

8-2013

The Academic Impacts of Attending a KIPP Charter School in Arkansas

Caleb P. Rose
University of Arkansas, Fayetteville

Follow this and additional works at: <https://scholarworks.uark.edu/etd>



Part of the [Educational Assessment, Evaluation, and Research Commons](#), [Education Policy Commons](#), and the [Junior High, Intermediate, Middle School Education and Teaching Commons](#)

Citation

Rose, C. P. (2013). The Academic Impacts of Attending a KIPP Charter School in Arkansas. *Graduate Theses and Dissertations* Retrieved from <https://scholarworks.uark.edu/etd/889>

This Dissertation is brought to you for free and open access by ScholarWorks@UARK. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of ScholarWorks@UARK. For more information, please contact scholar@uark.edu.

The Academic Impacts of Attending a KIPP Charter School in Arkansas

The Academic Impacts of Attending a KIPP Charter School in Arkansas

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

by

Caleb P. Rose
East Carolina University
Bachelor of Arts in Psychology, 2000
Marshall University
Master of Arts in Clinical Psychology, 2004

August 2013
University of Arkansas

This dissertation is approved for recommendation to the Graduate Council.

Dr. Gary W. Ritter
Dissertation Director

Dr. Brinck Kerr
Committee Member

Dr. Robert Maranto
Committee Member

Dr. Tom Smith
Committee Member

Abstract

KIPP Delta College Preparatory School (KIPP: DCPS), an open-enrollment charter school, opened in 2002 in Helena, Arkansas. Since its opening, KIPP: DCPS students have consistently outperformed their peers in the Helena/West Helena School district, and moreover, recent test scores suggest that white students and minority students are achieving at the same rate, essentially eliminating the achievement gap that persists between whites and minorities elsewhere in the state. In fact, KIPP's achievement record was so influential that when Arkansas lawmakers instituted a cap on the number of open-enrollment charter schools in the state, they made an exception for KIPP, essentially allowing for an unlimited number of KIPP schools to operate in Arkansas.

Yet, despite the national reputation of this charter school network that led lawmakers in Arkansas to exempt KIPP network from the charter school cap in the state, there has been no single evaluation of KIPP performance that compares KIPP students to traditional public school peers on matched observable academic and demographic variables present prior to the KIPP student's eventual enrollment at the charter school. Thus, the purpose of this study is to evaluate KIPP student academic performance to determine whether this policy has been a success. Further, the extent to which students enroll and then remain – or leave – KIPP (attrition) is also examined.

In summary, with regard to student attrition and achievement at KIPP: DCPS as compared to their traditional public school (TPS) feeder district peers:

- KIPP student attrition rates are statistically significantly higher than the set of academically and demographically matched peers from the TPS feeder districts, with the largest differences observed at the grade 5 to grade 6 transition year.

However, when KIPP attrition is compared to the aggregated TPS attrition rates from grades 5 through 8, only the grade 5 to 6 transition year attrition rates are statistically significantly higher at KIPP.

- Students who enroll in KIPP during grade 5 and spend at least one year in the charter school from grade 5 through grade 8 outperform their traditional public school peers on the Arkansas Benchmark Exams in math and literacy.
- Of first time grade 5 KIPP entrants who are binned together by the number of years they stay in KIPP, only those students who remain enrolled through grade 8 show positive differences in math and literacy achievement as measured by the Arkansas Benchmark Exam when compared to their matched TPS peers.
- A subset of first time grade 5 KIPP entrants that remained enrolled in the charter school through grade 8 outperformed their matched TPS peers on the Arkansas Benchmark Exams in math and literacy.

Acknowledgements

This dissertation represents the culmination of seventeen years of postsecondary study between 1996 and 2013. If anything, my 4 years of undergraduate work and thirteen years of graduate study have taught me that life does not always walk in a straight line. However, I have been fortunate to have a steady stream of individuals who have been influential and integral to my progress and maturation along this journey, and I would be remiss if I did not acknowledge their contributions to my success.

First, I would like to thank two individuals in particular from the KIPP Delta network: Executive Director Scott Shirey and KIPP Blytheville Collegiate Preparatory School principal Maisie Wright. Their openness and inviting nature while I studied their schools was humbling. These individuals are an inspiration to me, and represent the kind of leadership qualities I hope to one day possess.

Second, I am indebted to the graduate students and research associates in the University of Arkansas Department of Education Reform and the Office for Education Policy, particularly Dr. Nathan Jensen and Dr. James L. Woodworth. Whether sitting at the computer next to me, or far on the west coast at their respective places of employ, they never hesitated to provide guidance and knowledge about the dissertation process. We would all do well to share their intellectual curiosity, resolve, and tireless work ethic.

I would like to extend my gratitude to Dean Collis Geren, Dean Patricia Koski, and Dean Todd Shields from the University of Arkansas Graduate School for their leadership and encouragement while I served on the Graduate Dean's Student Advisory Board. I promise, I did get more out of our monthly meetings than just a free lunch. It was nice to feel like graduate

students' opinions were as important as those of the administration. Graduate students, current and future, are in good hands.

I am also humbled to have had the guidance from a dedicated dissertation committee. I thank Dean Tom Smith for his availability to serve on my committee despite his commitments and duties as Dean of the College of Education and Health Professions at the University of Arkansas. I am equally thankful for the guidance provided by Dr. Brinck Kerr, whose time was equally strained through serving as the Chair of the Public Policy PhD program, teaching courses, and serving on many of my classmates' dissertation committees. I am thankful for the consistent push towards completion of the dissertation that was provided by Dr. Robert Maranto, the Endowed Chair in Leadership in the Department of Education Reform. Having adjacent offices was integral to Dr. Maranto's daily visits asking me "did you write last night?" I may not have given him the answer he wanted every day, but I would like him to know that I finally did get around to writing that whole dissertation thing.

I am most indebted to Dr. Gary Ritter, the Endowed Chair in Education Policy in the Department of Education Reform, and Director of the Office for Education Policy. Not only am I thankful for him taking a chance on me by admitting me to the Public Policy PhD program, but I am also thankful for the opportunity to have spent the last five years of my time at the University of Arkansas working as a research associate in the Office for Education Policy. In this position, I was able to apply the teachings of my program to real-world situations occurring in k-12 schools. Dr. Ritter's direction, mentorship, and teaching outside of the classroom will continue to be an invaluable component of my continued education. I hope my desire to not let him down continues well into my post-graduate career.

I have been lucky to have a cohort of dedicated and understanding friends who were supportive through this process. Special thanks to Ryan Kennemur for always being able to make me laugh off the stress of graduate school, ex-lady friends (and ex-wives!), and general life by reminding me that it was never nearly as bad as the time his brand new bag of dog food got infested with ants...rendering the bag to be fit only for the trash can, wasting twenty dollars, because “once those ants get in there, you just can’t get them out.” I also want to thank Katie Bell for showing me that there is always one more try in everyone, no matter how difficult the task at hand. To David Schieffler, who may be the hardest-working graduate student I have ever encountered, thank you for reminding me what it is like to be hungry and curious for new knowledge. I hope that hunger lasts throughout your career. I owe a large amount of gratitude to Rachel Myers, who was a regular at my kitchen table, working diligently on her own deadlines, which pushed me to complete mine. I also want to note the contributions, guidance, and (sometimes estranged) friendship of Dr. Chris Mizelle, with whom I made a “PhD pact” back in my undergraduate days...looks like we made it, buddy. And large portions of this dissertation would not have been written if not for the excellent staff and comforting environment provided by the Smoke & Barrel Tavern in Fayetteville, Arkansas. Al Shaffer, Dan Daniel, Desiree Easley, Mark Boochie, Nic Claro, Phil Haughey, and Robert Baldomero Warner – thank you for helping me ease the stress during the writing of this dissertation. You all feel like family to me.

Finally, I would have never achieved this accomplishment had it not been for the encouragement and guidance of a loving and dedicated family. Although my brother, Rodney (RG) is still the smartest person I know, I can at least say that we both now hold terminal degrees, and that should count for something in the long-standing tradition of brothers trying to “one-up” one another. His was the voice in my head when deadlines were looming and sleep was

little saying “Get mad at it, and defeat it. It is your enemy.” To my mother, Julie, and my father, Rod, please know that the conversation at dinner when I was 14 - the one after dad returned from Mack Trucks Inc., covered in grease, and held up a pencil and a piece of paper saying to my brother and me “go get your education so you never have to lift anything heavier than these to do your job, unlike me,” - was never far from my mind. Your constant encouragement for us to grow, achieve, and seek higher education is remarkable considering that RG and I are both first-generation college students. I have long said that 49% of the reason I earned this PhD was for myself, and 51% of it was to make you two proud. I hope I did. I love you and thank you for everything you have ever done to make me the man I have become. Thanks to you, my best days lie ahead. This dissertation is lovingly and humbly dedicated to you.

Caleb P. Rose

July 2013

Table of Contents

Chapter 1 - Introduction	1
Problem Statement	3
Arkansas Charter Schools	4
Importance	8
Research Questions	9
Paper Organization.....	10
Chapter 2 – Literature Review	11
Knowledge is Power Program (KIPP) Attrition Literature.....	11
Selected Charter School Achievement Literature.....	17
Arkansas Charter School Achievement Literature	33
Knowledge is Power Program (KIPP) Achievement Literature	35
KIPP Achievement Literature Review Process	36
Selection criteria.	36
Application of selection criteria.....	39
General literature review findings.	43
Academic impacts.....	44
Summary of Literature Review.....	59
Chapter 3 – An Overview of KIPP Delta Public Schools	61
Chapter 4 – Methods	67
Research Question #1: Attrition.....	67
Sample.....	68
Analytic strategy.....	74
Research Question #2: Achievement Impacts	75
Sample.....	75
Matching KIPP students to TPS peers: intent to treat (ITT) analysis.....	76
Instrument.	84
Matching KIPP students to TPS peers: treatment on treated (TOT) analysis.....	85
Analytic strategy: intent to treat analyses.	91
Analytic strategy: treatment on treated analyses.	93

Chapter 5 – Results	95
Research Question #1: KIPP Attrition.....	95
Research Question #2: KIPP achievement	96
Intent to treat (ITT).....	96
Treatment on treated (TOT).....	105
Summary of Results.....	113
Chapter 6 – Discussion	116
Attrition Summary	117
Achievement Summary.....	119
Recommendations & Conclusions.....	122
Works Cited	124

Chapter 1 - Introduction

The concept of charter schools as an educational choice option for public school students is relatively new. The first charter school law was enacted in Minnesota in 1991 with California to follow shortly thereafter enacting a similar law in 1992. Over a time span of 20 years and four presidential administrations, national and state laws and/or education policies governing charter schools continue to be enacted and revised in a majority of states across America. According to the National Alliance for Public Charter Schools, today there are more than 5,600 charter schools enrolling approximately 2 million students across 41 states and the District of Columbia. In fact, in the 2011-12 academic year, 538 new charter schools opened, which was an increase of 7 percent over the previous year.

According to annual reports, KIPP Delta College Preparatory School (KIPP: DCPS), an open-enrollment charter school, opened in 2002 in Helena, Arkansas. Since its opening, KIPP: DCPS students have consistently outperformed their peers in the Helena/West Helena School district, and moreover, recent test scores suggest that white students and minority students are achieving at the same rate, essentially eliminating the achievement gap that persists between whites and minorities elsewhere in the state. In fact, KIPP's achievement record was so influential that when Arkansas lawmakers instituted a cap on the number of open-enrollment charter schools in the state, they made an exception for KIPP, essentially allowing for an unlimited number of KIPP schools to operate in Arkansas. Today, there are two KIPP schools in Arkansas, KIPP Delta Collegiate Preparatory in Helena, Arkansas, (which serves grades K-12 as of the 2012-13 academic year) and KIPP Blytheville Collegiate Preparatory School (KIPP: BCPS) located in Blytheville, Arkansas (which will serve grades 5-8 in the 2013-14 academic year).

The performance of KIPP charter schools in Arkansas is also important because the existing literature cited later in this document suggests that charter school students do not typically outperform their traditional public school peers until they have been enrolled in the charter school for at least 3-5 years. However, according to publicly available school-level data through the Arkansas Department of Education, the students in KIPP Delta College Preparatory have been consistently outperforming students in the traditional Helena/West Helena schools since KIPP opened.

Academic performance at KIPP has also been subject to scrutiny (see critical blogs hosted by Jim Horn [www.schoolsmatter.info], Diane Ravitch [www.dianeravitch.net] and a National Education Policy Center study [Miron, Urschel, & Saxton, 2011] for a review). General arguments against the model suggest that the high performance at the KIPP schools is due to “creaming,” that is, enrolling only the brightest and highest performing students from traditional public schools (TPS) who were already scoring high on achievement measures. Attrition of students is another concern, which may buttress the creaming argument if only the brightest of the KIPP students remain enrolled. Finally, opponents blame KIPP (and charter schools in general) for taking revenues from the TPS. When a student exits a TPS, their per-pupil expenditure amount follows that student to KIPP.

Despite the national reputation of this charter school network that led lawmakers in Arkansas to exempt KIPP network from the charter school cap in the state, there has been no single evaluation of KIPP performance using an “apples to apples” comparison of KIPP students who have been matched to traditional public school peers on observable academic and demographic variables present prior to the KIPP student’s eventual enrollment at the charter school. Thus, the purpose of this study is to evaluate KIPP student academic performance to

determine whether this policy has been a success. Further, I will examine the extent to which students enroll and then remain – or leave – KIPP. In this section, I begin with a brief overview of what charter schools are, noting the lack of effectiveness studies in Arkansas, discuss the history of charter school laws and policies in Arkansas, specifically as they apply to KIPP, and finally provide a brief history of the KIPP charter school network in the U.S. and in Arkansas noting some common criticisms of the model.

Problem Statement

Since the launch of the Russian satellite Sputnik in October 1957, a keen eye has been cast upon American education. It was this event that led many to realize that American education may not be as strong as originally believed. In fact, President Ronald Reagan would later create the National Commission on Excellence in Education, which produced a landmark report titled *A Nation at Risk* signaling that American Schools were failing. *A Nation at Risk* would soon initiate a wave of education reform efforts in an America geared toward improving student achievement. Less than ten years after the report was issued, new types of schools, free from the restriction of traditional public school regulations, would begin to emerge. The purpose of these schools, which were chartered by an entity separate from the traditional public schools, was to operate outside of the boundaries of their traditional public school counterparts. Thus, charter schools are public schools of choice that are relieved from some restrictions imposed upon traditional public schools in exchange for greater levels of accountability and student achievement. It was believed that these new "charter schools" could serve as laboratories for developing and testing new administrative strategies, teaching methods, and school culture that was effective in increasing academic achievement for the students enrolled. These strategies

could then be shared with the traditional public schools in the hope that they would also increase student achievement there as well.

As states enact charter legislation and continue to support the use of charter schools, the impact these schools have on academic achievement compared to traditional public schools has become a topic of increased scrutiny. To researchers' advantage, charter school enrollment has increased steadily and become more demographically diverse over the past ten years, providing a pool of research subjects that look increasingly similar to their peers in traditional public schools across the U.S. For example, the percentage of total public school students enrolled in charter schools has increased from 1.7 percent in the 1999-2000 academic year to 5.8 percent in the 2011-12 academic year (National Alliance for Public Charter Schools, 2012). Between the 2007-08 and 2008-09 academic years alone, the charter student population increased by 11 percent and the number of charter schools in operation grew 8 percent (*ibid*). Charters are usually granted for a period of 3-5 years, during which time the schools are expected to produce student achievement results that exceed their traditional public school peers. Nationally, the average public charter school has been open 6.3 years. In addition, 31 percent of existing charter schools have been open at least 10 years, an increase from 11 percent only five years ago (*ibid*).

Arkansas Charter Schools

Because the focus of this research is on a particular brand of charter school in Arkansas - the Knowledge is Power Program (KIPP) - it seems appropriate to briefly review the history of charter school policy in Arkansas, before moving into a specific discussion about KIPP charter schools.

In Arkansas, the laws, and subsequent social policy movement surrounding the establishment of charter schools has continued to evolve over an eighteen-year period from 1995

until the present. The first law governing charter school establishment in Arkansas was Act 1126 passed in 1995. This first iteration of Arkansas charter school law only allowed for the establishment of "conversion" charter schools, that is, existing schools that could be "converted" to charter schools only after:

- The school received approval from the school board.
- Two-thirds of the teachers and two-thirds of the student's parents agreed to the conversion.
- The school agreed to conform to rules set forth by the Arkansas State Board of Education - which included collective bargaining rights not typically common in charter schools (Ark. Code. Ann. § 1126, 1995; Costrell & Wolf, n.d.).

Act 1126 was seen as one of the most stringent charter school laws in the country, and as a result, no conversion charter schools were opened between 1995 and 1999 - when the law would be revised (Costrell & Wolf, n.d.). The Arkansas General Assembly revised the charter school law in 1999 with Act 890, which permitted the creation of new, open-enrollment charter schools in addition to conversion charters. Open-enrollment charter schools differed from conversion schools in that they could be opened and managed by any non-sectarian group with tax-exempt status, including both public and private colleges and universities (Ark. Code. Ann. § 890, 1999). Open enrollment charter schools could accept students from across district lines, in contrast to conversion charters, which could only accept students from within their local school district boundaries. The passage of Act 890 permitted the establishment of up to twelve open-enrollment charter schools with no more than three of the schools in any of the state's four congressional districts. This new law generated charter school applications, and resulted in the opening of the state's first four charter schools in the fall of 2001 (Costrell & Wolf, n.d.).

Since Act 890 of 1999, other laws modifying the governance of charter schools have been enacted in Arkansas including Act 1788 of 2001, which gives students with siblings already enrolled in charter schools priority over those without siblings in the school (Ark. Code. Ann. § 1788, 2001); Act 463 also from 2001, which mandates that schools to use a lottery in the selection process when the number of applicants is greater than the number of available seats in the school, thus ensuring that all applicants have an equal chance of being selected for admission (Ark. Code. Ann. § 463, 1002); Act 2005 of 2005 raised the initial cap on open-enrollment charter schools from twelve to twenty-four (Ark. Code. Ann. § 2005, 2005) and, Act 736 of 2007 removed the requirement for equal distribution of charter schools over the state's four congressional districts (Ark. Code. Ann. § 736, 2001). During the 2011 legislative session, Public Act 987 of 2011 was signed into law, essentially removing the cap on the number of open enrollment charter schools permitted in Arkansas. The current statewide cap remains at 24 charter schools; however, under the measure, the charter cap will increase by five (5) each time the total number of Arkansas charters is within 5 schools of the cap. Also in this session Public Act 993 of 2011 also provides for expansion under the Arkansas Charter School Act. Previously, open enrollment charters could be renewed for a term not to exceed five years. The measure gives the state Board of Education the authority to renew a charter on “a one-year or multiyear basis, not to exceed twenty (20) years.” It eliminates the requirement for a petition supporting “an open-enrollment public charter school signed by a specified number of parents or guardians of school-age children residing in the area in which an open-enrollment public charter school is proposed,” and removes the board’s authority to “hold a public hearing to determine parental support” for the charter.

Despite the many revisions over the years, Arkansas charter school law has been identified as the 11th weakest among the 43 states and District of Columbia with charter school laws (Center for Education Reform, 2013). According to the Center for Education Reform, Arkansas' charter school law was given a grade of "D" for the following reasons:

- Cumbersome approval system has made growth difficult throughout state
- Pulaski County suing state to prevent new charters from opening in Little Rock
- Equitable funding not guaranteed
- Number of charters schools allowed very low

However, probably the most interesting, and certainly relevant here, component of Act 890 of 1999 is the special provision made for KIPP public charter schools. According to 6-23-304 (d) of the Act:

(1) The General Assembly recognizes by established relevant demonstrated educational accountability measures that the Knowledge Is Power Program (KIPP) Delta College Preparatory Open-Enrollment Charter School has:

- (A) Improved student learning through innovative ideas and techniques;
- (B) Increased learning opportunities for all students;
- (C) Created special emphasis on expanded learning experiences for students who were previously identified as low-achieving.

(2) As a result, the Knowledge Is Power Program is recognized as an effective method for:

- (A) Meeting the statutory intent of this chapter;
- (B) Closing the achievement gap in public schools for economically disadvantaged, racial, and ethnic subgroups, which is addressed by the Arkansas Comprehensive

Testing, Assessment, and Accountability Program Act, § 6-15-401 et seq., and § 6-15-1601 et seq.; and

(C) Otherwise providing an alternative education that has been proven adequate and equitable to Arkansas students.

Because of this, KIPP charter schools have been given special permission in the state of Arkansas to open as many schools as the organization can feasibly operate. Moreover, KIPP charter schools could also be granted special freedoms, such as the approval of teacher certification waivers from the Arkansas State Board of Education. Moreover, charter schools, including KIPP, play an important role in providing an educational choice for parents of students in the public school system. But this educational choice still does not seem to be a well-known option for these parents for a number of theorized reasons: one being that there is a lack of information about charter schools available to the public. At the crux of this lack of knowledge and thus poor participation lies the main **policy problem: the existing education gap between students who attend schools in the Arkansas delta region and elsewhere in Arkansas (as well as those regions beyond the Arkansas delta), evidenced by low achievement scores, low graduation rates, low college attendance rates, is problematic for the future success of students living in this region. As such, greater access to public school choice options that could help break this cycle, and provide better opportunities to graduate and help students go to, and through, college is warranted.**

Importance

This study is important first and foremost because it not only adds information to the recent growing body of charter school research, but it also represents the first student-level, “apples to apples,” comparison of KIPP charter schools in Arkansas. While much of the early

KIPP literature compares academic performance at the school-level (as I will show in Chapter 2), this study has the advantage of using individual student achievement and demographic data. Use of these records allows for the creation of a matched comparison group, that is, for each KIPP charter school student in the dataset, a TPS student with matching academic and demographic characteristics will represent a TPS “virtual twin” within the comparison group. This procedure will lead to a stronger comparison for the student achievement analyses. For example, publicly available data available through the Arkansas Department of Education provides student demographic data at the aggregate district and school levels, whereas, the data used to create the matched comparison group are student-level data. As such, comparing student performance at the school level does not account for individual student differences in achievement or demographic characteristics, rather, the only proxy would be the school-level averages of these variables. In this study, my student-to-student, apples-to-apples matched comparison will yield more accurate results than those comparisons made at a grander unit of assignment (i.e. school- or district-level). Thus, this research can contribute to the existing national research on charter and KIPP school effectiveness while concurrently filling the gap that currently exists in the state of Arkansas. I propose to do this by answering the research question outlined in the next section.

Research Questions

The evaluation of KIPP charter schools in Arkansas was guided by the following research questions:

1. Attrition Impacts: How many students who enter KIPP as first-time 5th grade students remain in KIPP through their 8th grade year, and to what extent do these attrition rates differ from the public feeder school districts students leave to enroll in KIPP?

2. Achievement Impacts: What impact does enrollment at a KIPP charter school in Arkansas have on student achievement? More specifically, how do KIPP students perform on the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) as compared to a matched comparison group of students from neighboring districts?

As stated previously, the research questions being asked examine the extent to which KIPP Delta students are leaving KIPP Delta as compared to the rates at which TPS students are leaving the traditional public schools and how KIPP Delta student achievement compares with traditional public school student achievement. Thus, the following review of the literature will be divided into two sections, with each section addressing a research question stated above.

Paper Organization

This dissertation is divided into six chapters. In Chapter 2, I provide a systematic summary of current and relevant research that addresses the impact of KIPP charter school attendance on students who enroll in these charter schools. This chapter is followed with a description of the KIPP school network in Arkansas. In Chapter 4, I provide a summary of the methods used to answer the aforementioned research questions, followed by the results of the accompanying analyses for the research question in Chapter 5. Finally, in Chapter 6, I summarize the findings of this evaluation, and conclude with a discussion of what the findings mean for the future of KIPP charter schools in Arkansas.

