

5-2019

Expanding Outcomes in Educational Program Evaluation: Student Outcomes, Systemic Effects, and Policy Implications

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Expanding Outcomes in Educational Program Evaluation: Student Outcomes, Systemic Effects,
and Policy Implications

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Education Policy

by

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May 2019
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Abstract

Education policy debates over the last twenty years have focused on the need to increase students' test scores. The federal government and states have implemented and expanded a variety of test-based, school accountability policies. Accountability pressures have incentivized schools to narrow their curriculum, decrease time allocated to extracurricular activities, and focus on short-term student outcomes. This dissertation focuses on expanding outcomes in educational program evaluations and demonstrates the value of looking beyond the goal of increasing student test scores. The first chapter, using random assignment, estimates the causal effects of culturally enriching field trips on various student outcomes. Such field trips have been declining in part due to accountability pressures. We find evidence that such field trips can actually have a positive impact on student achievement as well as school engagement. The second chapter focuses on post-secondary outcomes for students. Also using an experimental design, we evaluate the impact of the Louisiana Scholarship Program on the likelihood of students entering college. Despite the program negatively affecting student test scores, we find that the program had no significant effect on the likelihood that students enter college. Finally, the third chapter takes a broader approach and evaluates systemic effects created by charter schools. Using nationwide data, I analyze the extent to which charter schools crowd out private schools in the market. I find evidence that charter and private schools compete for student enrollment, and as charter schools remain in the market, the quantity of private schools decreases.

Acknowledgements

I would first like to acknowledge my advisor, Dr. Jay Greene, and my other dissertation committee members, Dr. Patrick Wolf and Dr. Robert Costrell, whose guidance and insight over the last four years has been invaluable. This work would not be possible without their support. I would also like to acknowledge my coauthors, Dr. Angela Watson, Molly Beck, and Dr. Jonathan Mills, who have greatly contributed to this work. Furthermore, I want to acknowledge Laura Florick, who has expertly managed our longitudinal arts field trip experiment, along with our research partners at The Woodruff Arts Center who are dedicated to improving students' lives and who have been incredible partners. Additionally, I am grateful for the faculty and the staff in the Department of Education Reform for their excellent training and encouragement that has helped me develop as a researcher.

Finally, I would like to thank my family for their unwavering support and encouragement. I am most grateful for the never-ending support of my husband, Dane Erickson. He enthusiastically moved to Arkansas and over the past four years has provided countless takeout meals, an endless supply of Diet Coke, and a steady foundation that I rely on daily.

Dedication

To my parents, Doug and Erin Holmes, to whom I owe my passion for education and who taught me to seek after truth.

Table of Contents

Introduction.....	1
References.....	7
Chapter 1: Does Art Make You Smart? A Longitudinal Experiment of the Effects of Multiple Arts-Focused Field Trips	9
Introduction.....	9
Previous Literature.....	11
Research Question and Hypotheses	14
Study Design.....	15
Results.....	23
Discussion.....	27
Conclusion	29
References.....	30
Chapter 2: The Effect of the Louisiana Scholarship Program on College Entrance	32
Introduction.....	32
Louisiana Scholarship Program Description	34
Literature Overview	34
Research Methodology	43
Results.....	50
Discussion.....	54
Conclusion	57
References.....	59
Chapter 3: Who Wins in School Choice? Evaluating the Impact of Charter Schools on the Market Share of Private Schools.....	64
Introduction.....	64
Research Question and Theory	66
Previous Literature.....	70
Research Methodology	72
Results.....	75
Discussion.....	81
Conclusion	84
References.....	86
Conclusion	89
Institutional Review Board Approvals	92

List of Published Papers

Erickson, H. H., Greene, J. P., Watson, A. R., & Beck, M. I. (2019). Does Art Make You Smart? A Longitudinal Experiment of the Effects of Multiple Arts-Focused Field Trips. *EDRE Working Paper no. 2019-05*. Social Science Research Network (Chapter 1 of this dissertation).

Erickson, H. H., Mills, J.N., & Wolf, P.J. (2019, April). The Effect of the Louisiana Scholarship Program on College Entrance. *EDRE working paper no. 2019-12*. Social Science Research Network. (Chapter 2 of this dissertation)

Introduction

Ever since the Nation at Risk report was published in 1983 under President Ronald Reagan's administration, education reform has been a hotly debated topic at all levels of government. The report declared that American students were falling behind students in other nations and that a tide of mediocrity was sweeping through the United States (Gardner et al., 1983). As a result, politicians, activists, and parents fearing that the United States would lose its economic standing in the world, called for higher standards and greater accountability at all levels of public education. Since the report's release, the demand for greater accountability has continued until today and remains central to education policy debates. President George W. Bush implemented the first substantial federal accountability program, No Child Left Behind (NCLB), in 2002. NCLB mandated that states administer tests in grades three through eight with the hope of holding schools accountable for student test scores and ensuring that students, especially minority and economically disadvantaged students, made adequate yearly progress. If schools failed to meet set standards, they faced threats of sanctions. While it is unclear the extent to which schools actually experienced sanctions, NCLB significantly changed the schooling climate where administrators and teachers felt great pressure to improve students' test scores (Reback, Rockoff & Schwartz, 2014; Ladd, 2017). In an attempt to enhance federal accountability policy, President Barack Obama replaced NCLB with the Every Student Succeeds Act (ESSA) in 2015. ESSA allows states to design the specific features of their accountability systems, but the law still requires states to administer tests in grades three through eight. While states have slightly more flexibility, student test scores remain the primary focus.

As a result of increased federal involvement in school accountability policy, policymakers and schools have intensely focused on improving student test scores. Unintentionally, test-based accountability incentivized schools to narrow their curriculum in

order to increase instructional time as well as time dedicated to test preparation in the hope of meeting accountability metrics (Greene; 2017; Ladd, 2017). Because of the increased emphasis on test scores, there is great political pressure to make policy decisions regarding implementing, sustaining, expanding, and discontinuing various education programs on a program's ability to increase test scores. Despite the attention to test scores by policy makers, few parents believe that test scores are the only, or even the most important measure of educational success (DiPerna & Catt, 2016; Erickson, 2017; Glazerman & Dotter, 2016; Hastings, Kane, & Staiger, 2005). Most families want an education for their children that does not simply teach students reading and math skills, but which also provides a safe learning environment where students learn citizenship, perseverance, and creativity, as well as expose them to a world beyond what they already know. But, due to high-stakes, test-based accountability, many of the other values that schools provide are not frequently considered when evaluating educational policies, which leads to a narrow understand of how and what programs impact students. I do not intend to say that test scores are not an important measure of educational success, student academic achievement is an important outcome, but a hyper sensitivity to test scores comes at the expense of other important educational inputs and outcomes.

In this dissertation, I evaluate programs and focus on student outcomes that have not been commonly considered during the high-stakes accountability era. These programs can impact students' success during and after their K-12 schooling and have widespread policy implications for the education system. Chapter 1 evaluates the benefits of culturally enriching field trips and how these field trips affect students' engagement in school as well as future academic outcomes. Field trips are a long-standing tradition in schools that serve to enrich students' learning and to expose them to a broader world. However, there is evidence that such field trips are declining in

part due to accountability pressures (Gadsden, 2008; Government Accountability, 2009; Rabkin & Hedberg, 2011). Schools, particularly low performing schools and those in high poverty areas, instead choose to increase instructional time in math and reading in the hopes of boosting test scores. This additional seat time comes at the expense of other subjects and supplemental educational activities. Unfortunately, there is limited rigorous research on the benefits of field trips. I, along with my colleagues, seek to understand these benefits by conducting, what is to our knowledge, the first ever longitudinal experiment of arts-related field trips. In collaboration with the Woodruff Arts Center in Atlanta, Georgia and a nearby, large urban school district, we randomly assigned fourth and fifth grade students to receive three arts-related field trips or to serve as a control. The Woodruff Arts Center is a world class arts center that offers premier facilities and award-winning theater productions and concerts that are of the highest professional quality. Treatment students receive a field trip to the Alliance Theatre, the Atlanta Symphony Orchestra, and the High Museum of Art, while the control group receives business as usual, which could be one field trip to various locations around Atlanta. We then measure the effect of the field trips on a variety of student outcomes. Surprisingly, we find that treatment students in the first cohort experience gains on their math and English Language Arts (ELA) end-of-year test scores. This finding was contrary to our original hypothesis since we expected to see no substantial test score gains. We believe that the test score gains may be a result of increased school engagement because we also find that treatment students report enjoying attending school more and have fewer reported behavioral infractions than their control counterparts. It is clear that attending three arts related fieldtrip throughout the year did not diminish student test scores, but instead could potentially increase test scores, as well as increase student engagement. As

such, the practice of reducing field trips due to accountability pressures is perhaps unnecessary and attending field trips may instead improve students' academic outcomes.

Chapter 2 is an evaluation of the Louisiana Scholarship Program's (LSP) effect on college entrance. The LSP is a private school voucher program that provides government financial aid to low-income families to attend a private school of their choice. There is a vast amount of school choice research that evaluates the effect of a program on students' academic achievement; however, there is less known regarding the impacts school choice programs have on students' post-secondary outcomes. Much of the policy discussion surrounding school choice focuses on whether or not programs are successful at increasing students' test scores. Policymakers face significant political pressure to discontinue programs that do not improve test scores. However, it is not clear if school choice programs affect student achievement and longer-term outcomes such as high school graduation and college entrance rates in the same way.

In the school choice literature, there is a growing disconnect between a program's effect on student achievement and later educational attainment (Hitt, McShane, & Wolf, 2018). For example, some choice programs, especially charter schools, have shown large significant test score gains but null or even negative effects on post-secondary outcomes. The opposite is true with other programs, particularly private school choice programs, demonstrating no significant effect on test scores, but large effects on high school graduation rates. When policy decisions are made based on test score results exclusively, the programs that have less impact on test scores face being discontinued despite improving students' longer-term outcomes. In previous evaluations, the LSP has shown large negative effects on students' math and reading test scores (Mills & Wolf, 2019). However, in this study using an experimental design, we find no significant effect on the likelihood that students who use a scholarship enroll in college at any

different rate than do their control counterparts. Our findings elicit many questions regarding how to evaluate programs and whether or not to maintain or discontinue the LSP. What is clear is that test scores and other outcomes are not always correlated and making significant policy decisions based solely on test scores provides a limited perspective on the varied impacts of a program.

Chapter 3 takes a broader approach to program evaluation and analyzes how charter schools impact the supply of private schools. While most of the school choice literature focuses on measuring participant effects, school choice programs can have significant impacts on the entire education system. Traditional public, charter, and private schools all play an important role in the K-12 schooling market. It is important to understand how one schooling sector affects others as a change in the supply of schools in one sector can impact the supply and quality of schools in another. Charter schools have grown quickly and expanded across the United States since they were first introduced in 1991. As of 2018, only seven states did not have a charter law. Charter schools offer a cost-free alternative to families who have been paying a premium for private schools. As such, families are likely to leave private schools for charters when new schools open. Using nation-wide panel data, I evaluate the extent to which charter schools affect the market share of private schools. I specially look at the effect that charter schools have on private school student enrollment as well as the number of private schools. I find that as charter school enrollment increases in a specific county, private school enrollment and the number of private schools in that county decreases. These findings have broad policy implications because they demonstrate that there is a demand for alternative schooling options and that some families prefer charter schools over traditional public schools. These findings also have significant financial implications because as more students leave the private sector and enter public schools,

public education funds are spread among more students, lowering per-student spending overall. This study illustrates the importance of considering the systemic impacts of programs because a change in one sector can have substantial ramifications on the entire education system.

Overall, this dissertation demonstrates the need to think broadly about how educational policies affect students and the education system as a whole. As a result of the test-based accountability era, schools have increased instruction in core subjects at the expense of thinning their overall curriculum. Research on various educational programs has also focused primarily on measuring the impact programs have on student academic achievement. However, as illustrated in the following three chapters, test scores give an important, yet narrow view on how programs affect students and the education system. In Chapter 1, we find evidence that students who were randomly assigned to receive multiple culturally enriching field trips were more engaged in school and they scored higher on their end-of-year exams than did control students. These findings question the efficacy of schools increasing traditional classroom instruction at the cost of reducing the number of extracurricular activities such as field trips. In Chapter 2, we find that the Louisiana Scholarship Program had no significant effect on the likelihood of students enrolling in college. This finding is particularly interesting given the large, negative effect the program had on student test scores. This chapter demonstrates the importance of considering long-term student outcomes such as college entrance when evaluating policies. The final chapter broadens the literature on school choice by focusing on the systemic effects created by charter schools. I find that charter schools draw a significant amount of enrollment from nearby private schools and that over time, the number of private schools actually decreases to adjust for declining enrollment. These findings have significant implications for state and local education resources.

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Chapter 1: Does Art Make You Smart? A Longitudinal Experiment of the Effects of Multiple Arts-Focused Field Trips¹

Introduction

In this paper we estimate the causal effects of culturally enriching field trips on students' academic performance and school engagement. Such field trips are a long-standing tradition in schools. There are many potential benefits for students from attending culturally enriching field trips. Field trips to cultural institutions, particularly arts institutions, expose students to new ideas, places, and cultures while providing opportunities to deepen learning outside of the traditional classroom. Arts institutions provide meaningful opportunities not only to see, hear, and discuss works of arts, but expose students to a world beyond what they know. Many students, especially in low-income areas, experience little beyond their homes, neighborhoods, and schools. Field trips can vastly expand what children experience as part of their schooling. Field trips to cultural institutions such as art museums and theaters continue mostly due to the wisdom of educators and historical tradition. However, in recent decades, institutions such as arts venues, science museums, and zoos have noticed a decline in field trip attendance (Ellerson & McCord, 2009; Greene, Kisida, & Bowen, 2014). Teachers and students also reported a decline in school sponsored field trips (Government Accountability Office, 2009; Keiper et al., 2009).

Some evidence suggests that schools are reducing the number of field trips due to increased pressure from high-stakes accountability (Gadsden, 2008; Government Accountability, 2009; Rabkin & Hedberg, 2011). Under test-based accountability systems schools are under pressure to reconsider the costs and benefits of traditional educational field trips as they focus on increasing math and reading test scores (Gadsden, 2008; Rabkin & Hedberg, 2011; Student Youth & Travel Association, 2016). Responding to these pressures, schools allocate additional

¹ This paper was co-authored with Jay P. Greene, Angela R. Watson, and Molly I. Beck

time to instruction, specifically in math and reading, and test preparation while cutting back on non-tested subjects and other activities such as field trips. Notably, academically low-performing schools that serve students from high-poverty areas are more likely to report a decline in school-sponsored field trips, including arts-focused trips (Government Accountability Office, 2009; Keiper et al., 2009). These schools also face the greatest accountability pressures. A decline in field trips in high-poverty areas is especially concerning as field trips can provide equitable access to cultural institutions for students across various economic and racial groups.

