A CBER Report

The Economic Impact of Guilford County Schools and the 2008 Bond Referendum

By Dr. Andrew Brod
Center for Business and Economic Research

April 2008

THE UNIVERSITY *of* NORTH CAROLINA
GREENSBORO
Bryan School *of* Business *and* Economics
CENTER FOR BUSINESS AND ECONOMIC RESEARCH

About The Researcher

Dr. Andrew C. Brod is the Director of the Center for Business and Economic Research, in the Bryan School of Business and Economics at The University of North Carolina at Greensboro. CBER's mission is to use applied research to serve the Triad community and to assist in the economic development of the region. Under Dr. Brod, CBER has served both private- and public-sector clients by conducting surveys, economic-impact studies, industry-cluster analyses, industry assessments, and regional profiles. Dr. Brod's research interests include regional economic development, industrial economics, and the home-furnishings industry, and he has published scholarly articles in the *Journal of Industrial Economics*, the *Canadian Journal of Economics*, and *Economics Letters*. He writes a monthly column on economic policy in the Greensboro *News & Record* and a quarterly column on the economics of the furniture industry in *Home Furnishings Retailer*. Dr. Brod has served on a series of committees for economic-development organizations and the City of Greensboro, most notably the city's Living Wage Study Committee, which he chaired.

Executive Summary

On May 6, Guilford County residents will vote on two school bonds totaling $457 million. The value of these projects is far-reaching, but it's useful to know what short-term economic impact they are likely to generate. Similarly, the entire Guilford County Schools system is an indispensible community institution. One of many measures of its significance to the local economy is economic impact. Moreover, GCS has managed to achieve improvements in various educational outcomes over the years, and those have economic impacts as well.

I calculate the economic impact of GCS on "final demand" to be $1.266 billion in the 2006-07 fiscal year. GCS's operations supported a total of 15,377 jobs in Guilford County that year. In addition, I project that the 2008 bond referendum will generate a multi-year economic impact of $657 million and will support a total of 6,238 job-years (i.e. either 6,238 jobs in one year, or a smaller amount per year over the course of a few years of construction activity).

Finally, I calculate the impacts of three measures of improved educational outcomes. Reducing drop-out rates since 2000 generated a final-demand impact of $1.1 million and 9 jobs in 2006-07. The increasing success of GCS students in winning college scholarships and earning Advanced Placement credit generated a final-demand impact of $54 million and 391 jobs in 2006-07. These outcomes impacts can be added to those of GCS operations to yield a comprehensive final-demand impact in 2006-07 of $1.32 billion and an employment impact of 15,777 jobs.

1. Introduction

Education has always played many roles in American society. It trains citizens for the voting booth, it prepares workers for the job market, and it creates culture and community. In recent years our educational systems have become even greater assets as the U.S. economy continues to experience a dramatic and transformative restructuring.

Of course the primary value of education lies in the success of its students. The significance of our schools is far-reaching, and it is difficult to imagine a world without them. In a real sense, there is no way to place a price tag on our schools. However, there are ways to measure aspects of the economic value of our schools. This study pursues a particular measure, that of *economic impact*.

In addition to teaching students, a school system is an integral part of its local economy. Like any organization, it hires people and makes purchases. That mercantile activity of hiring and purchasing generates additional value, as each person hired or dollar spent generates a ripple effect of additional hiring and spending in the local economy. In the regional-economics literature, these ripple effects are referred to as *multiplier effects*, and they are the focus of this economic-impact analysis (EIA). This study has measured the various multiplier effects of the operations of the Guilford County Schools.

2. Methodology

An EIA takes a specified level of initial economic activity, expressed in terms of job creation, direct revenue, or direct expenditures, and calculates the short-run effects of that activity on a specified regional economy. The initial activity generates additional

spending and employment in the region, which are calculated by tracing the linkages between the economic sector in which the initial activity takes place and all other sectors. In this report, the economic impacts of the Guilford County Schools (GCS) will be expressed in terms of final demand (comparable to aggregate gross sales revenues), value added (equivalent to Gross Domestic Product, Gross State Product, etc.), and employment.

