

**The effect of North Carolina's Public School Building Bond Fund on
county capital spending patterns, kindergarten enrollment, and
local property tax growth**

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EXECUTIVE SUMMARY

OBJECTIVE (PAGE 1)

The goal of this research project is to use the North Carolina Public School Building Bond Fund as a test case to broaden the understanding of how outside capital funding may affect capital budget decisions at the county level. In addition, I examine whether increased kindergarten enrollment or lower rates of property tax growth followed changes in spending. Determining how counties translate funding into budgeting decisions at the local level—and whether those decisions lead to improved educational outcomes for North Carolina students or lower rates of tax growth for North Carolina taxpayers—will be an important task, particularly in light of the current budgetary environment in which program results can be a key determinant of successfully securing program funding.

BACKGROUND (Page 2)

North Carolina has a long history of offering state bonds meant to address the capital needs of its public school system. The last major State effort taken to help counties in funding capital needs took place in 1996 with the passage the of the Public School Building Bond Act (H.B.1100), which created a \$1.8 billion fund for all 100 North Carolina counties. Counties applied for funding on a project-basis and the only restriction on approved projects was the need to supply matching funds for certain allocations. County budgets began including funding from the fund as early as 1997 and 99% of the funds were used by 2006.

METHODOLOGY (Page 16)

Normalization framework: The first section of my analysis is an investigation into the county use of bond funds. The framework I will use describes changes in capital spending before, during, and after bond use and explores how such changes varied depending on selected characteristics of North Carolina counties. The “treatment” years when each county drew from the bond fund were normalized to year 0; the three years before treatment for each county were normalized as years -1, -2, and -3; and the three years after bond usage were normalized as years 1, 2, and 3.

Two types of averages can now be calculated and compared for the years preceding and following treatment, regardless of the years in which counties took advantage of their bond allocation. The first will show the change a typical county will have experienced before, during, and after the bond usage. In contrast, a second average will be used to demonstrate changes in spending from a statewide perspective. These percent changes and levels of spending across normalized years are then presented graphically to highlight trends in capital spending.

Three questions, three spending measures: This framework will be applied to three different measures of spending. First, I will track changes in per ADM capital spending to establish whether the bond increased capital spending. Second, I will track changes in per ADM local capital spending to determine whether local officials increased or decreased local funds once state funds were available. Finally, I will display changes in the share of capital spending that came from local sources to show how the relationship between state and local funding of capital needs may have changed over time.

Different groups, different reactions: Spending changes will be stratified by comparing average changes in counties that were categorized according to size, the number of allocations as determined by bond legislation, and the top and bottom ranked counties in each of the three measures. This stratification should provide insights into the effectiveness of state bond money that may be obscured when looking at statewide or average changes.

Kindergarten enrollment and property tax growth: The second major section of analysis follows the same normalization process, but looks for a relationship between changes in spending and changes in kindergarten enrollment and rates of local property tax growth. Because kindergarten enrollment is not compulsory in North Carolina, my hypothesis is that increased capital construction activity will induce parents at the margin to enroll children in kindergarten, which is an important indicator of future educational success. Changes in total capital spending are plotted against changes in kindergarten ADM to determine whether there is a positive relationship. In addition, kindergarten growth rates from the pretreatment period and the posttreatment period are compared by small county allocation status, rate of kindergarten ADM before bond use, and per ADM capital spending before bond use. Because state bond funds might reduce the need for local funding of capital projects, some counties might be able to reduce the rate of property tax change that finances those projects. Changes in local capital spending are plotted against changes in tax growth to determine whether a relationship exists. Pretreatment rates of tax growth and posttreatment rates of tax growth are also examined for small counties, counties with the highest and lowest total tax base and tax base per ADM, and the counties who did the most and the least amount of local spending in the pretreatment period.

RESULTS (Page 22)

The bond fund significantly increased capital spending, both on average and statewide. Counties that had low levels of spending prior to treatment tended to ramp up local spending prior to bond usage in order to meet the matching requirements, increase spending dramatically during treatment, and reduce spending after treatment, suggesting that the bond was effective at addressing previously unmet needs for these counties. However, counties that had high levels of spending prior to bond usage tended to reduce local spending prior to bond usage and then raise it again after bond use, implying some crowd-out of local spending.

No relationship appears to exist between changes in capital spending and increases in kindergarten enrollment. Further research can determine whether this is due to missing data or concurrent changes in private or charter schools. Counties that reduced local spending tended to reduce the rate of tax growth as well, although counties with higher spending levels, total tax base, and per student tax bases were able to afford much steeper reductions.

The design of future policy interventions should include considerations of county differences in spending, tax base, and secondary benefits such as reduced rates of tax increase. Establishing a consistent electronic format to submit, collect, and archive more granular, project-level data during the early stages of policy design could be a useful step in future evaluations of bonds. But budget constrained state staffs and the need to balance bond management and bond evaluation remain significant barriers in establishing such a system.

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OBJECTIVE

The goal of this research project is to use the North Carolina Public School Building Bond Fund (established in 1996 by H.B.1100) as a test case to broaden the understanding of how counties react to an infusion of outside capital funding. Do counties that receive state assistance use that money to increase overall capital spending? Does increased state funding cause a decrease in locally sourced capital funding? Do changes in the share of capital funding that comes from local sources stem from local or state decisions? And do the wealth and size of a county change the answer to these questions?

This paper will also examine whether H.B.1100 had positive outcomes outside of its effect on capital school budgeting decisions. Does the construction funded by state bonds lead to increased kindergarten enrollment, a key indicator of future educational attainment?¹ Can counties reap benefits from state construction bond funds in the form of lower property tax growth independent of changes in county capital spending? By determining whether these projects led to improved educational outcomes or lower tax growth, I hope to provide a more informed picture of how well we might expect federally funded school construction projects or future state bonds to perform in North Carolina. Furthermore, I will show that both the direct and indirect effects of capital bonds in North Carolina are not monolithic: policy makers must consider differences in county characteristics when assessing the budgetary effects that follow the infusion of outside capital funding.

¹ The North Carolina Department of Public Instruction uses several measures of attendance, but Average Daily Membership (ADM) is considered the most accurate and is the basis for various funding allotments. This paper will

To provide context on how outside funding for school construction might impact North Carolina, Section 1 of this paper will outline the state of the K-12 public school capital stock and a history of public school capital funding in North Carolina, with a focus on the creation and mechanics of H.B.1100. Section 2 will provide a literature review that covers the effects of building quality on selected educational outcomes, the effect of those outcomes on later educational success, and an overview of the flypaper effect. Section 3 explains the methodology employed to aid cross county comparisons. Section 4 will present information summarizing the use of funds—including capital spending levels before and after county use of the bond—and an examination of the relationship between capital spending and kindergarten enrollment and rates of tax growth. Section 5 will discuss the policy implications of the results of this study along with areas for future research.

SECTION 1: BACKGROUND

On September 12, 2011, in response to an economy still struggling to recover from a protracted period of high unemployment, President Barack Obama sent The American Jobs Act (AJA) to Congress for consideration. Amongst the many policies included meant to spur job creation, Subtitle D proposed an allocation of \$25 billion to “provide assistance for the modernization, renovation, and repair of elementary and secondary school buildings in public school districts across America in order to support the achievement of improved educational outcomes in those schools.”² This is not the first time that North Carolina school districts have been targeted for an infusion of funds to address its capital stock needs. Although responsibility for capital project

² American Jobs Act of 2011

funding in North Carolina, like most states, is located at the county level, North Carolina has a history of offering State funds through the creation of capital-project bonds. These interventions and the periodic survey of facility needs are summarized in Table 1.

Table 1. A history of North Carolina capital needs and financing

| Year | Description | K-12 State Funding | Needs |
|------------------|--|--|---|
| 1949 | 25 Million Appropriation + Bond | \$50 Million | |
| 1953 | State Bond Issue | \$50 Million | |
| 1963 | State Bond Issue | \$100 Million | |
| 1973 | State Bond Issue | \$300 Million | |
| 1983-1986 | Portions of two 1/2 cent local option sales taxes earmarked for school construction | | |
| 1987 | School Finance Act began the Public School Building Capital Fund and Critical Needs Fund from a new Corporate Income Tax | \$86.7 Million; C.I.Tax diverted for other purposes since 07/08 | Prior to this date only individual LEA surveys |
| 1988 | First Statewide Survey of Needs | | \$3.7 Billion |
| 1993 | Statewide Facility Needs Survey | | \$5.58 Billion |
| 1996 | K-12 Public School Bond and Statewide Facility Needs Survey | \$1.8 Billion | \$6.2 Billion; 10,062 core classrooms and 14,730 total classrooms |
| 2001 | Statewide Facility Needs Survey | | \$6.2 Billion; 84,680 additional students in past five years |
| 2006 | Statewide Facility Needs Survey | | \$9.8 Billion; 91,181 additional new students in past five years |
| 2006 | State Lottery | \$107.2 Million; 40% of educational programs share allotted to the PSBCF | |
| 2011 | Statewide Facility Needs Survey | | \$8.17 Billion; 46,995 additional new students in past five years |

This history of intervention and needs assessment, along with the data set that the North Carolina Department of Public Instruction has compiled in accordance with each bond issuance, creates a unique opportunity to explore the efficacy of state funds in addressing capital needs. The last major State effort taken to help counties in funding capital needs took place in 1996 with the passage the of the Public School Building Bond Act (H.B.1100), which created a \$1.8 billion fund for all 100 North Carolina counties. Because H.B.1100 began providing funding assistance at a known point in time and ended when the bond allocations for each county were exhausted, the effect, if any, of that funding on county government decision-making regarding local budgetary decisions regarding capital projects should be clearly observable.

Capital needs in North Carolina

The capital needs of K-12 schools in North Carolina remain significant. Every five years, the North Carolina State Board of Education (NCSBE) releases a 10-year estimate of public school capital needs. In 2006, overall capital needs in North Carolina schools totaled \$9.7 billion, of which \$5.3 billion (or 54.2%) was needed for renovations, additions, and furnishings.³ By 2011, the overall needs total decreased by \$1 billion, or 16.8%, to \$8.2 billion. Although encouraging on the surface, much of this decrease may be the result of counties not reporting capital needs that have little chance of securing funding in the foreseeable future due to the current economic conditions. Additionally, some of the decrease in projected capital needs may be driven by prior misestimations of the student enrollment growth rate: while the 2006 Facility Needs Report expected an enrollment of 1,475,241 in 2010-11, the actual enrollment in the 2011 Facility Needs Report was 1,415,075, or 4% lower than projected. The need for additions, renovations,

³ NCSBE, "Facility Needs Preliminary Report 2006"

and furnishing fell only slightly to \$5.2 billion in 2011, but at 64.1%, the proportion of all needed funding in these categories increased by 10 percentage points.⁴

There remain several factors that may complicate North Carolinian efforts to fund needed capital projects from state funds in the near future. The first is that the number of K-12 students attending school in North Carolina is expected to increase by 7.48% in the next 10 years.⁵ While this growth rate is, as discussed above, significantly lower than the 10-year growth of 15.2% predicted in 2006, it still shows that K-12 capital needs will only increase over time. Moving forward, these needs will be particularly concentrated in the elementary school facilities that contain the kindergarten classrooms this paper will address. From 2016-2021, enrollment growth in K-5 facilities is projected to increase by 8.69%, which is significantly higher than the overall growth rate of 4.92%. As a result, elementary and elementary/middle school facility needs comprise 40.8% of costs and 46.8% of needed student capacity for new construction and 47.3% of needed classroom additions over the next ten years.

A second—and perhaps more pressing—problem for addressing capital needs in North Carolina is that the state has seen declining revenues due to the recession, and this has led to a restriction of resources for a legislature that must balance its budget each year. In both FY2009 and FY2010, for instance, the portion of the corporate tax that funds the Public School Building Capital Fund (PSBCF) was diverted to the General Fund. The North Carolina School Board Association estimated that this change cost the PSBCF \$60.5 million and \$64.5 million, respectively, in these years. Similarly, in FY2010 the need for money to fund K-3 teachers

⁴ NCSBE, “Facility Needs Preliminary Report 2011”

⁵ NCSBE, “Facility Needs Preliminary Report 2011”

caused the portion of lottery funding that normally goes into the PSBCF to be reduced from 40% to 25%.⁶ Even if the PSBC funding is restored, the recent history of PSBC use suggests that it is unlikely to make a significant impact on capital needs. Over the last five years, 59% of PSBC funds were dedicated to debt service on existing buildings rather than new construction or renovation. Over that same five years, state funding in all forms has addressed only 3.3% of the new construction and renovation needs identified in the 2006 Facility Needs Report.

