Paying the Piper:

The Financial Consequences of Public Policies on Local Budgets

Dissertation Proposal

Michah Weitzman Rothbart

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I. **Introduction**

Public policies often lead to unintended financial consequences that are not readily apparent, while public policy analysis most often focuses on the intended outcomes. Policy makers and researchers alike focus on the effects of education policies, for example, on student test scores or the effect of public health policies, as another example, on reduced incidence of illness. Recent research in the field of public policy has paid close attention to identifying impacts in a causal framework to better understand the extent to which desired aftereffects are a result of intervention or simply associated with it. For example, the growing body of rigorous public policy research in education science, estimate impacts on students (such as academic achievement, social-emotional health, and student experiences in school, among others). These studies can begin to uncover what works, but do not address at what cost.[1]

This proposed dissertation focuses on the unintended budget and resource use implications of state and local policies on local and school budgets. The dissertation will include three articles that estimate the effects of public policies on either local budgets or school budgets and, in particular, financial consequences not expressly discussed in the programs' objectives. The first article will examine the unintended impacts of a district school choice policy on school expenditures. The second article will examine the effects of a public health policy on local tax and fine revenues. The third article will estimate the unintended distributional effects of court-order reforms on intergovernmental grants and local school district responses. This dissertation, therefore, focuses on three of the most studied topics in public financial management -- local public expenditures, local public revenues, and intergovernmental grants -- but does so in the context of policies for which the financial implications are largely ignored.

[1] Some researchers have bridged this gap by partaking in cost-effectiveness studies, but even rigorous cost-effectiveness studies supplementing credible causal estimates of policy impact, may overlook other unintended consequences of policy changes on budgets and spending.

The rest of this proposal is organized as follows. Section II provides an overview of each paper's research questions and key contributions. Section III includes a detailed proposal for the first article of the dissertation (the other two articles are already drafted and are attached) and a road map for the completion of all three essays.

II. Research Questions and Contributions

This dissertation will explore the unintended impacts of public policies on local and school budgets: the first paper examines the budgetary responses of public schools to competition driven by school choice; the second assesses whether and to what extent public display of food safety inspection grades in NYC affects consumer behavior and, by extension, the source of City local tax and fine revenues; the third offers new evidence on the impact of school finance reform (SFR) on local school district resources, estimating the impact of SFR on the relationship between race, state aid, and local revenues.

Paper One: Competing for Students: The Impact of Increased School Choice on School Budgets

The first essay examines how school budgets change in response to competition driven by school choice. Open enrollment policies are one type of school choice policy, which foster an environment within which consumers of education (students and their parents) choose schools based on relative preferences for short travel distances, extracurricular activities, nurturing school environments, academic outcomes, among others (Harris and Larson, 2014). Economic theory suggests that schools then compete for students based on these dimensions. Thus, in addition to its intended purpose of promoting innovative instruction, choice policies such as open enrollment may alter the distribution of school expenditures across and within schools. Increased

choice may lead to larger changes in programs facing larger increases in competition. Greater competition may also lead to other market-like outcomes such as product differentiation across schools. For example, some schools may focus more exclusively on academic outcomes to attract prospective students while others may increase investment in extracurricular activities.

In this paper, I identify budgetary changes in New York City (NYC) high schools through a discrete change in the choice set available to students in 2003-2004, differentiating between programs on the basis of selectivity and admissions method used as well as changes in the high school choice set over time. Among other changes, the new choice policy removed default assignment of unmatched students to zoned programs, increasing competition among schools formerly offering zoned programs (nearly 1/3 of students were default assigned before 2003-2004). Using the new high school choice system as an exogenous change, I estimate the responses in distribution of schools' expenditures, noting that changes in level and mix of school expenditures may vary by admissions method, selectivity, geographic location, and school "brand". I use detailed data on NYC high school expenditures during the 1996-2011 academic years.

In response to increased choice in NYC, I hypothesize that schools that previously admit unmatched students to zoned programs may have large increases in competitive pressure and large changes in mix of expenditures, while those that operate academically screened programs may have little change in competitive pressure and few changes in budget allocations. I further estimate impacts of increased choice across alternative admissions methods, levels of selectivity, and school geography (schools located in more remote parts of NYC may face less competition for students even following the change in high school choice policy). In addition, I explore how school "brand" may affect expenditure decisions in the face of increased competition using two

examples, the mix of expenditures for programs that traditionally excel at academic outcomes and those that have strong nurturing environments (estimating if they double down on academic and ancillary services investments, respectively). In this study, I exploit the change in school choice policy and variation in program selectivity, admissions methods, geography, and the set of schools competing each year in order to estimate the impact of school competition on school budgets.

Findings from this paper will offer novel evidence on the implications of school choice policies and unintended effects of increased school competition on school budgets. Charter schools, school vouchers, open enrollment policies, among many others are designed to increase the choice sets available to students and, by extension, improve academic outcomes through competition. Results from this study will provide evidence on how the increased competition from choice policies affects distribution of expenditures within schools. Additionally, findings will extend the literature on the implications of pressure on schools (in this case enrollment pressure) on budget allocations. The study will identify subsets of schools that experience greater and lesser competition for students (exploiting variation in selectivity, admissions methods used, high school openings and closings over time, and geography), estimating the extent to which increased school choice has a greater effect on budgets where competition is greater.

Paper Two: The Impact of Restaurant Letter Grades on Taxes and Sales: Micro Evidence from New York City

The second essay examines the impact of food safety inspection grades in NYC on local revenues, first estimating the impact on economic activity (sales and closures) and then on the sources of local revenues (fines and sales taxes). A large and growing number of municipalities

require restaurants to post summary letter grades (or other markers of merit) of food safety regulation compliance in their window in order to provide information to consumers at the point of sale. This study, as part of joint work with coauthors, examines the financial and fiscal implications of the public grading policy in NYC. We use longitudinal data on sales, taxes, fines, closures, and health inspections to gain insight into the impact of public restaurant grades on economic activity and, by extension, implications for the sources of the City's revenues.

There are two notable studies that estimate the impact of public restaurant grades, both studying the effects in Los Angeles (LA). Jin and Leslie (2003) find that posted grades improve compliance, consumer demand responds to hygiene quality signals, and foodborne-disease hospitalizations decrease following implementation of the program. Simon et al. (2005) also estimate the effect of grading on foodborne illness hospitalizations, comparing LA to the rest of California, finding a decrease in foodborne-illness hospitalizations that is sustained for at least three years. No work to my knowledge has examined the effects in other localities (generalizability) or the effects of these laws on other stakeholders. Further, no studies have yet examined the impact of grades on economic activity or restaurant viability while also controlling for restaurant food safety practice. In addition, current studies do not consider potential changes in public finances resulting from such programs. In a time of increasing competition for public resources, understanding the potential revenue effects resulting from these public health initiatives for governments is critical and yet unexplored.

In this paper, I will explore one key feature of the program: the effect on local revenue sources. While public restaurant grades are designed to increase food safety compliance, they may also unintentionally change the level and mix of local tax and fine revenues for the City, first by changing dining behavior and then by changing sales taxes. Using both difference-in-

differences models and a regression discontinuity design we estimate the impact of posting an A (vs. B and vs. C) on restaurant closures and sales and second estimate the impact of grades on payments to the City (fines and sales taxes), while controlling for a range of restaurant characteristics and fixed effects. More specifically, using food safety inspection scores as the assignment variable, we estimate the effect of receiving an A or a C grade on sales, closures, sales taxes and fines, compared to a B grade.