Economic impacts are categorized as follows:

- Direct effect: The number of people directly employed, or the amount of money directly spent, as part of the school system's operations.
- Indirect effect: The employment or spending generated by businesses that trade with the school system.
- Induced effect: The employment or spending generated by businesses serving households of employees of the school system.

The "direct effect" is another term for the initial economic activity. The direct effect generates the indirect and induced effects, which taken together are the multiplier effects. The EIA in this report was conducted using the IMPLAN (for "impact planning") software in conjunction with regional economic data produced by Minnesota IMPLAN Group, Inc.[1] Data on GCS's operations and activities were provided by GCS.

In this EIA, I investigate three main areas of GCS's economic impact: the school system's operations (including the academies); the 2000, 2003, and 2008 construction bonds, including minority-, woman-, and disabled-owned businesses; and improvements in two important educational outcomes.

[1] The data are from 2006, the latest year for which IMPLAN data are available.

3. Guilford County Schools

GCS serves the K-12 educational needs of Guilford County, North Carolina. The system includes 64 elementary schools, 20 middle schools, 27 high schools, and five special schools and academies. Total student enrollment in 2006-07 was 70,409 (71,418 in 2007-08), 41.8% of whom were white, 40.9% black, 7.6% Hispanic, and 9.7% other. GCS students speak a total of 70 languages and dialects and represent 106 cultural and ethnic groups. GCS serves 10,469 students with special needs and 13,801 advanced students. Nearly 49% of GCS students receive free or reduced-price lunches, as compared to 44% throughout North Carolina.

In 2006, 4,400 high-school diplomas were awarded to students who earned a total of $68 million in college scholarships, a new record for the school system. Graduates included 11 National Merit Scholars, 200 Presidential Scholars, and 336 North Carolina Scholars.

GCS employed 9,011 full-time teachers, administrators, and other personnel in 2006-07, and another 1,075 part-time workers. Its total expenditure on salaries and benefits was $474 million.

4. The Impact Region

An EIA must specify a region in which to measure the economic impacts. The obvious impact region for GCS is Guilford County. The table at the top of the following page provides some vital statistics for the county in 2006, the last year for which detailed regional data are available:

Table 4.1: Regional Indicators for Guilford County

Indicator	Value
Area (square miles)	650
Population	451,905
Employment	363,241
Number of Households	192,664
Total Personal Income (millions)	$15,984
Average Income per Household	$82,964

Source: IMPLAN data

After years of low unemployment in the 1990s, Guilford County experienced higher rates in the early part of this decade. The following table illustrates the unemployment picture in the county.

Table 4.2: Unemployment Rate in Guilford County (%)

Year	Guilford
2000	3.3
2001	5.1
2002	6.3
2003	6.2
2004	5.4
2005	5.1
2006	4.7
2007	4.7

Source: North Carolina Employment Security Commission

5. Impact of GCS's Operations

For the direct effects in this study, I use financial information provided by GCS. I express economic impact in terms of three separate measures: *final demand*, or *output*, which is comparable to aggregate gross sales revenues (retail and wholesale) and captures the overall increase in fiscal flows throughout Guilford County resulting from GCS's operations; *value added*, which is an increasingly common way to report economic impact and is essentially the same as gross product, such as Gross Domestic Product on a national level and Gross State Product at the state level; and *employment*, which is

expressed as the average annual full- and part-time jobs (i.e. not full-time equivalents). All fiscal impacts are in 2006 dollars.

In order to conduct this analysis, I make some modifications in the IMPLAN data. I use IMPLAN sector 461, which includes private elementary and secondary schools. Even though GCS is a public system, it can be modeled effectively using this sector. However, I adjust the model data to match such GCS measures as average salary and compensation.

In 2006-07, the fiscal budget for GCS was $744 million. Of that, $10.3 million was allocated to purchasing and salaries at what I will term the academies: the Middle and Early Colleges, High Point Central Academy, Smith Academy. These imply the following economic impacts:

Table 5.1: Final-Demand Impact of GCS Operations ($ millions)

Institution	Direct	Indirect	Induced	Total
GCS	744.10	215.69	306.30	1,266.10
Academies	10.31	2.58	3.67	16.56

Source: IMPLAN analysis by the author

The economic impact on final demand of GCS in 2006-07 was $1.266 billion. The implied multiplier (the ratio of total to direct impact) is 1.70 (= 1,266.1/744.10). This means that each additional dollar of spending by the school system in 2006-07 added another 70 cents to final demand in Guilford County. By the standards of economic-impact analysis, this is a strong multiplier, which indicates the degree to which the operations of the public schools are integrated into the county economy.

