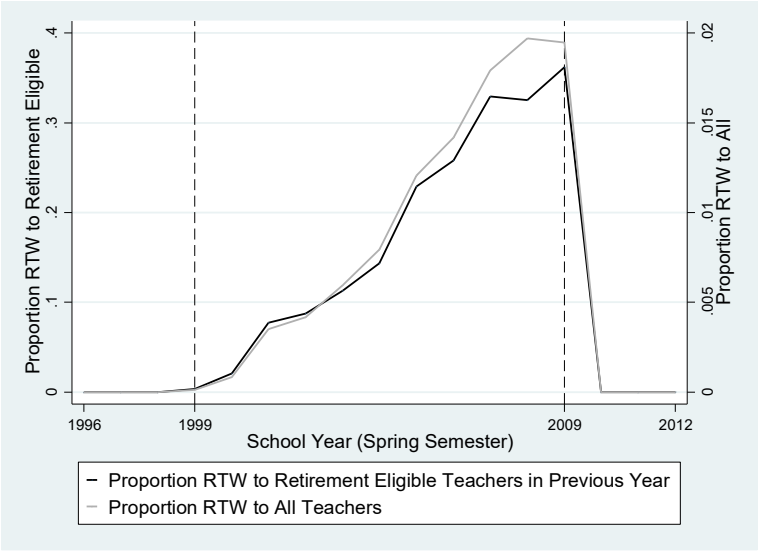
Return-to-Work Policy

North Carolina implemented a RTW policy in 1999 to combat a potential shortage of teachers in the labor market caused by the impending retirement of the large cohort of Baby Boomers. Before and after RTW, if retired teachers returned to a full-time teaching position, their pension benefits and health insurance coverage from the retirement system would be suspended. If instead they returned to a part-time position, they could keep collecting health and retirement benefits as long as their public teaching earnings did not exceed a cap of half of their previous full-time salary. RTW raised this salary cap, allowing retirees to receive both their full-time salary and pension benefits concurrently, luring retirees back to the full-time workforce.

Indeed, we see that the RTW policy brought a significant number of teachers back to work after retirement, as shown in Figure 1.

Figure 1

Policy Take-Up



Notes: This figure shows the proportion of RTW to retirement eligible teachers in the previous year (left y-axis, black line) and the proportion of RTW to all fulltime teachers (right y-axis, gray line) from 1996 through 2012. A retirement eligible teacher is someone who is (a) 65 years old with 5 years of membership service, (b) 60 years old with 25 years of service, or (c) 30 years of service at any age. The years on the x-axis correspond to the spring semester of the school year. The first and last years of the policy, 1999 and 2009, are denoted by the vertical dashed lines.

The gray line is the proportion of RTW teachers out of all teachers for each year between 1996 and 2012. It steadily increases and peaks just under 2% in 2008. While looking at the number of teachers who came back relative to all teachers does show that the policy created a meaningful incentive to return, it may be more informative to look at who came back relative to teachers qualified to take up the policy: teachers eligible for retirement.

The black line shows policy take-up relative to the number of teachers who were eligible for retirement in the prior year. A teacher is eligible for retirement if she is 65 years old with 5 years of service (i.e., has been a member of the Teachers' and State Employees' Retirement System for 5 years), 60 years old with 25 years of service, or is any age with 30 years of service. The proportion of RTW teachers out of those eligible for retirement increases throughout the policy period until 2009, when just over 35% of previously retirement eligible teachers return to full-time work. The number of RTW teachers drops to zero in 2010 corresponding with the expiration of the policy.[3]

The policy was originally set to expire in 2003 but was extended multiple times until it ultimately expired in the fall of 2009. During this time, the policy underwent several revisions. For example, during the first year of the policy, teachers were required to return to low-performing schools in places with shortages of teachers in their certification areas. They were also only allowed to return as interim instructors or substitutes, not permanent teachers. These restrictions were lifted

[3] We identify RTW teachers based on their budget codes. While teachers are no longer marked as RTW in the budget codes after the policy ends, there are some who keep working full time. Less than a quarter of RTW teachers keep working in 2010, and even fewer remain in 2011 and 2012.

in June of 2000.[4] Only 0.01% of full-time teachers (10 teachers) were RTW during this restricted policy. This may not be because the restriction was undesirable, but just that the large cohort of Baby Boomers had not yet reached retirement eligibility.