Findings from this study have implications for the design of future public restaurant grading policies and, more generally, policies based on similar assumptions about consumer behavior. In municipalities which already use public restaurant grades, this study will provide evidence on how grades impact consumer behavior and tax revenues remitted. In settings that are deciding about whether or not to adopt similar regulations, this study will provide information on the revenue implications of similar policies. Moreover, other policy settings such as school accountability have used public grading for accountability purposes. The focus on the differential impacts across grades in the restaurant setting may inform understanding of the distributive consequences of public grading and provide further evidence on the returns to public grading policies more generally.

Paper Three: Does School Finance Reform Change the Link Between Race and Local Resources?

The third paper offers new evidence on the impact of school finance reform (SFR) on local school district resources. School finance reform (SFR), which is defined in this paper as state funding reform precipitated by a court order in a state's highest court, may serve as a remedy to funding gaps and may help explain declines in resource discrepancies across racial

groups. By this definition of SFR, 20 states have had at least one SFR by 2010.[2] SFR is a court mandate for a state to change its school funding system in order to provide fairer educational opportunities across the state, most often explicitly working to break the link between district wealth and school spending. Due to the strong correlation between race and wealth, SFR may also weaken the link between race and education funding (see, for example, Ryan, 1999). Alternatively, SFR may not affect racial differences in funding, perhaps narrowing gaps in funding between wealthy and poor districts without addressing gaps across racial groups. This study will estimate whether and to what extent SFR changes the link between state aid and racial composition and, further, estimate local revenue responses.

Court-ordered SFRs have previously been shown to increase school spending overall and shift school funding away from local revenues and towards state aid (Card and Payne, 2002; Corcoran and Evans, 2008; Murray, Evans, and Schwab, 1998; Jackson, Johnson, and Persico, 2014). This article estimates the impact of SFR on the relationship between district resources and minority representation, studying SFRs impact on state aid, local revenues, and local property taxes. How does SFR change the relationship between district racial composition and resources? Does this lead, for example, to districts with greater black student populations to be better resourced than might otherwise be expected? And what is the response in local revenues? This paper will also contribute to the public financial management literature on "flypaper" effects whereby, in this case, a flypaper effect would imply that reductions in local revenues are not the same level as increases in state aid. Perhaps, for example, the relative size of a flypaper effect varies on the basis of minority representation, thus illuminating the extent to which district racial composition affects local tastes for education spending.

[2] The students in these 20 states comprise approximately 69% of the total U.S. elementary and secondary public student population in 2010.

In this study, I estimate the extent to which court-ordered SFR increases the distribution of state-aid to U.S. districts with greater shares of minority students. Using a 16-year panel of over 10,000 school districts, my analyses exploit variation in funding across school districts and timing of school finance reform across states to estimate the effect of school finance reform on the relationship between district resources (state aid and local revenues) and district racial composition. The models specified include relevant control variables available in national data on school districts but, due to data limitations, do not include controls for time-varying district wealth, such as property tax base. As a robustness check, I conduct a detailed descriptive analysis of the changes in New York State financing of its school districts since finance reform using a 13-year panel spanning 2000-2012. This analysis includes control variables unavailable nationally in order to assess how sensitive the results are to including the variables unavailable nationally.

On average, I find that court-mandated school finance reform increases state funding to U.S. districts with marginally greater representation of Black, Hispanic and American Indian students as compared to greater percentage of White students. As district share of Black, Hispanic and American Indian students increases, the relative generosity of state aid as a result of school finance reform increases as well. Conversely, following school finance reform, as Asian student share of a district increases, state aid per pupil decreases. This result holds whether comparisons are made across or within states. These changes are sufficiently large to address most of the disparities in funding that exist in the absence of school finance reform for districts with higher percentage of minority representation, except for Asian students. These results hold after a series of robustness checks including estimating the effect of percent change of state aid rather than changes in aid dollars disbursed, as well as estimating effects in New York State with

additional control variables only available within the State. Future work will examine the extent to which state aid crowds out local revenues or if SFR causes a differential flypaper effect on the basis of district minority representation.

Baker and Green (2007) argue that using race as a determinant of funding could help overcome peer group and teacher quality disadvantages that face districts with greater share non-White students. One might believe that the only way to address racial inequity is to target the equity issue directly and focus on the racially disadvantaged groups. Funding on the basis of race, however, could potentially be challenged in court as providing disparate treatment to different districts on the basis of race. Instead, these results suggest that the average court case in the national sample, which are court-mandated reforms initiated over adequacy concerns from 1990 through 2010, does help remedy the funding gap faced by districts with greater shares of minority students. Adequacy rulings may be able to equalize funding across districts with dissimilar racial demographic characteristics without exposing states to potential disparate treatment lawsuits. Therefore, despite previous concerns, the current waves of judicial mandates can affect education aid in multiple ways – they guarantee access to a minimum threshold of education funding and can also address racial equity concerns.

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III. Research Paper Proposals

Paper 1.

1. Introduction

From charter schools to school vouchers, one of the major innovations in public funding of K-12 schooling in the past two decades has been increased reliance on competition from school choice. Supporters of greater levels of school choice believe that market competition will increase educational innovation and improve efficiency (Chubb & Moe, 1990; Friedman, 1962). A basic assumption of school choice policies is that schools facing little competition will operate inefficiently as monopolies, stagnating innovation and sub-optimally allocating resources. The argument goes that parents and students are consumers that, if empowered, will choose schools that best fit their needs, incentivizing schools to provide better services (DiMartino and Jessen, 2014). Schools that do not respond to parent and student preferences – the argument goes –will eventually fail and can be replaced by better alternatives.

Economic theory suggests that school choice policies allow consumers of education (students and their parents) to choose schools based on relative preferences for short travel distances, extracurricular activities, nurturing school environments, academic outcomes, among others (Harris and Larson, 2014). While there is a large body of research that estimates the extent to which school choice and student sorting improve academic outcomes and lead to greater (or lesser) equity, little work has examined how administrators respond to the increased competition. These studies have primarily focused on the implications of student choices between private and public schools (e.g. VanAlstine, 2014), between school districts (e.g. Hoxby, 2000), or between universities (e.g. Dooley, Payne, and Robb, 2012). This paper, instead, focuses school administrator responses to an expanded choice set for students within a public school district

and, in particular, their choices in allocating resources. While there are many plausible impacts of increased competition from school choice on schools (for example increasing instructional efficiency, encouraging the use of catchier names, increasing course offerings, or emphasizing sports), this essay focuses on budgetary responses. For example, what happens to the budgets of zoned schools when they move from operating largely in a monopolist environment to a more competitive environment?

Since V.O. Key (1940), public budgeting research has often focused on "the allocation of expenditures among different purposes as to achieve the greatest return" (Key, 1940, pp 1137). For schools, these decisions include important tradeoffs between investing in more teachers, better teachers, providing more counseling services, providing more enriching afterschool programs, and many more. The decisions often lie in the hands of principals and other school administrators, who must decide how to allocate the resources provided to them from districts, states, and the federal government. Under increased competition from school choice, administrators may change their calculus. For example, in order to attract a certain set of academically focused students, school administrators may target resources towards their preferences and ramp up classroom instructional spending. Alternatively, in order to attract students fearful of academically demanding environments, schools may focus resources on greater wrap-around services and student supports.