Chapter 2 – Literature Review

As stated in the previous chapter, there are two main research questions being asked; the first examining the extent to which KIPP Delta students are leaving KIPP Delta as compared to the rates at which TPS students are leaving the traditional public schools. Secondly, I also will examine how KIPP Delta student achievement compares with traditional public school student achievement. Thus, the following review of the literature will be divided into two sections, with each section addressing a research question stated above.

Knowledge is Power Program (KIPP) Attrition Literature

KIPP critics (such as the vocal Jim Horn on his www.schoolsmatter.info blog, and Gary Miron of Western Michigan University) will often point to the premature departure of KIPP students benefiting the aggregate academic performance of the students who remain in KIPP (Miron, Urschel, & Saxton, 2011). This premature departure from KIPP, called attrition, occurs when students leave the charter school before graduating, and re-enroll in another school (i.e., traditional public, private school, home school etc.). Critics such as Miron (2011) claim that such attrition results in selective admission at KIPP as well as ‘cream-skimming,’ that is, only enrolling a school full of the highest performing students culled from the surrounding schools. Fortunately, several of the studies included in the systematic review of KIPP schools above examined the impact of attrition on academic performance.

For example, MacIver et al., (2007) examined attrition at KIPP Ujima Village Academy using an intent-to-treat model (i.e., a model that treats a student as treated, in this case, as a KIPP student, even though the student may not be in the treatment condition at the outcome year) and found “non-trivial levels of attrition among the original KIPP cohorts, occurring not only during the 5th grade year, but in subsequent years as well” (p. 15). For example, of the 79 5th graders that

enrolled at KIPP in that fall semester of the 2002-03 academic year, only 49 of this initial 79 remained in KIPP at their 8th grade year. Likewise, the 2003-04 cohort started with 89 first-time KIPP 5th graders of which half had left KIPP by their 8th grade year. The authors also examined the academic impacts of attrition among KIPP students who did not leave in their first year of KIPP attendance.¹ The authors report that although student achievement was equivalent at the baseline (4th grade) year for three of the four cohorts, those students who left (KIPP leavers) after having one full year of KIPP instruction (5th grade year) scored significantly lower on the MSA in math (Cohort 2, 5th grade 2003-04) and reading (Cohort 1, 5th grade 2002-03 & Cohort 3, 5th grade 2004-05) than did those students who remained enrolled at KIPP (KIPP stayers). It should also be noted that since this was an intent-to-treat design, meaning KIPP leavers are still treated as remaining in the “treatment condition,” these results actually do not benefit KIPP in the overall analyses, as these KIPP leavers are included in the KIPP sample.

KIPP student attrition was examined in the SRI study of California Bay Area KIPP schools (Woodworth et al., 2008). The authors reported that in the cohort where students matriculated through grades 5-8, over half (60%) of students enrolled at KIPP left prior to or during their 8th grade year. Further, those students who leave KIPP prior to their 8th grade year also have lower baseline test scores than those students who remain at KIPP (Woodworth et al. 2008).

In their study of KIPP Lynn, Angrist et al., (2010) examined whether the positive academic outcomes for the lotteried-in students might be explained by high rates of attrition. In their analyses, the authors found that KIPP Lynn lottery winners were less likely to change

¹ Because the authors were examining the impact of attrition on academic achievement, students who left KIPP in their first year were excluded because achievement of students who left in their first year at KIPP could be attributed to instruction received at their previous school.

schools as compared to those who lost the lottery. They further claim that the difference is attributable to the fact that KIPP Lynn students stay at KIPP during the transition from 5th grade to 6th grade, when Lynn Public School students move from elementary to middle school. When removing this transition for Lynn Public School students, the results show no difference in attrition rates between KIPP students and Lynn Public School students; thus, there should be little concern that a high rate of attrition spurred the positive academic results for KIPP students .

Attrition rates across the 22 KIPP middle schools studied by Tuttle et al. (2010) were measured by examining the percentage of students who exited KIPP between grades 5 and 8. To define attrition in the traditional public schools, Tuttle et al, (2010) examined school transfers in the traditional public feeder schools (both out-of-district and within-district) occurring during or immediately after a grade served by KIPP. The authors reported observed cumulative attrition rates at KIPP ranging from a low of 10 percent to a high of 76 percent. These attrition rates were compared to those observed in the surrounding traditional public school districts. Likewise, attrition in the middle grades at the tradition public feeder schools varied, ranging from a low of 20 percent to a high of 57 percent. However, the authors report no systematic pattern of attrition. For example, roughly one-third of the 22 KIPP middle schools in the sample had attrition rates that were significantly lower than the local feeder schools for a majority of the grades served. Conversely, there were six KIPP schools in the sample with attrition rates significantly higher than the feeder schools in a majority of grades (Tuttle et al., 2010).

Tuttle et al. also examined the selective attrition among the 22 KIPP middle schools and their feeder school sites, that is, the authors examined whether students of lower ability leave KIPP more often than higher-achieving students. To do this, baseline test scores of students who transfer were compared to those who stay at the same middle school through 8th grade. The study

authors reported that students who transfer within district have overall lower baseline test scores than those students who do not transfer at all. For example, the baseline test scores (in either math or reading) for KIPP students transferring within district were significantly lower at 12 schools. In fact, none of the KIPP schools recorded higher baseline scores for students transferring within district. Students from non-KIPP schools had baseline scores that were significantly lower in at least one subject in all 22 sites. The results were mixed for out-of-district student transfers. The study authors reported that 17 KIPP schools have test scores for out-of-district transfers that were not significantly different from KIPP stayers. Among the comparison districts, out-of-district transfer student baseline scores were significantly lower at 14 sites, and significantly higher at 5 sites. Tuttle et al. conclude that the enrollment patterns observed in the study do not provide evidence suggesting that KIPP schools benefit from the effects of student selection as there were no observed systematically higher or lower levels of attrition across the 22 KIPP middle schools or their traditional public feeder schools (2010).

In a Mathematica working paper related to the Tuttle et al. (2010) study of 22 KIPP middle schools, Nichols-Barrer, Gill, Gleason, & Tuttle (2012) examined attrition rates at 19 KIPP middle schools in nine states and the District of Columbia. To be included in the study, the a school had to be one of the 35 KIPP schools established in the 2005-06 academic year to ensure that at least two cohorts per school could be observed. The study author's final sample included 7,143 KIPP students and a comparison group of 1,202,060 students enrolled in districts where a KIPP school is located. For the attrition analyses, KIPP students were compared to two groups of district students: a full district sample, and a comparison group of district middle schools believed to be the most relevant district middle schools to compare with KIPP middle schools. The study authors did not report a consistent pattern of differences in attrition rates

between KIPP schools and district schools. In fact, KIPP attrition rates declined moderately over the course of middle school (grades 5-8). For example, KIPP's grade 5 attrition rate (16%) declined to 13 percent by grade 6, and fell further to nine percent by grade 7. Cumulative attrition rates are an identical 34 percent for KIPP and the comparison schools; however, the full districts cumulative attrition rate (36%) was significantly higher than that of the KIPP schools.

In a less favorable study of KIPP attrition by Miron, Urschel, & Saxton (2011), used the national Common Core of Data (CCD) to examine four cohorts (2005-06 through 2008-09) of KIPP schools and their feeder districts. To examine attrition rates, grade-level cohorts were created for KIPP schools and local districts by linking grade-level groups as they progressed over successive years and grades. Data were gathered over a three and four academic year period and covered three cohorts (Cohorts A, B & C). Cohort A covered a three academic year period from (2006-07 through 2008-09) and included grades 6-8; Cohort B covered a four academic year period (2005-06 through 2008-09) and included grades 5-8; and Cohort C also included grades 6-8 but covered the three academic year period from 2005-06 through 2007-08. In order for a KIPP school to be included in the cohort, it must have had students enrolled at each of the grade levels for the corresponding cohort. Further, it should be noted that the study authors employed a different definition of attrition as compared to other studies included here. For example, when calculating estimated attrition, the first year of the cohort is reported as 100% enrollment. Thus if a school had a year 2 enrollment of 80, the attrition rate for that year at that school would be 20 percent. Higher attrition rates for KIPP as compared to the respective traditional public school districts that feed into the KIPP schools were reported. The authors note that as much as 15% of the students at KIPP disappear from their grade cohorts each year. About 30% of the students at KIPP leave between grades 6-8 (Miron et al. 2011).

Unfortunately, these claims result from suspect methodology that created a mismatched comparison group. The key difference here is that “within district attrition” is not included in the figures for the traditional public school districts highlighted in Miron’s analyses. For example, in the demographic comparison, Miron and his colleagues most glaring oversight is the incongruence between the “unit of assignment” and the “unit of analysis.” On page 4 of the document, the authors write: “Each KIPP school was compared with its local traditional public school district.” The KIPP model begins with a 5th grade class and grows one grade-level each year; therefore, much of the student enrollment over the four academic years analyzed in the study (2005-09 to 2008-09), was among students in grades 5-8. However, Miron et al, unlike Tuttle et al. (2010) and Nichols-Barrer et al. (2012), do not consider grade-level attrition rates - nor the contribution to attrition by within-district transfers (which these other studies reported as noteworthy, if not significant). Thus, any claims made regarding attrition by Miron et al (2010) should be interpreted with extreme caution.

Access to student-level datasets, which has become more common in recent years, allows for stronger attrition analyses in studies that examine KIPP attrition rates with their traditional public feeder schools. When considering the analyses reported here, it would appear that there is no systematic pattern with regard to student attrition at KIPP schools. The same can be said for the impact of attrition on KIPP student selection.

The second research question examines KIPP student achievement as compared to TPS student achievement, the review of the literature will include a brief overview of charter school literature that may be generalizable to this study. Next, a systematic review of the literature examining KIPP achievement will be presented, using parameters set by the Campbell

Collaboration. Finally, a general review of the literature will be presented for the questions examining KIPP attrition.

Selected Charter School Achievement Literature

With the increase in number of charter schools and charter student enrollment, education researchers have completed numerous studies assessing the effectiveness of charter schools with regard to improvements in student achievement. Because not all charter school research examines academic outcomes, a review of the research was conducted to identify and include relevant studies that will define the landscape of charter school research similar to this study. Therefore, this review only includes empirical studies that measure the impacts of the charter school on charter students as compared to their traditional public school peers. Studies were selected if they employed a strong research design (randomized control trial or quasi-experimental design) and included a clear comparison group upon which achievement could be compared. The search resulted in 12 empirical studies that used either a random assignment lottery or matched-comparison quasi-experimental design. I begin by discussing two city-level charter school evaluations (in New York City, NY and Boston, MA), and then move to broader statewide studies of charter impacts, to finally reviewing charter school impact studies conducted at the national level.

A multi-year evaluation employing a string random assignment design by Hoxby, Murarka, & Kang (2009) examined charter school effects in New York City. Using achievement data from the 2000-01 to the 2007-08 academic years, the researchers took advantage of “over-subscription” at charter schools to conduct a random assignment analysis. The authors examined charter school effects based on the performance of 93 percent of the New York City charter school students who were enrolled in grades 3-12 during the course of the study. The effects of

student achievement in this study are based on a comparison between students who were “lotteried-in” (that is, those who were selected attend a charter school as a result of a randomized lottery) and those who were “lotteried-out” (that is, those who applied to be selected for enrollment in the charter school, but were not selected through the randomized lottery and thus remain in the traditional public schools). One advantage of the random lottery is that it takes into account unobservable characteristics such as student motivation and parental investment/interest in the student's education. For example, because both the “lotteried-in” and the “lotteried-out” students and/or their parents were equally motivated to apply for admission to a charter school, we assume no “selection bias” because the non-charter students lacked the similar motivation to apply. Overall, Hoxby et al. (2009) found that students who attended a charter school from kindergarten through grade eight would close 86 percent of the achievement gap on the state achievement tests in math and 66 percent of the “Scarsdale-Harlem achievement gap” in English. Charter students scored on average 3 points higher on the Regents examination for each year they attended the charter school as compared to their “lotteried-out” peers. Charter students are 7% more likely to earn a Regents Diploma by age 20 for every year they attend a charter school when compared to their “lotteried-out” peers who remained on grade level while progressing through the traditional public school system.

In Boston, MA, charter school impacts were not only measured against traditional public schools, but also against “pilot schools” - union-supported and staffed charter alternatives that offer some of the same options as charter schools, such as an extended school day, extended school year, and more teacher autonomy (Abdulkadiroglu, Angrist, Dynarski, Kane & Pathak, 2009). Like the New York study, the charter and pilot schools used in the analyses were populated using a random lottery. Because none of the elementary schools in the sample

employed a random lottery, only middle and high school effects were examined. The authors found that charter students in Boston showed gains of .4 standard deviations in mathematics and almost .2 standard deviations in English Language Arts. However, the effects of attending a pilot school were small and insignificant. Although the source of the difference in performance cannot be pinpointed, the authors suggest that charter school policies, such as an extended school day, smaller student-teacher ratio, and a longer school year may be contributing factors to charter student performance in Boston (Abdulkadiroglu, 2009).

Previous research studies on charter school impacts at the state-level have also been conducted in individual states such as Michigan (Eberts & Hollenbeck, 2002); North Carolina (Bifulco & Ladd, 2006); Florida (Sass, 2006); and Texas (Hanushek, Kain, Rivkin, & Branch 2007). Trends emerging from the individual state studies listed above are that students in charter schools do not perform significantly better (and sometimes do perform significantly worse) than their traditional school peers in their first year of charter school attendance; however, these negative effects seem to reverse for students who continue to attend the charter school in subsequent years (Booker, Gilpatric, Gronberg, & Jansen, 2007).

In a national study conducted by Greene, Forster, and Winters (2003), students in charter schools outperformed students in traditional public schools with demographics similar to the charter schools. This study was unique, as it was the first study to evaluate student achievement with similar students, thus creating a more accurate representation of achievement gains. The researchers compared test performance for students in eleven states, and found that overall, students in charter schools gained an additional three percentile points in math and two percentile points in reading above students in traditional public schools.

More recent research has examined statewide charter school performance in a national context (CREDO, 2009a), within Arkansas (CREDO, 2009b), and specifically among students who attend charters run by a large Charter Management Organization (CMO's) (Woodworth & Raymond, 2013). The CREDO (2009a) study examined the performance of 70% of the U.S. charter school student population in charter schools across 15 states and the District of Columbia. Using student-level data, learning gains on state achievement tests in math and reading were examined alongside the learning gains of matched comparison group. These comparison students, or "virtual twins", were matched identically with students in charter schools on demographic variables such as English language proficiency, participation in special education programs, and the national school lunch program. First, charter schools across the nation were examined as a whole. Furthermore, charter schools were disaggregated by state to look at relative charter school effectiveness on a state by state basis and to consider the influence of individual state policy factors. The charter schools were further disaggregated in a comparison of with their local traditional public school (TPS) alternatives. These comparisons were made by matching each charter student to a student in a TPS.

The CREDO analyses of total charter school effects using the pooled student-level data revealed significantly lower growth scores in math and reading performance for charter students overall. In addition, learning gains for black and Hispanic charter students were significantly worse than those realized by their TPS twins. The negative results were due in large part to the fact that first-year charter school students experience a decline in learning. These declines may result from a combination of mobility effects and the experience of a charter school in its early years (ibid). However, the subgroup analyses also revealed some benefits for the charter schools in the sample. For example, students in elementary and middle school grades and English

language learners in charter schools had significantly higher rates of learning when compared to their TPS peers (CREDO, 2009a).

CREDO further disaggregated the state by state data and published individual state reports on charter school performance, including one for Arkansas (CREDO 2009b). The report covered five years of schooling (from the 2003-2004 school year to the 2007-2008 school year) examining 4,627 charter school students in grades 3-8 from 24 charter schools. Like the larger study, each charter school student was matched to a “virtual twin.” Overall findings from the report indicate that charter school students learn significantly more in math and reading than their virtual twins in the traditional public schools with effect sizes of .05 in math and .02 in reading. The authors also found that new charter school students do not significantly outperform their virtual twins in either math or reading during their first two years of charter school attendance, however, by the third year, charter student performance is significantly higher than their virtual twins with effect sizes of .21 in math and .14 in reading. Finally, students eligible for a free or reduced-price lunch, black students, and Hispanic students in both charter schools and traditional public schools performed significantly lower than the average white, non-FRL students, however, the gap in academic performance is less for charter students analyzed in the study than TPS students.

More recent charter school literature has examined the impact on student achievement for students who attend a charter school run by a Charter Management Organization (CMO). For example, Mathematica Policy Research Inc., published a report examining achievement impacts for students in CMO-run schools. Results in 11 of the 22 observed CMO's showed students in schools with significantly positive impacts in math or reading. Nine CMO's had significantly

negative impacts in one or both subjects. In both math and reading, 10 of the 22 CMOs had significantly positive impacts while only four had significantly negative impacts in both subjects.

In 2013, CREDO also conducted an analysis examining the impact on student achievement for students attending a charter school run by a Charter Management Organization (CMO), an Educational Management Organization (EMO), or independently-run charter schools versus matched “virtual twins” as was done in the 2009 study. Results suggest that students who attend charter schools associated with a CMO experience academic growth statistically significantly stronger in math but weaker in reading compared to students who attend non-CMO charter schools. Further, the growth of CMO charter students increases more as they spend more years in the school than does the growth of students attending non-CMO charter schools. The results of the literature review highlighting overall charter school achievement impacts is shown below in Table 1.²

² When searching for empirical studies measuring charter school effects on charter school students, the EBSCOHost, ERIC, J-STOR, PRO-Quest, and Google Scholar databases were searched using a combination of the terms "charter school" and "effects" and "impacts". I decided to include the use of Google Scholar because a number of studies on charter school effects may not be published in peer reviewed journals and this search engine will include such studies. Only random assignment and quasi experimental design studies after 2001 are included.

Table 1

Review of Relevant Empirical Charter School Research

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Eberts & Hollenbeck (2002)	State: Michigan	QED - matched comparison	Student Level: Charter students in Michigan charter schools from 1996-97 through 2000- 01.	TPS students from the "charter district" - that is the district that "houses" the charter school and TPS students from the "charter ISD", that is, all buildings and districts in the intermediate school district where the charter school is located.	Scores on the Michigan Educational Assessment Program (MEAP) test from the 1996-97 through 2000-01 academic year for grades 4 (math and reading) and grade 5 (science and writing).	Mixed: Charter schools did not improve on academic measure, scoring 3-4 percentage points lower on reading and math tests in grade 4 and 2-3 percentage points lower on science and 5-9 percentage points lower on writing tests in grade 5. However these results were reversed after 5 years of charter attendance, consistent with the hypothesis that more business-like management practices yield better student performance.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Greene, Forster & Winters (2003)	National: 11 states (AZ, CA, CO, FL, MI, MN, NC, NJ, OH, PA, TX)	QED - matched comparison	Student Level: Over 2,300 general population charter students in eleven states.	General population traditional public school (TPS) students from the "closest regular public school."	Year-to-year test score changes in each state for each test subject (math, reading, language, or science).	Positive: Charter Schools serving the general student population outperformed nearby regular public schools on math tests by .08 standard deviations and on reading tests by .04 standard deviations.
Bifulco & Ladd (2006)	State: North Carolina	QED - matched comparison, student fixed-effects	Student Level: 8,745 students who spent at least one year in a charter school in 5 cohorts of grades 3-8 (or graduation, whichever came first) from the 1995-96 through 2001-02 academic years.	TPS students from the "universe" of public school students in each cohort year.	Scores on the state End of Grade math and reading tests administered to grades 3-8 each spring.	Negative: Charter students make considerably smaller achievement gains than their TPS peers - scoring .16 and .25 standard deviations lower in math and reading, respectively as compared to their TPS peers. However, charter students perform equal to their TPS peers after 5 years of charter school attendance. The negative effect of charters is attributed to high rates of student turnover.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Sass (2006)	State: Florida	QED - matched comparison, student fixed-effects	Student Level: More than 28,000 charter students who took the FCAT-NRT in grades 3-10 and attended a charter school in one or more of three consecutive academic years: 1999- 2000 through 2002-03.	TPS students matched demographically at public schools within a 5-mile radius of the charter school.	Scores on the Florida Comprehensive Achievement-Norm Referenced Test (FCAT-NRT) in grades 3-10 in math and reading.	Mixed: Achievement is initially low (1.2 scale score points in math and .5 scale score points lower in reading) in charters but reverses after 4 years to be on par in math and produce higher reading achievement scores than their TPS peers.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Abdulkadiroglu, Angrist, Dynarski, Kane & Pathak, (2009)	City: Boston, MA	RCT - students assigned to a charter or pilot school through a random lottery.	4,187 charter students in 22 charter schools in grades 3-8 and 10 from the 2001-02 through 2007- 08 academic years.	"Lotteried-out" students who remained in a pilot school or TPS when not randomly selected.	Raw scores in math and English language arts (ELA), and writing on the Massachusetts Comprehensive Assessment System (MCAS).	Positive: Lotteried-in charter school students in middle school scored .4 standard deviations higher in math and almost .2 standard deviations higher in ELA as compared to their non-lotteried pilot school and TPS peers. In high school, charter students scored significantly better than pilot school students in math (.2 standard deviations), ELA (.1 standard deviations) and writing (.5 standard deviations).

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
CREDO (2009a)	National: 15 states (AR, AZ, CA, CO, FL, GA, IL, LA, MA, MN, MO, NM, NC, OH, TX) and Washington DC	QED - matched comparison	Student Level: An indeterminate number of students from over 2400 charter schools.	Charter student "virtual twins" matched on student demographics, English language proficiency and participation in special education or national school lunch programs.	Student learning gains on state achievement tests in reading and math.	Mixed: Nationwide, charter schools are not advancing the learning gains of their students performing .01 and .03 standard deviations below their TPS peers in reading and math, respectively. Students in elementary and middle grades showed higher gains in reading of .01 and .02 standard deviations, respectively than their TPS peers. The study also found that charter students tend to show greater positive gains after the second and third year in a charter school.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
CREDO (2009b)	State: Arkansas	QED - matched comparison	Student Level: 4,627 charter school students in grades 3-8 from 24 charter schools.	Charter student "virtual twins" matched on student demographics, English language proficiency and participation in special education or national school lunch programs.	Student learning gains on state achievement tests in reading and math.	Positive: Charter school students learn significantly more in math and reading than their virtual twins in the traditional public schools with effect sizes of .05 in math and .02 in reading. The authors also found that new charter school students do not significantly outperform their virtual twins in either math or reading during their first two years of charter school attendance, however, by the third year, charter student performance is significantly higher than their virtual twins with effect sizes of .21 in math and .14 in reading.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Hanushek, Kain, Rivkin & Branch (2009)	State: Texas	QED - matched comparison, student fixed-effects	Student Level: Four consecutive cohorts of students from Texas Education Agency panel data covering the years 1996- 2002 were tracked from grade 4 through 8. For each cohort, there are more than 200,000 students in over 3000 public schools including over 200 charter schools.	Traditional public school students matched using state panel data.	Scores on the Texas Assessment of Academic Skills (TAAS) in grades 3-8 in math and reading.	Negative: Mean school performance results indicate that the average charter school is not superior to the average traditional public school.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
Hoxby, Murarka & Kang (2009)	City: New York City, NY	RCT - students assigned to a charter school through a random lottery.	Student Level: 93 percent of the New York City charter school students in grades 3-12 from 2000-01 to 2007-08.	"Lotteried-out" students who applied for admission to an NYC charter school but remained in a TPS when not randomly selected.	State achievement test scores in math and English in grades 3-8; science in grades 4 and 8; and social studies in grade 5 and 8; passing scores on Regents Exams and earning of Regents Diplomas.	Positive: Charter students in Grades k-8 closed 86% of the achievement gap in math and 66% of the "Scarsdale-Harlem achievement gap" in English as compared to "lotteried out" peers. Charter students scored on average 3 points higher on the Regents examination for each year they attended the charter school as compared to their "lotteried-out" peers. Charter students are 7% more likely to earn a Regents Diploma by age 20 for every year they attend a charter school.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
RAND (2009)	National: 5 Cities - Chicago, Denver, Milwaukee, Philadelphia, & San Diego; and 3 states - Florida, Ohio, & Texas	QED: Student fixed-effects for students transferring into charter schools.	Student-level: using a longitudinal, student-level dataset examining charter school student data between 1994-95 through 2005-06.	Student achievement gain trajectories prior to entering a charter school.	Student gain trajectory after a defined number of years of charter school attendance.	In all but two locations, charter school performance does not differ from TPS performance. In Chicago (in reading) and in Texas (in both reading and math), charter middle schools appear to be falling short of traditional public middle schools.
Mathematica Policy Research (2010)	National: 40 CMO's were selected from 14 states with the highest concentration in AZ, CA, IL, NY, OH, TC and Washington DC	RCT and QED - matched comparison using propensity score matching	18,769 students attending 22 CMO's.	325,063 comparison students either "lotteried out" from the RCT condition or matched with propensity score matching in the QED condition.	Student learning gains on state achievement tests in reading and math.	11 of the 22 observed CMO's had students in schools with significantly positive impacts in math or reading and nine had significantly negative impacts in one or both subjects. In both math and reading, 10 of the 22 CMOs had significantly positive impacts while only four had significantly negative impacts in both subjects.