Unfortunately, there is little systematic evidence on the value of cultural field trips for students. However, foregoing field trips could have unintended consequences for students as time in school is allocated to other academic activities in hopes of increasing student test scores. We seek to increase the literature on the impacts of field trips with the goal of better understanding the benefits for students and what might be lost if schools continue to decrease such activities. We expand the literature on the educational benefits of field trips by conducting, to our knowledge, the first-ever multi-visit, longitudinal experiment to estimate these effects. We randomly assign fourth and fifth grade students in ten elementary schools in a large urban school district to receive multiple arts-related field trips throughout the school year or to serve as a control group. This paper presents the results from the second year of the study. Our findings show significant educational benefits for students who attend arts-related field trips. We find that treatment students exhibit higher levels of school engagement. Surprisingly and contrary to our hypothesis, we find that treatment students also perform significantly better on their end-of-year standardized tests, and that this effect is persistent one year after treatment. These effects appear to be stronger for the first cohort of students in our sample.

The paper proceeds as follows. First, we discuss the previous literature on the impact of field trips and arts exposure for students. Second, we present our research questions and describe the study design. We then present our results and conclude with discussing policy implications and future research.

Previous Literature

Despite the educational tradition of fieldtrips, there is limited rigorous research evaluating the effects students experience from such activities. We draw on the literature evaluating the benefits of arts education as well as research on specific field trips. We group the literature based on research design pulling from both observational and experimental designs.

Observational Studies

There are a handful of observational studies focusing on the value of the arts for students' academic and social development. Longitudinal studies find positive correlations between arts exposure and academic outcomes (Ruppert, 2006; Lacoë, Painter, & Williams, 2016). Jægar and Møllegarrd (2017), comparing identical twins, find that children who frequent museums, theaters, and musical performances when they are younger also perform better in school when they are teenagers. Notably, a recent meta-analysis on the effects of student achievement from arts integration programs finds a four-percentage point increase in achievement (Ludwig, Boyle, & Lindsay, 2017). While a four-percentage point increase reflects significant academic gains, the authors warn against causal interpretation as none of the studies in the meta-analysis were able to establish a causal connection between arts activities and academic performance. Further, Lacoë, Painter, & Williams (2016) evaluate an arts integration program and find evidence that the dosage of exposure is important; students who receive longer and more intensive dosages

experience larger academic gains and fewer school suspensions. However, they also find diminishing effects once treatment ceases.

Other research has found social and emotional benefits from exposure to the arts. A recent study looking at single-visit art museum field trips finds that students experience increases in critical thinking, creative thinking, and human connection (Randi Korn & Associates, 2018). Human connection is defined as an awareness or sense of connection to others and the self and is similar to the construct of social perspective taking (Gehlbach, Brinkworth, & Wang, 2012; Greene et al., 2018). In addition to a single art museum visit, the study adds a second treatment condition of a near identical arts program that takes place in a classroom instead of in the museum. The authors find that the in-gallery experience appears to be more impactful than simply seeing and discussing identical art content at school (Randi Korn & Associates, 2018).

Experimental Studies

Fortunately, there is a growing, yet still limited, body of literature on the causal effects for students from arts integration and specifically, arts-related field trips. A study of a district-wide arts enrichment program where, due to budget constraints, schools were randomly chosen to participate, shows positive outcomes on students' compassion for others, school engagement, as well as increased standardized test scores (Bowen & Kisida, 2019). Greene, Kisida, and Bowen (2014) experimentally evaluate the effects of a single visit to an art museum on student outcomes and find that students who tour an art museum demonstrate a host of significant benefits when measured nearly two months after the visit occurs. Treatment students are more likely to report a greater desire to consume art in the future and actually visit the same art museum on their own following the field trip (Kisida, Greene, & Bowen, 2014). In addition, there is evidence that treatment students demonstrate increased levels of critical thinking skills,

as well as increased tolerance, content knowledge, and historical empathy (Bowen, Greene, & Kisida, 2014; Greene, Kisida, & Bowen, 2014). Further, these benefits appear stronger for students from low socioeconomic backgrounds.

In a similar experimental study evaluating the effects of attending field trips to see live theater performances, students demonstrate higher levels of tolerance, social perspective taking, and evidence of increasing desire to consume theater in the future (Greene, et al., 2015; Greene et al., 2018). Particularly interesting, Greene et al. (2018) adds a second treatment condition wherein some students receive a field trip to a live theater performance, some receive a field trip to see a movie of the same play, and the control group remains at school and receives neither the play nor the movie treatment. Students who view the live theater performance demonstrate higher levels of tolerance, social perspective taking, and content knowledge compared to the students who viewed a movie of the same play.

Our current study adds to the existing literature on the benefits of culturally enriching field trips in four ways. First, we use an experimental design that allows us to capture the causal effects on students from attending field trips. Second, where most of the previous literature focuses on the effects from attending one field trip, treatment students in this study attend three different arts-related field trips: an art museum, live theater, and the symphony. Third, this study takes place in a large urban city, and the participating schools consist primarily of students of color who are from economically disadvantaged backgrounds. Much of the existing research was conducted in suburban and rural areas. Fourth, this study is the first longitudinal experiment where we collect both survey and administrative data for students in our sample.

Research Question and Hypotheses

This paper examines whether attending multiple arts-focused field trips throughout the school year improves students' engagement in school and affects their academic performance. We measure the effect of receiving three field trips in one year, six field trips over two years, and the effect one year following treatment. We set the following hypotheses:

H1: We expect that treatment students will demonstrate higher levels of school engagement.

H1a: We expect treatment students to report higher levels of school engagement through self-reported measures on surveys than their control counterparts.

H1b: We also expect treatment students to have fewer behavioral infractions throughout the school year than their control counterparts.

H2: We expect to find no statistically significant treatment effect on students' end of year standardized test scores.

We hypothesize that treatment students will demonstrate higher levels of school engagement by spending time away from traditional instruction and being exposed to new ideas and art forms with which they are unfamiliar. Exposing students to new ideas sparks their creativity and desire to learn. When students are excited about a certain subject or idea, they are naturally more engaged in school. It is also possible, that simply providing a break from traditional instruction motivates and refreshes students so that they enjoy school more. There is not a comprehensive measure of school engagement; we use a self-reported and behavioral measure to capture students' engagement. First, we use students' self-reports on how boring they believe school is. Second, we use the number of infractions a student receives in a year. Students who are engaged in school are less likely to act out. Using both self-reported and behavioral measures provides a good proxy for students' engagement in school.

While field trips can expose students to arts and provide a unique learning environment, it is unlikely that three arts-related trips will significantly affect students' academic performance on math or reading exams. Three days away from traditional instruction is unlikely to harm student achievement nor provide enough content to improve test scores. While some previous studies have found positive effects on students' academic performance from arts exposure, these studies have evaluated more intensive arts integrations programs. We are evaluating a less intensive program of only arts-related field trips. As such, we expect to find no significant difference between treatment and control students' test scores.

Study Design

In partnership with The Woodruff Arts Center in Atlanta, Georgia and a large urban school district, we randomly assign fourth and fifth grade classes within ten elementary schools to receive a field trip to each of the three Woodruff arts partners, the Alliance Theatre, the Atlanta Symphony Orchestra, and the High Museum of Art, or to serve as a control group. The Woodruff Arts Center is a world-class center that offers some of the nation's leading exhibits and facilities. The three high-quality field trips, all part of the otherwise existing educational programming at each venue, are carefully designed for maximum impact and cultural relevancy. The hour-long Alliance Theatre performance is designed for children and families and performed by a professional cast and is of the highest artistic quality. A trained volunteer docent leads the hour-long High Museum of Art's program featuring several works of art followed by an hour-long hands-on studio experience led by a teaching artist. Finally, the Atlanta Symphony Orchestra fills their 1,700-seat facility for an hour-long concert with a full symphony performing music carefully selected for younger audiences and accented with large-screen video descriptions and images.

In the first year of the study there were four participating schools, and in year two six additional schools were included for a total of ten schools. Randomization occurred within schools between the fourth and fifth grade. We ensured that we had equal numbers of fourth and fifth grades that were assigned to treatment and control. For example, in the first year of the study with four participating schools, two schools had fourth grade receive treatment and fifth grade serve as a control; while the other two schools had fifth grade receive treatment and fourth grade serve as a control. Treatment students who were in fourth grade in the first year received an additional year of treatment when they were in fifth grade the following year. Table 1 shows treatment assignment in year two for each school and grade. In year two, we are able to estimate the effect of three field trips in one year, six field trips in two years, and the effect of three field trips a year following the treatment.

Table 1: Treatment Assignment by Cohort in Year 2

School 1		School 5	
4 th	Treatment	4 th	Treatment
5 th	Control	5 th	Control
6 th	Treatment- year post treatment	School 6	
School 2		4 th	Treatment
4 th	Treatment	5 th	Control
5 th	Control	School 7	
6 th	Treatment- year post treatment	4 th	Treatment
School 3		5 th	Control
4 th	Control	School 8	
5 th	Treatment- double dose	4 th	Control
6 th	Control	5 th	Treatment
School 4		School 9	
4 th	Control	4 th	Control
5 th	Treatment- double dose	5 th	Treatment
6 th	Control	School 10	
Cohort 1		4 th	Control
Cohort 2		5 th	Treatment

Randomization occurred within schools between 4th and 5th grades. Students in 6th grade from schools 1 and 2 were randomly assigned to treatment when they were in 5th grade in year one of the study. As such, in year two they are one year post treatment. Students in 5th grade in schools 3 and 4 were randomly assigned to treatment when they were in 4th grade in year one of the study. As such, in year two they receive an additional dose of treatment for a total of 6 field trips.

Ideally, we would prefer to randomize individual students to the treatment or control group; however, it is logistically difficult to take a mix of fourth and fifth grade students from different classes and schools on three field trips throughout the year. We wanted to minimize the administrative burden on the schools and create minimal disruption to their normal schedules. It was easier on schools and more efficient for entire grades within a school to attend the field trips. We believe that our design remains a rigorous experiment because participating students are very similar to each other prior to randomization, therefore increasing the probability of having similar treatment and control groups. First, all the schools are in the same large urban school district. The ten elementary schools are all near each other and feed into two neighboring middle

schools. Second, the ten schools all serve very similar student populations. Students live in a large, urban area and are primarily students of color and the majority qualify for free or reduced-price lunch (FRL). Third, fourth and fifth grade students in the same schools are relatively similar to each other. The primary reason students are either in fourth or fifth grade is their birthday. We also believe that arts-related field trips are unlikely to affect fourth grade students in a significantly different way than fifth grade students in the same school. If, by chance, there are significant differences between fourth and fifth graders, our design accounts for the differences by ensuring a balance of fourth and fifth grades across the treatment and control groups.

Following randomization, our research team surveyed all students at the beginning of the school year. The treatment group then attended the three field trips throughout the course of the school year. It is important to note that the treatment consisted of the three field trips and one day of professional development for teachers in treatment grades conducted by The Woodruff Arts Center. Any supplementary activities either before or following any of the field trips were done at the discretion of the teacher or school. The control group received business as usual which could have been up to one field trip to various locations in Atlanta throughout the school year. Our team then administered post surveys near the end of the school year following the end-of-grade exams. We also received administrative data from the school district for all students in the year prior to them entering the study and each year following.

Sample and Data

Our sample consists of just under 1,400 students who are 10.5 years old on average. Over 90% of the students in our sample identify as black or African American. We do not report the percent of students who qualify for FRL because the majority of schools in our sample record all

students as qualifying for FRL. Table 2 includes demographic and pre-treatment measures for treatment and control groups separately.

Our treatment and control groups are statistically similar to each other at baseline on key measures such as demographics, special education status, test scores, discipline measures, and school attendance (Table 2, Column 3). Most of these measures come from administrative data provided by the school district. There are some statistically significant differences between the treatment and control groups on pre-treatment survey measures. Treatment students report greater desires to consume art in the future (Table 2, Column 3). However, we believe these differences are due to teachers priming treatment students prior to our pre-treatment surveys and are not due to underlying differences between the two groups. Teachers were aware of their class' treatment assignment prior to surveying due to scheduling constraints. Many teachers told the students before beginning the survey that they were going to attend various field trips throughout the year and discussed the importance of museums and theaters prior to survey administration. We believe these differences reflect some effect of the treatment if students exhibit interest in the arts when they simply anticipate attending the given institutions. We controlled for baseline desire to consume art in our analysis and it does not affect our outcomes of interest in any significant ways.

Table 2: Pre-Treatment Comparisons of Treatment and Control Groups

Variables	(1) Control (mean)	(2) Treatment (mean)	(3) Adj. Difference (T-C)	(4) Observations
Demographics:				
Age in years	10.48	10.59	0.11	1135
Female	51.21%	51.14%	-0.07	1363
Black or African American	98.82%	99.32%	0.50	1018
Students with Disabilities	15.50%	15.27%	-0.23	1228
Baseline Standardized Test Scores				
ELA	-0.35	-0.31	0.04	1202
Math	-0.32	-0.28	0.04	1201
Combined Tests	-0.37	-0.34	0.03	1205
Baseline Discipline Measures				
Infractions	0.12	0.12	0.00	1363
Suspensions	0.04	0.06	0.02	1363
Prior Year Percent Absent	4.47%	4.58%	0.11	1228
"School is Boring"	0.04	0.00	-0.04	1193
Desire to Consume Art	-0.05	0.14	0.19***	1222
Desire to Participate in Art	0.03	0.05	0.02	1222
Previously attended The Woodruff	75.10%	80.61%	5.51*	1181
Previously attended Alliance Theatre	32.10%	30.84%	-1.26	1211
Previously attended Atlanta Symphony	39.74%	47.95%	8.21**	1216
Previously attended High Museum of Art	49.03%	52.38%	3.35	1133
The difference between treatment and control group students are adjusted controlling for school fixed effects. *** p<0.01, ** p<0.05, * p<0.1				

Consent and Attrition

We received consent to participate in the study from 78% of all enrolled fourth and fifth grade students in the ten elementary schools. Of the enrolled students, we did not receive a spring survey from 39.6% of students. There was a 6.8% differential attrition rate between the treatment and control groups with more students leaving the control group. We received school district administrative data from nearly all students who consented to the study. However, we received more consent forms from the treatment than the control group. Therefore, when using administrative data, we have a 15.7% differential attrition rate between the treatment and control groups.