This paper will estimate the impact of school choice on level and mix of school expenditures using school and program data from New York City (NYC) high schools. In particular, the study will examine the effect of high school choice in NYC, exploiting a discrete change in high school choice policy and estimating the response in school expenditures. This policy, in effect, eliminated traditional zoned high schools – allowing students access to schools

in every district – and increased the number of schools to which students may apply (from 5 to 12). While some schools still give preference to students on the basis of academic ability and student residents, zoned programs no longer serve as the receivers of default assigned students. This policy has important implications for schools, which now face greater competition for students.

This paper, then, will exploit the policy change and variation in admissions criteria across schools to explore three central research questions. First, what is the impact of increased competition from open enrollment on the level and distribution of expenditures? Second, does the impact vary across admissions criteria (both method and selectivity)? Third, to what extent is there heterogeneity along other school characteristics, including level of academic press, nurturing environment, and distance to nearest competition?

The change in NYC choice policy provides a unique opportunity to explore the impacts of competition from school choice. In most circumstances, by decreasing the need to move residences in order to switch schools, open enrollment policies would be expected to lead to an increase in the sensitivity of parents and students to school quality and match, amplifying competitive pressure on public schools. The case of NYC, however, is unique because NYC has long allowed students to apply to high schools in other NYC school districts and, in particular, a long tradition of elite selective high schools. In NYC, instead, the change to centralized open enrollment increased the number of schools to which students could apply, the seats available in other districts, and eliminated default assignment of students to zoned programs. Changes in competitive pressure on NYC high schools are not, therefore, evenly distributed, allowing for interesting comparisons across schools. Some high schools, which relied heavily on default assignment to zone programs during the period before the change in enrollment policy, are

expected to have large increases in competition for students. Other high schools, which have always received many applicants and are allowed to screen based on academic achievement, are expected to have only modest changes in the level of competition for students. Finally, high schools with low application totals face pressure to reach school enrollment benchmarks to avoid threat of closure and to avoid being forced to enroll "over-the-counter kids" – still unmatched students at the end of the centralized match process, whom are often lower performing. I explore the variation in policy impact, using a difference-in-differences strategy, to estimate the extent to which increased competition alters level and mix of school expenditures.

In addition, open enrollment policies like the one in NYC should have differential impacts across admissions methods used and school "brand." In case studies, Lubienski (2005) and DiMartino and Jessen (2014) find that increased choice often is paired with marketing efforts by schools. These case studies suggest that in addition to promoting innovative instruction, open enrollment policies may lead to other market-like outcomes such as product differentiation across schools. That is, as one example, some schools may focus more exclusively on academic outcomes in order to attract academically focused students while others may increase investment in extracurricular activities in order to attract students interested in sports and arts. I explore differences in expenditure outcomes by school "brand" (using two examples of "brands") in order to estimate the extent to which increased competition leads to greater product differentiation across NYC high schools.

This study proposal is organized as follows. The next section outlines relevant literature on school budgets and why school choice may affect the distribution of school expenditures. The third section describes the data and measures used and the fourth outlines the empirical strategy. The fifth section discusses the steps needed for completion of this paper.

2. Relevant Literature

This paper will examine school administrator responses to changes in the competitive environment and, in particular, how competition driven by increases in the school choice set impacts school expenditures. The paper will be informed by two distinct literatures. First, I will review literature to motivate the premise that school administrators are able to make decisions on school expenditure mix in response to competition shocks. Second, I will explore the theoretical reasons that one might expect budget responses to discrete changes in school choice. I outline the relevant literature below.

a. Can school administrators affect school budgets?

In order to estimate budget responses to competition within NYC, sufficient variation must exist across public schools in how resources are spent. Previous work on intradistrict variation in public education resources has found that schools within the same school district are very often differently resourced (Iatarola and Stiefel, 2003; Rubenstein, Schwartz, Stiefel, and Bel Hadj Amor, 2007; Stiefel, Rubenstein, and Berne, 1998). Still, competition from school choice may not elicit administrator expenditure responses if differences across schools are a result of district funding rules only. That is, if school expenditures are entirely mandated, schools will not be able to adjust their mix of expenditures in response to the competitive environment.

In the context of NYC, there is reason to believe that variation in mix of school expenditures may result from differences in discretionary spending. Beginning in the 1997-98 school year, NYC moved toward a formal, system-wide school-based management and budgeting (Iatarola and Stiefel, 1998). In addition to providing the data necessary of the research

conducted in this study, this reform – in principal – provides the preconditions necessary for market-like responses in school expenditures to increased school choice. Importantly, Goertz and Stiefel (1998) find that schools have discretion over less than 20 percent of resources even in environments like NYC, which have school based budgeting systems (see also, Iatarola and Stiefel, 1998). This is sufficiently large to illicit changes in expenditure mix, but any effects on expenditures from competition are, therefore, expected to be at the margins.

Despite schools' limited discretion over budget allocations, some studies have found a relationship between expenditure mix and accountability policies – which offer another source of competitive pressure on schools. Studying the impact of accountability ratings, Craig, Imberman, and Perdue (2013) find that schools and school districts increase instructional resources in response to a poor accountability grade. Some of the increase is likely driven by increased funding from school districts (school districts increase allocations to schools with falling accountability grades). They find these two effects to be almost a 1-to-1 match, suggesting that districts increase funding and schools use these resources on instruction. These effects, however, are likely specific to the policy studied. In Craig et al., the response of school administrators to accountability pressure is to increase instructional expenditures.

In dissertation research, Mascitti-Miller (2012) examines discretionary expenditures differences between four schools in "good standing" and four schools not in good standing in an upstate New York urban school district. Mascitti-Miller finds that most of discretionary funding is used to address the individual students' needs and core academic needs. This case study further finds that those schools in good standing spend discretionary funds to create highly individualized student environments, while those not in good standing spend relatively more investing in teacher quality. It is unclear in this work if the use of discretionary funds is a

response to good standing or not in good standing status or if these practices lead to improved student outcomes. Mascitti-Miller suggests that perhaps creating more individualized student learning is the optimal use of discretionary funds, but this work is not conclusive on the matter. Further, it is unclear if the responses to accountability policies are the optimal responses in the context of school choice policies. Under what conditions would administrators change budgets in response to choice driven competition and what would they invest in? I explore the literature on these questions below.

b. Why choice induced competition may illicit budget responses

There is a large body of research estimating the extent to which school choice and student sorting improve academic outcomes and lead to greater (or lesser) equity. These studies have primarily focused on the implications of student choices between private and public schools (e.g. Goldhaber, 1996), between school districts (e.g. Hoxby, 2000), or between universities (e.g. Dooley, Payne, and Robb, 2012; Hossler and Gallagher, 1987). This paper instead focuses on school administrator responses to an expanded choice set for students within a public school district. For example, what happens to the budgets of zoned schools when they move from operating largely in a monopolist environment to a more competitive environment?