Study Name/ Date	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results
CREDO (2013)	State & City: 20 States (AR, AZ, CA, CO, FL, GA, IL, IN, LA, MA, MI, MN, MO, NC, NY, OH, OR, PA, TN, TX) and New York City and Washington DC	QED - Matched Comparison Group using "Virtual Control Records" (VCR's)	3.7 million student observations in 1,872 schools from across 20 states, New York City, and Washington DC.	Charter student "virtual control" students - an amalgamation of several real traditional public school students who are identical on all observable characteristics but receive their schooling in the alternate setting.	Student learning gains on state achievement tests in reading and math.	Students who attend charter schools associated with a CMO experience academic growth statistically significantly stronger in math but weaker in reading compared to students who attend non-CMO charter schools. Further, the growth of CMO charter students increases more as they spend more years in the school than does the growth of students attending non-CMO charter schools.

Of the 12 studies reviewed, four studies, at all three levels - national, state and city - showed positive results. Two of these four studies (Hoxby et al. and Abdulkadiroglu et al.) employed a strong research design (random assignment lotteries). The remaining 6 studies, all employing a quasi-experimental design where charter students were matched to their TPS counterparts, showed mixed or negative results, that is, initial estimates of charter school effects showed a negative impact on student performance. However, after 3-5 years of charter school attendance, charter students were performing as well as their TPS peers. Because charter schools are still a novel concept in the education arena (the first charter school was opened in Minnesota in 1991), much of the research on charter school effects includes newly-opened charter schools in the first 1-3 years of operation. As a result, studies examining the net effect of charter schools at the national, state, or city level that suggest these schools negatively impact student achievement may be falsely weighted by these new charter schools which have not seen the reversal of negative academic achievement after 3-5 years of operation. However, as data collection and storage at the student level becomes more advanced and as the number of students in charter schools for more than 3-5 years increases, we should be able to generate more accurate findings on the effect of charter schools on student academic achievement.

Arkansas Charter School Achievement Literature

Because the focus of this research is on a particular brand of charter school in Arkansas - the Knowledge is Power Program (KIPP) - it seems appropriate to briefly review existing research on Arkansas charter schools and their impact on student achievement, before moving into a specific discussion about KIPP charter schools.

Although some literature exists, we know very little about charter student performance in Arkansas, and what little we do know is based on a poor research design employed by a small

research group (Huron Mountain Research, 2006). For example, their evaluation of charter school performance in Arkansas included interviews with administrators and teachers in the charter schools, administration of a school climate questionnaire, and an examination of academic data, but failed to state how charter students were matched to their TPS peers. What we have learned from this research, however, is that by the eighth grade, all five of the open-enrollment charter schools for which data were provided from the 2002-2005 academic years outperformed their statewide, non-charter peers on the Arkansas-specific state assessment in mathematics. Additionally, by grade eight, three of the four open enrollment charter schools (for which data were provided) outperformed their statewide, non-charter peers on the literacy portion of Arkansas exam (Huron Mountain Research, 2006). Nonetheless, because it is unclear how the researchers matched the charter students to their traditional public school peers, these results should be interpreted with caution, or ignored altogether.

The recent CREDO study (2009b) also examined charter school student performance in Arkansas, and used the same student matching technique used in the national pooled study. Their analysis covered five years of schooling beginning with the 2003-2004 school year, and included a total of 4,627 charter school students from 24 charter schools drawn from grades 3-8 who were tracked for as many years as student achievement data were available (CREDO, 2009a).³ The outcome variable in the Arkansas study was academic growth on state achievement tests. When compared to their traditional public school peers, Arkansas charter school students earned significantly better results in reading among the overall charter student population, and specifically for students enrolled more than three years and students in poverty. In math,

³ Students were drawn from grades 3-8 because these are the grades covered by the state achievement testing program.

Arkansas charter schools provided better results for the aggregate charter student population, and specifically for students enrolled for more than three years, blacks, Hispanics, and students in poverty as compared to their TPS peers (ibid).

While this Arkansas-specific research contributes to an understanding of how charter schools in Arkansas perform, the topic of student achievement and charter schools remains a pressing issue for education officials and policymakers – in both Arkansas and across the nation – as more and more charter schools open each year. In fact, the recent focus on national studies by Mathematica (2010) and CREDO (2013) highlighting the variability between different charter organizations and among schools may suggest that studies of particular schools or networks are more important than overall charter studies. Thus, in the next section I look specifically at the literature examining the impact of KIPP charter schools

Knowledge is Power Program (KIPP) Achievement Literature

According to their website, KIPP is a "national network of free, open-enrollment, college-preparatory public schools...preparing students in underserved communities for success in college and in life. There are currently 125 KIPP schools operating in 20 states and the District of Columbia serving more than 41,000 students. Eighty-seven percent of the students who attend KIPP schools are from low-income families and are eligible for the federal free or reduced-price lunch program, (FRL) and 95% are African American or Latino. Nationwide, there are 37 KIPP elementary schools serving Pre-K through 4th grade, 70 middle schools serving grades 5-8 and 18 high schools serving grades 9-12. Since KIPP schools are open-enrollment, students are accepted regardless of race, prior academic record, conduct, or socioeconomic status.

Despite KIPP's relatively long tenure among other charter schools in the United States, as evidenced by the charter school review earlier in this document, few studies exist that compare

academic achievement of KIPP students to how these same students may have performed academically had they remained in their traditional public school. Likewise, creating an environment that produces an appropriate counterfactual – that is, a group of students academically and demographically representative of those who exit the TPS system to enroll in KIPP, is difficult.

KIPP Achievement Literature Review Process

Rather than provide a complete background of the literature on KIPP schools, I chose to provide a more specific review of the cross-section of empirical data available on student achievement at these charter schools. To do this, I conducted a systematic review of the literature examining KIPP achievement outcomes. This systematic review will provide a general snapshot of existing literature centered around a specific, and recent, time period that outlines the time and place of the study, the number of students observed, and finally the general findings and magnitude of impact(s) on students who attend KIPP. As such, this review should serve as a proxy for the methods employed to design this study, and what I might expect to find in my own analyses. Thus, I will begin by discussing how I chose the studies that are included in the systematic review.

Selection criteria.

To provide context for how policymakers might respond to the implementation of a KIPP charter school, and to assess what types of achievement gains might (or might not) be expected for students who enroll in KIPP, I sought to identify research that addressed the impact KIPP charter schools have on student achievement. In order to ensure that my review of existing research was as comprehensive as possible, I began my review by developing criteria to help

focus my search of KIPP charter school achievement research. The criteria used for this literature review were based on the frameworks employed by the Campbell Collaboration, an organization that aims to prepare, maintain, and disseminate systematic reviews in such fields as education, crime and justice, and social welfare.⁴ The purpose of the Campbell Collaboration guidelines for identifying research, and thus the guidelines used in this review, was to systematically identify all current and relevant high-quality research on the topic of KIPP charter school student achievement.

For these purposes then, the guidelines used to identify KIPP student achievement research adhered to the following search criteria:

- Research conducted within the previous twelve years (since July of 2001);
- Must be focused KIPP evaluations that include a comparison group consisting of public school students not attending KIPP;
- The research includes an evaluation component specifically aimed at measuring the impact of attending a KIPP school on student academic achievement

There were two reasons for limiting this review to only include research conducted within the previous twelve years. First, the KIPP charter school network has only been operational since 1994 (just three years beyond the first charter school opening in Minnesota), thus the body of research on KIPP in these early years is thin, and does not include any studies using a strong evaluation design.

Further, K-12 education in the last twelve years has become much more focused on accountability and evaluation of student performance than in years prior, much of this as a direct

⁴ More information on the Campbell Collaboration can be accessed at: <http://www.campbellcollaboration.org/>

result of the mandates established under the No Child Left Behind (NCLB) Act of 2001. These mandates have resulted in the establishment of a greater number of charter schools, including KIPP schools, and have also resulted in more of these schools being subjected to rigorous evaluations of their impacts on student achievement. Thus, in the past ten years, the establishment and evaluation of KIPP charter schools has become much more common across the United States.

One important consideration for this review was that all research should include studies that have an established comparison group that is representative of the KIPP students being evaluated. Studies conducted wholly within a single school do little to answer the question “as compared to what?” Because I am aiming to determine whether enrolling in a KIPP charter school has an impact on student achievement that is different from the impact that would have otherwise been seen had the student remained in the TPS system, it is paramount to find existing research that includes an appropriate comparison group. Therefore, any study that uses a comparison group will be included, however, I will note whether the comparison group is appropriate. For example, when the strongest design (random assignment from student lotteries) is not available, student-level matched comparison groups (that is, when students at the KIPP school are matched to student peers with similar academic and demographic characteristics at baseline) will constitute the preferred design. In some cases, there may be a mismatch between the level of assignment (i.e., students are matched at the school level) and the level of analysis (i.e., outcomes are evaluated at the district level), and these mismatches will be noted as a threat to the design and potentially to the results.

Finally, one of the primary goals of this review was to identify high-quality research specifically aimed at evaluating the academic impact of attending a KIPP charter school.

Because of this, one of the key criteria in this review process was to only include research that included an evaluation component, where the exact impact of attending a KIPP school on student achievement could be directly quantified or measured relative to a comparable alternative standard or counterfactual. This guideline was established to ensure that the research used for this review included actual evaluations of KIPP student achievement, rather than opinions for or against attendance at KIPP schools or simply discussions about various aspects of the use of KIPP schools as an agent of school choice.

Application of selection criteria.

After developing my search criteria, the next step in my review was to apply these criteria to a number of different search options to identify as much high-quality KIPP student achievement research as possible. For the purposes of this review, I used the following search engines and alternative search options:

- University of Arkansas Library Resources:
 - Ebsco Academic Search
 - ProQuest Research Library
 - Education Resources Information Center (ERIC)
- Hand searches of academic journals (2001-2011):
 - Journal of Policy Analysis and Management
 - Education Finance and Policy
 - Educational Evaluation and Policy Analysis
- Google Scholar (for non-journal ‘grey literature’ and policy reports)
- Hand searches of published, non-journal research (2001-2011):

- National Bureau of Economic Research
- Mathematica Policy Research
- Henig (2007) review references
- KIPP website of Independent Reports (<http://www.kipp.org/results/independent-reports>)

The primary means by which research was identified was through searches of electronic databases through the University of Arkansas library, specifically Ebsco Academic Search, ProQuest Research Library, ERIC and the Google Scholar electronic search engine for non-journal “grey literature” studies and policy reports. In these databases, the following search terms were used in combination to maximize the identification of relevant merit pay journal articles: “KIPP” OR “Knowledge is Power Program” AND “evaluat*” OR “effect*” OR “impact” AND “school” and NOT “Kipp” with the search field set to “Author.” The search terms with asterisks (“effect*” and “evaluat*”) were included to identify articles in which effectiveness was measured and/or evaluations were conducted. These search parameters resulted in the initial identification of a total of 3,468 journal articles.⁵

In order to ensure that relevant articles on merit pay were not overlooked in my initial searches of the aforementioned databases, I also conducted title reviews of every article from the previous twelve years from five prominent education and economics journals, specifically the Journal of Policy Analysis and Management (JPAM), Education Finance and Policy (EFP), Educational Evaluation and Policy Analysis (EEPA), and the Review of Education Research (RER). During this hand review process, my goal was to identify any article pertaining to teacher

⁵ Of the initial 3,491 journal articles, 537 were obtained from the Ebsco Academic Search database, 484 from the Proquest Research Library, 84 from the ERIC database, 13 from the KIPP website, and 2,350 from Google Scholar.

merit pay whatsoever for initial inclusion in this review. In total, 48 articles were initially identified for inclusion in this literature review.⁶

I also conducted hand searches of articles from the past twelve years from various education policy research organizations and think-tanks. Organizations included in this search process were the National Bureau of Economic Research (NBER), the National Center on Performance Incentives (NCPI), the Rand Corporation, Mathematica Policy Research, and MDRC; all relevant organizations were identified through discussions with researchers with significant experience researching the KIPP charter school network. The purpose of these searches was to identify research on KIPP that had not been published in an academic journal, which may not have been located in the two previous search processes. These hand reviews resulted in the initial retention of an additional 23 articles on KIPP.⁷

For each of the four search options, my review process started with numerous studies, and I then went through a series of steps to filter out research that did not meet my aforementioned selection criteria or was a duplicate of an article that had already been identified. In my search of electronic academic databases, all of the studies identified based on my search terms were initially retained. With these articles, as well as with the studies identified in the hand reviews of academic journals and non-journal research, I then reviewed the titles of all of the different articles; if an article appeared to address the topic of KIPP charter schools, it was retained for further review. After this title review, all retained articles then went through an

⁶ Many of the articles identified in this search were also identified in my search of electronic online databases. However, in this initial identification process, I chose to retain all articles that were relevant, even if they had already been identified.

⁷ An example of an article identified in this process is the evaluation of 22 KIPP middle schools by Tuttle et al (2010), which was only identified by reviewing research published by Mathematica Policy Inc. For these types of articles, if they were subsequently published in an academic journal, I would use the journal version of the study in my review.

abstract review, and then a final review of the entire article if the review of the abstract showed that the article still fit all of the selection criteria. In the article review, I primarily focused on the methodology employed by the authors of each study, to ensure that retained articles were focused on an evaluation of the impact of KIPP charter school attendance on student achievement, while also adhering to the inclusion criteria of this review.

In sum, there were a total of 3,491 KIPP-related articles that were initially identified in this review (3,468 from electronic academic databases, and 23 from the hand review of academic journals and non-journal research). After the title and abstract review, that number was reduced to 21 articles that met all inclusion criteria and were not duplicates of other articles; from those 21 articles, 14 more were removed after I completed a full article review, primarily because these articles were not evaluations of the impacts of student achievement – or employed a research design that was not conducive to the above selection criteria. An example of one such article that was removed from the systematic review results was a meta-analysis of charter school performance literature by Betts & Tang (2011); while the authors included a separate section on KIPP charter school effects, there was no information presented on the comparison groups used in the KIPP studies included in their review, thus, inclusion of this article did not fit with the criteria that guided this literature review. Further, the information in this article was more conducive for the general literature review of this document. As such, the information was still relevant – and utilized – however, not for the purposes of the systematic review.

As a result of the selection criteria and filtering process, there were a total of eight (8) articles that met all criteria, and served as the basis for this literature review. A summary of this review process, including the number of articles that were retained after each step of the review, is included in Table 2.

Table 2

Identification of Merit Pay Studies for Literature Review

Resource	Initial Identification of Research Articles	Articles Retained from Title Review	Articles Retained after Abstract Review	Articles Retained for Full Review (Duplicates Removed)	Final Articles Retained
Electronic Academic Databases					
EBSCO	537	39	21	6	4
ProQuest	484	18	16	3	0
ERIC	84	28	25	0	0
KIPP Website	13	13	13	9	2
Google Scholar	2,350	247	75	4	1
Hand-Reviews					
Academic Journals	10	10	10	0	0
Published, Non-Journal Research	13	13	13	0	1
Total	3,491	368	173	22	8

General literature review findings.

The eight studies included in the above review represent analyses at three different levels (district, state, and national). Two of the studies reviewed (Angrist et al, 2010, Tuttle et al, 2013) employed the “gold standard” randomized lottery design evidenced in the Abdulkadiroglu et al. (2009) and Hoxby et al. (2009) studies referenced earlier in this document. The remaining six studies retained in this review employed a quasi-experimental design involving either a matched comparison group – or compared KIPP performance to national norms. For example, two of the studies (MacIver et. al, 2007 and Ross et. al., 2007) employed a student-level matched comparison design, two studies (Woodworth et. al., 2008 and Tuttle et. al., 2011) also used a

student-level design, but the comparison group was selected using propensity score matching.⁸ Finally, two studies (EPI, 2005; and Anderson & DeCesare, 2006) compared KIPP student performance with national norms.

Academic impacts.

Of the seven articles retained through my search, all seven considered the impact of attending a KIPP charter school on student achievement. I have summarized the results of the search in Table 3 below. In this table, I have included information about the KIPP charter school(s) being evaluated, as well as the student achievement outcome measure used in each evaluation (standardized test gains), the level of the study (national, state, district, etc.) the study design, sample, and comparison group, the results of each evaluation, and whether the findings were positive, mixed, negative, or null.

I have characterized KIPP student attendance outcomes in these evaluation reports as having a ‘positive’ impact if student achievement was positively impacted for those students enrolled in the KIPP charter school in the majority of grades/schools/subject areas; a program that had a ‘negative’ impact is one where student achievement was negatively affected by KIPP charter school attendance in the majority of grades/schools/subject areas. Further, a program characterized as ‘mixed’ is one in which there were some instances of student achievement significantly improving as a result of KIPP school attendance (such as at certain grade or school levels), but in other areas, student achievement was significantly lower, or where there was simply an inconsistent pattern of achievement across grades, subjects, or school levels. Finally, in instances where a program had no effect on student achievement, be it positive or negative, I

⁸ The Tuttle et al, 2013 study also included a QED condition using propensity score matching.

have characterized these programs as having a ‘null’ impact; indicating student achievement was not affected by attending a KIPP school.

In total, all seven evaluations had positive impacts for students attending KIPP charter schools. These positive results were consistent across studies at the national, state, and district level. In the earliest single KIPP school evaluation retained in the systematic review, MacIver & Farley-Ripple (2007) matched grade 5 students from the KIPP Baltimore Ujima Village school to their grade-level peers from the surrounding traditional public feeder schools. Four cohorts of students were tracked from grade 5 until their attained grade by the 2005-06 outcome year. Positive effects were found on the Terra Nova assessment in both math and reading. For example, after one year, KIPP students in 5th grade significantly outperformed comparison peers gaining on average 24 NCE points on the Terra Nova compared to 0.7 NCE points for comparison peers. Furthermore, by the outcome year, KIPP students in grades 6-8 significantly outperformed comparison peers on the Maryland State Assessment (MSA) in both math and reading.

In another single-KIPP school evaluation from the same year, Ross, McDonald, Alberg, & McSparrin Gallagher (2007) compared 49 KIPP grade 5 students to a peer match from one of the five proximal elementary schools that fed into KIPP. After one year, the authors found positive results for KIPP students. For example, KIPP DA students significantly outperformed comparison peers on 2 of 3 subtests (math, adjusted effect size +0.35 and reading, adjusted effect size +0.31) on the NRT portion of the Tennessee Comprehensive Assessment Program: Achievement Test (TCAP: AT). On the CRT portion of the TCAP: AT, KIPP students outperformed their matched peers on 2 of 3 subtests (math, adjusted effect size +0.63, and reading, adjusted effect size +0.31).

In a study of one-year KIPP effects in five California Bay-Area KIPP middle schools, Woodworth, Jane, Guha, & Lopez-Torkos (2008) matched 231 grade 5 KIPP students in two cohorts (a 2003 and a 2004 cohort) to 1,896 comparison students using propensity score matching. By the end of their 5th grade year, KIPP students outscored their matched peers on nearly all outcomes (English Language Arts scores for two schools in the 2003 cohort were not significantly different). Effect sizes for math performance ranged from +0.19 to +0.86 and from +0.16 to +0.54 in English Language Arts in favor of KIPP.

The Educational Policy Institute (EPI) conducted the first national study of KIPP in 2005, which measured academic performance of 1,825 KIPP 5th grade students across 27 cohorts against Normal Curve Equivalent (NCE) scores and National Percentile Ranks (NPR) the national normed sample on the Stanford Achievement Test Ninth and Tenth edition (SAT9/10). The 18 KIPP schools testing students on a Fall-Spring timeline experienced mean NCE gains in math (10.1 NCE's), language (12 schools tested, 10.9 NCE's), and reading (17.4 NCE's). The 9 KIPP Schools testing students on a Fall-Fall timeline experienced mean NCE gains in math (7.4 NCE's), language (8 schools tested, 7.4 NCE's), and reading (11.5 NCE's). Although the findings in the EPI study are positive for KIPP, these results should be interpreted with caution. For example, rather than compare KIPP students to matched comparison students from the surrounding traditional public schools, the KIPP students are being compared to a national normed sample – which does not account for differences between the KIPP student sample and the nationally normed sample. For example, at the time the EPI study was conducted, enrollments in the 24 KIPP schools across the nation were 62.5% black and 32.7% Hispanic. Although the EPI did not provide demographic data of the norming sample, they did provide nationwide school enrollment demographics from the National Center for Educational Statistics

(NCES) indicating that national enrollments in 2001-02 were 16.9% black and 18.5% Hispanic. The authors also report that there were differences in the percent of KIPP students qualifying for a free or reduced price lunch (78% FRL in KIPP schools, 40% in the NCES national dataset). However, I decided to include this study because it does represent a quantitative comparison of KIPP performance to traditional public school performance, despite the differences in student characteristics.

Another study where KIPP students are compared to a nationally normed sample was conducted by Anderson & DeCesare (2006) but only features a single KIPP school: KIPP Cole College Prep in Denver, Colorado. This study compared academic performance of 90 KIPP 7th and 8th grade students at KIPP Cole College Prep to national norms using NCE and NPR growth from the fall 2005 SAT-10 administration to the spring 2006 SAT-10 administration. On the SAT 10, NCE and NPR growth scores of 0 from the baseline to the outcome administration indicate a full year of growth. The authors reported results that favored KIPP, indicating that KIPP Cole College Prep students demonstrated NCE and NPR point growth across all tested subjects. However, as in the case of the EPI study above, these results should be interpreted with caution. Once again, the authors made no attempt to match KIPP Cole College Prep students to a set of comparison students from the traditional public schools – instead they compared KIPP performance to national norms on the SAT-10. In addition, KIPP Cole College Prep was unique to the KIPP model in that it was a “transition school.” That is, after the Colorado State Board of Education closed Cole Middle School, KIPP was selected to take the school over. The study by Anderson & DeCesare (2006) examines KIPP Cole College Prep’s performance in the first years of this transition. In fact, the full implementation of the KIPP model would not begin at KIPP Cole College Prep until 2007. Thus, these results should also be interpreted cautiously because of

the weak student comparison design, and the hybrid KIPP model that was being employed at the time of this study.

In the more recent single-KIPP school study of KIPP Lynn in Lynn Massachusetts, Angrist, Dynarski, Kane, Pathak, & Walters (2010), employed a stronger design, using applicant lists from the KIPP Lynn lottery. For example, the authors had access to data from those students who were randomly selected to attend KIPP Lynn as well as the students who applied to attend KIPP Lynn but were not randomly selected for admission to the school. Only those students who had data in the Massachusetts Student Information Management System (SIMS) and were subject to the lottery were included in the analyses. To measure academic impacts of KIPP Lynn, the authors measured math and English language arts (ELA) scores on the Massachusetts Comprehensive Assessment System (MCAS) test. For this study, scores were normalized to a statewide mean of 0 and a standard deviation of 1. The study authors report positive results in favor of KIPP Lynn noting that KIPP Lynn students increase their scores by a statistically significant 0.35 standard deviations in math and approximately 0.12 standard deviations in ELA for each year attending KIPP Academy Lynn.