When using only survey data, the overall and differential attrition rates fall within the What Works Clearinghouse tolerable threat of bias under optimistic assumptions (What Works Clearinghouse). We believe the optimistic assumptions are appropriate for this study because it is unlikely that treatment status affects the attrition of a student from our sample. Students in our sample are a highly mobile population and movement within the year is fairly common as seen in the overall attrition rate.

When district administrative data is included, however, we have a higher threat of bias under the What Works Clearinghouse guidelines. The administrative data has significant benefits, despite the high differential attrition between the treatment and control groups. Administrative data provides data on students who leave their original school but stay within the district. It also provides a rich set of control and outcome variables of interest. Unfortunately, issues with consent and attrition are common in field work. As a robustness check, we ran our analysis with administrative data limiting it to students who have spring surveys. All effects remain in the same direction and are typically stronger in magnitude and statistically significant at higher confidence levels when just using students with survey and administrative data. In this paper, we present the analysis that includes all students from whom we received administrative data.

Outcome Measures

In this paper we focus on the effects field trips have on students' academic performance and school engagement. To measure academic performance, we use a composite math and English language arts (ELA) score on the Georgia Milestones end-of-grade exams. The Georgia Milestones are given to all public school students in the state starting in third grade and the exam scores are used in Georgia's accountability system. In our analysis, we include baseline test

scores which are from the school year prior to treatment². All test scores are standardized within grade level and presented in standard deviation effect sizes.

To measure school engagement, we use the number of infractions a student receives during the school year as well as the student’s self-reported responses of how boring school is. In the district administrative data, we are able to see every time a student is written up for a behavioral infraction. We use the number of infractions during the treatment year as our outcome variable and control for the number of infractions in the prior year. For student self-reports, students indicate how much they agree with the statement “School is boring” on a five-point scale from disagree a lot to agree a lot. We control for pre-treatment responses to the same statement. All pre- and post-treatment responses are standardized. We recognize that these two measures do not capture all forms of student engagement, but believe they capture important elements of school engagement.

Analyses

Due to the randomized field trial design, which generates similar treatment and control groups, we use a straightforward analytic approach to estimate the causal effect of attending arts-related field trips on students’ academic performance and school engagement. Our technique estimates mean differences between the treatment and control groups using the following equation for outcome Y for student i in school s :

$$Y_{is} = \beta_0 + \beta_1 1Treat_{is} + \beta_2 2Treat_{is} + \beta_3 PTreat_{is} + \beta_4 Baseline_{is} + X_i \beta_5 + \theta_s + \alpha_i + \varepsilon_{is}$$

² For our baseline test score measure, we use a combined standardized score of all Georgia Milestone exams a student took in the year prior to a treatment. All students took the math and ELA milestone while some students also took the science and social studies exams.

Where $1Treat$ is a binary variable equal to 1 if a student receives one dosage of treatment, $2Treat$ is equal to 1 if a student receives a second dosage of treatment, and $PTreat$ is equal to 1 if a student receives treatment in the prior year. In order to increase the precision of our estimates, we include baseline measures of the outcome, *Baseline*, and a vector of student characteristics, X , which includes binary variables for a student's gender and if the student is in sixth grade. Because randomization occurred within schools, θ is a fixed effect for each school, which effectively compares treatment and control students within the same school instead of across schools. We also include student random effects, α , to account for correlation between a student's error over the two years. It is important to note that we have an unbalanced panel data set where cohort one students appear in year one and year two, and cohort two students only appear in year two. We believe random effects are appropriate because we are correcting for student errors correlated over time and not trying to account for potential endogeneity where fixed effects would be more appropriate. Finally, ε is the stochastic error term clustered at the teacher level to account for spatial correlation from students in the same classroom.

Results

Student Academic Performance

As reflected in Table 3, receiving the opportunity to attend three field trips has a marginally statistically significant effect at the 90% confidence level on students' math and ELA test scores the year following treatment. Receiving treatment in a prior year leads to a 0.12 standard deviation increase in the following year test scores. However, the effect on test scores varies when looking at cohorts one and two separately. Cohort one students who receive the first dosage of treatment experience a statistically significant 0.15 standard deviation increase in test scores compared to their control counterparts. This effect is significant at the 95% confidence

level. The effect persists a year after treatment, where treatment students score 0.13 standard deviations higher than control students. The effect slightly increases with a second dosage of treatment, where treatment students score 0.17 standard deviations higher than control students; however, it is only statistically significant at the 90% confidence level. These effects do not appear for cohort two students.

Table 3: Treatment Effect on End of Grade Math and ELA Tests

	Combined	Cohort 1	Cohort 2
1st Treatment	0.06 (0.042)	0.154** (0.068)	0.027 (0.057)
2nd Treatment	0.06 (0.092)	0.166* (0.09)	
Previous Treatment	0.119* (0.066)	0.128** (0.064)	
Pre-Composite Test Score	0.857*** (0.018)	0.858*** (0.024)	0.850*** (0.021)
Female	0.008 (0.035)	0.05 (0.051)	-0.007 (0.031)
Grade 6	-0.022 (0.04)	0.038 (0.044)	
Observations (N)	1,493	817	889
Number of Students	1,130	454	889

Fixed effects for the ten elementary schools and student random effects are included in each model. Standard errors clustered at the teacher level are in parentheses. Observations refer to the number of observations in the panel. Number of students refers to the number of unique students in the sample *** p<0.01, ** p<0.05, * p<0.1

Student School Engagement

As reflected in Table 4, receiving the opportunity to attend three arts-related field trips significantly increases student engagement a year following treatment when measured by the number of disciplinary infractions and self-reports. Treatment students have 0.6 fewer infractions than their control counterparts in a year after treatment. This effect is significant at the 95% confidence level. They also reported that school was less boring by 0.33 standard deviations; however, this effect is only significant at the 90% confidence level. These effects are solely

found for previously treated students in cohort one, but it is important to note that only cohort one students have been in the study for two consecutive years.

Table 4: Treatment Effect on School Engagement Measures

	Number of Infractions			"School is Boring"		
	Combined	Cohort 1	Cohort 2	Combined	Cohort 1	Cohort 2
1st Treatment	0.049 (0.05)	0.037 (0.076)	0.072 (0.078)	0.00 (0.079)	-0.06 (0.102)	0.07 (0.109)
2nd Treatment	-0.011 (0.103)	0.024 (0.109)		0.084 (0.115)	0.088 (0.137)	
Previous Treatment	-0.570** (-0.24)	-0.622*** (0.222)		-0.327* (-0.177)	-0.425** (0.17)	
Pre-Composite Test	-0.159*** (0.036)	-0.171*** (0.06)	-0.111*** (0.035)	0.001 (0.032)	-0.035 (0.04)	0.00 (0.042)
Pre-Infraction Count	0.644*** (0.156)	0.780*** (0.23)	0.606*** (0.152)			
Pre "School is boring"				0.287*** (0.036)	0.234*** (0.048)	0.329*** (0.04)
Female	-0.117** (0.053)	-0.059 (0.079)	-0.161*** (0.056)	-0.110* (0.065)	-0.07 (0.103)	-0.176** (0.075)
Grade 6	0.952*** (0.206)	0.985*** (0.189)		0.08 (0.136)	0.101 (0.153)	
Observations (N)	1,687	964	950	1,176	657	690
Number of Students	1,205	482	950	919	400	690

Fixed effects for the ten elementary schools and student random effects are included in each model. Standard errors clustered at the teacher level are in parentheses. Observations refer to the number of observations in the panel. Number of students refers to the number of unique students in the sample *** p<0.01, ** p<0.05, * p<0.1

Discussion

We present the first experimental evidence on the effects from students attending multiple arts-related field trips. We find that treatment students received fewer behavioral infractions and reported that they enjoyed school more than their control counterparts. The significant effect on behavioral infractions is only present for treatment students a year after treatment. We believe that we are able to capture this effect due to a structural change between elementary and middle schools. Previously treated students consist of cohort one students who were assigned to the treatment group in fifth grade and in the second year of the study are in sixth grade where they progressed to middle school (see Table 1). Middle schools are more likely to write-up students for various behavioral infractions than are elementary schools. It is likely that treatment affects students' behavior in all grades, but that there is insufficient variation in student discipline records in elementary school for our models to detect any differences. Despite data limitations, we find evidence that arts-related field trips significantly reduce the number of infractions a student receives. These results provide causal evidence of the benefit of field trips on student behavior.

Contrary to our hypothesis, we find evidence that students in cohort one experienced test score gains from one and two years of treatment and that the effect persisted a year following treatment. We expected that treatment would have no significant impact on student test scores. We believed that three days out of school were unlikely to negatively affect test scores, but at the same time, three field trips were unlikely to provide enough math or ELA content to significantly improve scores. There are a few possible explanations for this unexpected result. First, it is possible that the treatment affects students' academic performance through school engagement. We found that treatment students experienced a significant increase in school engagement.

Treatment students could have exerted greater effort in their core subjects which then affected their test scores. Second, it is possible that students learned skills or content from the field trips that assisted them on their exams. Each of The Woodruff arts partners design their programming with the Georgia state standards in mind with the goal of connecting students' experiences to classroom content. However, this seems less probably given that the field trips were only three days and unlikely to provide specific content that overlapped with a significant portion of the standardized tests. The specific mechanisms of how the field trips benefit students is unknown. The experimental design, while the only method to produce causal results, is, unfortunately, a black box and does not give any evidence of mediating mechanisms.

It is important to note that the test score effects are primarily for cohort one students. While there is no clear reason why the treatment affects cohort one and two students differently, there were a couple disruptions throughout the school year in the year cohort two entered the study that could affect how the cohorts responded to the treatment. First, in the fall, Hurricane Irma hit Atlanta and many schools were closed for more than a week due to loss of electricity and damage to school buildings. Second, later that same year, Atlanta also experienced severe winter storms resulting in school cancellations and rescheduling one of the three field trips. Both natural disasters resulted in multiple missed days, and while missing a few days of school is unlikely to affect test scores, missing multiple days plus the added stress of natural disasters could offset any test score increases the treatment caused. It is also possible that there are some underlying differences between cohort one and two students that we are not capturing which influences the way students respond to the treatment. However, we believe this is less likely as both cohorts are not statistically different from each other on key demographic and administrative measures. Whatever the reason for differential effects on cohorts one and two

students, it is clear that missing a few days of school to attend field trips does not negatively impact student test scores. As such, the practice of reducing field trips due to accountability pressures to allow more time for instruction is not needed, and furthermore, providing students with experiences outside the classroom may even improve test scores.

Conclusion

We provide the first causal evidence of sustained academic and school engagement benefits for students from attending culturally enriching field trips. One of the most intriguing findings is that student test scores are not negatively affected from missing three days of instruction and in some cases test scores substantially increase up to 16% of a standard deviation. Test score gains also remain one year after treatment. These gains are strikingly significant given that the elementary schools in our sample are generally low performing schools with very few students performing at grade level. Test score effects are particularly important when considering accountability policies. Due to increased accountability pressures to improve student test scores, many schools have opted for additional instructional time in core subjects along with extensive test preparations at the expense of other activities. However, the evidence presented here questions how effective these changes may be. While quality instruction and seat time are important for student academic progress, there are other valuable ways to increase student learning while also providing opportunities for a broader curriculum.

Many questions remain about the benefits of field trips for students; specifically, if the academic and school engagement effects we observe will persist multiple years after treatment and if additional cohorts will experience these same benefits. We hope to be able to answer these and many other questions in coming years as a third cohort is added, and as we continue to follow existing students through their middle and high school experiences.

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Chapter 2: The Effect of the Louisiana Scholarship Program on College Entrance³

Introduction

Private school choice continues to be a highly controversial education reform. Choice remains popular, however, as the number of private school choice programs and participating students have both increased rapidly in the last decade (EdChoice, 2019). School choice broadly gives parents the opportunity to select a school for their children other than their residentially assigned public school. Private school choice, in the form of vouchers, tax-credit scholarships, or Education Savings Accounts (ESAs), provides families the opportunity to select a private school for their child and to receive financial support to pay for tuition. Milton Friedman (1962) argued that a robust market of schools supported by government resources but managed privately would lead to a more efficient and successful education system. Choice critics contend that education is a public good best delivered by government-run schools (Gutmann, 1987).

Most research evaluating private choice programs has focused on their effects on student academic achievement. A majority of experimental evaluations find modest, neutral-to-positive effects of private school choice on the student achievement of participants (Bettinger & Slonim, 2006; Cowen, 2008; Cowen et al., 2013; Greene, Peterson, & Du, 1999; Greene, 2001; Howell et al., 2002; Howell & Peterson, 2006; Jin, Barnard, & Rubin, 2010; Krueger & Zhu, 2004; Rouse, 1998; Wolf et al, 2013), with some recent and notable exceptions that find negative effects on student test scores (Abdulkadiroğlu, Pathak, & Walters, 2018; Dynarski et al., 2017; Figlio & Karbownik, 2016; Mills & Wolf, 2019; Waddington & Berends, 2018). Abdulkadiroğlu, Pathak, and Walters (2018) and Mills and Wolf (2019) both evaluate the Louisiana Scholarship Program (LSP) and find large negative effects on both math and English Language Arts (ELA) test scores

³ This paper is co-authored with Jonathan N. Mills and Patrick J. Wolf

in the first year of the program. Mills and Wolf (2019) include three additional years of data and find that the negative test score effects diminish in the second year and become statistically insignificant in the third year only to reemerge in the fourth and final year of the program evaluation. The LSP, demonstrating large negative effects on student test scores, stands out as the most notable exception to the majority of findings in private school choice research.

In this paper we seek to understand how the LSP impacted college enrollment for students who applied to the program in its first year, 2012-13. Using detailed data from the National Student Clearinghouse (NSC) Student Tracker Service, we find that 60% of students who were awarded a scholarship through a lottery and enrolled in their first-choice private school enter college, compared to 59.5% of their control student counterparts. We find that treatment students are two percentage points more likely to enroll in a four-year institutions than a two-year; however, this difference is not statistically distinguishable from zero.