Given these restraints on state assistance in capital funding and the extensive needs still present, significant assistance from the federal government may be necessary to close the needs gap. Whether funding for future capital needs come from the federal government or from further passage of state school construction bonds, determining how counties translate that funding into budgeting decisions at the local level—and whether those decisions lead to improved educational outcomes for North Carolina students or lower rates of tax growth for North Carolina taxpayers—will be an important task, particularly in light of the current budgetary environment in which program results can be a key determinant of funding allocation decisions. Race to the Top, from which North Carolina received \$400 million of funding over four years, provides a useful example of the important connection between demonstrating effectiveness and receiving federal funds.

The timeline and structure of capital funding in North Carolina

Before the passage of the H.B.1100, the Public School Building Capital Fund (PSBCF) provided state funding to aid local capital projects. Established in 1987, the PSBCF is funded by quarterly

⁶ NC School Board Association, “School Construction Brief”

deposits of 7.25% of the corporate income tax.⁷ Counties receive money from this fund based on approved project applications, average daily membership (ADM), and a match of \$1 of county money for each \$3 of state money. Starting in 2006, funding of the PSBCF was supplemented by revenues from the NC State Lottery, although as discussed above this money has been diverted toward the General Fund since 2010. Normally, the PSBCF receives 40% of the public education portion of lottery revenues, which are in turn 35% of total lottery proceeds.

In 1995, the North Carolina General Assembly authorized the creation of the School Capital Construction Study Commission, which produced a report finding overall state K-12 capital needs totaling \$6.2 billion, 61% of which were related to additions or renovations to existing facilities.⁸ The final report to the General Assembly presented two different funding levels that tracked concurrent legislative proposals. Senate Bill 1129⁹, which proposed a bond of \$950 million, represented the lower amount, while House Bill 1100 proposed a \$1.8 billion bond. The report also set out a template for how money would be allocated from the bond fund that was negotiated by legislators representing smaller, poorer districts and larger, faster growing districts. An initial allocation of \$30 million was set aside for counties designated as both “small” and high-need, both because negotiators agreed that these counties often lacked the tax base to address their capital needs and because it likely made these counties more amenable to the negotiations over weights discussed below. The remaining \$1.77 billion from the bond fund was allocated based upon three criteria: average daily membership (ADM), the level of student growth, and the ability to pay. Larger counties pushed for more weight to be applied to the

⁷ NC General Statute 115C-546.1

⁸ 1995 School Capital Construction Committee, “Public School Facility Needs Survey”

⁹ S. 1129, “1996 School Bonds Act”

allocation based on ADM while smaller counties worked for more weight on the ability to pay criterion. In the end, the negotiated weights were derived in such a way that it brought all the parties together to support a bond that on its face appears to provide the biggest benefits for poorer, high-need counties who could not make capital investments without state intervention. Thus, to the extent that the allocation of bond money to each LEA follows a formula consistently applied to each criterion, allocation can be considered rule-based. However, the negotiation that led to the relative weights of those criteria represents a mix of political- and rule-based allocations.

While neither the small county allocation nor the allocation based on ability to pay required matching funds, allocations based on ADM and growth required a match of 3 cents times the ability to pay rank for every dollar of state bond funding. Matches could be done retroactively so that projects funded with local dollars or debt incurred dating from 1992 onward that addressed capital needs counted toward the matching requirements for the ADM and growth allocations.

In May of 1996, the North Carolina General Assembly acted on the recommendations of the School Capital Construction Study Commission by referring both the SB1129 and the H.B.1100 versions of the Public School Building Bond Fund Act to committee. SB1129 never made it out of committee for a floor vote and, after H.B.1100 was ratified by the General Assembly in July, the establishment of a \$1.8 billion bond fund was placed on the November 1996 ballot, where it passed with 73% of the vote.¹⁰

¹⁰ Cobough, “Bond vote provides boost for local schools”

Although H.B.1100 created a bond fund worth \$1.8 billion, the legislation created a natural lag in the disbursement of the funds in order to better manage fund applications and save a significant amount on interest payments.¹¹ Namely, the total of \$1.8 billion was released in four tranches, so that no more than \$450 million could be disbursed in any of the first four years following the establishment of the fund. LEAs applied for money from the bond on a project basis. For the majority of LEAs, disbursements from the fund were made to the county in which they were located. For LEAs that were split between counties, each county was granted money from the allotment for the LEA based on the percentage of ADM that resided within each county, although this situation only applied to four counties throughout the life of the bond.¹²

SECTION 2: LITERATURE REVIEW

The effect of building quality on educational outcomes

There is a substantive body of work that examines the effect of inadequate school facilities on student health and academic achievement. These are outlined at the national level in Filardo's "Good Building, Better Schools" (1998), a report for the Economic Policy Institute. Blincoe (2008) estimates a 4-9% difference in test scores and a 4% difference in graduation rates between students in schools in the worst and best condition in 416 Texas high schools. Sheets (2009) found that for every 10% increase in deferred maintenance average test scores decreased by 0.61 points. Boese & Shaw (2005) found that the number of unsatisfactory buildings led to higher rates of suspension, lower attendance rates, and lower test scores. Similarly, Branham (2004) found that quality of infrastructure has a significant effect on attendance and drop out

¹¹ Steve Taynton, interviewed by author October 27, 2011

¹² H.B.1100, "Public School Building Bond Act of 1996"

rates. Picus, Marion, Calvo & Glenn (2005), working in Wyoming, produced one of the few studies that found no relationship between building conditions and test scores.

The effect of capital investment on educational outcomes

Although the through line from capital bond funding to building quality to educational outcomes may seem obvious enough, the scholarly literature on the educational effects of public school capital investment through bond initiatives are less numerous and more ambiguous. Crampton (2009) found that although investment in human and social capital had larger effects on test scores than investments in physical capital, standardized test scores still increased by .236 points for each dollar invested in school infrastructure. Cellini, Ferreira, & Rothstein's (2010) regression discontinuity study of California school districts that passed capital bonds produced inconclusive or small positive effects on test scores that disappeared by the sixth year after the bond passage. However, their housing-price-based hedonic model indicated that residents placed significant value on the non-academic results of capital spending (like safety and aesthetics) and had a willingness-to-pay of over \$1.50 in future property taxes for each \$1 in school facility spending.

Literature on outcomes of interest

Kindergarten enrollment

In North Carolina, school enrollment is compulsory for seven-year-old children and parents may choose to enroll their child in kindergarten if he or she is five years of age on or before August 31 of the year he or she is presented for enrollment.¹³ Because kindergarten enrollment in North Carolina is voluntary rather than compulsory, the theory of why we might expect an improved

¹³ NC General Statute 115C-364

capital stock to lead to increased kindergarten enrollment is relatively straightforward. My hypothesis is that parents at the margin—who otherwise might choose not to enroll their child in kindergarten—would be induced by improved capital facilities to have their child participate in kindergarten. This could come either from the psychological effects of seeing daily construction activity taking place or an increase in confidence in the effectiveness of local school services produced by a physical embodiment of a commitment to school improvement. The following literature underscores why increasing kindergarten enrollment should be seen as a step towards improved academic achievement.

The majority of studies investigating the effect of kindergarten enrollment have focused on the difference in benefits between half-day and full-day kindergarten programs. Clark and Kirk (2000) provide a review of the literature and find that while all day kindergarten does provide higher benefits as compared to half-day kindergarten, the content of “what they do is more important than how long they may be in the classroom each day.” A meta-analysis of full day versus half-day research conducted by Cooper, Batts Allen, Patall, and Dent (2010) suggests that full day kindergarten leads to improved results in academic outcomes and mixed results in social outcomes, but that those advantages seem to dissipate by the 3rd grade.

But as Dhuey (2011) notes, “very few studies have examined the overall effect of any kindergarten enrollment, either full or half, on later outcomes.” She uses the sudden introduction of kindergarten availability at differing intervals in states across the U.S. to investigate the educational benefits of kindergarten availability for different socioeconomic and ethnic groups. She finds that kindergarten provides the most benefits to “Hispanic children, non-English

speakers, children from immigrant households, and children of low socioeconomic status”.

Hispanics particularly benefited, with kindergarten enrollment leading to a 17% reduction in the likelihood of being below grade and a 5% increase in wage earnings later in life. Dhuey’s work builds upon the earlier findings of Cascio (2010), who used a similar methodology and concluded that kindergarten enrollment only provided educational benefits for white students. She hypothesizes that the lack of effect for black students may come as a result of kindergarten availability crowding out participation in the more rigorous Head Start program. Anderson, Butcher, Cascio, and Schanzenbach (2010) find that exposure to an extra year of schooling, as would be the case for those that enroll in kindergarten in North Carolina, significantly lowers obesity levels for children who spend less time in childcare prior to kindergarten.

Kindergarten enrollment may also result in better educational outcomes for the children of enrollees, a mechanism known as “intergenerational effects.” Oreopoulos, Page, and Stevens (2006) use U.S. Census data from three decades and conclude that the extra year of education that parents can attain as a result of kindergarten enrollment results in a 2%-4% decrease in the likelihood that their children will have to repeat a grade. Similarly, Bauer and Riphahn (2009) examine Swiss data and find that kindergarten enrollment largely neutralizes differences in children’s “educational endowment” because earlier enrollment reduces the impact of parental education levels on child education attainment.

This paper will not attempt to address the causal relationship between kindergarten enrollment and improved educational outcomes. Instead, I will attempt to use the data to find out if capital improvements can play a role in increasing kindergarten enrollment while relying on the general

findings in the literature described above that kindergarten availability is a more or less positive step towards improved educational outcomes. . As far as can be determined at this time, this will be the first attempt to determine the effects of bond funding on kindergarten enrollment, and as such should make a useful addition to the literature.

The flypaper effect

The flypaper effect is the economic phenomenon in which the increase in spending spurred by grants from central to local governments exceeds the increase in spending one would predict from an equivalent increase in personal income. Because traditional microeconomic theory states that the median voter expresses their preferences for program spending through the ballot box, infusions of grant funds should result in tax reductions or a shift of resources away from the grant recipient and towards spending in other areas.

However, Gramlich (1969) found that while a dollar increase in private income increased government spending by \$0.02 to \$0.05, a dollar in inter-government grants raised spending by between a \$0.30 and \$1. Because this money seemed to “stick where it hits”, their colleague Artur Okun dubbed this discrepancy the “flypaper effect”. Early reviews of the literature on the subject were conducted by Gramlich (1977) and Inman (1979). Hines and Thaler (1995) produced a widely cited and extensive review of the topic, including a review of studies that tested alternative explanations for the effect and a summary of estimated effect size ranging from \$0.25 to \$1.

Several authors have explored possible explanations for the existence of the flypaper effect. Wyckoff (1991) used Michigan aid to school districts to test four popular explanations for the existence of the flypaper effect. None of these explanations (econometric misspecification, omitted variables, voter confusion of average price of public goods with marginal price, and voter unawareness of the aid) held up in Wyckoff's study, and he suggested that the bureaucracy of local government may tend to maximize its own budget and lead to the effect while admitting that testing for such an effect is difficult. Strumpf (1998) tests this bureaucracy theory by using the amount of overhead in Pennsylvania local governments as a proxy for voter control over fiscal decisions and finds that the flypaper effect is stronger in communities with high-overhead and an implied lower level of voter attentiveness to policy decisions. In Knight's (2002) examination of federal highway grants and state highway spending, he found a correlation between the determination of grants and preference for government services, suggesting that the endogeneity of grants explains the flypaper effect. Aragon (2010) posited that one third of the flypaper effect could be explained by the cost of taxation, as municipalities with a lower cost of tax collection experienced smaller flypaper effects.

There is also a small but useful literature on the flypaper effect as it applies to schools, bonds, and capital spending. Deller and Maher (2005) found that the size of the flypaper effect varied greatly depending on the type of expenditure that is being funded and that this variance may be masked by the aggregation of "total spending" that is the basis of most flypaper effect studies. In short, they found that the effect is stronger on "luxury goods" (including educational services) than on "essential goods" (like police and fire protection), although school capital spending is not included as a category of study. Olmsted, Denzau, and Roberts (1993) examined the effect of

bond retirements on school spending in Missouri and found that reductions in debt service changed the way voters perceived the opportunity costs of concurrent tax rate increases, leading voters to routinely forego possible tax reductions. Wyckoff (1988) found that a bureaucratic model was more powerful in explaining the flypaper effect on capital spending while a median-voter model was more powerful in explaining current operating expenditures. Wyckoff notes that “it seems plausible that the extra complexity of capital expenditures, along with their ability to be financed through debt, might allow the bureaucrat to get more of what he wants...” Jones (2009) used impact fees to determine that the flypaper effect exists for capital projects outside of grants-in-aid and that the effect is larger on capital projects with lower future maintenance and operation costs. In the Cellini, Ferreira, and Rothstein study discussed above, there is strong evidence of a flypaper effect from locally approved capital construction bonds.