The two most recent studies included in this review is likely the most ubiquitous in recent discussions of the impact attending a KIPP charter school has on academic achievement. First, Tuttle, Teh, Nichols-Barrier, Gill & Gleason (2010) with Mathematica Policy Inc., studied this impact by analyzing performance of KIPP students from 22 KIPP middle schools across 11 states over a 4-year period (from 2003-04 through the 2007-08 academic years). Using propensity score matching, the study authors matched 6,118 KIPP middle school students to 681,329 traditional public school students from the local feeder districts. Scores on each KIPP school's statewide achievement tests in math and reading were then analyzed for KIPP students

and their matched peers at the end of each academic year. The study authors reported positive results for KIPP students. For example, KIPP schools had statistically significant impacts of 0.26 standard deviations in math and 0.09 standard deviations in reading after one year of KIPP enrollment. After three years of enrollment, these impacts grew to 0.42 standard deviations in math and 0.24 standard deviations in reading, even when students who exited KIPP schools through attrition were kept in the treatment group.

In a follow up of the above study, Tuttle, Gill, Gleason, Knechtel, Nichols-Barrier, & Resch (2013) with Mathematica Policy Inc., studied this impact by analyzing performance of KIPP students from 43 KIPP middle schools across 13 states and Washington DC states over an 8-year period (from 2003-04 through the 2010-11 academic years). Using a randomized control trial (RCT) design employing student lottery records from 13 of the 43 schools, as well as propensity score matching for those schools that did not have “oversubscription” lotteries, the study authors compared the academic performance of over 16,000 KIPP middle school students to over 5 million traditional public school students from who were either lotteried-out, in traditional public feeder *schools* (that is, from a school that a current KIPP student had exited to attend KIPP), or the surrounding feeder districts. The study authors found that KIPP schools had statistically significant impacts in math and reading for each of the four years after KIPP enrollment. In math, effect sizes range from 0.15 after one year of KIPP to 0.31 after 4 years of KIPP. In reading, effect sizes ranged from 0.05 after one year of KIPP to 0.22 after 4 years of KIPP. All effect sizes were statistically significant at $p < .05$.

In general then, there is an apparent academic benefit realized for students who chose to attend a KIPP charter school as compared to students who remain in the traditional public school system who share demographic and academic characteristics of KIPP students. Of the eight

studies included in this review – three at the national level, and five at the state/district level – all showed positive academic impacts for KIPP students. Thus, we might expect to see similar results in future studies that employ either the matched-comparison model, or a randomized control trial.

Table 3

Summary of KIPP Articles Focused on Academic Impacts

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Educational Policy Institute (2005) - EPI	24 KIPP schools (locations not disclosed)	Nat'l	School- level: National Norms Comparison	Approximately 1,825 KIPP 5th grade students across 27 cohorts in the 2003- 04 academic year.	KIPP students were compared to national norms on the Stanford Achievement Test-Ninth Edition (SAT- 9). An NCE score gain of 0 over baseline on the SAT-9 indicates normal growth.	NCE scores on the math, reading, and language subtests of the Stanford Achievement Test, Ninth Edition (SAT-9).	The 18 KIPP schools testing students on a Fall- Spring timeline experienced mean NCE gains in math (10.1 NCE's), language (12 schools tested, 10.9 NCE's), and reading (17.4 NCE's). The 9 KIPP Schools testing students on a Fall-Fall timeline experienced mean NCE gains in math (7.4 NCE's), language (8 schools tested, 7.4 NCE's), and reading (11.5 NCE's).	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Anderson & DeCesare (2006)	KIPP Cole College Prep, Denver CO	State/ District	QED, School- level: National Norms Comparison	90 KIPP 7th and 8th grade students.	KIPP students were compared to national norms on the Stanford Achievement Test-Tenth Edition (SAT- 10). An NCE score gain of 0 over baseline on the SAT-10 (Fall 2005 to Spring 2006)) indicates normal growth.	NCE scores and National Percentile Ranks (NPR) on the math, reading, language, science, and social science subtests of the Stanford Achievement Test, Ninth Edition (SAT-10 .	KIPP Cole College Prep students had NCE score and NPR gains in all subjects across both grades during the outcome year.	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Mac Iver & Farley- Ripple (2007)	KIPP Ujima Village, Baltimore, MD	State/ District	QED, Student- level: Matched Comparison	372 KIPP Ujima Village 5th grade students in four cohorts between 2002-03 and 2005-06 - and their matched peers from BCPSS.	Students from feeder schools in BCPSS were matched to KIPP Ujima Village Students. Cohorts 1 and 4 were equivalent at baseline, KIPP students un cohorts 2 & 3 had significantly higher math and reading scores at baseline.	Scale scores on the Maryland State Assessment (MSA) in reading and mathematics (grades 6-8); NCE Scores on the Terra Nova math and reading exams.	Math: After one year, KIPP students in 5th grade significantly outperformed comparison peers gaining on average 24 NCE points on the Terra Nova compared to 0.7 NCE points for comparison peers. Reading: KIPP students in grades 6-8 significantly outperformed comparison peers.	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Ross, McDonald, Alberg, & McSparrin Gallagher (2007)	KIPP: DIAMOND Academy (DA), Memphis, TN	State/ District	QED, Student Level: Matched Comparison	49 KIPP DA 5th grade students.	Students from one of five proximal elementary schools that fed students into KIPP DA matched on gender, lunch status, ethnicity, and 2001-02 NRT reading and mathematics subtest scores. Groups were equivalent at baseline.	"Scores" on the Norm- Referenced (mathematics , reading, language arts) and Criterion Referenced (mathematics , reading/lang uage arts, writing) portions of the Tennessee Comprehensi ve Assessment Program: Achievement Test (TCAP: AT) in mathematics, reading, language arts, and writing.	On the NRT portion of the TCAP: AT.KIPP DA students significantly outperformed comparison peers on 2 of 3 subtests (math, adjusted effect size +0.35 and reading, adjusted effect size +0.31). On the CRT portion of the TCAP: AT, KIPP DA students outperformed their matched peers on 2 of 3 subtests (math, adjusted effect size +0.63, and reading, adjusted effect size +0.31).	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Woodworth, Jane, Guha & Lopez- Torkos (2008) - SRI	San Francisco Bay Area KIPP Schools	State/ District	QED, Student- level: Matched Comparison - Propensity Score Matching	231 KIPP 5th grade students in two cohorts (2003 & 2004).	1896 students from local SF Bay Area schools selected using propensity score matching on academic and demographic variables.	Academic Performance Index (API) scores on the California Standards Test (CST) in math and English language arts (ELA).	KIPP students outscored their matched peers on nearly all outcomes (ELA scores for two schools in the 2003 cohort were not significantly different). Effect sizes for math performance ranged from +0.19 to +0.86 and from +0.16 to +0.54 in ELA in favor of KIPP.	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect + / 0 / -
Angrist, Dynarski, Kane, Pathak, & Walters (2010)	KIPP Academy Lynn, Lynn, MA	State/ District	QED, Student- level: Randomized Control Trial (student lottery)	419 "lotteried -in" KIPP students across 4 cohorts from 2005-06 through 2008-09	457 students in the lottery sample not offered admission to KIPP LYNN whose data was located in the Student Information Management System (SIMS).	Math and English language arts (ELA) scores on the Massachusetts Comprehensi ve Assessment System (MCAS) test. For this study, scores were normalized to a statewide mean of 0 and a standard deviation of 1.	2SLS estimates suggest , KIPP Lynn students increase their math score by a statistically significant 0.35 standard deviations and approximately 0.12 standard deviations in ELA for each year in KIPP Academy Lynn.	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Tuttle, Teh, Nichols- Barrier, Gill & Gleason (2010)	22 KIPP Middle Schools	Nat'l	QED, Student- level: Matched Comparison - Propensity Score Matching	6,118 KIPP students in 22 KIPP Middle Schools across 11 states.	681,329 students from each KIPP school's feeder districts selected through propensity score matching.	Scores on each KIPP school's state achievement exams in math and reading.	KIPP schools had statistically significant impacts of 0.26 standard deviations in math and 0.09 standard deviations in reading after one year of KIPP enrollment. After three years of enrollment, these impacts grew to 0.42 standard deviations in math and 0.24 standard deviations in reading , even when students who exited KIPP schools through attrition were kept in the treatment group.	Positive

Authors/ Date	KIPP School	Level	Study Design	Sample Data	Comparison Group	Outcome Measure(s)	Results	Effect +/-
Tuttle, Gill, Gleason, Knechtel, Nichols- Barrier, & Resch (2013)	43 KIPP Middle Schools	Nat'l	QED, Student- level: Randomized Control Trial using student lottery data, and Matched Comparison using Propensity Score Matching.	Over 16,800 KIPP students in 43 KIPP Middle Schools across 11 states.	Over 5,043,000 students from each KIPP school's feeder schools or the districts in proximity to KIPP. In the RCT condition, 'lotteried-out" students served as the control group. In the QED condition, comparison students were selected through propensity score matching.	Scores on each KIPP school's state achievement exams in math and reading.	KIPP schools had statistically significant impacts in math and reading for each of the four years after KIPP enrollment. In math , effect sizes range from 0.15 after one year of KIPP to 0.31 after 4 years of KIPP. In reading , effect sizes ranged from 0.05 after one year of KIPP to 0.22 after 4 years of KIPP. All effect sizes were statistically significant at p<.05. These results are from the intent to treat analyses, that included students as "treated" even if they exited a KIPP school.	Positive

Summary of Literature Review

In sum, a systematic review of the academic impacts of attending a KIPP school are generally positive on student achievement. Eight studies employing an experimental or quasi-experimental design were reviewed and included in the review. In fact, when a strong experimental design is employed, there is little evidence to suggest negative academic impacts on students attending a KIPP charter school. Further, these positive impacts are reported at the local, individual school level (as was the case with KIPP Lynn Academy in Massachusetts and KIPP DIAMOND Academy in Memphis, TN) as well as the national level (as was the case with the Mathematica studies of 22 KIPP middle schools and 43 KIPP middle schools). Further, when statistical tests were employed, not only were the findings in the reported studies positive for KIPP student achievement, but the differences were statistically significant.

Likewise regarding attrition, when a strong design is employed, attrition rates at KIPP do not seem to differ significantly from the traditional public feeder school attrition rates. For example, in the two Mathematica studies reported, attrition is analyzed at the grade-level - only for those grades that the KIPP schools serve - and then compared to feeder school grade-level attrition for the same grades. Weaker designs that compare KIPP schools to entire districts - and that do not include within-district transfers for the traditional public feeder schools as part of the attrition rate, generate more suspect results.

Studies of academic achievement employing Hoxby's (2009) "gold standard" of randomization based on student lotteries, as well as studies employing a matched comparison group comparing KIPP student achievement to TPS peer achievement do exist; however, none of these studies single out KIPP charter school student performance in Arkansas. Because of this, my evaluation of the impact of the KIPP charter schools in Arkansas on student achievement is

highly important and relevant, as this evaluation can add to the nonexistent pool of research on this topic. With this evaluation, I aim to help fill the existing research gap so that school leaders, teachers, parents, and policymakers have a greater understanding of the costs and benefits associated with KIPP charter schools in Arkansas.

Chapter 3 – An Overview of KIPP Delta Public Schools

As mentioned earlier, the KIPP charter school network currently operates 125 schools across 20 states and Washington DC. Of these schools, only three are located in a non-urban area: KIPP Gaston College Preparatory in Gaston, NC, and two rural KIPP Schools in Arkansas – KIPP Delta Collegiate Preparatory in Helena, AR and KIPP Blytheville Collegiate Preparatory in Blytheville, AR. The latter two schools are the focus of this paper.

KIPP Delta Collegiate Public School (DCPS) opened in Helena, Arkansas in the summer of 2002 with an incoming 5th grade class of sixty-five students. Each successive year as the most recent 5th grade class would matriculate into grade six, KIPP: DCPS would welcome a new 5th grade class of students. According to the www.kipp.org website, the KIPP model adds a new grade each year until reaching grade 12. From there, KIPP schools began adding elementary grades. The progression of grades in both KIPP DCPS and KIPP: BCPS are illustrated in Table 4 below.

Table 4

Grade Expansion in KIPP Charter Schools in Arkansas, 2002-03 to 2012-13

	2002 -03	2003 -04	2004 -05	2005 -06	2006 -07	2007 -08	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13
KIPP DCPS Elementary								K-1	K-2	K-3	K-4
KIPP DCPS Middle	5	5-6	5-7	5-8	5-9	5-8	5-8	5-8	5-8	5-8	5-8
KIPP DCPS High						9-10	9-11	9-12	9-12	9-12	9-12
KIPP Blytheville									5	5-6	4-7

As can be seen in Table 4, KIPP: DCPS expanded in both “directions” during the 2009-10 academic year by not only adding a grade 12, but also opening an elementary school serving both kindergarten and grade 1. The next academic year, 2010-11, KIPP: BCPS opened in Blytheville serving an inaugural 5th grade class of 63 students. By the 2012-13 academic year, KIPP: DCPS was serving approximately 927 students in grades K-12 in three buildings: KIPP: Delta Elementary Literacy Academy serving 360 students in grades K-4; KIPP: Delta Collegiate Preparatory School serving 320 students in grades 5-8; and a KIPP: Delta Collegiate High School serving 247 students in grades 9-12. By the 2012-13 academic year, KIPP BCPS, 134 miles north of Helena, was serving 234 students in grades 4-7. KIPP: BCPS houses all 4 grades in one school. A snapshot of each school’s student demographic characteristics is shown in Table 5 below.

Table 5

KIPP Charter Schools in Arkansas Student Demographics, 2012-13

	Enrollment	Grades Served	% FRL	% Minority	% Female ⁹
KIPP: DCPS Elem.	360	K-4	91%	97%	42%
KIPP: DCPS Middle	320	5-8	83%	97%	58%
KIPP: DCPS High	247	9-12	86%	99%	61%
KIPP: BCPS Middle	234	4-7	77%	88%	45%
Total:	1161	K-12	85%	96%	52%

Both KIPP charter schools are located in the Arkansas Delta, a region of the state characterized by higher poverty and higher minority rates than other regions in the state. For example, according to publicly available data from the Arkansas Department of Education (ADE), 72% of

⁹ Data for percent female is from the 2011-2012 academic year.

the students in the southeast region of Arkansas (which includes the Arkansas Delta) qualify for a federal free or reduced-price lunch as compared to 60% for the entire state. Further, over half of the student population (52 percent) in the southeast Arkansas Delta region are minority students (45 percent of which are identified as black students) as compared to a 35% minority rate across the state (where 21 percent of the state population are black). As such, the school districts in the area reflect the demographics of the region as well. Indeed, the KIPP school student population, one would expect, should mirror that of the surrounding feeder districts. Demographic comparisons between KIPP: DCPS in Helena/West-Helena AR and the surrounding feeder districts are shown in Table 6 below.

Table 6

Demographic Characteristics, KIPP: DCPS (Helena/West-Helena) and Feeder Districts¹⁰

	Enrollment	% FRL	% Minority	Distance from KIPP (in miles)
Helena/W. Helena SD	1,654	93%	95%	1.0
Lee County SD	920	100%	92%	27.0
Marvell-Elaine SD	451	97%	91%	22.0
KIPP: DCPS (Helena/West-Helena)	927	87%	97%	0.0

Both KIPP: DCPS and the surrounding feeder districts have student bodies with high minority populations (in fact, KIPP: DCPS has the highest minority rate when compared to its surrounding feeder districts), and a majority of students receiving a free or reduced-price lunch

¹⁰ It should be noted that these districts do not represent every feeder school district from where KIPP: DCPS receives students. However, as will be shown in the analyses in the next chapter, the majority of students who attend KIPP: DCPS enrolled from these districts.

(FRL, a poverty indicator). District demographic characteristics for the KIPP: BCPS feeder districts are shown below in Table 7.

Table 7

Demographic Characteristics, KIPP: BCPS (Blytheville) and Feeder Districts⁸

	Enrollment	% FRL	% Minority	Distance from KIPP (in miles)
Blytheville SD	2,593	100%	81%	2.0
Oscelola SD	1,310	100%	81%	16.0
KIPP: BCPS (Blytheville)	234	77%	88%	0.0

Similar to the student body at KIPP in Helena/West-Helena, KIPP: BCPS has a larger minority population than the surrounding feeder districts. Also similar to the KIPP in Helena/West-Helena, a majority of students attending KIPP: BCPS are receiving a federal free or reduced-price lunch.¹¹

Not unlike the “no-excuses” charter school models highlighted in the literature review, the KIPP schools in Arkansas feature an extended school year and an extended school day. Today, both KIPP: DCPS and KIPP: BCPS share the same calendar, but it has evolved over the years. For example, when KIPP: DCPS opened in Helena/West-Helena in 2002, students began attending summer school in June, and during the regular school year, attended class two

¹¹ The figures indicating that all students in the Osceola and Blytheville school districts are receiving FRL may be misleading. Under Arkansas’ “Provision 2” standard, districts with large FRL populations can report all students under this category as the cost of providing the additional categorical funds for the small number of ‘paid-lunch’ students is cheaper than the administrative costs that would entail ensuring what percentage of categorical funds should be allocated to the school. As of the writing of this paper, Arkansas has not released the 2012-13 Provision 2 figures. As a proxy, it should be noted that in the 2011-12 academic year, the Provision 2 FRL% for Blytheville SD and Osceola SD was 82% and 88%, respectively.

Saturday's per month while school was in session. For the past two years, both KIPP: Delta schools hold summer school from the last week in July until the second week in August. After a four-day weekend, the "regular" school year then begins – which is in line with when the traditional public school year begins.

One difference over the past two years has been a change in Saturday school. Students used to attend school two Saturday's per month, where they would attend class like any weekday. However, for the past two years, "Saturday school" has focused on "field lessons," where students work on a project or lesson outside of the classroom. Students engage in Saturday field lessons once per month, and the other Saturday is now relegated to teacher planning time.

According to the KIPP: Delta website, during the regular school year, school begins at 7:15 AM and ends at 4:00 PM. KIPP students attend school five days per week, plus their monthly Saturday field lessons until the end of May (Memorial Day Weekend), when the regular school year ends. The only remaining school event beyond Memorial Day weekend are the class trips, which have occurred the first two weeks in June for the past two years. In previous years, KIPP students have visited areas such as Washington DC as a means for providing opportunities for KIPP students to learn from experiences and travel to other parts of the country. Once students return from their class trip in the first or second week of June, their summer vacation begins until summer school starts again the last week in July.

The model employed by KIPP schools in the Arkansas Delta does not deviate much from the "typical" KIPP model in place at KIPP schools across the country.¹² However, both school leaders at each KIPP location in Arkansas have evaluated and adjusted the model at their

¹² This "typical" model was highlighted nicely in the 2009 narrative book *Work Hard. Be Nice* written by Washington Post Columnist Jay Matthews (Algonquin Press, Chapel Hill, NC).

respective KIPP schools to best serve the needs of the students. Indeed, in this study, I present my analysis of the impact that the KIPP Delta Collegiate Preparatory School has on student achievement for its students Helena, Arkansas. The analyses below do not include KIPP Blytheville Collegiate Preparatory School because KIPP: BCPS was not serving all of grades 5-8 by the most recent year of data in the statewide dataset. Thus, for all analyses below, the figures only represent those students who attended KIPP Delta Collegiate Preparatory in Helena, Arkansas.

Chapter 4 – Methods

In this chapter, I present the methods used in my evaluation of the impact of attending a KIPP charter school in Arkansas on student academic achievement. For the first research question examining attrition, I describe the research sample and the analytic strategy I used to determine the attrition rates of both KIPP: DCPS and the TPS feeder districts. For the second research question, I describe the research sample, the instrument, and the analytic strategy I used to determine how students were impacted academically by attendance at KIPP.

Research Question #1: Attrition

Before discussing the sample, it is first important to discuss why attrition matters in the case of a study on the academic impacts of attending KIPP. In this study, I address the concerns of KIPP critics that the positive results for KIPP performance occur because the lowest performing students are attriting, leaving only the high performing students to be analyzed in evaluation results. I deal with this issue in this study in two ways. First, I analyze academic performance results using an Intent to Treat (ITT) analysis which identifies students as “KIPP” students by virtue of their entry in KIPP in grade 5. Put differently, students who enroll in KIPP as first time grade 5 students are treated as “KIPP treatment” students even if the student transfers out of KIPP. Consequently, it is unlikely that the results in the Intent to Treat analyses are being driven by only the highest performing students who may constitute the sample after the attrition of the low performing students (because ALL students remain in the sample throughout).

Secondly, it is worth checking to see if the attrition at KIPP is larger than that of the surrounding traditional public feeder schools. According to critics like Miron, KIPP, on average,

has higher attrition levels, however, in his 2011 study; Miron's methodology includes a clear flaw in that it does not count within-district attrition of students in the traditional public schools in his analyses. For example, students who transfer from "Middle School A" to "Middle School B" do not count toward the attrition figure if both middle schools were in the same district. In this study, I employ a methodology similar to that used in a Mathematica report which counts students in traditional public school districts who transfer to schools within the district as attrited (Tuttle et. al., 2012).

As such, the results of the attrition analyses below should quell the criticism that KIPP results are being driven by the performance of the remaining high performing students, considering in the ITT model, I do not exclude students who attrited from KIPP in my analyses.

Sample.

The first research question is: "How many students who enter KIPP as first-time 5th grade students remain in KIPP through their 8th grade year, and to what extent do these attrition rates differ from the public feeder school districts students leave to enroll in KIPP?" To do this, I will employ a methodology similar to Mathematica study on KIPP attrition (Nichols-Barrer, et al., 2012) that includes within district transfers as well as transfers out of the district as attrition.

Because the KIPP model begins with a new fifth grade class at the start of each school year until all grades are served (as was the case in both Helena/West-Helena and Blytheville), it provides a unique opportunity to study the academic impact of attending a charter school, while providing pre-KIPP academic ability data necessary to select an appropriate comparison group of peer students who remained in a TPS. In this study, I compare the sample of KIPP students with their TPS peers in two ways: First, I observe differences in performance on those KIPP students who entered KIPP: DCPS during their grade 5 year, and remain in KIPP through their grade 8

year. This treatment on treated (TOT) analysis will examine the impact of entering and matriculating through KIPP: DCPS middle school. In the second analysis, I observe differences in performance between comparison peer students and those KIPP students who began grade 5 in either the 2006-07, 2007-08, or 2008-09 academic year but may not have remained in KIPP through their grade 8 year. This intent to treat (ITT) analysis will examine whether there are differences between students who enter KIPP at grade 5 and only receive “some KIPP” as a treatment condition versus those students who receive “no KIPP.” This strategy adjusts for concerns that may occur due to the attrition rate at KIPP. The progression of each class of first-time grade 5 KIPP entrants, and the years in which they matriculated through each successive grade level is shown below in Table 8.

Table 8

Pre-Match Grade-Level of KIPP First Time Grade 5 Entrants by Year

2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Grade 5	Grade 5	Grade 5			
	Grade 6	Grade 6	Grade 6		
		Grade 7	Grade 7	Grade 7	
			Grade 8	Grade 8	Grade 8

The following analyses are based upon an aggregated group of three 5th grade classes of first-time KIPP students across three grade 5 entry years (2006-07, 2007-08, and 2008-09). As such, there are also three “outcome” years representing when students from each of these three “cohorts” were in grade 8 (2009-10, 2010-11, and 2011-12). Rather than examine student performance during a given year, for the analyses below, I aggregate performance across testing years by measuring KIPP student performance at the pre-KIPP (grade 4) testing administration (during the 2005-06, 2006-07, or 2008-09 academic years) and at the grade 8 test administration

(2009-10, 2010-11, and 2011-12). For most of my analyses, I combine these three cohorts into a single combined study sample.

