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STRUCTURE OF SCHOOL DISTRICTS IN GEORGIA ECONOMIES OF SCALE AND DETERMINANTS OF CONSOLIDATION

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THE STRUCTURE OF SCHOOL DISTRICTS IN GEORGIA: ECONOMIES OF SCALE AND DETERMINANTS OF CONSOLIDATION

EXECUTIVE SUMMARY

The structure of school districts in Georgia and the efficient delivery of public schooling are important concerns for policy makers in the state of Georgia. In particular, a major concern with regard to the structure of school districts in Georgia is the small size of some school districts. Many previous studies have found that it costs more for small school districts to provide the same quality schooling than for larger school districts. This concept is referred to by economists as “economies of scale.” If economies of scale are present in the provision of public elementary and secondary education in Georgia, public funds could possibly be saved by eliminating small school districts and merging them with large neighboring school districts.

Georgia has a school district structure consisting of 159 county-based school districts and 22 municipal or “independent” school districts. This structure of school districts was established by the state Constitution of 1945 which formed a system of county-wide school districts while prohibiting the formation of new independent school districts. However, the Constitution did allow certain existing independent school districts to continue to operate. Over the past three decades the number of independent school district in Georgia has declined slowly through consolidation, from 35 independent school districts in 1967, to 29 district in 1977, to 27 independent school districts in 1987, to 22 in 1998.

Longstanding legislative concerns about small school district size were incorporated in the *Quality Basic Education Act* (QBE) of 1986. The Act gives financial incentives for school districts to consolidate by offering 100 percent state funding for capital outlays accompanying the voluntary

consolidation of two or more school districts. In the decade since QBE was implemented five independent school districts have consolidated with the surrounding county-wide school districts.

However, a relevant policy question is whether giving fiscal incentives for school district consolidation is warranted on economic grounds. A consideration that should be taken into account is that residents of small independent school districts often prefer this arrangement, despite potential savings due to economies of scale that might result from consolidation. Therefore, the fundamental basis for directing state policy on school district consolidation is an enhanced understanding of why certain school districts choose to consolidate with the surrounding county district while others choose not to do so.

School district consolidation involves other issues besides the cost-effective delivery of educational services. In fact, the school district consolidation decision involves a variety of complex political and fiscal factors. Besides the potential gains from economies of scale, other factors that could explain whether or not school districts consolidate include income and tax base differences across districts, racial factors, and the size of the school districts with which operations will be merged. All these elements should be considered in the analysis of school district consolidation in Georgia.

Consequently, the major policy issues with regard to the structure of school districts in Georgia are, first, whether economies of scale are present in the provision of public education in the state of Georgia and, second, what determines why certain city school districts choose to consolidate with the surrounding county-wide school districts, while other municipal districts opt to remain independent.

Policy Issues

The first policy issue that is addressed is whether or not economies of scale are present in the provision of public education in Georgia. An examination of the cost structure of school districts in Georgia over the period from 1977-1995 generated the following finding:

- Economies of scale at the district level do exist in the provision of high school education in Georgia. That is, as high school enrollment increases, costs per student decrease. This suggests that potential savings could indeed result from school district consolidation.
- Economies of scale at the district level do not exist in the provision of elementary education. This means that costs per student remain unchanged as the level of elementary enrollment increases.
- Our results suggest that potential savings from economies of scale are small for most school districts. On average, a ten percent increase in high school enrollment would result in savings of 7 dollars per student. However, substantial savings could be realized if a small independent school district consolidated with a neighboring county school district that is several times larger than the independent district. For several independent school districts the potential savings from such a consolidation exceed \$ 300 per student per year.

The second policy issue that is addressed is the determination of why certain school district consolidate with a neighboring school district while others do not. The study upon which this *Policy Brief* is based contains an analysis of the characteristics of independent school districts that consolidated in the period from 1977-1995. The study only takes into account consolidation of independent districts because the consolidation of two county school districts is institutionally more complex and has not actually taken place. In this context it is important to understand that a county system does not have a choice but to accept consolidation with an independent school district if the latter chooses to give up its charter. This places the choice of whether or not to consolidate solely with the independent school district. Our analysis resulted in the following findings:

- The greater the potential economies of scale, the greater the probability that an independent school districts consolidated with its surrounding county district when all else is held equal.
- The likelihood of consolidation significantly increases if the merging partner is geographically smaller in absolute terms. This finding is consistent with the notion that increased physical

distance will result in higher transportation cost after consolidation, thus making consolidation less desirable. Also, the effect of geographical size of a surrounding county district on the consolidation decision could also be due to feared loss of local involvement and control after consolidation by the residents of the independent district.

- Independent school districts that choose to consolidate with the surrounding county-wide district in general have higher tax burdens relative to the county district. As such, consolidation would allow the residents of the independent district to shift some of their tax burden onto county residents. However, this characteristic was not found to influence the consolidation decision in a statistically significant manner.
- Independent school districts with smaller enrollments relative to the surrounding county-wide district were less likely to consolidate. This is to be expected, since the smaller the population of the independent school district vis-a-vis the county district, the smaller the influence of the independent district would be in a potential consolidated county district.
- Finally, independent school districts that have a greater concentration of minorities relative to the surrounding county district were significantly more likely to opt for consolidation. A possible explanation of this result is that if voters believe that a higher concentration of minorities results in lower school quality, residents of an independent school district will favor consolidation if school district consolidation results in a lower concentration of minorities in the consolidated district.