This paper expands our understanding of how the LSP affected students on multiple educationally important outcomes. It also contributes to the emerging body of literature on private school choice programs' effects on student attainment by using an experimental design to estimate the causal effect of the LSP on college entrance. Finally, it adds another case to the growing list of school choice evaluations reporting a disconnect between the short-term test score effects and longer-term attainment effects of school choice programs (Hitt, McShane & Wolf, 2018).

The paper proceeds as follows: first, we define the features and policy context of the LSP; second, we review the previous literature on private school choice including the LSP; third, we discuss our research methodology and data; fourth, we present our results; and last, we discuss the implications of our findings and further research.

Louisiana Scholarship Program Description

The LSP is a school voucher program providing students a scholarship to attend a private school of their choice. The program piloted in New Orleans in 2008 and expanded statewide in 2012. Students are eligible for the LSP if their family incomes are below 250% of the federal poverty line and if they are currently attending a public school rated C, D, or F on the statewide school grading system. Students entering kindergarten or currently enrolled in the Recovery School District, which is the state government takeover mechanism for Louisiana schools, are also eligible to apply for a scholarship.

Scholarship funding comes from the state and is the lesser amount of 90% of state and local funding or the tuition of the private school of the student's choice. In order to participate in the program, private schools are required to administer the state standardized test and cannot have selective admission policies. They also must comply with state financial and safety regulations.

In the first year of the statewide program, 2012-13, over 9,500 students applied for and 5,296 were awarded a scholarship (Mills & Wolf, 2017a). The majority of student applications in the first year were for kindergarten through third grade, with 19% of applications for seventh through twelfth grades.

Literature Overview

A large body of research evaluates the effects of various private school choice programs on the student achievement of participants (Abdulkadiroğlu, Pathak, & Walters, 2018; Bettinger & Slonim, 2006; Cowen, 2008; Dynarski et al., 2017; Greene, Peterson, & Du, 1999; Greene, 2001; Jin, Barnard, & Rubin, 2010; Krueger & Zhu, 2004; Mills & Wolf, 2019; Rouse, 1998; Waddington & Berends, 2018; Wolf et al., 2013). A recent meta-analysis by Shakeel, Anderson,

and Wolf (2016) summarizes the effects of private school vouchers around the world and finds statistically significant positive effects on student test scores two or three years after random assignment, with larger results in reading than math. The effects for programs in the United States are smaller and less conclusive than the effects in non-U.S. countries. In many studies there are heterogeneous effects for various subgroups. For example, in the D.C. Opportunity Scholarship Program, test score impacts are larger for girls and students who entered the program from public schools that were not classified as needing improvement (Wolf et al., 2013). A number of studies find greater impacts for African American than for non-African American students (e.g. Howell et al., 2002).

There is a much smaller body of literature on the effects of private school choice on students' educational attainment as measured by high school graduation, college entrance, and degree completion. This research base is less developed than the private school choice achievement impacts literature because attainment evaluations require following students for many years after their initial experience in the program. Educational attainment is, however, arguably, more important than student test scores because it is a more direct proxy for student success and is strongly associated with a host of positive long-term outcomes. Higher levels of educational attainment are predictive of a longer, healthier, and more economically productive life (Belfield & Levin, 2007; Day & Newburger, 2002; Meara, Richards & Cutler, 2008; Muenning, 2005; Muennig, 2008). Moreover, the achievement effects of a school choice program seldom predict that program's later attainment effects. Some choice programs demonstrate large positive test score impacts for students but null or negative post-secondary outcomes; while other programs show no effect on test scores but large positive effects on attainment (Hitt, McShane & Wolf, 2018). Examining both achievement and attainment provides

a more comprehensive understanding of the LSP's effect on students' future success, particularly in light of the large negative test score effects students experienced over most of the first four years of the program.

Literature on Private School Choice and Student Attainment

Eight studies assess the impact of private school choice on student attainment in four programs: the Milwaukee Parental Choice Program (MPCP), the District of Columbia Opportunity Scholarship Program (D.C. OSP), the New York School Choice Scholarships Foundation Program, and the Florida Tax Credit Scholarship.⁴ Two studies consider high school graduation only (Warren, 2011; Wolf et al., 2013), four studies consider college enrollment only (Chingos, Monarrez, & Kuehn, 2019; Chingos, 2018; Chingos & Kuehn, 2017; Chingos & Peterson, 2015), and two studies examine both (Wolf, Witte & Kisida, 2018; Cowen et al., 2013).

Of the four total studies that consider the effect of private school choice on the likelihood of students graduating from high school, all of them find statistically significant positive effects. The largest impact is in the D.C. OSP experimental evaluation, where the effect of using a voucher is a twenty-one percentage point increase in the likelihood of graduating from high school (Wolf et al., 2013). Using student matching methods, Cowen et al. (2013) find that students participating in the MPCP are two to seven percentage points more likely to graduate from high school in four years compared to similar peers in traditional public schools, an initial finding largely replicated by a follow-up study (Wolf, Witte & Kisida, 2018). Evaluating the same program but with an observational design, Warren (2011) finds that voucher students are

⁴ For a systematic review of five of these studies see Foreman, 2017.

twelve percentage points more likely to graduate in six years compared to the state average high school graduation rate.

Regarding impacts on college enrollment and persistence, four of the six total studies find significant positive effects for the overall sample. Students participating in the Florida Tax Credit (FTC) scholarship program are six percentage points more likely to enter college, with most entering community colleges (Chingos & Kuehn, 2017). In a follow up study of the FTC using college enrollment data from the National Student Clearinghouse, Chingos, Monarrez, and Kuehn (2019) find that FTC participants are between six and ten percentage points more likely than similar nonparticipants to enroll in both two-year and four-year institutions. FTC participants are also more likely to earn a bachelor's degree by one to two percentage points. The updated study of the FTC is consistent with the previous findings, but in some cases the effects are larger due to a large portion of FTC participants enrolling in out-of-state colleges. Similarly, students in the Milwaukee program are four to six percentage points more likely to enter four-year colleges and persist in them longer than matched public school students (Wolf, Witte & Kisida, 2018; Cowen et al, 2013). Students in neither the New York City program (Chingos & Peterson, 2015) nor the DC program (Chingos, 2018) realized any significant college enrollment benefits of those private school choice initiatives, although African American and non-immigrant subgroups of students demonstrated attainment impacts in New York.

Overall, private school choice programs tend to have a significant positive effect on students' likelihood of graduating from high school and enrolling in postsecondary institutions. However, research remains limited. Only eight studies have considered the attainment effects of only four private school choice programs in the U.S. Only three of those evaluations employed a gold standard, experimental design. We expand this nascent literature by experimentally

evaluating the impact of the Louisiana Scholarship Program on students' likelihood of entering college.

Previous Literature on the Louisiana Scholarship Program

The LSP is one of the most comprehensively studied private school choice programs in the United States. There is evidence of the LSP's impact on students' academic achievement, competitive effects on students who remain in traditional public schools, and school segregation. Researchers also have studied the types of private schools that participate in the LSP, which may help in understanding the various outcomes of the program.

First, the LSP had large negative effects on achievement for participating students in the first year. Those negative test score effects ranged from a 0.40 standard deviation (Abdulkadiroğlu, Pathak, & Walters, 2018) to a 0.65 standard deviation decrease in math test scores (Mills, 2015).⁵ The effect was smaller in English Language Arts, but also negative and statistically significant. These initial negative achievement effects of the LSP decreased in the second year and became statistically insignificant by the third year, only to reemerge in the fourth and final year of the evaluation (Mills & Wolf, 2019). The LSP is one of only two voucher programs, along with the D.C. OSP (Dynarski et al. 2017), to show negative test score effects based on an experimental design.⁶

The reasons for the negative achievement effects of the LSP are unknown. Potential explanations include disruption due to switching schools (especially during the chaotic first year

⁵ Abdulkadiroğlu, Pathak, & Walters (2018) and Mills, 2015 have slightly different point estimates for two main reasons. One, the studies use slightly different samples of students. Two, Mills (2015) and Mills & Wolf (2017a) standardized student test scores to the control group testing distribution, and Abdulkadiroğlu, Pathak, & Walters (2018) standardize student test scores to New Orleans student test scores.

⁶ Figlio and Karbowink (2016) and Waddington and Berends (2018) find negative achievement effects in the first years of the Ohio and Indiana voucher programs, respectively. Both studies use non-experimental designs.

of the initiative), differences in testing culture and familiarity, and the quality of participating private schools.

The LSP was enacted less than three months before the start of the 2012-13 school year. Program implementers and private school personnel had to rush the roll-out of the new initiative. Participating private schools had little time to prepare for an influx of new students, many of whom arrived with challenging backgrounds and low achievement levels (Sude & Wolf, 2019). At least some of the initial achievement loss of the LSP students compared to the control group students can be attributed to the extreme conditions in which students had to adjust to new schools and the schools to new students.

Private schools participating in the program are required to administer the state accountability test to their LSP students. In the first two years of the LSP, the test came in two versions, LEAP and iLEAP. The LEAP was fully aligned to the content of the curriculum taught in Louisiana public schools, while the iLEAP was only partly aligned to the state's curriculum standards. The students in the evaluation who took the more aligned LEAP exam demonstrated negative test score effects of the LSP that were twice as large as the students who took the less aligned iLEAP exam through the first two years of the study (Mills & Wolf, 2017a, pp. 15-16). While public schools are accustomed to taking the LEAP/iLEAP, both tests were new for private schools, which also might have contributed to the negative LSP effects using both tests. The difference between treatment and control group students' test scores could in part reflect differences in familiarity between private and public schools with the state test and the practice of accountability-based testing. In the third year, when there were no statistical differences between treatment and control students' test scores, the state switched assessments from LEAP/iLEAP to the PARCC. The PARCC test was new to both public and private schools, and

no accountability penalties were attached to school-level performance on that test that year. The effects of the LSP on student achievement were null in outcome year 3, the one year the PARCC was used. In outcome year 4, the state used a third accountability test, modeled after the PARCC that was fully aligned to the state curriculum. The test was high-stakes that year, with accountability rewards and penalties attached to school-level performance. The LSP effects on test scores returned to statistically significant negative in that fourth year. In sum, the test score impacts of the LSP varied across time and across tests, from null in year 3 to negative in years 1, 2 & 4, in part probably because of differences in test alignment and test familiarity between the private and public schools.

Some evidence suggests that the quality of private schools participating in the program is a factor in the generally negative test score effects of the LSP. Sude, DeAngelis, and Wolf (2018) find that only 33 percent of Louisiana private schools participated in the program. When surveyed, private school leaders listed “concerns about future regulations” as their main reason for not participating in the LSP (Kisida, Wolf & Rhinesmith, 2015). While there is no simple measure of private school quality at the start of the program, since private schools were not required to administer or report test scores until they joined the LSP, indicators suggest that lower quality private schools disproportionately participated in the program. Participating schools charge lower tuitions, enroll fewer students per grade, and have smaller school staffs than nonparticipating private schools in the state. In a separate report by our team, Lee, Mills and Wolf (2019) find that most of the negative test score effects of the LSP were concentrated among students attending private schools in the lower two-thirds of the distribution on various quality indicators.

Louisiana has a robust private school market with approximately 20 percent of students attending a private school. The state provides a state tax deduction for parents who self-fund their child's private education, providing a resource benefit to private schools that comes with no restrictions (EdChoice, 2019). As such, high quality private schools in Louisiana have little incentive to participate in the LSP because demand already exists for private schools and other government programs provide financial support that does not come with the same regulations as the LSP.

In sum, the negative test score effects observed throughout most of the longitudinal evaluation of the LSP have several plausible causes. The especially large negative effects in the first year of the program likely were magnified due to the challenge of student-school adjustments amidst a rushed implementation schedule. The smaller, but still substantial, negative effects observed in the second and fourth outcome years of the evaluation probably are due to some combination of test alignment favoring students taught in public schools and the average quality of the private schools participating in the LSP. Conceptually, the supply of private schools from which parents can choose is largely the school choice program intervention. The fact that only one-third of the private schools in Louisiana, apparently disproportionately coming from the lower part of the quality distribution, participated in the LSP is not an excuse for the generally negative test score effects of the program after four years, but it is a partial explanation for those results.

Second, Egalite and Mills (2019) evaluated the impact the LSP had on student test scores in traditional public schools. They use multiple measures of private school competition: distance, density, diversity, and concentration. Using school fixed effects and regression discontinuity

models, they find that students in traditional public schools experienced small gains in math test scores due to competitive pressures from the LSP.

Third, the LSP has reduced racial segregation in public schools, especially those under federal desegregation orders (Egalite, Mills, & Wolf, 2016). The effect of school choice on racial stratification in both private and public schools is an increasingly discussed outcome that can have significant consequences for students (Swanson, 2017). Egalite and her colleagues find that students who use an LSP voucher to attend a private school tend to leave schools in which their own race is dramatically overrepresented relative to the surrounding community. Students entering private schools are more likely to enter private schools that have a larger proportion of students of their similar race. However, the racial demographics of the private school is more closely representative of the larger community than the public school. On balance, the authors conclude the LSP has decreased racial stratification in Louisiana.

In sum, there is a large amount of research on the LSP to consider when evaluating the value of the scholarship program. There are clear negative effects on student academic achievement in the first years of the program that reemerge in the fourth year of the evaluation. The estimates of the test score effects of the LSP are limited to approximately 15% of all LSP applicants with baseline and outcome test scores and who faced a placement lottery in their first-choice private school. As a result of the LSP, public schools also seem to have moderately benefited both in terms of small test score increases and improved racial integration. We add to the existing literature by evaluating the impact of the LSP on yet another important dimension, college entrance.

Research Methodology

Experimental designs are considered the gold standard for evaluation because they hold the greatest potential to identify causal effects (Mosteller & Boruch, 2002; Pirog et al., 2009; Rossi, Lipsey, & Freeman, 2004). In this paper, we exploit lotteries in oversubscribed private schools to estimate the causal effect of the LSP on students' likelihood of entering college. To participate in the LSP, students apply through a centralized enrollment process administered by the Louisiana Department of Education (LDOE). Families are able to rank in order their top five preferred private schools. This enrollment system is similar to the New York City Department of Education's public high school choice system (Abdulkadiroglu, Pathak, & Roth, 2005). The LSP enrollment system awards scholarships based on available seats in students' preferred private schools and their priority status. Students with disabilities as well as multiple birth siblings (twins, triplets, etc.) are automatically awarded a scholarship if space is available in their desired private schools. Remaining students are awarded a scholarship based on six priority factors.