Prior to matching on grade 4 baseline observables, the data set included 124 first-time KIPP 5th graders from the 2006-07, 2007-08, and 2008-09 academic years representing six different school districts in Arkansas.¹³ The number of students starting KIPP at each of the academic years above is listed in Table 9.

Table 9

Number of Entering 5th Grade KIPP Students, 2006-07, 2007-08, and 2008-09 Academic Years

	N of Students	% of Total Sample
2006-07 Academic Year	42	34%
2007-08 Academic Year	37	30%
2008-09 Academic Year	45	36%
Total:	124	100%

These KIPP grade 5 entrants entered the KIPP school from numerous nearby districts in Arkansas; these are presented below in Table 10.

¹³ There were 4 students did not have pre-KIPP (grade 4) district data who may have entered from the private school sector or moved to Arkansas from another state.

Table 10

Number of Entering 5th Grade KIPP Students 2006-07, 2007-08, and 2008-09 Academic Years from Each Represented Feeder School District

District LEA	District	# 07-08 KIPP 5th Grade Cohort	# 08-09 KIPP 5th Grade Cohort	# 09-10 KIPP 5th Grade Cohort	# Total Students	% of Total Sample
3904000	Lee County SD	2	8	2	12	9.7%
4801000	Brinkley SD	0	0	2	2	1.6%
5401000	Barton-Lexa SD	0	0	1	1	0.8%
5403000	Helena/West Helena SD	32	26	25	83	66.9%
5404000	Marvell-Elaine SD	7	3	15	25	20.2%
6001000	Little Rock SD	1	0	0	1	0.8%
	Totals	42	37	45	124	100%

Not surprisingly, the largest percentage of first-time KIPP 5th grade students enter from the Helena/West Helena School District (67%). Approximately 30% of the sample attends from both the Marvell-Elaine and Lee County School Districts, both of which are over 20 miles away from KIPP's location in Helena/West Helena, Arkansas.

Next, I examine what grade level students are most often exiting KIPP and to where they exit. KIPP student attrition behavior from grade 5 through grade 8 is shown below in Table 11.

Table 11

KIPP Student Attrition Behavior, Grade 5 to Grade 8

	N	% of
	Students	Sample
Remained in KIPP	78	62.9%
Exited to Original Feeder District	15	12.1%
<i>Grade 5 to 6</i>	8	6.5%
<i>Grade 6 to 7</i>	3	2.4%
<i>Grade 7 to 8</i>	4	3.2%
Exited to Other Feeder District	9	7.3%
<i>Grade 5 to 6</i>	5	4.0%
<i>Grade 6 to 7</i>	1	0.8%
<i>Grade 7 to 8</i>	3	2.4%
Attended Multiple Districts	9	7.3%
Exited Dataset	13	10.5%
<i>Grade 5 to 6</i>	5	4.0%
<i>Grade 6 to 7</i>	7	5.6%
<i>Grade 7 to 8</i>	1	0.8%
Total	124	100.0%

Roughly 37% of first-time grade 5 KIPP entrants left the charter school and either returned to their original feeder school district (15 students, 12 percent), exited to another traditional public school district other than their original feeder school district (9 students, 13 percent), exited KIPP and attended multiple traditional public school districts over the ensuing years (4 students, 3 percent) or exited the dataset altogether (13 students, 11 percent). Although the statewide dataset does not keep records indicating where students in this last category go upon exiting the dataset, the most plausible explanation is that these students exit to a private school (for which the state does not collect data) or move out of the state.

I was also interested to know how long students were enrolled in KIPP prior to exiting. Thus, the number of students exiting KIPP at each grade level is shown in Table 12 below.

Because all students in the sample entered KIPP during their grade 5 year, we can also use grade-level-at-attrition as a proxy for how many years students, on average, remained enrolled in KIPP prior to exiting. For example, students exiting at the 7th grade year would have been enrolled in KIPP for two years.

Table 12

KIPP Student Attrition at Each Grade Promotion Level

	N Attrited Students	% of Attrited Students	% of Sample Attrited (N=124)
Exited Grade 5 to 6	27	58.7%	21.8%
Exited Grade 6 to 7	12	26.1%	9.7%
Exited Grade 7 to 8	7	15.2%	5.6%
Totals	46	100.0%	37.1%

The students who attrit from KIPP are also performing across all levels of the academic spectrum, that is, there does not appear to be higher numbers of low-performing first time grade 5 KIPP entrants contributing to these attrition figures. For example, when splitting students into performance quartiles (using pre-KIPP achievement scores), 13 exiting students (28%) are in the first (lowest) quartile in math performance – which is equal to the number of exiting students in the third quartile in math performance. This breakdown of attriters by math performance reveals no obvious trend in terms of which types of students attrit as students from across the ability spectrum at KIPP left the school. However, in literacy, a pattern did emerge whereby the attriters were somewhat more likely to come from the lower half of the distribution, and particularly from the lowest quartile. This underscores the importance of the Intent to Treat (ITT) analysis below, especially for literacy, because this analysis will treat attrited students as

“KIPP treatment” students even after these student leave KIPP. A complete breakdown of student attrition by pre-score performance quartile is shown in Table 13 below.

Table 13

KIPP Student Attrition at by Pre-score Quartiles

	Math (N)	Math (%)	Literacy (N)	Literacy %
Quartile 1 (low)	13	28%	17	37%
Quartile 2	10	22%	11	24%
Quartile 3	13	28%	8	17%
Quartile 4 (high)	10	22%	10	22%

Consistent with the literature review, KIPP: DCPS is not immune to attrition. Thus, it seems pertinent to include the information on students who leave KIPP when describing the sample so that we have a better understanding of how many students were available for matching to TPS peer comparison students necessary to conduct the analyses on student achievement, which is described in the next section. Moreover, I compare the attrition of KIPP to that of the surrounding TPS schools in the attrition analysis that will follow. The majority of KIPP attrition in Arkansas seems to occur after students have attended KIPP: DCPS for one year (27 students, 59 percent). However, the attrition rate declines steadily as students remain in KIPP over successive years. Despite these attrition figures, 63% of the students who are first-time grade 5 KIPP entrants remain in the school through grade 8.

Analytic strategy.

Unlike previous research on attrition (i.e., Miron, 2010), I employed a similar methodology to a 2012 Mathematica study that not only considered students who transferred out of the district as part of the overall attrition rate, but also included those students who made a

“non-structural” transfer between schools within a district as attrition. Given that the KIPP: DCPS feeder districts are small, the Helena/West Helena school district was the only district where intra-district transfers were possible (that is, it was the only district with multiple schools serving a grade configuration – k-6 – that overlapped KIPP’s 5-8 grade convention). Because I am primarily interested in determining whether there is any difference between the rates at which KIPP students leave the charter school as compared to the rates that the KIPP matched peers leave their TPS schools. I also consider how KIPP’s attrition rate compares with that of the aggregated TPS feeder districts.

To measure attrition, I considered any grade 5 student who was enrolled at either KIPP or a TPS but was not enrolled in the same school by grade 8 as attrited. I then calculate the overall rates of attrition for each grade level for each group (KIPP, TPS comparison peers, and all TPS feeder districts). I also calculate an overall attrition rate from grade 5 to grade 8 and compare this attrition rate between the three sample conditions. Finally, attritions rates between grade-levels and across the three conditions are compared statistically using t-tests to determine the magnitude of differences, if any, in the attrition rates.

Research Question #2: Achievement Impacts

Sample

The second research question in this paper is: “What impact does enrollment at a KIPP charter school in Arkansas have on student achievement? More specifically, how do KIPP students perform on the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) as compared to a matched comparison group of students from neighboring districts?” To do this, I assess how KIPP students performed on the criterion-referenced Arkansas Benchmark Exam, as compared to a group of academically and demographically

similar students in other local school districts. This traditional public school (TPS) comparison group was comprised of students matched using a 1 to 1 convention, that is, each KIPP is matched to student from one of the feeder school districts that KIPP students attended prior to enrolling in the charter school. For these analyses, I chose to only examine performance on the Arkansas Benchmark Exams because these exams are directly tied to Arkansas' accountability measures, thus, the results of my analyses can be taken in this context.

I analyze KIPP student achievement in two ways. First, I compare students who enter KIPP in grade 5 at 2006-07, 2007-08, or 2008-09 and continue to treat the students as "KIPP treatment" even if they transfer out of KIPP and return to the traditional public schools. These intent to treat (ITT) analyses factor in some of the effects of student attrition at KIPP. Secondly, I examine academic performance for first-time grade 5 KIPP students who remained in KIPP through grade 8. The purpose of this treatment on treated (TOT) analysis is to examine the impact of enrolling in KIPP on those who remain in KIPP throughout all of middle school.

Matching KIPP students to TPS peers: intent to treat (ITT) analysis.

Because there were no successful lotteries at either KIPP location during the years for which there is available data, I employed a 1 to 1 matched comparison (i.e., one TPS student matched to each KIPP student) design for each set of first-time grade 5 KIPP entrants beginning with the 5th grade class from 2006-07 (who were in grade 8 during the 2009-10 academic year) and ending with the entering 5th grade class at KIPP during the 2008-09 academic year (who were in grade 8 during the 2011-12 academic year). KIPP students were matched to comparison peers on a number of observable measures, though the matching process was based primarily on identifying students with identical pre-test scores. Since students enter KIPP during grade 5, the pre-test score for each student would be the student's grade 4 performance on the spring

administration of the Arkansas Benchmark Exam during the prior school year. By using grade 4 data, we can observe student achievement levels for both KIPP students and their TPS peers prior to any direct KIPP influence.¹⁴ Using this as my base criteria for matching purposes, I ensured that the academic performance of both KIPP and their TPS peers was as similar as possible prior to any enrollment at KIPP. However, there still may be some concern about the type of students who select to attend KIPP (i.e., students who “select in” to KIPP may have parents who are abnormally informed about educational choice options, and/or more involved in their child’s education, thus creating an overall difference between the type of student who attends KIPP and the TPS peer). However, if there are no observable differences in academic ability between both groups’ pre-test scores (which there are not) these analyses represent the best possible strategy for determining *whether any differences in performance during the outcome year is a result of the impact of attending a KIPP charter school.*

Beyond simply matching on test scores, I also sought to create a comparison group that was as similar as possible on observable demographic characteristics such as eligibility for free and reduced lunch (FRL), minority status, and gender. This was important because differences in

¹⁴ Because a single year of test performance might not be representative of a student’s true ability (i.e., the student was ill during testing, and did not perform as well as he or she would have if in better health), I created a pre-score by averaging each student’s z-score from their grade 3 and grade 4 benchmark performance. The z-scores allow me to compare benchmark test performance across grade levels, whereas the scale score values are unique to each grade level (that is, a scale score of 500 from a grade 3 test administration and a scale score of 500 from a grade 4 test administration would not necessarily mean that no change in test performance occurred over the two administrations). Thus, this two-year pre-test average will better account for any unique test results not indicative of a student’s true performance. However, it should be noted that the statewide dataset used in these analyses does not include test score data prior to the 2005-06 academic year. Therefore, students who entered KIPP during their 5th grade year in 2006-07 (as well as their matched TPS comparison peers) will only have one year of pre-score data (2005-06). Further, only those students with a pre-score value +/- .05 z-score points from the KIPP student pre-score were considered as matches.

these characteristics can have an impact on student performance on standardized assessments, and I wanted to ensure that my counterfactual condition was as similar to the group of KIPP students as possible. KIPP students were matched to TPS students on their grade 4 observables; however, because I chose to prioritize accuracy on academic variables in my matching, the resulting TPS peer groups were not identical to the group of KIPP students on some of these other demographic characteristics.

KIPP students in this intent-to-treat (ITT) analysis started KIPP in grade 5 in either 2006-07, 2007-08 or 2008-09, but may not have remained enrolled in KIPP through their 8th grade year. I generated two KIPP peer TPS groups, one matched on math performance and one matched on literacy performance. This analysis will examine whether there are differences between students who enter KIPP at grade 5 and only receive “some KIPP” as a treatment condition versus those students who receive “no KIPP.”

Because the matched comparison analyses presented below only include KIPP students who had pre- and post- test data, I also wanted to see how the sample changes as a result of the inability to match students on pre-score test data, or because the students exited the dataset. Thus, a description of KIPP students who are not included in the analytical sample as a result of not being able to find an appropriate TPS peer student match, or due to attrition from the dataset is presented below in Table 14 (math analytical sample) and Table 15 (literacy analytical sample) below.

Table 14

KIPP Student Sample Exclusion, Math Analytical Sample

	All First Time KIPP 5th Graders	No Peer Match: Math	Exited Dataset	Remaining Analytical Sample	% of Sample Lost
KIPP Grade 5 2007-08	42	7	6	29	31.0%
KIPP Grade 5 2008-09	37	4	6	27	27.0%
KIPP Grade 5 2009-10	45	10	1	34	24.4%
Totals	124	21	13	90	27.4%

Table 15

KIPP Student Sample Exclusion, Literacy Analytical Sample

	All First Time KIPP 5th Graders	No Peer Match: Literacy	Exited Dataset	Remaining Analytical Sample	% of Sample Lost
KIPP Grade 5 2007-08	42	7	6	29	31.0%
KIPP Grade 5 2008-09	37	3	6	28	24.3%
KIPP Grade 5 2009-10	45	10	1	34	24.4%
Totals	124	20	13	91	26.6%

Roughly 27% percent of the first-time grade 5 KIPP entrants between 2006-07, 2007-08, and 2008-09 are not included in the final analytical sample for the attrition and achievement analyses outlined below. Most students are excluded from the analytical samples below because I was unable to find an appropriate match. Typically, this occurs because of the difficulty in matching “tail kids,” For example, since I matched primarily on grade 4 test scores, those students who were performing at the very low end or the very high end of the distribution (i.e., the “tails”) are challenging to match, since there are fewer students in any distribution that perform on these tails. In other cases, I was unable to match students because they may not have had an appropriate pre-test or post-test score. In addition, some students exited the dataset

completely. These students may have exited the public school system and enrolled in a private school, or exited the state altogether and thus, the Arkansas Department of Education then ceases data on these students.

In both the math and literacy matched groups, there were no observed statistical differences in pre-test scores. However, for the math TPS peer comparison group, there was statistical difference in the percentage of students that were classified as minority (African-American, Asian, Hispanic, or Native American).¹⁵ The percentage of minority students in the math TPS peer comparison group was 83%, compared to 98% for KIPP students. For the literacy TPS peer comparison group, there was a statistical difference in the number of males and females. The percentage of female students in the literacy TPS peer comparison group was 54% compared to 76% for KIPP students. Because differences did exist between students in the math group, I controlled for differences in these matching characteristics in all of my estimations of the impact of KIPP attendance on student achievement. Grade 4 (pre-KIPP) academic and demographic characteristics of the ITT math group are shown below in Table 16 below.

¹⁵ Despite the differences observed in the demographic characteristics of the two student groups, the decision to place a greater emphasis on ensuring similarity on academic variables appears justified based on a simple review conducted at the University of Arkansas Office for Education Policy on the impact each of these variables have on predicting achievement in 2011. For example, using a state-wide student-level dataset for Arkansas students in grades 4-9, a regression model controlling for student grade and 2010 math score accounted for 57% of the variance in 2011 math scores, and including 2009 math scores in this model increased that percentage to 63%. Beyond these variables, the addition of FRL status, minority status, and gender to the regression model only accounted for 64% of the variance in 2011 math scores, or an additional 1% of the variance beyond grade and test scores. Thus, I use this estimation as a proxy to justify the relatively low impact differences in demographic characteristics will ultimately have on academic performance comparisons.

Table 16

Baseline (Grade 4) Descriptive Statistics for KIPP and Comparison TPS Peer Student, Intent to Treat Group, Math, 2006-07 to 2008-09¹⁶

	KIPP	Matched Peers	Total Sample
N of All Students	124	x	x
N of All Students with Data	90	90	180
Average Grade 4 z-Score (Math)	-0.42	-0.42	-0.42
% FRL	98%	97%	98%
% Minority ¹⁷	98%	83%	91%
% Female	72%	62%	67%
2006-07 Cohort N	29	29	58
2006-07 Cohort Grade 4 z-Score (Math)	-0.45	-0.45	-0.45
2006-07 Cohort % FRL	97%	93%	95%
2006-07 Cohort % Minority	100%	100%	100%
2006-07 Cohort % Female	75%	52%	64%
2007-08 Cohort N	27	27	54
2007-08 Cohort Grade 4 z-Score (Math)	-0.56	-0.56	-0.56
2007-08 Cohort % FRL	100%	96%	98%
2007-08 Cohort % Minority	100%	100%	100%
2007-08 Cohort % Female	67%	52%	60%
2008-09 Cohort N	34	34	68
2008-09 Cohort Grade 4 z-Score (Math)	-0.27	-0.27	-0.27
2008-09 Cohort % FRL	97%	100%	99%
2008-09 Cohort % Minority	94%	56%	75%
2008-09 Cohort % Female	71%	79%	75%

¹⁶ The demographic figures in Table 16 exclude the 34 students who could not be matched to a TPS Peer on math pre-test score. These 34 students had higher grade 4 pre-test scores on the math benchmark exam (average z -score of -0.09) but were similar demographically (94% FRL, 88% minority, and 65% female).

¹⁷ The differences in percentage of minority students is significant at the $p < .05$ level.

For the math analyses, there were 90 students who were first-time KIPP entrants in 5th grade during the 2006-07, 2007-08, or 2008-09 academic years, and 90 matched comparison peers for whom I was able to find appropriate matches on pre-test math Benchmark exam z scores for a total sample size of 180 students. Students were included in this analysis if they had valid, match-able math test scores on the Arkansas Benchmark Exam from their grade 4 test administration (for the KIPP treatment group, this would be the grade prior to entering KIPP) through their grade 8 year.¹⁸ However, in this intent to treat (ITT) model, KIPP students remained in the KIPP group even though they may have not remained enrolled at KIPP through their 8th grade year.

There were roughly 30 students in each first-year grade 5 cohort from 2006-07 through 2007-08. Each of these three cohorts had high percentages of FRL and minority students. Further, the last cohort of grade 5 entrants (2008-09) were achieving at a higher level as compared to the earlier two grade 5 entry cohorts. Grade 4 (pre-KIPP) academic and demographic characteristics of the ITT literacy group are shown below in Table 17 below.

¹⁸ The choice to use grade 8 as the “outcome” grade level was twofold: First, the Arkansas Benchmark Exam is administered to students in grades 3-8, thus it would eliminate the need to measure outcome performance on a different assessment, which may not align properly with the benchmark. Second, KIPP DCPS serves grades 5-8, thus the effects observed for students who remain in KIPP throughout the entire grade span could also be attributed to a KIPP ‘middle grades’ effect.

Table 17

Baseline (Grade 4) Descriptive Statistics for KIPP and Comparison TPS Peer Student, Intent to Treat Group, Literacy, 2006-07 to 2008-09¹⁹

	KIPP	Matched Peers	Total Sample
N of All Students	124	x	x
N of All Students with Data	91	91	182
Average Grade 4 z-Score (Literacy)	-0.18	-0.18	-0.18
% FRL	98%	99%	99%
% Minority	100%	97%	99%
% Female	67%	56%	62%
2006-07 Cohort N	29	29	58
2006-07 Cohort Grade 4 z-Score (Literacy)	-0.28	-0.28	-0.28
2006-07 Cohort % FRL	97%	100%	99%
2006-07 Cohort % Minority	100%	100%	100%
2006-07 Cohort % Female	79%	55%	67%
2007-08 Cohort N	28	28	56
2007-08 Cohort Grade 4 z-Score (Literacy)	-0.14	-0.14	-0.14
2007-08 Cohort % FRL	100%	100%	100%
2007-08 Cohort % Minority	100%	96%	98%
2007-08 Cohort % Female	57%	60%	59%
2008-09 Cohort N	34	34	68
2008-09 Cohort Grade 4 z-Score (Literacy)	-0.15	-0.15	-0.15
2008-09 Cohort % FRL	97%	97%	97%
2008-09 Cohort % Minority	100%	94%	97%
2008-09 Cohort % Female	65%	53%	59%

¹⁹ The demographic figures in Table 17 exclude the 33 students who could not be matched to a TPS Peer on literacy pre-test score. These 33 students had higher grade 4 literacy benchmark exam scores (average z -score of 0.03) had a similar number of FRL students (94%), fewer minority students (82%) and more female students (82%).

For these analyses, there were 91 students who were first-time KIPP entrants in 5th grade during the 2006-07, 2007-08, or 2008-09 academic years, and 91 matched comparison peers for whom I was able to find appropriate matches on pre-test literacy Benchmark exam z scores for a total sample size of 182 students. Similar to the math group comparison above, students in both the KIPP treatment and TPS comparison peer groups were included in this analysis if they had valid literacy test scores on the Arkansas Benchmark Exam from their grade 4 test administration through their grade 8 year. These KIPP students remained in the KIPP group even though they may have not remained enrolled at KIPP through their 8th grade year.

Again, there were roughly 30 students in each first-year grade 5 cohort from 2006-07 through 2007-08. Similar to the math group in Table 15, each of these three cohorts had high percentages of FRL and minority students. However, all three cohorts of grade 5 entrants and their matches were achieving at relatively similar levels at the grade 4 pre-test score baseline.

Instrument.

I obtained student-level testing data for the Arkansas Benchmark assessments spanning the 2005-06 through 2011-12 academic years. These data were obtained from the Arkansas Department of Education, and included student demographic information such as student grade, school/district attended, FRL status, race, etc. These data were de-identified when obtained, so there were no variables included that could be directly linked to a specific student (such as student name or social security number). The Arkansas Benchmark Exam is administered in the Spring to students in grades 3-8, and includes open-response and multiple-choice items to assess student performance in math and literacy. All results reported for the Arkansas Benchmark are presented in computed z-scores of the Benchmark scaled scores. These z-scores were normed around the statewide population. The rationale for using z-scores is that the Arkansas Benchmark

Exam scaled scores, which range from 0-999, are scaled differently for each grade. That is, because this test is vertically scaled, the performance of a student who earns a scale score on his or her grade 4 math Benchmark exam of 600, and a scale score on the grade 5 math Benchmark exam of 600 does not indicate that there was no change in performance. Nevertheless, since these scaled scores have different values for different grades (and years), we use the z-score to explain performance around a normal scale. For example, since z-scores are standardized around a mean of 0 and a standard deviation of 1, we can compare z-score differences of the Arkansas Benchmark Exam scaled scores across grades, since each z-score is simply the deviation in performance (positive or negative) from the average Arkansas' student performance on the exam.

Matching KIPP students to TPS peers: treatment on treated (TOT) analysis.

Next, I examined KIPP student performance as compared to the TPS peers *only* for those students who enrolled in KIPP during their grade 5 year (in either 2006-07, 2007-08, or 2008-09) and *remained* in KIPP through grade 8. I generated two KIPP peer TPS groups, one matched on math performance, and one matched on literacy performance. In both cases, there were no observed statistical differences in pre-test scores, that is, the students' performance in grade 4, or the percentage of students receiving a free or reduced-price lunch in each group (see Tables 18 and 19). However, for the math TPS peer comparison group, there was a statistically significant difference in the percentage of students classified as minority (African-American, Asian, Hispanic, or Native American). The percentage of minority students in the math TPS peer comparison group was 83%, compared to 98% for KIPP students. For the literacy TPS peer comparison group, there was a statistically significant difference in the number of males and females. The percentage of female students in the literacy TPS peer comparison group was 54%

compared to 76% for KIPP students. Because differences did exist between students in both groups, I controlled for these matching characteristics in all of my regression models estimating the impact of KIPP attendance on student achievement.

