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WORKING PAPER 183 • January 2018

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Acknowledgements

This research was supported by the Walton Family Foundation and the National Center for the Analysis of Longitudinal Data in Education Research (CALDER) funded through Grant R305A060018 from the Institute of Education Sciences, U.S. Department of Education. We would like to thank Miami-Dade County Public Schools for providing part of the data used in this analysis. All opinions expressed in this paper are those of the authors and do not reflect the views of the Miami-Dade County Public Schools or our funders.

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CALDER Working Paper No. 183
January 2018

Abstract

In this study, we compare the teacher quality distributions in charter schools and traditional public schools, and examine mechanisms that might explain cross-sector differences in teacher effectiveness as measured by teacher value-added scores using school and teacher level data from Florida. We have three main findings. First, we find that teachers working in above-average poverty charter schools have significantly higher value-added scores compared to traditional public school teachers working in similar settings, which is mainly driven by the right tail of the value-added score distribution, yet we find no such differences in below-average poverty settings. Second, we find that cross-sector differences in observed teacher characteristics such as experience and educational attainment fail to explain any of the observed gaps in teacher effectiveness in higher-poverty settings. Instead, we find that differences in returns to experience on teacher productivity, which is significantly higher in the charter sector, explains most of the observed cross-sector effectiveness gaps. Third, we find considerable differences in teacher support and teacher influence on instructional policies and practices between charter schools and traditional public schools, which might help explain the higher returns to experience on teacher effectiveness as well as the observed effectiveness gaps between charter schools and traditional public schools serving disadvantaged students.

Keywords: Charter Schools, Teacher Effectiveness, Teacher Value-Added, Urban School Districts

1. Introduction

School choice is a longstanding and highly debated reform strategy in the U.S. and one promoted by the Race to the Top legislation. School choice reforms extend the traditional Tiebout choice, in which residential choice implies school choice, by providing various alternatives to the household's 'neighborhood' public school. These alternatives include private schools (via private school voucher programs), new publicly funded schools (such as charter and magnet schools), or other traditional public schools (via open enrollment programs which make out-of-boundary schools available to nonresidents).

Over the past three decades, charter schools have become the most popular form of school choice, especially in urban school districts. Since the enactment of the first charter school legislation, the number of charter schools nationwide has soared from 2 in 1992 to 7,114 in 2015, making up roughly 8 percent of all public schools. During the last decade, the number of students enrolled in public charter schools more than quadrupled from 300,000 students to 2.5 million students, accounting for 5.1 percent of all public school students and almost 15 percent of all public school students in urban school districts in 2013-14.[1] As of 2010, 43 states and the District of Columbia had enacted a charter school law (NCES, 2015).

Economic theory may suggest that such market-based educational systems, where parents 'shop' for schools, are efficiency-enhancing because they induce competition between schools and potentially produce better student-school matches. Furthermore, increasing parental choice can also be regarded as increasing equality of opportunity, since it serves to level the playing field in terms of access to high-quality education for disadvantaged students whose families cannot afford private school or

[1] In contrast, private school enrollment nationwide declined from roughly 6 million students to 5.4 million students during the same time frame.

homes near better schools. Opponents, on the other hand, argue that school choice reforms hinder the progress of low-performing public schools by attracting the 'best' students and withholding much needed funds as students depart and enrollment numbers decline. As such, a great deal of empirical research has focused on school choice.

The effectiveness with which charter schools raise student achievement has been studied at length. Observational studies of administrative data find that enrolling in a new charter school has a negative impact on student achievement growth, more so in newer schools.[2] Carruthers (2012a) shows that a small part of the maturation of new charter schools is due to accumulating faculty experience. In some settings, however, even relatively new charters compare very favorably to traditional public schools. On the other hand, recent studies have attempted to address the identification challenges by using the lottery-based admission policies to urban, oversubscribed charter schools and find large and positive impacts of charter attendance, yet the results for nonurban charters are mixed (Angrist et al., 2013; Tuttle et al., 2013, Hoxby and Murarka 2009; Dobbie and Fryer, 2011; and Abdulkadiroglu et al., 2011).[3]

In this study, we investigate the degree to which differences in teacher quality explain the effectiveness of charter schools, and in doing so, we seek to bridge the gap between research on the effectiveness of charter schools and research demonstrating the profound importance of teachers in advancing student outcomes. Ex-ante, teacher quality is a likely factor for driving charter school effectiveness because researchers commonly recognize teachers as the most important schooling factor that has significant impact on students' short-run test achievement and longer-term life outcomes, such

[2] See Bifulco & Bulkley (2008) and Gleason et al. (2010) for reviews.

[3] A related line of research examines the pathways by which charter schools affect students and teachers in traditional public schools. See Dee (1998), Hoxby (2002) and Booker et al. (2008) for empirical evidence that mainstream student performance improves in light of competition from choice schools. Fryer (2012) shows that some of the strategies employed by KIPP and "No Excuses" charter schools can be successfully implemented in traditional public schools. "No Excuses" philosophy in some urban charter schools has also been cited as a possible explanation to the disparity between urban and non-urban charter school performance (Angrist et al. 2011).

as college-going behavior and labor market earnings.[4] For instance, Rockoff (2003) finds that a one standard deviation increase in elementary teacher quality increases reading scores by .20 standard deviations and math test scores by .24 standard deviations. Similarly, Chetty et al. (2014a) find that replacing an ineffective teacher with an average teacher in elementary school has a significant effect on the present value of students' lifetime income.

Despite general agreement on the importance of teacher quality, very little is known about charter teachers or disparities in teacher effectiveness between charter schools and traditional public schools (TPS) due to two important data limitations. First, in many locales (e.g., District of Columbia), charter schools are subject to different data reporting requirements than TPS, and therefore many educational data systems lack student-teacher linkages in charter schools that are necessary to estimate teacher value-added scores. Second, despite the rapid growth of charter schools nationwide, the size of the charter school sector in many states and school districts is insufficient for adequate statistical power in a comparison of teacher effectiveness distribution across sectors. In this study, we overcome these limitations by using teacher- and school-level data from Florida, which has one of the largest charter school systems along with one of the most sophisticated educational data systems in the United States.[5]

Using these data, we compare the teacher value-added score distributions in charter schools and TPS, examine the extent to which these gaps are explained by observed teacher characteristics such as experience and educational attainment, and explore some of the mechanisms that might be contributing to these differences. Value-added scores are particularly well suited for this analysis because they have been commonly used as a measure of teacher effectiveness in research in the past decade (Goldhaber and Hansen, 2010; Hanushek et al., 2005; Harris and Sass, 2012; Koedel and Betts,

[4] See, for instance, Aaronson, Barrow, & Sander (2007), Goldhaber and Hansen (2013), Kane and Staiger (2008), and Hanushek and Rivkin (2010) for estimates of the effects of teachers on student test scores, and Chetty et al. (2014a) on the long-term effects of teachers.

[5] In particular, Florida is currently ranked third behind California and Texas in terms of the number of charter schools and charter school enrollment in 2013-14 school year.

