Improving the Quality of High Schools

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Introduction

Inner-city minority students who attend suburban schools fare better academically than those who stay in their neighborhood school (Race, 2006). Memphis's public school system has come a long way in the past two centuries. The Memphis City School system performs side by side with the Shelby County School system to serve the public school children of the Memphis area. The Memphis City School system provides thirty-one public high schools alongside with the seven found in the Shelby County School system.

A high school diploma is one of the most important achievements in a child's life. Yet, many are being denied graduation privileges due to the required proficiency on mandated exit exams. Among many findings, teachers and principals seem committed to helping students pass these exams though, and schools have changed staffing patterns to assign some of their strongest teachers to teach tested subjects. English, Algebra, and Biology educators are spending more time emphasizing topics and skills likely to be tested and on test-taking skills, bringing greater focus to instructions but potentially inhibiting more in-depth learning and time for non-tested topics (Report, 2005). In California, Judge Robert Freedman of Superior Court in Alameda County said that the exams, standardized math and English tests that high school seniors have to pass to graduate, discriminated against impoverished students and students learning English (McKinley, 2006). The following study performed will capitalize on different variables that could help further improve test results for high schools by finding an equation to predict ACT and Gateway exit exam scores.

Memphis City Schools

Memphis City Schools is the largest school system in the state of Tennessee and the 21st largest school system in the nation. Created as a special school district by a private act of the Tennessee General Assembly in 1869, Memphis City Schools today serve more than 119,000 students among grades K-12 (Facts website). From 1826, the year the Memphis school system was chartered, until 1848, all Memphis schools were privately offered by well-to-do citizens. The first recorded school in Memphis was taught by a man named Underwood from Alabama in 1826. At this time, education was scarce for lower- to middle-class white children and non-existent for black children. That changed, however, with the opening of the first free school in 1848, named Third and Overton for its location. In this year, a system of free schools was adopted in the city largely through the influence of J.W.A. Pettit, often referred to as the father of the free school system of Memphis (Brief History website). Among quick sought after growth, the city was soon divided into four educational wards, and each ward had one teacher in one rented schoolroom. There was a tuition to be paid but the fee of two dollars was not strictly enforced and quite often ignored and overlooked. The creation of a city school tax rate, soon followed by a county school tax rate, though, made it possible for students who could not afford school tuition to receive a public education but was not extended to black citizens for another twenty years. It wasn't until 1868 that the city of Memphis began supporting public schools for black students. By 1910, eighty percent of the white school-age population of Memphis were enrolled in public schools, whereas, only sixty percent of black children aged six to fourteen were enrolled in school. By 1920, Memphis City Schools reached a population of 20,364 students. Until January 24, 1973,

segregation was practiced in most Memphis City Schools. However, in 1973, court-ordered busing was instituted to help integrate the schools. The order was quickly followed by many parents withdrawing their children from the Memphis City Schools system in favor of private schools. By 1988, school enrollment reached 104,000 in 162 school buildings worth more than $200 million. Over time, through a series of annexations from 1958 to the present with Cordova high school, Memphis City Schools now operate 191 schools across the city of Memphis under the direction of Dr. Carol R. Johnson, superintendent. Starting in the 2004-2005 school year, Cordova High School started its first year as a member of the Memphis City School system after being annexed from the Shelby County school system.

Today, the Memphis City School's demographics are comprised of approximately eighty-seven percent African-American compared to nine percent white. In 2003-04, the system-wide graduation rate was sixty-one percent, which comprised 5,532 Memphis City School students. Eighty-one percent of these graduates earned a regular or honors diploma while nineteen percent earned a GED, high school certificate, or special education diploma. Memphis City Schools had the most students named as National Merit Semifinalists, with 20 out of the 259 in the state of Tennessee in 2004-05. Memphis City Schools offer optional programs at thirty-one elementary, middle, junior and senior high schools throughout the city, giving parents a number of educational choices for their child.

Shelby County Schools

With a population of over 45,000 students, the Shelby County School district is the fourth largest school district in the state of Tennessee and about the ninetieth largest

public schools district in the nation. The Shelby County School district includes all the public schools in the county outside the corporate limits of the city of Memphis, including those schools located within the six incorporated towns of Arlington, Bartlett, Collierville, Germantown, Lakeland and Millington. Growth rates in Shelby County are currently the highest in the state creating an increase in student population averaging 1,000 students each year (SCS website). In the 2004-05 school year, the Shelby County School system opened Arlington High School making it the newest addition to an increasing population growth. Twenty-nine years ago Shelby County Schools was the first Tennessee school system accredited in its entirety by the Southern Association of Colleges and Schools. *Money Magazine* has recognized Shelby County Schools as one of the 'Top 100 School Systems' in the United States (SCS website).