- **Priority 1** – Students who receive LSP scholarships in the prior school year who are applying to the same school
- **Priority 2**– Non-multiple birth siblings of Priority 1 awardees in the current round
- **Priority 3** – Students who received LSP scholarships in the prior school year who are applying to a different school
- **Priority 4** – New applicants who attend public schools that received a “D” or “F” grade in Louisiana’s school accountability system
- **Priority 5** – New applicants who attended public schools that received a “C” grade

- **Priority 6** – New applicants who are applying to kindergarten

Figure 1 summarizes the process of awarding scholarships. The process begins by trying to place all students in Priority 1 into their first-choice private school. If there are more seats than there are students applying for the specific school, then all students are awarded a scholarship to that given school. If there are no seats available for students in the specific school, no students are awarded a scholarship for that school. If there are more applicants for a school than seats available, scholarships are awarded by lottery. Priority 1 students who were not awarded a scholarship for their first-choice school repeat the same process for their second, third, fourth, and fifth-choice schools. After all Priority 1 students are placed, the process repeats for students in priority categories 2 through 6. The process continues until all students are awarded or not awarded a direct placement in a preferred private school supported by a scholarship.

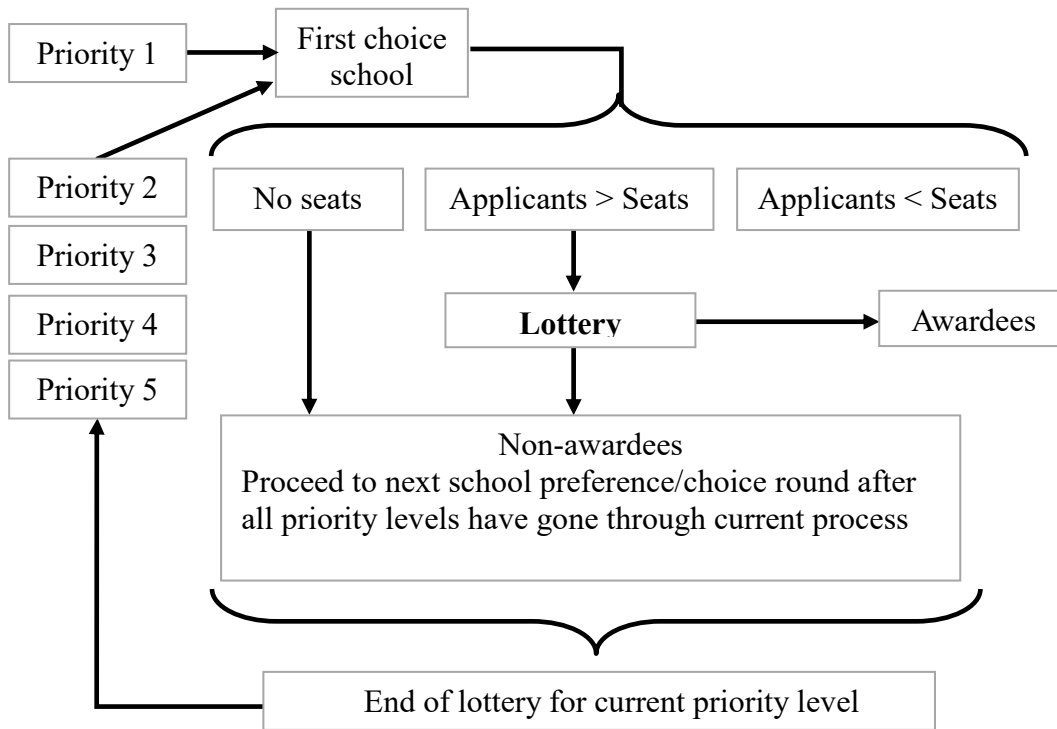


Figure 1: First Stage of the Louisiana Scholarship Program award allocation process for the 2012-2013 school year
 Source: Mills and Wolf, 2017a

Given the allocation process, only a subset of students faced a lottery. Using data on student school preferences, we identify if a student faced a lottery when the percentage of students awarded a scholarship fell between 0%-100% for a given priority category, school, and grade combination. We limit our sample to students who faced a lottery for their first-choice school to ensure that each awarded scholarship is independent of any other student being awarded a scholarship, within the same priority category. This same strategy was used in test scores evaluations of the LSP (Abdulkadiroğlu, Pathak, & Walters, 2018; Mills & Wolf, 2019; 2017a; 2017b) as well as other evaluations of choice programs with similar lottery designs (Deming et al., 2014; Bloom & Unterman, 2014).

Data

We use two data sources in our analysis. First, we use student application data for the LSP in the first year of program implementation provided by the LDOE. Second, we use data from the National Student Clearinghouse (NSC) Student Tracker Service for college entrance. The NSC collects data on college entrance, persistence, and degree attainment from 98 percent of all public and private post-secondary institutions (National Student Clearinghouse). The comprehensiveness of the NSC database allows us to capture records for students in our sample who attend college outside of Louisiana. While the NSC collects information on post-secondary completion, this paper focuses exclusively on college enrollment, in both two and four-year institutions, because there are not enough students in our sample who have been enrolled long enough to complete a degree for our analysis to be able to detect a treatment effect on college graduation.

Sample

Using these data, our analytic sample consists of LSP applicants who faced a lottery for their first-choice private school and those who were eligible to have enrolled in college by the fall of 2018. Table 1 shows how many students applied for the LSP in its first year and how many students faced a lottery for their first-choice private school. A total of 9,809 students applied for a scholarship through the LSP for school year 2012-13 (Table 1, Column 1) of which 6,599 students faced a lottery for their first-choice school (Table 1, Column 2). A total of 1,927 students are eligible to have entered college by fall 2018 (Table 1, Column 1), of which 1,113 faced a lottery to gain admission to their first-choice private school (Table 1, Column 2). The students in our analytic sample are not evenly distributed across grades, with more students applying for earlier grades (Table 1, Column 2). Students who applied for twelfth grade in 2012-

13 could have enrolled in up to five and a half years of college by fall 2018, while students applying for seventh grade in 2012-13 could have enrolled in one semester of college, assuming students graduated from high school within four years. Students in our analytic sample are also concentrated in priority categories four and five (Table 1, Column 2) which are students applying for a scholarship who were attending public schools that received a C, D, or F grade from the state accountability system.

Table 1 also contains baseline comparisons between our treatment and control groups on observable characteristics. Experimental designs rely on randomization to create similar treatment and control groups. Our treatment and control groups appear similar at baseline on observable characteristics (Table 1, columns 3-6). Overall, the information on observable characteristics of treatment and control students suggests that randomization worked properly. Our treatment and control groups do not greatly differ from each other, at least on observable characteristics, in any systematic way that would bias our estimates.

Table 1:
Descriptive data on Experimental Sample and Baseline Equivalence

	(1) Applicant Sample	(2) Experimental Sample	Baseline Equivalence			
			(3) Treatment Mean	(4) Control Mean	(5) Adjusted Diff.	(6) P-Values
Students applied for scholarship in baseline year	9,809	6,599				
Eligible for college by 2017-18	1,927	1,113				
Enroll in college for at least one semester	52%	55%				
Enroll in 4yr. institution (of those who enroll in 1+ semesters)	48%	46%				
Enroll in 2yr. institution (of those who enroll in 1+ semesters)	52%	54%				
7th Grade	38%	37%				
8th Grade	24%	22%				
9th Grade	22%	23%				
10th Grade	9%	11%				
11th Grade	5%	6%				
12th Grade	2%	1%				
LSP Priority 1	7%	3%				
LSP Priority 2	1%	0%				
LSP Priority 3	1%	1%				
LSP Priority 4	49%	56%				
LSP Priority 5	43%	39%				
LSP Priority 6	0%	0%				
Female	50%	52%	50%	53%	-3	0.360
Black	89%	91%	88%	92%	-3	0.148
White	7%	5%	6%	4%	2	0.319
Hispanic	3%	3%	3%	3%	0	0.918
Other	2%	1%	2%	1%	1	0.133
Number of School Preferences listed	1.9	2.1	2.0	2.1	-0.1	0.171

Applicant sample includes all students who applied for the LSP for the 2012-13 school year. Experimental sample refers to students who applied for a scholarship who faced a lottery for their first-choice private schools. The descriptive statistics for each sample are based on the number of college eligible students; 1,927 students in the applicant sample and 1,113 students in the experimental sample. Adjusted differences (column 5) is the difference between treatment and control group students controlling for first-choice school lottery specific fixed effects. The p-values for the adjusted differences are in column 6.

Analytical Strategy

Due to the demand for the LSP and the nature of the allocation process, we are able to leverage lotteries and estimate the causal effect of students enrolling in their first-choice private school on their likelihood of entering college. The lotteries allow us to compare students who applied for the LSP but received or did not receive a scholarship by random chance.

Randomization is key in determining the causal effect of the scholarship because it removes selection bias created by students choosing to apply to the program (Bækgaard et al., 2015). In order to identify the casual effect, we limit our sample to only students who faced a lottery for their first-choice private schools because the first lottery is the only lottery that is independent of all other lotteries. For example, a student could have lost a lottery to his or her first-choice school but won a lottery for a less preferred school; however, the student faced the possibility of a second lottery because he or she lost a first-choice lottery.

We calculate the Local Average Treatment Effect (LATE) to estimate the causal effect of students winning a scholarship and enrolling in their first-choice private school. The LATE provides an unbiased estimate of the effect of the scholarship for students who actually use it. We argue that the LATE is a more appropriate estimate of the impact of the LSP than the simpler intent-to-treat estimate because winning a first-choice lottery simultaneously entails the offer of a scholarship and placement in a particular private school. The LATE is interpreted as the effect of receiving a scholarship and enrolling in that first-choice private school.

We calculate the LATE using a two-step process via two stage least squares (TSLS). In the first step, we use students' lottery assignments to predict the probability of students enrolling in their first-choice private schools. In the second step, we replace the lottery assignment with the predicted probability of enrolling in a student's first-choice school to predict the probability

of that student entering college. We use the following linear probability models⁷ to estimate the LATE where i denotes student and k denotes lottery.

$$Enroll_i = \vartheta_0 + \vartheta_1 W_i + \gamma_k + X_i \vartheta_2 + u_{ik} \quad (1)$$

$$CollegeEntrance_i = \beta_0 + \beta_1 \widehat{Enroll}_i + \gamma_k + \beta_2 X_i + \epsilon_{ik} \quad (2)$$

Where, in equation 1, $Enroll_i$ is a dichotomous variable indicating if student i actually enrolled in his or her first-choice school. W_i indicates whether or not student i was awarded a scholarship through the lottery. γ_k is a fixed effect for the specific lottery a student was in, which is a combination of his or her priority category, school, and grade. The lottery fixed effects account for where randomization took place and effectively compare students in the same lottery to each other. X_i is a vector of student characteristics including gender, race, and the number of school preferences listed on students' applications. While student characteristics are not required to identify the causal effect of the LSP on college entrance due to randomization by the lotteries, student characteristics can help to more precisely estimate the effect. In the second step (equation 2) of the LATE estimation process, we replace the lottery assignment with the predicted probability of enrolling in student i 's first-choice school to estimate the probability of entering college. $CollegeEntrance_i$ equals 1 if a student enrolled in any college for at least one semester and 0 if a student had never started college. To account for clustering of students within lotteries, we use bootstrapped standard errors (Angrist & Pischke, 2009).

Results

The results of our LATE estimates are presented in Tables 2 and 3 as well as Figure 1.

Table 2 presents the results of the first stage model where we predict the likelihood of students

⁷ We estimate all the models as linear probability models due to the difficulty of a probit or logit achieving convergence given the large number of lottery fixed effects in our model. For each of our models the linear predictions all fall within the appropriate range of zero to one.

enrolling in their first-choice private schools by their lottery status. We find that 77% of students who win a lottery for their first-choice private school use the awarded scholarship to actually enroll in their given schools. Table 3 contains the results of our second stage and represents the causal effect of winning a lottery and enrolling in a student's first-choice private school. We find that the LSP has no statistically significant effect on college entrance for students who enroll in their first-choice private school. Column 1 in Table 3 presents the results of the two-step model without any student level covariates. Column 2 presents the results with student covariates. Students who receive a scholarship and enroll in their first-choice private school are more likely to enter college by 0.5 percentage points compared to students who did not win a lottery to attend their first-choice school. The estimated effect is small and statistically insignificant. The estimates are also imprecise as the standard errors are relatively large. The lack of precision is likely due to the demands placed on the data by estimating a two-stage analytic model with fixed effects.

The majority of students in the analysis enroll in college, with 59.5% of control students and 60% of treatment students entering college (Table 3, Column 2, and Figure 2). The percentage of students entering college is particularly higher given that students who applied for the program came from economically disadvantaged backgrounds. These higher than average college enrollment rates could be a result of other efforts Louisiana has made to expand access to college. We also estimate the likelihood of participating students entering two-year or four-year institutions. We find that the LSP had no significant effect on the rate at which treatment and control students choose a four-year over a two-year post-secondary institution. Treatment students enroll at a slightly higher rate, by two percentage points, in four-year institutions than

do their control counterparts, but the difference is not statistically significant (Table 3, Columns 3 and 4).

