

THE FISCAL EXTERNALITIES OF CHARTER SCHOOLS: EVIDENCE FROM NORTH CAROLINA

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Abstract

A significant criticism of the charter school movement is that funding for charter schools diverts money away from traditional public schools. The magnitude of such adverse fiscal externalities depends in part on the nature of state and local funding policies. In this paper, we examine the fiscal effects of charter schools on both urban and nonurban school districts in North Carolina. We base our analysis on detailed balance sheet information for a sample of school districts that experienced substantial charter growth since the statewide cap on charters was raised in 2011. We find a large and negative fiscal impact in excess of \$500 per traditional public school pupil in our one urban school district, which translates into an average fiscal cost of about \$3,600 for each student enrolled in charter schools. We estimate comparable to somewhat larger fiscal externalities per charter school pupil for two nonurban districts.

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INTRODUCTION

The expansion of charter schools over the past thirty years has raised a number of important questions in education policy. Considerable empirical research, for example, has examined the effectiveness of charter schools at increasing student learning (e.g., Bifulco and Ladd 2006; Abdulkadiroğlu et al. 2011; Dobbie and Fryer 2013; Chabrier, Cohodes, and Oreopoulos 2016; Ladd, Clotfelter, and Holbein 2017), how parents and students choose and value charter schools (e.g., Walters 2014; Ladd et al. 2018; Ferreyra and Kosenok 2018), and whether charter schools induce public schools to become more efficient or productive (e.g., Betts 2009; Ni 2009; Imberman 2011; Winters 2012; Buerger and Bifulco 2019; Terrier and Ridley 2018).¹ In contrast, despite public concern and anecdotal evidence about the potential for charter schools to have negative fiscal impacts on public school districts, only a few studies have sought to quantify the magnitude of such externalities. Bifulco and Reback (2014) report estimates for the urban districts of Albany and Buffalo, New York, but little to no work has examined how such impacts vary across smaller districts, both urban and nonurban, that are increasingly exposed to charter schools.²

In this paper, we examine the fiscal impacts of charter schools in one urban and five nonurban districts in North Carolina that have experienced significant charter entry since the 2011 removal of the statewide cap of 100 charter schools. As clarified by Bifulco and Reback (2014), charter schools generate negative fiscal externalities on public school districts to the degree that districts are unable to reduce spending in line with the revenue losses they experience as a result of charter schools without reducing services to the remaining public school students. The magnitude of the fiscal impact will depend on several factors, including the share of students lost to charters, the flexibility that districts have to adjust various components of their education budgets, as well as the types of students who enroll in charter schools. Because such factors differ across school districts, the fiscal impacts of charter schools may be more pronounced in some types of districts than for others. For example, nonurban school districts, which tend to be smaller and lower density, may have less latitude for adjusting their spending than urban districts when they lose enrollments to charter schools. Of policy interest is both the magnitude of the fiscal externalities from charter schools in different types of public school districts and the appropriate policy responses.

The school districts sampled for this study are drawn from North Carolina, a relatively large state with a population that exceeds 10 million people. The state has 100 counties and 115 school districts. A few counties include more than one district, one of which is typically a city district. Our sample comprises one medium-sized urban school district (Durham County), which we include because it has a large and growing share of charter schooling, with charter school students now accounting for about 15 percent of enrollment.³ The other five districts in our sample are less densely populated and

1. See Epple, Romano, and Zimmer (2016) for a recent review of the literature. Recent work (Singleton 2019) also examines the equity implications of how charter schools respond to funding.
2. An exception is Lapp et al. (2017), who estimate fiscal impacts for six Pennsylvania school districts. Cook (2018) examines the effect of charter schools on public school district revenues in Ohio.
3. As of 2018, Durham is the eighth largest district in the state, with 34,172 students. The largest two districts in the state are Wake County, with about 155,000 students, and Charlotte-Mecklenburg, with about 146,000 students.

have charter enrollment shares that range from about 3 percent up to 14 percent (compared to a statewide average of about 6 percent). Charter enrollment has grown rapidly recently in these nonurban school districts.

To highlight the key mechanisms through which charter schools may generate negative externalities for school districts, we begin by presenting a simplified form of our Net Fiscal Impact calculations. We then describe the sample of districts and the data we use to implement our calculations. The data combine information from the state on school funding programs, and from expenditure reports detailed at the program code level for each school district for 2015–16. With these data, we build on the methodology of Bifulco and Reback (2014) by categorizing spending items as either fixed or variable costs in the short run, and estimating fiscal impacts under a range of scenarios.

Our results point to sizable negative fiscal externalities of charter schools in all six school districts. For Durham, under reasonable assumptions about its cost structure, we estimate a Net Fiscal Impact in excess of \$500 per traditional public school (TPS) student, which creates a \$16 million total burden. This value represents the magnitude of reductions in educational services for TPS students due to charter schools. Alternatively, quantifying the externality as the cost to the district for each student enrolled in charter schools, this burden translates into an average impact of around \$3,600 per charter school pupil in Durham. We find smaller, though sizable, Net Fiscal Impacts in the nonurban districts and considerable heterogeneity across them. For two of the nonurban districts in our sample, the fiscal costs per charter school pupil are comparable with or exceed the estimated magnitude of the externality in Durham.