Table 18

Baseline (Grade 4) Descriptive Statistics for KIPP and Comparison TPS Peer Student, Treatment on Treated Group, Math, 2006-07 to 2008-09

	KIPP	Matched Peers	Total Sample
N of All Students	124	x	x
N of All Students with Data	65	65	130
Average Grade 4 z-Score (Math)	-0.36	-0.36	-0.36
% FRL	97%	95%	96%
% Minority ²⁰	98%	83%	91%
% Female	77%	63%	70%
2006-07 Cohort N	23	23	46
2006-07 Cohort Grade 4 z-Score (Math)	-0.32	-0.32	-0.32
2006-07 Cohort % FRL	96%	91%	94%
2006-07 Cohort % Minority	100%	100%	100%
2006-07 Cohort % Female	0.83	0.48	66%
2007-08 Cohort N	17	17	34
2007-08 Cohort Grade 4 z-Score (Math)	-0.70	-0.70	-0.70
2007-08 Cohort % FRL	100%	94%	97%
2007-08 Cohort % Minority	100%	100%	100%
2007-08 Cohort % Female	76%	59%	68%
2008-09 Cohort N	25	25	50
2008-09 Cohort Grade 4 z-Score (Math)	-0.17	-0.17	-0.17
2008-09 Cohort % FRL	96%	100%	98%
2008-09 Cohort % Minority	100%	92%	96%
2008-09 Cohort % Female	68%	44%	56%

²⁰ The differences in percentage of minority students is significant at the $p < .01$ level.

For these analyses, there were 65 KIPP students and 65 TPS peer comparison students for whom I was able to find appropriate matches on pre-test math Benchmark exam z scores for a total sample size of 130 students. Students in both groups were included in this analysis if they had valid math test scores on the Arkansas Benchmark Exam from their grade 4 test administration (for the KIPP treatment group, this would be the grade prior to entering KIPP) through their grade 8 year. In addition, only those KIPP students who remained enrolled in the charter school through grade 8 were included in these analyses.

As expected, there are fewer students in each condition, particularly the grade 5 cohort from 2007-08, which only included 17 students and their matches. Compared with the other two grade 5 cohorts, these 17 students also had lower grade 4 pre-test scores (grade 4 math Benchmark z-score = $-.70$), however, the overall sample appears to be achieving closer to the state average because the 2006-07 and 2008-09 grade 5 cohorts had higher average grade 4 pre-test scores. Grade 4 (pre-KIPP) academic and demographic characteristics of the TOT literacy group are shown below in Table 19.

Table 19

Baseline (Grade 4) Descriptive Statistics for KIPP and Comparison TPS Peer Student,

Treatment on Treated Group, Literacy, 2006-07 to 2008-09

	KIPP	Matched Peers	Total Sample
N of All Students	124	x	x
N of All Students with Data	63	63	126
Average Grade 4 z-Score (Literacy)	-0.11	-0.11	-0.11
% FRL	98%	98%	98%
% Minority ²¹	100%	97%	99%
% Female	76%	54%	65%
2006-07 Cohort N	21	21	42
2006-07 Cohort Grade 4 z-Score (Literacy)	-0.10	-0.10	-0.10
2006-07 Cohort % FRL	100%	100%	100%
2006-07 Cohort % Minority	100%	100%	100%
2006-07 Cohort % Female	86%	62%	74%
2007-08 Cohort N	18	18	36
2007-08 Cohort Grade 4 z-Score (Literacy)	-0.19	-0.19	-0.19
2007-08 Cohort % FRL	100%	100%	100%
2007-08 Cohort % Minority	100%	100%	100%
2007-08 Cohort % Female	72%	50%	61%
2008-09 Cohort N	24	24	48
2008-09 Cohort Grade 4 z-Score (Literacy)	-0.07	-0.07	-0.07
2008-09 Cohort % FRL	96%	96%	96%
2008-09 Cohort % Minority	100%	92%	96%
2008-09 Cohort % Female	71%	50%	61%

For these analyses, there were 63 KIPP and 63 TPS peer comparison students for whom I was able to find appropriate matches on pre-test literacy Benchmark exam z scores for a total sample of 126 students. Students in both groups were included in this analysis if they had valid

²¹ The differences in percentage of minority students is significant at the $p < .01$ level.

literacy test scores on the Arkansas Benchmark Exam from their grade 4 test administration (for the KIPP treatment condition, this would be the grade prior to entering KIPP) through their 8th grade year. In addition, only those KIPP students who remained enrolled in the charter school through grade 8 were included in these analyses.

Though still a smaller sample as compared to the ITT literacy group, the grade 5 cohorts in this literacy TOT group are more even across the three grade 5 entry cohorts from 2006-07 through 2008-09, each with roughly 20 students and characterized as consisting of nearly all FRL and all minority students.

Finally, to illustrate the importance of using the matched comparison group, I present demographic and academic characteristics of the study sample of first-time 5th graders, the Helena/West Helena school district, the Southeast (Arkansas Delta) region, and Arkansas as a whole. By doing this, I am able to note how similar (or dissimilar) the study sample looks as compared to the surrounding district, region, and state. These academic characteristics are presented below in Table 20.

Table 20

*Academic and Demographic Characteristics of KIPP Sample and Surrounding Areas*²²

	Study Sample	Helena W/ Helena Avg.	Southeast Region (AR) Avg.	State (AR) avg.
N of Students	124	2,883	29,188	455,559
% FRL	97%	91%	69%	54%
% Minority	95%	95%	53%	32%
% Proficient/Advanced in Math	51%	35%	51%	62%
% Proficient/Advanced in Literacy	58%	39%	54%	61%

One difference is that the KIPP sample clearly has higher proficiency rates in math and literacy than all other comparison sites. However, that does not mean that the analyses below are comparing students of different ability. For example, despite the differences in proficiency rates on the Benchmark exam in math and literacy, I was able to match those KIPP students who entered KIPP from the Helena/West Helena school district to the high ability Helena/West Helena Students. In fact, there were roughly 500 4th grade students in the Helena/West Helena school district over the three pre-score years (2005-06, 2006-07, 2007-08) of which 39 percent would amount to 175 potential high performing students in the matching pool. Thus, since the sample of KIPP students and their matches were shown to be equivalent at the baseline (grade 4) year earlier in this section, these differences are of little concern with regard to the analyses that follow. Demographically speaking, we see similar FRL and minority rates between the KIPP study sample and the Helena/West Helena school district.

²² Figures are three year averages from 2005-06, 2006-07, and 2007-08 corresponding to the grade 4 (pre-KIPP) years for students in the study sample. Math and literacy proficiency scores for the KIPP sample and the Helena/West Helena school district are grade 4 averages.

Analytic strategy: intent to treat analyses.

For my ITT analysis of KIPP student performance on the Arkansas Benchmark Exam, I used multiple regression analyses to assess the extent to which enrollment in KIPP at grade 5, impacts student achievement (relative to the performance of students in the TPS comparison peer group), for students who either remain enrolled in KIPP through the 8th grade year, or exit to the another school prior to grade 8. In my regression analyses, I controlled for student achievement indicated by the pre-test scores computed by averaging performance from the students' grade 3 and grade 4 test administrations, and demographic variables such as student FRL status, race, and gender.²³ I tested two models in this ITT condition, each with a different coefficient of interest. In the first model, the coefficient of interest is the "KIPP_any" variable, which returns the coefficient of effect for all students in the analytical sample who began attending KIPP during grade 5 in either 2006-07, 2007-08, or 2008-09 but may have exited the charter school prior to grade 8. Thus, the "KIPP_any" coefficient of interest will return the effect of having ever attended KIPP between grades 5 and 8. A second regression model included a set of binary "dummy" variables that indicated whether a student attended KIPP for 0 years, 1 year, 2 years, 3 years, or 4 years (where KIPP_0_years is omitted). In this regression analysis, the coefficient for these variables are the key coefficients of interest, as it provides an estimate of how much of an impact the number of years attending a KIPP school had on student achievement (and whether that impact was positive or negative), and whether or not that impact was statistically significant.

For these purposes then, the unstandardized equation for the regression models used in these analyses can be expressed in the following ways:

²³ Because the dataset did not have two years of pre-test data for students in grade 5 during the 2006-07 academic year, 58 of the 180 students in math group and 59 of the 182 students in the literacy group were matched on one year (2005-06) of pre-test data.

Model 1 (KIPP_any): $Y_i = \beta_0 + \beta_1 X_{\text{KIPP_any}} + \beta_2 X_{\text{pre}} + \beta_3 X_{\text{frl}} + \beta_4 X_{\text{minority}} + \beta_5 X_{\text{female}} + e_i$

Model 2 (KIPP_years): $Y_i = \beta_0 + \beta_1 X_{\text{KIPP_years}} + \beta_2 X_{\text{pre}} + \beta_3 X_{\text{frl}} + \beta_4 X_{\text{minority}} + \beta_5 X_{\text{female}} + e_i$

where:

- Y_i is the grade 8 test score (the z-score for the Arkansas Benchmark scaled score) for student i
- β_0 is the intercept
- In Model 1, β_1 is the coefficient for predictor $X_{\text{KIPP_years}}$, a binary variable indicating whether a student entered KIPP at 5th grade and remained in the school for at least one year between grade 5 and grade 8
- In Model 2, β_1 is the coefficient for predictor $X_{\text{KIPP_years}}$, a set of binary “dummy” variables indicating the number of years a student attended KIPP (If a student attended KIPP for one year, $\text{KIPP_1_year} = 1$, if a student attended KIPP for 2 years, $\text{KIPP_2_years} = 1$, and so on)
- β_2 is the coefficient for predictor X_{pre} , a continuous variable representing the test z-score for student i from the grade 5 test administration
- β_3 is the coefficient for predictor X_{test09} , a continuous variable representing the test score for student i from the 2008-09 school year
- β_4 is the coefficient for predictor X_{frl} , a binary variable indicating whether a student was eligible for free or reduced lunch (1 = FRL eligible, 0 = non-FRL eligible)

- β_6 is the coefficient for predictor $X_{minority}$, a binary variable indicating a student's ethnicity (1 = minority (African-American, Asian, Native American, or Hispanic), 0 = non-minority (Caucasian))
- β_7 is the coefficient for predictor X_{female} , a binary variable indicating a student's gender (1 = female, 0 = male)
- e_i is the residual for student i .

Analytic strategy: treatment on treated analyses.

For my TOT analysis of KIPP student performance on the Arkansas Benchmark Exam, I used multiple regression analyses to assess the extent to which continued enrollment in KIPP from grade 5 through grade 8 impacted student achievement (relative to the performance of students in the TPS comparison peer group). In my regression analyses, I controlled for student achievement indicated by the pre-test scores computed by averaging performance from the students' grade 3 and grade 4 test administrations, and dummy indicators for demographic variables such as student FRL status, race, and gender.²⁴ Also included in these regression models was a binary variable that indicated whether a student was a KIPP or TPS comparison student; the coefficient for this variable is the key coefficient of interest in these regression models, as it provides an estimate of how much of an impact KIPP attendance from grade 5 through grade 8 had on student achievement (and whether that impact was positive or negative), and whether or not that impact was statistically significant.

²⁴ Because the dataset did not have two years of pre-test data for students in grade 5 during the 2006-07 academic year, 46 of the 130 students in math group and 42 of the 126 students in the literacy group were matched on one year (2005-06) of pre-test data.

For these purposes then, the unstandardized equation for the regression model used in these analyses can be expressed in the following way:

$$Y_i = \beta_0 + \beta_1 X_{\text{KIPP}} + \beta_2 X_{\text{pre}} + \beta_3 X_{\text{frl}} + \beta_4 X_{\text{minority}} + \beta_5 X_{\text{female}} + e_i$$

where:

- Y_i is the grade 8 test score (the z-score for the Arkansas Benchmark scaled score) for student i
- β_0 is the intercept
- β_1 is the coefficient for predictor X_{KIPP} , a binary variable indicating whether a student was a KIPP or TPS comparison student (1 = KIPP, 0 = TPS comparison student)
- β_2 is the coefficient for predictor X_{pre} , a continuous variable representing the test z-score for student i from the grade 5 test administration
- β_3 is the coefficient for predictor X_{test09} , a continuous variable representing the test score for student i from the 2008-09 school year
- β_4 is the coefficient for predictor X_{frl} , a binary variable indicating whether a student was eligible for free or reduced lunch (1 = FRL eligible, 0 = non-FRL eligible)
- β_6 is the coefficient for predictor X_{minority} , a binary variable indicating a student's ethnicity (1 = minority (African-American, Asian, Native American, or Hispanic), 0 = non-minority (Caucasian))
- β_7 is the coefficient for predictor X_{female} , a binary variable indicating a student's gender (1 = female, 0 = male)
- e_i is the residual for student i .

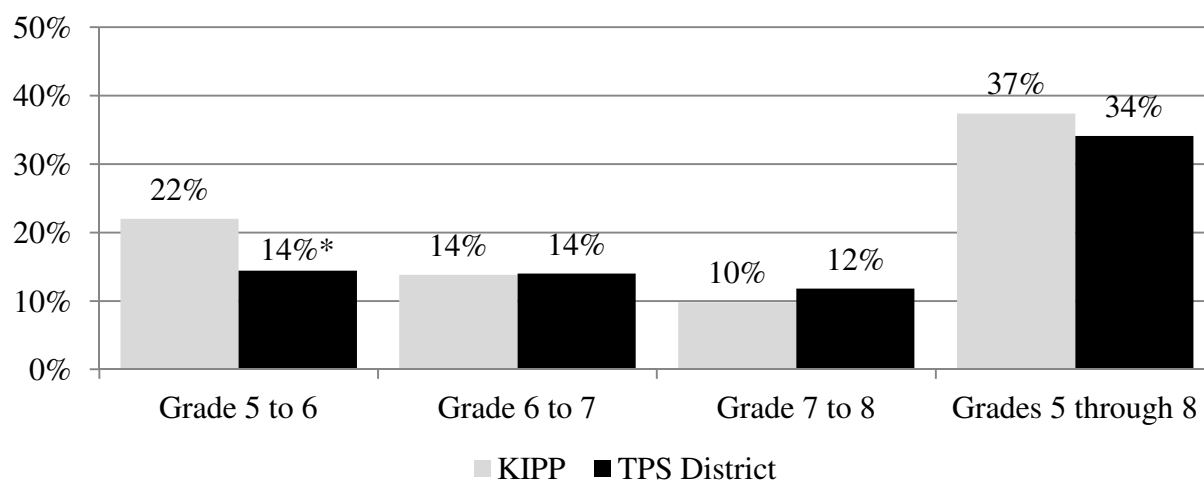
Chapter 5 – Results

Research Question #1: KIPP Attrition

The first question I address is “How many students who enter KIPP as first-time 5th grade students remain in KIPP through their 8th grade year, and to what extent do these attrition rates differ from the public feeder school districts students leave to enroll in KIPP?” To do this, I observed attrition rates for the KIPP study sample as compared to the attrition rates at KIPP to the attrition rates for students in grades 5-8 in the surrounding KIPP TPS feeder districts. These comparisons are listed below in Figure 1.

Figure 1

Attrition Rate Comparisons for KIPP and TPS Feeder Districts



More students attrit from KIPP during the grade 5 to 6 transition than any of the subsequent transition years. However, the attrition rate in the TPS feeder districts appears to be more stable across the transition years, but still with the fewest students exiting the TPS feeder districts at the grade 7 to 8 transition period. Further, I compared the differences between KIPP student attrition and TPS peer attrition using a two-tailed t-test and found that there was only one

transition period (grade 5 to 6) where the KIPP student attrition rate (22 percent) was statistically significantly different than the TPS feeder districts (14 percent, $p < .05$). In fact, by the grade 7 to 8 transition year, though not statistically significantly different, the TPS feeder district attrition rates are higher (12 percent) than KIPP (10 percent).

Finally, I compared the overall attrition rates between these three groups for grades 5 through 8. Overall, the story matches that of the individual grade transition periods: KIPP student attrition rates are statistically significantly higher than their TPS peers, however, there are no observable differences in attrition rates between KIPP students and students in the aggregate TPS feeder districts. Next, I address my second research question examining academic achievement for KIPP students and their TPS peers.

Research Question #2: KIPP achievement

Intent to treat (ITT)

For my second research question, I set out to ask “what impact does enrollment at a KIPP charter school in Arkansas have on student achievement? More specifically, how do KIPP students perform on the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) as compared to a matched comparison group of students from neighboring districts?” In this intent to treat (ITT) model, the KIPP treatment group includes students who were first-time KIPP entrants during 5th grade but remain in the KIPP treatment group regardless of whether they exit to the traditional public school sector, or perhaps another charter school by grade 8. As such, this model does not include students who leave KIPP for the private school sector, or move out of state, because the State Department of Education does not continue to collect data on these students.

To determine how KIPP students performed on the ACTAAP assessments relative to the academically and demographically similar TPS comparison students, I used multiple regression analyses to quantify the overall impact of KIPP in two ways. First, I examined the impact of attending KIPP for any amount of time after first enrolling in the school at grade 5 (KIPP_any). I then ran a second regression, which examined the impact of the number of years spent in KIPP after enrolling in grade 5 (KIPP_years). The parameters of these models are specified in Chapter 4, but the main difference in these analyses is the key coefficient of interest. In the first model, the KIPP_any variable will return a coefficient that can be used to interpret the impact of attending KIPP for any amount of time after enrolling in 5th grade. The coefficient of interest in the second set of ITT analyses (KIPP_years) was the number of years enrolled in KIPP variable, a variable with a range of 0 – 4 indicating how many years between grade 5 and grade 8 the student was enrolled in a KIPP school. My regression models estimate grade 8 achievement on the Arkansas Benchmark Exam while controlling for variables such as prior achievement, gender, and FRL and minority status. Thus, the presence of any enrollment in KIPP, and the number of years of KIPP attendance coefficients provide information about the magnitude and direction of the difference between students in these two groups, and whether or not the difference in performance was statistically significant.

The raw average z-scores of the Arkansas Benchmark Mathematics Exam scaled scores are presented below in Table 21 for both KIPP students who entered KIPP in grade 5 and remained in the dataset through their grade 8 year (regardless of whether they remained in KIPP through grade 8) and their matched peers from the TPS comparison group.

Table 21

KIPP and Comparison Student Performance on the Arkansas Benchmark Exam in Math, First-time KIPP Entrants, Grade 5, Intent to Treat

	N of Students	Avg. Benchmark Pre-test z Score	Pre-test Percentile Rank	Avg. Benchmark Post-test z Score	Post-test Percentile Rank
KIPP Students	90	-0.42	34	-0.15	44
TPS Comparison Students	90	-0.42	34	-0.45	33
Difference		0	0	+0.30	+11

Since z-scores may be more difficult to interpret, I present pre- and post-test scores here as z-scores and percentile ranks. Recall that since the z-score is normed around the state Benchmark exam-taking population, these percentile ranks are essentially an “Arkansas percentile rank.” Student performance on the math benchmark exam increased by nearly one-third of a standard deviation from the grade 4 baseline to the grade 8 outcome year for students who were first time grade 5 KIPP entrants, but the difference in math z-scores between these KIPP students and their TPS comparison peers was 0.30, a difference of nearly 1/3 SD in favor of KIPP. Put another way, KIPP students moved from the 34th percentile to the 44th percentile from grade 5 to grade 8 while their TPS peers actually dropped from the 34th percentile to the 33rd. At the grade 8 outcome year, KIPP students showed a net gain of 10 percentile points on the Arkansas Benchmark Exam in math. It should be noted here that these 90 students include first time grade 5 KIPP entrants who may not have been enrolled at KIPP by the grade eight year, thus, this percentile point gain also includes students who only had “some” KIPP treatment.

Further, since policymakers and educators are interested in year by year academic performance, graphical representations of KIPP and TPS student grade- by grade performance on

the math benchmark exam is shown in two ways. First, Figure 2 shows KIPP and TPS student performance on the math benchmark exam as represented by z-scores. Second, because educators often present district, school, and student performance according to the percent of students meeting academic proficiency levels, Figure 3 shows the percent of KIPP and TPS students scoring at the proficient level on the math benchmark exam for each grade level (5-8).

Figure 2

Average z-Scores for KIPP and TPS Students on the Math Benchmark Exam, Grade 5 Through 8, Intent to Treat

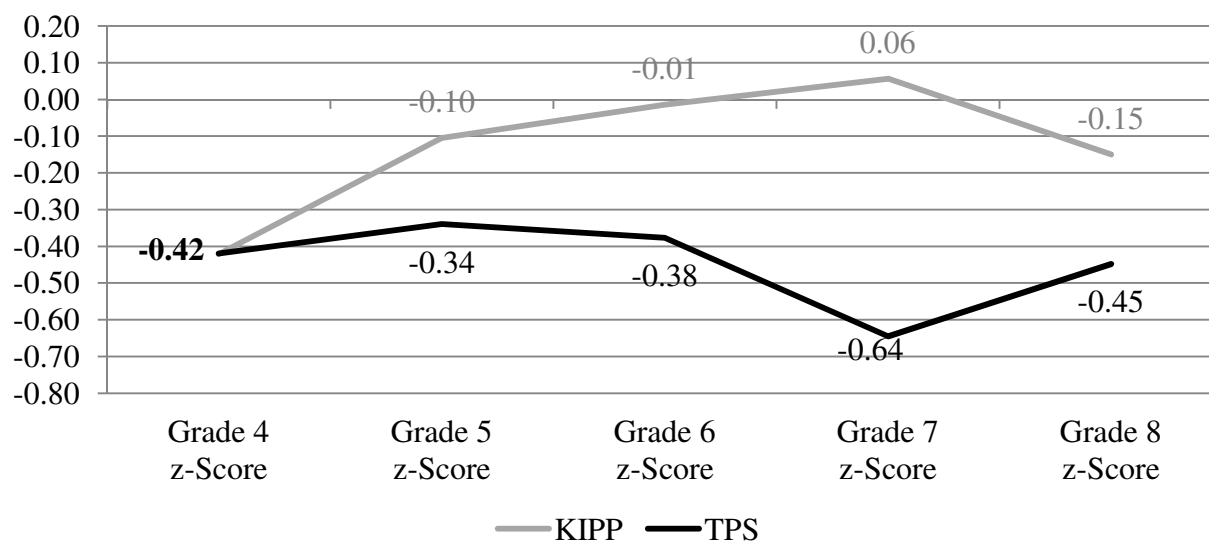
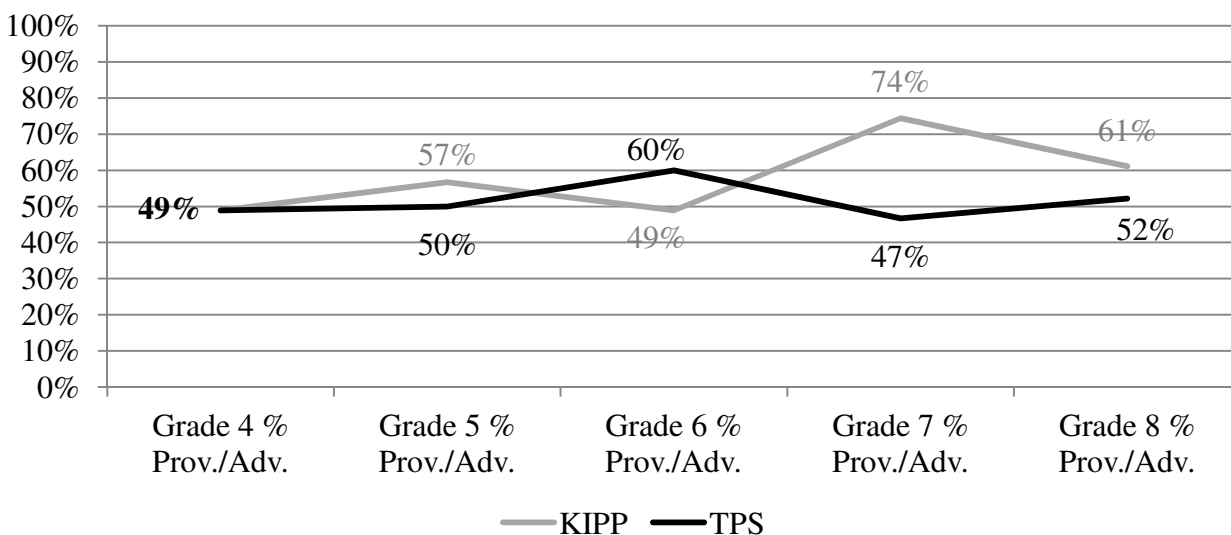


Figure 3

Percent of KIPP and TPS Students Scoring Proficient or Advanced on the Math Benchmark Exam, Grade 5 Through 8, Intent to Treat



When performance is represented in average z-scores, KIPP student consistently outperform their TPS peers on the math benchmark exam. However, when performance is represented using the percent scoring at the proficient or advanced level, the graphs differ. For example, more KIPP students scored at the proficient or advanced levels at each grade level on the math benchmark as compared to the TPS students with the exception of grade 6. This difference may stem from the arbitrary cutoff scores set by the state of Arkansas to determine proficiency levels on the math benchmark exam. However, by grade 8, KIPP students are outperforming their TPS peers with 61% of KIPP students scoring at the proficient on the math benchmark exam, as compared to 52% of their TPS peers.