Data Summary

Prior to May 8, 2002, the ACT (American College Test) was one of three tests approved by the State Board of Education to fulfill a requirement in state law that all students take an exit exam to receive a full high school diploma. This requirement is no longer applicable though. The total number of Tennessee graduates taking the ACT rose 35.8% during the first six years of this requirement: from 32,628 in 1995 to 44,307 in 2002. Even with these dramatic increases in the number and percentage of students tested, Tennessee graduates improved performance in English, Reading, and the Composite scores. Being that the ACT is no longer required to receive a high school diploma, this now causes a bias in my study because only students who plan on going to college will take the ACT. The table below compares Tennessee's performance to the 13 states served by the Southern Association of Colleges and Schools (SACS) and to the

nation as a whole.

ACT Averages for All Students (Tennessee website)

Area	English			Reading			Composite		
Year	**1992**	**2001**	**2002**	**1992**	**2001**	**2002**	**1992**	**2001**	**2002**
Tennessee	20.2	19.9	20.0	20.8	20.4	20.5	20.2	20.0	20.0
SACS	19.8	19.6	19.6	20.2	20.2	20.2	19.9	20.0	19.9
Nation	20.2	20.5	20.5	21.1	21.4	21.4	20.6	21.0	21.0

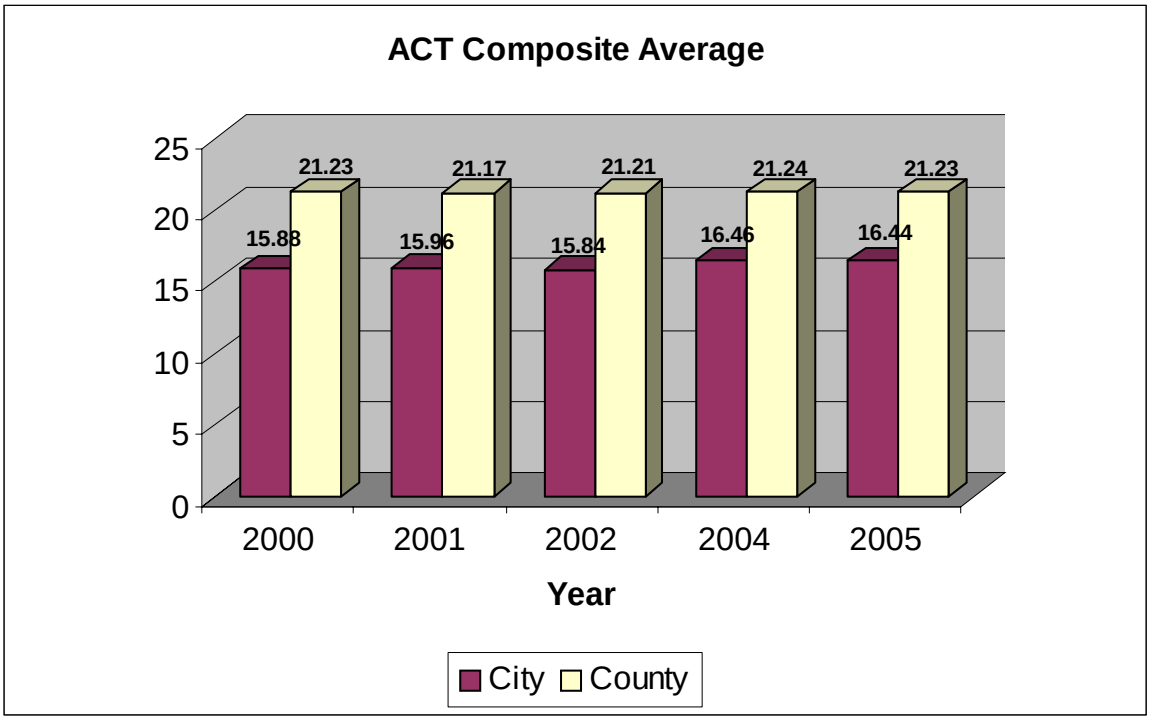
The Tennessee State Board of Education and the Tennessee Legislature have long recognized the need for establishing achievement standards for Tennessee graduates. In 1981, the Tennessee General Assembly endorsed the State Board's regulation with a legislative mandate. The 1981 law required regular diploma recipients to pass a proficiency test, later named the Tennessee Proficiency Test (TPT). This test represented a standard in mathematics and language roughly equivalent to grade six. In 1992, the Tennessee State Board of Education directed a revision of the TPT to assess higher levels of learning in mathematics and language arts. The new Competency Test, first administered in 1995, required a passing score of 70% of the items correct on both parts of the assessment. Students covered the curriculum standards addressed by the Competency Test in their instructional programs by the end of grade eight. The Competency Test was first administered to students during the fall of grade nine with unlimited opportunities to retake the test if not initially successful in passing both parts. Later, on October 29, 1998, the Tennessee State Board of Education designated high school courses for the development of examinations. Three of the assessments envisioned by the board were to be administered as students completed Algebra I, Biology I, and English II to determine proficiency in high school math, science, and language arts respectively. These assessments were named the Gateway Tests. The new