2011; Chetty et al., 2014a and 2014b), and are currently being used in teacher evaluations in several states and school districts, including Wisconsin, Florida, and DC. Research evidence suggests that value-added models perform well in isolating the contribution of a teacher's impact on student achievement (e.g., Chetty et al. (2014b)).[6]

We find that charter teachers working in above-average poverty settings have significantly higher value-added scores compared to TPS teachers serving similar student populations. We find no such cross-sector differences among schools serving more affluent students. The results also indicate that the cross-sector teacher effectiveness gaps in above-average poverty settings are mainly driven by the right tail of the teacher value-added distribution. That is, we find that the most effective teachers working in above-average poverty charter schools have significantly higher value-added scores than the most effective teachers working in above-average poverty TPS, while we find no such difference in the left-tail of the value-added distribution. These cross-sector teacher effectiveness gaps in urban, high-poverty settings might help explain the positive effects of attending an urban charter school on student achievement found in recent lottery-based studies.

We also find that one of the mechanisms that might be contributing to these teacher effectiveness gaps in higher poverty settings is higher returns to experience on teacher productivity in the charter sector. In particular, our findings suggest no significant relationship between teacher value-added scores and experience in above-average poverty TPS. In contrast, charter teachers experience a large improvement in their value-added scores in the first 3-5 years of teaching. Our analysis of the 2011-12 wave of Schools and Staffing Survey (SASS) for teachers in Florida also provide several factors that might be contributing to cross-sector teacher effectiveness gaps including higher levels of support charter teachers receive from school administration, other teachers, and parents; and higher levels of

[6] For a review of the literature on value-added modeling, see Koedel et al. (2015).

teacher influence on instructional policies and practices (e.g., course content and teaching techniques) in the charter sector, which might lead to higher levels of teacher engagement and productivity.

2. Background

Compared to the burgeoning research literature on charter effectiveness *per se*, very little is known about charter teachers or charter teacher effectiveness. To date, the body of research on charter teachers has been mostly limited to descriptive explorations of their observable characteristics such as attitudes, education, credentials, mobility, and pay.[7] For instance, Stuit and Smith (2012) find that low union membership, low certification rates, and self-reported working conditions explain part of the fact that charter schools tend to have higher teacher turnover than traditional public schools. Jackson (2012) tests how charter school entry in North Carolina affects teacher labor markets, finding small increases in pay for traditional public school teachers and little impact on teacher turnover in traditional public schools.[8]

To our knowledge, two recent studies are worth noting for their attention to teacher value-added in charter schools. Carruthers (2012b) shows that North Carolina teachers moving to charter schools tend to be less effective in terms of math and reading value added than teachers moving between quantitatively similar mainstream schools and that this disparity is even wider for teachers moving to urban, high-minority, or low-performing charter schools. Using elementary school teachers in

[7] Survey evidence suggests that charter teachers work longer hours than traditional public school teachers (Malloy and Wohlstetter, 2003), have taken more math and science courses at the college level, but are no more or less likely to have earned a post-baccalaureate degree (Hoxby, 2002). Despite working longer hours and taking on responsibilities that are not normally expected of traditional public school teachers (like governance, hiring, and peer evaluation), charter teachers note that school autonomy and shared educational philosophies are among some of the non-pecuniary benefits of working in a charter school (Malloy and Wohlstetter 2003). Charter schools are generally free to exceed step-lane pay rates for teachers, but nonetheless, charter teachers tend to earn no more than their mainstream counterparts, and unlike mainstream school districts, charters do not necessarily pay teachers more for experience, licensure, or education (Podgursky & Ballou (2001); Hoxby (2002); Taylor (2005)).

[8] This suggests that teachers who leave traditional public schools for the charter sector likely would have changed schools or left teaching regardless of charter opportunities.

Florida, Cowen and Winters (2013) find no differential relationship between teacher attrition and teacher value added in charter schools.

In this study, we extend the literature on charter teacher effectiveness by exploring the disparities in teacher value-added between charter schools and TPS using data from Florida. Since the enactment of the charter school legislation in 1996, the charter school sector in Florida has grown exponentially, with the number of charter schools increasing from 113 in 1999 to 646 in 2014, and charter school enrollment rising from 17,251 to 251,082 during the same time frame, placing Florida third only behind California and Texas along these two measures. As of 2015, almost 10 percent of all public school students in the state attend a charter school. Figure 1 maps the charter schools in Florida in 2011. Similar to other locales, charter schools in Florida are concentrated in less affluent, urban neighborhoods where the demand for alternative schooling options is higher. In particular, more than 50 percent of all charter schools in Florida are located in five counties (out of 67) with large urban populations such as Broward, Dade, and Palm Beach all of which are part of Miami metropolitan area, Hillsborough (Tampa), and Orange (Orlando). In what follows, we detail the data used in our analysis.

3. Data and Empirical Strategy

Our primary measure of teacher effectiveness is the official teacher value-added scores compiled by Florida Department of Education (FDOE) as part of the state's teacher evaluation system. Florida's educator evaluation system, which was enacted in 2011, requires at least 50 percent of a teacher's performance evaluation to be based on student performance in standardized tests.[9] For classroom teachers with students who take the Florida Comprehensive Assessment Test (FCAT), this

[9] While individual districts have the flexibility to adjust the share of the student growth component in teacher ratings, Florida requires a minimum of 50 percent for all districts. The other component of the overall teacher ratings is the instructional practices portion which is primarily based on observations of teachers' performance. These observations may be formal and informal, scheduled and unscheduled events, walkthroughs, meetings, and examination of materials that reflect the teacher's work.

"student growth" portion is calculated using the value-added model approved by the Student Growth Implementation Committee. The Florida value-added model is based on a covariate adjustment model that conditions a student's current year test score on student demographics, prior test scores, and classroom characteristics, and teacher and school effects are estimated simultaneously in a random effects framework using the empirical Bayes estimator which shrinks teacher and school effects toward their population means in proportion to the degree of expected imprecision in the estimates.[10] The final teacher value-added scores are then calculated by adding 50 percent of the empirical Bayes estimate of the unique school component to the empirical Bayes estimate of the unique teacher component.

Following a lawsuit from the Florida Times-Union, FDOE released the value-added scores of all teachers in the state for years between 2011-12 and 2013-14. These publicly available data include the names of teachers and their schools along with the value-added scores in reading and math as well as combined scores that use test scores in both subjects, the standard errors associated with these value-added estimates, number of students included in the calculations by subject, and whether the teacher instructed an FCAT-related course. The reported value-added scores in the first year of the program (2011-12 school year) are annual scores that were estimated using classrooms in 2011-12 only, whereas the scores in the other two years are multi-year averages for which classrooms in multiple years were utilized (classrooms in the first two years were used to estimate 2012-13 teacher value-added scores whereas classrooms in all three years were used in 2013-14) when available.