A subset of the overall GCS impact is the impact of the academies, which Table 5.1 shows was $16.56 million in 2006-07. This should not be added to the GCS impact figure.

The following tables summarize GCS's value-added and employment impacts:

Table 5.2: Value-Added Impact of GCS Operations ($ millions)

Institution	Direct	Indirect	Induced	Total
GCS	492.58	119.72	184.47	796.77
Academies	5.90	1.43	2.21	9.54

Source: IMPLAN analysis by the author

Table 5.3: Employment Impact of GCS Operations (jobs)

Institution	Direct	Indirect	Induced	Total
GCS	10,599.1	1,746.3	3,031.5	15,376.9
Academies	126.9	20.9	36.3	184.1

Source: IMPLAN analysis by the author

The final-demand impact is the most popular measure of fiscal economic impact, but the value-added impact is the soundest. There is a degree of double-counting in the final-demand impact (the result of recirculating spending), whereas value added would be comparable to "Gross Guilford Product," if such an indicator were measured.

Table 5.3 shows that in 2006-07, GCS supported a total of 15,377 jobs in Guilford County.

It is often instructive to see which industries are most affected by the industry being analyzed. Table 5.4, at the top of the following page, ranks the industries in Guilford County that experience the greatest indirect impacts of GCS operations. The table ranks indirect but not induced impacts, because induced impacts tend to be the same regardless of the industry being analyzed. For the most part, workers in all industries buy groceries, purchase homes, and so on.

Table 5.4: Industries with Largest Indirect Impacts of GCS Operations

IMPLAN Sector	Description
431	Real estate
43	Maintenance and repair of buildings
390	Wholesale trade
463	Other educational services
422	Telecommunications
419	Sound recording studios
31	Natural gas distribution
439	Architectural and engineering services
455	Business support services
499	Other state and local govt. enterprises

Source: IMPLAN analysis by the author

The top industries in which GCS generates business-to-business impacts include telecommunications, architectural and engineering services, other educational services, and other state and local government enterprises.

6. Bond Impacts

Before the 2000 bond referendum, it had been over 20 years since schools in Guilford County had issued a school-construction bond. The $200 million bond in 2000 was followed by a $300 million bond in 2003. And now on May 6, voters in the county will decide whether to approve a pair of bonds that add up to $457 million, including the $45 million bond for the reconstruction of Eastern Guilford High School.[2]

To analyze these bonds, I employ IMPLAN sector 38, construction of commercial and institutional buildings, and sector 439, architectural and engineering services. In addition, I construct a local-government investment function to model purchases of furniture, fixtures, and technology. I assume that all purchasing, design, and construction

[2] The total cost of the Eastern Guilford project will be $61 million, with insurance paying approximately $16 million. Because the insurance proceeds would not be spent without the bond approval, it would be reasonable to calculate the impact of the entire $61 million. Therefore, the impact of the bond money alone understates the full economic impact of the Eastern Guilford construction.

took place in the year after the bond referendum was approved. So on the assumption that the 2008 bonds will be approved, I assume that all purchasing, design, and construction resulting from those bonds will take place in 2009 (this may be literally true for the Eastern Guilford bond). This all-in-one-year assumption has little effect on the fiscal impacts, i.e. final demand and value added. It does affect the interpretation of the employment impact, however. Strictly speaking, a job in one year and a job in the next year don't add up to two jobs. Therefore, the employment impact of the bonds can be taken as a measure of "job-years." For example, 20 job-years would be consistent with four jobs in each of five years.

Finally, I subtract land costs from the bonds, because land purchases do not generate economic impacts. This reduces the projected spending from the 2008 non-Eastern Guilford bond from $412.3 million to $402.2 million; it reduces the spending from the 2003 bond from $300.0 million to $297.0 million.