This study will add to the literature by supplying further evidence of the presence or absence and size of the flypaper effect, particularly as it applies to local capital spending. One possible explanation for the existence of a flypaper effect in capital spending is that smaller, poorer counties do not have the tax base to match their preferences for capital spending. If this explanation, commonly known as a “corner solution,” is true, we should expect to see larger increases in overall spending (or a greater persistence in the reduced share of overall spending that comes from local sources) amongst poorer counties relative to richer counties. Relatedly, this explanation would also be suggested if richer counties use increased state funding to reduce taxes more frequently than poorer counties. A competing explanation for the flypaper effect, as discussed above, is that extensive bureaucracies tend to subvert true voter spending preferences in order to protect or extend their spheres of authority. If this explanation is true, we should

expect to see larger increases in spending amongst counties that are more bureaucratic, which is likely to be associated with richer, more populated counties.

SECTION 3: DATA AND METHODOLOGY

This project approaches the question of the effect of H.B.1100 from two different but related directions. The first approach is an investigation into the county use of bond allocations and, broadly speaking, describes changes in capital spending before, during, and after treatment and how such changes varied depending on selected characteristics of North Carolina counties. The second approach builds on the results of the first to determine whether there is a relationship between changes in total capital spending and kindergarten enrollment and local capital spending and the rate of tax growth.

Capital spending and the use of bond funds

This section of the analysis will utilize a consistent framework to investigate changes in a variety of county capital spending measures from periods before, during, and after usage of the bond fund. Specific treatment and post-treatment periods were created for each county based on the years in which a county used funds from their bond allotment, with the exception of the cases discussed in Appendix II. Various spending measures are then presented graphically, with individual treatment periods normalized to year 0, the three years preceding the initial bond usage normalized to -3, -2, and -1, respectively, and the three years following the final usage normalized to 1, 2, and 3, respectively.¹⁴ The percentage change in a spending measure for each year will be presented along with the absolute level of that measure. The percentage change

¹⁴ Because smaller draws from the bond fund would likely have little effect on county decision making and thus skew results, county treatment periods are considered ended when draws total less than \$50,000.

during treatment is the change from the pretreatment average of spending, rather than the change from year -1. This calculation of treatment percent change may, in isolated cases, cause a graphic discrepancy in which capital spending may appear to have risen while the percentage change is negative; in these cases, the apparent rise is over year -1 spending while the decrease is over the average of the entire pretreatment period.

To illustrate this process, we can look at two counties as examples. Beaufort County drew from the bond fund in 1997 and 1998, while Yadkin County drew from the bond fund from 2000 to 2003. Using the above framework, the spending measures for Beaufort County’s 0 period correspond to data from years 1997-1998, with years -1, -2, and -3 containing data from 1996, 1995, and 1994, respectively, and years 1, 2, and 3 containing data from 1999, 2000, and 2001, respectively. Spending data in period 0 for Yadkin, meanwhile, refers to data from 2000-2003. For Yadkin, years -1, -2, and -3 refer to spending measures in 1999, 1998, and 1999, while years 1, 2, and 3 refer to spending measures in 2004, 2005, and 2006, respectively. These designations are presented in Table 2.

Table 2. An example of normalized pretreatment, treatment, and posttreatment periods

| | -3 | -2 | -1 | 0 (Treatment) | 1 | 2 | 3 |
|-----------------|------|------|------|---------------|------|------|------|
| Beaufort County | 1994 | 1995 | 1996 | 1997-1998 | 1999 | 2000 | 2001 |
| Yadkin County | 1997 | 1998 | 1999 | 2000-2003 | 2004 | 2005 | 2006 |

Just as in the example above, treatment periods statewide varied in start date, end date, and duration. The earliest treatment period began in 1997—the first year of allocation—and the latest

end date was in 2007. The duration period of treatment ranged from 2 years to 11 years, with 3 years of treatment being the most common duration. Table 3 provides a fuller picture of statewide treatment period statistics.

Table 3. Year 0 treatment statistics

| Share of counties starting treatment in: | |
|--|-----|
| 1997 | 29% |
| 1998 | 51% |
| 1999 | 15% |
| 2000 or later | 5% |
| Share of counties ending treatment in: | |
| 1998 | 1% |
| 1999 | 4% |
| 2000 | 13% |
| 2001 | 13% |
| 2002 | 19% |
| 2003 | 15% |
| 2004 | 18% |
| 2005 or later | 17% |
| Share of counties with duration: | |
| 2 years | 7% |
| 3 years | 19% |
| 4 years | 9% |
| 5 years | 11% |
| 6 years | 17% |
| 7 years | 18% |
| 8 years | 6% |
| 9 years | 5% |
| 10 or more years | 7% |
| Share of allocation used in counties with 3 year duration in: | |
| Year 1 | 36% |
| Year 2 | 40% |
| Year 3 | 23% |

Two types of averages can now be calculated and compared for the years preceding and following treatment, regardless of the years in which counties took advantage of their bond

allocation. The first average will be calculated by averaging the percent change in a given spending measure (defined below) for each county in each normalized period. This will show the change the average, or “typical”, county will have experienced before, during, and after the bond usage. In contrast, a second average will be used to demonstrate changes in spending from a statewide perspective. This figure will be calculated using an average that is weighted by a county’s share of statewide ADM.

An example may help in understanding the difference between the “typical county” perspective and the “statewide” perspective. For instance, the increase in a typical county’s total per ADM capital spending 3 years before the beginning of bond usage was 1.9%. From a statewide perspective, however, total per ADM capital spending increased by 5.6%. This distinction between typical county change and statewide change will provide useful insights into whether changes in spending are being driven by larger counties or smaller counties. (In the example above, the data suggests that larger county spending grew slightly faster than smaller county spending in year -3.)

This normalization and bifurcated averaging framework will be applied to three types of spending measures in order to answer three questions about capital spending. First, did capital expenditures increase following the infusion of bond funds? It is conceivable that counties simply substituted state bond money on projects that they would have built anyway using existing local bond money. If this was in fact the case, overall county capital spending will not show an increase after the infusion of state bond money. The spending measure used to determine whether capital expenditures increased is total capital spending per ADM.

Second, did local sources of funding increase or decrease after bond usage? Local sources were calculated in a way that captures the discretionary portions of county capital budgeting.¹⁵ Some counties may have decreased local expenditures on capital projects after infusion of bond money while maintaining pretreatment overall county spending levels, some counties (most likely the “corner solution” counties discussed above) may have increased local expenditures due to the matching requirements of the bond, and some counties may have maintained a similar level of local spending and simply increased overall capital spending. The statewide average will provide an overall picture of changes in local spending, while the average of each county’s change will show how a given county may have changed local allocations.

Third, did the share of capital spending that came from local sources change after bond usage began? Just as local funding decisions may vary depending on the capital needs, tax preferences, and matching ability of particular counties, the share of spending may also vary depending on circumstances. Even if a county chose to increase their local spending, for instance, the large infusion of state money may result in a decrease in the local share of funding.

In order to drill down into how pretreatment county characteristics may influence spending decisions, each of the three measures will be stratified into several different categories. These stratifications will consider differences in size, need as determined by H.B.1100 legislative negotiators, and spending patterns prior to bond usage. In particular, spending changes will be stratified by comparing average changes in counties that did (and did not) receive a portion of the

¹⁵ See Appendix II for details on data sources and the calculation of local expenditures.

\$30 million small county set aside; average changes in counties that did (or did not) receive all three types of allocation outlined in H.B.1100 legislation; and average changes in the top ten and lowest ten ranked counties in the three spending measures.¹⁶ Changes for each stratified category will be presented as the change from the average pretreatment amount to the average posttreatment amount for the entire group—rather than the average change for each county in the group—to avoid atypical results obscuring overall trends for a given category.

The effect of bond funds on kindergarten enrollment and tax changes

To determine whether bond usage effected kindergarten enrollment as measured by ADM, the same normalization process described above will assign year -3, year -2, and year -1 to the three years preceding treatment and year 1, year 2, and year 3 for the years following treatment for each county. The percentage growth in kindergarten ADM will be averaged across the pre and post periods for each county and plotted against the percentage change in capital spending for each county. My hypothesis is that increased capital school spending will encourage parents at the margin to enroll their children in kindergarten. If this hypothesis is correct, the relationship between percentage increases in capital spending and percentage increases in kindergarten ADM will be reflected in a positively sloped trendline. Data will be stratified by small county funding status, ranking of total ADM in 1997, and the counties that had the fastest and slowest rate of kindergarten enrollment growth in the years preceding treatment.

A similar framework will be applied to examine the effect of the bond on tax levels. The tax rate used is the effective tax rate for each county as determined by the North Carolina Local

¹⁶ Rankings based on average level of spending measure during pretreatment period.

Government Commission and is calculated to allow comparison of tax rates across counties even though property value reevaluation may occur at different times for each county. Pretreatment averages of tax levels and rates of increases provide a picture of the general trends in local taxation before bond usage began. Because changes in local property tax take time to enact, the average percentage changes in rates of tax increase after bond usage are then plotted against changes in local capital spending. Comparisons of pretreatment and posttreatment rates of tax increase are then stratified by small county allocation status, ADM size, top and bottom ranked counties in tax valuation per ADM, and top and bottom ranked total county tax valuation.

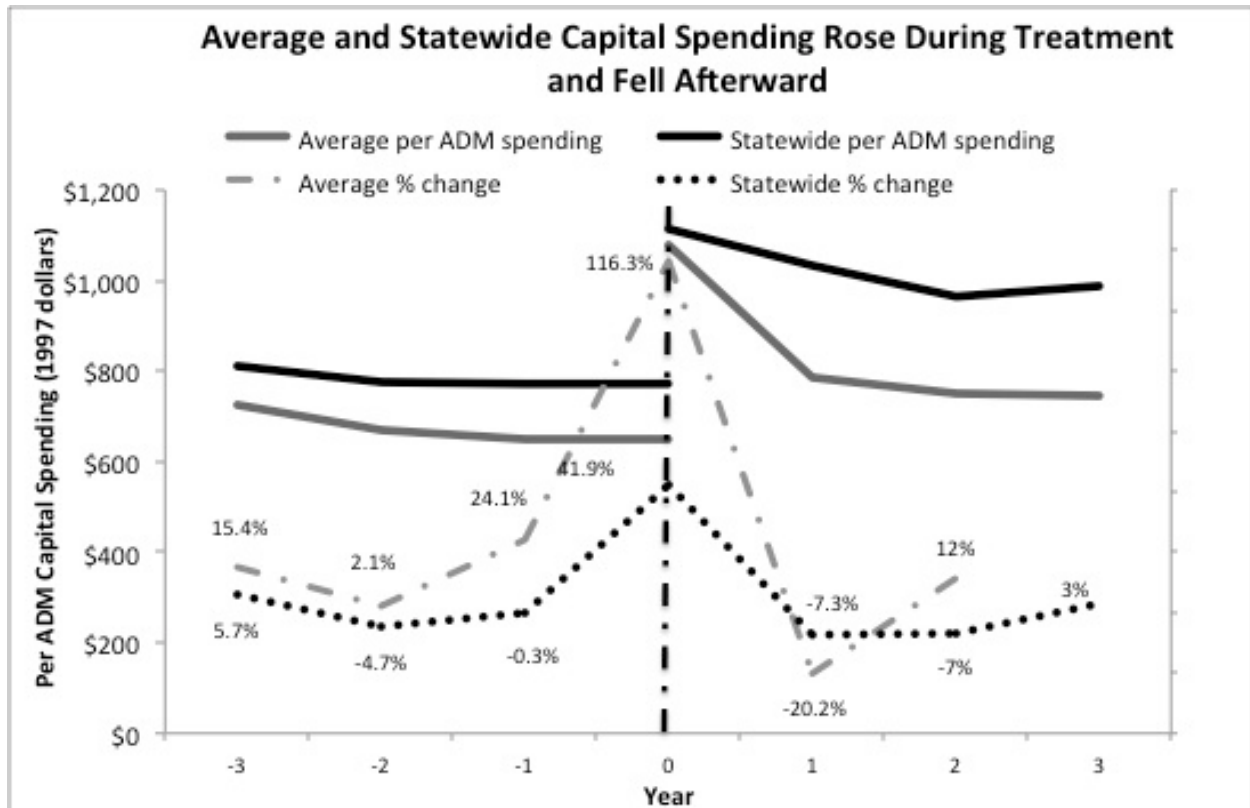
SECTION 4: RESULTS

Total capital spending changes

If the goal of H.B.1100 was to increase public school capital spending, it can be considered a successful policy intervention. Figure 1 displays the level of total per ADM capital spending, along with the percent change from the previous year, both on average and statewide. Both on average and statewide, capital spending fell slightly during the three years before treatment, rose substantially during treatment, and fell after treatment to a level just above pretreatment levels. But in what will be a recurring theme in examining the data, statewide averages obscure many of the changes occurring for a typical county. During treatment, statewide capital spending rose by 42% over pretreatment spending levels, from \$772 to \$1114, and then fell by 7.2% following the last year of bond usage. On average, however, county capital spending rose by 112% over pretreatment spending levels before taking a much steeper decline of 20%. Because the weighting used to create the statewide average was based on a county's percentage of the state's

ADM, the discrepancy in the increase during treatment suggests that smaller counties experienced a much larger percentage increase in spending. Similarly, the difference in the fall in spending in the posttreatment period suggests that smaller counties experienced significantly deeper reductions in capital spending after treatment ended.

