School and Teacher Characteristics and Proficiency Rates of Black, White, and Economically Disadvantaged Students: An Exploratory Analysis of Forsyth County, NC Elementary Schools

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EXECUTIVE SUMMARY

Economic mobility has been declining in the United States since the 1940s. In southern states, like North Carolina, mobility rates are as low as 5 percent in counties like Forsyth. The quality of school systems is one of the strongest correlates to upward mobility, especially among low-income persons. Using 2018 North Carolina Public School Report Card (SRC) data, I find that the share of experienced teachers at an elementary school significantly predicts the share of students (all, economically disadvantaged, black, and white) that score proficiently on standardized tests. The magnitude and significance of the relationship is strongest for disadvantaged children. Research demonstrates that experienced and high-quality teachers promote student achievement, which improves the economic outcomes of students, especially those from underprivileged households. NC school systems can contribute to reversing the low mobility rates by re-allocating experienced teachers to schools that predominately serve them.

INTRODUTION

There are some areas in the United States where upward economic mobility is nearly impossible to attain. Mobility rates are especially low in states, such as North Carolina where rates are as low is 5 percent in counties like Forsyth.[1] Hence, in Forsyth County, NC, a child born to parents in the bottom quantile of the income distribution has less than a 5 percent chance of reaching the top quantile as an adult.[2] In their paper, Chetty et al. (2014) find that one of the most consistent and robust correlates to these mobility rates are the quality of local school systems.[3]

Research demonstrates that receiving an education from a high-quality school can improve long-term economic outcomes.[4] Findings suggest that attending high-quality schools can significantly increase the achievements of economically disadvantaged children.[5] Indeed, Dobbie and Fryer Jr. (2011) show that attending elementary schools, within the Harlem Children's zone, can close achievement gaps between black and white children in both English and mathematics.[6] The presence of particular school-related characteristics, in as early as kindergarten, can have profound impacts.[7] Chetty et al. (2011) find that kindergarten children randomly assigned to talented teachers earned substantially more in total lifetime earnings, compared to children who had average teachers.[8] Hence, elementary school is a critical phase in a child's life, especially a disadvantaged child, regarding his/her upward mobility.

[1] Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. *The Quarterly Journal of Economics*, *129*(4), 1553-1623.
[2] *Id.* at 1.
[3] *Id.*
[4] Card, D., & Krueger, A. B. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy*, *100*(1), 1-40; Dobbie, W., & Fryer Jr, R. G. (2011). Are high-quality schools enough to increase achievement among the poor? Evidence from the Harlem Children's Zone. *American Economic Journal: Applied Economics*, *3*(3), 158-87; Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schanzenbach, D. W., & Yagan, D. (2011). How does your kindergarten classroom affect your earnings? Evidence from Project STAR. *The Quarterly Journal of Economics*, *126*(4), 1593-1660;
[5] *Id*. at 3.
[6] *Id.*
[7] *Id.*
[8] *Id.*

Considering the importance of elementary education in determining the economic outcomes of children, understanding the part that elementary school teachers play is crucial. Since the quality of an elementary school education affects economic mobility, and teachers affect the quality of an education received, it stands to reason, then, that they play a critical role in the promotion of upward mobility. Moreover, considering that high-quality teachers can significantly impact disadvantaged students' achievement and teacher-related characteristics associated with high-quality (advanced degrees, full certifications, and more years of experience) are positively related to student achievement, it stands to reason that these characteristics may have differential impacts on different groups of students (economically disadvantaged, black, or white students).

In the present study, I examine a subset of NC public elementary schools to understand how certain teacher and school characteristics are related to student performance. Since there is evidence that attending high-quality schools is particularly beneficial to economically disadvantaged (ED) and black students, I apply the analysis across different groups of students. Thus, in addition to analyzing students in general, I also separately analyze the performance of ED, black, and white students. I find that teacher characteristics, like having more experience, more education, and lower turnover, are significantly related to student proficiency. Moreover, I find that the magnitude and significance of the relationship between teacher experience and proficiency is largest for ED students. Additionally, I find that student attendance and the share of students in poverty both predict student proficiency rates.

This paper proceeds as follows. First, I briefly review the relevant literature. Second, I present the results and interpret key findings. Third, I discuss the implications of the results.