These assumptions lead to the final-demand impacts summarized in the following table. All fiscal impacts have been translated into 2006 dollars, for greater ease of comparison with the operational impacts in the previous section. In addition, I've broken out the projected impact of the Eastern Guilford bond.

Table 6.1: Final-Demand Impact of GCS Bonds ($ millions)

Bond	Direct	Indirect	Induced	Total
2000	209.40	46.49	54.66	310.55
2003	316.86	72.90	86.74	476.50
2008: Total	428.74	103.70	124.40	656.83
2008: Eastern Guilford	42.93	10.71	12.88	66.52

Source: IMPLAN analysis by the author

Both the 2000 and 2003 bonds generated a substantial construction impact throughout the Guilford economy: multi-year impacts of $311 million and $477 million, respectively,

when expressed in 2006 dollars. The 2008 bonds are projected to generate a total multi-year impact of $657 million in the county, with the Eastern Guilford bond accounting for $67 million of that.

The following tables give the value-added and employment impacts for the bonds:

Table 6.2: Value-Added Impact of GCS Bonds ($ millions)

Bond	Direct	Indirect	Induced	Total
2000	90.21	25.06	32.92	148.19
2003	140.21	39.38	52.24	231.84
2008: Total	196.23	56.31	74.92	327.46
2008: Eastern Guilford	20.23	5.82	7.75	33.81

Source: IMPLAN analysis by the author

Table 6.3: Employment Impact of GCS Bonds (jobs)

Bond	Direct	Indirect	Induced	Total
2000	1,821.5	450.3	540.9	2,812.7
2003	2,862.0	713.8	858.5	4,434.2
2008: Total	3,980.2	1,027.0	1,231.1	6,238.4
2008: Eastern Guilford	411.0	106.3	127.4	644.8

Source: IMPLAN analysis by the author

The 2000 and 2003 bonds supported a total of 2,813 and 4,434 job-years in Guilford County, and the 2008 bond can be expected to support 6,238 job-years.

GCS has endeavored to involve minority-, woman-, and disabled-owned businesses (MWDBEs) in the construction process for each of the three bonds. A total of 11.3% of the design and construction contracts resulting from the 2000 and 2003 bonds went to MWDBEs, and GCS has set a goal of 12.5% for the 2008 bonds if they are approved. It appears that the MWDBE share for the Eastern Guilford bond will be even higher, close to 50%. I use these proportions in my projections of the impact of the 2008 bonds. The next three tables summarize the economic impacts of MWDBE contracts for each of the bonds.

Table 6.4: Final-Demand Impact of MWDBE contracts ($ millions)

Bond	Direct	Indirect	Induced	Total
2000	14.00	3.68	4.45	22.13
2003	33.96	8.97	10.84	53.76
2008: Total	47.33	12.69	15.33	75.36
2008: Eastern Guilford	21.51	5.77	6.98	34.26

Source: IMPLAN analysis by the author

Table 6.5: Value-Added Impact of MWDBE contracts ($ millions)

Bond	Direct	Indirect	Induced	Total
2000	7.06	1.99	2.68	11.73
2003	17.14	4.85	6.53	28.52
2008: Total	23.95	6.90	9.24	40.08
2008: Eastern Guilford	10.88	3.14	4.20	18.22

Source: IMPLAN analysis by the author

Table 6.6: Employment Impact of MWDBE contracts (jobs)

Bond	Direct	Indirect	Induced	Total
2000	148.1	36.4	44.0	228.5
2003	357.4	88.9	107.3	553.5
2008: Total	490.3	126.4	151.8	768.5
2008: Eastern Guilford	222.6	57.5	69.0	349.1

Source: IMPLAN analysis by the author

I project that MWDBE contracts resulting from the 2008 school bonds will generate a multi-year final-demand impact of $75.4 million and an employment impact of 769 job-years. The Eastern Guilford bond will account for $34.3 million and 349 job-years of those amounts.