Using these data, we first compare the distribution of teacher value-added scores in TPS and charter schools. An important challenge in this exercise is that charter school teachers are significantly

[10] In particular, the Florida value-added model includes the following covariates: the number of subject-relevant courses in which the student is enrolled; two prior years of achievement scores (except for grade 4 where only one prior year achievement score is available); disability status; limited English proficiency; gifted status; student attendance; student mobility across schools; difference from modal age in grade; class size; and homogeneity of entering test scores in the class. For more information on Florida value-added model, see the Florida Value Added Model Technical Report, http://108.59.20.64/core/fileparse.php/7503/urlt/0072168-floridacomprehensiveassessmenttestvalue-addedmodeltechnicalreport1112.rtf, accessed on 10/28/2016.

more likely to be new teachers. Therefore, their value-added scores in the second and third years of the program are more likely to rely on fewer years of student performance compared to TPS teachers, which makes them more susceptible to random fluctuations. For instance, in 2012-13 school year, the value-added scores of 40 percent of charter school teachers relied on a single year of student performance compared to 26 percent for TPS teachers. While such random fluctuations are not expected to have an effect when comparing average value-added scores across sectors, they might increase the variance of value-added scores in charter schools and hence might have an effect when comparing the right and left tails of the value-added score distribution across sectors. To mitigate this effect, we focus on the first year of the program in our distribution analysis where the value-added scores of all teachers were calculated using one year of student performance.

We supplement these teacher-level data with school characteristics from the Common Core of Data such as student composition, school poverty, and charter status; and measures of school performance such as the percentage of proficient students in reading and math from school accountability reports produced by FDOE for the state's school accountability system. To investigate the extent to which differences in teacher value-added between charter schools and TPS can be explained by observed teacher characteristics, we also link these data to teacher characteristics such as experience and educational attainment from Miami-Dade County Public Schools, which houses more than 20 percent of all charter schools in Florida. Finally, we make use of the 2011-12 wave of SASS for teachers in Florida to better understand why some charter teachers are more effective than comparable teachers in traditional public schools.

Table 1 presents the school- and teacher-level characteristics of all public schools in Florida in 2011-12 school year, broken down by school sector, charter school tenure, and school poverty as measured by the percent free-or-reduced-priced lunch (FRPL) eligible students in the school. Overall, charter schools in Florida have slightly higher percentages of students who are proficient, or have made

adequate gains in reading and math, and students in charter schools are significantly less likely to be FRPL eligible and more likely to belong to a minority racial/ethnic group. These gaps remain almost unchanged when we compare TPS to mature charter schools that have been operational for at least 3 years (which constitute about 70 percent of all charter schools in our sample)[11], or when we look at below average poverty (less than 60 percent of students FRPL eligible) or above average poverty schools.

The second panel of Table 1 compares teacher experience and educational attainment across sectors in our Miami-Dade sample in 2011-12 for teachers who instructed an FCAT-related course. The findings indicate that charter school teachers have significantly less teaching experience and are significantly less likely to have advanced degrees compared to TPS teachers. In particular, 27 percent of charter teachers in our Miami-Dade sample have no prior teaching experience (compared to 13 percent among TPS teachers), and more than half of charter teachers have less than 3 years of experience (compared to 16 percent among TPS teachers). Once again, these gaps in teacher credentials remain unchanged when we exclude new charters, or when we break down the analysis by school poverty.

To compare the teacher value-added distributions across school sectors and to explore the mechanisms that might be driving these differences, we follow a similar approach as in Sass et al. (2012) who compare the teacher value-added distributions in high-poverty versus lower-poverty schools. First, we compare teacher value-added scores in charter schools versus TPS at different points of the distribution (mean and 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles) as well as the dispersion of teacher value-added scores across sectors. Thus, not only do we investigate the effectiveness gaps between the average teachers in the two sectors, but we also examine differences between the highly effective and the ineffective teachers in the two school sectors. Second, we explore several mechanisms that might be driving these differences. In particular, we use Oaxaca-Blinder decomposition to break down the

[11] Results are similar when we use a threshold of 5 years to identify mature charter schools.

difference in average teacher effectiveness across sectors into three components: (1) differences in effectiveness due to differences in observed teacher attributes; (2) differences in effectiveness due to differences in returns to these attributes (e.g., whether the returns to experience in one sector is larger than the other); and (3) differences in effectiveness due to the interaction between attributes and their returns. Further, we examine factors such as differences in teacher support, working conditions and job satisfaction across sectors in Florida using the teacher responses in the 2011-12 wave of SASS.

4. Results

4.1. Differences in Value-Added Score Distributions across Sectors

Table 2 presents the means and standard deviations of value-added scores along with value-added scores at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of the distribution in math (first panel), in reading (second panel), and combined scores (third panel) by school sector. This analysis includes all teachers who instructed an FCAT-related course in 2011-12. The second and third columns of the table provide the statistics for all TPS and charter teachers in Florida public schools in 2011-12, the fourth column presents the differences between the two groups, the fifth column restricts the sample to mature charter schools, and the last column provides the differences between all TPS teachers and teachers working in mature charter schools.

We find small and statistically insignificant differences favoring charter teachers in the average reading and math value-added scores between the two sectors. The difference in average combined value-added scores is slightly higher, yet is only marginally significant at conventional levels. The dispersion of value-added scores in the charter sector is significantly higher in math, which is mainly driven by the right tail of the value-added distribution in charter schools. That is, the most effective teachers in the charter sector have significantly higher value-added scores than the most effective teachers in TPS. For example, charter students assigned to a math teacher whose value-added score falls

on the 90th percentile of the charter teacher value-added distribution perform 3.6 percent of a standard deviation better in math tests than similar TPS students assigned to a math teacher whose value-added scores falls on the 90th percentile among TPS teachers. Similar results emerge when we use combined value-added scores, yet the findings are much weaker in reading.

We observe similar patterns that are even stronger when we restrict the charter teacher sample to those who teach in mature charter schools. Once again, highly effective teachers in mature charter schools have significantly higher value-added scores in reading and math compared to highly effective TPS teachers, while we find no such differences at the lower end of the value-added distribution. Figure 2 presents a more complete picture by portraying value-added scores in mature charter schools and TPS at each percentile of the value-added distribution in each sector, and shows how teacher value-added scores in mature charter schools diverge from the value-added scores of TPS teachers as we move from the lower end of the distribution to the higher end.

A key goal for this study is to examine if differences in teacher quality between urban and nonurban settings can be explained by the distribution of teacher quality. As discussed above, several lottery-based studies have recently found significant positive effects of attending an urban charter school on student outcomes, yet these benefits do not necessarily carry over to charter schools operating in more affluent non-urban settings. For instance, Abdulkadiroglu et al. (2011) shows that students who won admission lotteries and subsequently attended urban charter schools in Massachusetts perform significantly better on reading and math tests compared to similar students who lost the lottery, yet no such effect exists in non-urban charter schools that typically serve more affluent students. One possible mechanism that might explain this finding is that charter teachers serving disadvantaged populations are more effective in raising student achievement than TPS teachers serving similar populations, yet this effectiveness gap does not exist in more affluent neighborhoods.

Table 3 explores this possibility by breaking down our analysis by school poverty where columns 2-4 compare value-added distributions between TPS and mature charter teachers in low-poverty settings, whereas columns 5-7 examine schools serving less affluent students. Analogous to Figure 2, Figure 3 presents the value-added scores at each percentile broken down by school sector and school poverty. The findings suggest that the differences in teacher performance across sectors on the higher end of the value-added score distribution are entirely driven by schools serving disadvantaged students.