Policy Implications

These findings have policy implications. The state government's concerns about sub-optimal size school districts appear to be warranted based on the estimates of economies of scale. However, for most school districts in Georgia potential cost savings from consolidation are quite small.

The drive to consolidate these small districts will need to address properly the potential concerns of small school districts. Loss of community involvement is detrimental to the (actual or perceived) quality of education. This appears to have resulted in resistance to consolidation by small independent school districts resisting consolidation. The state would likely have to provide large financial incentives if it sought to encourage further school district consolidation.

THE STRUCTURE OF SCHOOL DISTRICTS IN GEORGIA: ECONOMIES OF SCALE AND DETERMINANTS OF CONSOLIDATION

I. Introduction

The existence of small school districts continues to be a significant policy concern in the state of Georgia. A commonly held view among economists is that it costs more for small school districts to provide the same quality schooling than for larger school districts; a concept referred to as economies of scale.¹ If economies of scale are indeed present in the provision of public elementary and secondary education in Georgia, public funds could possibly be saved by eliminating small school districts and merging them with large neighboring districts. Some policy makers in Georgia believe that economies of scale cause an inefficient allocation of public resources and that this presents sufficient reason to mandate school district consolidation or to provide financial incentives for small school districts to consolidate.

An opposing view on the issue regards school district consolidation largely as a local matter which for all intents and purposes falls outside the purview of state government. While the state government supports elementary and secondary public education in Georgia through intergovernmental grants, public schooling is provided by local school districts who raise much of their funding through local taxes. Proponents of this “hands-off” approach would argue that residents of small school districts may wish to pay higher taxes in order to have a separate school district. There are a variety of reasons why voters may prefer separate provision of public schooling over consolidated provision: residents of the small school district may fear loss of local control, separate provision allows differences in the curriculums that the school districts offer, schools in a consolidated school district may be located further from home, and so on. Thus an economic argument could be made that if residents of a small school district are willing to pay more for separate provision, this should

be their choice. However, if cost efficiency is a concern, the option of school district consolidation should be available if residents of the small school districts believe that the possible savings from scale economies exceed the benefits of maintaining an independent school district.

The possible presence of scale economies in public schooling in Georgia begs two questions that this report seeks to answer. The first issue that this report seeks to examine is whether economies of scale are indeed present in the provision of public schooling in Georgia. When it is shown that economies of scale do exist in the provision of public schooling, a secondary question arises. The second issue that this report addresses is what factors influenced the consolidation of school districts that occurred in Georgia. Our goal is to gain insight into why certain city school district consolidated with the surrounding county school districts, while other municipal districts remained independent. One possible motivation for consolidation might arise if substantial savings could be realized through consolidation. If this were the case in Georgia, small school districts could reduce their costs by consolidating with neighboring districts.

However, as already mentioned, school district consolidation involves other issues besides the cost-effective delivery of educational services. In fact, the school district consolidation decision involves a variety of complex political and fiscal factors. Besides the potential gains from economies of scale, other factors that could explain whether school districts consolidate include income and tax base differences across districts, racial factors and the size of the school districts with which operations will be merged. All these elements are considered in this study of school district consolidation in Georgia.

The rest of this report is organized as follows. Section II provides a short overview of the structure of elementary and secondary public education in the state of Georgia. This overview includes a brief history of education policy for Georgia and a comparison of the state's structure of

school districts with those of surrounding states. Section III evaluates per student costs in the provision of local public schooling in Georgia. Our cost estimates reveal that in both 1977 and 1987 high school education in the state operated within the range where savings due to economies of scale could be realized. In Section IV we analyze the consolidation decisions of school districts in Georgia over the last two decades. We compare and analyze characteristics of municipal school districts that consolidated over the past two decades with those who did not. We also specify a probability model to examine what factors have been significant in leading independent school districts to consolidate with surrounding county school districts. In Section V we summarized our results, evaluate the state's policy on consolidation and offer some concluding remarks.

II. The Structure of School Districts in Georgia

In evaluating the structure of school districts in Georgia, two dimensions need to be addressed. First, a brief historical overview will be given of the evolution of the structure of school districts in Georgia over the past 50 years. Second, the current structure of school districts in Georgia will be compared to structures found in surrounding states.

A. Historical Overview of School Districts in Georgia

The foundation for the current structure of school districts in Georgia was laid in 1945, when the new state constitution eliminated 1,257 sub-county tax districts and replaced them with a system of county-wide school districts (Hepburn, 1987). At the same time, however, a number of municipal corporations that had maintained independent school districts were granted the authority to continue this arrangement. Yet the establishment of new municipal or “independent” districts was prohibited.² Since the enactment of the state constitution of 1945, consolidation has been the single most dominant theme in the state's policy toward the structure of school districts in Georgia.³

As a result of the 1945 state constitution, by 1952 the number of school districts in the state was dramatically reduced to 187 districts, of which 159 were county-wide school districts. Despite the constitutional prohibition on the creation of new districts, subsequent amendments to the constitution increased the number of districts to 194 by 1967. After 1967, the number of school districts in Georgia once again started to slowly decrease, only returning to the level of 186 districts by 1986. By 1995, the total number of district had declined further to 181.

Not only did several independent school districts in Georgia consolidate with their surrounding county districts in the period after 1967; cooperation between county school districts also commenced during this period. Beginning in 1974, due to low enrollment, a number of rural county school districts no longer found themselves in a position to independently provide high school education. These districts were compelled to enter into long-term contracts for the provision of high school education with neighboring districts. As a result of this arrangement, the "sending" school districts effectively lost all control over high school provision to its students. These districts did continue to separately provide elementary education. Several rural county districts were compelled to accept such arrangements and send their high school students across district borders.⁴ Due to the length of the contracts, specified at 25 years, the character and scope of the cooperation between these rural counties has remained unchanged for the past two decades.

