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The Fiscal  
Externalities of  
Charter Schools:  
Evidence from North  
Carolina

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# **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. As shown in prior work by Bifulco and Reback (2014) for two urban districts in New York, the magnitude of such adverse fiscal externalities depends in part on the nature of state and local funding policies. In this paper, we build on their approach to examine the fiscal effects of charter schools on both urban and non-urban school districts in North Carolina. We base our analysis on detailed balance sheet information for a sample of school districts that experienced significant charter entry since the statewide cap on charters was raised in 2011. This detailed budgetary information permits us to estimate a range of fiscal impacts using a variety of different assumptions. We find a large and negative fiscal impact from \$500-\$700 per pupil in our one urban school district and somewhat smaller, but still significant, fiscal externalities on the non-urban districts in our sample.

## I. 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. Abdulkadiroğlu 2011, Bifulco and Ladd 2006, Chabrier et al. 2016, Ladd et al. 2017a), how parents and students choose and value charter schools (e.g. Clotfelter et al. 2017, Ferreyra and Kosenok 2015, Walters 2014), and whether charter schools induce public schools to become more efficient or productive (e.g. Betts 2009, Buerger and Bifulco 2016, Imberman 2011, Ni 2009, Winters 2012, Terrier and Ridley 2017).<sup>1</sup> 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 we are aware of no studies that have examined how such impacts vary across smaller districts, both urban and non-urban, that are increasingly exposed to charter schools.

In this paper, we examine the fiscal impacts of charter schools in one urban and five non-urban 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

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<sup>1</sup> See Epple et al. (2017) for a recent review of the literature. Recent work also examines the equity implications of how charter schools respond to funding (Singleton 2017).

of their education budgets, as well as the types of students that enroll in charter schools. Because such factors vary across school districts, the fiscal impacts of charter schools may be more pronounced in some types of districts than for others. For example, non-urban school districts, which tend to be smaller and lower density, may have more limited latitude for adjusting their spending when they lose enrollments to charter schools than urban districts. Of interest, therefore, 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 ten million people.<sup>2</sup> 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.<sup>3</sup> The other five districts in our sample are less densely populated and currently have charter enrollment shares that range from about 3 percent up to 14 percent (the statewide average is around 5 percent). Charter enrollment has also grown very rapidly recently in these non-urban school districts.

To highlight the key mechanisms through which charter schools may generate negative externalities for school districts, we begin our analysis by presenting a stylized formalization 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)

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<sup>2</sup> The state has 100 counties and 115 school districts. A few counties include more than one district, one of which is a city district

<sup>3</sup> As of 2018, Durham is the 8<sup>th</sup> 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.

to categorize spending items as belonging to either fixed or variable costs and to estimate fiscal impacts under a range of scenarios.

Our results point to significant negative fiscal externalities of charter schools in all six school districts. For Durham, we estimate a Net Fiscal Impact in excess of \$700 per public school student, close to a \$25 million total burden, under reasonable assumptions about the cost structure of the district. While our results reveal considerable heterogeneity across the non-urban school districts in fiscal impacts, we also find that in some cases the impact can be equally significant on a per pupil basis. For Iredell and Orange, we estimate Net Fiscal Impacts in the range of \$200-\$500 per pupil. This fiscal burden is comparable in magnitude with Durham despite, in the case of Orange County, a far lower charter school enrollment share. 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, non-urban districts. Moreover, by benchmarking the fiscal impacts of charter schools, our findings are relevant to understanding the social value of charter schools, which may expand choice for some students while imposing costs on taxpayers and students that remain in district schools.

## II. Net Fiscal Impact

In this section, we describe our empirical approach to estimating the fiscal externalities of charter schools. We begin by presenting a stylized expression for the fiscal impact of charter schools that identifies key mechanisms and highlights the empirical ingredients necessary to generate estimates.