In particular, among schools serving more affluent students, we find no significant difference in the distribution of value-added scores of charter teachers and the distribution of value-added scores of TPS teachers. In contrast, among schools serving disadvantaged students, the charter teacher value-added score distribution in each subject diverges significantly from the TPS teacher value-added distribution as we move from the left tail of the distribution to the right. Specifically, looking at combined value-added scores, we find no significant differences between the least effective charter teachers (teachers whose combined scores fall on the 10^{th} or the 25^{th} percentile of charter teacher distribution) and the least effective TPS teachers. This difference increases to 2.5 percent of the standard deviation and is marginally significant when we compare the median teachers in the two sectors. The most effective teachers at above-average poverty charter schools (teachers whose combined scores fall on the 75^{th} or the 90^{th} percentile of charter teacher distribution) have significantly higher value-added scores than the most effective TPS teachers serving disadvantaged schools. Overall, the average charter teacher at above average poverty charter schools has a combined value added score that is 3.1 percent of the standard deviation higher than the average TPS teacher in a similar school.

An important concern when comparing teacher value-added scores across schools is the possibility that the measured differences might be driven by common school effects that are unrelated to teacher quality instead of differences in true teacher effectiveness. This is also the case in our study where differences in school leadership or policies and practices across sectors (e.g., curriculum) might

explain the observed differences in value-added scores of charter and TPS teachers in higher poverty settings, even though no such differences exist in true teacher effectiveness. While it is not possible to disentangle teacher and school effects and test for this hypothesis directly, we follow a similar approach as in Sass et al. (2012) and present indirect evidence.

In particular, we make use of teachers with value-added scores who served in both higher poverty mature charter schools and higher poverty TPS during the three years between 2011-12 and 2013-14. If differences in school effects are indeed driving differences in observed teacher value-added scores, one would expect sector switchers to have significantly higher value-added scores in the higher poverty charter school setting. The main challenge in this exercise is that, as documented in Cowen and Winters (2013), there are very few sector switchers in Florida. Therefore, to maximize sample size, we focus on combined value-added scores using both reading and math teachers. Over the three years we examine, there were 66 unique teachers with valid combined value-added scores who switched sectors in a higher poverty setting once. Of these teachers, 38 moved from a charter school to a TPS and 28 moved from a TPS to a charter school.

Table 4 presents the combined value-added scores of these teachers before and after the switch, broken down by the direction of the move. There are several findings worth highlighting. First, teachers who moved from a charter school to a TPS have significantly lower value-added scores prior to the switch. Second, neither type of switchers experienced a significant change in their value-added scores following the move. Finally, we find no significant differences in the within-teacher effects across school sectors, providing evidence against the hypothesis that our results are driven by school effects that are higher in the charter sector.

4.2. Mechanisms behind Discrepancies in Teacher Effectiveness across Sectors

In this section, we examine several mechanisms that might be contributing to the observed differences in teacher effectiveness between mature charter schools and TPS serving disadvantaged

student populations. Table 5 presents the Oaxaca-Blinder decomposition of cross-sector differences in value-added scores, and explores the extent to which differences in teacher experience and educational attainment explain effectiveness gaps. For this exercise, we use Miami-Dade teachers between 2011-12 and 2013-14 for whom we observe experience and educational attainment, and once again rely on combined value-added scores to maximize sample size.

There are two main takeaways from this analysis. First, similar to our statewide findings, above-average poverty charter teachers in Miami-Dade have significantly higher combined value-added scores than TPS teachers serving less affluent students in the district. Second, differences in returns to observed teacher attributes, experience in particular, explain the entire effectiveness gap between above-average poverty charter and TPS teachers. In contrast, differences in observed attributes or the interactions with their returns explain virtually none of the observed differences in teacher value-added scores.

Table 6 further examines the returns to teacher characteristics on teacher effectiveness in TPS versus charter schools in higher poverty settings. Similar to Sass et al. (2012), we find no significant relationship between teacher experience and effectiveness in above-average poverty TPS schools. In contrast, there are significant returns to experience on teacher productivity in charter schools serving similar student populations, especially in the first 5 years of teaching. In particular, charter teachers with no prior teaching experience have combined value-added scores that are 3 percent of the standard deviation lower than teachers with 1 to 2 years of experience (although this difference is not statistically different from zero), and this gap further widens to 6 percent when comparing novice teachers to charter teachers with 3 to 5 years of experience.

There are several factors that might explain the higher returns to experience on teacher effectiveness in charter schools. For instance, charter schools might be better at filtering out less

effective early-career teachers as a result of less restrictive personnel policies.[12] An important limitation of our data that prevents us from exploring this possible mechanism is that we only observe teachers with value-added scores. Therefore, we are unable to distinguish between cases where a teacher is no longer in the sample because he/she left the teaching workforce and cases where a teacher is no longer in the sample because he/she teaches an untested grade in the same school. When we examine teacher mobility conditional on staying in the sample (i.e., teacher moving to another school *and* teaching a tested grade), we find that teachers who left an above-average poverty charter school had significantly lower combined value-added scores before the move compared to teachers left a TPS serving similar students (-0.12 versus -0.07).[13]

Another factor that might explain the higher returns to experience in charter schools (and the effectiveness gaps between charter schools and TPS serving disadvantaged students) is differences in school climate and school policies and practices between sectors. Table 7 compares the charter and TPS teacher responses in the 2011-12 wave of SASS in Florida along four dimensions: (1) teacher support (first panel); (2) teacher job satisfaction (second panel); (3) teacher working conditions (third panel); and (4) the influence of teachers on school policies and practices (fourth and fifth panels). We are unable to break down this analysis by school poverty due to small sample sizes in SASS, and present the cross-sector differences along these measures using all surveyed schools in Florida in 2011-12 school year.

The findings reported in the first panel indicate that charter teachers receive more support overall, especially from parents and students. In particular, charter teachers are slightly more likely to agree that the school administration is supportive and encouraging, that they are recognized for a job well done, and that there is cooperative effort among staff compared to TPS teachers in Florida. The

[12] According to the 2011-12 wave of SASS, 13 percent of charter school principals in Florida reported personnel policies as a barrier to dismissal of poor performing teachers, in stark contrast to 69 percent of TPS principals.
[13] In particular, over the three years we examine, 44 teachers left an above-average poverty mature charter school, and 34 teachers left an above-average poverty TPS.

cross-sector differences in teacher responses are significantly larger when asked about whether teachers receive a great deal of support from parents (67 percent of charter teachers agree compared to 52 percent of TPS teachers); or whether lack of parental involvement is a problem (39 percent of charter teachers agree compared to 62 percent of TPS teachers); or whether student unpreparedness is a problem at school (44 percent of charter teachers agree compared to 66 percent among TPS teachers).[14] Higher levels of support in charter schools might prevent teacher "burn-out", resulting in larger increases in productivity over time compared to TPS teachers working in high-poverty settings.