7. Improved Educational Outcomes

A school system can confer economic benefits on its community in other, less tangible, ways. For example, success in educating children means keeping them off the streets and reducing the costs that must be incurred by police, social-service agencies, and hence ultimately the taxpayers. In this section I consider three such mechanisms, the decrease in the drop-out rate in Guilford County since 2000, the increase in grants and

scholarships earned by graduating students, and the increase in Advanced Placement credits earned by graduating students.[3]

Decrease in the drop-out rate: The drop-out rate among GCS students was 5.97% in the 2000 school year, but that rate was cut in half by 2006, to 2.99%. The reduction of 2.98 percentage points amounts to about 655 high-school students who were in school in 2006-07 but would have dropped out if not for the reduction in the drop-out rate.[4]

Those who drop out tend to earn thousands of dollars less per year than high-school graduates (and this earnings gap is growing as income in our economy flows more and more to those with an education). Drop-outs pay less in taxes on average, and they are more likely to be unemployed, on public assistance, and incarcerated. In other words, higher drop-out rates impose costs on the public sector and hence on taxpayers.

Following a study by the Friedman Foundation,[5] I consider two primary avenues of public cost: increased Medicaid costs and increased incarceration costs (it also calculates lost tax revenues, but the calculation is entirely in terms of income tax revenue, which is not directly shared with the counties). These two types of costs certainly understate the full cost imposed on the county by drop-outs, but they provide an instructive way to look at this problem.

At the state level, the Friedman Foundation study calculates an increased Medicaid cost per drop-out of $1,496. Because counties in North Carolina are

[3] GCS students also earn college credits via the International Baccalaureate program, but the numbers in that program are small relative to Advanced Placement, and I have limited my analysis to the AP program in order to conduct a conservative analysis.
[4] There has been some debate recently regarding the appropriate method for calculating drop-out and graduation rates in North Carolina, but these are distinct measures.
[5] Brian J. Gottlob, "The High Cost of Low Graduation Rates in North Carolina," The Milton and Rose D. Friedman Foundation, October 2007.

responsible for 15% of the state's Medicaid cost, that translates to a county-level cost of $224.40 per drop-out. Multiplying by the 655 drop-outs yields a total cost of $147,010. The same study uses drop-out rates, incarceration rates, and demographic factors to obtain an incarceration cost per drop-out of $1,946. If half of these incarcerated drop-outs are held in county facilities, that implies a total cost of $637,435. Adding the two costs yields $784,445. By making it possible for the county to avoid incurring this cost, GCS conferred a benefit on the county when it lowered its drop-out rate.

To calculate the economic impact of this improved educational outcome, I treat the $784,445 as an implicit grant to the county government. I use a county-government consumption function from the IMPLAN library to model the way those funds could have been spent. The result appears in the following table.

Table 7.1: Economic Impact of Reduced Drop-Out Rate

Type of Impact	Direct	Indirect	Induced	Total
Final demand ($1000)	784.45	-229.33	506.47	1,061.59
Value added ($1000)	423.70	-263.01	423.65	584.34
Employment (jobs)	6.8	-3.9	6.6	9.4

Source: IMPLAN analysis by the author

The negative indirect impacts are an artifact of the way economic-impact models account for government institutions (the basic building blocks of such models are industries, not government sectors). The total impact is the relevant amount, and we see that by reducing its drop-out rate from 2000 to 2006, GCS freed up county funds that generated a implicit final-demand impact of $1.06 million dollars in 2006-07, and an implicit employment impact of 9 jobs.

Increases in scholarships and AP credits: These can be analyzed together, because the nature of their economic impact is the same. Each represents a grant to

households in Guilford County. The grant is direct and obvious in the case of scholarships to students. It is indirect in the case of earned AP credits, which allow students to pay less tuition in college.

In 2000-01, GCS graduates earned a total of $31.0 million in college scholarships. By 2006-07, that figure had more than doubled, to $68.1 million. The entire $68 million is a benefit to households in the county, but if the goal is to capture the benefit most closely associated with GCS efforts in recent years, the increase of nearly $37.2 million is the appropriate measure.