Gateway Test requirements were applicable to the 2001-02 entering freshman. The curriculum standards addressed by these assessments should be covered by the time the student completes Algebra I Biology I, and English II. Therefore, results of these assessments are also appropriate for determining a part of the grade assigned in these subjects. Beginning in 2001-02, the Tennessee Department of Education began administration of the Gateway Tests in Algebra I and Biology I three times annually to accommodate students completing work in the fall, spring, and summer semesters. The Gateway assessment for English II began with the fall 2002 administration of the Gateway assessments. Students who started high school in 2001-2002 or later must score proficient or advanced on all three (Algebra I, Biology I, and English I) Gateway tests to receive a diploma. Half of all the nation's high school students are enrolled in the 19 states that require students to pass an exit exam, like Gateway, and seven other states are scheduled to have exit exams by 2012. If they all do so, an estimated 72% of public school students will have to pass at least one exam to graduate from high school (Jacobson, 2006).

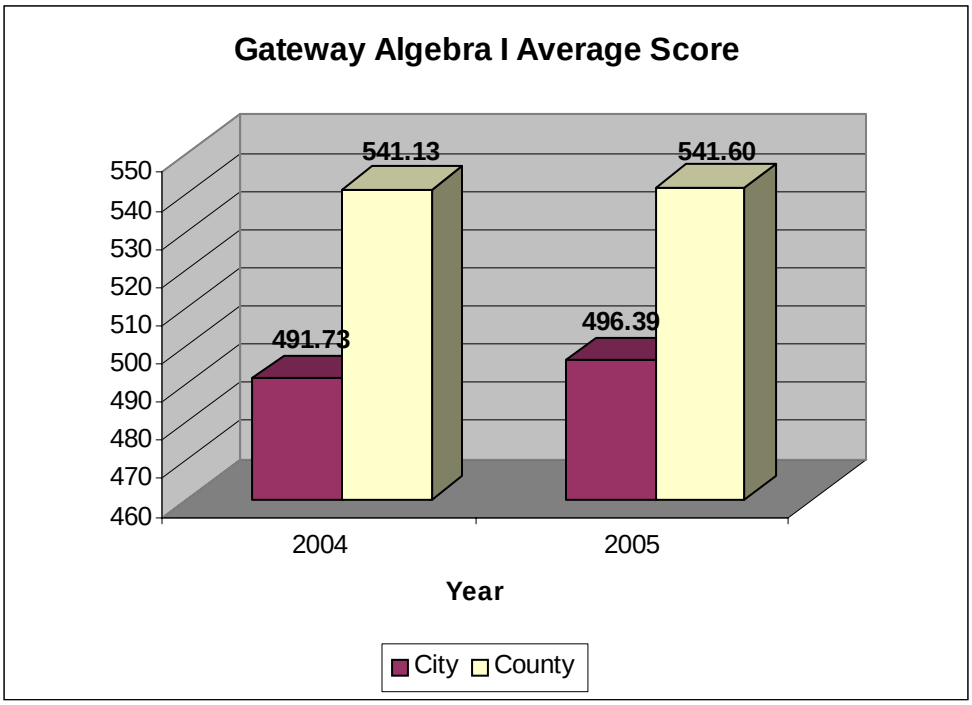
The Tennessee Department of Education website lists every year a report card for each individual county and each public school within that county. These report cards provide information varying from the number of students broken down by race to the individual schools average ACT composite score. Information for each individual high school in the Memphis City and Shelby County districts was found for the years of 1999 through 2005 excluding data for the year 2002-03, which was not available.[1] One of the most important variables was the average ACT test scores from the composite score

[1] The information was not available on the Tennessee Department of Education website for the 2002-2003 school year.