Higher levels of support and acknowledgement might also lead to higher levels of job satisfaction among charter teachers, of which we find modest evidence. Specifically, we find that charter teachers are slightly more likely to be satisfied with their salary (although salary satisfaction is low in both sectors), less likely to be worried about their job security, more likely to be satisfied with teaching at their current schools, less likely to leave teaching for higher pay, and less likely to report that they have less enthusiasm than when they first began teaching, although cross-sector differences in teacher responses in almost all cases are small. Aside from higher levels of support, these differences in job satisfaction might be driven by the fact that charter teachers have significantly less teaching experience than TPS teachers if teacher optimism dissipates over time, especially among teachers working in more challenging environments.

Charter teachers also have slightly better working conditions compared to TPS teachers. Significantly fewer charter teachers report student misbehavior or tardiness as interfering with teaching activities (30 percent versus 37 percent for misbehavior, 20 percent versus 42 percent for tardiness), or report that routine duties interfere with teaching (69 percent versus 78 percent); a higher percentage of

[14] Cross-sector differences in parental support might be driven by the fact charter parents make an active choice to send their children to charter schools, which might be considered as a sign of higher educational motivation compared to TPS parents.

charter teachers state that they have necessary materials available for teaching (82 percent versus 71 percent).

Another interesting cross-sector difference in working conditions is that charter teachers are significantly more likely to agree that content standards have positive influence on teaching (63 percent versus 41 percent) compared to TPS teachers. One possible explanation behind this finding is that charter teachers in Florida have significantly more influence on school policies and practices, especially in terms of instructional policies and practices, which might lead to higher rates of teacher buy-in for course content in charter schools. In particular, compared to TPS teachers, charter teachers have significantly more influence on selecting materials for classroom (52 percent versus 35 percent), content taught in classroom (56 versus 45 percent), establishing curriculum (62 versus 42 percent), teaching techniques used in classroom (95 versus 82 percent), and evaluating and grading students (96 versus 89 percent). Charter teachers also have larger control over disciplining students and evaluating other teachers, yet we find no significant cross-sector differences in teacher influence on the content of professional development, hiring new full time teachers, or school budget. Higher levels of control over instructional practices and course content among charter teachers might lead to higher levels of teacher engagement and motivation, which might in turn explain the higher returns to experience on teacher effectiveness and the observed discrepancies in teacher value-added scores between charter schools and TPS serving disadvantaged students.

5. Conclusions

In this study, we compare the teacher quality distributions in charter schools and TPS, and examine mechanisms that might explain cross-sector differences in teacher effectiveness as measured by teacher value-added scores. We have three main findings. First, we find no significant difference in teacher quality distribution between lower-poverty charter schools and TPS. In contrast, we find that

teachers working in above-average poverty charter schools have significantly higher value-added scores compared to TPS teachers working in similar settings. These differences in teacher effectiveness are mainly driven by the right tail of the value-added score distribution. That is, while we find no significant cross-sector differences between the least effective teachers in the two sectors, the most effective teachers in above-average poverty charter schools have significantly higher value-added scores compared to the most effective TPS teachers in similar settings.

Second, we find that cross-sector differences in observed teacher characteristics such as experience and educational attainment fail to explain any of the observed gaps in teacher effectiveness in higher-poverty settings. Instead, these gaps are primarily driven by differences in returns to these attributes – experience in particular – on teacher productivity. In particular, the results indicate no significant relationship between teacher experience and effectiveness in above-average poverty TPS schools whereas the value-added scores of teacher improve considerably in the first 3 to 5 years of teaching in similar charter schools.

Third, using the responses of Florida public school teachers in the 2011-12 wave of SASS, we find significant cross-sector differences in the level of support teacher receive (especially from parents), which might help explain the higher returns to experience on teacher effectiveness as well as the observed effectiveness gaps between charter schools and TPS serving disadvantaged students. In particular, higher levels of support might prevent teacher "burn-out", resulting in larger increases in productivity over time compared to TPS teachers working in high-poverty settings. We also find that charter teachers have significantly more influence on classroom policies and practices including course content and teaching techniques, which might lead to higher teacher productivity through higher levels of engagement and motivation.

Our study has several important implications for public policy. If teacher effectiveness gaps are mainly driven by charter schools being better at filtering out less effective teachers as a result of less

restrictive personnel policies, which we are unable to test directly due to data limitations yet find some indirect evidence for, less restrictive personnel policies might also be preferred in above-average poverty TPS schools. Similarly, if cross-sector differences in teacher influence on school policies is the main driver of these effectiveness gaps, such policies might be adopted in TPS to increase teacher motivation and prevent burn-out. In contrast, no public policy will likely remedy the teacher effectiveness gaps between charter schools and TPS in higher poverty settings if higher levels of parental involvement in charter schools, which might be naturally occurring as more educationally motivated parents send their children to these schools, create a better working environment for charter teachers and increase their effectiveness.

Our findings might also shed light on prior research on charter schools. In particular, recent studies that make use of admission lotteries in oversubscribed charter schools find positive effects of attending an urban charter school on student outcomes – a finding that does not necessarily persist in non-urban settings. Cross-sector differences in teacher effectiveness in urban settings that do not carry over to more affluent non-urban settings, of which we find evidence in this study, might explain the observed benefits of attending charter schools in higher-poverty urban neighborhoods.

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Figure 1 – Charter Schools in Florida, 2011-12 School Year