Figure 1



The notion that the discrepancy between average and statewide spending averages is driven by different reactions among counties of different size is borne out when the data is stratified according to county characteristics. As covered in the discussion of the H.B.1100 legislation, counties were eligible for allocations from the bond fund based on three criteria: county size as determined by ADM, the level of county growth, and the ability to pay. Every county received a portion of funding based on ADM, but funding based on growth and ability to pay was based on

eligibility. Counties that received all three allocations, therefore, were considered both more high-growth and less able to pay than counties that only received one or two allocations. The data indicates that counties that did receive all three allocations increased their spending by 82% over pretreatment levels while counties that received only one or two allocations increased spending by 34%.¹⁷ In the two years after treatment, counties that received all three allocations saw capital spending decrease by 32% and 20%, respectively, while counties that received one or two allocations saw a decrease of only 21% in the first year after treatment and an increase of 14% in the second year after treatment. Taken together, these statistics indicate that the criteria for eligibility negotiated in the legislation accurately gauged county high-growth and ability to pay status.

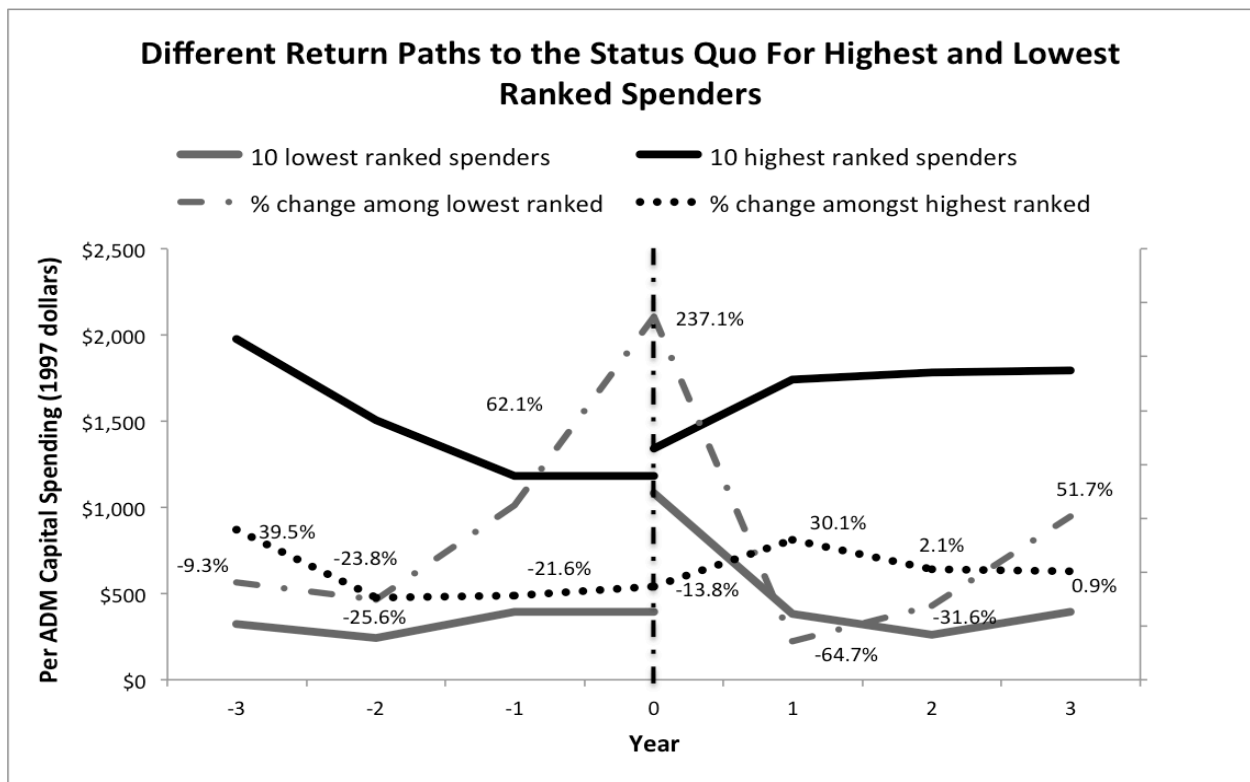
The second stratification of the data was between counties that received a portion of the \$30 million set aside for small counties with high-needs and counties that did not receive a portion of this set aside. The change in capital spending during treatment for counties that did not receive this money were similar to the change for counties that received only one or two allocations discussed above, increasing by 40%. By the third year after treatment, county spending had decreased to a level slightly above pretreatment levels. Counties that did receive the set aside seem to have benefited substantially. At \$445, pretreatment spending for these counties was only 61% of the spending for counties not receiving the set aside. During treatment, counties receiving the set aside showed extraordinary growth of 200%, such that their level of spending actually surpassed the level of non-small counties by nearly \$300. Following treatment, small county spending plummeted by 72% in the first year after treatment before rebounding by 55%

¹⁷ See Appendix III for all charts discussed but not shown in the body of this report.

in the second year after treatment. Both small and non-small counties, then, returned to pretreatment levels of spending by the third year after treatment, but this outcome followed much more dramatic increases during treatment and more volatile changes following treatment for smaller counties. This indicates that these small counties did in fact have capital needs that were not being met before use of the bond funds and that the small county set aside was likely to have been put to effective use.

As seen in Figure 2, the highest ranked and lowest ranked counties in terms of pretreatment spending reacted very differently to the infusion of state funds.¹⁸

Figure 2



The top ten spending counties reduced spending by 24% and 21% in the two years before treatment, respectively. Some of this decline may have been due to dissipating proceeds from

¹⁸ See Appendix IV for top 10 and bottom 10 spending counties and their spending levels

local bond issuances. But there are some indications that much of the decline was made in anticipation of incoming state funds. First, only one of these counties began using state bond funds in 1997, which means that most of the high spending counties began making capital budget decisions after the passage of H.B.1100. Second, several of the counties that decreased capital spending before treatment had recently passed large local bonds so dissipating local bond proceeds were less likely.¹⁹ Wake County, for instance, passed a \$250 million bond in 1996, reduced capital spending by over \$100 per student in 1997, and began drawing from their allocation in 1998. Third, on average these counties increased their spending 30% in the year after treatment so that spending levels were nearly equal to the year before significant reductions began. The fact that some counties reacted to incoming bond funds by lowering spending in the year preceding treatment means that the 13% reduction in spending during treatment for these counties may be overstating the effect of the bond usage.

Unlike the highest ranked spending counties, the lowest ranked spending counties increased total spending before beginning to draw from the bond fund. The 62% rise in spending in the year before treatment was most likely due to the matching requirements imposed for two of the three allocations. As these counties were spending relatively small amounts of money on capital before the passage of H.B.1100, the matching requirements represented a dramatic increase compared to previous levels. During treatment, spending increased by 237% for these low spending counties. And unlike high spending counties—who increased spending after treatment to return to pretreatment levels—low spending counties decreased spending to return to pretreatment levels. In the year after treatment, spending fell by 65% and then fell a further 32% in the

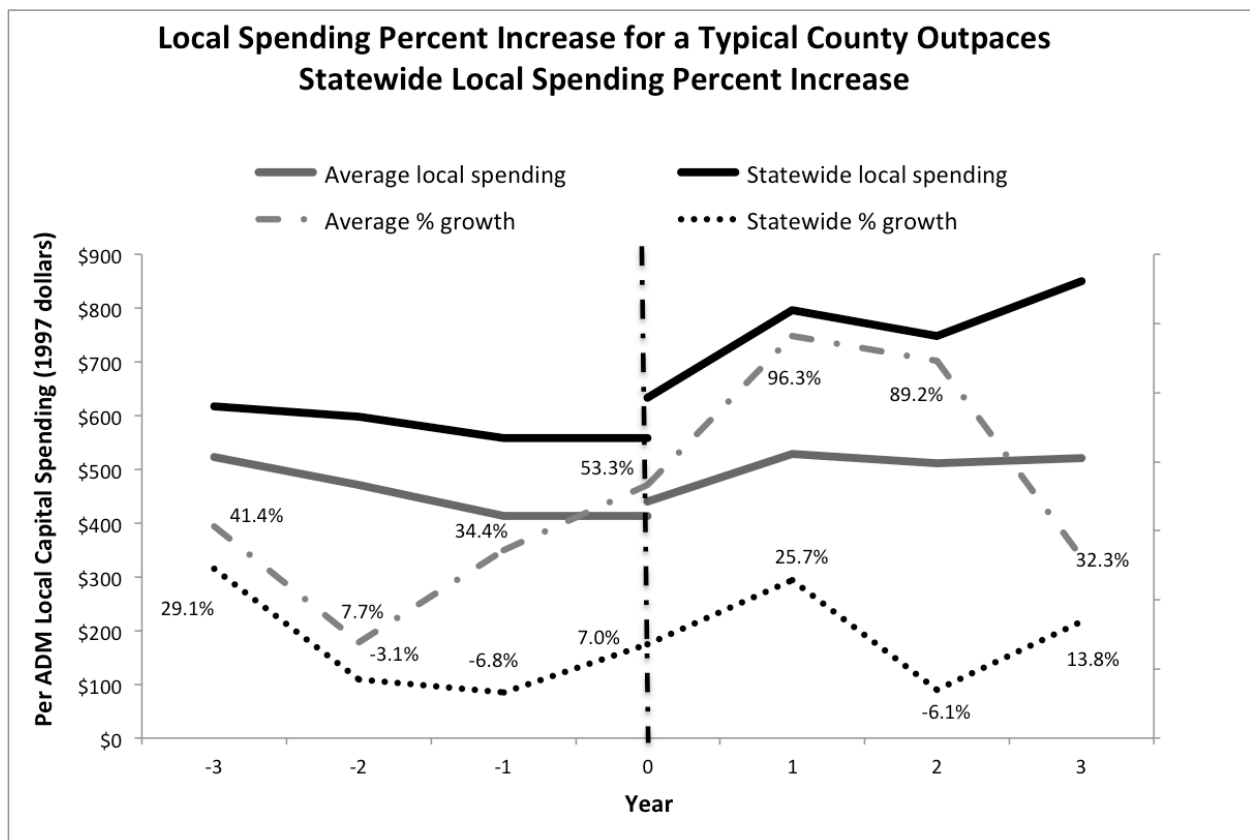
¹⁹ See Appendix I for a full list of local general obligation bonds.

following year. The data indicates that these low spending counties had serious capital needs that they would have been unable to adequately address in the absence of bond monies.

Local capital spending changes

As shown in Figure 3, the level of local capital spending for the average county was lower than the statewide level of local capital spending, indicating that larger counties dedicated higher amounts of local funding to capital budgeting.

Figure 3



While statewide local spending fell in each of the two years prior to treatment, local spending rose on average by a combined 42% during that same time period. This discrepancy suggests that

larger counties were slightly decreasing local spending and smaller counties were increasing it in order to meet the matching requirement. Real differences also exist for local spending during treatment. Although significantly lower than the increase in overall spending, statewide local spending did increase by 7% over pretreatment levels. But, on average, local spending increased by 53% compared to pretreatment levels. However, this increase is only among counties that did any local spending during pretreatment years. As Table 4 shows, a growing number of counties reduced local spending to zero leading up to the treatment period, which means that the 53% increase in local spending during treatment actually overstates the effect of bond use.