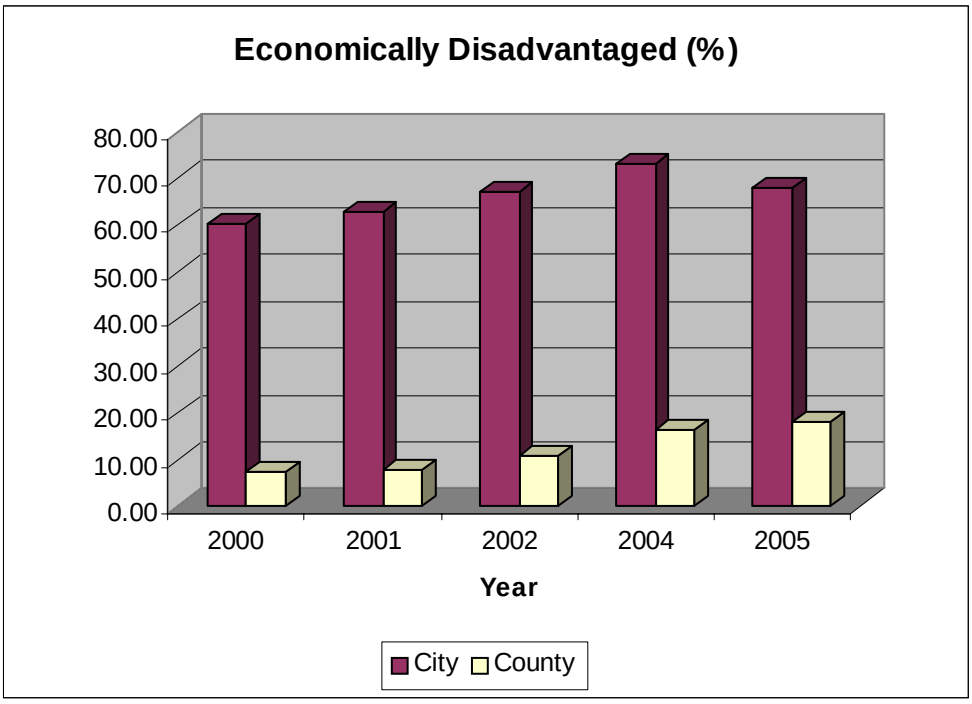
broken all the way down into the English, Math, Reading, and Science subpart average scores. The chart below compares the county versus city in the average ACT composite score, which ranges from one to thirty-six. It is clear that the county schools outperform the city schools with an average of twenty-one to sixteen, respectively.



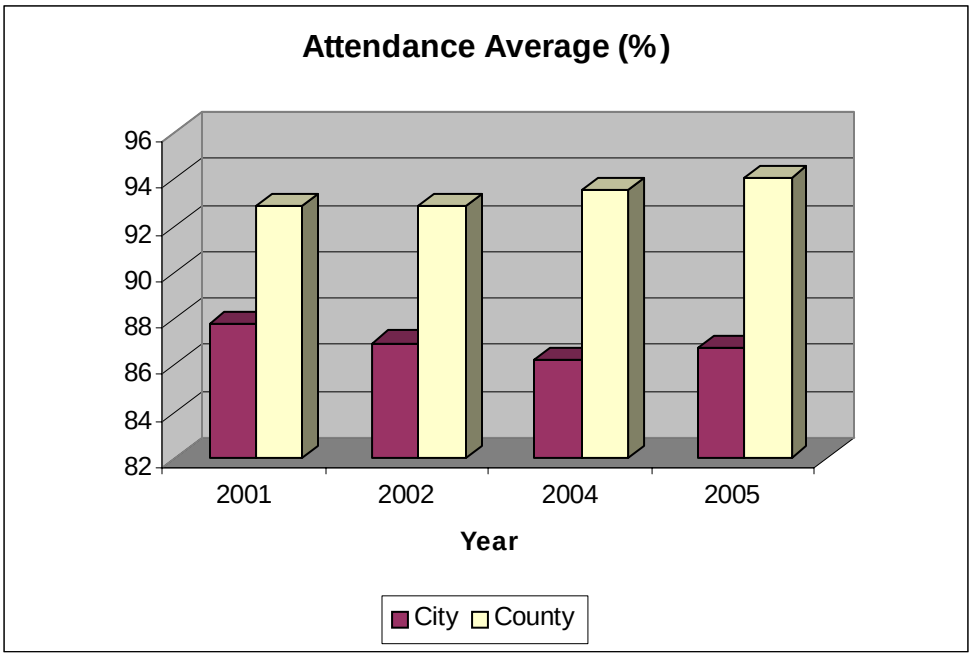
Gateway test scores are broken down into each individual subject including Algebra I, Biology I, English I, English II, and Math Foundations. Whereas, math foundations is only a component used for testing in the Shelby County School system. Once again, in comparison, the county out performs the city each year by nearly fifty extra points on the Algebra I gateway exam.