BACKGROUND LITERATURE

In their influential paper on intergenerational income mobility, Chetty et al. (2014) find that the quality of local primary school systems is one of the strongest correlates to upward mobility rates in the US.[9] Chetty et al. (2014) use grades 3-8 math scores as a proxy for school quality, and find that they are consistently and robustly correlated to many different mobility statistics.[10] Dobbie and Fryer Jr. (2011) demonstrate that attending elementary schools in the Harlem Children's zone can close achievement gaps between white and black children, which promotes better long-term outcomes.[11] Hanushek and Woessmann (2012) show that effective schools promote long-term economic growth through their promotion of cognitive skills.[12] In their 1992 study, Card and Kruger estimate that for every additional year of schooling received in a state with high-quality schools, men earn a higher rate of return.[13] Card and Kruger (1992) demonstrate that rates of return were higher for individuals from states with better-educated teachers.[14] Chetty et al. (2011), analyzing Project STAR data, find that kindergarteners randomly assigned to above average teachers earned significantly higher lifetime earnings, compared to children with average teachers.[15] Indeed, research regularly shows teachers are an important factor in determining the effectiveness of schools at promoting student outcomes, especially at the elementary school level.

Research finds that teachers are important factors in determining the effectiveness of schools at promoting student achievement. Using various proxies for teacher quality, Greenwald, Hedges, and Laine (1996) show that teacher quality is positively related to student achievement.[16]

[9] *Id.* at 3.
[10] *Id.*
[11] *Id.*
[12] Hanushek, E. A., & Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of economic growth, 17*(4), 267-321.
[13] *Id.* at 4.
[14] *Id.*
[15] *Id.*
[16] Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of educational research, 66*(3), 361-396.

Hanushek (2011) estimates that having a teacher just one standard deviation above the mean effectiveness can result in a student earning an additional $400,000 in lifetime earnings.[17] Using a similar approach, Chetty, Friedman, Rockoff (2014) find that if a below average teacher was replaced by an average teacher, the average student stood to gain an additional $250,000 in future earnings.[18] In their 2007 paper, Anderson, Barrow, and Sander demonstrate that high-quality teachers can significantly increase the achievements of students, especially economically disadvantaged students.[19] Hence, effective teachers promote the upward mobility of their students, especially those from disadvantaged families. These findings suggest that certain teacher characteristics may be closely related to student achievement.

Many studies find evidence that teacher characteristics, such having advanced degrees and more experience, are positively related to student outcomes.[20] Croninger, Rice, Rathbun, and Nishio (2007) find that having teaching certifications and licenses, and more years of experience are all related to early student achievement and learning.[21] Harris and Sass (2011) find that experienced teachers are highly effective at promoting their students' reading and math skills, especially elementary school teachers.[22] Nye, Konstantopoulos and Hedges (2004) find similar results demonstrating a significant relationship between teacher experience and elementary school student

[17] Hanushek, E. A. (2011). The economic value of higher teacher quality. *Economics of Education review*, *30*(3), 466-479.
[18] Chetty, R., Friedman, J. N., & Rockoff, J. E. (2014). Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. *American economic review*, *104*(9), 2633-79.
[19] Aaronson, D., Barrow, L., & Sander, W. (2007). Teachers and student achievement in the Chicago public high schools. *Journal of Labor Economics*, *25*(1), 95-135.
[20] Cavalluzzo, L. C. (2004). Is National Board Certification an Effective Signal of Teacher Quality? CNA Corporation; Hanushek, E. A., Kain, J. F., O'Brien, D. M., & Rivkin, S. G. (2005). The market for teacher quality (No. w11154). National Bureau of Economic Research; Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American economic review*, *94*(2), 247-252; Rowan, B., Chiang, F. S., & Miller, R. J. (1997). Using research on employees' performance to study the effects of teachers on students' achievement. *Sociology of education*, 256-284; *Id.* at 16; Betts, J. R., Zau, A., & Rice, L. (2003). Determinants of student achievement: New evidence from San Diego (pp. 1-5821). San Francisco: Public Policy Institute of California; Dee, T.S. (2004). Teachers, race, and student achievement in a randomized experiment, *Review of Economics and Statistics*, *86*(1), 195–210; Center for the Study of Teaching and Policy, Wilson, S. M., Floden, R. E., & Ferrini-Mundy, J. (2001). Teacher preparation research: Current knowledge, gaps, and recommendations: A research report prepared for the US department of education and the office for educational research and improvement, February 2001. Center for the Study of Teaching and Policy.
[21] Croninger, R. G., Rice, J. K., Rathbun, A., & Nishio, M. (2007). Teacher qualifications and early learning: Effects of certification, degree, and experience on first-grade student achievement. *Economics of Education review*, *26*(3), 312-324.
[22] Harris, D. N., & Sass, T. R. (2011). Teacher training, teacher quality and student achievement. *Journal of public economics*, 95(7-8), 798-812.

achievement.[23] Etim, Etim, and Blizard (2020) show that in NC, middle schools with larger shares of experienced teachers tend to earn higher performance scores.[24] In the same paper, they find that teacher turnover is inversely related to school performance.[25] In a study focused on Forsyth County, NC elementary schools, Blizard (2021) finds similar results.[26] Thus, teacher experience and qualifications can promote better student achievement, especially in elementary school.