This policy brief makes two primary contributions: First, we generalize the findings of Bifulco and Reback (2014) from two large cities in New York to a sample of school districts, including nonurban districts, in a different state. A second contribution is to then clarify the basic mechanisms that generate fiscal impacts, with attention to the contribution of the funding mechanisms in a state. Our findings are important for informing policy responses to ease the fiscal burden on public school districts, particularly as recent charter school expansion has impacted smaller, nonurban districts. Moreover, by benchmarking the fiscal impacts of charter schools, our findings contribute to understanding the net social value of charter schools, which may expand choice for some students while imposing costs on taxpayers and students who remain in district schools.

NET FISCAL IMPACT

We define the Net Fiscal Impact of charter schools, denoted *NFI*, in a school district as the dollar amount reduction in services per TPS pupil due to charter schools. We do not include a subscript to denote the district because we do the analysis separately by district. To highlight the key mechanisms that may drive negative fiscal externalities of charter schools, *NFI* can be expressed as:

$$NFI = (\text{Average Revenue Lost per Charter Pupil} - \text{Average Variable Cost per Charter Pupil}) * \text{Charter Enrollment Share.}$$

Net Fiscal Impact is the product of two terms. The second term, the Charter Enrollment Share, reveals that *NFI* is proportional to the fraction of students in the district served

by charter schools. The fiscal impact will therefore be greater in districts for which charter enrollment constitutes a larger share of schooling. The first term of the expression quantifies the magnitude of the fiscal externality: Charter schools will impose a burden when the revenue lost per charter school pupil is greater than the variable costs per charter pupil. This first term can also be viewed as the cost to the school district of a student enrolling in charter schools. Intuitively, fiscal impact thus turns on a district's ability to reduce expenditures commensurate with revenue losses. This ability may differ across school districts. For instance, the Average Variable Cost per Charter Pupil will vary with differences in the composition of students that belong to recognized need categories, such as children with disabilities. Further, a key motivation for our analysis is that districts serving nonurban areas with fewer students and less density are likely to be more limited in their ability to adjust, a difference that would be reflected quantitatively as a higher fiscal cost of charter school enrollment.

This stylized formulation for Net Fiscal Impact follows from simplifying assumptions elaborated upon in Appendix A that we later discuss and relax in the empirical implementation. In particular, we assume that the costs of providing education in traditional public schools can be divided into those that are fixed in the short run and those that are variable. Variable costs, such as the cost of employing teachers, change with student enrollment. Fixed costs, in contrast, are expenses that do not respond to changes in enrollments, which might include facility operations and maintenance, administration and support staff, and services for students with disabilities. This formulation also focuses only on the major revenue sources for both traditional public and charter schools, namely, state aid generated from state tax sources and local revenue generated from county taxes. Finally, we assume that all charter school students leave public schools (as opposed to private schools or homeschooling). Applying some notation, these assumptions allow us to express Net Fiscal Impact as follows:

$$NFI = (r_S + r_L - VC) * \frac{Q^C}{Q^P + Q^C},$$

where $r_S + r_L$ is the Average Revenue Lost per Charter Pupil, which consists of state and local per pupil revenue, respectively. VC represents the Average Variable Cost per Charter Pupil, and the Charter Enrollment Share is given by $Q^C / (Q^P + Q^C)$ (i.e., charter enrollment, Q^C , divided by charter plus public enrollment).

Two substantive assumptions are important to highlight regarding estimating Net Fiscal Impact: The first is the assumption that the Average Variable Cost per Charter Pupil for the school district is equal to the Average Variable Cost of serving TPS students. This assumption, which we revisit and modify to address recognized categories of student need, such as special education, allows us to calculate what variable costs would be in the counterfactual in which there are no charter schools. Second is the assumption that charter expansion does not generate any benefits to TPS students in the form of decreased congestion in the consumption of fixed cost inputs.

DATA AND IMPLEMENTATION

To estimate Net Fiscal Impact, we combine data with various assumptions regarding different elements that enter the calculation. In this section, we describe in detail the

Table 1. School District Characteristics, 2015–16

	Durham	Buncombe	Cabarrus	Iredell	Orange	Union
County population	306,212	256,088	201,590	172,916	141,796	226,606
Population growth	3.76%	2.44%	5.11%	3.59%	1.37%	3.87%
Density (students/square mile)	130	41	95	43	23	68
TPS school enrollment	33,144	24,305	31,260	20,643	7,501	41,873
Charter enrollment share	15%	7%	6%	14%	6%	3%
Number of charters	13	5	3	4	2	1
Charter enrollment growth	17%	113%	84%	36%	94%	6%

Notes: Population refers to the 2016 estimate of county Resident Population per the U.S. Census Bureau and population growth reports growth rate since 2014. Numerator of density is traditional public plus charter school enrollment in the district. Charter enrollment share is charter enrollment as a fraction of charter and traditional public school enrollment (i.e., excluding private school enrollment) in the district. Charter enrollment growth is percentage growth in enrollment in the district since the 2013–14 school year. TPS = traditional public school.

data we gathered and empirical implementation of the calculations for an illustrative sample of six North Carolina school districts.