Table 2:

First Stage Results of TSLS: Probability of Enrolling in First Choice Private School

	Scholarship Usage
Win Lottery	0.770*** (0.025)
Female	0.029* (0.017)
Black	0.057 (0.093)
White	0.046 (0.099)
Hispanic	0.032 (0.106)
# of schools listed	0.013 (0.008)
Constant	-0.042 (0.096)
Observations	1,113
Number of Lotteries	106
R-squared	0.728

Notes: Bootstrap standard errors in parentheses to account for clustering of students within lotteries. All models are linear probability models. Linear predictions fall within zero and one. *** p<0.01, ** p<0.05, * p<0.1

Table 3:

The Effect of Enrolling in a Student's First Choice School on College Entrance

	(1) College Entrance	(2) College Entrance	(3) 2yr. Institution	(4) 4yr. Institution
LSP Enroll	-0.001 (0.043)	0.005 (0.042)	-0.020 (0.059)	0.020 (0.059)
Female		0.153*** (0.034)	0.085* (0.045)	-0.089** (0.045)
Black		-0.079 (0.122)	-0.048 (0.157)	0.030 (0.152)
White		-0.247** (0.115)	-0.029 (0.215)	0.019 (0.212)
Hispanic		-0.161 (0.147)	-0.092 (0.164)	0.083 (0.161)
# of schools listed		-0.017 (0.017)	0.014 (0.022)	-0.012 (0.022)
Constant	0.551*** (0.021)	0.595*** (0.135)	0.514*** (0.173)	0.502*** (0.168)
Observations	1,113	1,113	613	613
Number of Lotteries	106	106	99	99

Notes: Bootstrap standard errors in parentheses to account for clustering of students within lotteries. All models are linear probability models. Linear predictions fall within zero and one. Columns 3 and 4 are conditional on having entered any college. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

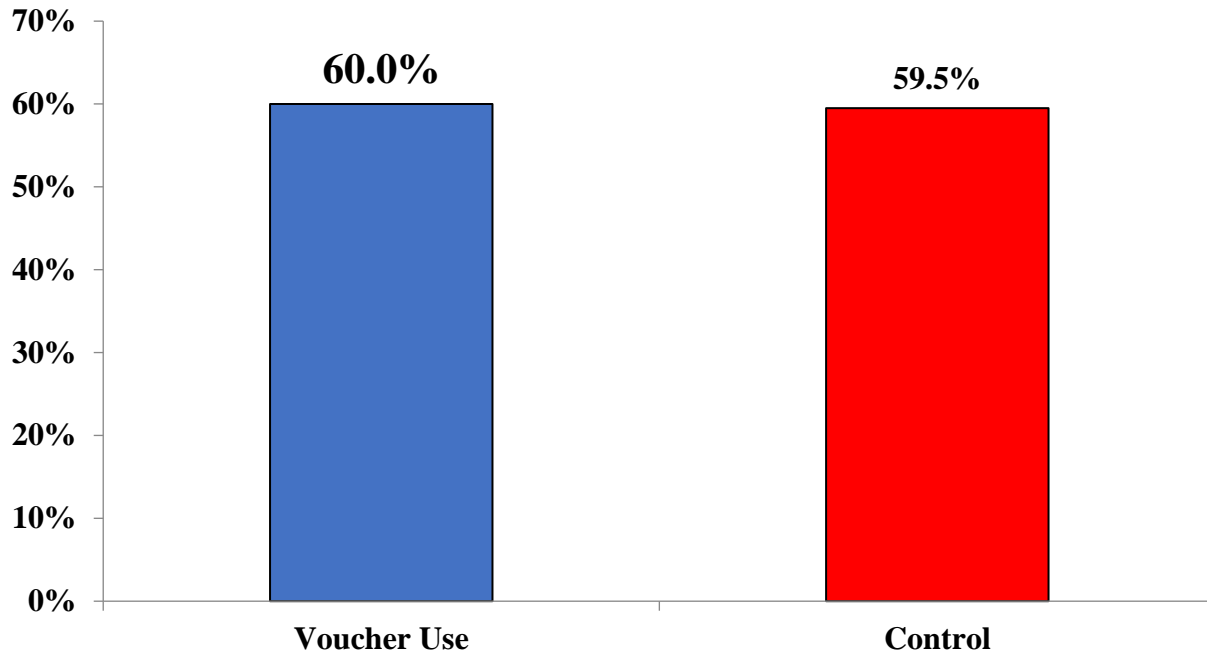


Figure 2. Regression-adjusted college enrollment rates for students who ever used an LSP voucher and students in the control group.

Notes: Enrollment rate is for enrolling in any two-year or four-year institution of higher education at any time between 2013 and 2018. Regression adjusted for student and family demographic characteristics.

Discussion

Overall, the LSP did not affect students' likelihood of enrolling in post-secondary schooling. There is no statically significant observable difference in the rate at which treatment and control students enroll in college. Our estimates are imprecise which could be due to the demands put on the data given the two-step estimation process. With 95 percent confidence, the true effect of the LSP on the likelihood of college enrollment could be as high as an increase of 9 percentage points or as low as a decrease of 8 percentage points. A larger sample of college-age students would provide greater statistical power to estimate an attainment effect of the LSP. In the next few years, the college-aged sample of students who participated in the LSP in 2012-13 will continue to grow. With a larger sample, we also will be able to estimate the effect of the

LSP on college persistence and degree completion. In coming years, we will hopefully understand much more regarding the effects of the LSP on multiple post-secondary outcomes.

Our research team's estimate of the LSP's effect on college entrance differs from our estimate of the program's effect on achievement. Students who enrolled in their first-choice private schools experienced large math and substantial reading test score declines compared to their control counterparts, even as late as the fourth year after random assignment (Mills & Wolf, 2019). However, we find that treatment students entered college at approximately the same rate as their control counterparts. One might expect that a program with such negative test score effects might also negatively affect the likelihood of students entering college.

There are a few probable explanations for the potential disconnect between the LSP's effects on student test scores and post-secondary enrollment. First, students in the achievement analysis are not the same group of students in the attainment analysis. The achievement analysis included students in the baseline year, 2012-13, who applied for grades four through eight, while our sample in this paper includes students who applied for seventh through twelfth grades. The differences between the test score findings and the college enrollment findings could be due to the difference between elementary and high schools. We estimate the effect of college entrance for seventh and eighth grade students and find no differential effect for these students; the treatment coefficient remains small and statistically insignificant.⁸ This result gives some evidence that the difference between the achievement and college entrance results is not driven by school grades, but there will be more conclusive evidence as more students in the achievement analysis enter college.

⁸ The LATE point estimate for seventh and eighth graders is -0.034 with a standard error of 0.079 and an associated p-value of 0.666.

Second, the disconnect could be due to the differences in how private and public schools treat standardized tests. As discussed above, the achievement effects of the LSP over the four years of the evaluation have been sensitive to the specific state test used as a measure of student learning. It is possible that a more general measure of learning than the state criterion-referenced accountability exam would have revealed LSP achievement effects that were more favorable, or at least less unfavorable, to the program than those reported in our team's test score analysis (Mills & Wolf, 2019).

Third, the disconnect between achievement and college enrollment effects of this private school choice program could be a result of public and private schools having different goals. While public schools are under great accountability pressures regarding student academic growth, specifically on math and reading test scores, private schools can focus more broadly on whole student education where they may focus on academic, social, emotional, and character development. An initial analysis of the impact of the LSP on student non-cognitive and civic outcomes reported null effects similar to those found here for student attainment (Mills et al., 2016).

The disconnect between student outcomes observed in the LSP is consistent with the tendency for a disconnect between attainment and achievement effects in school choice programs generally (Hitt, McShane, & Wolf, 2018). For example, evaluations of the Washington, D.C. Opportunity Scholarship Program (Wolf et al., 2013) and the Milwaukee Parental Choice Program (Wolf, Witte & Kisida, 2018; Witte et al., 2014; Cowen et al, 2013) both found marginal to null test score effects but large statistically significant increases in high school graduation rates. Evaluations of the Boston charter schools (Angrist, et al. 2016), the Harlem Promise Academy (Dobbie and Fryer, 2015), the KIPP charter schools (Tuttle, et al., 2015), and

the SEED Boarding Charter school (Unterman, et al., 2016) reported significant increases in student test scores but no increase in high school graduation or college entrance rates. The pattern in the literature suggests that schools affect students in ways not always detected on standardized tests. It could be that various school sectors, whether they are private, traditional public, or charter, have diverse goals and a comparative advantage at improving certain, distinct student outcomes. For example, private schools of choice could have more of a comparative advantage over public schools in developing the non-cognitive skills of students, including grit, persistence and conscientiousness. These character traits likely affect the probability that students continue with higher education independent of their performance on the state standardized test scores, compared to their public school peers. The LSP is the first private school choice program to show negative test score effects and null attainment effects. While the actual reason for the achievement-attainment disconnect in school choice evaluations is unknown, it seems to be a prevalent pattern that deserves further consideration particularly in light of the unique findings from the LSP.

Conclusion

We use a rigorous experimental design to estimate the causal effects of the LSP on the likelihood of students entering post-secondary schooling. We compare students who won a lottery and enrolled in their first-choice private school to those who lost a lottery. Our findings indicate that the LSP had no statistically significant impact on students' likelihood of entering college if they initially applied for the program entering grades seven through twelve in the 2012-13 school year. While we find no statistically significant effect on college entrance, our estimates are relatively imprecise.

This paper is part of a larger evaluation of the LSP that has considered many aspects of the scholarship program including the effects on student academic performance. The null findings in this paper are particularly interesting given the large negative test score effects students experienced in the first year of the program. The academic and college entrance effects from the LSP seem to conflict with each other as treatment students experienced a significant negative effect on test scores but appear to be just as likely as their control counterparts to enter college. A disconnect between the effects of school choice programs on student achievement and attainment is a consistent pattern in other school choice literature generally (Hitt, McShane, & Wolf, 2018). Fortunately, as time passes, our sample will increase as more students graduate from high school and enter college. A larger sample will increase our analytic power, as well as allow us to estimate the effect of the LSP on college persistence and degree completion. There is still a great deal yet to be discovered regarding the effects of the LSP on post-secondary outcomes and the apparent disconnect between the student achievement and college entrance findings.

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Chapter 3: Who Wins in School Choice? Evaluating the Impact of Charter Schools on the Market Share of Private Schools

Introduction

Over the past twenty years of education reform in the United States, school choice has become increasingly popular. School choice is designed to improve education in a variety of ways: to facilitate a better match between students and schools, to provide access to higher quality schools, to increase competition among schools, and to allocate funds more efficiently. School choice can take many forms in both public and private school choice programs; however, charter schools are the most popular and widespread form of school choice. As of 2015, nearly 2.9 million students, which is six percent of total public school students, attended approximately 7,000 charter schools nationwide (National Alliance of Public Charter Schools). Much of the school choice literature focuses on evaluating the academic benefits for students attending schools of choice as well as impacts on students remaining in traditional public schools. In this paper, I ask a different question: if and to what extent charter schools compete with private schools for student enrollment. While it follows logically that charter schools attract students from private schools because charters offer a financially attractive alternative, there is limited systematic evidence of any significant private school crowd out in the market due to increasing charter school presence. I seek to expand this literature and estimate the effect of charter school presence on the market share of private schools, specifically the effect on private school student enrollment and the number of private schools.

The background and current market of charter and private schooling in the United States are important to understand when examining how families sort between school sectors. Charter schools are public schools that do not have typical neighborhood catchment areas; students from any public school district can attend. Charter schools also have greater autonomy compared to

traditional public schools in selecting curriculum, in setting a school's mission, and in hiring decisions. The first charter law was passed in Minnesota in 1991. Since then, charter schools have spread across the country leaving only seven states, as of 2018, without having a charter school law. Charter laws have received bipartisan support, notably when President Barack Obama encouraged their growth under the federal Race to the Top program in 2009. Up until recently, many states expanded students' access to charter schools by raising or eliminating caps on charter student enrollment and the number of charter schools allowed. Nationwide charter schools enroll six percent of all public school students; however, charter enrollment varies greatly across states with states reporting anywhere from one to fifteen percent of total public school enrollment (National Center for Education Statistics A).

Private school enrollment across the country over the past twenty years has been relatively stable at about ten percent of total K-12 enrollment, or approximately 5.8 million students. Most families whose children attend private schools pay for tuition out of pocket or find private scholarships. There are a variety of publicly-funded private school choice programs which take the form of vouchers, education saving accounts, or tax-credit scholarships all of which provide money for families to select a private school of their choice. Compared to the rapid rise of charter schools, the number of private school choice programs have grown at a considerably slower rate in comparison and consist of a much smaller percent of school aged children (McShane, 2015b). As of 2018, only 31 states had any type of private school choice program. In 2000, there were less than 50,000 students using a private school choice program, and as of 2018, over 450,000 students participated in a private choice program (Edchoice, 2019). Programs are limited in part due to political unpopularity and in part because many private

choice programs are targeted specifically for economically disadvantaged families or for families who have children with disabilities (McShane, 2015b).

Understanding the extent to which charter schools compete with private schools is important when considering various educational policies. Private schools are an important, albeit small, part of the schooling market in the United States. A decline or increase in any school sector whether is it private, charter, or traditional public can have consequences on access to schools, education quality, and various student outcomes. It is also important to consider the financial implications of a change in student enrollment across various sectors. If students who have traditionally attended private schools do enter the public system by enrolling in charter schools, public education dollars are spread among more children reducing the total amount of public dollars spent per student. Understanding competition among schooling sectors can also reveal various family preferences. Specifically, if families decide to leave private schools and enter charter schools, that decision illustrates that families value whatever it is that charter schools offer to them more than what their assigned public school offers.

Research Question and Theory

In this paper I ask to what extent do charter schools penetrate the private school market and eventually crowd out private schools? Specifically, I look at how charter schools impact private school student enrollment as well as the quantity of private schools within a county. I operationalize the presence of charter schools by using three definitions: student enrollment in charter schools, the number of charter schools, and simply if at least one charter school exists in a county. I then estimate the impact that each measure of charter presence has on private school student enrollment and the number of private schools in a county.

In a non-school choice market, families have the option of attending a public school that is free of direct costs or a private school where they are responsible for tuition and fees. Due to the cost differences, public schools have a clear competitive advantage over private schools when competing for student enrollment. In order for a family to attend a private school, the perceived benefit of the private school must greatly outweigh the benefit of their nearby public school due to the large cost associated with the private school.

However, when charter schools are introduced into the market, families have a choice between two types of public schools, both without any direct costs, in addition to private schools. Charter schools have greater flexibility than do traditional public schools over hiring decisions, curriculum, mission statements, and budgets. Charter schools can innovate and specialize the schools' missions to attract families. When charter schools are available, families attending private schools have a less expensive option that may be preferable to the traditional public school that they were originally assigned. A charter school does not necessarily need to be as attractive as a private school is for a family to switch to it. The charter school just needs to offer a more favorable cost benefit ratio to induce the switch. As charters remain in the market, families who attend private schools are more likely to switch to charter schools as a cost-effective alternative. As a result of the increased charter presence in the market, private school enrollment decreases, and, over time, private schools may close due to lower demand, therefore resulting in a decreased number of private schools.