Data

We use statewide administrative data from the North Carolina Education Research Data Center (NCERDC). We primarily use data from two dimensions of this very rich dataset. The first is data on teachers, which includes demographic characteristics, information on their schooling (including the selectivity of their colleges based on the Barron's Admissions Competitiveness Index and the highest degree they earned), their years of teaching experience, and snapshots of yearly pay. Importantly, the pay data includes budget codes that allow us to identify who retired and returned during the policy period ("RTW teachers"). We limit our sample to full-time teachers because we cannot tell whether part-time workers are returning retirees (drawing their pension simultaneously) or are not yet retired. The second is data on schools from the Common Core of Data (CCD). School characteristics include type (elementary, middle, high), student characteristics (percentages of minority and economically disadvantaged students), and urbanicity. Overall, the data includes almost 168,000 full-time teachers in over 2,700 schools between 1999 and 2009. About 3,700 teachers (2.2%) returned to work during the policy and over 1,600 (58%) schools hired at least one of them.

To construct our analysis sample, we merge together the teacher and school data to get a teacher-school-year level dataset that has all the characteristics we study. Then we identify RTW teachers using the budget code indicator present in the data. We exclude teacher-year observations from our sample if the teacher is identified as RTW but has too few years of experience to realistically be retired. Specifically, about 5% of RTW teacher-year observations have less than 24

[4] Information about the policy is found in North Carolina General Assembly Legislation: S.L. 1998-212, S.L. 1998-217, S.L. 2000-67, S.L. 2001-424, S.L. 2002-126, S.L. 2004-124, S.L. 2005-144, S.L. 2005-276, S.L. 2005-345, S.L. 2007-145, S.L. 2007-326.

years of experience at ages below the appropriate cutoffs. We do not understand why these teachers are considered RTW and exclude them from our sample so they do not bias our results.

In addition, we keep only the RTW teachers who have non-missing values for the characteristics we study. Specifically, we exclude teacher-year observations if the data does not include the subject they teach; the highest degree they earned; the competitiveness of their college; their race or gender; their years of experience; whether they taught at an elementary, middle, or high school; and whether their school was located in a city, town/suburb, or rural area. We drop about 13% teacher-years due to missing values, most of whom are dropped because we cannot identify their teaching assignment.

After going through this sample selection process, there are some RTW teachers for whom we no longer observe their first year back to work after retirement. We exclude the rest of these teachers' observations to keep our analysis sample consistent. In other words, we only include RTW teachers in our sample if we can see the first year they return to work. We explain why we use only first-year RTW teachers in the methods section. Our final analysis sample includes 2,694 RTW teachers.

Methods

First, we identify RTW teachers and examine their characteristics and teaching position during the first year they return. Specifically, we look at demographics, qualifications, and the subjects they teach. We only use the first year the retiree comes back to work because we want a teacher-level sample for our analysis. This way our results describe the population of RTW teachers. An alternative would be to describe all RTW teachers over all the years they returned, but this would overweight the characteristics of teachers who return for more years. It is not problematic to use this teacher-level sample because most (85%) RTW teachers do not switch schools after their first year

back and the characteristics we observe, aside from years of experience and possibly subject taught, are time-invariant.

Second, we characterize the schools RTW teachers returned to, again in their first year back. We do this at the teacher-level, meaning schools that hired more than one RTW teacher are overrepresented. We look at average school characteristics like school level and urbanicity. Specifically, we use our teacher-level sample to identify, on average, how many RTW teachers worked in an elementary, middle, or high school, or a school that is in a city, suburb or town, or rural area. We also identify how many RTW teachers went back to the school they taught at just prior to retirement versus went to a different school.

Additionally, we examine the student body in the schools that hired RTW teachers. Since previous literature suggests that teacher shortages are concentrated in schools with many high-need students, we focus our analysis on student economic disadvantage and minority status, which are generally indicative of need. We also look at quartiles (like Carver-Thomas & Darling-Hammond, 2019 and NCES, 2022) instead of average characteristics to give us a clearer idea of the distribution of schools impacted by the policy rather than just the mean. Specifically, we calculate quartiles of the percentages of economically disadvantaged and Black students in a school-by-year dataset that covers all the policy years. We identify the quartile for each school that hired a RTW teacher. Schools with less than 23% of economically disadvantaged students are in the bottom quartile and those with more than 53% are in the top quartile. Analogously, schools with less than 11% of Black students are in the bottom quartile while schools with over 49% are in the top quartile. Then we determine how many first-year RTW teachers taught in schools within each quartile over the policy period. This tells us the distribution of RTW teachers across schools with varying degrees of economic disadvantage and minority student populations.

