



Charter Schools and Labor Market Outcomes

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What We Studied

We estimate the impact of charter schools on early-life labor market outcomes using administrative data from Texas. We find that, at the mean, charter schools have no impact on test scores and a negative impact on earnings. No Excuses charter schools increase test scores by 0.09 standard deviations and four-year college enrollment by 2.8 percentage points, but, due to imprecision, have a statistically insignificant impact on earnings - though the coefficient is almost identical to what one would expect given the correlation between test scores and wages. Other types of charter schools decrease test scores, four-year college enrollment, and earnings, and, surprisingly, the decrease in wages is more negative than one would anticipate.

Texas enacted legislation allowing for the establishment of charter schools in 1995. The Texas charter sector has subsequently grown into one of the largest in the nation. Today, there are more than 600 charter schools in Texas educating approximately 3.5 percent of public school students. In this study, we estimate the impact of charter schools on early-life labor market outcomes using administrative data from the state of Texas. The combination of high-stakes accountability and large and varied charter school sector makes Texas an archetypal laboratory to measure the effect of charter schools on labor market outcomes.

How We Analyzed the Data

Ideally, one would use admission lotteries to identify the effect of charter schools on earnings. Unfortunately, Texas charter schools are only required to retain admissions lottery records for two years, and none of the schools that we were able to successfully contact had admissions lottery data for the relevant cohorts.

In our analysis, we therefore use a combination of matching and regression to adjust for baseline differences between charter and non-charter students. Our primary specification controls for elementary school by race by gender fixed effects and a rich set of background characteristics including third-order polynomials in baseline math and reading test scores. We identify school-specific effects by comparing the outcomes of students who attended the same non-charter elementary school, but different middle or high schools. This specification yields relatively precise earnings estimates while controlling for any observable differences between charter and non-charter students. The key identifying assumption of our empirical design is that gender-race-cohort-school effects and baseline controls account for all observed and unobserved differences between charter and non-charter students.

We present results for three categories of charter schools: all charter schools, No Excuses charter schools, and regular charter schools. All charters refers to the complete set of charter schools in our estimation sample. No Excuses charters have higher behavioral expectations, stricter disciplinary codes, are more likely to have uniform requirements, and are more likely to have an extended school day and year. Regular charters are defined as all charters in Texas that are not No Excuses schools.

Table 1: Students in Estimation Sample

	Full Sample	Trad. Elem.	Baseline Covars	Test Scores	In Texas	Cohort Size	Matched Cell
Non-Charterers	2305979	2292567	2145143	1993841	1880024	1880024	376208
No Excuses Charterers	3300	3122	2826	2779	2569	2550	2550
Regular Charterers	12324	10738	10260	9685	9083	8537	8537

Note: This table details the number of students in our estimation sample. All rows are restricted to Texas public school students expected to graduate high school in or before 2008-2009. Column 1 is the total number of students with no additional restrictions. Column 2 drops students who did not attend a traditional elementary school in 4th grade. Column 3 drops students with missing gender and race. Column 4 drops students with no middle or high school test scores. Column 5 drops students who transferred to an out-of-state school. Column 6 drops charter school cohorts of fewer than 10 students. Column 7 drops students who are not in a matched cell of 4th grade school, cohort, gender, and race.

We make six sample restrictions to the student data with the overarching goal of having a valid comparison sample. Table 1 provides details on the number of students dropped by each sample restriction. With no restrictions, there are 2,305,979 students in regular public schools, 3,300 students in No Excuses charter schools, and 12,324 students in regular charter schools. Column 2 omits students who did not attend a public elementary school in 4th grade. This decreases the sample by 13,412 students in non-charters, but only by 178 students in No Excuses Charters and 1,586 in regular charters. Column 3 leaves out students with missing baseline covariates such as gender or race. Column 4 drops students with no middle or high school test scores. Column 5 drops students who transferred to an out-of-state primary or secondary school. Column 6 drops charter schools with a cohort size fewer than ten. In our final estimation sample - which includes all students for which there is a match cell on 4th grade school, cohort, gender, and race - there are 376,208 students in non-charters, 2,550 in No Excuses charters, and 8,537 students in regular charter schools. The majority of the non-charter sample was dropped due to not matching individuals in the charter sample, primarily because these students attend schools in districts without a charter school.