Data Sources and Descriptive Information

We collected data for six school districts in North Carolina. Because North Carolina does not centrally collect district expenditure data detailed at the program code level, we collected the data from the individual districts. We use the medium-sized urban district of Durham to illustrate fiscal impacts of charters in an urban district. We chose Durham because its 15 percent share of charter school students exceeds that in all other North Carolina urban districts. We use Durham as the point of comparison for the impacts of charters in five nonurban districts, which we selected as follows. We first identified all school districts with fewer than 100 students per square mile and more than two charter schools as of 2016–17. Using these criteria, we contacted Buncombe, Cabarrus, Guilford, Iredell–Statesville, and Union for detailed expenditure data. We also contacted three additional more rural districts with just two charter schools each (Granville, Orange, and Pitt). We included in our final sample the five districts from which we were able to obtain complete and usable expenditure records for the 2015–16 school year.⁴ The characteristics of Durham and the five nonurban districts—Buncombe, Cabarrus, Iredell–Statesville, Orange, and Union—are shown in table 1.⁵

As the table shows, in addition to being the most populated, Durham is the most urban of the counties, with a density of 130 students per square mile. Charter schools also have the highest presence in Durham; 13 charter schools are located in Durham County and about 15 percent of students attend a charter school as opposed to a district public school. The remaining school districts in our sample have lower densities of

4. All but one of these nonurban districts (Granville) responded to our inquiry for detailed expenditure records for the 2015–16 school year, but the data we received were incomplete or otherwise unusable for two of the districts (Guilford and Pitt).
5. Note that our sample of school districts includes two that have the same name as their respective counties but do not cover the whole county—namely, Cabarrus and Orange. Those two counties each include a city district, Kannapolis City and Chapel Hill–Carrboro, respectively, that are not in our sample but are included in the county population figures in table 1.

students, indicative of less urbanization. In addition, with the exception of Union County's nearly 42,000 students, these districts also serve fewer students than Durham. Buncombe County schools, for example, serves over 24,000 TPS students, with a student density of just 41 per square mile, or about a third of the density of Durham.

The shares of charter school enrollments differ significantly across the nonurban districts. Although Buncombe, Cabarrus, and Orange have charter shares that are near or exceed the national and or state averages of around 6 percent, Iredell's charter enrollment share is far larger, at 14 percent, whereas the share in Union is just 3 percent. The table also presents the percentage growth in charter enrollment since 2013–14. On this score, the nonurban districts (save Union county) significantly exceed Durham's growth rate of 17 percent and, in the cases of Orange and Buncombe, have experienced nearly a doubling of charter school enrollment in the district in just two years. Charter enrollment grew 84 percent in Cabarrus, as well. Given the need to assure classroom spaces in schools that are accessible to families, the rapid growth of charter schooling in these nonurban districts, combined with their overall low student densities, may make it difficult to adjust spending in ways commensurate with lost revenues.

The detailed annual expenditure data provided by each of our six school districts list expenditures by line item, which are categorized by fund and program code. This level of detail is important for two reasons: First, as we elaborate below, building upon the prior work of Bifulco and Reback (2014), we use them to identify spending items that are fixed and those that may be adjusted with enrollment. Second, the detailed expenditure sheets list the amount of funding from local revenue sources sent by the school district to charter schools. We supplement these data with public information collected from the state of North Carolina regarding state allocations, district, and charter enrollments.

Empirical Approach

Our empirical approach to estimating fiscal impacts of charter schools requires attention to three additional elements: (1) the share of students who enroll in charter schools who would otherwise have been in public schools, as opposed to private or home schooling (abstracted from in our stylized exposition); (2) school funding formulas, which affect how much revenue is transferred to charters, as well as additional support for recognized categories of student need (including from the federal government); and (3) the structure of costs and their heterogeneity across school districts. We detail each component in this subsection before discussing some limitations of our approach and presenting the findings.

The Demand for Charter Schooling

The fraction of students who enroll in charter schools who otherwise would have attended a public school in the district (rather than a private school or home schooling) matters because only the state aid for students switching from public schools is lost revenue to the district. (The state aid for students switching from private or home schooling represents a cost to the state, however). To see this, note that in the extreme case in which all charter enrollees left private schools, the district's enrollment and revenues from state aid would remain unchanged. In that scenario, charter enrollment creates

lost revenue for the school district in North Carolina only via the sharing of per pupil local revenues.⁶ Thus, to reflect the reality that charter school students are drawn from a combination of district public schools and private schools or homeschooling, we generalize the expression for Net Fiscal Impact as follows:

$$NFI = \frac{(r_S - VC(1)) * (Q^P(o) - Q^P(1)) + r_L * Q^C(1)}{Q^P(o)}$$

We use (1) in this expression to represent the value of a variable after charter schools open in the school district and (o) to represent the counterfactual without charter schools. Thus, $Q^P(o) - Q^P(1)$ is the number of TPS students who left for charter schools [which need not equal charter enrollment, $Q^C(1)$].⁷

To take this expression to the data, note that public school enrollment in the absence of charter schools, $Q^P(o)$, is a counterfactual object. As a result, we, like Bifulco and Reback (2014), must make assumptions to produce empirical estimates regarding the fraction of charter students who leave public schools. We therefore compute and report predicted fiscal impacts under three alternative scenarios for charter students who do not belong to a specific category of need recognized in funding formulas:

Scenario A: Drawn entirely from public schools

Scenario B: Drawn proportionately from public and private schools

Scenario C: Drawn disproportionately from private schools

In scenario C, the share of charter students drawn from public schools is the traditional public school share of all students, including students in private schools.⁸ We regard as unrealistic and exclude the extreme case that charter students are drawn entirely from private schools.