Another variable used was the percentage of economically disadvantaged students in each individual high school. Below is a chart comparing the city to the county in the percentage of economically disadvantaged high school students. In comparison, the number of economically disadvantaged students in city schools out numbers the county schools by at least four times the amount. Also, an interesting observation to note is how in 2005 the percentage of economically disadvantaged students starts to decrease for the city schools but continue to increase for the county schools. An economically disadvantaged student qualifies for free or reduced price lunches. This program provides nutritionally balanced, low-cost or free lunches to eligible children each day.

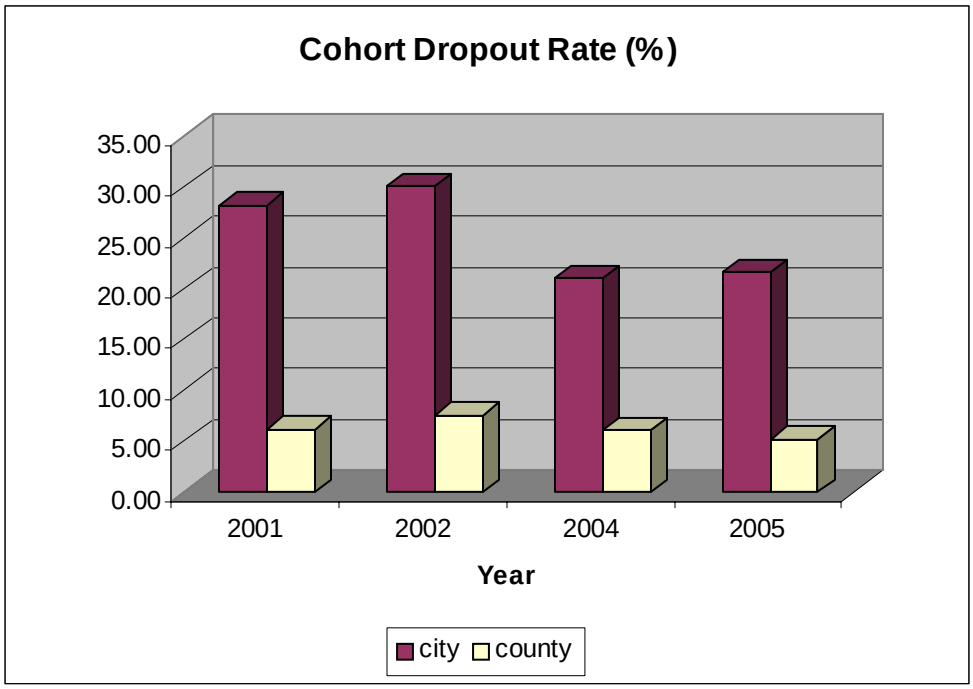


Another variable used was the average attendance rate for each individual school. On a county versus city scale, the chart below shows that county school's attendance rates out number the city school's attendance rates. Attendance rate refers to the number of days students attend school as compared to the average number of days the students are enrolled. To put this into perspective, a look at the 2004 city average of almost 85% means that the Memphis City School high school students missed approximately one out of every seven days of every seven days of school.



On the other hand, the cohort dropout rate shows opposite results when compared to the attendance averages from above. The city's dropout rates out number the county's dropout rates by nearly four to five times the amount. Cohort dropout rate is the percentage of an entering ninth grade class that has dropped out by the end of twelfth grade. The cohort rate measures what happens to a single group, or cohort, of students over a period of time. Cohort rates are important because they reveal how many students starting in a specific grade drop out over time.[2]

[2] Attendance averages were not available for the year 1999-2000.



Throughout the analysis, I will use a number of dummy variables, which will take on the value of either one or zero. A dummy variable was used for both city and optional schools. The dummy variable for city will designate whether or not the individual high school is a county or city school. A dummy variable implies that for a city school the city variable will equal one and for a county school the city variable will equal zero. A Memphis City School can have the opportunity to provide an optional school program. The Memphis City School system provides optional programs in seven high schools including Central High, Craigmont High, East High, Kingsbury High, Overton High, Whitehaven High, and Wooddale High School. These programs give parents options in selecting a public education that can best fit their children's talents and abilities. Optional programs at high school levels are designed to prepare students for college and careers. Current programs in the Memphis City school system at these levels include: College Preparatory; International Studies; Creative and Performing Arts;

Aviation/Travel and Tourism; Technology and Careers; Arts and Academics; Health Sciences; Business and Finance; and Engineering. Optional schools are tuition-free to city residents and accessible to all parts of the city. Residents from outside the city may apply, but first priority is given to children who live within the city. Also, the variable total student body was formed to take into account the number of students in each individual high school.