FINDINGS[27]

Figure 1 is a 1x3 panel of scatterplots, plotting the estimated simple linear relationships between student proficiency rates of all (grey), black (blue), white (red), and economically disadvantaged (ED) (green) students with the share of teachers with 0 to 4, 4 to 10, and over ten years of experience, all at the school level.[28] Each panel, for each group of students, shows very similar linear relationships. The more inexperienced teachers a school has, the lower student proficiency rates tend to be and the more highly experienced teachers a school has, the higher student proficiency rates tend to be. However, one difference is that for both black and ED students, their proficiency rates are negatively related to the share of teachers at a school with 4 to 10 years of experience, while for white students' proficiency rates, they are positively related to it.

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[23] Nye, B., Konstantopoulos, S., & Hedges, L. V. (2004). How large are teacher effects?. *Educational evaluation and policy analysis*, *26*(3), 237-257.

[24] Etim, J. S., Etim, A. S., & Blizard, Z. D. (2020). Teacher Effects, Student School Attendance and Student Outcomes: Comparing Low and High Performing Schools in North Carolina. *Educational Research Quarterly*, *44*(2), 47-81.

[25] *Id*. at 24.

[26] Blizard, Z. D. (2020). Has the Allocation of Certain Teachers Impacted Student Achievement and Upward Economic Mobility? The Case of Forsyth County, NC Elementary Schools. *Education and Urban Society*, 0013124520972678.

[27] Data used in this study are for NC public elementary schools for the year 2018. The analysis dataset includes 990 records for 990 schools. There are 1,329 public elementary schools in NC, hence, the dataset includes around 75 percent of the elementary schools in the state. The 339 elementary schools that were dropped from the final dataset had missing values for many of the key variables in the analysis. Once complete case was established among the observations and variables, the final dataset contained 990 schools.

[28] *Student Proficiency Rate* is the percentage of students in one of five proficiency levels for both EOC and EOG subjects. The public school system also provides a calculation specifying the percentage of students within one of the five levels for both the EOC and EOG, aggregated across all subjects. Therefore, this proficiency calculation is comprised of a set of five mutually exclusive and exhaustive variables. They are the following:

1. The first variable is the percentage of students, at a given school, that earn level 1 proficiencies on their exams.
2. The second variable is the percentage of students, at a given school, that earn level 2 proficiencies on their exams.
3. The third variable the percentage of students, at a given school, that earn level 3 proficiencies on their exams.
4. The fourth variable is the percentage of students, at a given school, that earn level 4 proficiencies on their exams.
5. The fifth variable the percentage of students, at a given school, that earn level 5 proficiencies on their exams.

For my analysis, four types of the proficiency variables are used, corresponding to different sets of students, which are all students, ED students, black students, and white students. Levels 3-5 are considered proficient levels, thus, from the set of 5 variables, I construct two new kinds of variables. The first is a variable measuring the share of students considered proficient, which is the sum of the shares of students in levels 3, 4, and 5.

Figure 1. Teacher Experience and Student Proficiency

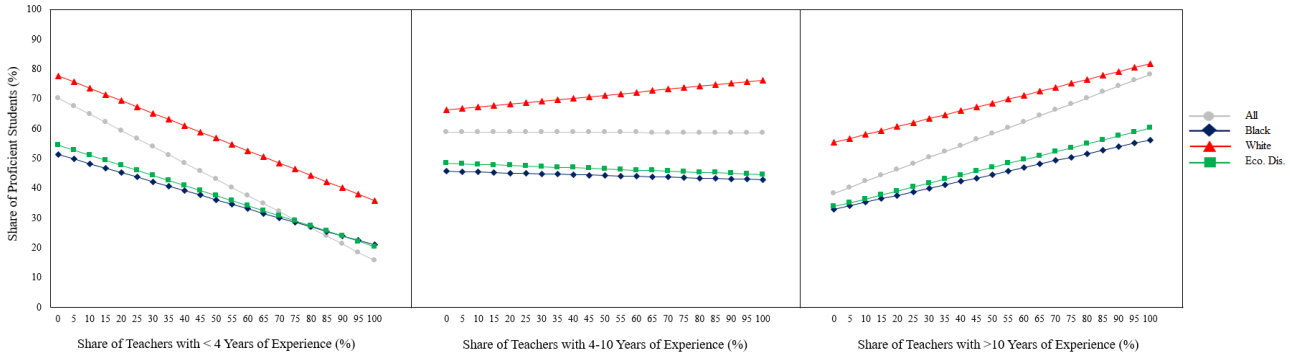

Figure 2 plots the estimated linear relationships between the student proficiency rates and the share of teachers with advanced degrees. For each of the four groups of students (all, black, white, and ED), there is a positively relationship between their proficiency rates and the share of teachers with advanced degrees. The relationship between the proficiency rates for whites and advanced degrees is noticeably steeper than those for black students and ED students. The latter of which is very flat and barely positive.