School Funding Formulas

Based on North Carolina statutes, charter schools receive the average per pupil allocation for the school district from the state for each student.⁹ North Carolina's education funding system is based primarily on allocations of various types of positions, not dollars, to each local district. This approach leads to variation in the per pupil dollar amount of per pupil state aid across districts in part because the state uses a statewide salary schedule to cover the cost of the allocated positions and some districts are able

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6. There would also be fiscal impacts, analogous to the analysis for students drawn from private schools or homeschooling, from students moving to the school district (from outside the district, including out of state) to attend a nearby charter school. As students can attend charter schools outside their district of residence in North Carolina, however, any incentive to residentially sort to access charter schools is lessened. Also, the empirical evidence from home prices suggests that such incentives are overall weak (Brehm, Imberman, and Naretta 2017).
 7. Fiscal impact per charter school student is total fiscal impact [$NFI * Q^P(o)$] divided by charter school enrollment.
 8. For illustration, if 70 students attend public schools, 20 charter schools, and 10 private schools, scenario C assumes that 70 percent of the charter school students (14 in total) switched from a public school. By contrast, in scenario B the share of charter students drawn from public schools is the public school share of enrollment in just charter and public schools (i.e., excluding private schools), that is, about 78 percent of charter students (about 16 total). Scenario A assumes that all 20 switched from a public school.
 9. The average is calculated excluding funding to the district for Children with Disabilities or who are Limited English Proficient, for which charters separately qualify.

to recruit more highly qualified teachers and other staff than other districts.¹⁰ Per pupil state aid for the district, represented by r_S in the expression for Net Fiscal Impact, is publicly reported for each district by the state.¹¹ Additionally, the detailed balance sheet for each school district reports total local payments to charter schools, $r_L * Q^C(1)$.¹² Using state records for the enrollment of students who reside in each district attending charter schools to obtain $Q^C(1)$, we are able to calculate the per pupil amount, r_L .

However, our stylized presentation for Net Fiscal Impact abstracts from categories of recognized student need reflected in school funding formulas, including those linked to federal sources of revenue such as Title 1. At the state level, charter schools in North Carolina may qualify separately for Children with Disabilities and Limited English Proficient (LEP) funding. Revenues that the school district would have received for qualified students follow those students to charter schools. To augment the formula for these categories, we therefore add lost revenue for the school district for charter enrollees that belong to these categories. The per qualified pupil amount of lost revenue for Children with Disabilities we take to be the per qualified pupil payment to charters in the district, and for LEP, the per qualified pupil state aid to the district, which we collect from the state.¹³ For the charter students who belong to these categories of need, we compute all of the estimates under the assumption that they are drawn entirely from traditional public schools. Districts also receive funding from federal sources, generally tied to students who are eligible for free or reduced-price lunch, that may be lost when qualified students switch to charters. We thus build lost revenue from Title 1, Title VI, and the Child Nutrition into the estimates program using the reported line item amounts on the district balance sheets. However, in contrast with students who belong to either the Children with Disabilities or LEP categories, we assume that students eligible for free or reduced-price lunches substitute between charters and private schools as in the three scenarios outlined in the prior subsection.

The Structure of School District Costs

The determination of variable costs per pupil, $VC(1)$, requires assumptions about the structure of school district costs. We pursue two steps using the detailed expenditure records: First, we apply the categorization of the district expenditure sheet items as either “Fixed” or “Variable” used by Bifulco and Reback (2014) to estimate impacts in New York. This approach ensures comparability of the findings across the two states. “Fixed” items are those that must be supplied regardless of enrollment in the short-run, and “Variable” items correspond to categories where districts may be able to cut

10. A district that is able to hire more experienced teachers (who command higher salaries according to the state schedule) thus receives more funding than a district that hires less experienced, and lower paid, teachers even if the districts are the same size and are allocated the same number of teachers. State funding per pupil is also greater for low-wealth and small districts.
11. Because North Carolina allocates much of its state aid using position allotments, this allocation is not necessarily equal to what the district would have received for the marginal student who switches to a charter school. r_S should instead be regarded as the average state aid per pupil lost to the district for students who attend charter schools.
12. To be more precise, school districts must share current revenue other than capital appropriations (which are made at the county level) on an equal per pupil basis with charter schools.
13. These are both approximations to the respective (nonlinear) funding formulas, which include caps on the qualified student population (for exceptional students) and base allocations on prior year enrollment as well (for LEP) in North Carolina.