Two variables that will later be shown to be statistically insignificant are both race and suspensions/expulsions. The race variable is composed of the percentage of white students out of the total student body at one individual school. The reason for choosing white students only is to compare solely the number of white students to all other races. All other races include African-American, Hispanic, Asian, and Pacific Islander students compiled into one group. USA Today reported that a broad swath of national educators mounted indisputable evidence that the surest way for a school to fail is for it to be filled with low-income black or Hispanic students, which proves false in this study since race will prove to be statistically insignificant (Race, 2006). The suspensions/expulsions variable includes combining both the male and female number of suspensions and expulsions divided by the total student body to get a percentage. An expelled student is one who is not allowed to attend school for a period of time greater than ten days, and they are removed from school rolls during the period of expulsion. A suspended student, on the other hand, is not allowed to attend school for a period of time no greater than ten days and remains on the school rolls.

Description of Model

Using all of the above variables, many different regressions were estimated trying

to find the perfect equation to predict test scores. The first equation regressed was:

$$CompACT = \beta_0 + \beta_1 race + \beta_2 econdis + \beta_3 city + \beta_4 attendavg + u$$

This regression turned out to be problematic because the independent variables of race, city, and economically disadvantaged were too closely correlated to one another. Race was negatively correlated to city at .8951 and to economically disadvantaged at .7596. In addition the economically disadvantaged variable was positively correlated to city with .6863. The correlation coefficient is a measure of linear dependence and the closer to 1 or -1 indicates a stronger linear relationship. For example, since the variables race and economically disadvantaged are negatively correlated, when race goes up, economically disadvantaged decreases. Next, by taking out the independent variable of economically disadvantage, the second equation regressed was:

$$CompACT = \beta_0 + \beta_1 race + \beta_2 city + \beta_3 attendavg + u$$

This equation also contained flaws because too much emphasis was placed on race and, once again, race was too highly correlated with city. Finally, by using a random effects panel regression, the final or 'best' model that resulted from many analyses was:

$$CompACT = \beta_0 + \beta_1 econdis + \beta_2 city + \beta_3 attendavg + \beta_4 cohdrpout + \beta_5 optional + u$$

This model does not have any variables that are too highly correlated; yet, it had some variables that turn out to be statistically insignificant though. A random effects panel regression is an unobserved effects panel data model where the unobserved effect is assumed to be uncorrelated with the explanatory variables in each time period. Basically, the regression is a way to combine time series and cross sectional data into one model. Other models using the same independent variables will be regressed on other dependent

variables including English ACT score, Math ACT score, Reading ACT score, Science ACT score, Gateway Algebra I, Gateway Biology I, Gateway English I, Gateway English II, and Gateway Math Foundations.

Econometric Results

Performing the above regressions with each independent variable on each individual ACT dependent variable produced the following results:

Independ Var Coefficient	Composite ACT	English ACT	Math ACT	Reading ACT	Science ACT
Constant	12.77**	9.8029**	14.1045**	10.3835**	17.4439**
Econom Disadvan	-0.0101**	-0.0108**	-0.0082**	-0.0125**	-0.0099**
City	-2.0992**	-2.5817**	-1.7140**	-2.2662**	-1.9013**
Attend Average	0.0864**	0.1273**	0.0565*	0.1145**	0.0328
Susp/Expuls	-0.1416	-0.5051	0.0322	-0.0041	-0.1050
Cohort Dropout	-0.0619**	-0.0755**	-0.0492**	-0.0531**	-0.0702**
Optional School	0.9537**	1.2396**	0.7484*	1.0800**	0.7022*
Total Student Body	.00002	0.0001	0.0003	0.0002	0.0003
N	105	105	105	105	105
R-squared Within	0.2094	0.1792	0.1920	0.0592	0.3101
R-squared Between	0.8711	0.8684	0.8303	0.8778	0.8934
R-squared Overall	0.8761	0.8653	0.8501	0.8760	0.8799

**Statistically Significant at α = 5%
* Statistically Significant at α = 10%

An overview look at the individual ACT score equations shows that the coefficients on the susp/expuls and total student body variables are statistically insignificant, meaning they are not any different than zero. One can interpret this to mean that the percentage of expulsions and suspensions in a school along with the size of each school does not have any effect on a student's composite ACT score.

Along with the independent variable coefficients, the regressions produced results including an 'N' value along with R-squared values for within, between, and overall the individual high schools. The N value is the number of observations in the sample size. The R-squared values tell how much of the variation in the dependent variable is actually explained by the independent variables. The R-squared within is the variation within an

individual high school overtime. The R-squared between is the variation between all the high schools. Whereas, the R-squared overall is essentially a weighted average.