One reason to expect a budgetary response to school choice is if parents or children choose schools on the basis of school quality. There is a long history of research examining the relationships between family sorting between school districts, inter-school-district competition, school district budgets, and student achievement (Hall & Ross 2010; Hoxby 2000; Rothstein 2004; Urquiola 2005). This work is grounded heavily in the concept of Tiebout sorting, which discusses conditions under which choice between local municipalities can produce market-like

conditions such that sorting between communities leads to efficient outcomes in public expenditures (Tiebout 1956). Economic theory suggests that choice between school districts allow consumers of education (students and their parents) to choose schools, other public services, and tax rates based on relative preferences for education, other public services, and personal consumption. Local governments then compete for students based on these dimensions, leading to more efficient provision of public services. Fundamentally, school choice policies are intended to produce similar efficient outcomes by introducing competition among schools and producing innovations in instruction.

Recent work has examined the budgetary impact of choice driven competition on individual schools. Charter school policies, for example, may promote market competition among schools and promote innovation (Arsen, Plank, & Sykes, 1999). Alternatively, some have argued that competition from charter schools may provide fiscal challenges for traditional public schools due to competition over public resources (Schafft, Frankenberg, Fuller, Hartman, Kotok, & Mann, 2014; Bifulco & Reback, 2014). Estimating impacts in NYC, however, Cordes (2015) finds that close proximity to charter schools leads to increases in total and instructional spending per pupil in traditional public schools – possibly due to decreases in general education student enrollments and higher concentrations of poor and special education students following charter school entry. The findings in Cordes (2015) demonstrate that school budgets in NYC do respond to competition from charter schools, but these changes could be due to changes in size and mix of enrollments.

Several studies of the effects of school competition in the private school market also illustrate the way in which schools may alter quality in response to competition. For example, using a structural model of school choice in Pakistan, Bau (2015) finds that – under increased

competition from school choice – private schools increase their targeting of wealthy students and reduce targeting of poor students. These results are consistent with Bau's hypothesis that wealthier students are more responsive to predicted achievement gains and that entry of an additional school into the market can lower school quality match for poorer students. In these studies, school quality is most often measured by per pupil expenditures.

The case of choice in NYC is different from previous research examining competition between school districts, private schools, and charter schools in two key ways: (1) the level of per pupil expenditures is largely decided by a single school district, the NYC DOE, and (2) the NYC DOE provides other measures of public high school quality including achievement test scores, high school graduation rates and, in more recent years, progress report grades. For these reasons, choice driven competition within a single school district may lead to different outcomes than competition between school districts, private schools, or between charters and traditional public schools. There is a new and growing body of literature examining how parents and students choose schools within public school districts.

In a recent technical report from the Education Research Alliance for New Orleans, Harris and Larson (2015) analyze the demand and preferences for schooling services in New Orleans, estimating the response of families to a comprehensive centralized open enrollment system. They find somewhat limited influence of academic outcomes in application decisions, instead finding that extracurricular activities and distance are at least as important. They also find heterogeneity in preferences as the lowest-income families have weaker preferences for academics. Their work provides great insight into the decisions consumers make in response to centralized open enrollment systems and suggests that greater horizontal product differentiation may be one response of school administrators.

A second reason to expect changes in the allocation of school resources is because a few case studies have found public schools facing centralized open enrollment policies often partake in increased marketing, perhaps indicating other budgetary responses to compete for students. Lubienski (2005) finds that in response to education reforms in Michigan many districts partake in marketing campaigns in order to attract students. These campaigns are small in comparison to the size of school district budgets, but may indicate concerted efforts by districts to attract students and perhaps larger structural changes in budgets. Lubienski argues that increased competition through school choice runs the risk of "corrupted and perverse incentive structures that have the unanticipated potential of short-circuiting reformers' intended objectives of educational innovation and improvement" and further raises concerns that marketing funds detract from classroom expenditures (2005, pp 480). DiMartino and Jessen (2014) examines the branding and marketing practices at a total of eight high schools including two new small high schools in NYC, finding common business practices across the schools such as seeking a market niche and targeting high-performing and hard-working students. DiMartino and Jessen raised further concerns about how parent and student consumers navigate the information provided to them by schools, calling out potential inequity across groups of consumers with greater or lesser ability to interpret the data.

In case studies examining the effects of an open enrollment policy in New Orleans, Jabbar (2015) explores the types of strategies school leaders employ in response to choice. In a qualitative study of 30 New Orleans schools, Jabbar finds that market pressures have different effects depending on school status in the "market hierarchy;" some schools make academic changes while others engage in marketing and "cream skimming." Strategies may vary both across schools and across time. Bagley (2006) conducts a longitudinal case study examining the

effects of increased market choice in the United Kingdom, finding that schools use marketing and promotional strategies early, while structural changes are often made in the long run. These results suggest competing for students in a market-like choice environment may change the behavior of school administrators. This paper is an important extension of this work, providing a careful look at whether schools respond to increased competition through its resource allocation choices and examining impacts of choice over time.

3. Data and Measures

This paper will use data obtained from multiple sources in the New York State Education Department (NYSED) and the New York City Department of Education (DOE) including information on school expenditures, aggregated student performance, school demographics, and admissions methods. School expenditure data comes from School Based Budget Reports (SBBR, available from 1997-2001) and School Based Expenditure Reports (SBER, available from 2002-2012), which include expenditures for all DOE public schools disaggregated by multiple line items and service types. SBBR/SBER variables used in this paper include per pupil expenditures on specific service types including classroom instruction, instructional support services, ancillary support services, and building services and specific line items within these service types including expenditures on teachers, other classroom staff and paraprofessionals, librarians, counseling services, attendance/outreach services, after school and student activities, parent involvement activities, transportation, school safety, custodial services, building maintenance, and leases (all reported in 2012 dollars).

High school program admissions methods come from two sources. The first are The Directory of New York City Public High Schools (High School Directory) for school years

1997-2004. These directories include the admissions methods for all high school programs available for rising 9th graders in the upcoming academic year. In addition, the High School Directories include number of applicants, program capacity information (number of students admitted from 1997-1999 and number of seats from 2000-2004), information on admissions priority on the basis of student residence (both zone and borough priorities), and zone restrictions for program eligibility for every program open to the previous 9th grade cohort.[3] For the later academic years (2004-2012), I use data aggregated from student applications data, which includes admissions methods, number of applicants, and capacity information (number of seats) for every program available each year to 9th graders in NYC.[4]

Program admissions methods include education option, screened, audition, exam/test, unscreened, limited unscreened, and zone. Education option programs select half of their students and are assigned half of their students at random. Using citywide standardized reading test scores, education option programs accept 16% of students reading above average, 68% in the average range, and 16% below average (in addition, students in the top 2% in reading test scores are guaranteed admissions if they rank an education option program first). Screened programs are academically screened based on student test scores, student grades, student attendance, or any combination of the three. Audition programs are screened programs on the basis of performance or portfolio and are most commonly used by visual or performing arts programs. Exam/test programs are academically screened programs on the basis of student performance on an entrance exam. Unscreened programs admit students at random in the event of oversubscription, taking into account priority listing. Unscreened programs only operate in the period before the

[3] The 1997-1998 Directory is not available, so lagged values from the 1996-1997 Directory are used. The 2003-2004 Directory uses data from the 2001-2002 cohort of incoming 9th graders, so these values are used.