Results

Table 1 shows the average characteristics of RTW teachers in their first year back to work, as well as the average characteristics of all teachers in the first and last years of the policy as reference points.

Table 1

Average Teacher Characteristics

	RTW Teachers, First Year Back After Retirement	All Teachers in 1999	All Teachers in 2009
	(1)	(2)	(3)
Teacher Demographics			
Female	0.81	0.81	0.80
White	0.76	0.85	0.85
Black	0.22	0.14	0.13
Other Race	0.02	0.01	0.02
Teacher Qualifications			
Less Competitive College	0.45	0.38	0.35
Competitive College	0.50	0.50	0.48
More Competitive College	0.05	0.13	0.16
No Advanced Degree	0.58	0.68	0.68
Experience (in the Fall)	31.42	13.08	12.08
Years Absent Before Returning	1.46		
Teaching Assignment			
No Discipline	0.30	0.35	0.30
Communication	0.19	0.17	0.17
Math	0.15	0.10	0.12
Science	0.08	0.07	0.09
Social Studies	0.08	0.07	0.09
Arts	0.03	0.05	0.06
Vocation	0.06	0.06	0.05
Other	0.11	0.13	0.12
Number of Teachers	2,694	65,423	77,463

Notes: This table shows average characteristics of RTW teachers in their first year back to work in column (1), average characteristics of all teachers in 1999 in column (2), and average characteristics of all teachers in

2009 in column (3). All numbers in the table are average proportions of teachers with each characteristic, aside from experience and years absent before returning, which are in years. All numbers are teacher-level averages.

There are 2,694 RTW teachers in our sample. 81% of these teachers are female, in line with the broader teacher workforce. Notably, relative to all teachers in 1999 and 2009, RTW teachers are more likely to be Black. Less than 15% of all teachers are Black in each of these years whereas 22% of RTW teachers are Black.

Looking at teacher qualifications, if we just consider where they went to school, it appears that, on average, RTW teachers are not the most qualified teachers. While 13-16% of all teachers in 1999 and 2009 attended a highly competitive college according to the Barron's Admissions Competitiveness Index, only 5% of RTW teachers did so. In contrast, if we consider advanced degree attainment, it appears that RTW teachers are more qualified than the average teacher in 1999 and 2009; 42% of RTW teachers compared to 32% of all teachers have education past a bachelor's degree. In addition, RTW teachers have more experience than the average teacher, perhaps not surprising given they had to retire before they could qualify to return during the policy. On average, RTW teachers have 31 years of experience and the average teacher in 1999 and 2009 has 12-13. Taken together, we cannot draw sweeping conclusions about RTW teachers' quality, but these metrics suggest they are, apart from their experience, not terribly different from the teaching workforce overall.

In addition to their demographics and qualifications, we also observe their teaching assignments. On average, RTW teachers are most likely to teach courses with no specific discipline, which are primarily elementary school classes that include all subjects, communication classes, and math classes. 30% teach classes with no discipline, 19% teach communication, and 15% teach math. The remainder teach science, social studies, arts, vocational, and other classes. There are only a few minor differences between the subjects taught by RTW teachers and the average teacher. RTW

teachers are a bit more likely to teach communication and math classes and less likely to teach art classes compared to all teachers in 1999 and 2009.

Like the teaching assignments suggest, many RTW teachers are elementary school teachers. Specifically, 44% of RTW teachers work in elementary schools while 24% work in middle and 32% work in high schools, as shown in Table 2.

Table 2

Average School Characteristics

	RTW Teachers, First Year Back After Retirement	All Teachers in 1999	All Teachers in 2009
	(1)	(2)	(3)
School Level			
Elementary	0.44	0.48	0.47
Middle	0.24	0.24	0.23
High	0.32	0.28	0.30
Urbanicity			
Rural	0.49	0.39	0.46
Town/Suburb	0.32	0.33	0.28
City	0.19	0.28	0.26
Student Demographics			
Percent Economically Disadvantaged	40.54	31.89	38.31
Percent Black	35.61	31.32	31.73
Number of Teachers	2,694	65,423	77,463

Notes: This table shows average characteristics of RTW teachers in their first year back to work in column (1), average characteristics of all teachers in 1999 in column (2), and average characteristics of all teachers in 2009 in column (3). The numbers in the table are average proportions of teachers with each characteristic; even though these are school characteristics, the numbers are teacher-level averages (e.g., 44% of RTW teachers taught in elementary schools). There are two exceptions to this, Percent Economically Disadvantaged and Percent Black, which are the percentages of students in the average school with those characteristics. The sample size for Percent Economically Disadvantaged and Percent Black differs slightly from the number of teachers listed above because some schools having missing data on these characteristics.