Table 2. Categorization of Expense Items

Item	Variable or Fixed
Classroom Teachers	Variable
Central Office Administration	Fixed
Non-Instructional Support Staff	Variable
School Building Administration	Fixed
Instructional Support	Variable
Driver Training	Variable
Non-Contributing Employee Benefits	Variable
Professional Development Programs	Variable
Career-Technical Education	Variable
Teacher Assistants	Variable
Behavioral Support	Fixed
Academically Gifted Programs	Variable
Child & Family Support	Fixed
Limited English Programs	Fixed
Transportation	Variable
Classroom Materials & Equipment	Variable
Alternative Programs & Schools	Fixed
At-Risk Student Services	Fixed
State Textbooks	Variable
Facilities & Capital Outlay	Fixed

spending as students leave to attend charter schools. Table 2 displays the categorization that we use of select expense items on the district balance sheets.

Classroom Teachers, displayed at the top of the table, is categorized as “Variable,” indicating that districts can adjust spending on teachers in response to lower public school enrollments. In contrast, we classify the second item, Central Office Administration, as “Fixed.” At least in the short run, the district must incur costs for administrative services and personnel regardless of the number of students that a district serves. Other items categorized as “Fixed” represent services for at-risk, LEP, and disabled or exceptional children. The categorization of these items as “Fixed” reflects two considerations: First, these spending items tend to have large fixed costs of supply, often in the form of specialized professionals or services, such as those needed to identify eligible students, that serve multiple sites. Second, enrollment of students belonging to these recognized categories of need in charter schools is significantly lower than in public schools, implying that charter expansion is unlikely to significantly reduce the demand for these services. In our sample, the average share of charter students who are categorized as LEP is less than 1 percent, far below the 7 percent share of public school students.¹⁴ The presence of fixed costs means that by reducing enrollments in traditional public schools, charter penetration is likely to raise average costs for the school district, which registers as a fiscal burden in our calculations. Thus, the distribution of

14. The share of exceptional or special education children in charter schools is also lower, though in lesser degree (9 percent in charters as opposed to 12 percent in public schools). Given evidence that students with more serious disabilities (Winters 2015) are relatively less represented among special education charter enrollees, this gap likely understates the difference.

each district's spending across these expense items will influence the magnitude of the Net Fiscal Impacts.

In the second step, we compute a range of predictions for Net Fiscal Impact given alternative assumptions regarding the adjustability of the "Variable" category items. This extension of Bifulco and Reback's (2014) approach is important for two reasons: First, it allows for the possibility that nonurban districts, due to smaller scale and lower density, face a greater difficulty of adjustment than do urban districts over the same time horizon. Second, this extension allows for the possibility that variable costs may not be fully or perfectly adjustable even within the short run. For example, although categorized as "Variable" in the first step, Transportation includes the fixed costs of hiring drivers and purchasing and maintaining equipment, which may not be appreciably adjusted if enrollment declines are modest. Similarly, if each classroom in a school loses perhaps only a few students, limited adjustment may be possible in Classroom Teachers.

To achieve this end, we introduce an elasticity of spending with respect to enrollment to reflect the fact that the district may face some stickiness in its ability to reduce "Variable" expenses in line with enrollment declines. Our earlier expression for Net Fiscal Impact implicitly embeds an elasticity of 1 where for each percentage point reduction in public school enrollment, variable spending can also be cut by a percentage point. In contrast, if the elasticity of a spending category were 0.5, variable spending can be cut by only 0.5 percent in response to a 1 percent loss in enrollment. We compute Net Fiscal Impact under three elasticities for the "Variable" spending category: 1, 0.8, and 0.5. Note that an elasticity of 1 can be interpreted as "Fully Adjustable" in that it implies no stickiness in the adjustment of district spending in response to an outflow of students. The elasticities can be equivalently understood as the share of variable costs that can be fully cut back in response to such an outflow.

Limitations

Our empirical approach and implementation is not without limitations. Although we examine multiple scenarios, the estimates remain potentially sensitive to the categorization of expenses as "Fixed." For example, the scenarios we have discussed so far do not allow for the possibility of any offsetting cost reductions that might arise from a reduced need to build new public school facilities due to charter expansion. Hence, we extend the analysis to include impacts for an additional scenario that treats facilities and related spending (e.g., capital outlay, plant operations, and maintenance) as variable with stickiness to adjustment rather than as fully fixed as a robustness check.¹⁵ This consideration is also valuable for comparing our results, based on North Carolina districts that are growing in enrollments over time, with Bifulco and Reback's (2014) estimates for Buffalo and Albany, New York, where enrollments are declining.

Another limitation of our approach is that our estimates do not account for the possibility that charter schools may induce the district to spend its money more efficiently. Such efficiency effects could potentially arise from competitive incentives that induce the public school districts to cut wasteful spending or that cause the district to reallocate inputs to more productive uses, potentially biasing upwards our estimates of Net Fiscal

15. Administrative expenditures, consistent with estimates showing global economies of size (see Duncombe, Miner, and Ruggiero 1995), remain fully fixed in this additional scenario.