[4] Please note that I do not have access to the student applications data. This aggregated data set was generously provided to me by Sean Corcoran solely for the purpose of this research.

open enrollment policy change and are replaced with other admissions methods in the post-period. Limited unscreened programs select students randomly by computer, but priority is given to students who attend a school information session with their parents. Limited unscreened programs only operate in the period after the open enrollment policy change. Zone programs give priority to students who apply and live in the high school's geographical zoned area. In the pre-period, most zoned programs were default assignment programs, whereby unmatched students were assigned to their local school by default.

Schools may operate more than one program each year. For example, some zoned schools offer an academically screened program in addition to the zoned program. Moreover, some programs within a school are very competitive, while others are less competitive (at least based on number of applicants and capacity). I characterize schools based on summary information of programs offered, aggregating program admissions data to the school level, because expenditure, demographic, and performance information is all observed by school. This is appropriate because while parents and students may choose programs based on program reputation in addition to school reputation, expenditure decisions are made and recorded at the school level.

One central research question explored in this paper is the extent to which zoned schools respond to increased competition following the change in NYC's enrollment policy. For this analysis, I use a school-level indicator, Zoned, taking a value of 1 if a school operates any zone program and 0 otherwise. Moreover, some -- but not all -- zone programs are default assignment programs for unmatched students in the pre-period. All of these programs remain zoned programs in the post-period, but no longer enroll students via default assignment (instead,

students apply to these zoned programs). I use an indicator, Default_Zoned, taking a value of 1 if a school operates a default assignment zone program and 0 otherwise.

Program and school selectivity is assessed using number of applicants, capacity, and admissions methods. The variable School Demand Ratio reflects demand for a school calculated as the ratio of lagged applicants and lagged capacity to all programs within a school. School Demand Ratio is then normalized within year (therefore addressing differences in capacity measures and application policy over time). Program Selectivity is a vector of indicator variables assessing the competitiveness of admissions standards for each program in a school based on admissions methods used and Program Demand Ratio (which is calculated in the same manner as School Demand Ratio but by program). Programs are "non-selective" each year they are Zoned, Unscreened, or in the lowest 50^{th} percentile of Program Demand Ratio. Programs are never "non-selective" if they are academically screened or test programs. Programs are "low-selective" each year they are between the 50^{th} and 90^{th} percentile of Program Demand Ratio for education option, limited unscreened, or audition programs or in the lowest 25^{th} percentile for academically screened programs. Finally, "high-selective" programs are exam/test programs, screened programs above the 25^{th} percentile in Program Demand Ratio, or audition, limited unscreened and education option programs above the 90^{th} percentile in Program Demand Ratio. Program Selectivity is aggregated to school as the count of non-selective, low-selective, and high-selective programs. Schools, therefore, can house programs that are both non-selective and high-selective if, for example, a zoned school operates a selective academically screened program. In 1997, 68.1% of schools house at least on non-selective program, 45.4% house at least one low-selective program, and 43.6% house at least one high-selective program. In 2012, 46.3% of

schools house at least on non-selective program, 37.4% house at least one low-selective program, and 28.6% house at least one high-selective program.

NYSED Annual School Reports and School Report Cards provide student performance and demographic information aggregated by school for the 1997-2003 and 2004-2012 academic years, respectively. Performance measures used in this study include percent of students receiving Regents diplomas and percent of students dropping out of high school. Importantly, student performance in NYC high schools is improving during this period (at least based on the above metrics). I note that schools compete within each school year, and normalize student performance by year, using the z-score of Regents diploma rate and high school dropout rate rather than raw the measures (standardized for NYC high schools with a mean of zero and standard deviation of 1). I use three year blocks to measure mean academic performance to smooth out single year aberrations in dropout rates and regents performance. Aggregated student performance, therefore, is relative to other NYC high schools and compared to mean performance in three year periods.

As one example of product differentiation, I predict that schools that excel in academic press and fostering a nurturing environment may increase investments in these activities. I construct indicator variables to reflect nurturing and academic school environments. Nurturing takes a value of 1 if the z-score for Regents diploma rate is below 0 and dropout rate is below zero. This measure indicates that a school has above average student persistence, but below average accelerated achievement (at least as measured by Regents test-taking and scores). To assess the extent to which the Nurturing variable is apt, I use NYC Progress Report data on school environments, which are based on city-wide surveys of students, teachers, and parents beginning in 2007. I find a positive correlation between Nurturing and school environment

score.[5] It has also been posited that small schools have more nurturing environments than large schools (Ferris and West, 2004; Lee and Loeb, 2000). I find a negative correlation between Nurturing and enrollment.[6] These results indicate that the Nurturing variable captures some components of the school environment measured directly in the later years of the panel and is also related to enrollment in the expected direction.

Academic takes a value of 1 if the z-score for Regents diploma rate is at least 1 standard deviation above the mean and 0 otherwise. This measure indicates that a school has well above average accelerated achievement. To assess the extent to which the Academic variable is apt, I estimate the correlation between school admissions methods and Academic. I find that academically screened and test schools have a higher probability of an academic environment.[7] Moreover, the student surveys include a set of questions that the DOE uses to construct an Academic Expectations score for schools. I find Academic and school Academic Expectations are correlated for school years 2007-2012.[8]

Demographic characteristics used in this study include racial composition (a vector of variables reflecting percent black, Hispanic, white, and Asian), gender composition (percent female), percent free or reduced price lunch eligible, percent limited English proficient, and percent full-time special education students. Table 1 shows demographic characteristics for schools that run zoned programs and schools that do not for the 1997, 2004, and 2012 academic years (the first year of the panel, the year of the policy change, and the last year of the panel, respectively). In these three years, zoned schools have a higher share white, Asian, and students with IEPs and a lower share black, Hispanic, and free lunch eligible students than non-zone

[5] Correlation of 0.12 (and 0.19 if Academic schools are excluded).
[6] Correlation of -0.24 (and -0.26 if Academic schools are excluded).
[7] Correlation of 0.26. A screened or test school has a 19 percentage point greater probability of being Academic.
[8] Correlation of 0.27.

schools. In these three years, zoned schools are less likely to be Nurturing or High Achievement, spend less per pupil on instructional expenditures, and have higher enrollments than non-zoned schools. Over these three years the number of zoned schools is declining (from 55 to 40) and the number of non-zoned schools increases (from 106 to 376). The mean enrollment of both zoned schools and non-zoned schools is also declining during the sample period.

I match the three data sources on unique school identifiers (school number and borough) by year. The panel spans 16 academic years from 1996-1997 through 2011-2012, including 4,301 observations of 462 unique high schools. Importantly, the portfolio of NYC high schools during this period expanded from 163 in 1997 to 406 in 2012. Some of the analysis in this paper will estimate impact on the 125 continuously operating schools, while other analyses will estimate impacts with the full sample of high schools. The panel includes a 7 year period before NYC's school choice reform (including observations of 226 high schools) and a 9 year period following the change in school choice policy (including observations of 448 high schools).

4. Empirical Methods

In this paper, I will identify budgetary changes in New York City (NYC) high schools through a discrete change in the choice set available to students, differentiating between schools based on admissions methods used. As stated above, the NYC DOE switched to centralized open enrollment 2003-2004 school year, which, among other changes, removed default assignment of unmatched students to zoned programs (nearly 1/3 of students were assigned to programs this way before 2003-2004). Using the new high school choice system as an exogenous change, I will estimate impacts on level and mix of school expenditures, noting that changes in school expenditures may vary by admissions method. I will exploit the change in school choice policy

and the variation across program admissions methods and school specialization in order to estimate the impact of school competition on school budgets.