The raw average z-scores of the Arkansas Benchmark Literacy Exam scaled scores are presented below in Table 22 for both KIPP students who entered KIPP in grade 5 and remained

in the dataset through their grade 8 year (regardless of whether they remained in KIPP through grade 8) and their matched peers from the TPS comparison group.

Table 22

KIPP and Comparison Student Performance on the Arkansas Benchmark Exam in Literacy, First-time KIPP Entrants, Grade 5, Intent to Treat

	N of Students	Avg. Benchmark Pre-test z Score	Pre-test Percentile Rank	Avg. Benchmark Post-test z Score	Post-test Percentile Rank
KIPP Students	91	-0.18	43	0.13	55
TPS Comparison Students	91	-0.18	43	-0.08	47
Difference		0.00	0	+0.21	+9

There appears to be similar growth in math performance on the literacy Benchmark exam. The difference in literacy z-scores between first-time grade 5 KIPP entrants and their TPS comparison peers was 0.21 of a standard deviation difference, or nine percentile points in favor of KIPP. Again, grade by grade performance on the literacy benchmark is presented in two ways: average z-score at each grade level (Figure 4) and percent scoring at the proficient or advanced level (Figure 5).

Figure 4

Average z-Scores for KIPP and TPS Students on the Literacy Benchmark Exam, Grade 5

Through 8, Intent to Treat

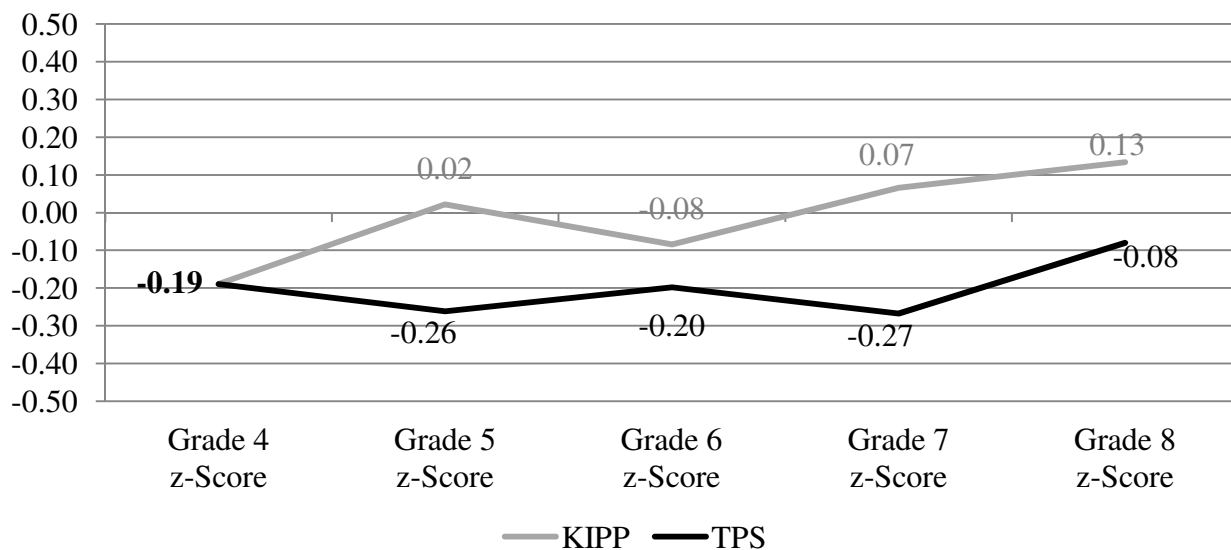
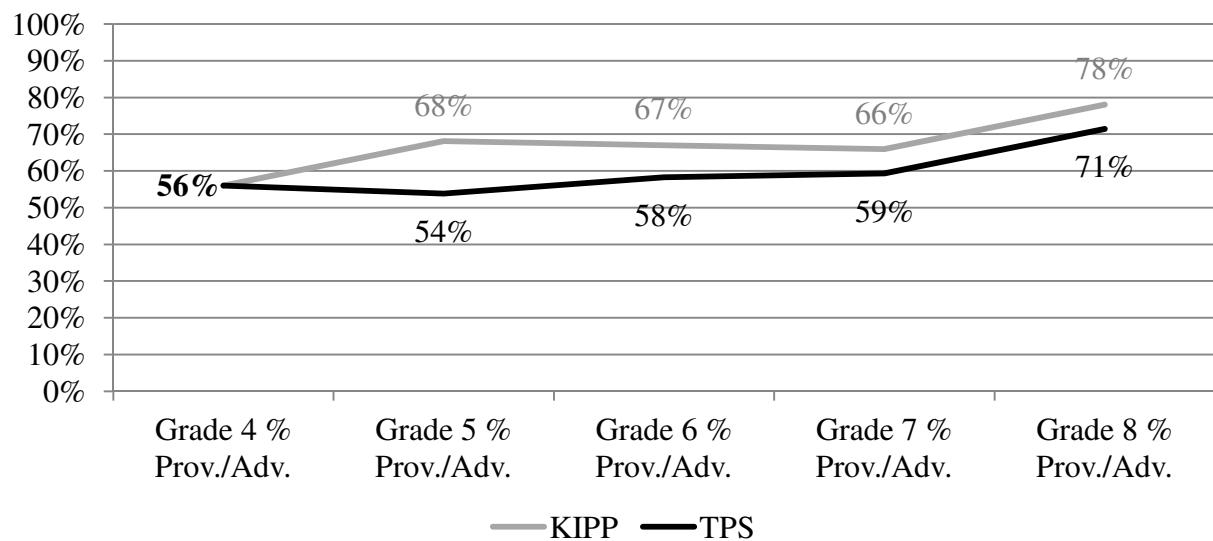


Figure 5

Percent of KIPP and TPS Students Scoring Proficient or Advanced on the Literacy Benchmark

Exam, Grade 5 Through 8, Intent to Treat



The line graphs showing performance on the literacy benchmark exam as represented by z-scores (Figure 4) and the percent of students scoring at the proficient or advanced level (Figure 5) are more similar than the figures depicting math performance in the intent to treat condition. In both figures, KIPP students are consistently outperforming their TPS peers at each grade level (5-8). By grade 8, 78% of the KIPP students in the intent to treat sample are performing at the proficient or advanced level on the literacy benchmark exam, as compared to 71% of their TPS peers. While these unadjusted results suggest that first-time grade 5 KIPP entrants benefit from having attended KIPP during any time between grade 5 through grade 8, I conducted multiple regression analyses as a more powerful way of determining if real differences did exist between KIPP students and their TPS peers.

The estimated regression coefficients and standard errors for all of the variables included in my math and literacy treatment on treated regression analyses are presented in Table 23. For the KIPP_any analyses (far left column), the combination of predictor variables for the math analysis was significantly related to my outcome variable (grade 8 math score on the Arkansas Benchmark Exam), adjusted $R^2 = .501$, $F(5, 174) = 37.00$, $p < .001$. The same was true for my KIPP_years analyses (second column from left), adjusted $R^2 = .506$, $F(8, 171) = 23.89$, $p < .001$.

The results of the KIPP_any analysis shows that, while holding constant a student's grade 4 math Benchmark test performance, gender, and FRL status, minority status and variable indicating enrollment in KIPP for any number of years between grade 5 and grade 8, there were significant differences on grade 8 math Benchmark performance in favor of KIPP students. The KIPP_any coefficient in the math analyses (.27) seems to fit with the raw averages observed above (raw post math z-score = .30). However, when looking at the impact of KIPP on math Benchmark performance holding constant variables for the number of years enrolled at KIPP,

there were only significant differences on grade 8 math Benchmark performance in favor of KIPP students who enrolled in the school at grade 5 and remained enrolled at KIPP through grade 8.

The results of these analyses suggest two things. When observed altogether, regardless of the number of years enrolled in KIPP, first time KIPP entrants at grade 5 that remained enrolled at KIPP for any period of time through grade 8 will earn higher scores on the Arkansas Benchmark Exam in grade 8 math than they would have had they never enrolled in KIPP. However, when students are binned according to the number of years spent in KIPP after enrolling in grade five, only those students who remained enrolled through grade 8 earn higher scores on the math Benchmark exam.

The combination of predictor variables for the literacy analysis was significantly related to my outcome variable (grade 8 literacy score on the Arkansas Benchmark Exam), for both the KIPP_any analysis, $R^2 = .407$, $F(5, 176) = 25.85$, $p < .001$ and the KIPP_years analysis, adjusted $R^2 = .424$, $F(8, 173) = 17.62$, $p < .001$. Similar to the math analyses, the results again suggest when observed altogether, regardless of the number of years enrolled in KIPP, first time KIPP entrants at grade 5 that remained enrolled at KIPP for any period of time through grade 8 will earn higher scores on the Arkansas Benchmark Exam in grade 8 literacy than they would have had they never enrolled in KIPP. Again, note that the KIPP_any coefficient for literacy (.22) is very close to the raw mean post-test score observed above (.21). Finally, when students are binned according to the number of years spent in KIPP after enrolling in grade five, only those students who remained enrolled through grade 8 earn statistically significantly higher scores on the math Benchmark exam. Thus, the overall results are driven largely by the students who remain in KIPP through grade 8.

Table 23

Arkansas Benchmark Exam Results in Math and Literacy, Grade 8, Intent to Treat

	Grade 8 Benchmark Math z Score (KIPP_any)	Grade 8 Benchmark Math z Score (KIPP_years)	Grade 8 Benchmark Literacy z Score (KIPP_any)	Grade 8 Benchmark Literacy z Score (KIPP_years)
Grade 4 Benchmark Math z Score	0.77** (0.06)	0.77** (0.06)	0.61** (0.06)	0.61** (0.06)
KIPP_Any (N= 90, 91)	0.27** (0.10)	xx xx	0.22* (0.09)	xx xx
KIPP 4 Years (N= 65, 63)	xx xx	0.35** (0.10)	xx xx	0.32** (0.10)
KIPP 3 Years (N=4, 7)	xx xx	0.21 (0.31)	xx xx	0.34 (0.24)
KIPP 2 Years (N=7, 7)	xx xx	-0.05 (0.24)	xx xx	0.06 (0.23)
KIPP 1 Year (N=14, 14)	xx xx	0.08 (0.18)	xx xx	-0.16 (0.17)
Grade 4 FRL Status	0.26 (0.28)	0.29 (0.28)	0.53 (0.37)	0.63 (0.37)
Minority	0.17 (0.16)	0.15 (0.16)	-0.41 (0.37)	-0.45 (0.37)
Female	0.05 (0.10)	0.03 (0.10)	0.07 (0.09)	0.04 (0.09)
Constant	-0.55	-0.55	-0.13	-0.17
Comparison Group Outcome Mean	-0.45	-0.45	-0.08	-0.08
Comparison Group SD	0.84	0.84	0.08	0.80
Adjusted R-Squared	0.50	0.50	0.41	0.42
Regression N	180	180	182	182

Omitted variables: KIPP 0 Years

* $p < .05$, ** $p < .01$ (standard errors in parentheses)

N's in parenthesis are for math sample, then literacy sample

Treatment on treated (TOT)

To determine how KIPP students performed on the ACTAAP assessments relative to the academically and demographically similar TPS comparison students, I used multiple regression

analyses to quantify the overall impact that attending a KIPP school from grade 5 through grade 8 had on student achievement. The parameters of the model are specified in Chapter 4, but for these purposes, the key coefficient of interest was the “KIPP attendance” variable, a binary variable that indicated whether or not a student attended KIPP from grade 5 through grade 8 (1) or was TPS comparison student (0). My regression model estimates grade 8 achievement on the Arkansas Benchmark Exam while controlling for variables such as prior achievement, gender, and FRL and minority status. Thus, the KIPP attendance coefficient provides information about the magnitude and direction of the difference between students in these two groups, and whether or not the difference in performance was statistically significant.

The raw average z-scores of the Arkansas Benchmark Mathematics and Literacy Exams scaled scores are presented below in Tables 24 and 25, respectively, for both KIPP students who entered KIPP in grade 5 and remained in KIPP through their grade 8 year and their matched peers from the TPS comparison group.

Table 24

KIPP and Comparison Student Performance on the Arkansas Benchmark Exam in Math, Grade 5 to Grade 8, Treatment on Treated

	N of Students	Avg. Benchmark Pre-test z Score	Pre-test Percentile Rank	Avg. Benchmark Post-test z Score	Post-test Percentile Rank
KIPP Students	65	-0.36	36	-0.03	49
TPS Comparison Students	65	-0.36	36	-0.39	35
Difference		0.00	0	+0.36	+14

Not only did KIPP student performance on the math benchmark exam increase by nearly one-third of a standard deviation (or from the 36th percentile to the 49th percentile) from the

grade 4 baseline to the grade 8 outcome year, but the difference in math z-scores between KIPP students and their TPS comparison peers was 0.36, that is, a difference of nearly 1/3 of a standard deviation (SD) in favor of KIPP (or a net gain of 14 percentile points). These results are predictable considering the gains reported for the intent to treat condition (which included those students that did not remain in a KIPP school through their eighth grade year) that showed an 11 percentile point gain on the math benchmark exam.

Similar to the ITT analyses above, I analyzed grade by grade performance in terms of average z-score (Figure 6) and percent of students scoring at the proficient or advanced level (Figure 7) on the benchmark exams.

Figure 6

Average z-Scores for KIPP and TPS Students on the Math Benchmark Exam, Grade 5 Through 8, Treatment on Treated

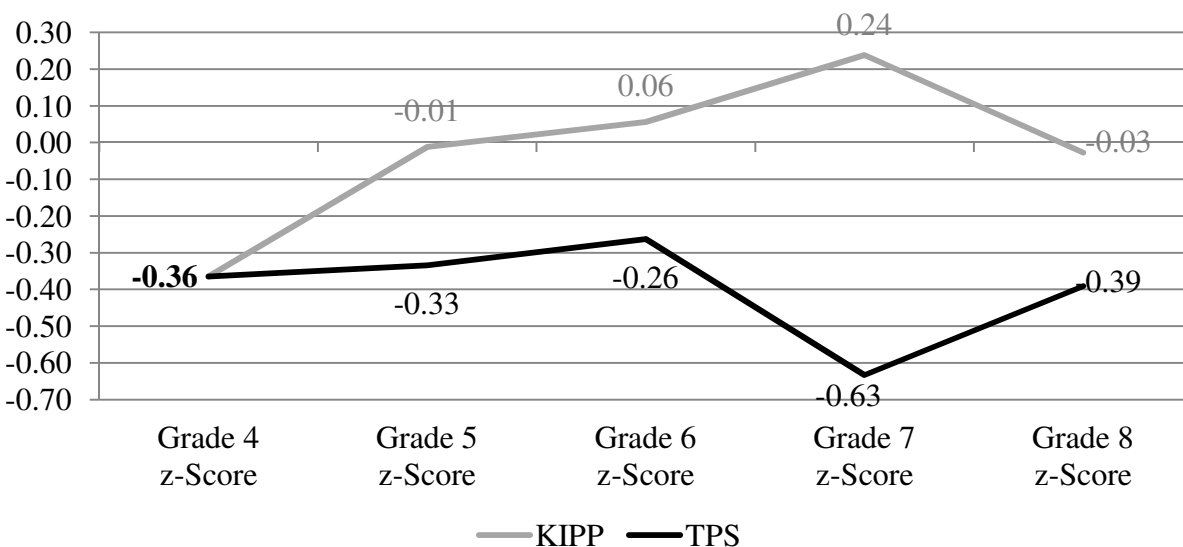
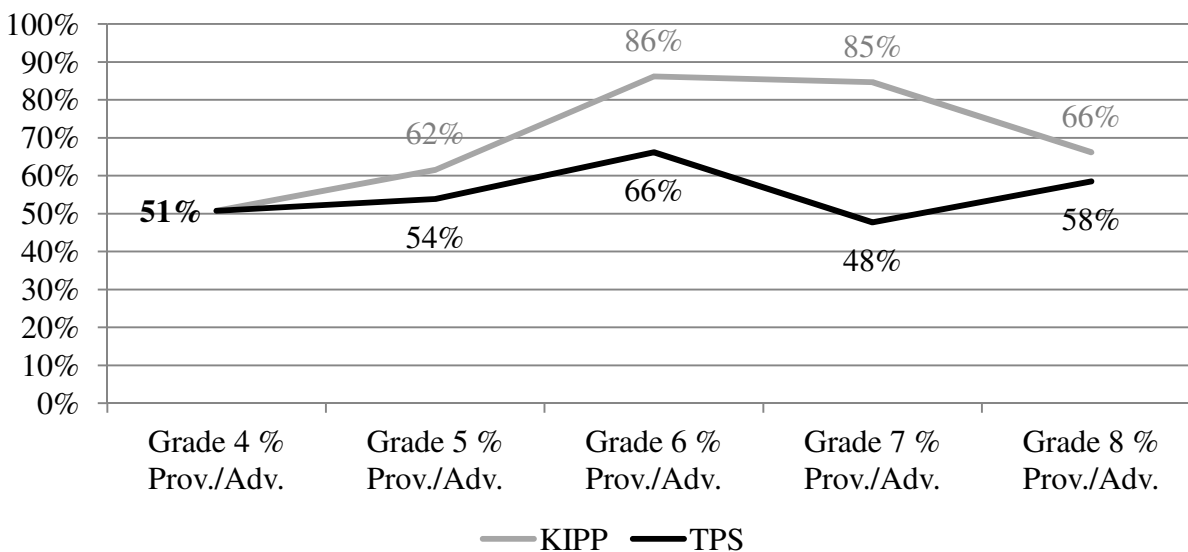


Figure 7

Percent of KIPP and TPS Students Scoring Proficient or Advanced on the Math Benchmark

Exam, Grade 5 Through 8, Treatment on Treated



First time grade 5 KIPP entrants who remain enrolled at KIPP through their eighth grade year consistently outperform their TPS peers on the math benchmark exam at each grade level. Unlike the pattern for math in the ITT analysis, the patterns of each line graph look similar with the largest performance gaps occurring at the grade 7 and grade 7 years. At each grade level, more KIPP students scored at the proficient or advanced level on the math benchmark as compared to their TPS peers. Further, both KIPP and TPS peer students saw higher achievement on the math benchmark in each successive grade, until grade 7 when KIPP regressed one percentage point from 86% proficient or advanced to 85% and the TPS peers dropped from 66% scoring proficient or advanced on the math benchmark in grade 6 to 48% in grade 7. Despite a further drop in performance in KIPP from grade 7 to grade 8 (85% proficient or advanced on the

math benchmark to 66%), there were still more KIPP students scoring at the proficient or advanced level at the grade 8 outcome year (66%) as compared to their TPS peers (58%).

The raw average z-scores of the Arkansas Benchmark Mathematics Exam scaled scores are presented below in Table 25 for both KIPP students who entered KIPP in grade 5 and remained in KIPP through their grade 8 year and their matched peers from the TPS comparison group.

Table 25

KIPP and Comparison Student Performance on the Arkansas Benchmark Exam in Literacy, Grade 5 to Grade 8, Treatment on Treated

	N of Students	Avg. Benchmark Pre-test z Score	Pre-test Percentile Rank	Avg. Benchmark Pre-test z Score	Post-test Percentile Rank
KIPP Students	63	-0.11	46	0.28	61
TPS Comparison Students	63	-0.11	46	-0.02	49
Difference		0.00	0	+0.30	+12

Similar to math performance, KIPP student performance on the literacy benchmark exam increased by nearly one-third of a standard deviation from the grade 4 baseline to the grade 8 outcome year (or grew from the 46th percentile to the 61st). Further, the difference in literacy z-scores between KIPP students and their TPS comparison peers was 0.30, a difference of nearly 1/3 SD in favor of KIPP (and a 12 percentile point gain from grade 5 to grade 8). Again, we would expect to see such gains from those first time grade 5 KIPP entrants who remained in KIPP through grade 8 as we also saw a nine (9) percentile point gain on the literacy benchmark for KIPP students in the intent to treat analysis...which included those first time grade 5 KIPP entrants who did not remain in KIPP through the eighth grade.

Again, grade by grade performance on the literacy benchmark is presented in two ways: average z-score at each grade level (Figure 8) and percent scoring at the proficient or advanced level (Figure 9).