On the legislative front, the optimal jurisdiction size of school districts was a concern to the Georgia legislature throughout the 1970s and 1980s. Recommendations made by the committee that proposed the *Adequate Program for Education in Georgia Act* (APEG) of 1974 included a call for statewide school district reorganization and district consolidation. However, these recommendations were not adopted by the state assembly in the final version of the Act. Twelve years later, a major incentive for consolidation was given to school districts in the *Quality Basic Education Act* (QBE)

of 1986. This Act provides 100 percent state funding for capital outlays "accompanying" the voluntary consolidation of two or more school districts. The QBE Act also provides for 100 percent state funding for capital outlays of two or more districts that voluntarily consolidate two or more elementary, middle or high schools into a single school of a specified size.

This policy has had some limited success. While between 1977 and 1986 only two independent city school districts consolidated with their surrounding county school districts, in the decade following the enactment of QBE five city school districts consolidated with their surrounding county-wide districts. In the decade from 1977-1986, the independent school districts of Cochran (Bleckley County) and West Point (Troup County) consolidated. However, West Point's decision to consolidate in 1985 was based largely on the expected passage of *QBE* the next year. Five more independent districts consolidated in the period from 1986-1995, namely Fitzgerald (Ben Hill), Hogansville (Troup), LaGrange (Troup), Thomaston (Upson), and Waycross (Ware). A listing of all independent school districts that operated between 1977 and 1995 is presented in Table 1.

B. Regional Comparison

The structure of school districts in Georgia, formed by county districts but with 22 municipal (or "independent") school districts, is not uncommon in the southeastern United States. Descriptive statistics from selected southeastern states are shown in Table 2. Compared to the southeastern region as a whole, Georgia has a larger than average number of school districts, with district enrollments below the regional average. The large number of school districts in Georgia is to a large extent a reflection of the large number of county jurisdictions; it is said that the number and size of Georgia counties was determined historically by the concern that county residents should be able to travel to and from the county seat in a horse-drawn buggy in one day. In addition to having a large number

Table 1. Georgia: Independent School Districts, 1995.

School District	County	Enrollment 1995
Americus	Sumter	3112
Atlanta	Fulton	59286
Bremen	Haralson	1275
Buford	Gwinnett	1653
Calhoun	Gordon	2139
Carrollton	Carroll	3612
Cartersville	Bartow	2958
Chickamauga	Walker	1270
Commerce	Jackson	1092
Dalton	Whitfield	4244
Decatur	DeKalb	2673
Dublin	Laurens	3867
Gainesville	Hall	3125
Jefferson	Jackson	1063
Marietta	Cobb	5934
Pelham	Mitchell	1685
Rome	Floyd	4655
Social Circle	Walton	1206
Thomasville	Thomas	3782
Trion	Chattooga	1192
Valdosta	Lowndes	7504
Vidalia	Toombs	2661

SOURCE: Bachtel and Boatright (1996).

Table 2. A Regional Comparison: Structure of School Districts in the Southeastern U.S., 1990.

State	Number of Districts	Number of Counties	Avg. Dist. Enrollment	Population Density**
Alabama	128	67	5641	79.6
Arkansas	327	75	1322	45.1
Florida	67	67	26453	239.6
Georgia	186	159	6054	111.8
Louisiana	66	64	11853	96.8
Mississippi	150	82	3112	54.8
N. Carolina	133	100	8098	136.1
S. Carolina	91	46	6754	115.8
Tennessee	138	95	5938	118.3
Region*	142	83	8358	110.9

*Unweighted average of the states (including Georgia).

** Population per square mile.

SOURCE: NCES (1994); U.S. Bureau of the Census (1991).

of county districts, Georgia's independent school districts are generally very small. In 1987, independent districts had an average enrollment of less than 3000 students, less than half the average enrollment for county-wide school districts.

The structure of school districts in Georgia resembles that of Louisiana, which has 64 parish-wide school districts and two non-county school districts. Florida's school district borders are required to be coterminous with the county lines of the state's 67 counties. Both due to the absence of non-county districts in Florida and due to the overall smaller size of counties in Georgia, school districts in Georgia are generally much smaller than districts in Florida and Louisiana.

The situations in Alabama, Arkansas, and Mississippi represent the other extreme: the structure of school districts in these states is dominated by an abundance of small, independent school districts. As a result, average district enrollment in these states is lower than average enrollment in Georgia.

Average school district enrollment in Arkansas, for example, is 1322, compared to an average enrollment of over 6000 for all school districts in Georgia. It should be noted, however, that Arkansas and Mississippi are considerably less densely populated than Georgia.

III. Decreasing Cost per Student in Public Schooling

There is a positive side to relatively smaller school districts. When a greater number of small school districts are available in an area, households have more public school districts to choose from when making their residential location decisions. However, the size of school districts may be suboptimal in the sense that larger school districts may be able to provide the same quality education at a lower cost per student. When larger school districts can achieve lower per student costs, this is referred to as economies of scale. There are a variety of potential sources of savings. First, a consolidated school district would require only one school board and one district administration instead of two, thereby reducing overhead costs. Second, a consolidated school district may be able to merge two or more schools that are too small to efficiently provide schooling. Third, a consolidated school district may be in a position to negotiate better prices from suppliers.