Compared to all teachers in 1999 and 2009, RTW teachers are more likely to teach in high schools and less likely to teach in elementary schools. We also observe that RTW teachers are more

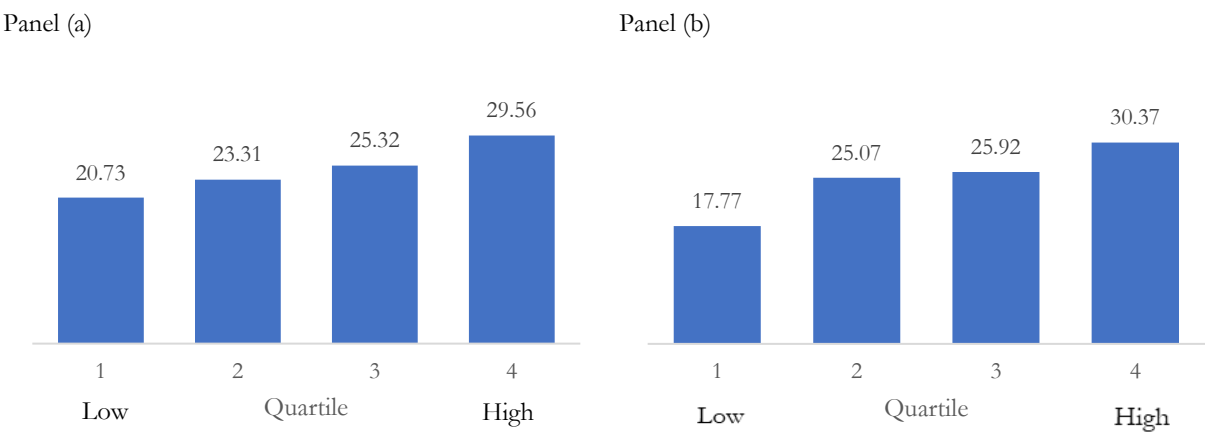
likely to teach in rural schools, both relative to town/suburban and city schools and relative to all teachers in 1999 and 2009. 49% of RTW teachers work in rural schools while 39-46% of all teachers do. Additionally, 58% of RTW teachers went back to teach at the same school where they taught just prior to retirement.

We also find that RTW teachers work in schools who serve more economically disadvantaged and Black students than the average teacher. RTW teachers return to schools where 41% of students are economically disadvantaged, whereas the average teacher works in schools where 32-38% are economically disadvantaged. Similarly, RTW teachers return to schools where 36% of students are Black while the average teacher works in schools where 31-32% of students are Black. Given these average differences, and that the literature suggests that schools at the upper end of the poverty and minority distributions suffer most from teacher shortages, we delve deeper into how RTW teachers sort across schools.

Figure 2 shows the distribution of RTW teachers across schools with different levels of economically disadvantaged students (panel (a)) and Black students (panel (b)).

Figure 2

Percent of RTW Teachers by Quartile of School Percent Economically Disadvantaged Students (a) and Black Students (b)



Notes: This figure shows the percentage of RTW teachers in each quartile of the percentage of economically disadvantaged (panel (a)) or Black (panel (b)) students in schools. Quartiles are calculated in a school-by-year level dataset that includes

1999-2009. Only the first year a RTW teacher comes back to work is used to group her into a quartile. The percentages across quartiles may sum to just shy of 100% due to some schools missing data on the percentage of economically disadvantaged or Black students.

Each column in these graphs represents the percentage of RTW teachers who taught in schools in the given quartile. Quartile 1 includes schools with the fewest economically disadvantaged or Black students while quartile 4 includes schools with the most. If RTW teachers were distributed equally across quartiles, there would be 25% of them in each quartile. However, panel (a) shows that 30% of RTW teachers taught in schools in the top quartile of the percent of economically disadvantaged students, while 21% taught in schools in the bottom quartile. This difference is statistically significant at the 1% level. Similarly, panel (b) shows that 30% of RTW teachers taught in schools in the fourth quartile of the percent of Black students, while just 18% taught in schools in the first quartile. This difference is also statistically significant. To put these findings another way, RTW teachers are disproportionately hired by schools with more traditionally high-need students, schools where there are generally more teacher shortages.