The summary statistics for this sample paint a familiar portrait of the characteristics of charter school enrollees. Students in charter schools are more likely to be minority, more likely to be on free lunch (a measure of poverty), and more likely to be labeled at risk of dropping out, and yet those in No Excuses charter schools enroll with higher test scores. Consistent with this, Allen and Consoletti (2007, 2008) state that charter schools attract minority students who are more probable of receiving free lunch and being at risk.

What We Discovered

Test Scores

Table 2 reports ordinary least squares (OLS) estimates of the effect of charter attendance on test scores. Odd numbered columns control for baseline characteristics, third-order polynomials in 4th grade math and reading state test scores, number of years spent at charter schools not included in our analysis sample, and 4th grade school x cohort fixed effects. The even numbered columns replace 4th grade school x cohort fixed effects with 4th grade school x cohort x race x gender fixed effects – the specification that aligns with the lottery estimates in Abdulkadiroğlu et al. (2011), Angrist, Pathak, and Walters (2013), and Dobbie and Fryer (2013).

In our preferred specification with 4th grade school x cohort x race x gender fixed effects, we find that the impact of attending a charter school for one year is 0.019σ ($se=0.003$) on math scores and 0.028σ ($se=0.003$) on reading scores. Stacking both math and reading test scores, we find that attending a charter school for one year increases test scores by 0.023σ ($se=0.003$). None of the estimates suggest economically large impacts of charter attendance on test scores at the mean.

However, the test score estimates differ markedly for No Excuses and non-No Excuses charter schools. In our preferred specification, the impact of attending a No Excuses charter school for one year is 0.105σ ($se=0.005$) in math, 0.081σ ($se=0.004$) in reading, and 0.093σ ($se=0.004$) when stacking scores. In contrast, the impact of attending a regular (non-No Excuses) charter school is -0.052σ ($se=0.004$) in math and -0.016σ ($se=0.004$) in reading, and -0.034σ ($se=0.003$) stacking scores across both subjects.

Overall, the results indicate that charter schools in Texas have little impact on test scores. However, No Excuses charter schools increase test scores and regular charters modestly decrease test scores.

Table 2: Charter School Attendance and Test Scores

	Math Scores		Reading Scores		Pooled Scores	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Pooled Results</i>						
Any Charter	0.018*** (0.003)	0.019*** (0.003)	0.028*** (0.003)	0.028*** (0.003)	0.023*** (0.003)	0.023*** (0.003)
<i>Panel B: By Charter Type</i>						
No Excuses	0.103*** (0.005)	0.105*** (0.005)	0.080*** (0.004)	0.081*** (0.004)	0.092*** (0.004)	0.093*** (0.004)
Regular Charter	- 0.052*** (0.004)	- 0.052*** (0.004)	- 0.016*** (0.004)	- 0.016*** (0.004)	- 0.034*** (0.003)	- 0.034*** (0.003)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Matched Cell FE	No	Yes	No	Yes	No	Yes
N Students x Years	2076898	2076898	2077867	2077867	4154765	4154765
Dep. Variable Mean	-0.017	-0.017	0.011	0.011	-0.003	-0.003

Note: This table reports OLS estimates of the effect of charter attendance on test scores. We report the coefficient and standard error on the number of years spent at the indicated charter school type. Odd columns control for the number of years spent at charter schools not in our main sample, the baseline controls, cubic polynomials in grade 4 math and reading scores, and 4th grade school x cohort effects. Even columns replace 4th grade school x cohort effects with 4th grade school x cohort x race x gender effects. All specifications stack 5th-11th grade test score outcomes and cluster standard errors by student. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Educational Attainment

Table 3 presents estimates for high school graduation, two-year college enrollment, and four-year college enrollment. We use the same specification and controls as above. At the mean, the effect of attending a charter school is 1.4 ($se=0.1$) percentage points for high school graduation, 0.8 ($se=0.2$) percentage points for two-year college enrollment, and 0.7 ($se=0.2$) percentage points for four-year college enrollment. Consistent with the test score results from Table 3, the effects differ by charter type, particularly for four-year college enrollment. No Excuses charters increase four-year college enrollment by 2.8 ($se=0.3$) percentage points, compared to -1.0 ($se=0.2$) percentage points for regular charters. High school graduation effects are also larger for No Excuses and regular charters, while two-year college enrollment effects are approximately zero for No Excuses charter and positive for regular charters.