In 2000-01, 49% of students taking Advanced Placement tests scored 3 or higher (on a scale of 1-5), indicating a high likelihood of earning college credits. According to the 2005 study conducted for the National Center for Educational Accountability, it is also one of the best predictors of college success. In 2006-07, that percentage had fallen to 46%, but the number of AP exams taken had risen so sharply (from 3,368 in 2000-01 to 8,393 in 2006-07) that the number of 3+ scores rose from 1,650 to 3,897. That increase of 2,247 successful AP exams represents an improved educational outcome.

University policies vary as to how AP exams can be translated into college credits. For some subjects, a score of 4 or 5 is required to earn credit. And the credit can vary from three to eight hours. For this analysis, I assume conservatively that an AP exam score of 3 triggers a college credit of three hours. I use College Board data on college tuition at various types of institutions (e.g. four-year public, four-year private) and calculated a weighted average tuition rate based on the types of colleges GCS graduates attend. For most universities, a full load of courses is understood to be 12 hours, so I calculate the weighted-average tuition for three credit hours. The result for

the 2007-08 college year, spanning both public and private universities, is $1,844. Multiplying that times the 2,247 increase in successful AP exams taken by GCS students in 2006-07, the implicit grant to households in Guilford County is just over $4.1 million. Added to the $37.2 million in increased scholarships gives a total implicit grant of $41.3 million.

To calculate the economic impact of this sum, I use a household expenditure function from the IMPLAN library (I use the function for households with incomes between $75,000 and $100,000 in order to capture the average household income in Table 4.1). The resulting impacts appear in the table.

Table 7.2: Economic Impact of Increased Scholarships and AP Credits ($ millions)

Type of Impact	Direct	Indirect	Induced	Total
Final demand ($ millions)	41.32	6.23	6.00	53.55
Value added ($ millions)	16.85	3.33	3.65	23.83
Employment (jobs)	279.3	40.9	71.0	391.2

Source: IMPLAN analysis by the author

The improvements in the school system's educational successes since 2000 have clearly paid a real dividend in the community (and remember these are the impacts of the increases only, not of the entire amount of scholarships and AP credits earned by GCS students). The improvements freed up enough additional money in household budgets to generate an implicit economic impact of $53.6 million, and to support 391 jobs in the county.

8. Summary

Table 8.1 summarizes all economic impacts on final demand and employment that are calculated in this report:

Table 8.1: Final-Demand Impacts ($ millions)

Institution or Event	Impact ($ millions)	Employment (jobs)
GCS Operations	1,266.1	15,377
Academies	16.6	184
2000 Bond	310.6	2,813
2000 MWDBE	22.1	229
2003 Bond	476.5	4,434
2003 MWDBE	53.8	554
2008 Bonds	656.8	6,238
2008 MWDBE	75.4	769
2008 E. Guilford Bond	66.5	645
2008 E. Guilford MWDBE	34.3	349
Reduced Drop-Out Rate	1.1	9
Increased Scholarships & AP	53.6	391

Source: IMPLAN analysis by the author

The bond impacts need to stand on their own, and should not be added to the others due to their diverse time frames. But it is acceptable to add the impacts for reduced drop-out rates and increased scholarships and AP credits to the total impact for GCS operations, yielding an overall final-demand impact of $1.32 billion in 2006-07. The total employment impact for those lines is 15,777 jobs.

These impacts are similar to some other economic-impact analyses CBER has conducted in the recent past (on the top of the following page):

Table 8.2: Recent CBER Economic-Impact Analyses

EIA	Impact Year(s)	Impact Region	Final-demand impact (millions)	Employment impact (jobs)
Dell factory	2004-2008	Guilford County	$3.52-4.04 billion*	4,911-6,320+
Moses Cone Health System	2003	Service Area#	$1.48 billion	16,322
High Point Furniture Market	2003	Triad	$1.07 billion	13,038
UNCG	AY 2004-05	Triad	$1.22 billion	13,520
Guilford County Schools	**AY 2006-07**	**Guilford County**	**$1.32 billion**	**15,777**

Sources: Various CBER reports

* Present value over 5-year period + In 5th year #Multi-county region

The overall economic impact of GCS (including the improved educational outcomes) is in the same ballpark as the impacts of the High Point Furniture Market, Moses Cone Health System, and UNCG.