Impact. The evidence regarding the competitive impacts of charter schools is mixed, however, and work that has examined efficiency directly finds little to weak evidence for such responses from districts (Ni 2009; Buerger and Bifulco 2019).¹⁶

Working in the other direction, our estimates likely do not account for all possible costs to districts of charter schools. For example, public school districts may have to devote resources to activities such as monitoring payments to charter schools. Further, districts may incur costs from charters even in the longer run that need not appear in terms of realized expenditures. One such cost arises because the existence of charters makes it difficult for the district to plan, given the uncertainty about the number and mix of enrollments in the traditional public school sector.

Finally, our estimates are partial in that they shed light only on the fiscal burden of charter schools. Such a burden is borne by students who remain in traditional public schools (in terms of reduced services) and/or by local taxpayers.¹⁷ For evaluating the full social value of charter schools, a more complete analysis of benefits and costs would be required. That analysis would have to include any benefits from charter school expansion through greater choice for parents and children, as well as any additional costs in the form of, for example, greater racial or economic isolation (Ladd et al. 2017, 2018).

RESULTS

In this section, we present our estimates of Net Fiscal Impact. We first present the estimates for Durham before discussing the results for the five nonurban school districts in our sample.

Durham County

Table 3 presents estimates of Net Fiscal Impact for Durham under the various scenarios outlined in the prior discussion. The first column reports estimates given the assumption that the adjustable category spending items, as classified in table 2, can be reduced one for one with reductions in enrollment. With the baseline categorization of spending categories as either fixed or adjustable in the short run, Durham's variable cost per TPS pupil is around \$6,468. Under scenario A, which assumes that all charter students exited public schools, we estimate a fiscal impact of \$520 per TPS student. In other words, charter schools require that Durham must reduce services for each TPS student by about \$500 or find other revenue sources to compensate. Under the more realistic scenarios that students are also drawn from private schools, the fiscal impacts are somewhat larger. This considerable Net Fiscal Impact stems from Durham's combination of a large charter enrollment share and local revenue stream that must be shared with charter schools. Given TPS enrollment of nearly 33,000 students in Durham, the total fiscal burden in this scenario translates into over \$16 million dollars each year.

16. Although state aid to the district does not respond to charter enrollment in North Carolina, bias could also arise from responses that affect local revenues. In this case, the bias would lead us to underestimate the impacts if, as is plausible, charter school enrollment in a district were associated with reduced support for local taxes for public schools.

17. Note that, because they receive state aid, students drawn to charter schools from private and home schooling also represent a fiscal burden for state taxpayers that is additional to the burden borne (and that is implicit in our estimates) by local taxpayers.

Table 3. Net Fiscal Impacts for Durham, 2015–16

Elasticity	1	0.8	0.5	*
Variable Costs / Pupil (VC(1))	\$6,468	\$5,175	\$3,234	\$7,234
Scenario				
A	\$520	\$710	\$994	\$409
B	\$534	\$706	\$964	\$432
C	\$547	\$703	\$935	\$445
State aid / pupil (r_s)		\$5,039		
Local payments / pupil (r_L)		\$3,271		
Charter enrollment share		15%		

Notes: Table presents estimates of Net Fiscal Impact for Durham in 2015–16. The columns each apply a different elasticity. Scenario A is all charter students left public schools; B is charters draw proportionately from public and private schools; C is charters draw disproportionately from private schools. Column * reports estimates for an elasticity of variable cost adjustment of 1, but facilities-related expenses are adjustable with an elasticity of 0.5 instead of fixed.

Table 4. Fiscal Impact per Charter School Pupil for Durham, 2015–16

Elasticity	1	0.8	0.5	*
Scenario				
A	\$3,562	\$4,856	\$6,796	\$2,795
B	\$3,599	\$4,757	\$6,493	\$2,912
C	\$3,634	\$4,663	\$6,207	\$3,023

Notes: Table presents estimates of fiscal impact per charter school pupil for Durham in 2015–16. The columns each apply a different elasticity. Scenario A is all charter students left public schools; B is charters draw proportionately from public and private schools; C is charters draw disproportionately from private schools. Column * reports estimates for an elasticity of variable cost adjustment of 1, but facilities-related expenses are adjustable with an elasticity of 0.5 instead of fixed.

For comparison, these estimates, which are methodologically most similar to those reported by Bifulco and Reback (2014), are smaller than their estimated fiscal impacts of charter schools in the urban school districts of Albany (\$883 to \$1,070) and Buffalo (\$633 to \$744) for 2009–10. A more direct comparison, however, is the average fiscal impact (or cost) per charter school student rather than per public school pupil. This measure is independent of the size of the charter sector, which is larger in Albany and Buffalo. For the same scenarios and elasticities as in table 3, table 4 reports estimates of this cost to Durham. Scenario A reports an estimate of \$3,599 fiscal impact per charter school student under an elasticity of 1. This estimate is nearly identical with the corresponding numbers for Albany and Buffalo (\$3,529 and \$3,698, respectively).¹⁸

The second and third columns of table 3 present estimates in which adjustments in variable costs for Durham are sticky. For example, in the second column, where variable costs can only be cut 8 percent for every 10 percent reduction in enrollment, our

18. It is also worth keeping in mind that in these comparisons, total expenditure per pupil is substantially higher on average in New York than in North Carolina.