Table 4. Share of counties that reduced local spending to \$0

| -3 | -2 | -1 | 0 (Treatment)* | 1 | 2 | 3 |
|-------|-------|--------|----------------|--------|-------|--------|
| 4.20% | 9.60% | 17.00% | 35.10% | 10.60% | 9.50% | 14.70% |

* No local spending in at least one year of treatment

It is clear, then, that some counties drastically reduced local spending leading up to and during treatment, larger counties reduced local spending more modestly, and still others counties increased local spending fairly dramatically to meet the matching requirements. But statewide and local spending trends in the posttreatment period looked generally similar. Unlike overall spending, which fell directly after treatment ended, local spending jumped 26% statewide and 20% on average in the first year after treatment. As Table 4 shows 35% of counties with no local spending during at least one year of treatment and many other counties reduced local spending during treatment, this large percentage increase once state funds were withdrawn is unsurprising. However, the fact that the share of counties with zero local spending three years after treatment is over ten percentage points higher than the share of counties with zero local spending three

years before treatment suggests that many counties had their most pressing capital needs addressed through use of the state bond funds.

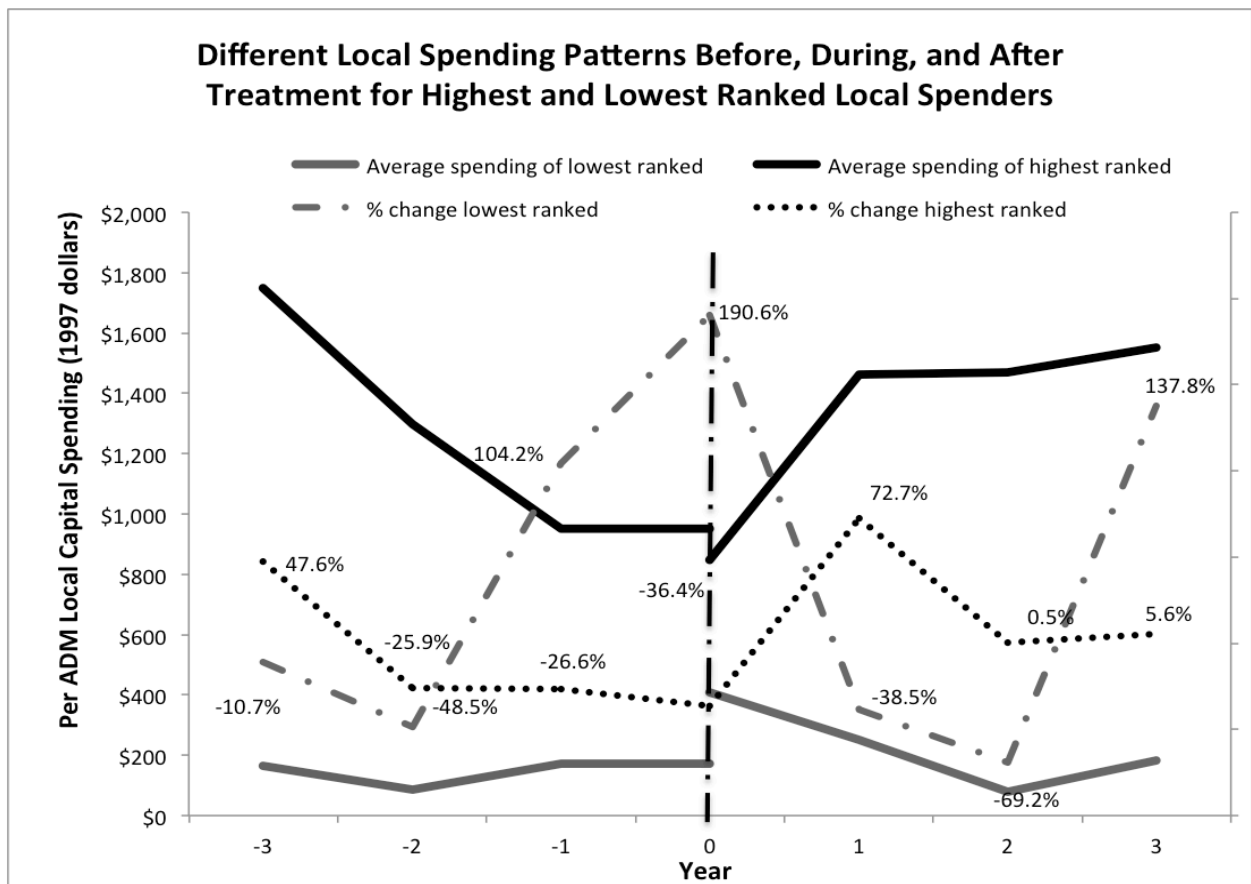
Counties that received all three bond allocations increased local spending by 5.5% during treatment, which is consistent with the assumed pretreatment level of need in these counties and the matching funds required to draw from the high-growth-based and ADM-based allocations. Counties that only received one or two allocations were by definition less needy and had less required local matching funds to raise. As a result, counties that did not receive all three allocations saw local spending fall by 16%. Posttreatment changes in local spending were also very different for these two groups. While both groups saw substantial increases in local spending following the exhaustion of state bond funds in the first year after treatment, counties receiving all three bond allocations saw local funding fall by a combined 30% in the second and third year after treatment. Counties receiving only one or two allocations, however, increased local spending by a combined 22% during that same period.

Counties that received the small county set aside saw a substantial increase in local spending, although at 30% this increase was much less than their 200% increase in total spending. Since many of these counties had low levels of local spending, the local increase was likely to have been from meeting the match. Small counties then decreased local spending by an average of 39% in the first year after treatment, which suggests that bond funds were supporting projects that would have otherwise not been undertaken. Counties that did not receive the small county set aside reduced local spending by a combined 23% in the two years before treatment and then, unlike small counties, reduced local spending by another 9% during treatment compared to

pretreatment levels. Also in contrast to small counties, these counties increased local spending in the posttreatment period, suggesting that bond funds were replacing local funds rather than augmenting them.

As with total spending, the highest and lowest ranked counties in terms of local spending exhibited very different reactions before, during, and after treatment, as Figure 4 shows.

Figure 4



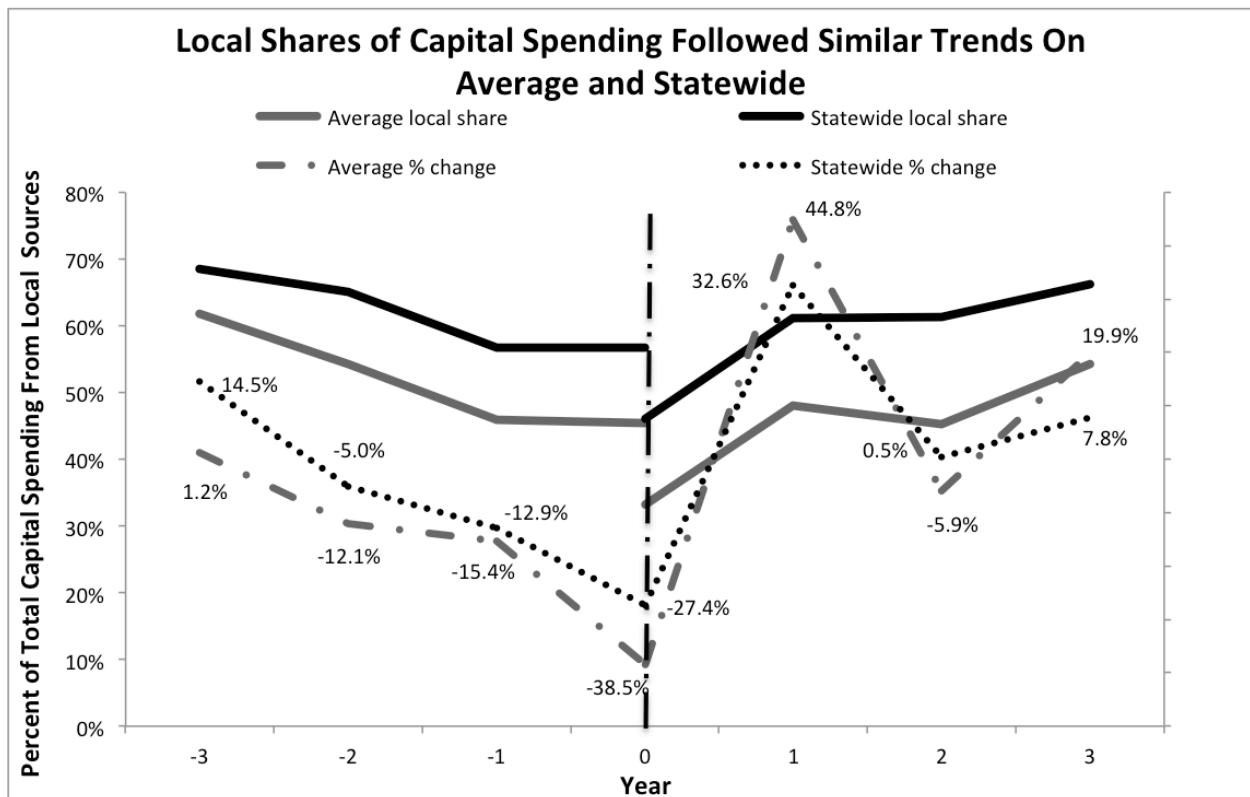
The lowest local spenders increased the level of local spending by 104% in the year before treatment—unsurprising given their low starting point and need to meet matching requirements—and by 191% during treatment. The highest spenders decreased local spending by

27% in the year before spending and by over 36% during treatment. The lowest spenders decreased local spending by 39% and 69%, respectively, in the two years after treatment, with 40% of the lowest spending counties reducing local spending to zero in each of the three years following spending. High spenders increased local spending by 73% and 0.5% in those same years. As with total spending, both high spenders and low spenders returned to local spending amounts near year -3 levels. This pattern suggests that bond funds addressed unmet needs in low spending counties at the cost of increased local matches. It is also evidence for some crowd-out among high spending counties, in which state money is supplied for projects that would likely have been paid for with local funds in the absence of bond usage.

Changes in local shares of capital spending

While local spending rose slightly statewide and fell slightly on average, Figure 5 shows that the share of total spending comprised by local spending fell significantly during treatment, both statewide and on average. In fact, the pretreatment, treatment, and posttreatment trends in the change of local shares were similar from the statewide perspective and the average county perspective. In both cases, local shares decreased in each of the two years before treatment, fell during treatment, then rose after treatment to roughly equal pretreatment shares. The differences in the absolute level of statewide local shares and the average local share indicates that larger counties tended to rely more heavily on local funding for capital budgeting than smaller counties. The rise in local shares in the year after treatment, even as Figure 1 shows a decrease in overall spending during this period, indicate that counties bond funds played a vital role in funding capital projects during treatment, although the steady decrease in shares during the pretreatment period suggest that this effect may be overstated.

Figure 5



The rise in the number of counties reducing the local share of spending below 10% in the year before treatment, as seen in Table 5, is striking and suggests that counties were adjusting budgeted spending amounts in preparation of incoming state bond funds. The fact that the number of counties with less than 10% local shares remained relatively high after treatment, even as average local spending returned to status quo levels, is evidence that the average county had its most pressing needs met by the bond money and thus did not feel the need to dedicate local money to capital projects. (Counties with 0% shares practically disappeared during treatment, as local funds were required to meet the matching requirements.)