These results are consistent with No Excuses charters only increasing the number of students attending four-year colleges, while regular charters shift students who otherwise would have attended a four-year school to a two-year school.

Table 3: Charter School Attendance and Academic Attainment

	High School Grad.		Two-Year Enrollment		Four-Year Enrollment	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Pooled Results</i>						
Any Charter	0.014***	0.014***	0.008***	0.008***	0.007***	0.007***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
<i>Panel B: By Charter Type</i>						
No Excuses	0.022***	0.023***	-0.003	-0.003	0.027***	0.028***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Regular Charter	0.007***	0.007***	0.018***	0.018***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Matched Cell FE	No	Yes	No	Yes	No	Yes
N Students	387295	387295	387295	387295	387295	387295
Dep. Variable Mean	0.761	0.761	0.326	0.326	0.281	0.281

Note: This table reports OLS estimates of the effect of charter attendance on academic attainment. We report the coefficient and standard error on the number of years spent at the indicated charter school type. Odd columns control for the number of years spent at charter schools not in our main sample, the baseline controls listed in Table 2, cubic polynomials in grade 4 math and reading scores, and 4th grade school x cohort effects. Even columns replace 4th grade school x cohort effects with 4th grade school x cohort x race x gender effects. All specifications include one observation per student and cluster standard errors at the 4th grade school by cohort level. *** = significant at 1 percent level, ** = significant 5 percent level, * = significant at 10 percent level.

Labor Market Outcomes

Table 4 presents OLS estimates for average earnings and employment in the state of Texas for ages 25-27, again, using the same specification and controls as in the prior analysis. At the mean, the effect of attending a charter school for one year is -\$143.55 (se=64.50). Thus, if a student attended a charter school for 5 years, expected annual earnings in the state of Texas would be about \$700 lower. Consistent with our test score and attainment results, No Excuses charters have less negative outcomes.

The impact of attending a No Excuses charter for one year is a statistically insignificant \$129.27 (se=102.23), in line with the cross-sectional correlation between test scores and average earnings observed in Texas. Given the academic impacts on math (respectively, reading) scores, one would expect a \$320.88 increase (respectively, \$159.41) based on the cross-sectional relationship between test scores and average earnings.

Regular charters have a surprisingly negative impact on earnings of -\$369.51 (se=82.14). We find little impacts of charter school attendance on employment.

Table 4: Charter School Attendance and Labor Market Outcomes at Ages 25-27

	Average Earnings					Earnings > 0	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A: Pooled Results</i>							
Any Charter	-139.270** (63.711)	-143.547** (64.496)	-177.068** (76.853)	-130.102** (55.216)	-91.004 (55.811)	-0.002 (0.001)	-0.002 (0.001)
<i>Panel B: By Charter Type</i>							
No Excuses	136.865 (101.481)	129.270 (102.230)	259.843* (119.415)	190.293** (83.787)	244.267*** (84.940)	-0.002 (0.002)	-0.002 (0.002)
Regular Charter	-368.746*** (80.885)	-369.513*** (82.144)	-530.773*** (95.849)	-395.476*** (70.162)	-368.700*** (70.832)	-0.002 (0.002)	-0.001 (0.002)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matched Cell FE	No	Yes	Yes	Yes	Yes	No	Yes
Non-Zero Earnings Only	No	No	Yes	No	No	No	No
Baseline Imput.	No	No	No	Yes	No	No	No
Output Imput.	No	No	No	No	Yes	No	No
N Students	387295	387295	284723	387295	387295	387295	387295
Dep. Variable Mean	18750.99	18750.99	25506.07	23991.66	24053.54	0.680	0.680