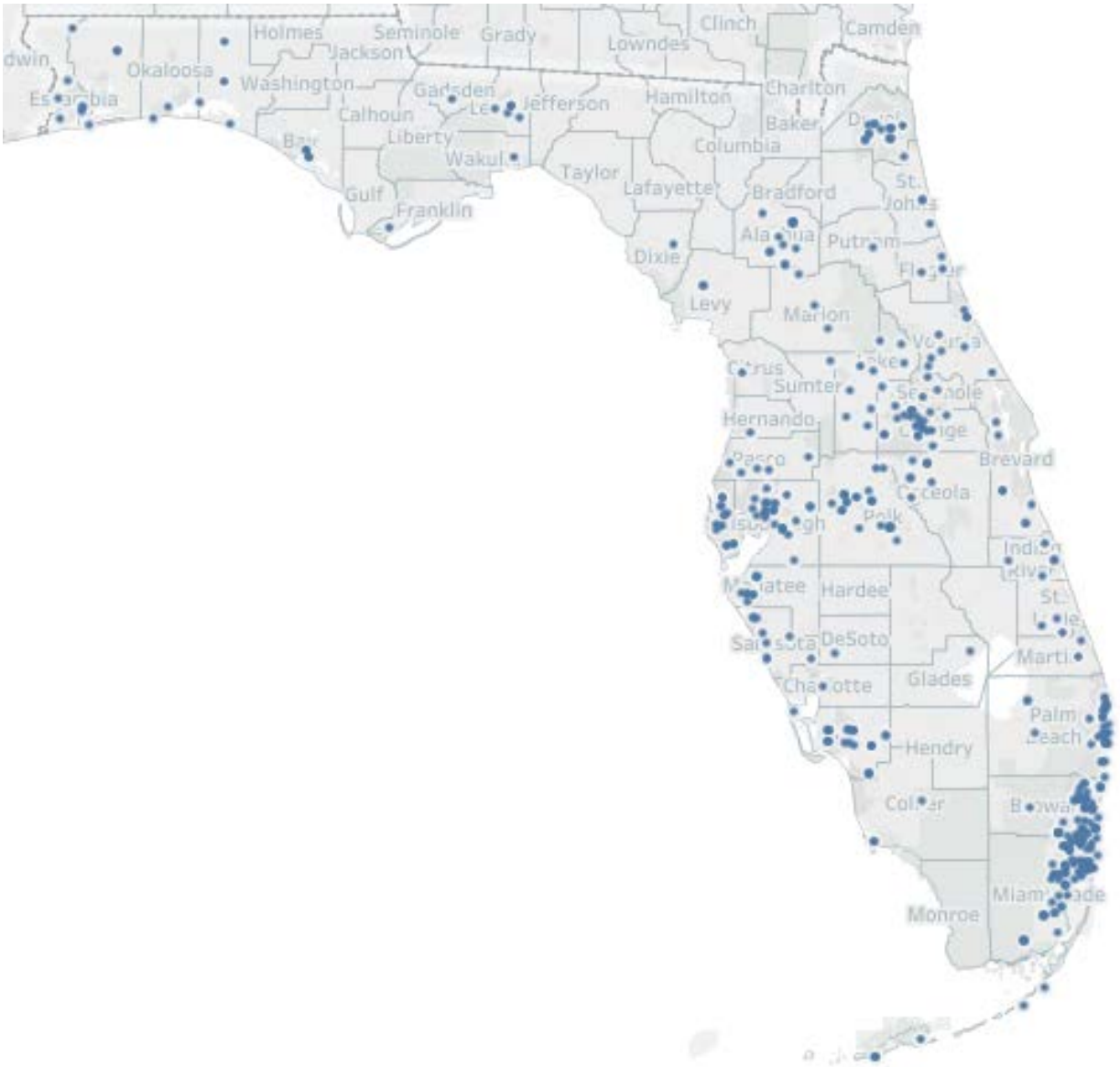
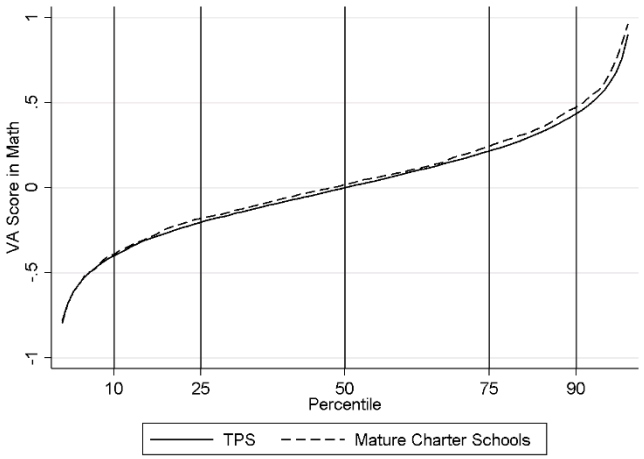
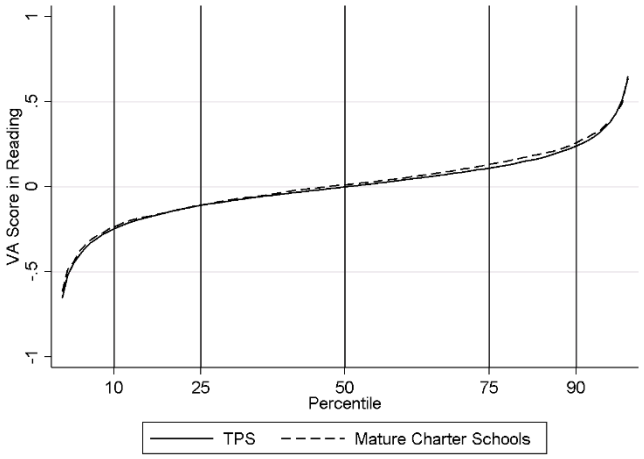


Figure 2 – Value-Added Scores by Percentile, Subject, and School Sector, 2011-12 School Year