To simplify the presentation, we make two assumptions at the outset. First, we assume that the costs of supplying education in public schools incurred by a school district can be



divided into some that are fixed and some that are variable.<sup>4</sup> Variable costs, such as the cost of employing teachers, vary with student enrollment in public schools. Fixed costs, in contrast, are expenses that are less responsive to changes (at least over the relevant horizon) to changes in enrollments. Examples of fixed costs might include facility operations and maintenance, administration, and support staff and services for students with disabilities. The second simplification is that we focus initially on only the two primary revenue sources for public schools and charter schools: per pupil state aid generated from state tax sources and per pupil local revenue supplements generated from local county taxes.<sup>5</sup> Despite North Carolina's goal of providing funding for a "sound, basic education" in all districts, peculiarities of the state's funding formula mean that that per pupil state aid differs across districts.<sup>6</sup> Local revenue per pupil also differs across districts, in this case because of differences in county wealth and local preferences for education. Most of the local revenue is used to supplement teacher salaries. In the following exposition, we do not include district subscripts because we use the same stylized model to analyze each district separately.

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 a student lives and also local revenue at the same per pupil rate as the regular public schools in the district. Thus, for each student who leaves a public school to attend a charter school, the school district in which the student

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<sup>4</sup> Note that although charter schools are a type of public school in that they are publicly funded, we use the term public school throughout the paper to refer to non-charter schools.

<sup>5</sup> Although we abstract from revenues from federal sources in this presentation, as discussed later, we build this source into our empirical implementation.

<sup>6</sup> The state's education funding system is based primarily on allocations of various types of positions, not dollars, to each local district. The dollar amount of the funding then depends on the quality of the staff that the district is able to recruit because the state uses a state-wide salary schedules to cover the cost of each allocated positions. For example, a district that is able to hire more experienced teachers who command higher salaries according to the state schedule 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.

lives must share local revenues with the charter school on a per pupil basis.<sup>7</sup> We let  $r_L$  represent this per-pupil amount of local revenue. Our prior assumptions allow us to 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:

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

In this expression,  $Q^P$  and  $Q^C$  represent public school and charter school enrollments, respectively.  $FC$  denotes total fixed costs while  $VC$  represents the per 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 some 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, can be observed directly from the balance sheets of each of the North Carolina public school districts that constitute our data sample. Similarly, we also observe in the data public school enrollments in the presence of charter schools,  $Q^P(1)$ .

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

$$NFI = VC(0) - VC(1)$$

Intuitively, the money that follows the students who leave public schools to charters requires that a district reduce its variable spending per pupil (as the district cannot reduce its spending on fixed costs).<sup>8</sup>

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<sup>7</sup> Note that the school district must share local per pupil revenues with any charter that enrolls a student who resides in the district regardless of the charter's physical location.

<sup>8</sup> 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.

Such reductions represent a reduction in the educational services provided to students who remain in the district's public schools.

To formalize this intuition, we make two additional assumptions later relaxed in our empirical implementation. First, we assume that all charter school students leave public schools (as opposed to private schools or homeschooling). Second, we also abstract from recognized categories of student need, such as Limited English Proficiency, that are reflected in the state funding formula. To compute  $VC(0)$ , we simply add total variable costs in the presence of charter schools to the total revenue lost to charters, namely, the sum of total state aid and local payments to charters. This amount represents the revenue available for spending on variable inputs in the absence of charter schools. We then divide that amount by public school enrollment absent charter schools,  $Q^P(0)$ :

$$VC(0) = \frac{VC(1) * Q^P(1) + (r_S + r_L) * Q^C(1)}{Q^P(0)}$$

In this equation,  $r_S$  represents the per pupil payment from the state while  $Q^C(1)$  is the number of students enrolled in charters.