While the benefits of choice and accountability associated with smaller size can not generally be measured, it is possible to measure the potential gains from economies of scale associated with larger size. This section of the paper investigates the question of whether or not school districts in Georgia operate within a range in which they can benefit from decreasing costs per student.

A. Fixed and Variable Costs

Many previous studies have found that larger school districts are able to provide schooling at a lower cost per student (see footnote 1). To establish empirically whether this is true for school districts in Georgia as well, we estimated a cost function for all school districts in the state. When

estimating a cost function for public schooling in Georgia, we have to recognize that while certain school district expenditures can vary on a yearly basis, other expenditures are fixed for periods exceeding one year. Since these “fixed costs” cannot be altered in the short run, we will concern ourselves with the remainder of school district expenditures, known as variable costs.

In 1987, the average school district in Georgia had variable expenditures or variable costs of \$ 2,180 per student and fixed expenditures or fixed costs of \$ 385 per student. For the purpose of our cost estimation, we assume that spending on maintenance and operation of the school buildings, interest on loans, as well as spending on student transportation is essentially fixed and cannot be changed from year to year. The balance of expenditures for a school district (the school district's variable costs) include instructional expenditures, administrative costs, and spending on teacher and student support services. Even though fixed costs could change as a result of school district consolidation, we excluded them from our cost estimation because the school districts have little or no influence over them in the short run. Since transportation costs could possibly go up in case of consolidation, the overall impact of excluding fixed costs in our estimation is ambiguous. With this in mind, we estimated a cost function to see if and how school district size influences variable costs per student. The estimation of variable cost per student (i.e., average variable costs) is described in detail in the Appendix.

B. Estimation and Results

The estimation of the cost function is based on the presumption that variable cost per student for each school district depends on (1) the price of the resources that are used to produce public education, (2) the size of the school district, as measured by enrollment, (3) the quality of the education that the school district provides, and (4) certain characteristics that are "fixed" in the short run. Since social and economic characteristics greatly influence the outcomes of schooling, these are

taken into account in specifying our cost estimation. Because elementary and secondary education may have distinctly different impacts on school district expenditures, we incorporate enrollment into our model separately for the elementary grades and the high school grades.

Due to data restrictions, we were unable to estimate cost functions for every year for the period under consideration. Instead, cost functions were estimated for 1977 and for 1987. The results from our cost estimation convincingly show that in 1977 as well as in 1987 high school education in Georgia operated in the range where economies of scale prevail; variable cost per student decline as high school enrollment in a school district increases. However, based on the empirical results we are led to conclude that average variable cost is not influenced by the level of enrollment in the elementary and middle school grades. Our estimations suggest that in 1977 a 10 percent increase in high school enrollment for an average independent district would have reduced average variable cost by about 0.12 percent. For 1987, based on our estimates, we predict that a 10 percent increase in high school enrollment for an average independent district would have resulted in a decrease of average variable cost of 0.35 percent, or only about \$ 7 per student. Although these amount seem small, substantial savings could be realized if small independent school districts consolidated with neighboring county school districts that are several times larger than the small district. For example, we project that in 1987 independent school districts in the state would have been able to reduce their variable cost per student between from virtually zero up to 13 percent by consolidating with their respective surrounding county districts. This would translate into potential savings due to scale economies of up to 300 dollars per student per year.⁵

IV. School District Consolidation in Georgia: 1977-1995

The second objective of this paper is to examine the factors behind the consolidation decisions of independent school districts in Georgia over the past two decades. Our analysis focuses on the consolidation decision of Georgia's municipal or "independent" school districts, as they have the option of consolidating with their surrounding county districts; county-wide school districts cannot refuse consolidation if the independent school district decides to give up its charter. The consolidation of two county school districts is institutionally more complex and for all practical purposes has not actually taken place. First, we compare the characteristics of independent school districts that consolidated in the period from 1977 to 1995 with those districts that remained independent. Then, using a probability model, we estimate the likelihood that an independent city school district will consolidate based on the potential gains from economies of scale that this district stands to gain. In addition, the role of the social and economic characteristics of the independent school district in the consolidation decision is considered.

A. Characteristics of Consolidating School Districts

Residents of independent school districts have a choice to either remain independent or to consolidate with the surrounding county school district. Although the schooling provided by each is similar in nature, these two options present distinctly different characteristics. These characteristics are relevant to the consolidation decision and can be divided along two dimensions: relative price and substitutability.

If consolidated provision of public schooling is less costly relative to independent provision, school district consolidation will be more attractive to the residents in the independent school district. The relative price of schooling can be influenced by a variety of factors, such as the presence of

economies of scales, changes in transportation costs due to consolidation and shifts in the tax burden as a result of consolidation. Further, if consolidated provision of schooling is a good substitute for the schooling provided by the independent school district, then consolidation will be the more attractive for the independent school district. Substitutability is affected by the degree of influence that the municipal residents will have in a possible consolidated districts, and similarities between the county and city school districts in educational, racial and socio-economic characteristics.

For the purpose of analyzing the characteristics of consolidating school districts and comparing them to independent districts that remained independent, we used information on all independent school districts and their surrounding county districts in Georgia for 1977 to evaluate school district consolidation in the period from 1977-1986. Equivalent data was collected for independent school districts for 1987 in order to consider consolidations from 1987-1995. Due to the uniqueness of the Atlanta school district, this observation was dropped from the sample for both years. As a result, we collected data on 28 independent school districts and their respective county systems for 1977, and on 26 for 1987. Variables were constructed using data provided by the U.S. Bureau of the Census (1991; 1994) and the Georgia Department of Education. In addition to these sources, data on total road mileage by school district was provided by the Georgia Department of Transportation (1996).