I first use an OLS model to identify differences in expenditure mix across schools on the basis of admissions methods. In particular, I estimate the relationship between schools offering zoned programs and school expenditure mix using the following baseline model:

(1) $\mathbf{ExpPP_{it}} = \beta_0 + \beta_1 Zone_{it} + \mathbf{X'_{it}}\beta_2 + \delta_t + \varepsilon_{it}$

Where $ExpPP_{it}$ is a vector of outcome variables that reflect school expenditures on specific service types including classroom instruction, instructional support services, ancillary support services, and building services and specific line items within these service types including teachers, other classroom staff and paraprofessionals, librarians, counseling services, attendance/outreach services, after school and student activities, parent involvement activities, transportation, school safety, custodial services, building maintenance and leases (all reported in 2012 dollars); Zone takes a value of 1 to indicate that school i offers at least one zoned program in year t and 0 otherwise; X is a vector of school characteristics including borough, racial composition (a vector of variables reflecting percent black, Hispanic, white, and Asian), gender composition (percent female), percent free or reduced price lunch eligible, percent limited English proficient, and percent full-time special education students; and δ is a year fixed effect. In addition to the above model, I will estimate an additional model specification separating out schools with default assignment zone programs from schools with zone priority programs for which students must apply in both periods.

I then use a difference-in-differences model to estimate changes in expenditure mix for zoned schools following the discrete change in high school choice policy in NYC.

(2) $\mathbf{ExpPP_{it}} = \beta_0 + \beta_1 BaselineZone_i + \beta_2 Post*BaselineZone_{it} + \mathbf{X'_{it}}\beta_3 + \delta_t + \varepsilon_{it}$

Where BaselineZone takes a value of 1 to indicate that school i offers at least one zoned program in an year prior to the new open enrollment policy and 0 otherwise; Post*BaselineZone takes a value of 1 in each year after the policy change if a school offers a zoned program in the years before 2003-04; and all other variables are as defined as previously.[9] I again will distinguish between schools with zone priority programs and default assignment zone programs.

I will also estimate the impact of competition from choice on school expenditure mix, comparing policy impact on schools with zoned programs to those without zoned programs using a school fixed effects model.

(3) $\mathbf{ExpPP_{it}} = \beta_0 + \beta_1 Zone_{it} + \beta_2 Post*Zone_{it} + \mathbf{X'_{it}}\beta_3 + \delta_t + \gamma_i + \varepsilon_{it}$

Post*Zone takes a value of 1 if the school offers any zone program in every year after the 2002-2003 school year; γ_i is a school fixed effect; and all other variables are as previously defined. Positive coefficients on β_2 reflect increased investment in response to open enrollment for zone schools relative to non-zone schools for each expenditure item.

I next will estimate the impact of competition driven by open enrollment by exploiting other variation in program selectivity and admissions methods. I modify model (3), adding interaction terms for program selectivity, admissions methods used, and the interaction of the two. I note that highly selective schools that run primarily academically screened programs are less affected by the changes in public school choices sets and use this set of schools as the omitted group in difference-in-differences and school fixed effects models, as follows:

(4) $\mathbf{ExpPP_{it}} = \beta_0 + \mathbf{SchoolType_{it}'}\beta_1 + \mathbf{Post*SchoolType_{it}'}\beta_2 + \mathbf{X'_{it}}\beta_3 + \delta_t + \gamma_i + \varepsilon_{it}$

Where $SchoolType_{it}$ is a vector of characteristics defining high school admissions criteria including presence of zone programs, high, low, and non-selective programs, admissions

[9] Note that $Post_t$ is in the rank space of the year fixed effects and, therefore, is not included in this model specification.

methods used, and school demand ratio; Post*SchoolType$_{it}$ is an interaction variable reflecting school type and school choice regime period; and all other variables are the same as defined previously. Positive coefficients on β_2 reflect increased investment in school type, i, for the expenditure item in response to increased competition as compared to highly selective, academically screened schools, which face little change in choice-based competition. I further estimate heterogeneity of impacts across geography, exploiting variation in distance to nearest competition (other high schools), predicting that schools closer to competitors will also have greater impact on level and mix of expenditures.

Finally, to test the hypothesis that increased competition from school choice will lead to greater product differentiation, I estimate impacts across two examples of school "brands." I modify model (3), adding interaction terms for academic rigor (as reflected by high Regents diploma rates) and nurture environments (as reflected by below average Regents diploma rates and below average drop-out rates). I estimate the impact of increased school choice competition on one example of product differentiation using the following difference-in-differences model with school fixed effects:

(5) $\mathbf{ExpPP_{it}} = \beta_0 + \beta_1 \text{Nurturing}_{it} + \beta_2 \text{Academic}_{it} + \beta_3 \text{Post*Nurturing}_{it} +$

$\beta_4 \text{Post*Academic}_{it} + \mathbf{X'_{it}}\beta_3 + \delta_t + \gamma_i + \varepsilon_{it}$

Where Nurturing$_{it}$ takes a value of 1 if a school offers a nurturing environment and 0 otherwise; Academic$_{it}$ takes a value of 1 if a school offers an accelerated academic environment and 0 otherwise; Post*Nurturing$_{it}$ and Post*Academic$_{it}$ are interaction terms reflecting nurturing and academic environment after the 2002-03 academic year; and all other variables are as previously defined. For this model, high schools offer three types of environments: schools which excel at graduating students with high credentials, those which excel at keeping students enrolled even

with lower graduation standards, and those that do not excel at either. These are two ways in which schools may differentiate themselves into a niche market. Positive coefficients on β_3 and β_4 reflect increased investment in the expenditure item in post-period for nurturing and academic schools, respectively, relative to schools that do not excel in either category. That is, for example, if β_3 is positive in a model estimating impact on classroom instruction expenditures per pupil, then this would serve as evidence that schools that excel in academic press are doubling down on those investments.

School budget responses are identified through changes in expenditure profile in each school, which reflects the school's allocation strategy. Allocations of funds among expenditure categories reflect the decisions of both the school districts and the individual school principals. My research strategy is to estimate the impact of competition on school budgets exploiting the timing of a discrete change in the high school choice set, using difference-in-differences and school fixed effects models comparing financial allocations of schools varying in admissions method and selectivity over time. My identifying assumption is that changes in distribution of expenditures across and within schools following the policy change reflect responses to school choice. In particular, I identify the difference in responses across school admissions methods in order to estimate the impact on schools facing increased competition for students as compared to schools with little change in the competitive environment. While changes in school budgets may reflect both district and school administrator responses, the differential changes in budgets on the basis of admissions method and selectivity used likely reflects responses to the competition for students and, therefore, is most likely a result of administrator use of discretionary funds (unless the district privileges the student profile of some schools over others). If school administrators have little discretion over school budgets, then estimates will be attenuated towards zero because

their responses will not be apparent from school expenditures. I will test this further by focusing on components of the budget over which school administrators have greater and lesser discretion and analyzing impacts on school controlled expenditures.