By applying our assumption that charter students would otherwise attend a public school (i.e.  $Q^P(0) = Q^P(1) + Q^C(1)$ ), we can simplify the expression for Net Fiscal Impact as follows:

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

This expression highlights the key mechanisms that may drive negative fiscal externalities of charter schools. First, note that the Net Fiscal Impact will be zero when the variable costs per public school pupil in the post charter world,  $VC(1)$ , are equal to the total revenue lost to charter schools,  $r_S + r_L$ .<sup>9</sup> Fiscal impact thus turns on a district's ability to reduce expenditures commensurate with revenue losses. Importantly, this ability is likely to be more limited for non-urban and rural school districts than for

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<sup>9</sup> Charter schools may in fact have a positive fiscal impact if the state and local revenues they receive are less than the variable costs of the school district.

urban districts. For districts that serve non-urban areas with fewer students and less density, fixed costs are both likely to account for a greater share of expenditure and they are likely to have more limited flexibility to adjust spending.<sup>10</sup> Moreover,  $VC(1)$  will vary across districts due to differences in the composition of students that belong to recognized need categories, such as children with disabilities. Additionally, the expression reveals that Net Fiscal Impact is proportional to the fraction of all students served by charter schools. This element suggests that, given present trends, the penetration of charter schools in smaller, non-urban districts may have even larger adverse impacts in the long run than the ones we report. Finally, all else held constant, lost revenue due to charters will be larger for districts that have greater per pupil local revenues or for those that receive greater per pupil state aid.

### III. Data and Implementation

As suggested in the preceding discussion, generating estimates of Net Fiscal Impact relies on combining data with assumptions regarding different elements that enter the calculation. In this section, we describe in detail the data we gather and empirical implementation of the calculations, which are made for a sample of North Carolina school districts.

#### a. Data Sources and Summaries

To understand quantitatively how the fiscal impact of charter schools differs for urban and non-urban school districts, we collected data for a sample of school districts in North Carolina. To do this, we first identified school districts with relatively low population density that had also experienced significant growth in charter schooling since 2013-14. These districts

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<sup>10</sup> While less of a factor in the particular North Carolina districts that we consider, population growth may also be a factor. Stagnant and declining districts may have to close schools to adjust to charter expansion, whereas a district experiencing enrollment growth may be able to respond to the loss of students simply by scaling back its building of new schools.

include Buncombe, Cabarrus, Iredell-Statesville, Orange, and Union.<sup>11</sup> For our point of comparison, we use Durham County, a relatively urban school district with a large charter share. Characteristics of our sampled school districts are presented below in Table 1.

As Table 1 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 around 15% of students attend a charter school as opposed to a district public school. The remaining school districts in our sample have lower densities of students, indicative of less urbanization. In addition, with the exception of Union County's nearly 42,000 students, these districts also serve fewer students overall than Durham. Buncombe County schools, for example, serve over 24,000 public school students, and students per square mile is just 41, or about a third of the density of Durham.

The non-urban districts in our sample exhibit large heterogeneity in charter enrollment share. Although non-urban, Buncombe, Cabarrus, and Orange have charter shares that are near or exceed the national and or state averages of around 5%. Iredell's charter enrollment share is quite large at 14%, while just 3% of students attend a charter school in Union. The table also presents the percentage growth in charter enrollment since 2013-14. On this score, the non-urban districts (save Union county) significantly exceed Durham's growth rate of 17% 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% in Cabarrus, as well. As we discussed in the previous section, the size of the charter sector, which is growing rapidly for most of these non-urban districts (and faster than population growth), and density, which

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<sup>11</sup> 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.

influences the latitude for possible spending adjustments, are likely to figure into the estimates of the fiscal externalities of charter schools.

We obtained detailed annual expenditure reports directly from each of our six school districts. These balance sheets 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 regarding the empirical implementation, the program codes are key to inputting assumptions about the structure of school district costs. Building upon the prior work of Bifulco and Reback (2014), we use them to help 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, such as the number of students that qualify for subsidized lunch.

#### b. Empirical Approach

Our estimates of fiscal impact depend upon data elements and assumptions pertaining to three primary components of the calculation: (1) the share of students who enroll in charter schools that 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 lost revenue to charters by setting amounts of per pupil funding 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 in turn before discussing some limitations of our approach and presenting the findings.