By taking an individual look at the Composite ACT regression results (remember the scale for the ACT score is one to thirty six), one can conclude that the equation would be:

$$CompACT = 12.77 - .0101econdis - 2.0992city + .0864attendavg - .0619cohdrpout + .9537optional$$

Therefore, the coefficient of -2.0992 on the dummy variable city implies that, keeping every other variable constant, if the high school is located in the city (variable equal to one) then the predicted composite ACT score will decrease by 2.0992 points. Also, the coefficient of .0864 on the attendance average variable concludes that for each additional percentage point increase in attendance there is a corresponding .0864 point increase in composite ACT score. The N value represents 105 different high schools within this data set were used to make up this particular sample size. The R-squared values for between and overall suggest that 87% of the variation in composite ACT scores can be explained by the economically disadvantaged, city, attendance average, cohort dropout, and optional school variables alone.

One important factor to look for in the different regression equations is the magnitude that each individual coefficient represents. By looking at the English ACT equation, compare the coefficient .1273 on the independent variable attendance average to the coefficient -.0108 on the economically disadvantaged variable. More magnitude is seen in the .1273 coefficient because it has a greater impact on the final English ACT score. A ten percentage point increase in attendance average will increase the English

ACT score by 1 point; whereas, the same percentage increase in the number of economically disadvantaged students results in only a .1 point decrease in English ACT score.

Performing the above regressions with each independent variable on each individual Gateway Exam dependent variable produced the following results:

Independ Var Coefficient	Algebra I	Biology I	English I	English II
Constant	561.0131**	352.7874**	491.5914	494.4268**
Econom Disadvan	-0.0879*	-0.1053**	-0.1008**	-0.1523**
City	-18.5118**	-18.1664**	-11.5643**	-13.0718**
Attend Average	-0.3400	2.0473**	0.2435	0.3906
Susp/Expuls	3.1158**	2.0992*	6.0728**	3.5949**
Cohort Dropout	-0.4932**	-0.2847**	-0.9318**	-0.7946**
Optional School	-0.1036	2.6059	3.04775	1.9341
Total Student Body	0.001	0.0056*	0.0061*	0.0071**
N	109	108	107	107
R-squared Within	0.1567	0.1483	0.4145	0.3332
R-squared Between	0.4373	0.8429	0.8203	0.8745
R-squared Overall	0.4444	0.8297	0.7832	0.8351

**Statistically Significant at $\alpha = 5\%$
* Statistically Significant at $\alpha = 10\%$

By comparing statistical significance between the ACT and Gateway exam regressions, the optional school variable becomes insignificant while the total student body variable becomes significant on most of the Gateway dependent variables. This could be explained by the reasoning that optional schools specialize in a certain area of curriculum which could be a downfall for Gateway exam takers. For example, if the optional school provides an engineering program then the students are more likely to excel in math based subjects. Therefore, the students could struggle when it comes to the Biology and English Gateway exams because they have been specialized in the area of math.

On the other hand, by taking a look at the individual regression on Biology I Gateway score, one can see that the predicted equation would be:

BioIGateway = 352.7874 -.1053econdis -18.1664city +2.0473attendavg +

2.0992susp/expuls -.2847cohdrpout +.0056totstudbdy

Therefore, the coefficient of -18.1664 on the dummy variable city implies that, keeping every other variable constant, if the high school is located in the city (variable equal to one) then the predicted Biology I Gateway exam score will decrease by 18.1664 points. The coefficient 18 places a greater magnitude on the variable city compared to the other independent variables in the equation. Also, the coefficient of 2.0473 on the attendance average variable concludes that for each additional percentage point increase in attendance there is a corresponding 2.0473 point increase in Biology I Gateway exam score. The N value represents 108 different high schools within this data set were used to make up this particular sample size. The R-squared values for between and overall suggest that approximately 84% of the variation in Biology I Gateway exam scores can be explained by the economically disadvantaged, city, attendance average, cohort dropout, susp/expuls, and total student body variables alone.

By comparing the Science ACT score to the Biology I Gateway exam score equation, there are many differences in how each individual independent variable affects the different dependent variables. Cohort dropout rate has a greater impact on the Biology I Gateway exam with a coefficient of -.2847 compared to the Science ACT score's cohort dropout rate coefficient of -.0702. Also, the coefficient on the independent variable city is -18.1664 for the Biology I Gateway exam equation compared to a mere -1.9013 for the Science ACT score. This could be a result of the fact that the Biology I Gateway exam tests on information supposedly taught straight from the Biology I course in high school; whereas, the Science ACT component does not test specific information from any course taught in high school. Therefore, the cohort dropout rate at school

would have a greater effect on the Biology I Gateway exam outcome than the Science ACT score results. Also, the city coefficient implies that a city school's education will greatly impact one's Biology I gateway exam outcome more than one's Science ACT score.