Figure 3 plots the estimated linear relationships between student proficiency rates and teacher turnover rates, at the school level. For each group of students, there is a negative relationship between proficiency rates and teacher turnover.

Figure 2. Advanced Degrees and Student Proficiency

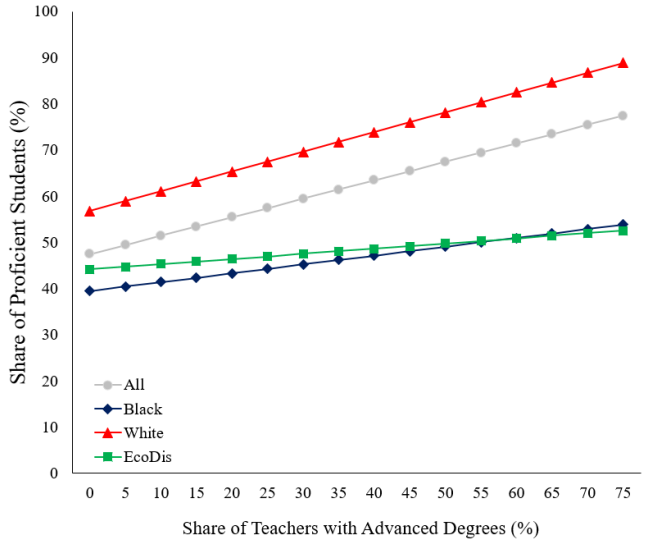

Figure 3. Teacher Turnover and Student Proficiency

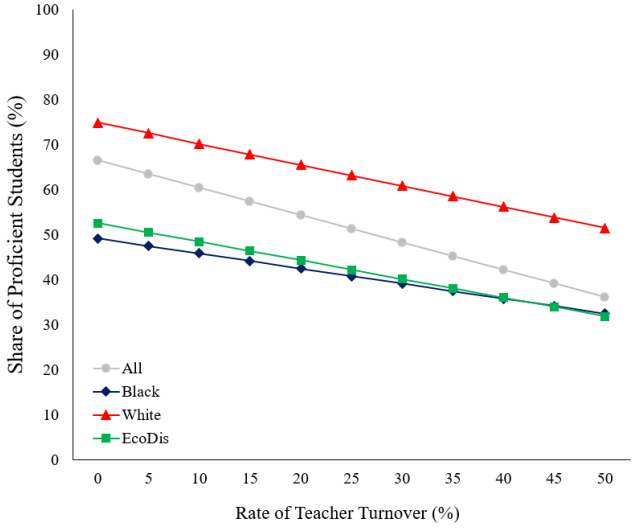

Figure 4 plots the estimated linear relationships between the student proficiency rates and the share of teachers with full licenses, at the school level. For each of the four groups of students, there is a positive relationship between their proficiency rates and the share of teachers with advanced degrees. The relationship between the proficiency rates for whites and full licenses is slightly flatter than those for black students and ED students.

Figure 4. Full Licenses and Student Proficiency

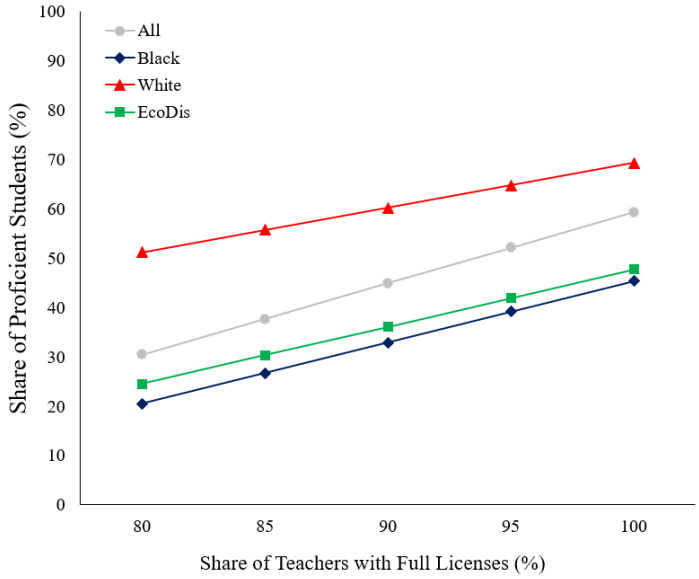

Figure 5 plots the estimated linear relationships between the student proficiency rates and the average daily student attendance rate, at the school level. For each of the four groups of students, there is a positive relationship between their proficiency rates and the average daily student attendance rate. The relationship between the proficiency rates for whites and attendance is sharper than those for black students and ED students.