Table 5. Share of counties that reduced local share to 0% or <10%

| | -3 | -2 | -1 | 0 (Treatment) | 1 | 2 | 3 |
|-------------------|----|-----|-----|---------------|-----|-----|-----|
| 0% local share | 3% | 11% | 17% | 1.10% | 8% | 6% | 13% |
| <10% local share* | 3% | 12% | 20% | 17.90% | 16% | 11% | 15% |

*<10% group includes counties with 0% share

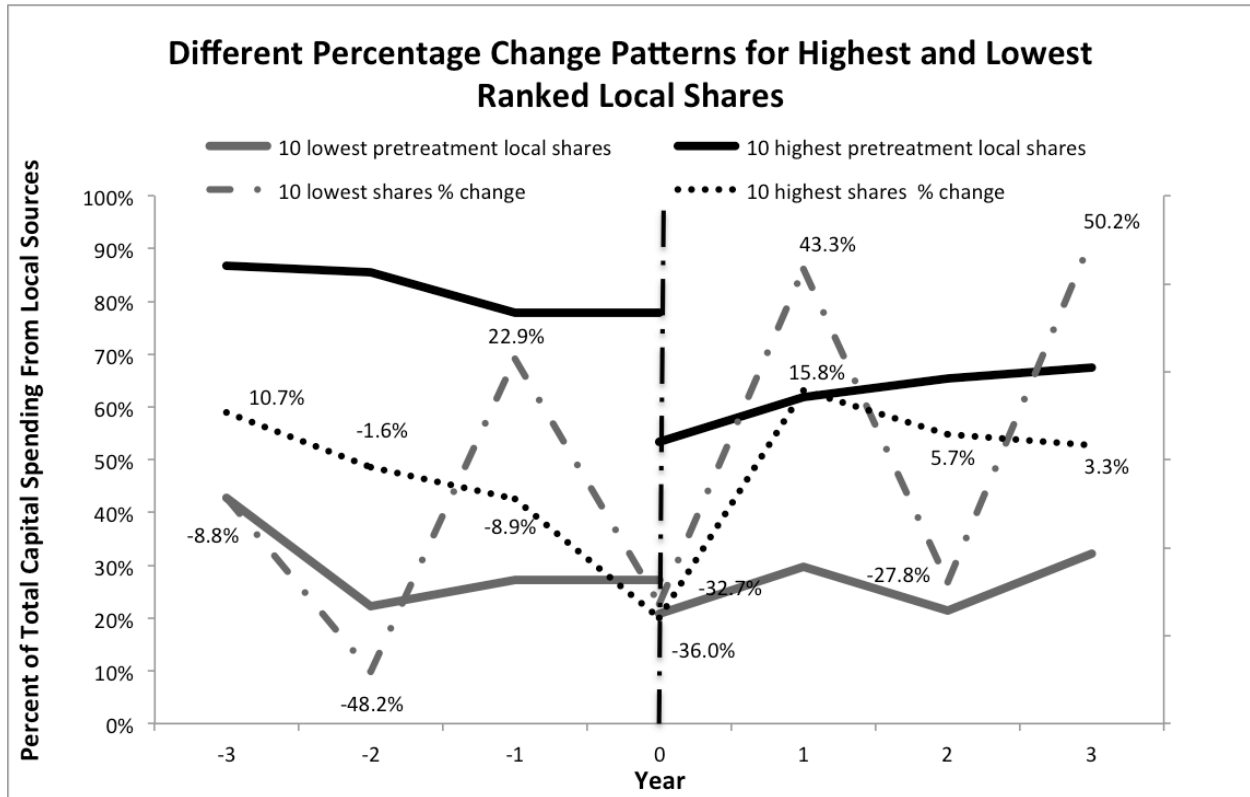
The changes in local shares among counties receiving all three allocations and among counties receiving one or two allocations were similar to the trends seen in average and statewide shares, respectively. Namely, both showed steady decreases in local share before treatment, substantial decreases during treatment, and significant increases in the year following treatment to a level near year -3 shares.

While the general trend for changes in local shares was similar for counties that did receive the small county set aside and those that did not, the reason for the drop that occurred during treatment was different. As discussed above, small counties increased their local spending by an average of 30% to meet the match requirement. Therefore, the 50.4% drop in local share reflects an overall growth in capital spending from the bond money. At least some of the 37% treatment drop in local share among non-small counties was due to the 9% decrease in local spending for these counties during that time period.

Figure 6 shows that the counties with the lowest and highest local shares during the pretreatment both saw local shares fall during treatment. Because these counties increased local spending even

as their share dropped, the data suggests that the drop in share was due to dramatic increases in state bond funding.²⁰

Figure 6



The counties with the lowest pretreatment local shares also exhibited large swings in the percentage change of shares throughout the years of this study, partially because the small sample size made it sensitive to large changes in any one county. Counties with the highest pretreatment shares were able to decrease the local shares from a high of nearly 87% three years before treatment to an average 53% during treatment. They also showed more predictable

²⁰ There was significant overlap in the counties with the lowest local spending and the lowest local share of total spending.

percentage changes in local shares, declining gradually before treatment, more dramatically during treatment, and then increasing gradually after treatment.

When examining the data on overall spending, local spending, and local shares, some broad patterns can be seen, with the important caveat that counties with the highest levels of each spending measure reacted differently in almost every treatment stage. In general, the average county was able to substantially increase total spending, with smaller counties increasing local spending prior to treatment and larger counties decreasing local spending prior to treatment. The share of spending from local sources fell for every group regardless of changes in local spending due to the infusion of state bond funds. After treatment, most counties decreased total and local spending to pretreatment levels, indicating that bond money financed capital projects that were going unfulfilled prior to treatment. High overall spenders and high local spenders, however, decreased spending before treatment and increased it afterwards to status quo levels, indicating that state funds were crowding out the local spending that was likely to have taken place even in the absence of the bond. The following sections will examine whether these wealthier, higher spending counties were able to reap benefits from the bond funds in the form of increased kindergarten enrollment and lower rates of tax growth, even if there is evidence that they did not benefit from dramatically higher levels of capital spending.

Kindergarten enrollment

Contrary to my hypothesis, a scatter plot of percentage changes in spending and percentage changes in kindergarten ADM growth shows no relationship between the two.²¹ Table 6 displays the percentage growth in spending from the pretreatment period to the treatment period and the

²¹ See Appendix V

growth rate in kindergarten ADM before and after treatment, broken down by small county allocation status, rate of kindergarten rate during the pretreatment period, and capital spending in the pretreatment period.

Table 6. Changes in kindergarten growth rates

| | % Change in Spending | K ADM Growth in Pre Period | K ADM Growth in Post Period |
|-----------------------------|----------------------|----------------------------|-----------------------------|
| Average County | 110% | 2.7% | 0.09% |
| Small County Allocation | 212% | 2.1% | -1.1% |
| Fastest Growing K ADM | -7.4% | 8.9% | 1.2% |
| Slowest Growing K ADM Pre * | -19.4% | -4.7% | 4.8% |
| Top 5 Pre Spenders | -40.6% | 2.4% | 2.7% |
| Bottom 5 Pre Spenders | 310% | 3.3% | 0.8% |

*Excluding Pequimans, which had atypical spending growth for this grouping

Although the percentage changes in capital spending varied widely, almost all of these groups showed a slowing in the growth of kindergarten ADM compared to the period before bond usage.²² One interesting exception is the growth in the five counties that exhibited the slowest rates of kindergarten growth in the pretreatment period, whose average annual rate of growth grew from -4.7% in the years before treatment to 4.8% in the years following treatment.

However, capital spending decreased during treatment in these counties by over 19%, so attributing their kindergarten ADM growth to use of the bond fund seems ill-advised.

The data does not appear to support the hypothesis that increased construction activity induced parents at the margin to enroll their children in kindergarten. Possible reasons for this result and useful areas for future research will be covered in the Discussion section of the paper.

²² Almost all of the small amount of growth in the Top 5 Pre Spenders category came from Currituck County.

Rates of tax change

Plotting changes in local spending against changes in the growth rate of taxes does not reveal a strong overall relationship. And as seen in Table 7, the average county increased local spending by 51.7% during treatment and saw a basically flat growth rate in local property taxes fall by 1% in the posttreatment period. But both of these broader views obscure the relationship between local spending decisions and rates of tax growth that occurred for counties with unique tax base characteristics.

Almost all of the categories in Table 7 were able to translate lower amounts of locally sourced capital spending into lower rates of tax growth. Small counties increased local spending to meet the match requirement, but the slow down in taxes after treatment suggests that these counties had the most pressing capital needs met through state bond funds. Although both the bottom five and the top five counties in terms of valuation per student decreased the rate of tax growth, the differences in scale of that decrease are striking. The bottom five can be considered the poorest counties in terms of resources to finance student needs. Thus a decrease of over 64% in local spending was accompanied by only a .1 percentage point drop in rates of tax growth, as significant decreases in property taxes would undermine their ability to finance needed construction. Meanwhile, because the counties with the highest valuation per student had more financial resources, they were able to pair a much more modest decrease in local spending of 35.9% with a much more dramatic decrease in tax growth, moving from 1% to -7%.

Table 7. Changes in rate of tax growth

| | % Change in Local Spending | Rate of Tax Growth in Pre Period | Rate of Tax Growth in Post Period |
|---------------------------------|----------------------------|----------------------------------|-----------------------------------|
| Average county | 51.7% | 0% | -1% |
| Small county allocation | 25.8% | 1.1% | -3.5% |
| Bottom 5 valuation per student* | -64.4% | 0.3% | 0.2% |
| Top 5 valuation per student* | -35.9% | 1% | -7% |
| Bottom 5 by total valuation* | -5.3% | 10% | -4% |
| Top 5 by total valuation* | 17.2% | -4.6% | 1.9% |
| Bottom 5 pre local spenders | 185.4% | -2.8% | 3% |
| Top 5 pre local spenders | -55.4% | -0.3% | -4.8% |

* Based on 1997 figures

The counties that saw the largest decrease in property tax growth were those with the lowest total valuation. Although their small tax bases limited their local spending decrease to 5.3%, their tax growth dropped from an extremely high 10% to -4%. Before treatment, a very small tax base forced these counties to continually increase tax rates just to keep up with the needs of their students. Once these needs were met through state funded bonds, the tax increases ceased.

The relationship between reducing local commitments to capital funding and reducing the taxes that pay for such commitments appears important for counties with tax bases at either extreme. While all but one category that decreased tax growth also lowered local spending, the two categories that saw higher tax growth—the bottom five ranked pretreatment local spenders and

the counties with the highest total valuation—both increased local spending considerably. Unlike the small counties, who may have had similar increases in local spending partially offset by the small county set aside, both the bottom ranked spenders and the highest total valuation counties likely financed increases in local spending with increases in local taxes. Much of the increase in the highest valuation category is driven by Mecklenburg and Wake, which saw rates of tax growth increase from -3.7% to 5% and -10.5% to .01%, respectively.

SECTION 5: DISCUSSION

This report has shown that policy makers looking to evaluate the effect of outside capital funding on county behavior must resist the temptation to base that evaluation on statewide changes in spending levels. In this case, H.B.1100 proved to be effective at increasing spending for counties with historically low levels of capital spending, thereby helping them address unmet capital needs. At the same time, counties that were already spending higher amounts on capital needs appear to have experienced some crowd-out. Moving forward, it will be important to remember that focusing evaluative efforts on statewide effects tends to obscure the very different ways in which wealthier counties and poorer counties change local capital budget decision-making in response to outside funding.

A related lesson is that evaluations of the effectiveness of outside capital funding should not be solely based on changes in spending. Many of the counties with high levels of local capital spending during the pretreatment period showed signs of crowd-out during treatment, which might lead decision-makers to deem the bond funds a waste in those instances. But those same counties were also able to significantly slow their rate of tax growth. As the ability to ease tax

growth was stronger among counties with higher valuation per student, both the design and the evaluation of future capital funding efforts should make sure to include considerations of a county's tax base.

Further research is needed to establish how much of the slowing in taxes was due to the steady increase in property value. Although some of this effect is likely dampened by using effective tax rates rather than actual tax rates, a better understanding of how the ballooning property tax values prior to the Great Recession shaped local budgeting and tax decisions will be particularly important in an environment in which property values are likely to remain depressed for the foreseeable future. Finally, as this report has only established that there is a relationship between county wealth (as measured by valuation per student and total valuation) and the ability to afford decreases in property tax, more work is required to control for other factors that may be correlated with tax rate changes in order to establish a firmer causal link.

The inability to show a clear connection between increased capital spending and increased kindergarten enrollment may indeed be a sign that treatment actually discouraged parents at the margin from enrolling their children in school. If that proves to be the case, one promising area for future research would be an investigation into whether changes in private school and charter school kindergarten enrollment growth were concurrent with the drop in kindergarten enrollment in public schools.

But the failure to confirm my hypothesis may also offer some clues about how to improve policy design. It is possible that counties that had new elementary school construction did in fact have

higher levels of kindergarten enrollment and that the effect is washed out by using overall spending changes. But although the North Carolina Office of the Treasurer and the Department of Public Instruction both collected project level data for use in the administration and management of the bond funds, that data was not collected with the express intent of being used to evaluate the effectiveness of the bond in the future. Project and school level data is thus dispersed across platforms and difficult to retrieve. If future researcher or legislators want to evaluate the effectiveness of different uses of capital bond funds, data should be more granular, collected more systematically, and made more easily retrievable. Establishing a consistent electronic format for the submission, collection, and archiving of this data as part of the policy and legislative design would be a useful first step.