Table 5. Net Fiscal Impacts for Nonurban Districts, 2015–16

	Buncombe	Cabarrus	Iredell	Orange	Union
Elasticity					
1	\$112	\$74	\$62	\$169	\$93
0.8	\$176	\$140	\$225	\$241	\$126
0.5	\$272	\$238	\$470	\$349	\$177
*	\$107	\$107	\$176	\$208	\$108
State aid / pupil (r_s)	\$4,899	\$4,737	\$4,787	\$5,165	\$4,848
Local payments / pupil (r_l)	\$1,904	\$1,412	\$824	\$4,200	\$2,959
Charter enrollment share	7%	6%	14%	6%	3%

Notes: Table presents estimates of Net Fiscal Impact for 2015–16. The three predictions presented for each district correspond to scenario B in which charter schools draw proportionately from public and private schools. Column * reports estimates for an elasticity of variable cost adjustment of 0.8, but facilities-related expenses are adjustable with an elasticity of 0.5 instead of fixed.

Table 6. Fiscal Impact per Charter School Pupil for Nonurban Districts, 2015–16

	Buncombe	Cabarrus	Iredell	Orange	Union
Elasticity					
1	\$1,716	\$1,192	\$433	\$2,943	\$2,885
0.8	\$2,696	\$2,246	\$1,580	\$4,197	\$3,936
0.5	\$4,167	\$3,827	\$3,300	\$6,078	\$5,511
*	\$1,641	\$1,714	\$1,237	\$3,624	\$3,373

Notes: Table presents estimates of fiscal impact per charter school pupil for 2015–16. The three predictions presented for each district correspond to scenario B in which charter schools draw proportionately from public and private schools. Column * reports estimates for an elasticity of variable cost adjustment of 0.8, but facilities-related expenses are adjustable with an elasticity of 0.5 instead of fixed.

estimates of Net Fiscal Impact are about \$700 per pupil for all scenarios. The corresponding estimates of fiscal impact per charter school student, reported in table 4, are around \$4,700. The third column, which models an additional stickiness in adjustment with a lower elasticity of 0.5, yields predictions of about \$1,000 per TPS pupil in reduced services due to charter schools. In the column labeled *, we present sensitivity estimates in which facilities spending is modeled as modestly adjustable (with an elasticity of 0.5), while variable costs are fully adjustable with an elasticity of 1. Even with these optimistic assumptions about how readily the district can adjust its spending to the growth of charters, particularly in the short run, we estimate the fiscal burden of charter schools in Durham to be over \$400 per traditional public school pupil, and the cost per charter school pupil to Durham is over \$2,700.

Nonurban Districts

Table 5 presents the estimates of Net Fiscal Impact of charter schools for the five nonurban North Carolina school districts, and table 6 reports estimates of fiscal impact per charter school pupil. We report the estimates only for scenario B, in which charter schools draw proportionately from public and private schools. As suggested by the

pattern of results in tables 3 and 4, the magnitudes of the estimates do not differ very much for alternative enrollment scenarios.

The results display consistently negative fiscal externalities of charter schools, with considerable heterogeneity in the magnitudes. For example, we estimate a Net Fiscal Impact of charter schools of \$272 per TPS pupil based on an elasticity of 0.5 scenario for Buncombe County. Based on comparable assumptions, we estimate slightly smaller fiscal impacts in Cabarrus (\$238) but even more modest ones in Union county (\$177). In contrast, we estimate the Net Fiscal Impact of charter schools on Iredell and Orange to be in the range of \$200 to \$500 per TPS pupil, given assumptions of 0.8 and 0.5 regarding the adjustability of fixed expenses for nonurban school districts.

The corresponding estimates of the fiscal cost per charter school student in table 6 are valuable for comparing the impacts with Durham. Although Iredell has a relatively large Net Fiscal Impact, its cost per charter school student is between \$1,500 and \$3,300, much less than the corresponding estimate for Durham. This highlights that Iredell's significant Net Fiscal Impact is driven by its large charter enrollment share. In contrast, for Orange the estimated fiscal impact per charter school pupil, from \$4,000 to \$6,000, is comparable to or exceeds the estimated cost to Durham. The estimated cost per charter student in Union is similar in magnitude, although its low charter enrollment generates a modest overall Net Fiscal Impact.

In the sensitivity checks presented in row * of tables 5 and 6, we allow facilities spending to be adjustable (with an elasticity of 0.5), while variable costs, in line with our preferred parameterization for nonurban districts, are somewhat costly to adjust (an elasticity of 0.8). In this scenario, the estimated Net Fiscal Impacts remain negative and the cost per charter pupil in the nonurban districts of Orange and Union remains comparable with Durham's.

CONCLUSION

Recent policy momentum behind charter school expansion has generated renewed interest in understanding the various impacts of charter schools. Despite concerns by local policy makers, popular writing, and anecdotes that charter schools may have large negative fiscal impacts on public school districts, limited empirical work has sought to quantify such externalities and how they may vary across types of school districts.