Figure 5. Student Attendance and Student Proficiency

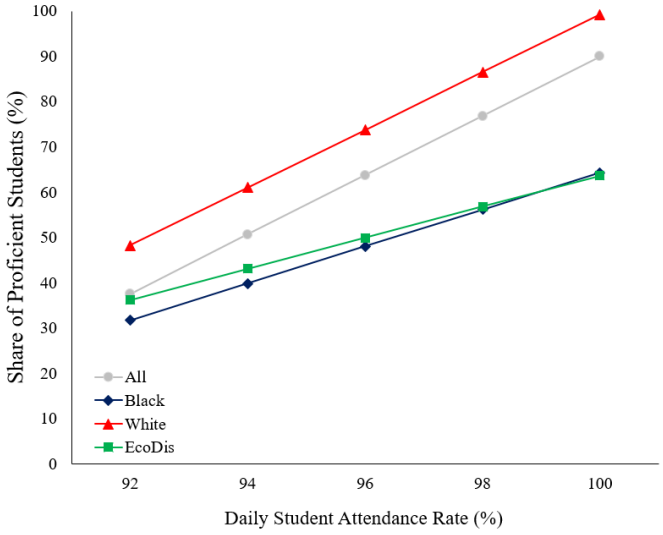

Figure 6 plots the estimated linear relationships between the student proficiency rates and the share of the student population that come from ED households. For each of the four groups of students, there is a negative relationship between their proficiency rates and the share of the student population that come from ED households. The relationship between the proficiency rates for whites and economic disadvantage is sharper than those for black students and ED students.

Figure 6. Disadvantaged Students and Student Proficiency

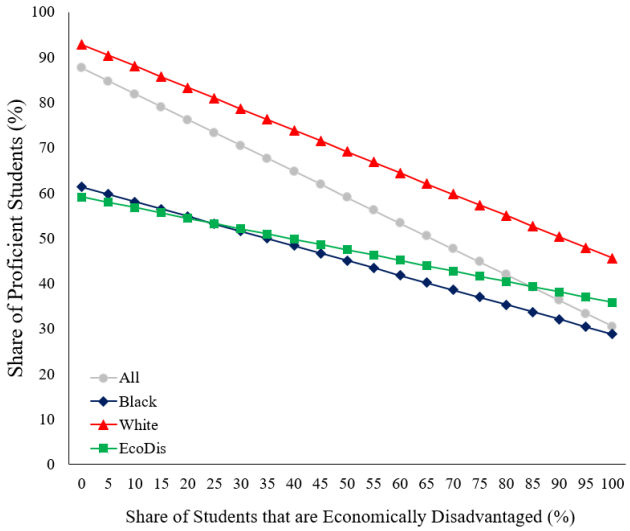

Table 1 shows what school-level characteristics are the most correlated with student proficiency rates, ordered from highest to lowest. For all four groups, their proficiency rates are most correlated with the share of students that are ED. The share of inexperienced teachers and student attendance are both similarly ranked among all groups. Teacher turnover seems particularly detrimental to black students' proficiency rates, while teachers with advanced degrees seem to benefit white students the most. Lastly, inexperienced teachers is more detrimental and highly experienced teachers is more beneficial to ED students.

Table 2 shows the statistically significant results from four linear regressions, corresponding to each of the four groups. Larger shares of highly experienced teachers are positively related to the share of all, ED, black, and white students that are proficient. The magnitude and significance of

the estimated relationship is strongest for ED students. Larger shares of teachers with advanced degrees are positively related to the share of white students that are proficient, however, they are negatively related to the share of ED students that are proficient. Larger shares of teachers with full licenses are positively related to the share of ED and black students that are proficient. Higher teacher turnover is negatively related to the share of all, ED, and white students that are proficient.