Note: This table reports OLS estimates of the effect of charter attendance on earnings nine years after high school graduation. We report the coefficient and standard error on the number of years spent at the indicated charter school type. All columns control for the number of years spent at charter schools not in our main sample, the baseline controls, cubic polynomials in grade 4 math and reading scores, and 4th grade school x cohort effects. Columns 2-5 and 7 replace 4th grade school x cohort effects with 4th grade school x cohort x race x gender effects. All specifications include one observation per student and cluster standard errors at the 4th grade school by cohort level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Columns 3-5 of Table 4 explore the robustness of our earnings results to various assumptions about missing earnings observations. Column 3 presents results dropping all zero earnings observations. In this scenario, the effect that is being estimated is the impact of charters on earnings, conditional on employment. Column 4 imputes the missing earnings observations using the baseline characteristics and 4th grade school x cohort x race x gender fixed effects. Column 5 imputes the missing earnings observations using the same baseline characteristics and the observed test score and academic attainment outcomes from Tables 2-3. Specifically, for both imputation procedures, we regress non-missing earnings on all characteristics. We then take the median predicted earnings in each 4th grade school x cohort x race x gender cell. Results are similar using the 25th or 75th percentile of each 4th grade school x cohort x race x gender cell instead.

Our earnings results are broadly similar regardless of how we deal with missing earnings. The estimated effect of No Excuses charters is modestly more positive and precise when dropping missing earnings observations or imputing outcomes, while the estimated effects of regular charters is somewhat more negative. The largest estimates (in absolute value) suggest that No Excuses charters increase earnings by a marginally significant \$259.84 (se=119.42) and that regular charters decrease earnings by -\$530.77 (se=95.85).

Broadly, any selection correction or imputation method that uses the differential attrition from earnings data between charters and non-charters will lead to qualitatively similar results, because, there is little differential attrition on average or across observable characteristics. Importantly, however, any “worse case” type bound that assumes the missing observations from non-charter schools are significantly lower earning earners will substantially alter the results. For example, our estimates will significantly understate the true effect of charter schools if all missing charter observations are due to out-state migration for high paying jobs and all missing non-charter observations are due to incarceration. Our robustness results should be interpreted with this caveat in mind.

Overall, the results indicate that charter schools in Texas have little impact on earnings. No Excuses charter schools have a small and statistically insignificant effect on earnings, while regular charter schools decrease earnings.

Policy Recommendations

Based on the portion of our analysis reported in this policy brief, we have established three facts. First, at the mean, charter schools in Texas have little impact on test scores, educational attainment, or earnings. Second, No Excuses charter schools increase test scores and educational attainment, but have a small and statistically insignificant effect on earnings. Third, regular charters modestly increase two-year college enrollment, but decrease test scores, four-year college enrollment, and earnings.

Charter schools, in particular No Excuses charter schools, are considered by many to be the most important education reform of the past quarter century. At the very least, however, this paper cautions that charter schools may not have the large effects on earnings many predicted. It is plausible this is due to the growing pains of an early charter sector that was “building the plane as they flew it.” This will be better known with the fullness of time. Much more troubling, it seems, is the possibility that what it takes to increase achievement among the poor in charter schools deprives them of other skills that are important for labor market outcomes.

References

- Abdulkadiroğlu, Atila, Joshua D. Angrist, Susan M. Dynarski, Thomas J. Kane, and Parag A. Pathak. 2011. “Accountability in Public Schools: Evidence from Boston's Charters and Pilots.” *Quarterly Journal of Economics*, 126(2): 699-748.
- Allen, Jeanne, and Alison Consoletti. 2007. “Annual Survey of America’s Charter Schools.” Washington, DC: Center for Education Reform.
- Allen, Jeanne, and Alison Consoletti. 2008. “Annual Survey of America’s Charter Schools.” Washington, DC: Center for Education Reform.
- Angrist, Joshua D., Parag A. Pathak, and Christopher R. Walters. 2013. “Explaining Charter School Effectiveness.” *American Economic Journal: Applied Economics*, 5(4): 1-27.
- Dobbie, Will, and Roland G. Fryer. 2013. “Getting Beneath the Veil of Effective Schools: Evidence from New York City.” *American Economic Journal: Applied Economics*, 3(3) 158-187.

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