To further illustrate the competition between charter and private schools, consider the supply and demand functions for both schooling sectors. Equations (1) and (2) represent the supply and demand for charter and private schools. The supply of charter schools (equation 1) is a function of the price of charter schools (P^c), in this case the amount of public funding charter

schools receive, and the legal regulations on charter schools (L^c), such as limits on: student enrollment, the number of new charter schools, or the number of charter school authorizers. The demand for charter schools is a function of the price of charter schools (P^c), the price of traditional public schools (P^{tps}), the price of private schools (P^p), and the quality of charter schools (Ql^c). In reality, the price to families of traditional public schools and charter schools is zero. As such, the price of private schools and the quality of charter schools are the largest contributors in the demand function for charter schools. If the charter market was in equilibrium, the supply of schools would equal the demand for schools. However, the charter school market is not in equilibrium demonstrated by many schools having student waitlists.

The supply of private schools (equation 2) is a function of the price of private schools (P^p) and other societal factors (E^p) that would affect where private schools are established, such as whether there is a Catholic Diocese in a given area. The demand for private schools is a function of the price of private (P^p), traditional public (P^{tps}), and charter schools (P^c) as well as the quality of private schools (Ql^p) and the quantity of charter schools (Q^c). The quantity of charter schools affects the demand for private schools because there are not enough charter schools to meet the demand. Hence, students enroll in private schools when charter schools are absent from the market, but when charters are present, students in private schools may switch sectors.

$$S^c(P^c, L^c) \leq D^c(P^c, P^{tps}, P^p, Ql^c) \quad (1)$$

$$S^p(P^p, E^p) = D^p(P^p, P^{tps}, P^c, Ql^p, Q^c) \quad (2)$$

The relationship between the presence of charter schools and the supply of private schools is illustrated in Figure 1. D_1 and S_{SR} represent the demand and supply curve prior to

charters entering the market. Q_{1SR} is the quantity of private schools in the short run, which can be thought of as student enrollment in existing private schools. When charters enter the market, they create a demand shock because they are a less expensive substitute for private schools. The D_2 demand curve reflects this change. As a result of the shift in demand, private school enrollment decreases from Q_{1SR} to Q_{2SR} . S_{LR} represents the long run supply of private schools which is more elastic than the short run supply. As charters remain in the market, private schools reduce their supply due to decreased demand, leading to a decrease in the quantity of private schools, Q_{LR} . In the long-run private school supply can be thought of as the number of seats available in private schools as well the number of private schools.

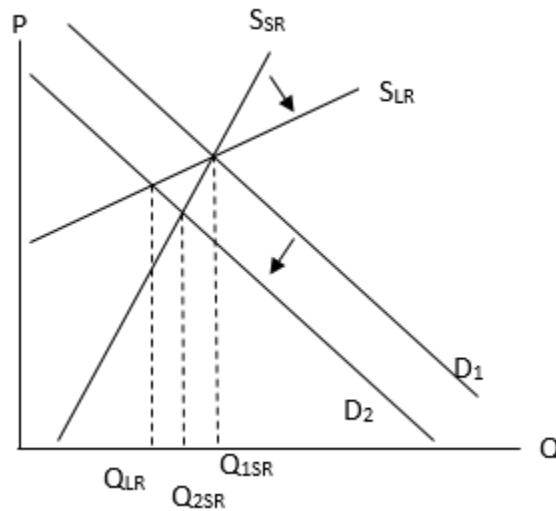


Figure 1: Short and Long Run Supply and Demand for Private Schools when Charter Schools Enter the Market

Notes: D_1 represents the demand for private schools prior to the introduction of charter schools. D_2 represents the demand shock created by charters entering the market. S_{SR} represents the short run supply of private schools prior to charter schools entering the market. S_{LR} represents the supply of private schools as charter schools remain in the market over the long run.

Previous Literature

There is a robust body of literature on the academic benefits from school choice (Angrist, et al. 2016; Betts & Tang, 2011; Foreman, 2017; Forster, 2013; Shakeel, Anderson, & Wolf, 2016; Wolf et al., 2013), the competitive effects on public schools (Arsen and Ni, 2012; Carnoy et al., 2007; Forster, 2013; Hoxby, 2001; Hoxby, 2003), as well as parental preferences and satisfaction (Erickson, 2017; Lincove, Cowen, & Imbrogno, 2018; Schneider & Buckley, 2002; Zeehandelaar & Winkler, 2013). There is less research on the supply of schools of choice and even less research on how the demand and supply in one school sector affects another (McShane 2015a).

As noted earlier, charter schools have increased rapidly over the past twenty years. Charters have grown in part due to political popularity and in part due to their organizational structure. Smarick (2015) describes three factors which charter schools exemplify that have contributed to their quick growth: school-network structure, incubation of high-potential schools, and authorizer-based accountability. These features are unique to charter schools and allow for relatively rapid proliferation of high-quality schools. Smarick suggests that if private schools embrace these factors, private schools will improve education quality for students in the short-run and have lasting long-term effects on the quality and quantity of private schools. However, unlike charter schools, private school choice programs are not designed in similar ways to encourage new entrants in the market or even the expansion of existing private schools. Current programs have done well at filling open seats in existing private schools, but the programs have done little to encourage new private schools to enter the market or to encourage existing private schools to increase student capacity (McShane, 2015b). As such, the current supply of private schools is unlikely significantly affected by private choice programs. The supply of private schools in the market is primarily driven by demand for alternatives to traditional public schools

that families are willing to pay for. Given the policy context of charter and private schools, charter schools are well positioned to compete with private schools for student enrollment.

McShane and Kelly (2014) present empirical evidence of private school crowd-out. They document a pattern of private Catholic schools in Miami, Washington, D.C., and Indianapolis actually switching sector by closing and then reopening as charter schools. The private schools report declining student enrollment and competition created by charter schools in the area as part of their reason for closing. After converting to charter schools, these schools experienced increased enrollment due to the removal of tuition as a financial barrier. McShane and Kelly suggest that in an unbalanced choice market where public school choice is more easily accessible and where parents who want to send their children to private schools continue to face significant financial barriers, charter schools have a competitive advantage and, as a result, private schools leave the market.

In related research, Buddin (2012) examines student enrollment trends across the country among private, charter, and traditional public schools that are located within the same geographic school district. He finds that charter schools attract students from traditional public schools as well as from private schools. He finds that, on average, eight percent of charter elementary students and eleven percent of middle and high school students in a school district transfer from private schools. In a similar design, Chakrabarti and Roy (2016) study competition between charter and private schools in Michigan. However, they find no significant crowd out of private schools following the passage of charter legislation. Using fixed effects and an instrumental variable approach, Chakrabarti and Roy find no statistically significant decline in private school enrollment when charters locate nearby. They also find no differential effects on private school enrollment when considering religious and non-religious private schools. Chakrabarti and Roy

hypothesize that due to the low quality of Michigan charter schools, which they claim have typically performed no better or even worse than traditional public schools on student test scores, families in private schools were unlikely to switch sectors. Private school parents may not have viewed low performing charter schools as viable alternatives to their current private school.

In this paper, I add to the previous literature on private school crowd out by evaluating the extent to which charter schools crowd out private schools by measuring the effect of charter competition on both private school student enrollment and the number of private schools nationwide. While past research evaluates nationwide student enrollment trends among school sectors, there is no research, to my knowledge, that estimates the impact of the charter schooling sector on the quantity of private schools nationwide.

Research Methodology

I use county level data covering all private, public and charter schools across the country to estimate the effect charter schools have on the quantity of and student enrollment in private schools. I use data from the Private School Universe Study (PSS) which surveys every private school in the U.S. every two years. For data on traditional public and charter schools, I use the Common Core of Data (CCD) which collects data on all public and charter schools annually. The data span from SY1991-1992 to SY 2011-2012 with a total of eleven years of data. I only include eleven years of data due to the PSS being collected every two years instead of yearly as is the CCD. It is important to note that while the first charter school law was passed in 1991, charter schools do not appear in the CCD until 2000. Table 1 contains summary statistics of the data. Over this time period, a county on average has about 46 total schools with the majority being public schools and has an average of 9.35 private schools and less than one charter school. Across all years in the data, the average total K-12 student enrollment in a county is 16,585, with

1,670 students in private schools and 221 students in charter schools. When limiting the data from 2000-2012, the average number of charter schools in a county is 1.2 with average enrollment of 348 students⁹.

The data are at the county level where each observation is a county in a given year. The sample contains 3,149 unique counties and 34,521 observations over the eleven years. I focus at the county level to restrict the area in which schools can compete with each other. Private and charter schools can only compete with each other for student enrollment if the schools are geographically close together. Due to variation in county size varies across and within states, there is a possibility that some counties are too large for schools to realistically compete with each other. A charter school locating in one part of the county may not create strong competitive pressures for a private school that is located on the opposite side of the county. However, other potential units of analysis risk being too large or too small to detect any effects. A state level would mask potential effects because charter schools tend to locate in urban areas more than in rural areas. Some might argue that a school district level would be the best unit of analysis, similar to Buddin (2012). However, many school districts are geographically very small and therefore do not capture the full competitive effect a charter school poses. A charter school that locates in a geographically small school district could attract students from multiple neighboring districts.

⁹ When the analysis is limited to only years when the CCD reports charter information, 2000-2012, the estimated effects are slightly larger but are consistent with the findings presented.

Table 1: Summary Statistics by County including eleven years of data

Variable	N	Mean	Std. Dev.	Min	Max
Year	34,521			1992	2012
All Schools	34,521	45.96	452.14	1	37,207
Charter Schools	34,521	0.76	6.30	0	323
Private Schools	34,521	9.35	38.25	0	2,186
Public Schools	34,521	35.85	444.91	0	37,207
Any Charter	34,521	0.12	0.33	0	1
Private Enroll	34,521	1,670.60	7,322.45	0	246,927
Charter Enroll	34,521	221.83	2,063.10	0	128,665
Public Enroll	34,449	14,717.03	48,789.27	0	1,703,003
Total K-12 Enroll	34,449	16,585.52	56,659.76	0	1,972,756

Notes: The county level data cover eleven years, starting in 1992 and continuing every two years until 2012. Charter schools do not show up in the data until 2000. The average number of charter schools in a county from 2000-2012 is 1.2, with average enrollment in all charter schools of 348.60.

Analytic Strategy

Following the school choice competitive effects literature, I leverage the large panel data set and use county fixed effects to estimate the effect charter schools have on the share of private schools within a given county. A fixed effects strategy will compare enrollment trends within a given county. A county fixed effect controls for all time invariant county characteristics that could affect the private school market share. In my most conservative models, I estimate the effect including year fixed effects which controls for any year specific shocks that could affect private and charter school enrollment. This strategy effectively compares enrollment trends within the same county within the same year. In additional models, to capture the long-term effect of charter competition, I include a trend variable which accounts for how long charter schools have been legal in a given state. The interaction between the measures of charter presence and the time trend estimates the long-term effect of charter presence on the private school market share. The model is as follows where i represents county and t represents year:

$PrivateShare_{it}$

$$= \beta_0 + \beta_1 CharterPresence_{it} + \beta_2 CharterPresence * Trend_{it} + \beta_3 Trend_{it} \\ + \beta_4 K12enrollment_{it} + \delta_i + \alpha_t + \varepsilon_{it}$$

$PrivateShare_{it}$ is measured by private school enrollment and the number of private schools in a given county, both definitions are included in separate models. To capture $CharterPresence_{it}$, which is the main variable of interest, I use three different definitions: charter school enrollment, whether or not there is at least one charter school in the county, and the number of charter schools. These measures capture the extent of the competition charters pose to private schools in the same county and are the same definitions of charter presence that Chakrabarti and Roy (2016) use in their analysis of private school crowd out in Michigan. Also similar to Chakrabarti and Roy (2016), I include $Trend_{it}$ which accounts for how long a charter law has been in place in a given state. The variable takes a 0 in the year a charter law was passed, and negative values for time periods leading up to passage and positive values in years following passage of the law. The data is biennial, so if a state passed a charter law in 2000, the trend variable would take the value 0 in 2000, -1 in 1998, -2 in 1996, 1 in 2002, and 2 in 2004 for each county in the given state. The interaction of trend and charter presence, $CharterPresence * Trend_{it}$, represents the effect of charter competition over time on the market share of private schools. I also include $K12enrollment_{it}$ which is the total K-12 student enrollment in the county, α_t is a year fixed effect, and δ_i is the county fixed effect. To correct for correlation of country errors across time, the error term, ε_{it} , is clustered at the county level.

Results

Table 2 contains the estimates for the impacts of charter school presence on private school enrollment. Columns 1-3 present the results using the charter school enrollment in a

county; columns 4-6 include the results using a dummy variable for if a county has any charter schools; columns 7-9 show the results using the number of charter schools in a county. The first columns of each new measure of charter presence (Columns 1, 4, and 7) present the results without year fixed effects. The second columns (Columns 2, 5, and 8) present the results including year fixed effects. The third columns (Columns 3, 6, and 9) present the results of charter presence interacted with the time trend variable.

Each measure of charter presence shows generally the same pattern; as charter presence increases, private school enrollment decreases. Charter school student enrollment has the most significant effect on private school enrollment as an increase in one student enrolling in a charter school results in a decrease in private school enrollment by 0.26 students (Table 2, Column 2). This result is substantial when considering charter school enrollment increasing by 10 or even 100 students then resulting in a decrease in private school enrollment by 2.6 to 26 students, respectively. When considering the impact of the number of charter schools, increasing the number of charter schools by one results in a decrease in private school enrollment by nearly 63 students (Table 2, Column 8); however this result is only statistically significant at the 90% confidence level. When measuring charter presence with a dummy variable for at least one charter school, the effect on private school enrollment is negative but is not statistically significant (Table 2, Columns 4 and 5).

In addition, the interaction between charter presence and trend is also negative and statistically significant, suggesting that there is a considerable, compounding negative effect of charter presence over time on private school enrollment. The coefficients on charter enrollment (Table 2, Column 3), any charter (Table 2, Column 6), and the number of charter schools (Table 2, Column 9) are all positive. While this seems opposite to the previously estimated effects in

Columns 2,5, and 8, the coefficients on charter presence can be interpreted as the estimated effect of charters when trend equals zero. However, when trend is equal to zero charter schools do not yet exist in a county, and, as such, the coefficients have no meaningful interpretation by themselves in these models.

Table 3 contains the estimates for the impact of charter school presence on the number of private schools. Columns 1-3 present the results using the charter school enrollment in a county; columns 4-6 include the results using a dummy for whether or not a county has at least one charter school; columns 7-9 show the results using the number of charter schools in a county. The first columns of each new measure of charter presence (Columns 1, 4, and 7) present the results without year fixed effects. The second columns (Columns 2, 5, and 8) present the results including year fixed effects. The third columns (Columns 3, 6, and 9) present the results with charter presence interacted with the time trend variable.