These models will yield estimates of the impact of changes in competition driven by school choice on budget allocations. Schools will be found to re-allocate resources in response to competition for students if they change allocations of resources consistent with economic theory – if schools facing greater changes in competitive pressure change mix of expenditures to a greater degree than those facing small changes in competitive pressure and if those competing more heavily based on academic outcomes increase instructional spending while those competing on nurturing environments increase spending on support services. Conversely, if schools believe student/parent choices do not respond to school budgets, then the models may show no differences in annual reallocations.

5. Next Steps

This paper is in the early stages of development. There are a number of items that must be completed in order to complete this paper. First, regression results are needed for all main model specifications outlined above. I will begin by estimating the impact of the policy change on zoned schools, comparing changes in expenditure to non-zoned schools. I will then test for heterogeneity within non-zone schools, separately estimating impacts by admissions methods to programs within a school (zone, education option, audition, academically screened, etc.), selectivity (based on school and program demand ratios), geography (distance to nearest neighbor schools), and schools with an Academic/Nurture focus. These results will provide insight into the extent to which competition driven by school choice impacts the distribution of

school expenditures and if there is any evidence that it leads to market-like outcomes predicted by economic theory.

Second, I will provide further evidence to support the main identification assumptions of a difference-in-differences strategy. I will first assess the extent to which pre-trends exist, such that, for example, zoned schools change expenditure mix in the lead-up to changes in school choice policy rather than after the discrete change in policy. I will then assess whether and to what extent the results are sensitive to the inclusion and exclusion of schools that open and/or closure during the sample period. I will, finally, estimate differential impacts across geographic space, testing the extent to which the choice results are mediated by distance to the next closest high school.

Third, this paper will be strengthened by a careful consideration of where funds are controlled. Are changes in expenditures discretionary or mandatory? The SBERs include a variable, rsrc_cde, capturing expenditures controlled by schools, field support, or the central district. I will estimate the impact of school choice competition on school discretionary expenditures in addition to the main analysis of impact on all expenditures by line item. This analysis will help assess the extent to which changes in expenditure mix is driven by funds controlled by schools and not funds controlled by the district. Importantly, school decision-making authority increases over this period and – through my analysis of impact on school-controlled expenditures – this paper will examine how competition from school choice affects school decisions about how to allocate discretionary funds.

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Tables and Figures

Table 1. Mean School Characteristics For Paper 1, Weighted by Enrollment

	Zoned			Non-Zoned		
	1997	**2004**	**2012**	**1997**	**2004**	**2012**
% of Students						
Female	49.9	48.6	47.4	49.7	50.5	50.3
Black	34.6	30.9	20.8	41.0	38.3	34.9
Asian	13.3	17.9	24.7	10.9	11.0	13.2
Hispanic	31.8	30.5	31.9	37.4	39.5	41.5
White	20.4	20.7	21.7	10.7	11.3	9.9
Free Lunch	37.1	42.7	54.0	50.3	63.1	64.3
IEP	15.9	13.8	14.1	10.4	10.9	11.0
Nurturing	0.05	0.05	0.04	0.14	0.13	0.15
High Achieving	0.07	0.09	0.00	0.16	0.18	0.27
Instr. Exp PP (2012 $)	4,995	6,208	7,180	5,221	7,317	7,956
Enrollment	3330	3442	3180	1937	1664	1063
N	55	40	30	106	184	376

Paper 2.

See attached Paper 2 for the current draft of the paper. A list of additions needed for the dissertation version are outlined below.

Categorized list of next steps

This paper is in the final stages of preparation for journal submission. Three main lines of work will improve the recent draft of this paper for inclusion in my dissertation. First, I have recently conducted a pair of sensitivity analyses to the closure findings including wider windows to assess the impact on restaurant closure and using an alternative measure of restaurant closure. Second, I have recently conducted a falsification test assessing impact of imputed grades on closure in the period before public grading. Third, this paper can include further descriptive work assessing the overall change in public revenues since the implementation of the policy. These three areas for future work are described below

1. Sensitivity Analyses for the Estimated Impacts on Closure

Our estimates for the impact of grades on probability of closure are based on a closure indicator from DOHMH inspection data. Thus, timing of inspection attempts affects the likelihood that a restaurant is observed as closed as well as the date at which the restaurant is recording as being closed. I recently tested the robustness of our results to an alternative time window between inspection and observation of a restaurant being out of business. Instead of estimating the impact on closure within a year (365 days), we test the impact on closure within 390 days. The point estimates of the results are marginally different, but qualitatively similar. These results are discussed very briefly in this version, but will be added to the dissertation paper.

In addition to the DOHMH measurement of restaurants out-of-business, we can exploit restaurant sales to estimate closure timing. Restaurants are grouped randomly on quarters of operation (as measured by sales), thus are likely closed during quarters in which the group do not appear in our DOF data set. I recently estimated the impact of grades on closure using the merged DOF and DOHMH data, using linear probability regression discontinuity models specified the same as the sales and tax models currently in the paper. The outcome variable is an indicator taking a value of 1 if the group of restaurants does not have sales revenues in the following quarter. The point estimates should be different than the current results because this form of closure is observed through sales rather than inspection timing and because treatment is based on standing inspection grade rather than based on graded inspection timing. Still, the results are qualitatively similar: A grades decrease probability of closure and C grades increase it as compared to B grades. These results are alluded to in this paper, but will be written up and included in the dissertation paper.

2. Falsification Test for the Estimated Impacts on Closure

In this version of the paper we include a short description of the results of a falsification test, which estimates the impact of "grades" in the pre-period. We also include a pair of appendices with the results of the falsification test. As with the above additions, a fuller discussion of the falsification test and the results will be included in the dissertation version of the paper.

3. Assessing the Overall Change in Public Revenues

The current paper estimates the impact of grades using micro data. The coefficients are well-identified precisely because we control for restaurant characteristics, underlying inspection scores, and quarter and restaurant fixed effects. Still, restaurant characteristics and inspection

scores change during this period, in part, as a result of the grading policy itself. In other work, for example, we find that final inspection scores improve by as much as 5 points (about half a grade) after the policy is put in place. Estimates of overall program impacts are not as well identified, but provide important context for this paper. I will add additional descriptive evidence to the paper, including changes in fine levels and sales tax revenues for the City. We discuss in the paper how the mix of NYC revenues may change as a result of the policy. I will support these claims with descriptive evidence on the extent to which changes in NYC resources since the beginning of the policy could, in part, be explained by the distribution of grades, how grades have changed over time, and the resulting impact on fines and sales taxes. The version of the paper included here provides some of this context in the conclusion and the data sections, but more can be added to provide better descriptive evidence on public revenue changes that occur concurrently with public grading.

Paper 3.

See attached Paper 3 for the current draft of the paper, which examines impacts on state aid and is titled "Does School Finance Reform Change the Link Between Race and State Aid?" A list of additions needed for the dissertation version are outlined below.

Categorized list of next steps

Three main lines of work will improve this paper for inclusion in my dissertation. First, I will further test the extent to which the national results are sensitive to the following changes: (1) limiting the sample to states that ever have a court-ordered reform, (2) using an event study to further examine the extent to which pre-trends predict court rulings, (3) estimating the impact of court overturns on state aid the year before the ruling, and (4) estimating the impact of cases that uphold state aid formulas. Second, the paper currently examines how school finance reform (SFR) changes the relationship between race and state aid, without further consideration of local revenues. Future work will estimate the impact of SFR on the relationship between race and local revenues and the extent to which state aid from SFR crowds out local revenues or leads to a "flypaper" effect. Third, I will rework the section exploring SFR in New York State (NYS), simplifying the methods section due to the fact that the models are detailed in the national analysis, expanding upon the uniqueness of the New York court cases, and taking advantage of variation of the State's initial response to the 2006 court ruling and fade-out of response over time. These three main areas of future work are described below.