The collection of school district data for two decades (as opposed to analysis on an annual basis) was largely driven by data availability, but also for other reasons. Use of annual data incorrectly suggests that a consolidation decision made in any year is independent of the characteristics of the school district in earlier years. Since school district characteristics can change greatly over the period of a decade, we assume that each independent school district's decision to consolidate in the period from 1987-1996 is only based on its characteristics in 1987, and is independent of its characteristics in 1977. Combining the data for 1977 and 1987 yields 54 observations. In our analysis, we

examine five factors that could potentially encourage or discourage school district consolidation. Descriptive statistics for these variables are presented in Table 3.

Economies of Scale. The first factor that could impact the consolidation decision of independent school districts in Georgia is potential savings due to economies of scale. This notion of decreasing per student costs has been the main theme emphasized by the state authorities over the years in pushing for more school consolidation in Georgia. The results of our cost estimates in the previous section of this paper are weakly consistent with the idea of decreasing average cost. Therefore, in general, municipal school districts would face lower average variable cost if they were to consolidate. As a measure of possible savings due to economies of scale reaped from consolidation, we defined the variable SCALE. For each independent school district, this variable measures the estimated percentage by which variable cost per student would be reduced as a result of consolidation with the respective surrounding county district.

A higher value of the variable SCALE indicates that potential savings from economies of scale are larger. Table 3 shows that in 1987, on average, possible savings resulting from economies of scale for all independent school districts were 4.25 percent. For small school districts that operate in the range where economies of scale are more relevant, all else equal, consolidation with the county district should be more likely. With this in mind, it is interesting to note that potential gains due to economies of scale for those districts that actually consolidated are in fact *below*, not above, the average for all independent school districts. This is clear evidence that other factors are at work in the ultimate decision of an independent school districts in Georgia to consolidate with their surrounding county district.

Table 3. Descriptive Statistics for Factors Potentially Influencing School District Consolidation.

	Pooled		1977		1987	
	Total	Consol.	Total	Consol.	Total	Consol.
Potential Economies of scale (SCALE)	2.68	2.60	1.22	0.83	4.25	3.31
	(2.64)	(2.63)	(0.86)	(1.17)	(3.01)	(28.00)
County road mileage (CO. ROADS)	903.0	602.6	860.8	531.9	948.5	630.9
	(428.7)	(165.5)	(376.0)	(220.2)	(482.4)	(159.6)
Relative Tax Burden (RTB)	-16.10	-18.82	-16.75	-31.16	-15.40	-13.89
	(30.27)	(25.11)	(30.43)	(5.49)	(30.67)	(28.84)
Local Control (CONTROL)	-554.57	-176.78	-485.83	-166.39	-628.60	-180.94
	(840.88)	(300.89)	(709.35)	(220.81)	(971.90)	(351.48)
Difference in Racial Composition (RACE)	14.99	26.77	15.11	31.46	14.87	24.89
	(12.06)	(14.12)	(11.97)	(10.61)	(12.39)	(15.98)
Number of Observations	54	7	28	2	26	5

NOTE: Standard deviations of the variables are reported in parentheses. See the text for variable definitions.

Transportation Costs / Distance from School. A second factor that may influence a city school district's consolidation decision is the possible increase in transportation costs and travel time to school for the students from the independent school district. Not only may some students have to travel further to go to school when school districts consolidate, but the increased physical distance may also result in a perceived loss of local control and a general distancing of the school from its community. Decreasing community involvement in education may result in poorer educational performance and increased distance may result in higher dropout rates. Since transportation costs and community involvement are difficult to measure, we use the total road mileage of the surrounding county district (CO. ROADS) as a proxy for both the possible increase in transportation costs as well as the potential loss of local control over schools.

We expect that the larger the surrounding county, the less likely that consolidation will be initiated by the independent district. The descriptive statistics in Table 3 indeed show that those independent school districts that did consolidate with the surrounding county district were located in counties with fewer miles of road.

Tax Capacity. A third factor that may influence consolidation decisions is the tax capacity of the city school district and the use of this capacity relative to the surrounding county district. Through consolidation, independent districts could possibly seek to place some of their heavy fiscal burdens on surrounding county districts. To account for this, we computed a measure of relative tax burdens (RTB).⁶ RTB measures the county's tax burden relative to the tax burden in the independent district. A positive relative tax burden indicates that a relatively higher burden is being borne by households in the county district, while a negative value of the RTB signifies that households in the city district bear a greater burden.

Overall, the descriptive statistics in Table 3 show that a decidedly higher tax burden is being borne by households in city school districts than in the surrounding county districts. In addition, the data shows that independent school districts that chose to consolidate have larger relative tax burdens than those who chose not to consolidate. This finding is consistent with the expectation that a greater disparity between tax capacities in favor of the county district (i.e., a large negative RTB) would give households in the city district a greater incentive to consolidate.

Loss of Local Control. A fourth factor in the consolidation decision is a measure of the control that the residents of the independent school district would have in a consolidated county-wide school district. Naturally, the larger the population of the independent school district vis-a-vis the county district, the larger the influence of the independent district would be, and the more a consolidated county-wide district would reflect the character of the independent school district. Our measure of local control is the difference between the population of the county school district and the population of the independent school district (CONTROL). A negative sign indicates that the county district's population is larger than that of the independent district.

We expect that residents of the independent district would be more likely to approve a consolidation as the level of control that they would have over the consolidated district increases. This view appears to be supported by the descriptive statistics in Table 3. The data suggest that the independent districts that chose to consolidate from 1977-1995 had a relatively greater level of control in the new consolidated district than those who did not consolidate.