Table 1. Size of Correlations and Student Proficiency

Order of Size of Correlation	Student Group			
	All	Black	White	Economically Disadvantaged
1st	- Students that are Economically Disadvantaged (%)	- Students that are Economically Disadvantaged (%)	- Students that are Economically Disadvantaged (%)	- Students that are Economically Disadvantaged (%)
2nd	+ Daily Student Attendance (%)	+ Daily Student Attendance (%)	+ Daily Student Attendance (%)	- Teachers with 0 to 3 Years of Experience (%)
3rd	- Teachers with 0 to 3 Years of Experience (%)	- Teachers with 0 to 3 Years of Experience (%)	- Teachers with 0 to 3 Years of Experience (%)	+ Daily Student Attendance (%)
4th	+ Teachers with Over 10 Years of Experience (%)	- Rate of Teacher Turnover (%)	+ Teachers with Advanced Degrees (%)	+ Teachers with over 10 Years of Experience
5th	- Rate of Teacher Turnover (%)	+ Teachers with Over 10 Years of Experience (%)	+ Teachers with Over 10 Years of Experience (%)	- Rate of Teacher Turnover (%)
6th	+ Teachers with Advanced Degrees (%)	+ Teachers with Advanced Degrees (%)	- Rate of Teacher Turnover (%)	+ Teachers with Full Licenses (%)
7th	+ Teachers with Full Licenses (%)	+ Teachers with Full Licenses (%)	+ Teachers with Full Licenses (%)	+ Teachers with Advanced Degrees (%)
8th	- Teachers with 4 to 10 Years of Experience (%)	- Teachers with 4 to 10 Years of Experience (%)	+ Teachers with 4 to 10 Years of Experience (%)	- Teachers with 4 to 10 Years of Experience (%)

Table 2. Model Results

	Proficiency rates amount students that are…			
	All (*all students, regardless of race or SES*)	Black	White	Economically Disadvantaged
When the share of teachers with…				
4 to 10 years of experience *increases* by 1 percentage point….	+ 0.1346 points	+ 0.0461 points	+ 0.1399 points	+ 0.1245 points
Over 10 years of experience *increases* by 1 percentage point….	+ 0.2304 points	+ 0.1395 points	+ 0.1096 points	+ 0.2356 points
Advanced degrees *increases* by 1 percentage point….	+ 0.0058 points	- 0.0462 points	+ 0.1223 points	- 0.1199 points
Full licenses *increases* by 1 percentage point….	+ 0.1760 points	+ 0.5455 points	- 0.1731 points	+ 0.4670 points
When the rate of **teacher turnover** *increases* by 1 percentage point…	- 0.1410 points	- 0.0462 points	- 0.1120 points	- 0.1408 points
When the **average daily student attendance rate** *increases* by 1 percentage point…	+ 2.6657 points	+ 2.0466 points	+ 3.1701 points	+ 2.1401 points
When the share of **students that are economically disadvantaged** *increases* by 1 percentage point…	- 0.4517 points	- 0.2513 points	- 0.3449 points	- 0.1465 points

DISCUSSION

Countless studies show that teachers and schools can promote the long-term economic outcomes of students, with the effect being substantial ED students.[29] Studies find that high quality teachers can promote student outcomes.[30] Advanced degrees, certifications, and years of experience have all been linked to better student achievements.[31] Hence, elementary school is a critical stage in a child's life. Considering the impact that schools and teachers can have on economic mobility, through their effect on student proficiency, a primary goal of this paper was to understand how they may help in reversing the low mobility rates in North Carolina. A secondary goal was to understand how the relationship may differ across groups of students.

Like other states in the US, the low-performing elementary schools in NC tend to have less experienced and educated teachers on staff, compared to the high-performing schools.[32] Furthermore, the low-performing schools tend to predominately serve students from ED households.[33] Numerous studies find similarly skewed distributions of inexperienced and experienced teachers.[34] Researchers emphasize that experienced teachers tend to leave these environments because of the "poor working conditions that make it difficult for" teachers "to teach and their students to learn".[35] In the present study, the results of the analysis show that the larger the share of highly experienced teachers on staff, the greater the share of proficient students there are, with the magnitude being the largest for ED students. This finding aligns well with others in

[29] *Id.* at 19; *Id*. at 4.
[30] *Id.* at 4.
[31] *Id.* at 20; Hanushek, E. A., Kain, J. F., O'Brien, D. M., & Rivkin, S. G. (2005). The market for teacher quality (No. w11154). National Bureau of Economic Research.
[32] *Id*. at 24; *Id*. at 25.
[33] *Id*. at 25.
[34] Rice, J. K. (2010). The Impact of Teacher Experience: Examining the Evidence and Policy Implications (No. 11). National Center for Analysis of Longitudinal Data in Education Research; Boyd, D., Lankford, H., Loeb, S., Rockoff, J., & Wyckoff, J. (2008). The narrowing gap in New York City teacher qualifications and its implications for student achievement in high-poverty schools. Journal of Policy Analysis and Management: *The Journal of the Association for Public Policy Analysis and Management, 27* (4), 793-818; Clotfelter, C., Ladd, H. F., Vigdor, J., & Wheeler, J. (2006). High-poverty schools and the distribution of teachers and principals. *NCL Rev., 85*, 1345; Sass, T. R., Hannaway, J., Xu, Z., Figlio, D. N., & Feng, L. (2012). Value added of teachers in high-poverty schools and lower poverty schools. *Journal of Urban Economics, 72*(2-3), 104-122.
[35] Simon, N. S., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. *Teachers College Record, 117*(3), 1-36.

the literature. Nevertheless, because experienced teachers tend to be located at schools that serve fewer disadvantaged children, these children are less likely to benefit from these teachers' talents and expertise.