Figure 8

Average z-Scores for KIPP and TPS Students on the Math Benchmark Exam, Grade 5 Through 8, Treatment on Treated

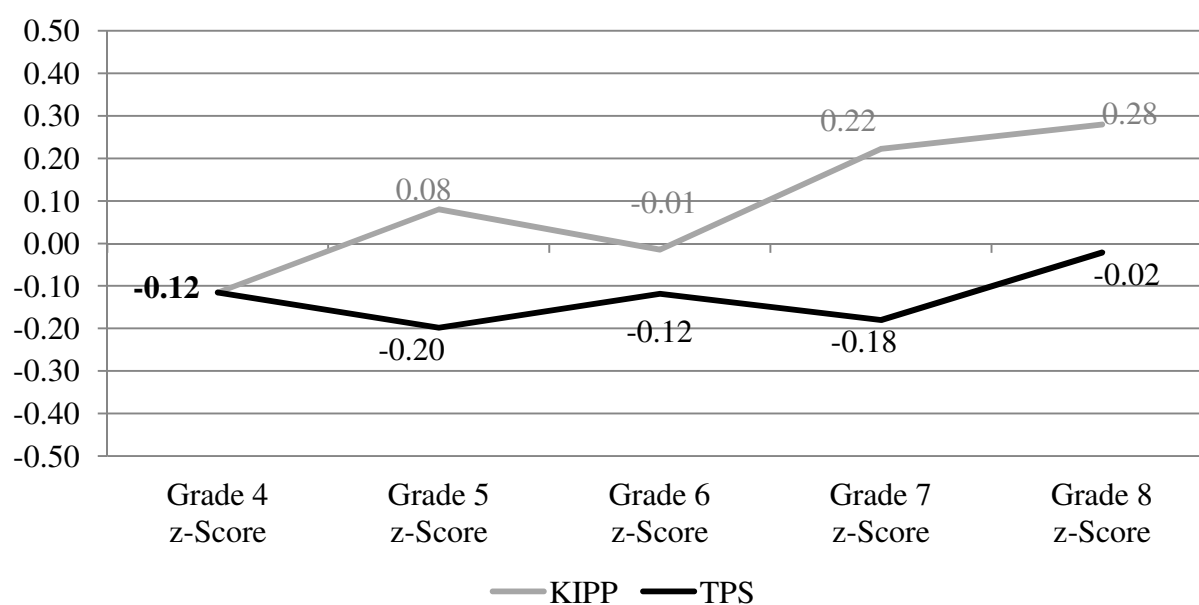
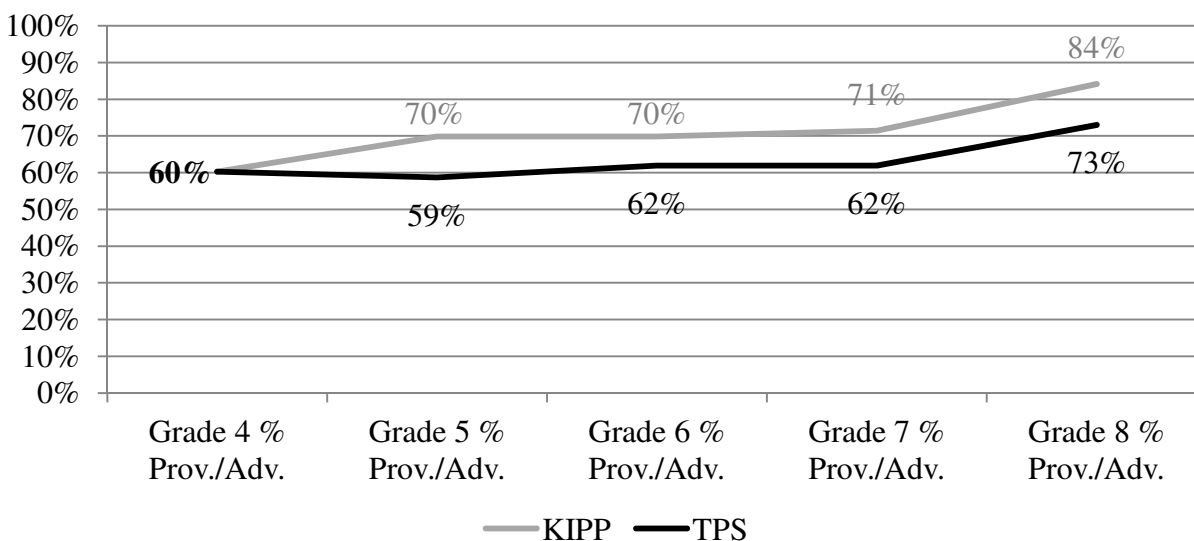


Figure 9

Percent of KIPP and TPS Students Scoring Proficient or Advanced on the Literacy Benchmark Exam, Grade 5 Through 8, Treatment on Treated



The line graph patterns between average z-score performance on the literacy benchmark exam and the percent of students scoring at the proficient or advanced level look relatively similar, with KIPP students outperforming their TPS peers at each grade level. More KIPP students (84%) scored at the proficient or advanced level on the literacy benchmark exam than their TPS peers (73%) at each grade level (5 through 8). Both KIPP and TPS student performance remained relatively flat until grade 8.

Again, however, since these results suggesting that students benefit from attending KIPP from grade 5 through grade 8 are unadjusted, I conducted multiple regression analyses as a more powerful way of determining if real differences did exist between Benchmark exam literacy scores of KIPP students and their TPS peers.

The estimated regression coefficients and standard errors for all of the variables included in my math and literacy treatment on treated (TOT) regression analyses are presented in Table 26. The combination of predictor variables for the math analysis was significantly related to my outcome variable (grade 8 math score on the Arkansas Benchmark Exam), adjusted $R^2 = .498$, $F(5, 124) = 26.63$, $p < .001$. The results of this analysis shows that, while holding constant a student's grade 3 and 4 math Benchmark test performance, gender, and FRL status, and minority status, there were significant differences on grade 8 math Benchmark performance in favor of KIPP students, suggesting that students who began attending KIPP during 5th grade will earn higher scores on the Arkansas Benchmark Exam in math than they would have had they never enrolled in KIPP. Further, as was noted above, the raw literacy outcome mean difference (.36) looks similar to the KIPP treatment coefficient from the regression (.34).

The combination of predictor variables for the math analysis was also significantly related to my outcome variable (grade 8 literacy score on the Arkansas Benchmark Exam), adjusted $R^2 = .336$, $F(5, 120) = 13.66$, $p < .001$. The results of this analysis shows that, while holding constant a student's grade 4 literacy Benchmark test performance, gender, and FRL status, and minority status, there were significant differences on grade 8 math Benchmark performance in favor of KIPP students, suggesting that students who began attending KIPP during 5th grade will earn higher scores on the Arkansas Benchmark Exam in literacy than they would have had they never enrolled in KIPP. The KIPP coefficient in literacy (.29) also follows the story seen in the raw mean post-test z score growth (.30). Again, these results are consistent with the coefficients reported in the ITT analyses above. Since the ITT analyses include students who left KIPP before grade 8, the coefficients for math (.27) and literacy (.22) are both smaller

than what was found in the TOT analyses, however both analyses revealed that KIPP students are achieving at statistically significantly higher levels than their TPS peers.

Table 26

Arkansas Benchmark Exam Results in Math and Literacy, Grade 8, Treatment on Treated

	Grade 8 Benchmark Math z Score	Grade 8 Benchmark Literacy z Score
KIPP	0.34** (0.12)	0.29* (0.11)
Grade 4 Benchmark Math z Score	0.82** (0.08)	0.61** (0.08)
Grade 4 FRL Status	0.27 (0.29)	0.55 (0.51)
Minority	0.16 (0.20)	-0.41 (0.51)
Female	-0.05 (0.12)	0.08 (0.12)
Constant	-0.45	-0.14
Comparison Group Outcome Mean	-0.39	-0.02
Comparison Group SD	0.88	0.78
Adjusted R-Squared	0.50	0.34
Regression N	130	126

*p< .05, **p<.01 (standard errors in parentheses)

Summary of Results

In summary, with regard to student attrition and achievement at KIPP: DCPS as compared to their TPS feeder district peers:

- KIPP student attrition rates are statistically significantly higher than the set of academically and demographically matched peers from the traditional public school (TPS) feeder districts, with the largest differences observed at the grade 5 to grade 6 transition year. However, when KIPP attrition is compared to the

aggregated TPS attrition rates from grades 5 through 8, only the grade 5 to 6 transition year attrition rates are statistically significantly different.

- Students who enroll in KIPP during grade 5 and spend at least one year in the charter school from grade 5 through grade 8 statistically significantly outperform their traditional public school peers on the Arkansas Benchmark Exams in math and literacy.
- Of first time grade 5 KIPP entrants that binned together by the number of years they stay in KIPP, only those students who remain enrolled through grade 8 show statistically significant positive differences in math and literacy achievement as measured by the Arkansas Benchmark Exam as compared to their matched TPS peers.
- A subset of first time grade 5 KIPP entrants that remained enrolled in the charter school through grade 8 statistically significantly outperformed their matched TPS peers on the Arkansas Benchmark Exams in math and literacy.

These results are mostly consistent with those found in the charter school literature earlier in this document. For example, KIPP attrition rates look high in isolation, however compared to the traditional public school attrition rates that account for students who move out of the school district or move to another school within the district, attrition looks relatively similar to that of the TPS feeder districts. The results examining KIPP impacts according to the number of years spent attending the charter school are also consistent with prior research showing little or no impact on student achievement among charter school attendees within the first 3-5 years of enrollment in a charter school. With regard to KIPP, the continued enrollment of first time

entrants in grade 5 who remain through grade 8 yield significant positive achievement outcomes.

Potential explanations for these findings will be discussed in the following chapter.

Chapter 6 – Discussion

In 2002, the Knowledge Is Power Program (KIPP) charter school network opened KIPP: Delta Collegiate Preparatory School (KIPP: DCPS) in Helena/West-Helena, Arkansas enrolling an inaugural 5th grade class of sixty-five students. Each successive year, as the new 5th grade class of students matriculated to the next grade, a new class of first-time KIPP students entered 5th grade. As of the 2012-13 academic year, the KIPP network in Arkansas was operating 4 schools: KIPP: Delta Elementary Literacy Academy serving 360 students in grades K-4; KIPP: Delta Collegiate Preparatory School serving 320 students in grades 5-8; and a KIPP: Delta Collegiate High School serving 247 students in grades 9-12. In the summer of 2010, the KIPP charter school network opened a new middle school 134 miles north of Helena/West-Helena in Blytheville, Arkansas, with an inaugural 5th grade class of 63 students. By the 2012-13 academic year, KIPP Blytheville Collegiate Preparatory School (BCPS), was serving 234 students in grades 4-7.

Utilizing a “no-excuses” charter school model, the KIPP schools in Arkansas feature an extended school year, an extended school day, summer school, and once-per-month Saturday “field lessons” where students work on projects outside of the classroom. Each academic year culminates with end of year “class trips” to locations outside of the Arkansas Delta – an opportunity many of the students from this region will not have the opportunity to do. Finally, the KIPP charter school network in Arkansas and across the nation operate under a simple, four-word motto: “Work hard. Be nice.”

This dissertation represents an evaluation of how student achievement changed as a result of enrolling at KIPP: DCPS for the first time in 5th grade in either the 2006-07, 2007-08, or 2008-09 academic years and remaining in KIPP – or an Arkansas traditional public or other

charter school through grade 8. For these purposes, my evaluation of the impact of attending KIPP: DCPS focused on the following research question and sub-questions:

1. Attrition Impacts: How many students who enter KIPP as first-time 5th grade students remain in KIPP through their 8th grade year, and to what extent do these attrition rates differ from the public feeder school districts students leave to enroll in KIPP?
2. Achievement Impacts: What impact does enrollment at a KIPP charter school in Arkansas have on student achievement? More specifically, how do KIPP students perform on the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) as compared to a matched comparison group of students from neighboring districts?

Attrition Summary

The focus of the attrition analyses was to determine whether KIPP students are leaving at higher rates than students in the traditional public schools. I discovered statistically significantly higher rates of attrition for the KIPP students as compared to a set of academically and demographically matched peers from the traditional public school districts (TPS) and each grade transition level (i.e., grade 5 to 6, grade 6 to 7, and grade 7 to 8), and cumulatively from grades 5 through 8. However, when comparing the attrition rates of first time grade 5 KIPP entrants with an aggregated group of all TPS feeder school students from grades 5 through 8, the only statistically significant observable difference is at the grade 5 to 6 transition, the transition year with the highest attrition rate at KIPP. Attrition rates during the grade 6 to 7 and grade 7 to 8 transition years, as well as cumulatively from grades 5 through 8 are no different for KIPP or the TPS feeder school districts. The latter finding is consistent with prior research identified in the literature review (Nichols-Barrer, et al, 2012).

One potential explanation for this is that students (and parents of these students) who select into KIPP may have a predisposition to be mobile as they searching for the best educational option in their region. As noted earlier, the TPS matches had substantially higher proficiency rates than the Helena/West Helena school district, Southeastern Arkansas region, and state as a whole. Thus, if these students are already succeeding in their traditional public school district, they, or their parents may see little reason to seek educational choice options, unlike the students at KIPP. Thus, it is possible that the comparison to the broader group of students in the TPS feeder districts, who do not feel that their current school is providing a sufficient education is more appropriate, since both groups of students are seeking the best education option. As such, the KIPP attrition rates so often highlighted in previous research (i.e., Miron, 2010) may not be as large of an issue when proper comparisons are made with regard to attrition rates.

Yet, the attrition analyses presented above are not perfect because there is a mismatch in grad conventions at the traditional public schools, which may present issues with this type or comparison. For example, KIPP:DCPS, which is classified as a “middle school” serves grades 5-8. However, no other “middle school” in the surrounding TPS feeder districts employ this same grade convention in their middle schools. Indeed, many of the surrounding district schools serve grades k-6 in their “elementary schools,” grades 7 and 8 in their “middle schools” and grades 9-12 in their “high schools.” As such, there is a “structured transition” between grades 6 and 7 which could cause issues not only related to student achievement, but also mobility. For example, after a student has been enrolled in the same school for 7 years (k-6) the transition to a new school culture may be so negative that the student leaves the school in search of an educational option more consistent with his or her needs.

Yet even the option to switch schools in the surrounding TPS feeder districts was not always possible in those TPS districts represented in this study. In fact, the Helena/West Helena school district was the only district that contained multiple elementary schools (all serving students in a grade k-6 convention). As such, this may be a reason for the higher mobility rates in this region. Still, I tried to account for these issues by observing attrition in the TPS feeder districts at each grade level, taking into consideration the structured transitions from grade 7 to 8. Though it is not perfect, it still presents the best possible comparison given the TPS school grade conventions being mismatched with that of KIPP.

Achievement Summary

The focus of this evaluation was determining how student achievement was affected as a result of attending KIPP for the first time in grade 5. To accomplish this, I analyzed student performance in two ways. First, I compared student performance on the Arkansas Benchmark Exams in math and literacy between students who were first-time KIPP entrants at grade 5 and remained enrolled at KIPP through grade 8 with a matched comparison group of traditional public school (TPS) peer students. I also compared Benchmark exam performance between first-time KIPP entrants at grade 5 who had grade 8 outcome data, but may not have been enrolled in KIPP during grade 8 with this matched comparison group. The TPS peer comparison group, was comprised of students in neighboring school districts who were matched to KIPP students based on observable demographic and academic characteristics. By using this matched group of students as the counterfactual condition, I could determine the extent to which attendance at KIPP impacted student achievement, since the only observable difference between these two groups of students was that KIPP students attended a school based on the “no-excuses” model, whereas TPS comparison peer students did not.

However, no discussion of charter school impacts would be complete without noting potential selection effects. That is, to what extent are the differences in student achievement better attributable unobservable characteristics, primarily, student motivation. For example, the choice to attend a charter school relies on 1) having access to the information that the charter school option exists; and 2) having the motivation to exit the traditional public school system to attend a charter school. Despite utilizing a TPS peer group with identical baseline academic performance variables, and then controlling for demographic variables in my analyses, the argument can still be made that the students who attend KIPP were inherently different because they elected to exit the traditional public school sector and exercise school choice. However, absent a randomized control trial evaluating performance between students who were “lotteried-in” to a charter school versus those who applied, but were “lotteried-out” and continued attending traditional public school, I am unable to completely account for this selection bias. In fact, when KIPP Blytheville Collegiate Public School (KIPP: BCPS) conducted their lottery in the spring of 2010, the 60 students (out of 120 applicants) who were initially lotteried-in elected to not attend the charter school after meeting with school leaders and learning what was required upon admission into the school. In the end, KIPP: BCPS would make admission offers to all 120 students who applied. Half of the total number of applicants elected not to attend the school after meeting with school leaders. As such, the concerns with regard to selection bias are not absent in this evaluation. However, in a matched comparison group design, such as the one employed in this evaluation, matching on pre-KIPP-attendance academic ability is the strongest control available to combat selection bias. Thus, the above results should be interpreted while considering the potential selection impacts.

The results of my analyses of student achievement revealed a consistent trend. KIPP students who enter at grade 5 and remain enrolled in KIPP through grade 8 outperformed their academically and demographically matched peers on the grade 8 Arkansas Benchmark Exams in math and literacy. Because I could make inferences about the impact of attending KIPP based on these analyses of Arkansas benchmark Exam performance, a reasonable conclusion from these analyses is that attendance at KIPP: DCPS from grade 5 through grade 8 had a positive impact on student achievement in math and literacy. However, these same impacts are not observed for first time grade 5 KIPP entrants who are binned together in groups according to the number of years spent in KIPP, that exit prior to grade 8 (or for students who never attend KIPP).

In general, these findings are consistent with other evaluations of charter school impacts on student achievement. In my literature review, I identified five charter school impact studies that showed more positive impacts on academic achievement for students who remained in a charter school for multiple years (Eberts & Hollenbeck, 2002; Booker et. al., 2004; Bifulco & Ladd, 2006; Sass, 2006; & CREDO, 2009) or more specifically, in a KIPP charter school (Angrist, et. al., 2010). My analyses of student performance on the Arkansas Benchmark Exams appears to support these findings, as KIPP students who remained in KIPP over time performed significantly better than TPS comparison peer students in math and literacy.

When taken together, it appears that consistent attendance at KIPP results in significant, positive performance differences in math and literacy achievement as compared to academically and demographically similar students who never attend KIPP. Because KIPP: DCPS is located in rural Arkansas, the surrounding feeder districts do not boast large student enrollments, already limiting my ability to select students who not only had similar academic and demographic characteristics from grade 4 (where the matching would occur) through grade 8. In addition,

since the Arkansas Delta is in an economically depressed area of the state, with high mobility rate, the pool of potential matches is further limited

Recommendations & Conclusions

The results of this evaluation revealed several areas in which additional research would be beneficial to provide further clarity about how student performance is impacted by attending a KIPP school. For example, because the statewide dataset used for this evaluation only contains student-level academic data from the 2005-06 through the 2011-12 academic years, I was limited to one unique cohort containing three groups of KIPP students who enrolled in KIPP in grade 5 in either the 2006-07, 2007-08, or 2008-09 academic year and would have reached grade 8 in 2009-10, 2010-11, and 2011-12, respectively. However, once student level data for the 2012-13 academic year is obtained, it will be possible to observe a unique set of first-time KIPP entrants who are in grade 5 during the 2009-10 academic year and grade 8 during the 2012-13 academic year. Indeed, it would have been possible to observe performance among first-time grade 5 KIPP entrants from 2009-10 with TPS comparison peers on observed academic performance in grade 7, but since KIPP: DCPS is a grade 5-8 school, it felt more natural to consider performance as a result of matriculating through all grade levels within the KIPP school.

Lastly, the most beneficial recommendation for further study of KIPP impacts is to continue seeking opportunities to observe performance differences between KIPP school attendees and TPS peers developed through randomized control trials resulting from KIPP lotteries. This “gold standard” noted by Hoxby (2009) represents the strongest evaluation design by producing results that should be generally free of the issue of selection bias. Indeed, had the KIPP: BCPS lottery not failed, a randomized control trial design could have been utilized to evaluate KIPP student performance absent concerns of selection noted earlier in this document.

Despite some of the limitations of this evaluation, there were indications in this research suggesting that academic differences do exist between KIPP students who entered KIPP in grade 5 and remained through grade 8 and their TPS comparison peers on grade 8 performance measures. Thus, it is reasonable to hypothesize that attending a KIPP school between grade 5 and grade 8 could result in significant positive impacts in math and literacy achievement by the time the students' reach grade 8. In addition, the results noted in this evaluation may be more impactful since performance differences are presented after multiple years of attending a KIPP school, rather than a single-year, single-cohort study that may be biased by a single test administration at a single outcome year.

In the end, this evaluation revealed a great deal of information about how KIPP student achievement in Arkansas compares to academically and demographically similar peers on academic measures of math and literacy. As such, the decision to enact an Arkansas law that does not limit the number of KIPP charter schools permitted to operate in the state can be further evaluated and/or addressed with the addition of these results. In addition, perhaps these findings will spur additional research in the future with the goal of evaluating the impact of attending a KIPP charter school in Arkansas on student academic achievement. At the very least, this evaluation has added to the growing, yet still small body, of literature on how attendance at a KIPP charter school in Arkansas can impact student achievement. Thus, as this charter school network continues to expand across the state, a great deal of effort should be made to continually understand the long-term academic impacts on students who attend KIPP charter schools in Arkansas.

Works Cited

- Abdulkadiroglu, A., Angrist, J., Dynarski, S., Kane, T.J., & Pathak, P. (2009). Accountability and flexibility in public charter schools: Evidence from Boston's charters and pilots. National Bureau of Economic Research Working Paper 15549, <http://www.nber.org/papers/w15549>.
- Anderson, A.B. & DeCesare, D. (2006). Opening closed doors: Lessons from Colorado's first independent charter school." Denver, CO: Augenblick, Palaich and Associates, Inc.
2006. Angrist, J., Dynarski, S., Kane, T.J., Pathak, P., & Walters, C.R. (2010). Inputs and impacts in charter schools: KIPP Lynn. *American Economic Review: Papers & Proceedings*, 100, 1-5.
- Arkansas Public Policy Panel (2011). *Analyzing the success of Arkansas charter schools - unfulfilled promises*. Retrieved from: <http://arpanel.org/content/AR%20Charter%20School%20Report%202011.pdf>
- Betts, J.R., & Tang, Y.E. (2008). *Value-added and experimental studies of the effect of charter schools on student achievement*. Seattle, WA: Center on Reinventing Public Education.
- Booker, K., Gilpatric, S.M., Gronberg, T., & Jansen, D. (2007). The impact of charter school attendance on student performance. *Journal of Public Economics*, 91, 849-876.
- Center for Education Reform (2013). *Charter School Ranking and Report Card, 2010*, retrieved from http://www.edreform.com/wp-content/uploads/2013/01/CER-CharterLaws2013_Chart_FINAL.pdf, April 27, 2013
- Center for Research on Education Outcomes (CREDO). (2009a). *Multiple choice: Charter school performance in 16 states*. Stanford, CA: Stanford University.
- Center for Research on Education Outcomes (CREDO). (2009b). *Charter school performance in Arkansas*. Stanford, CA: Stanford University.
- Center for Research on Education Outcomes (CREDO). (2013). *National Charter School Study*. Stanford, CA: Stanford University.
- Costrell, S., & Wolf, P.J. (n.d.). The History and Status of Charter School Law and Policy in Arkansas, Department of Education Reform retrieved from: http://www.uark.edu/ua/der/SCDP/Arkansas_Charter_Schools.php April 15, 2011.
- Education Policy Institute (2005). *Focus on results: An academic impact analysis of the knowledge is power program (KIPP)*. Accessed July 2012 at <http://www.educationalpolicy.org/pdf/kipp.pdf>

- Henig, Jeffrey R. (2008). *What do we know about the outcomes at KIPP schools?* East Lansing, MI: Great Lakes Center for Education Research and Practice.
- Hoxby, C.M., Murarka, S., & Kang, J. (2009). *How New York City's charter schools affect achievement, August 2009 report*. Second report in series. Cambridge, MA: New York City Charter Schools Evaluation Project.
- Huron Mountain Research Services (2006). *Arkansas Charter Schools*. Final Evaluation Report. Marquette, MI.
- KIPP.org/schools accessed July 29, 2012
- Mac Iver, M.A. & Farley-Ripple, E. (2007). *The Baltimore KIPP Ujima village academy, 2002-2006: A longitudinal analysis of student outcomes*. Paper prepared for the Abell Foundation by the Center for Social Organization of Schools, Johns Hopkins University.
- Miron, G., Urschel, J.L., & Saxton, N. (2011). *What makes KIPP work? A study of student characteristics, attrition, and school finance*. Paper jointly released by the National Center for the Study of Privatization in Education and the Study Group on Educational Management Organizations accessed July, 2011 from www.wmich.edu/leadership/emo
- National Alliance for Public Charter Schools. Online Charter School Dashboard. Accessed July 29th 2012 from <http://dashboard.publiccharters.org/dashboard/home>
- Nichols-Barrer, I., Gill, B.P., Gleason, P. & Tuttle, C.C. (2012). *Student selection, attrition, and replacement in KIPP middle schools*. Working Paper (updated edition) prepared for Mathematica Policy Inc., Washington DC.
- Ross, S.M., McDonald, A.J., & Alberg, M. (2007). Achievement and climate outcomes for the knowledge is power program in an inner-city middle school. *Journal of Education for Students Placed at Risk*, 12, 137-165.
- Tuttle, C.C., Teh, B., Nichols-Barrer, I., Gill, B.P., & Gleason, P. (2007). *Student characteristics and achievement in 22 KIPP middle schools*. Final Report prepared for Mathematica Policy Inc., Washington DC.
- Woodworth, J. L., & Raymond, M. E. (2013) *Charter school growth & replication*. Stanford, CA: Stanford University.
- Woodworth, K. R., David, J. L., Guha, R., Wang, H., & Lopez-Torkos, A. (2008). *San Francisco Bay Area KIPP schools: A study of early implementation and achievement. Final report*. Menlo Park, CA: SRI International.
- Zimmer, R., Gill, B., Booker, K., Lavertu, S., Sass, T. R., & Witte, J.– RAND. (2009) *Charter schools in eight states. Effects on achievement, attainment, integration, and competition*. The Rand Corporation.