Racial Characteristics. The last factor we consider as possibly influencing consolidation decisions of Georgia school districts are differences in racial characteristics between the city and county's populations. In the presence of preferences for racial disassociation, Martinez-Vazquez, Rider, and Walker (1996) show that whites may prefer separate provision of school services.⁷

Similarly, consolidation may be opposed by minority voters in the smaller district if they fear that their preferences may be disregarded in larger jurisdictions. On the other hand, if voters prefer a lower concentration of minorities, residents of the independent school district will favor consolidation if consolidation results in a lower concentration of minorities in the consolidated district.

To analyze the effect of racial characteristics on the consolidation decision, we compute the difference in the racial composition (RACE) between the independent city district *vis-a-vis* the county school district.⁸ If the variable RACE is positive, this indicates that the city district has a relatively larger minority population than the county district. If RACE is negative, the county district contains a higher percentage of minorities than the city district. Empirically, we observe in Georgia that in many cases the city school districts have a larger percentage of minorities than the surrounding county districts (i.e., $RACE > 0$). Because county districts can not refuse the decision by independent school districts to consolidate, and assuming that minorities are not prejudiced against whites, we expect RACE to reduce the likelihood of consolidation if minorities feel that their preferences will be disregarded in a larger school district with a relatively small minority population. On the other hand, if residents of the independent school district seek to lower the concentration of minorities in their school district, the existence of a large racial gap should increase the probability of consolidation. Table 3 shows that the independent school districts that consolidated over the period from 1977 to 1995 consistently had greater concentrations of minorities than those who did not.

Other Factors. The list of factors that may influence school district consolidation in this paper is not exhaustive. Based on theoretical arguments, there could be other reasons why local government districts might or might not consolidate. For example, Kenny and Schmidt (1994) argue that increased monopoly power for bureaucrats has provided an incentive for local officials to support school district consolidation. On the other hand, consolidation may be hindered by the desire of

elected officials to "protect their own turf." It should be noted in this regard that the characteristics of the surrounding county district are only relevant in Georgia insofar as they would affect the independent district after consolidation. The county district has no choice in absorbing the independent district when the latter gives up its charter; the choice of consolidation therefore completely belongs to the independent school district.

B. A Probabilistic Model of Consolidation

A comparison of characteristics of independent school districts that consolidated with those that did not is a useful first step in analyzing the determinants of school district consolidation. However, descriptive statistics fail to reveal more complex interactions and effects that could be at play. Therefore, we specify and estimate a probability model of consolidation. We believe that the likelihood of consolidation increases with the present value of potential benefits accruing to the residents of the independent school districts from consolidation. Likewise, the present value of potential costs or disadvantageous factors are expected to decrease the likelihood of such a merger. Consolidation of a school district will only occur if the benefits of consolidation to the voters of the independent school district outweigh the disadvantages.⁹

For the purpose of measuring how certain factors influence the likelihood of an event occurring, we use an estimation method called probit estimation. In our case, this econometric model measures the influence of each of the five factors discussed above on the probability that a school district will consolidate. The parameter estimate will be positive if the likelihood of consolidation is increased by this characteristic and the parameter estimate will be negative if the characteristic reduces the chance of consolidation. In addition to estimating the parameter estimates, we also perform chi-square tests for each of the parameter estimates. The chi-square statistic indicates with what statistical certainty we know whether a parameter is different from zero. Only if the parameter that we

estimate for a certain characteristic is significantly different from zero do we have sufficient evidence to conclude that this characteristic influences consolidation.

The results of the probability model are presented in Table 4. Out of the five factors that were discussed and defined, three appear to have a statistically significant effect on the probability of consolidation. First, the larger the potential savings from economies of scale (SCALE), the higher the probability that consolidation will occur. Second, the greater the road mileage of the surrounding county district, the lower the probability that consolidation will occur. This is consistent with the notion that increased physical distance will result in higher transportation costs. However, the increase in road mileage may also be result in loss of local involvement and control over the school. Third, a larger difference in the racial composition of the merging partners increases the chance of school district consolidation. This means that given the racial composition of the county school district, independent school districts with a greater minority concentration are more likely to consolidate.

The results from the probability model are somewhat at odds with the conclusion drawn based on the simple descriptive statistics. In particular, the descriptive statistics in Table 3 revealed that potential scale savings were smaller than average for districts that chose to consolidate. However, the probability model suggests that the probability of consolidation indeed increases as potential savings from scale economies increase. This apparent contradiction is caused by the fact that savings from scale economies is correlated with other variables that measure the relative size of the school districts, allowing the probability model to reveal a relationship between economies of scale and consolidation that would otherwise have gone unnoticed.

Table 4. Probit Estimation: Probability of School District Consolidation in Georgia

Variable	Parameter Estimate
Intercept	3.0448 (2.62)
Potential Economies of Scale (SCALE)	0.8127** (3.95)
County road mileage (CO. ROADS)	-0.0111* (6.69)
Relative Tax Burden (RTB)	-0.0116 (0.26)
Local Control (CONTROL)	0.0021 (0.78)
Difference in Racial Composition (RACE)	0.0977** (4.74)
Number of Observations/ Number Consolidated	54 / 7

NOTE: Chi-square statistics are reported in parentheses. * and ** indicate statistical significance at the 1 and 5 percent level, respectively.