This study found that teacher turnover rates are significantly related to student proficiency. As teacher turnover rates increase, a school's share of proficient students decrease, with the estimated relationship being significant for the share of white and ED students. Turnover, in particular, can be a major challenge for schools that serve predominately disadvantaged kids. Guin (2004) finds that schools with high turnover struggle "implementing a coherent curriculum and sustaining positive working relationships among teachers."[36] Hanushek, Rivkin, and Schiman (2016) find that turnover is particularly damaging to lower-achieving schools, due to the losses in teacher productivity and experience.[37] In their 2013 study, Ronfeldt, Loeb, and Wyckoff, using a sample of 850,000 fourth and fifth-grade students, found that high turnover lowers math and English scores.[38] They also found the effects to be worse for low-performing black students.[39] Hence, the present study supports this finding in that NC elementary schools with high rates of teacher turnover tend to have lower shares of students who score at proficient levels on standardized tests. Further complicating the situation is the fact that teachers who leave low-performing schools are often the most effective teachers.[40] These teachers tend to leave for high-performing schools, while less effective and experienced teachers remain at low-performing schools.[41]

[36] Guin, K. (2004). Chronic teacher turnover in urban elementary schools. *Education Policy Analysis Archives, 12*, 42.
[37] Hanushek, E. A., Rivkin, S. G., & Schiman, J. C. (2016). Dynamic effects of teacher turnover on the quality of instruction. *Economics of Education Review, 55*, 132-148.
[38] Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal, 50*(1), 4-36.
[39] *Id.* at 36.
[40] Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff, J. (2008). Who leaves? Teacher attrition and student achievement (No. w14022). National Bureau of Economic Research.
[41] *Id*. at 32.

A surprising finding from the present study is that larger shares of highly educated teachers are negatively related to the share of proficient ED and black students. This is unintuitive because with more advanced education and formal training, one would expect a teacher to be better at promoting student academic achievement and outcomes. Studies do find positive relationships between these variables.[42] However, considering the data used in the given study is at the school level, there are likely student and teacher-level factors that are left unmeasured. However, the result may stem from a well-supported phenomenon. Firstly, a greater share of whites in the US possess advanced degrees. Secondly, a greater share of elementary school teachers are white. Therefore, it could be the case that the elementary school teachers with advanced degrees are much more likely to be white, instead of black or Hispanic.[43] Research finds that ED students and black students tend to have better academic outcomes when their teachers are similar to them, in terms of ethnicity, culture, and background.[44] Hence, if ED and black students tend to have lower levels of proficiency at schools with larger shares of teachers with advanced degrees, and those teachers are more likely to be white, it could be a result of the phenomenon just described. Nevertheless, this is largely speculative because the data does not permit a firm conclusion on this point.

In NC, student proficiency is higher at elementary schools with higher shares of experienced teachers and lower turnover rates. The magnitude is largest for ED students, where the estimated relationships between highly experienced teachers and turnover with ED student proficiency is largest. Additionally, black and ED student proficiency is lower at elementary schools with higher

[42] *Id*. at 20.
[43] Espinosa, L. L., Turk, J. M., Taylor, M., & Chessman, H. M. (2019). Race and ethnicity in higher education: A status report. Retrieved from Virginia Tech Website.; Digest of education statistics. (n.d.). National Center for Education Statistics. Retrieved from NCES Website. Accessed on July 24, 2020.
[44] Dee, T.S. (2004). Teachers, race, and student achievement in a randomized experiment, *Review of Economics and Statistics, 86* (1), 195–210; Fairlie, R.W., Hoffmann, F., and Oreopoulos, F. (2014). A community college instructor like me: Race and ethnicity interactions in the classroom. *The American Economic Review, 104* (8), 2567–2591; Gershenson, S., Holt, S.B., and Papageorge, N.W. (2016). Who believes in me? The effect of student–teacher demographic match on teacher expectations. *Economics of Education Review, 52*, 209–224; Gershenson, S., Hart, C., Hyman, J., Lindsay, C., & Papageorge, N. W. (2018). The long-run impacts of same-race teachers (No. w25254). National Bureau of Economic Research.

shares of teachers with advanced degrees. Bearing in mind these findings, a number of policy implications arise.