#### i. The Demand for Charter Schooling

The fiscal impact of charter schools on a district will depend in part on the fraction of students who enroll in charter schools who otherwise would have attended a public school rather than a private school or home schooling. This share matters because the state aid for students switching to charters from private schools does not represent lost revenue to the district (though it does represent a cost to the state). To see this, note that in the extreme case in which all charter enrollees left private or home schooling, the district's enrollment and revenues from state aid would remain unchanged. In that scenario, charter enrollment creates lost revenue for the school district only via the sharing of per pupil local revenues. 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:

$$NFI = \frac{(r_S - VC(1)) * (Q^P(0) - Q^P(1)) + r_L * Q^C(1)}{Q^P(0)}$$

where  $Q^P(0) - Q^P(1)$  is the number of public school students who left for charter schools (which need not equal  $Q^C(1)$ ).

To take this expression to the data, note that public school enrollment in the absence of charter schools,  $Q^P(0)$ , is a counterfactual object that is inherently unknown. As a result, we, like Bifulco and Reback (2014), must make assumptions regarding the fraction of charter students who leave public schools to produce empirical predictions. We therefore compute and report predicted fiscal impacts under three alternative scenarios for charter students that do not belong to a category of need recognized in funding formulas:

- A. Drawn entirely from public schools
- B. Drawn proportionately from public and private schools
- C. Drawn disproportionately from private schools

In scenario C., the share of charter students drawn from public schools is the public school share of all students, including students in private schools.<sup>12</sup> We regard as unrealistic and exclude the extreme case that charter students are drawn entirely from private schools.

ii. School Funding Formulas

Per North Carolina statutes, charter schools receive the average per pupil allocation for the school district from the state for each student.<sup>13</sup> This amount, represented by  $r_S$  in the expression for Net Fiscal Impact, is publicly reported for each district by the state.<sup>14</sup> Additionally, the detailed balance sheet for each school district reports total local payments to charter schools,  $r_L * Q^C(1)$ . 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 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

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<sup>12</sup> For example, if 70 students attend public schools, 20 charter schools, and 10 private schools, scenario C assumes that 70% 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), 78% of charter students (about 16 total). Scenario A assumes that all 20 switched from a public school.

<sup>13</sup> The average is calculated excluding funding to the district for Children with Disabilities or who are Limited English Proficient, which charters separately qualify for.

<sup>14</sup> As North Carolina allocates much of its public school funding using position allotments, this allocation is not necessarily equal 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 that attend charter schools.



payment to charters in the district and for Limited English Proficient the per qualified pupil state aid to the district, which we collect from the state.<sup>15</sup> 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 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 charter. 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 that belong to either the Children with Disabilities or Limited English Proficiency categories, we assume that free and reduced price eligible students substitute between charters and private schools as in the three scenarios outlined in the prior subsection.

### iii. The Structure of School District Costs

While total expenditures by each school district are known from the detailed balance sheets, inputting variable costs per pupil,  $VC(1)$ , requires assumptions about the structure of school district costs. Specifically, we pursue two steps using the detailed expenditure records: First, we build upon the analysis of Bifulco and Reback (2014) to categorize spending items that appear on the expenditure sheets for each district as either “Fixed” or “Variable.” “Fixed” items are those that must be supplied regardless of enrollment, while “Variable” items correspond to categories where districts may be able to cut 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.

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<sup>15</sup> 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 Limited English Proficiency) in North Carolina.

Classroom Teachers, displayed at the top of Table 2, 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.” The district must incur costs administrative services and personnel regardless of the number of students that a district serves. Other items categorized as “Fixed” represent services for at-risk, limited English proficient, and disabled or exceptional children. The categorization of these items as “Fixed” is 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 identification of qualified students, that serve multiple sites. Second, enrollment of students belonging to these recognized categories of need in charter schools is lower than in public schools. In our sample, the average share of charter students who are categorized as limited English proficient is less than 1%, far below the 7% share of public school students.<sup>16</sup> This implies that charter expansion is unlikely to reduce the demand for these services. The fixed costs imply that charter penetration, by reducing enrollments in public schools, is likely to raise average costs for the school district, registering as a fiscal burden in our calculations. How each district’s spending is allocated across these expense items, including due to differing compositions of students that belong to recognized need categories, will thereby influence the estimates of Net Fiscal Impact.