It should not be concluded from the estimated model that economies of scale, surrounding county district size and racial characteristics are the only factors that determine the probability of consolidation. For example, the insignificance of the other parameters may be a result of our notably small sample size. Other social and economic characteristics were tested in preliminary estimations, but were not found to be statistically significant.¹⁰ Again, the lack of statistical significance of these variables may be due to the small sample size.

Finally, it should be noted that we may not be able to generalize the conclusions from our study. For example, in the case of racial composition, the independent school districts in Georgia in almost all cases have a larger minority population than the surrounding county. This would not necessarily be the case in other settings, and future research would have to establish how school district

consolidation is influenced by racial compositions in different settings. In summary, different factors may be more or less significant in different contexts.

V. Conclusions

The main goal of this paper was to determine whether independent districts that have consolidated in the past 20 years have taken the savings from economies of scale into consideration, and what other factors affected their consolidation decision. However, first we had to establish whether economies of scale were present in the provision of public education in Georgia.

Our cost estimation in Section III revealed that many school districts in the state indeed operate in the range where economies of scale are present. Using the results from this cost function, we set up a model to predict the probability of school district consolidation. We found that potential savings due to economies of scale did indeed appear to be a significant factor in the consolidation decision. Other factors that significantly affect the consolidation decision are the size of the surrounding county district and the difference in the racial composition between the independent school district and the county district. A larger surrounding school districts appears to discourage the decision by smaller independent school districts to consolidate, while a greater gap in the racial composition increases the likelihood of consolidation.

This research has several policy implications. The state government's concerns about sub-optimal size school districts appear to be warranted, judging from our cost estimates. However, potential cost savings from consolidation are quite small. The drive to consolidate these small districts needs to properly address the potential concerns of small school districts. Loss of community involvement would be detrimental to the (actual or perceived) quality of education. This has resulted in small independent school districts resisting consolidation. We need to understand better

why residents in small school districts are willing to pay a higher price for their children's education and forego substantial savings. Perhaps it is that they do not want to send their children to a far-away county school, or perhaps it is that they fear losing control or representation in a larger, more economical, but also more anonymous school system. Until we learn more about these complex issues it is not clear that the state should offer special incentives to induce these systems into consolidating.

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APPENDIX

This appendix describes the procedure that we used to estimate variable costs per student (i.e., average variable cost) for school districts in Georgia. The methodology used largely follows Callan and Santerre (1990). We specify a Cobb-Douglas functional form, a common and flexible specification, to estimate average variable costs, such that

$$AVC = AVC(P_I, P_N, Q_1, Q_2; K, T, H) \quad [1]$$

where AVC represents the short-run average variable cost, while P_I and P_N represent the prices for instructors (I) and non-teaching personnel (N), respectively. Output measures are included separately for elementary schooling (Q_1) and secondary schooling (Q_2); these measures should be adjusted to incorporate differences in school quality as discussed below. We assume that physical plant (or capital investments, K), transportation services (T), and the amount that students learn at home (H) are all unchanged in the short-run.

The data set used for this estimation was collected from various sources. Socio-economics characteristics were taken from the Census of Population and Housing for 1980 and 1990. Financial data, enrollment statistics, and test score data were provided by the Georgia Department of Education, while school district employment data were taken from the Census of Governments for 1977 and 1987.

Even though Equation [1] is specified as a simple cost function, the estimation of a cost function for public education is a rather intricate process. One of the major issues that needs to be resolved is how to cope with the multi-dimensionality of educational output. The production of education clearly has both quantity aspects as well as a quality dimension. Here, we will follow the consensus approach in measuring these two dimensions of output. In the literature, enrollment is often used as

a measure of the *quantity* of educational services provided, while test scores are often used as an indication of the *quality* of educational services.

To arrive at measures of output that reflect both quantity and quality, we need to adjust elementary enrollment (N_1) and high school enrollment (N_2) for differences in quality. The adjustment consists of using standardized test scores to control for quality both at the elementary as well as high school level. However, here we have to allow for the fact that a student's test score reflects both learning that was produced in school as well as learning that took place at home. Following Callan and Santerre (1990), we separate these two effects, home-produced education (h_n) and school-produced education, by regressing our quality measures (i.e., test scores) on characteristics related with the home environment. The dependent variables for these regressions are average math scores on the Iowa Test for Basic Skills for the respective years in each school district. The explanatory variables used in these regressions, which are also defined at the school district level, are the percent of the population that has a college education or more; the percent of the population below the poverty level; and the percent of the population that is a minority (i.e., non-white or hispanic). These are standard explanatory variables used in the literature which has attempted to explain variations in test scores. Other socio-economic characteristics were tried in preliminary regressions, but were dropped because they failed to significantly impact home-produced learning on a consistent basis. These regressions are presented in Table A-1.

The residuals from the auxiliary regressions described in Table A-1 are used to arrive at quality-adjusted levels of output, Q_n ($n = 1, 2$). For each of the outputs, an index is created from these residuals by adding one plus the absolute value of the lowest residual (q_n). To arrive at quality-adjusted levels of output, primary education (Q_1) and secondary education (Q_2) for each school

Table A-1. Estimates of Home-Produced Schooling.