1. Sensitivity Analyses of National Estimates

The estimation strategy used in this paper is similar to Card and Payne (2002), Corcoran and Evans (2008), and Murray, Evans, and Schwab (1998), but I include a set of interaction terms for district racial composition. While previous research provides evidence that SFR case

rulings are exogenous, I should provide similar sensitivity analyses in my paper. I propose adding four checks on the sensitivity of my findings.

First, limiting the sample to states with a court-mandated SFR further alleviates concerns about state selection. While the initial analysis controls for state and district selection with district fixed effects, this sample restriction further clarifies the counterfactual. In these cases, the comparison groups are the periods before the court-order in SFR states only, rather than also including non-SFR states and controlling for district fixed effects.

Second, I will estimate the impact of SFR on the relationship between race and state aid for each year before and after the ruling. I have estimated the impact over time, pooling the pre-period. Estimating the impact in the pre-period will show if there is any non-linear pre-trend in funding patterns that predict court rulings, if the state aid patterns shift when a ruling seems likely, and will better validate that the difference-in-difference assumptions hold. The identification strategy exploits variation of racial composition within state and year, so differences in the relationship between race and state aid in the years before SFR should already be differenced out, but if there is no pre-trend it will provide further evidence for the validity of the identified effects.

Third, I will use a variation of the event study sensitivity analysis and present results from a falsification test. Instead of estimating the impact of SFR in the years following a court ruling, I will estimate the impact of SFR on the relationship between race and state aid in the year immediately preceding a court order.

Fourth, I will present estimates from a second falsification test, which will estimate impacts in states with court rulings in favor of the State defendants. Instead of estimating the impact of SFR this will estimate the impact of a failed SFR attempt. These cases are a part of my

counterfactual, which compares impacts in an SFR state to all states without overturns. This falsification test will provide evidence that court intervention is the treatment and not the threat of court intervention.

2. Impact on Local Revenues

SFR cases are intended to change the state aid levels received by districts. While the intentions of these reforms are not to change the relationship between state aid and race, the change in state aid is likely a direct result of mandated changes in funding formulas. Conversely, local revenue responses are not directly tied to SFR rulings. Local school districts may, however, change local revenues in response to changes in state aid.

Notably, Sims (2011), finds little disproportionate SFR total revenues gains for districts with high shares of minority students, while I find state aid increases to districts with higher shares of certain minority students (most notably black and Hispanic students). Perhaps the difference is explained by local revenue responses to SFR. As noted in the current draft of my paper, the main results presented in Sims (2011) provide estimates of the impact on total local resources, rather than state aid. Thus, the Sims (2011) findings may result from state aid crowd-out of local revenues shares of minority students increases.

Alternatively, local school districts could respond to increased state revenue by letting the money "stick where it hits." Card and Payne (2002) find evidence of a flypaper effect for SFR in the 1980s, finding that a one-dollar increase in state aid increases district education spending by 50-65 cents. Despite this flypaper effect, they still find that differences in local revenues per student widens between richer and poorer districts following SFR. Perhaps similar differences exist between the responses of districts with greater and lesser minority student representation.

My dissertation will include model to estimate the impact of SFR on the relationship between local revenues and race.

$$LREV_{ist} = \beta_0 + \beta_1 NW_{ist} + \beta_2 SFR * NW_{ist} + \beta_3 Pov_{ist} + \beta_4 Enroll_{ist} + \gamma_{is} + \mu_{st} + \varepsilon_{it}$$

Where LREV reflects local revenues per pupil for district i in state s in year t; SFR is an indicator variable taking a value of 1 if the highest court in state s has overturned school finance laws before or during time t and taking a value of 0 otherwise; NW is a vector of variables representing a district's non-White racial composition (percentage Black, Hispanic, Asian, and American Indian); Pov is the percentage of district students in poverty (receiving free lunch); Enroll are a pair of variables capturing district size; and γ and μ are district and state-by-year fixed effects, respectively;. The coefficient of interest is β_2, which provides an estimate of the effect of school finance reform on local revenues per pupil to districts with a 1 percentage point greater share of Black, Hispanic, Asian, or American Indian students, respectively.

Moreover, I will specify a model which examines differences in local revenue responses to state aid increases or decreases – further estimating the extent to racial composition mediates the crowd out of local revenues by state aid. Iis there a difference in flypaper effect on the basis of district racial composition? This model will be specified as:

$$LREV_{ist} = \beta_0 + \beta_1 Aid_{ist} + \beta_2 NW_{ist} + \beta_3 Aid * NW_{ist} + \beta_4 Aid * NW * SFR_{st} + \beta_5 Pov_{ist} + \beta_6 Enroll_{ist} + \gamma_{is} + \mu_{st} + \varepsilon_{it}$$

Where Aid_{ist} is per pupil state aid in district i in state s in time t; and all other variables are defined as above. β_3 is an estimate of the relationship between minority representation and the flypaper effect in the absence of SFR. β_4 is an estimate of the effect of SFR on the relationship between minority representation and the flypaper effect.

Including local revenue responses to state aid broadens the focus of the paper. As a result, the introduction and literature review will need to provide supportive evidence of why we may expect a flypaper effect or crowd-out in the context of intergovernmental education aid. I will add this relevant literature to the dissertation version of the paper.

3. Improving NYS Case Study and Adding Nuance

The current paper uses a case study of NYS to further explore the relationship between race and state aid. The analysis in the NYS section is very similar to the national analysis, but with additional controls for cost and revenue raising capacity in lieu of state or state-by-year fixed effects. I currently specify additional models for the NYS analysis, but this is mostly redundant. Instead, I will refer back to the models in the national analysis and streamline the methods section.

The NYS case is unique for a couple reasons, but the paper currently does not exploit the opportunities it provides. As one example, SFR in NYS specifically calls for increased aid to New York City; the legislative response changed the funding formula for all districts. This provides important context for two reasons. One, this provides one example of how legislative responses to SFR do not always follow in lock-step of the rulings. Legislative responses to SFRs, in fact, are political, just like the legislation that leads to unequitable state aid formulas in the first place. The difference, however, is that post-SFR legislation is constrained by compliance with the court mandate. This should be discussed more deeply in the paper. Two, I exclude New York City and the other "Big 5" school districts in some analyses as a robustness check (due to their size and high minority representations). The history of SFR in NYS, however, suggests that these results should be discussed more fully instead of being delegated to an appendix.

The second example of NYS's uniqueness is that NYS has four distinct treatment periods that can be exploited: (1) before any SFR (from the beginning of the panel until 2003), (2) after the 2003 SFR from 2003-2006, (3) following the 2006 SFR until the state fell out of compliance with its own legislative response to the court ruling, and (4) the "non-compliance" period. While exploring the relationship between race and state aid during these periods will not provide causal estimates of the impact of SFR, it will provide greater context, which is one of the benefits of this case study. In the dissertation version of this essay, I will explore how the relationship between race and state aid changes in each of these four periods.