We check the robustness of our results relative to a couple different things. First, given how we calculate quartiles, it is possible for schools to fall in different quartiles over time. To make sure the differences in the number of RTW teachers across quartiles is not being driven by schools changing quartiles, we hold constant the school's percentage of economically disadvantaged or Black students at the 1999 level and repeat our analysis. The numbers change somewhat in magnitude, but the takeaway stays the same. Second, we know that the number of teachers becoming eligible for retirement is increasing over time in our sample as more Baby Boomers reach retirement age. It could be the case that the schools in the top quartiles just have a lot of teachers close to retirement and that is why there are more RTW teachers in those schools. We test for this by testing whether the percentage of teachers eligible for retirement is different across quartiles. We find that consistently 5-6% of teachers in each quartile of either the percentage of economically disadvantaged

or the percentage of Black students are eligible for retirement, leading us to conclude that our results are not being driven by differences in the number of retirement-eligible teachers across schools.

Discussion of Limitations and Unintended Consequences

The key takeaway from our analysis is that the North Carolina RTW policy incentivized teachers to come back to work and the schools that hired them were high-need schools. There are a few things policymakers may be interested in or should keep in mind when interpreting this result. First, data limitations prevent us from answering certain questions. For instance, we cannot estimate the size of the teacher shortage in North Carolina because we do not have data on vacancies.[5] Thus, we do not know the degree to which the RTW policy offset the teacher shortage. We only know that many Baby Boomer teachers were retiring at this time, and that the policy was able to bring some of them back.

Another data limitation is that we do not know who would have taught in place of RTW teachers absent the policy. We cannot easily infer a counterfactual because RTW teachers were not randomly assigned to classrooms and the structure of the policy does not provide a natural experiment for us to exploit. This makes it difficult for us to get an estimate of the potential benefits of the policy (e.g., the effect of RTW teachers on student achievement) and conduct a cost-benefit analysis. As an exercise, we think about the cost differentials if a novice teacher or another highly experienced teacher was hired instead of a RTW teacher. If a novice teacher was hired instead, the school district would pay out a lower salary plus health benefits, but the RTW teacher would still get an annuity and health benefits. If the district hired the RTW teacher, the district would pay a higher salary plus her annuity and health benefits. Thus, the cost of hiring a RTW teacher rather than a novice teacher is not the annuity – because this would be paid regardless. Instead, it is the difference

[5] Bleiberg & Kraft (2022) describe how difficult it is to truly estimate shortages because there is no system for gathering good data on employment, vacancies, and turnover for teachers and education staff.

between the two teachers' salaries minus the amount that would have been paid for the novice's health benefits. To some degree, this additional cost is likely mitigated by the fact that more experienced teachers are generally more effective than novices.[6] Additionally, the cost differential may decline over time as the novice teacher gains experience and is paid a higher salary. An alternative scenario is that the school district hires another highly experienced, non-retired teacher instead of the RTW teacher. In this case, their salaries are likely similar and which teacher would be the better hire depends on their relative quality.

Second, the policy may have unintended consequences. We need to think carefully about potential incentives embedded in the policy, one of which is that it may induce teachers to retire earlier than they would have otherwise just to return and reap the policy's benefits. We do not formally test whether this occurred but based on how teacher pension plans work in North Carolina, we think this kind of behavior was unlikely. North Carolina teachers are incentivized to retire at a relatively young age because of the state's defined-benefit (DB) retirement plan. Like we described before, those who are 65 years old with five years of membership service (i.e., five years with the Teachers' and State Employees' Retirement System), 60 years old with 25 years of service, or those with 30 years of service (at any age) could receive their full pension benefits immediately upon retirement (Folwell & Toole, 2017). If they retired without meeting these requirements, they would receive a reduced pension or have to wait before payments start, decreasing the incentive to retire. Once eligible for full benefits, the opportunity cost of working increases due to forgoing pension benefits, increasing the incentive to retire (Costrell & Podgursky, 2009). This structure both compels teachers to stay until they are eligible for full benefits and pushes them to leave after they become eligible (Costrell & McGee, 2010).