Collecting this granular data more systematically without overburdening a DPI staff that is already underbudgeted presents a real challenge. Future research into effective and affordable data management strategies will be essential for policy makers interested in balancing bond management and bond evaluation.

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APPENDICES

Appendix I. Local General Obligation Bonds

| <u>County</u> | <u>Date</u> | <u>Amount</u> | <u>Vote Result (a=Pass, d=defeat)</u> | |
|---------------------|-------------|---------------|---------------------------------------|----------------|
| Pitt | 03/14/95 | 31,800,000 | | d |
| Chatham | 05/23/95 | 5,300,000 | a | |
| Mecklenburg | 05/30/95 | 304,267,000 | | d |
| Mecklenburg | 11/07/95 | 217,000,000 | a | |
| Forsyth | 11/07/95 | 94,000,000 | a | |
| Johnston | 11/07/95 | 50,000,000 | a | |
| Craven | 11/07/95 | 17,050,000 | a | |
| Davie | 11/07/95 | 7,635,000 | a | |
| Cabarrus | 05/07/96 | 49,000,000 | a | |
| Iredell-Statesville | 05/07/96 | 22,180,000 | a | |
| Lee | 05/07/96 | 25,000,000 | a | |
| Pender | 05/07/96 | 25,000,000 | a | |
| Wake | 06/04/96 | 250,000,000 | a | |
| Franklin | 08/27/96 | 17,000,000 | a | |
| Stokes | 09/07/96 | 25,000,000 | a | |
| Scotland | 11/05/96 | 18,600,000 | a | |
| Caldwell | 02/04/97 | 13,910,000 | a | |
| Catawba | 03/11/97 | 50,000,000 | a | |
| Dare | 05/20/97 | 59,500,000 | a | |
| Cumberland | 10/07/97 | 98,000,000 | a | |
| Alamance | 11/04/97 | 25,000,000 | a | |
| Mecklenburg | 11/04/97 | 415,000,000 | a | |
| Moore | 11/04/97 | 25,000,000 | a | |
| New Hanover | 11/04/97 | 125,000,000 | a | |
| Orange | 11/04/97 | 47,000,000 | a | |
| Transylvania | 11/04/97 | 24,300,000 | a | |
| Henderson | 11/18/97 | 46,500,000 | | d |
| Person | 02/10/98 | 18,525,000 | | d |
| Stanly | 05/05/98 | 38,000,000 | | d |
| Bladen | 09/15/98 | 25,000,000 | a | |
| Granville | 11/03/98 | 18,700,000 | a | |
| Wilkes | 11/03/98 | 28,000,000 | | d |
| Union | 11/03/98 | 52,700,000 | a | |
| Caswell | 05/04/99 | 4,500,000 | a | |
| Wake | 06/08/99 | 650,000,000 | | d |
| Buncombe | 10/05/99 | 45,000,000 | a | |
| Brunswick | 11/02/99 | 83,500,000 | a | |
| Craven | 11/02/99 | 25,000,000 | | d |
| Johnston | 11/02/99 | 80,000,000 | a | |
| Beaufort | 11/02/99 | 17,000,000 | * | vote cancelled |

Appendix I, contd.

| <u>County</u> | <u>Date</u> | <u>Amount</u> | <u>Vote Result (a=Pass, d=defeat)</u> | |
|---------------|-------------|---------------|---------------------------------------|---|
| Guilford | 05/02/00 | 200,000,000 | a | |
| Lincoln | 05/02/00 | 36,000,000 | a | |
| Lee | 05/02/00 | 25,700,000 | | d |
| Stanly | 05/02/00 | 26,000,000 | a | |
| Mecklenburg | 11/07/00 | 275,500,000 | a | |
| Union | 11/07/00 | 55,000,000 | a | |
| Wake | 11/07/00 | 500,000,000 | a | |
| Catawba | 03/20/01 | 72,000,000 | | d |
| Carteret | 03/20/01 | 33,500,000 | | d |
| Durham | 11/06/01 | 51,800,000 | a | |
| Gaston | 11/06/01 | 89,000,000 | a | |
| Craven | 11/06/01 | 28,000,000 | a | |
| Wilson | 11/06/01 | 21,000,000 | a | |
| Johnston | 11/06/01 | 75,000,000 | a | |
| Forsyth | 11/06/01 | 150,000,000 | a | |
| Orange | 11/06/01 | 47,000,000 | a | |
| Burke | 05/21/02 | 25,000,000 | | d |
| Polk | 09/10/02 | 15,500,000 | | d |
| Yadkin | 11/05/02 | 20,000,000 | | d |
| Rowan | 11/05/02 | 76,900,000 | a | |
| Mecklenburg | 11/05/02 | 224,000,000 | a | |
| Union | 12/10/02 | 70,000,000 | a | |
| Davie | 03/11/03 | 29,000,000 | | d |
| Wake | 10/07/03 | 450,000,000 | a | |
| Durham | 11/04/03 | 105,315,000 | a | |
| Davie | 11/04/03 | 8,825,000 | a | |
| Surry | 11/04/03 | 59,000,000 | | d |
| Guilford | 11/04/03 | 300,000,000 | a | |
| Union | 05/07/04 | 100,000,000 | a | |
| Northampton | 07/20/04 | 9,000,000 | a | |
| Beaufort | 07/20/04 | 33,000,000 | a | |
| Lincoln | 07/20/04 | 47,000,000 | a | |
| Edgecombe | 11/02/04 | 12,800,000 | a | |
| Cabarrus | 11/02/04 | 94,900,000 | a | |
| Franklin | 11/02/04 | 30,000,000 | a | |
| Union | 11/02/04 | 45,000,000 | a | |

Appendix I, contd.

| <u>County</u> | <u>Date</u> | <u>Amount</u> | <u>Vote Result (a=Pass, d=defeat)</u> |
|-----------------|-------------|---------------|---------------------------------------|
| Haywood | 05/03/05 | 25,000,000 | a |
| Pender | 05/03/05 | 51,475,000 | a |
| Johnston | 05/10/05 | 85,000,000 | a |
| New Hanover | 05/10/05 | 123,000,000 | a |
| Martin | 07/12/05 | 17,100,000 | a |
| Iredell County | 10/11/05 | 44,630,000 | a |
| Carteret County | 11/08/05 | 50,010,000 | a |
| Onslow County | 11/08/05 | 90,000,000 | a |
| Davidson County | 11/08/05 | 66,400,000 | a |
| Richmond | 11/08/05 | 25,000,000 | a |
| Mecklenburg | 11/08/05 | 427,308,000 | d |
| Franklin | 05/02/06 | 45,000,000 | d |
| Lenoir | 05/02/06 | 50,000,000 | a |
| Forsyth | 11/07/06 | 250,000,000 | a |
| Hoke | 11/07/06 | 20,000,000 | a |
| Union | 11/07/06 | 174,500,000 | a |
| Wake | 11/07/06 | 970,000,000 | a |
| Davie | 05/08/07 | 37,000,000 | d |
| Johnston | 05/15/07 | 99,000,000 | a |
| Durham | 11/06/07 | 194,240,000 | a |
| Gaston | 11/06/07 | 175,000,000 | a |
| Macon | 11/06/07 | 42,100,000 | d |
| Mecklenburg | 11/06/07 | 516,000,000 | a |
| Moore | 11/06/07 | 54,000,000 | a |
| Franklin | 05/06/08 | 53,000,000 | a |
| Guilford | 05/06/08 | 412,315,000 | a |
| Guilford | 05/06/08 | 45,000,000 | a |
| Lincoln | 05/06/08 | 44,600,000 | a |
| Forsyth | 11/04/08 | 38,650,000 | a |

Appendix II. Notes on data and methodology

The data used to determine whether capital spending increased comes from a document entitled “Report On County Spending on Public School Capital Outlays” (see Appendix for example), which the North Carolina State Treasurer’s Office Local Government Commission is required to produce each year. The total spending amount reflects the actual money dedicated by county governments within a fiscal year on public school capital projects and is comprised of four main sources of funds: portions of local sales taxes that are required by state law to be restricted to capital funding, withdrawals from the Public School Building Capital Fund, withdrawals from the Public School Building Bond Fund (H.B.1100), and Other Sources. These other sources, which include county capital project funds, county general funds, and locally funded debt service, represent local funding that, unlike the restricted amount of local sales taxes, counties have the discretion to change. Two counties (Alamance and Cleveland) chose to restrict a higher percentage of local sales tax for capital use than required by law; in both cases, the difference between the required and enacted restricted amount was considered part of the discretionary total.

As rises in both overall and local capital may result from student population growth, both figures are also calculated on a per Average Daily Membership (ADM) basis. In order to account for inflation so that spending across time can be compared, all dollars in this study are in 1997 dollars (the year of the initial allotment announcement) using the BLS Producer Price Index for non-commercial construction.

Appendix II, contd.

Although H.B.100 granted the responsibility to manage bond funds to counties, the criteria by which those funds were allocated were applied at the LEA level. Therefore, if a county has more than one LEA within its jurisdiction, the allocation totals for that county are calculated by summing the allocation of each LEA. In two cases, LEAs were split across counties and, as per the legislation, the availability of allocated funds for those counties corresponded to the proportion of ADM that reside within the effected areas. Based upon NCDPI ADM totals from 1997, Cabarrus County could use 74% of Kannapolis' allocation while Rowan County could use 26%. Cleveland County could use 93% of Kings Mountain's allocation, while Gaston had access to 5%.

Four of the 100 counties were dropped from the spending analysis due to missing data on withdrawals from the bond fund.²³ All four of these counties are small in size and allocation amount: combined, these four counties comprised only 0.78% of state ADM in 1997 and while the average share of overall bond allocations for the 96 other counties was 1.03%, these four counties' share averaged only 0.14%. Seven individual data points were dropped from the analysis as well because counties did not submit their spending reports on time to the State Treasurer's Office, although again all these counties were small.²⁴ Camden was dropped from the local funding analysis because the data on the source of funding was inconsistent.

²³ Mitchell, Polk, Transylvania, and Tyrrell Counties

²⁴ Tyrrell, Camden, Graham, Jones, Gates, and Hoke Counties average share of state capital spending was 0.03%, 0.12%, 0.05%, 0.05%, 0.13%, and 0.29%, while the average share of the other 94 counties was 1.05%.

Appendix III. Figures Discussed and Not Shown in Body of Report
 Figure 7. Total capital spending by number of allocations