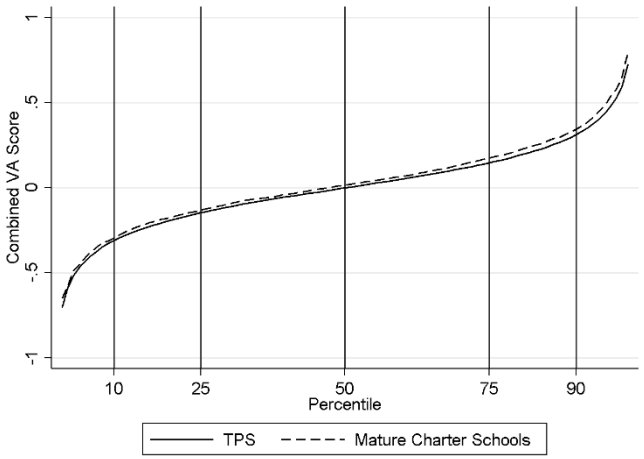
(I) Math



(II) Reading

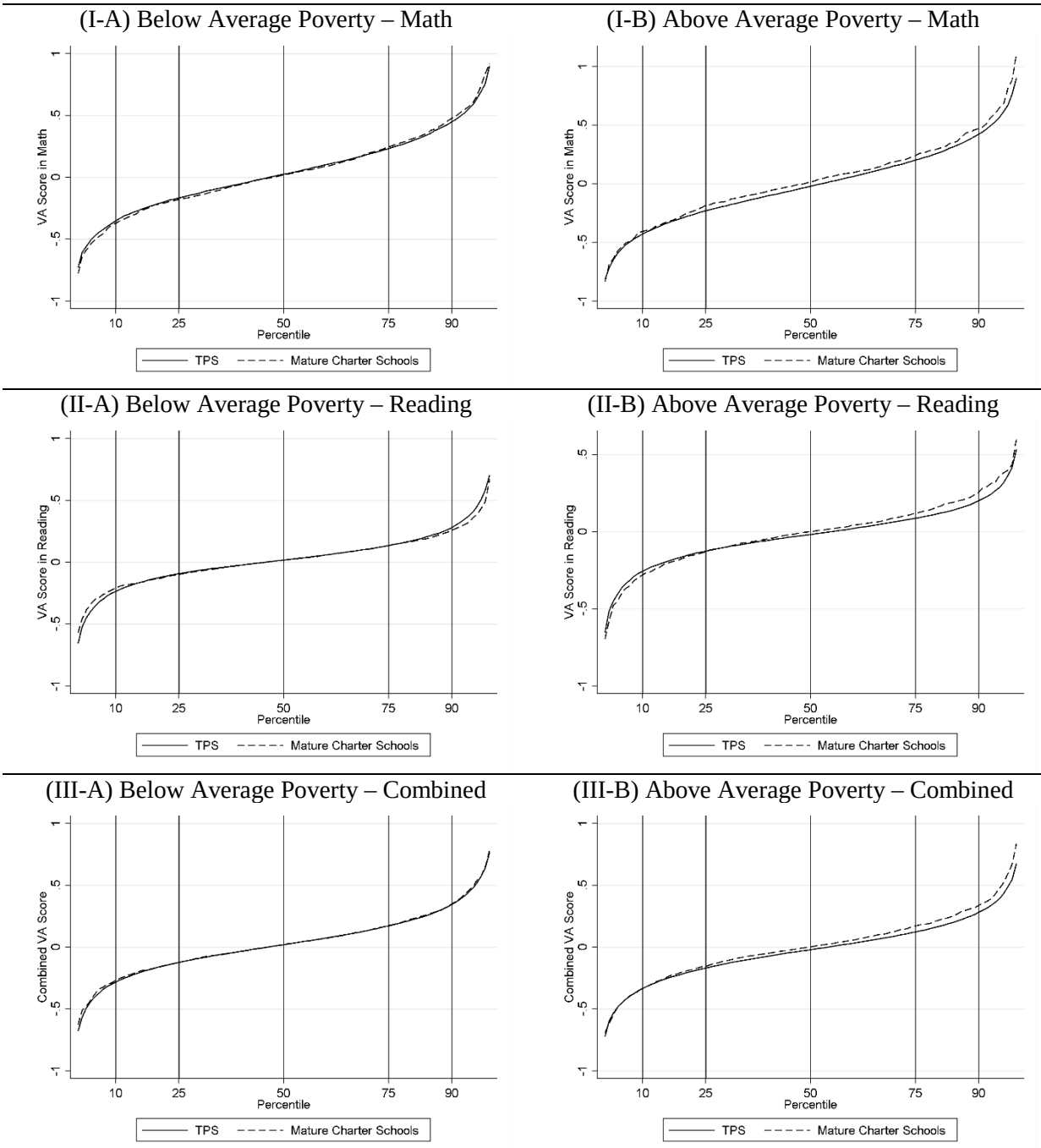


(III) Combined



Notes: Each figure displays the value-added scores at each percentile of the distribution in traditional public schools and charter schools that have been operational for at least 3 years by subject.

Figure 3 – Value-Added Scores at Various Percentiles, by School Sector and Poverty, 2011-12 School Year



Notes: Each figure displays the value-added scores at each percentile of the distribution in traditional public schools and charter schools that have been operational for at least 3 years by subject and school poverty.

Table 1 – School and Teacher Characteristics in Charter Schools and TPS in Florida, 2011-12 School Year

				Below Average Poverty		Above Average Poverty	
Schools -	TPS	All Charters	Mature Charters	TPS	Mature Charters	TPS	Mature Charters
% proficient in reading	0.571	0.600***	0.604***	0.687	0.690	0.486	0.485
	(0.156)	(0.182)	(0.184)	(0.118)	(0.148)	(0.123)	(0.161)
% proficient in math	0.578	0.588	0.598***	0.688	0.661***	0.496	0.513
	(0.151)	(0.191)	(0.189)	(0.113)	(0.165)	(0.122)	(0.187)
% gains in reading	0.673	0.685***	0.689***	0.702	0.708	0.651	0.664*
	(0.0788)	(0.105)	(0.103)	(0.0709)	(0.0948)	(0.0772)	(0.109)
% gains in math	0.664	0.671	0.681***	0.703	0.695	0.635	0.662***
	(0.111)	(0.160)	(0.153)	(0.107)	(0.144)	(0.106)	(0.163)
% FRPL eligible	0.599	0.495***	0.508***	0.362	0.335***	0.795	0.775**
	(0.258)	(0.257)	(0.259)	(0.170)	(0.163)	(0.110)	(0.111)
% white	0.424	0.359***	0.356***	0.567	0.462***	0.305	0.193***
	(0.271)	(0.287)	(0.286)	(0.218)	(0.266)	(0.253)	(0.235)
% black	0.271	0.276	0.272	0.175	0.177	0.350	0.417***
	(0.254)	(0.288)	(0.286)	(0.175)	(0.196)	(0.281)	(0.337)
% Hispanic	0.250	0.315***	0.323***	0.191	0.304***	0.298	0.353***
	(0.227)	(0.285)	(0.284)	(0.167)	(0.253)	(0.256)	(0.324)
Number of schools	3,781	633	419	1,536	241	2,245	178
Teachers (Miami-Dade)-							
Experience (in years)	10.45	2.157***	2.341***	11.24	2.332***	10.25	2.349***
	(8.475)	(2.802)	(2.864)	(8.535)	(2.823)	(8.449)	(2.903)
No experience	0.128	0.269***	0.244***	0.102	0.233***	0.134	0.253***
	(0.334)	(0.444)	(0.430)	(0.303)	(0.423)	(0.341)	(0.435)
Experience: 1-2 years	0.0393	0.268***	0.270***	0.0279	0.282***	0.0422	0.260***
	(0.194)	(0.443)	(0.444)	(0.165)	(0.450)	(0.201)	(0.439)
Experience: 3-5 years	0.146	0.164	0.177**	0.140	0.197**	0.147	0.161
	(0.353)	(0.370)	(0.382)	(0.348)	(0.399)	(0.355)	(0.368)
Experience: 6-12 years	0.317	0.0910***	0.0996***	0.329	0.091***	0.313	0.107***
	(0.465)	(0.288)	(0.300)	(0.470)	(0.288)	(0.464)	(0.309)
Experience: 13+ years	0.370	0.195***	0.201***	0.398	0.184***	0.362	0.214***
	(0.483)	(0.397)	(0.401)	(0.490)	(0.388)	(0.481)	(0.410)
Advanced degree	0.362	0.158***	0.160***	0.365	0.201***	0.361	0.128***
	(0.481)	(0.365)	(0.367)	(0.482)	(0.401)	(0.480)	(0.334)
Number of teachers	5,491	675	618	1,108	285	4,384	334

Notes: Standard deviations in parentheses. *, **, and *** indicate that the average charter school or charter teacher attribute is different than that of TPS or TPS teachers at 10, 5, or 1 percent significance level.

Table 2 – Means and Standard Deviations of Teacher Value-Added, and Value-Added Scores at Various Percentiles, by School Sector, 2011-12 School Year

	TPS	Charter Schools	Difference	Mature Charter Schools	Difference
Math -					
Mean	0.011	0.023	0.012	0.034	0.023*
Standard deviation	0.338	0.355	0.017***	0.355	0.017***
10th percentile	-0.399	-0.399	0.0001	-0.390	0.009
25th percentile	-0.204	-0.190	0.014	-0.182	0.022**
50th percentile	0.001	0.007	0.006	0.018	0.017
75th percentile	0.216	0.230	0.014	0.244	0.028
90th percentile	0.433	0.469	0.036*	0.472	0.039***
Number of teachers	23,482	1,845		1,574	
Reading -					
Mean	-0.003	0.005	0.008	0.009	0.012
Standard deviation	0.227	0.227	0.0001	0.228	0.001
10th percentile	-0.247	-0.241	0.006	-0.237	0.01
25th percentile	-0.111	-0.112	-0.001	-0.108	0.003
50th percentile	-0.002	0.009	0.011	0.011	0.013*
75th percentile	0.109	0.125	0.016*	0.131	0.022**
90th percentile	0.237	0.253	0.016	0.257	0.020
Number of teachers	35,296	2,504		2,130	
Combined -					
Mean	0.0001	0.017	0.017*	0.023	0.023***
Standard deviation	0.267	0.277	0.010***	0.278	0.011**
10th percentile	-0.311	-0.299	0.012	-0.295	0.016
25th percentile	-0.148	-0.143	0.005	-0.132	0.016
50th percentile	-0.002	0.009	0.011	0.016	0.018**
75th percentile	0.146	0.166	0.020**	0.175	0.029***
90th percentile	0.309	0.341	0.032**	0.343	0.034***
Number of teachers	44,537	3,291		2,816	

Note: *, **, and *** indicate that the statistic for the charter teacher value-added score distribution is different than that of TPS teachers at 10, 5, or 1 percent significance level.