Given alternative assumptions of the adjustability of the “Variable” category items, in the second step we compute a range of predictions for Net Fiscal Impact. This step relaxes the (implicit) assumption in our stylized exposition that variable costs are fully adjustable. This is important for capturing the greater difficulty of adjustment facing non-urban districts (in

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<sup>16</sup> The share of exceptional or special education children in charter schools is also lower, though in lesser degree (9% in charters as opposed to 12% 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.

addition to likely a greater share of costs that are fixed). To do this, we input an elasticity of spending with respect to enrollment to reflect the reality that reductions in these expenses depend on enrollments, but in a manner in which there may be costs to adjustment. For example, Transportation, while categorized as “Variable” in the first step, includes the fixed costs of hiring drivers, 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. The elasticity provides an intuitive characterization of impact. If the elasticity of an item were zero, the “Variable” categories would equivalently be “Fixed” and no spending adjustments would be possible in response to enrollment reduction due to the opening of charter schools. At the other extreme, our earlier expression for Net Fiscal Impact 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. We compute Net Fiscal Impact under three elasticities for “Variable” category spending: 1, 0.8, and 0.5.<sup>17</sup> Note that an elasticity of 1 may be equivalently conceived as “Fully Adjustable” in that it implies no stickiness in the adjustment of variable input spending.

#### iv. Limitations

Our empirical approach and implementation is not without limitations. For one, our estimates do not account for the possibility that charter schools may affect the efficiency of the district’s spending. Such 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 Impact. The evidence regarding the competitive impacts of charter schools is mixed, however, and work that

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<sup>17</sup> The elasticity can equivalently be understood as the share of adjustable expenses that can be fully adjusted.

has examined efficiency directly finds little to weak evidence for such responses from districts (Buerger and Bifulco 2016, Ni 2009).

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 that need not appear in terms of realized expenditures, such as the risk that charter schools in the district may close, which requires that the district be able to absorb those students into the public schools. These costs, which would contribute to negative fiscal impacts from charter schools, are not reflected in our estimates.

Another limitation of our approach is that 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. Hence, we extend the analysis to include impacts for a 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. This additional scenario is intended to reflect the possibility that our sample districts, all of which are experiencing enrollment growth, may be able to absorb some of the adverse fiscal impacts by not adding new buildings or temporary classrooms.

Finally, our estimates shed light only on the fiscal burden of charter schools. Such a burden is borne by students who remain in public schools (in terms of reduced services) and/or by local taxpayers.<sup>18</sup> For evaluating the 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

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<sup>18</sup> 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 we estimate) by local taxpayers.

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.<sup>19</sup>

## IV. Results

In this section, we present our estimates of Net Fiscal Impact, which quantify the reduction in services per public school pupil due to charter schools. We first present the estimates for Durham before discussing the results for the five non-urban school districts in our sample.

### a. 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 predictions given the assumption that the adjustable category spending items, as classified in Table 2, can be reduced 1 for 1 with reductions in enrollment. With the baseline categorization of spending categories as either fixed or adjustable, the variable cost per public school pupil is around \$6,468 in Durham. Under scenario A, which assumes that all charter students exited public schools, we estimate a fiscal impact of \$520 per public school student. In other words, charter schools require that Durham must reduce services for each public school student by about \$500. Under the more realistic scenarios that students are also drawn from private schools, the fiscal impacts are somewhat larger. These estimates, which are methodologically most comparable 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-\$1,070) and Buffalo (\$633-\$744). This smaller impact is most likely attributable to the fact that unlike Albany and Buffalo which are in areas facing

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<sup>19</sup> Additional relevant costs of charter school expansion would also include greater segregation of schooling (Ladd et al. 2017a and 2017b).

declining population and are responsible for the fixed costs of ongoing retirement benefits of teachers. Durham and other North Carolina districts are growing and are not responsible for retirement benefits.