Building on the approach taken by Bifulco and Reback (2014) for the New York cities of Albany and Buffalo, we examine the short-run fiscal impacts of charter schools for a sample of six North Carolina districts: Durham County and five nonurban districts that have experienced significant charter entry since 2011. Our results point to negative fiscal externalities of charter schools in all six school districts, with considerable heterogeneity in impacts across the nonurban districts. In the nonurban districts of Iredell and Orange, the Net Fiscal Impact—which quantifies the magnitude of potential service reductions for students who remain in traditional public schools—is sizable in magnitude (though smaller than the impact per traditional public school pupil we estimate for Durham). For Iredell, this magnitude reflects a larger charter enrollment share. For Orange and Union, two nonurban districts with low overall charter enrollment share, the average fiscal cost per charter school student is comparable to or exceeds the magnitude of the externality in Durham. We estimate a cost per charter school student in

those two districts of around \$4,000 under reasonable assumptions about nonurban districts' ability to adjust spending, above the \$3,600 estimated for Durham.

These negative fiscal externalities suggest the need for statewide policies to ease the adverse fiscal impact of charter schools on traditional public schools. To the degree that such impacts of charter schools are temporary, one policy response would be for the state to provide transitional aid to smooth or mitigate revenue losses for school districts as local charters expand. Such a program has precedents in New York and Massachusetts, although in neither case does the magnitude of the aid offset the full negative fiscal impacts of charters. In Massachusetts, the aid is supplied over a six-year period (bigger in the first year) and further compensates districts for students drawn from private and home schooling (Schuster 2016). The appropriate period for transitional aid is likely to vary by district. The greater difficulty that nonurban districts face in adjusting to an influx of charter schools because of their lower density and smaller scale suggests, for example, that the relevant short-run period may be longer than for urban districts with flexibility to adjust programs across a greater number of classrooms and schools. Although the particular details of such a policy raise important questions about design and implementation, a transitional aid program would recognize that the state should bear the full costs of the charter schools it authorizes by including among those costs the negative externalities that charter schools impose on the local districts.

Temporary assistance, however, may not suffice if impacts are permanent. Our estimates do not speak directly to the size of costs in the long-run, but the existence of two sectors implies duplication of functions and services. For example, the district must continue to maintain a substantial central office operation. Further, the presence of a charter sector in which schools may open or close for various reasons (such as financial mismanagement, academic failure, changing goals, or changing parental preferences) generates uncertainty for district policy makers. An important direction for future work, then, is quantifying the longer-run impacts of charter expansion on school districts.

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APPENDIX A: CALCULATING NET FISCAL IMPACT

This appendix walks through the derivation of our stylized expression for Net Fiscal Impact. We divide the costs of providing education in traditional public schools into those that are fixed in the short run and those that are variable, and focus the exposition only on the primary sources of revenue, per-pupil state aid generated from state tax sources, and per-pupil local revenue generated from local county taxes. Each charter school in North Carolina receives funding directly from the state at the same average per-pupil rate as the school district in which the charter student lives, and also local revenue at the same per-pupil rate as the regular public schools in the district. We let r_L represent this per-pupil amount of local revenue. We can therefore express a school district's total expenditure, which we denote by E , as the sum of fixed costs, total variable costs, and total payments to charter schools:

$$E = FC + VC * Q^P + r_L * Q^C,$$

where Q^P and Q^C represent enrollments in traditional public schools and charter schools, respectively; FC denotes total fixed costs, and VC represents the per traditional public school pupil variable cost.

To conceptualize the impact of charter schools, we need to consider what costs the district would have incurred had there been no charter schools in the district. To do so, we introduce additional notation: Let 1 represent the value of a variable after charter schools open in the school district and let 0 represent the counterfactual without charter schools. Thus, $E(1)$, the total expenditure for a school district in the presence of charter schools, is observed directly from the balance sheets of each of the school districts in our data. Similarly, we also observe enrollments in traditional public schools in the presence of charter schools, $Q^P(1)$, in the data.

The Net Fiscal Impact of charter schools, denoted NFI , is the dollar amount reduction in services per TPS pupil due to charter schools.¹⁹ This is given by the difference between the amount of spending per TPS pupil on variable inputs without charters, $VC(0)$, and the per TPS pupil amount after charter schools open, $VC(1)$:

19. The district's total revenue and expenditure are held constant in this formulation. The Net Fiscal Impact can be equivalently conceptualized as the per-pupil amount that total expenditure could be reduced in the absence of charter schools, holding per-pupil variable spending fixed.

$$NFI = VC(o) - VC(1).$$

Intuitively, the money that follows the students who leave traditional public schools to charters requires that a district reduce its variable spending per pupil (as the district cannot reduce its spending on fixed costs). To compute $VC(o)$, we add total variable costs in the presence of charter schools to the total revenue lost to charters, the sum of total state aid and local payments to charters. We then divide that amount by TPS enrollment absent charter schools, $Q^P(o)$:

$$VC(o) = \frac{VC(1) * Q^P(1) + (r_S + r_L) * Q^C(1)}{Q^P(o)}.$$

In this equation, r_S represents the per pupil payment from the state and $Q^C(1)$ is the number of students enrolled in charters. Assuming that charter students would otherwise attend a public school [i.e., $Q^P(o) = Q^P(1) + Q^C(1)$], the expression for Net Fiscal Impact simplifies as follows:

$$NFI = (r_S + r_L - VC(1)) * \frac{Q^C(1)}{Q^P(1) + Q^C(1)}.$$