School systems should consider expanding or adopting plans to attract, and then retain, experienced teachers to low performing schools. At the same time, schools should lower the share of inexperienced teachers, subsequently increasing the share that highly experienced teachers comprise of the faculty. The goal of this adjustment to the "teacher mix" at low-performing schools is to maximize student achievement by increasing their exposure to experienced teachers. Additionally, inexperienced teachers that remain at these low-performing schools would also benefit from this policy. Since low-performing schools have low percentages of experienced teachers, this means that novice teachers may be less likely to benefit from interacting with and mentoring from experienced educators while on the job. Mentoring can be extremely beneficial to novice teachers, which can potentially improve effectiveness and reduce turnover. The final result would likely be improved student outcomes, especially for ED students. This, in turn, may have promotional effects on these students' long-term economic outcomes. Special attention should also be given towards aligning the ethnic composition of the students with the ethnic composition of the teachers. This is especially important for black students. A policy with such goals will need to incorporate a number of components.

Incentive structures need to be created or expanded to attract experienced teachers to low-performing schools. Studies show that such strategies can work, however, the incentives require more than simple pay raises. Darling-Hammond (2010) writes that numerous school systems have attempted to attract experienced teachers to low-achieving schools using large pay raises and bonuses, though whether these strategies have worked is unclear.[45] The more successful incentives

[45] Darling-Hammond, L. (2010) Recruiting and retaining teachers: Turning around the race to the bottom in high-need schools. *Journal of Curriculum and Instruction, 4*(1), 16-32.

seem to include opportunities such as the ability to participate in high-level decision making, to work for visionary principals with supportive administrations, and to join faculties that nurture collegial and professional relationships.[46] Thus, a program centered on attracting experienced teachers will incorporate the benefits just mentioned. Nevertheless, once teachers are drawn to low-performing schools, they will need to be retained there. Hence, turnover needs to be reduced. Whether financial incentives are effective at attracting experienced teachers to low-performing schools, there is evidence suggesting that financial incentives are effective at keeping them at low-performing schools.

North Carolina offered bonuses of around $2,000 to experienced and educated teachers at high-poverty schools to reduce turnover and improve teacher retention there. According to Clotfelter, Glennie, Ladd, and Vigdor (2008), this strategy reduced turnover rates by at least 12 percent.[47] According to Ingersoll's (2004) survey study, over 65 percent of departing teachers from high-poverty schools report that better monetary compensation is needed if teacher turnover is to be reduced.[48] Indeed, better compensation is often shown to be a common predictor of whether teachers stay.[49] In addition to better pay, Simon and Johnson (2015) argue that retention policies need to promote elements of teachers' working environments that are most significant to them.[50] These elements are identified as collegial relationships and school culture.[51]

Addressing low upward mobility rates will benefit businesses and local governments, in addition to students. As children, especially those from disadvantaged backgrounds, enjoy higher

[46] *Id*. at 43.
[47] Clotfelter, C., Glennie, E., Ladd, H., & Vigdor, J. (2008). Would higher salaries keep teachers in high-poverty schools? Evidence from a policy intervention in North Carolina. *Journal of Public Economics, 92*(5-6), 1352-1370.
[48] Ingersoll, R. M. (2004). Why do high-poverty schools have difficulty staffing their classrooms with qualified teachers?.
[49] Murnane, R. J., Singer, J. D., & Willett, J. B. (1989). The influences of salaries and "opportunity costs" on teachers' career choices: Evidence from North Carolina. *Harvard Educational Review, 59*(3), 325–346; Adamson, F., & Darling-Hammond, L. (2012). Funding disparities and the inequitable distribution of teachers: Evaluating sources and solutions. *Education Policy Analysis Archives, 20*, 37.
[50] *Id.* at 33.
[51] *Id.*

lifetime earnings from their exposures to uplifting elementary schools, governments will earn more in tax revenues. Moreover, early exposure to enriching environments has been shown to reduce negative behaviors, such as crime and drug abuse, which may help save tax payer dollars. With higher rates of upward mobility resulting in more education attainment, as adults, these children will be more qualified and wanted job candidates, increasing businesses' pool of possible employees. Bearing in mind that many large employers in Forsyth County face viable employee shortages, this outcome will be helpful. Hence, addressing the elementary school challenges in Forsyth County, NC can bring about "win-win-win" outcomes for the three major societal players in the community - businesses, individuals, and governments.[52]

CONCLUDING REMARKS

There are beneficial policies that NC elementary schools can pursue to help in stimulating upward mobility by improving student outcomes, especially those of economically disadvantaged children. Successful policies will seek to increase the share of experienced teachers at low-performing schools and reducing turnover, while also attempting to balance the ethnic makeup of students and teachers. Elementary schools and teachers have a critical role to play as promoters of upward economic mobility, especially in states such as NC where mobility rates are some of the lowest in the entire country.

[52] Blizard, Z. (2020). Teachers, Disadvantaged Students, and School Performance: The Case of Forsyth County Elementary Schools. CSEM Policy Brief, Volume 1, Issue 4. Retrieved from CSEM Website.