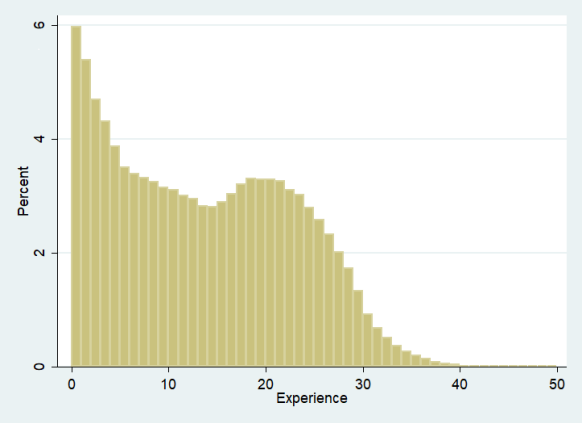
[6] There is clear evidence that experienced teachers are more effective than novices. The evidence on whether experience gained after the first five years leads to additional improvement in effectiveness is mixed. See Rockoff (2004); Rivkin, et al. (2005); Harris & Sass (2011); Wiswall (2013); and Papay & Kraft (2015).

Figure 3 shows the distribution of teacher experience for all full-time teachers before the RTW policy in panel (a). Because of the pension plan structure, after about 30 years of experience, the number of teachers in the workforce declines dramatically. This pattern is not affected by the RTW policy. Panel (b) shows that during the policy most teachers still leave after reaching retirement age. Finally, panel (c) shows the experience distribution of RTW teachers. While there are some RTW teachers with less than 30 years of experience, the majority have 30-40 years of experience. This suggests that RTW teachers are not retiring early to take advantage of the policy.

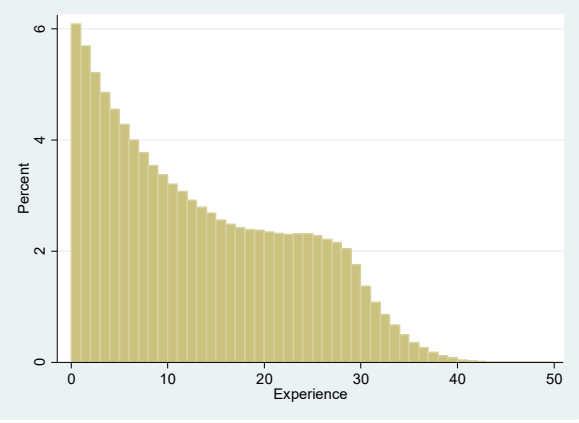
Figure 3

Histograms of Teacher Experience for All Teachers Before the RTW Policy (a), All Teachers During the RTW Policy (b), and RTW Teachers (c)

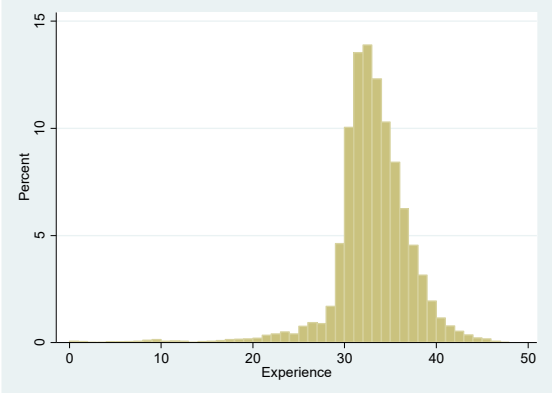
Panel (a)



Panel (b)



Panel (c)



Notes: This figure shows histograms of teacher experience, i.e., the percentage of all fulltime teachers between 1995 and 1998 (panel (a)), all fulltime teachers between 1999 and 2009 (panel (b)), and RTW teachers between 1999 and 2009 (panel (c)) with different years of experience.

Policy Implications

While we do not directly address the RTW policy adopted by North Carolina from July 2019 through June 2021, or the one proposed by lawmakers in March 2023,[7] our results can shed some light on the potential effects of these recent policies given their similarities to the one we study. Like the one we examine, the recent versions allow retired teachers to return to work full-time and collect both retirement benefits and earn a full-time salary. One difference is that the new policies require teachers to return to low-performing, high-need schools. Our results suggest that the new policies will incentivize retired teachers to return to high-need schools even without this stipulation, and thus that targeting these schools is perhaps unnecessary, but also inconsequential. While we cannot definitively say why RTW teachers tend to teach in high-need schools, we posit that these are the schools where teacher demand is high, and supply is low. A school with few high-need students likely has many teachers interested, thus any policy looking to get RTW teachers in high-need schools just needs to privilege non-retired teachers' applications rather than disallow RTW teachers from applying. Further exploring the labor market for RTW teachers and their impact on student achievement is a promising area for future research.

[7] See S.L. 2019-110 and S.B. 2023-187 for more details.

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