	1977		1987	
	MATH4	MATH11	MATH3	MATH10
Intercept	63.34* (84.21)	44.02* (32.99)	218.00* (137.28)	325.30* (273.41)
Pct. Educated	0.182* (4.75)	0.283* (4.16)	0.096** (1.78)	0.239* (5.90)
Pct. in Poverty	0.012 (0.35)	0.021 (0.33)	-0.213* (2.72)	-0.014 (0.24)
Pct. Nonwhite	-0.093* (6.40)	-0.086* (3.32)	-0.126* (4.14)	0.023* (4.90)
Mean value	62.72	44.73	211.8	325.5
R ²	0.36	0.18	0.39	0.39

NOTE: Absolute values of t-statistics are reported in parentheses; * indicates significance at the 1 percent level; ** indicates significance at the 10 percent level.

district, q_n is multiplied by the respective enrollment, N_n , ($n = 1, 2$). The same auxiliary regression equations are also used to determine the "home-produced" component of schooling. The predicted values from the estimated equations for our quality measures, h_1 and h_2 , are weighted by the enrollment in elementary schools (N_1) and high schools (N_2), respectively.

For the purpose of our estimation, total short-run variable costs are defined as expenditures on instructional services plus expenditures on non-instructional services. The price of instructional services, P_I , is attained by dividing the expenditures on instruction by the full-time equivalent of instructors. A similar approach is used to compute a price for non-instructional services (P_N).

Since we are estimating a short-run cost function, the physical plant available to each school district is assumed to be fixed. Since we lack any direct measure of the physical plant of Georgia school districts, we will use expenditures on maintenance and operation plus interest on capital loans as a proxy for the amount of capital available to the school districts (K). Finally, each school district's

expenditures on transportation services (T) as well as the amount of home-based learning (H) are included in the estimation as fixed factors that effect the production of schooling. Descriptive statistics for the relevant variables are presented in Table A-2, while the parameter estimates for the cost estimation are presented in Table A-3. A more detailed analysis of the cost estimation is given by Boex and Martinez-Vazquez (1996).

Table A-2. Mean Values for Characteristics of Georgia School Districts.

Variable name	1977	1987
Average Variable Cost (AVC)	670.21	2180.19
Enrollment in Elementary Education (N_1)	3,963	3,953
Quality-adjusted Enrollment in Elem. Ed. (Q_1)	34,151	68,142
Enrollment in Secondary Education (N_2)	2,409	2,195
Quality-adjusted Enrollment in Sec. Ed. (Q_2)	21,915	17,925
Price of Instruction (P_I)	8,904	21,943
Price of Non-instruction (P_N)	6,657	25,302
Capital Expenditures (K)	667,318	1,795,454
Transportation Services (T)	227,654	810,937
Home-Produced Education (H)	251,933	842,974

Table A-3. Average Variable Cost Using the Cobb-Douglas Specification.

Variable name	1977	1987
Intercept (α_0)	-2.2393* (15.32)	-1.7709* (9.28)
Price of instruction services (α_1)	0.8485* (27.86)	0.6526* (16.83)
Quality-adjusted elementary school enrollment (α_1)	-0.0206 (0.64)	-0.0547 (1.49)
Quality-adjusted high school enrollment (α_2)	-0.0124** (2.07)	-0.0351* (5.43)
Capital (α_K)	0.1313* (3.78)	0.2349* (4.94)
Transportation services (α_T)	0.0179* (3.59)	0.0459* (4.20)
Home-produced education (α_H)	-1.1562* (3.08)	-0.2648* (4.31)
R-squared	0.843	0.769

NOTE: Absolute values of t-statistics are reported in parentheses; * and ** indicate statistical significance at the 1 and 5 percent level, respectively.

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ENDNOTES

1. Many previous studies have shown that, all else equal, smaller school districts generally have higher costs per student than larger school districts. See for example Callan and Santerre (1990), Duncombe, Miner and Ruggiero (1995), Kenny (1982), Ratcliffe, Riddle and Yinger (1990) and Riew (1966).
2. Note that municipal (non-county wide) school districts in Georgia are referred to as independent school districts. This is different from the common usage of the term. The term “independent school district” is commonly used to indicate a school district that is a separate government entity, independent from state, county or municipal control. Under this definition, all school districts in Georgia are “independent.” However, throughout this paper I will adhere to the narrow definition used in Georgia.
3. School district funding, teacher salaries and especially racial desegregation have been other important themes in the Georgia public school system. The impact of desegregation was mostly felt *within* jurisdictions or through migration. Desegregation did little to directly change the structure of school districts in Georgia.
4. Baker, Chattahoochee and Clay county school districts contract for provision of schooling at the high school level with neighboring county districts.
5. See Section IV on school district consolidation for the computation of the potential savings due to scale economies. For Buford Independent School District potential savings amount to 13 percent of average variable cost; based on a variable cost of 2436 dollars per student, this translates into potential savings of 316 dollars per student.
6. We define the relative tax burden (RTB) as

$$\text{Relative Tax Burden (RTB)} = \frac{\text{Tax Burden}_{\text{county}} - \text{Tax Burden}_{\text{city}}}{\text{Tax Burden}_{\text{city}}} \cdot 100\%$$

where the tax burden for the city and the county is calculated as expenditures on public education as a share of median household income.

7. Martinez, Rider and Walker (1996) find empirical evidence that increased racial heterogeneity increases the number of school districts in metropolitan areas and states in the United States.
8. The variable RACE was computed as $RACE = \text{Minority}_{\text{city}} - \text{Minority}_{\text{county}}$, where *Minority* is the share of the population that is non-white or hispanic.
9. We assume that the median voter is decisive in such public choices. The median voter model hypothesizes that the level of public services provided by the local government is that demanded by the median voter in the jurisdiction. The median voter is typically identified with the median income taxpayer in the jurisdiction.

10. Variables tried include the difference in educational spending per student for the merging partners; the difference in test scores for the city and county school district and differences in educational attainment of the population. None of these measures reached statistical when entered into the model.