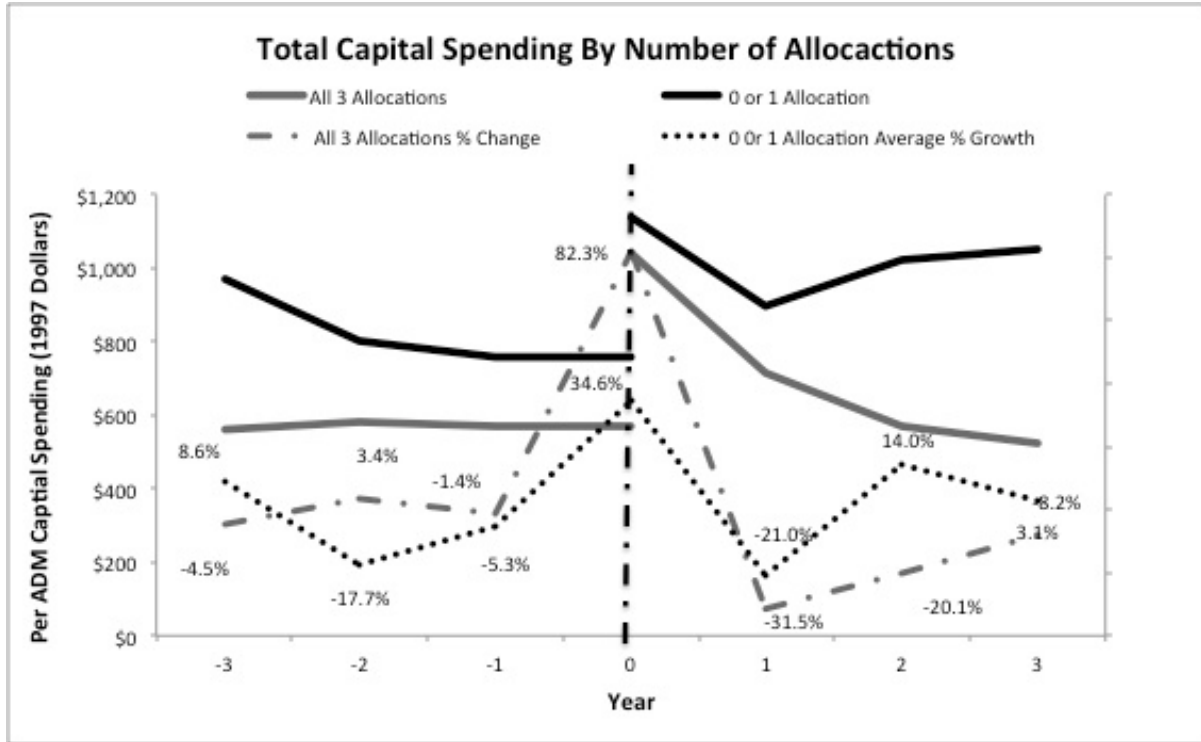
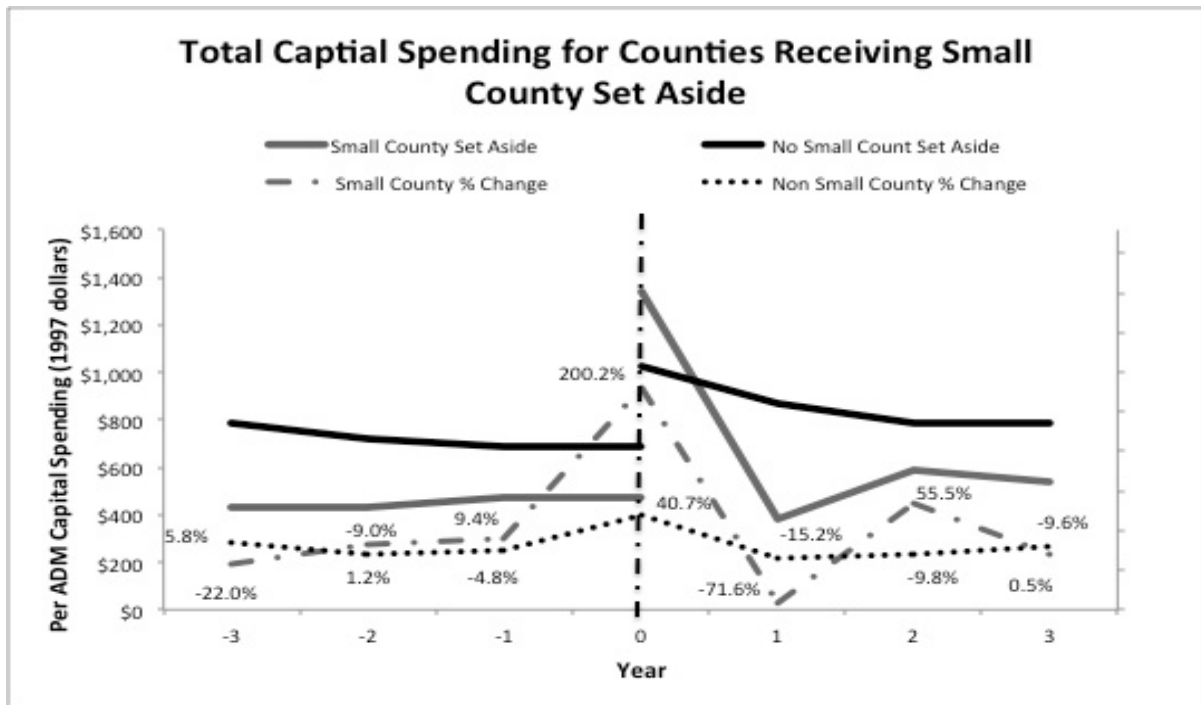


Figure 8. Total capital spending by small county allocation status



Appendix III, contd.

Figure 9. Local spending by small county allocation status

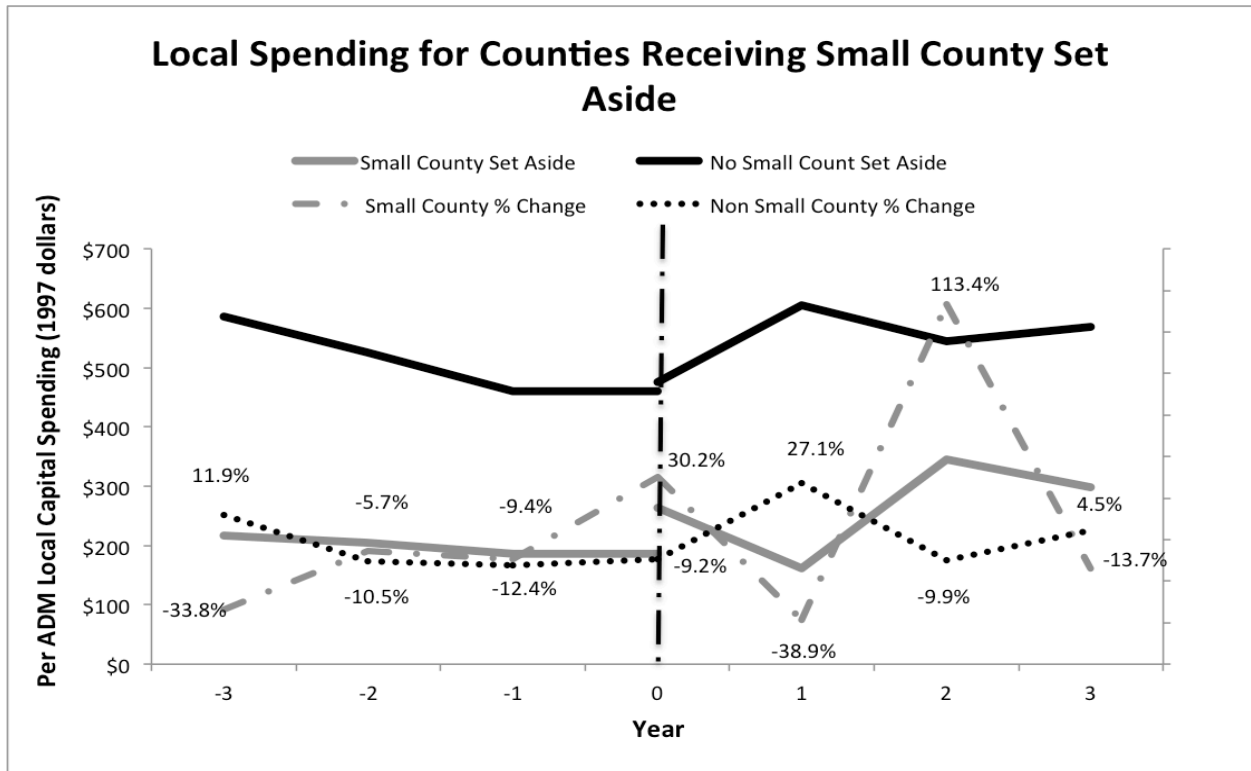
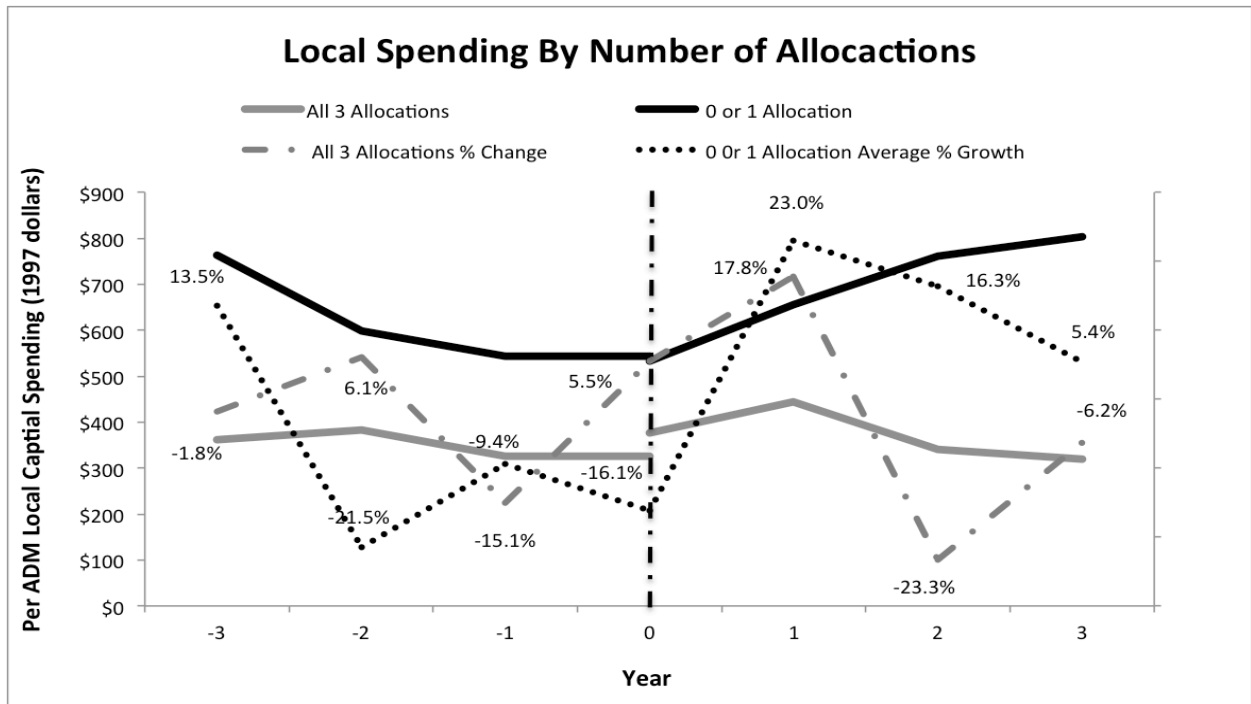


Figure 10. Local spending by number of allocations



Appendix III, contd.

Figure 11. Local share changes by number of allocations

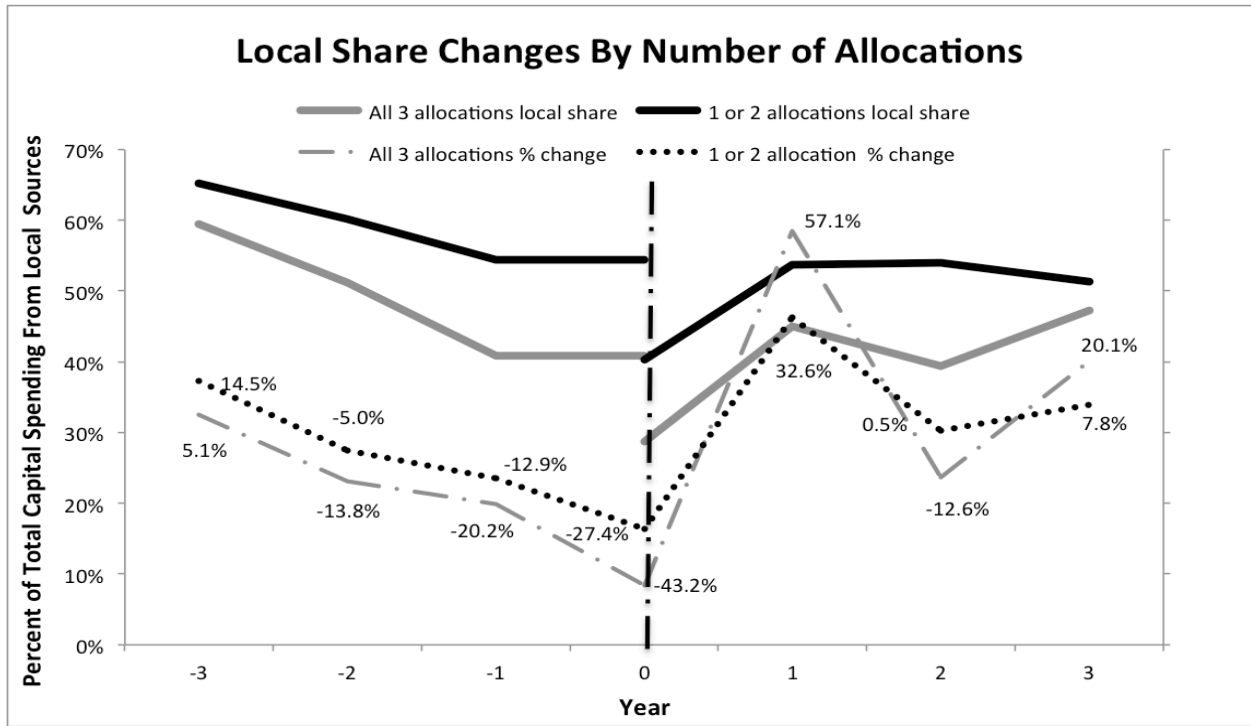


Figure 12. Local share changes by small county allocation status