Table 3 – Means and Standard Deviations of Teacher Value-Added, and Value-Added Scores at Various Percentiles, by School Sector and Poverty, 2011-12 School Year

	Below Average Poverty			Above Average Poverty		
	TPS	Mature Charter Schools	Difference	TPS	Mature Charter Schools	Difference
Math -						
Mean	0.039	0.037	-0.002	-0.010	0.030	0.040*
Standard deviation	0.325	0.345	0.020***	0.345	0.373	0.028***
10th percentile	-0.351	-0.370	-0.019	-0.427	-0.408	0.019
25th percentile	-0.166	-0.179	-0.013	-0.230	-0.184	0.046*
50th percentile	0.025	0.020	-0.005	-0.020	0.016	0.036
75th percentile	0.231	0.245	0.014	0.202	0.242	0.040
90th percentile	0.447	0.478	0.031	0.422	0.469	0.047**
Number of teachers	9,993	1,016		1,574	558	
Reading -						
Mean	0.021	0.019	-0.002	-0.023	-0.010	0.013
Standard deviation	0.242	0.223	-0.019	0.211	0.235	0.024
10th percentile	-0.235	-0.207	0.028	-0.256	-0.280	-0.024
25th percentile	-0.093	-0.099	-0.006	-0.126	-0.127	-0.001
50th percentile	0.017	0.017	0.0001	-0.017	0.002	0.019*
75th percentile	0.136	0.137	0.001	0.089	0.121	0.032**
90th percentile	0.279	0.258	-0.021	0.201	0.254	0.053***
Number of teachers	16,340	1,376		18,956	754	
Combined -						
Mean	0.027	0.031	0.004	-0.022	0.009	0.031**
Standard deviation	0.273	0.272	-0.001	0.262	0.287	0.025***
10th percentile	-0.281	-0.269	0.012	-0.332	-0.331	0.001
25th percentile	-0.124	-0.123	0.001	-0.169	-0.153	0.016
50th percentile	0.021	0.023	0.002	-0.021	0.004	0.025*
75th percentile	0.173	0.177	0.004	0.123	0.173	0.050***
90th percentile	0.345	0.347	0.002	0.281	0.336	0.055***
Number of teachers	20,384	1,791		24,153	1,025	

Note: *, **, and *** indicate that the statistic for the charter teacher value-added score distribution is different than that of TPS teachers at 10, 5, or 1 percent significance level.

Table 4 – Combined Value-Added Scores of Sector Switchers in Higher-Poverty Setting, Before and After the Switch, by the Direction of Switch

	Before the switch	After the switch	Difference
Charter school to TPS	-0.084	-0.081	0.003
TPS to charter school	-0.024	-0.027	-0.003
Difference (charter to TPS vs. TPS to charter)	-0.060	-0.054	
All switchers (charter vs. TPS)			0.009

Note: The analysis sample includes teachers who worked in a charter and a traditional public school with above-average poverty level between 2011-12 and 2013-14 school years with non-missing combined value-added scores. We also restrict the sample to teachers who switch sectors only once during this time frame. The numbers indicate the average combined value-added scores of sector switchers before and after the switch.

Table 5 – Oaxaca-Blinder Decomposition of Cross-Sector Differences in Combined Teacher Value-Added Scores, Miami-Dade Sample, Above Average Poverty Schools

Mean predicted charter teacher score	0.039***
	(0.010)
Mean predicted TPS teacher score	0.017***
	(0.003)
Difference (charter teachers vs. TPS teachers)	0.022**
	(0.010)
Due to differences in…	
Teacher characteristics	-0.001
	(0.015)
Returns to teacher characteristics	0.034***
	(0.011)
Interaction of returns and characteristics	0.012
	(0.015)

Note: The analysis sample includes teachers who worked in Miami-Dade County public school between 2011-12 and 2013-14 school years with non-missing combined value-added scores. Teacher characteristics included in the analysis are indicators for teachers with 1-2 years of experience, 3-5 years of experience, and 6 or more years of experience, and an indicator for teachers with advanced degrees.

Table 6 – Combined Teacher Value-Added Scores and Teacher Characteristics, Miami-Dade Sample, Above Average Poverty Schools, by School Sector

	TPS Teachers	Charter teachers
Experience 1-2 years	0.0002	0.032
	(0.012)	(0.026)
Experience 3-5 years	0.020	0.057**
	(0.012)	(0.029)
Experience 6+ years	0.016*	0.027
	(0.009)	(0.032)
Advanced degree	0.004	-0.009
	(0.006)	(0.033)
N	13,553	1,149

Note: Standard errors in parentheses. *, **, and *** indicate statistical significance at 10, 5, or 1 percent significance levels respectively. Feasible Generalized Least Squares (FGLS) is used to account for the error in value-added scores.

Table 7 – School Climate and Teacher Attitudes in Florida, by School Sector, 2011-12 Wave of Schools and Staffing Survey

	TPS Teacher	Charter Teachers
Teacher support		
School administration is supportive and encouraging	0.883	0.903
Staff members are recognized for a job well done	0.754	0.840
There is cooperative effort among staff	0.822	0.910
Receive a great deal of support from parents	0.522	0.667
Lack of parental involvement is a problem	0.624	0.390
Student unpreparedness is a problem at school	0.660	0.437
Teacher job satisfaction		
Satisfied with salary	0.219	0.251
Teachers worry about the security of their jobs	0.634	0.595
Teachers are satisfied with teaching	0.894	0.907
Teachers are satisfied teaching at the school	0.724	0.780
Teachers would leave teaching for higher pay	0.412	0.352
Teachers have less enthusiasm than when first began	0.424	0.346
Teacher working conditions		
Student misbehavior interferes with teaching	0.370	0.304
Student tardiness interferes with teaching	0.420	0.193
Routine duties interfere with teaching	0.771	0.687
Have necessary materials available	0.713	0.818
Content standards have positive influence on teaching	0.412	0.632
Teachers have control over…		
selecting materials for classroom	0.346	0.524
content taught in the classroom	0.454	0.557
selecting teaching techniques used in classroom	0.818	0.949
evaluating and grading students	0.888	0.961
disciplining students	0.877	0.938
High influence of teachers in…		
setting performance standards for students	0.463	0.580
establishing curriculum	0.424	0.617
content of professional development	0.428	0.439
evaluating other teachers	0.140	0.205
hiring new full time teachers	0.169	0.188
setting discipline policy	0.374	0.420
school budget	0.182	0.171

Notes: The numbers presented in the first three panels indicate the percentage of teachers who somewhat or strongly agree with each listed item whereas the numbers in fourth and fifth panels indicate the percentage of teachers who think that teachers have moderate or great deal of control or influence on each listed item.