The second and third columns of Table 3 present estimates in which there is stickiness to adjustments in variable costs for Durham. For example, in the second column, where variable costs can only be cut 8% for every 10% reduction in enrollment, our estimates of Net Fiscal Impact are about \$700 per pupil for all scenarios. The third column, which instead uses an elasticity of 0.5 to model additional stickiness in adjustments, yields predictions of about \$1,000 per public school pupil in reduced services due to charter schools. Given public school enrollment of nearly 33,000 students in Durham, the fiscal burden in this scenario translates into over \$30 million dollars each year. This considerable Net Fiscal Impact likely stems from Durham's combination of a large charter enrollment share and local revenue stream that must be shared with 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 very optimistic assumptions about how readily the district can adjust its spending to the growth of charters, especially in the short run, we estimate that the fiscal burden of charter schools in Durham is over \$400 per public school pupil.

#### b. Non-Urban Districts

Table 4 presents the estimates of Net Fiscal Impact of charter schools for the five non-urban North Carolina school districts. We report the estimates only for scenario B, in which charter schools draw proportionately from public and private schools. As indicated by the pattern of results in Table 3, the magnitudes of the estimates would not differ very much for alternative enrollment scenarios.

The results display consistently significant 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 public school pupil based on an elasticity of 0.5 scenario for Buncombe County, which is about half the fiscal burden per pupil incurred by Durham from charter schools assuming full adjustability. 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 that the Net Fiscal Impact of charter schools on Iredell and Orange in the range of \$200-\$500 per public school pupil given reasonable assumptions of 0.8 and 0.5 about the adjustability of fixed expenses for non-urban school districts. For Iredell, these relatively large fiscal impacts are likely to reflect its large charter enrollment share, while for Orange, which like Durham has a considerable local revenue stream, the estimated Net Fiscal Impacts are significant despite much smaller charter school attendance. In the sensitivity check presented in row \* of Table 4, we allow facilities spending to be adjustable (an elasticity of .5), while variable costs, in line with our preferred parameterization for non-urban districts, are costly to adjust (an elasticity of .8). In this scenario, the estimated Net Fiscal Impacts remain negative and significant.

## V. 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.

We build upon the approach taken by Bifulco and Reback (2014) to examine the fiscal impacts of charter schools in Durham County and five non-urban North Carolina districts that have experienced significant charter entry since 2011. Our results point to significant negative fiscal externalities of charter schools in all six school districts. Moreover, for two of the non-urban school districts, we find significant fiscal impacts that are large and significant in magnitude, despite a considerably smaller level of charter school enrollment in one of them. While we find more modest impacts for three other non-urban districts, the fiscal burden placed on public schools is likely to increase as the charter sector continues to expand.

These negative fiscal externalities suggest the need for state-wide policies to ease the adverse fiscal impact of charter schools on traditional public schools. The state of North Carolina is constitutionally required to provide sufficient funding for all students in all local districts to receive a “sound, basic education.” While North Carolina claims to be doing so (a claim that is currently being litigated under the ongoing *Leandro* case), it is imposing additional costs on local districts by authorizing charter schools. As we have shown, the negative fiscal impacts are large, particularly in the urban and densely populated district of Durham but also in some of the non-urban counties as well. Moreover, the continued expansion of charter schools in non-urban districts is likely to impose an increasing large fiscal burden over time.

One policy response would be for the state to provide transitional aid to smooth or mitigate revenue losses for school districts as charters expand. While only offsetting a fraction of the negative fiscal impacts of charters, such a program has precedents in New York and Massachusetts. 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). At the same time, however, our analysis suggests that transitional aid, given its temporary duration, may not fully compensate for the fiscal externalities to non-urban districts



to the degree that, stemming from lower density or a smaller scale, charter school impacts are permanent. Though charter school supporters may be likely to oppose assistance, it is nonetheless difficult to argue against the logic that the state should bear the full costs of the charter schools it authorizes by including the negative externalities that charter schools impose on the local districts among those costs.

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*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 / sq. mi.)	130	41	95	43	23	68
Public 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%

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

*Table 2: Categorization of Expense Items*

<b>Item</b>	<b>Variable or Fixed</b>
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

*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			

Table presents estimates of Net Fiscal Impact for Durham in 2013-14. 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: Net Fiscal Impacts for Non-Urban 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

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.