A consistent pattern exists between charter presence and the number of private schools in a county as it did when looking at private school enrollment; as charter presence increases, the number of private schools in a county decreases. Having at least one charter school in a county reduces the number of private schools by 1.3 schools (Table 3, Column 5). In a similar direction, each additional charter school in a county decreases the number of private schools by 0.53 of a school. Understandably, charter school student enrollment captures the smallest effect on the number of private schools; increasing charter enrollment by one student reduces the number of private schools by 0.002 (Table 3, Column 2). To put it in more realistic terms, increasing charter enrollment by 100 students reduces the number of private schools by 0.2. These effects are all significant at the 95% confidence level or higher.

When considering any compounding effect of charter presence over time, the interaction terms between the time trend and the three measures of charter presence are negative and statistically significant (Table 3, Columns 3, 6, and 9). This pattern suggests that the longer charters have been legal in a state combined with increased charter school presence in a given county significantly reduces the number of private schools in that county.

Table 2: Impact of Charter School Presence on Private School Enrollment

	1	2	3	4	5	6	7	8	9
Charter Enrollment	-0.261*** (0.085)	-0.261*** (0.085)	0.137 (0.229)						
Any Charter				-92.287 (121.876)	-89.102 (110.078)	1,002.771*** (156.599)			
# Charter Schools							-62.863* (33.822)	-62.835* (34.087)	91.497** (44.371)
Trend*Charter Enrollment			-0.047** (0.021)						
Trend*Any Charter						-178.779*** (30.124)			
Trend*# Charter School									-19.298*** (6.113)
Trend			-83.464** (41.087)			-80.818** (41.136)			-82.881** (41.382)
K-12 Enrollment	0.042* (0.025)	0.041* (0.024)	0.038* (0.022)	0.033** (0.017)	0.033** (0.016)	0.032* (0.016)	0.040* (0.024)	0.040* (0.023)	0.037* (0.021)
Observations	34,438	34,438	27,967	34,438	34,438	27,967	34,438	34,438	27,967
# of Counties	3,149	3,149	2,553	3,149	3,149	2,553	3,149	3,149	2,553
Year fixed effect		YES	YES		YES	YES		YES	YES
Joint Significance P-value [^]			0.000			0.000			0.005
R-squared	0.217	0.227	0.250	0.081	0.093	0.106	0.147	0.158	0.200

Standard errors in parentheses are clustered by county. *** p<0.01, ** p<0.05, * p<0.1

[^]Joint Significance P-value is the p-value for a test of joint significance of charter presence and the interaction between charter presence and trend.

Analysis including the time trend excludes 9 states (WV, WA, VT, SD, ND, NE, MT, KY, AL) that did not have a charter law by 2012.

Table 3: Impact of Charter School Presence on Number of Private Schools

	1	2	3	4	5	6	7	8	9
Charter Enrollment	-0.002*** (0.001)	-0.002*** (0.001)	-0.001 (0.001)						
Any Charter				-1.429*** (0.504)	-1.350*** (0.479)	2.625*** (0.862)			
# Charter Schools							-0.528** (0.265)	-0.531** (0.271)	0.163 (0.217)
Trend*Charter Enrollment			-0.000* (0.000)						
Trend*Any Charter						-0.652*** (0.166)			
Trend*Charter School									-0.087*** (0.025)
Trend			0.197 (0.354)			0.280 (0.390)			0.200 (0.361)
K-12 Enrollment	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Observations	34,438	34,438	27,967	34,438	34,438	27,967	34,438	34,438	27,967
# of Counties	3,149	3,149	2,553	3,149	3,149	2,553	3,149	3,149	2,553
Year fixed effect		YES	YES		YES	YES		YES	YES
Joint significance p-value [^]			0.000			0.000			0.003
R-squared	0.087	0.095	0.100	0.001	0.011	0.014	0.052	0.061	0.072

Standard errors in parentheses are clustered by county. *** p<0.01, ** p<0.05, * p<0.1

[^]Joint Significance P-value is the p-value for a test of joint significance of charter presence and the interaction between charter presence and trend

Analysis including the time trend excludes 9 states (WV, WA, VT, SD, ND, NE, MT, KY, AL) that did not have a charter law by 2012.

Discussion

Overall, I find evidence of modest private school crowd out as a result of increasing charter presence. Charter school presence has an impact not only on private school student enrollment but also on the number of private schools. These results suggest that private schools face significant enough competition from charter schools for private schools to lose student enrollment and actually close or possibly consolidate multiple locations. There are a few limitations that are important when considering the implications of these findings. First, restricting the geographical area that schools can reasonably compete with each other always risks being too large or too small to accurately estimate the effect. It is possible that limiting the analysis to the county level masks some of the effect given that, in large counties, schools locating on opposite ends of the county may not actually be competitors with each other. This analysis also does not capture the competitive effects of schools that are located near each other but on opposite sides of a county line. However, given that other units of analysis such as school districts or states have similar if not more severe limitations, the county level is a reasonable level that balances the risks of being too small to too large to accurately estimate the effect. Additionally, this analysis does not account for virtual charter or private schools. Virtual private and charter schools are included in the PSS and CCD. However, virtual charter schools could pose competitive effects to all private schools in a state, given that families who want to use virtual schools face no geographic constraints. Including virtual charter schools in this analysis has the potential to weaken the estimated effect as the model only captures the effect of the virtual charter school in the county where its offices are located instead of the effect across the entire state. Given that the current models in this paper find a significant effect, it is possible that

the estimated effects are a lower bound of the potential effect charter schools could have on the private school market share.

Despite these limitations, the findings in this paper are significant when considering school choice policies broadly. First, these findings suggest that there is demand for other schooling options. When charter schools enter the market, some families leave private schools, where they paid a premium, for the more cost-effective alternative of charter schools. However, the number of families who leave private schools is modest and does not account for all charter school enrollment. Therefore, charter school enrollment primarily comes from students who attend traditional public schools, suggesting that there are families in traditional public schools who prefer other options, but due to financial constraints or the lack of nearby options, are not able to attend a private school and instead enroll in a charter school when it becomes available. Similar to what Chakrabarti and Roy (2016) demonstrate, the findings in this paper show that parents prefer charter schools to traditional public schools, not that parents prefer charter schools to private schools, due to the additional costs of attending a private school¹⁰. This pattern also suggests that families would sort between school sectors differently than they currently do if there was a robust choice market that removed cost differences among schooling sectors.

Second, when students move from private schools to charter schools, public education funding is spread across more students causing an overall decline in the money spent per student. As charter schools continue to grow in the market, more students in private schools and those who would have entered private schools will enter charter schools instead, creating greater financial strain on public resources. In times when public resources are strained among education, healthcare, and transportation, additional students who would not have entered the

¹⁰ For clarity, I run the analysis replacing private school enrollment with public school enrollment as the dependent variable and find that approximately 74% of charter enrollment comes from students in traditional public schools.

public school system if it were not for the introduction of charter schools will increase the demand for additional funds to be allocated to public education. As charter schools remain in the market and increase in quality, more private school students will likely opt for charter schools. The extent of the additional financial burden is unknown as charter schools draw only a portion of private school users. There is likely a specific group of families who will always be private school users despite availability of charter schools.

Third, the decline in the number of private schools has implications for further expansion of private school choice programs as well as for the options available to families in the schooling market. If the supply of private schools continues to decrease due to competition from charter schools, families in areas that have a high concentration of charter schools will have fewer schooling options overall, even if they are willing to pay a premium for a private education. There are some potential drawbacks from a declining private school market share. Private schools are the only schools that are able to include religious instruction. Over 50% of private school students are enrolled in religious schools, with 38% of those students in Catholic schools (National Center for Education Statistics). There is evidence showing that religious education has positive effects on student outcomes. Catholic schools have higher graduation rates for underprivileged students in large urban areas compared to public schools (Grogger & Neal, 2000; Neal 1995). Bowen and Cheng (2016) show that when students receive religious cues during a task, compared to secular cues, students' exhibit greater self-regulation and political tolerance. Their findings suggest that religious based education can provide benefits that charter or traditional public schools may not be able to replicate. I do not intend to suggest that one sector is preferable over the other, but that the decline in one market could have unexpected

negative effects for the education system as a whole as well as the availability of a variety of schooling options for families.

A low supply of private schools also creates challenges when implementing new and expanding existing private school choice programs. Current private school choice programs have not encouraged a substantial increase in the number of private schools (McShane, 2015b). However, there is some evidence suggesting that charters do not crowd out private schools when there is a robust private choice market. Ladner (2007) analyzed the competition between charter and private schools in Arizona and found no significant crowd out of private schools. He hypothesized that this pattern could be due to the robust private school choice programs available in Arizona, which removes the financial advantage of charter schools. If private school choice programs were expanded and designed to encourage a greater supply of private schools to enter the market, more families may choose private schools over charter or traditional public schools. Increasing public and private choice options would allow families to sort based on their preferences and the perceived quality of schools instead of by cost differences.

Conclusion

This paper demonstrates that charter schools crowd out existing private schools. Leveraging a national panel data set and using a county-level fixed effects model, I analyze the extent to which private school student enrollment and the supply of private schools is affected by the presence of charter schools in a county. I find that when charter schools enter the market, many families switch from their children attending private schools where they are financially responsible for tuition and fees to charter schools where they are not. I also find evidence that as charter schools persist in the market, the number of private schools in a county decreases. These patterns have implications for broader education policy because a declining private school

market causes additional financial strain on public funding as well as an overall loss of schooling options for families to choose from.

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Conclusion

This dissertation demonstrates the importance of expanding existing outcomes that are presently used to evaluate educational policies. The high-stakes, test-based accountability era has created a hyper sensitivity to test scores. As a result, researchers and policymakers have focused their attention primarily on programs designed to increase students' math and reading test scores. This increased focus has come at the cost of other valuable programs and has led to a narrow view of the purpose of a formal education. In the three preceding chapters, I have used rigorous methods to evaluate three different programs on various education outcomes that are important for students' overall success as well as outcomes that are important for the U.S. school system.

The first chapter demonstrates the value of enriching a student's experience through arts-related field trips. Schools have decreased the number of field trips due to accountability pressures. However, my colleagues and I find no evidence that taking multiple days away from traditional instruction to attend field trips harms student academic learning. We even find evidence that such experiences have the potential to increase student achievement and engagement in school. This study presents the results from the second year of an ongoing longitudinal evaluation. We will continue to follow these students to see if the effects persist throughout the time when students are in middle and high school.

The second chapter focuses on expanding student outcomes beyond test scores and evaluates the effect of the Louisiana Scholarship Program (LSP) on college entrance. Previous evaluations of the LSP have found large negative effects on students' math and English Language Arts test scores. However, we find that the LSP had no significant effect on the likelihood of students entering college. These findings are particularly interesting because they demonstrate that student test scores are not always correlated with post-secondary outcomes.

Policymakers should consider this disconnect as they make decisions regarding the future of various programs.

The third chapter takes a step back from evaluating student outcomes and illustrates how policies can have broad effects on the entire U.S. education system. In this chapter, we see how charter schools have a competitive advantage over private schools for student enrollment. When charter schools enter the market, private school enrollment and the number of private schools decrease. Private schools play an important role in the K-12 system with approximately ten percent of K-12 aged students attending a private school. With the introduction of charter schools, students who once attended private schools enter the public school system creating greater financial strain on public resources. This pattern also illustrates that there is significant demand for cost effective alternatives to traditional public schools. These patterns are important for policymakers to consider as they plan state and local budgets as well as when designing school choice programs.

I argue that it is important for researchers and policymakers to consider a breadth of student and systemic outcomes when evaluating programs; however, I do not intend to suggest that every new program or policy needs a comprehensive evaluation and that all policy decisions need to be evidence based. My intention is to question the almost singular-focus on student test scores and to show instead that broadly considering multiple aspects of education and student outcomes is important when making policy decisions. Focusing narrowly on student test scores provides a limited view of education and risks restricting the content that students encounter during school. Policymakers also risk making incorrect conclusions about the success or failure of a program when only considering its short-term effects. Researchers and policymakers should

work together to improve education for students by considering broadly the effects policies have on the school system and students' long-term outcomes.

Institutional Review Board Approvals



To: Jay Phillip Greene
GRAD 200

From: Douglas James Adams, Chair
IRB Committee

Date: 05/08/2018

Action: **Expedited Approval**

Action Date: 05/04/2018

Protocol #: 1708010217R002

Study Title: An Evaluation of Culturally-Enriching Field Trips

Expiration Date: 05/26/2019

Last Approval Date: 05/27/2018

The above-referenced protocol has been approved following expedited review by the IRB Committee that oversees research with human subjects.

If the research involves collaboration with another institution then the research cannot commence until the Committee receives written notification of approval from the collaborating institution's IRB.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date.

Protocols are approved for a maximum period of one year. You may not continue any research activity beyond the expiration date without Committee approval. Please submit continuation requests early enough to allow sufficient time for review. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study closure.

Adverse Events: Any serious or unexpected adverse event must be reported to the IRB Committee within 48 hours. All other adverse events should be reported within 10 working days.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, study personnel, or number of participants, please submit an amendment to the IRB. All changes must be approved by the IRB Committee before they can be initiated.

You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with the IRB Committee, original signed consent forms, and study data.

cc: Heidi Lauren Holmes, Investigator
Angela R Watson, Investigator
Molly Irene Beck, Investigator
Laura Kathryn Florick, Investigator



September 26, 2017

MEMORANDUM

TO: Patrick Wolf Jay Greene
Anna Jacob Egalite Jonathan Mills
Albert Cheng Collin Hitt
Heidi Erickson Corey DeAngelis
Sivan Tuchman Mohammad Danish Shakeel
Yujie Sude Matthew Lee

FROM: Ro Windwalker
IRB Coordinator

RE: EXEMPT PROJECT MODIFICATION

IRB Protocol #: 13-02-501

Protocol Title: *State Mandated Evaluation of the Louisiana Students Scholarships for Excellence Program and Course Choice Program*

Review Type: EXEMPT

New Approval Date: 09/26/2017

Your request to modify the referenced protocol has been approved by the IRB. If you wish to make any further modifications in the approved protocol which would change the level of risk to the participants, you must seek approval *prior to* implementing those changes.

Please note that we will no longer be requiring continuing reviews for exempt protocols.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.