In another comparison between the Math ACT score to the Algebra I Gateway exam score equation, there are many differences in how each individual independent variable affects the different dependent variables. The percentage of economically disadvantaged students and the cohort dropout rate coefficients both have a ten percent greater impact on the Algebra I Gateway exam with the coefficients -.0879 and -.4932, respectively, compared to the Math ACT score's economically disadvantaged percentage and cohort dropout rate coefficients of -.0082 and –00492, respectively. Also, the coefficient on the independent variable city is -18.5118 for the Algebra I Gateway exam equation compared to a mere -1.7140 for the Math ACT score. The greater magnitude on the cohort dropout rates and economically disadvantaged percentage with the Algebra I Gateway exam could be a result of the fact that the information tested on the Algebra I Gateway exam comes from material covered in class time at high school; whereas, the Math ACT component tests on a broader range of material not necessarily taught in high school. Therefore, the cohort dropout rate and percentage of economically disadvantaged students at particular school would have a greater effect on the Algebra I Gateway exam outcome than the Math ACT score results. Also, the city coefficient implies that a city school's education will have a greater impact on one's Algebra I Gateway exam outcome than on one's Math ACT score.

Conclusion

Future research could improve the accuracy of the predicted models from above. For example, teacher quality was not a variable in the regressions to predict test scores. Teacher quality could constitute retention rates, educational attainment, where they attended college, race, salary, etc. Skeptics have often expressed doubt that good teachers would make any difference in the lives of the country's poorest students, who typically show up in first grade not at all prepared to learn. Yet, an Illinois study found teacher quality mattered a great deal in high-poverty high schools, where students with highly rated teachers were about twice as likely to meet standards as similarly situated students elsewhere. For example, students who took Algebra II at schools with average teacher quality turned out to be better prepared for college than students who had completed calculus at schools with low teacher ratings. The multistate data show that teacher experience makes a profound difference in student performance, as do teacher literacy levels. The facts are especially clear when it comes to the crucial areas of math and science, where teachers who have majored in the subject areas generate better student performance than those who majored outside areas (Teachers, 2006). Producing this variable could have a profound effect on future studies of the Memphis City and Shelby County school systems primarily because approximately ninety-five percent of Memphis City School's teachers are highly qualified under No Child Left Behind Law standards. No Child Left Behind law was signed by President Bush on January 8, 2002. This legislation includes the federal support that states and local school districts receive for eligible schools known as Title 1. NCLB requires that every state and school district develop and implement standards, assessments and an accountability system in Reading, Mathematics and Science. Some of the main elements of the NCLB law include a

strengthened district-wide core curriculum aligned to state standards and testing, investing in high quality professional development for teachers, emphasis on accountability and assessment, and expanding options for parents with open enrollment process and supplemental educational services.

Also, parental involvement and feeder school quality are positive factors in determining how individual high schools perform on standardized tests. Parental involvement is key in Shelby County Schools because they enjoy the largest PTA membership in Tennessee. Parental involvement has made it possible for Shelby County students to consistently score about state and national averages on standardized tests.

Improving low-performing schools is not an easy endeavor. A number of states have taken steps to provide direct assistance to low-performing schools. These steps range from dispatching assessment teams to identify sources of low performance to assigning veteran educators to work in tandem with the principals of low-performing schools. Arizona recently launched a school turnaround program that calls for replacing principals of low-performing schools with highly experienced educational leaders (Duke, 2006). Therefore, furthering this study by implementing teacher quality could further support the actions taken in Arizona.

In conclusion, comparing the two equations shows that many of the same independent variables have a statistically significant effect on the different dependent variables for the Gateway and ACT exam and subparts. The impact of whether a high school is in the Memphis City school district along with the percentage of economically disadvantaged students, attendance average, and cohort dropout rates all have a significant effect on final standardized test scores. In comparison between the Gateway

and ACT tests, the optional school variable was found statistically significant in the ACT exam equations but not in the Gateway exams; whereas, the susp/expuls variable was found statistically significant in the Gateway exam equations but not in the ACT exams. Therefore, taking all of this into consideration, city schools should put resources into improving controllable variables like average attendance and cohort dropout rates in high schools. Lowering the number of economically disadvantaged students would have an effect on future standardized test scores but controlling this factor is unlikely. Also, since optional schools play a factor in improving test scores, Memphis City schools should try and implement more optional schools within their already existing thirty-one high schools.

Appendix A

2004-2005 ACT Averages by High School

School	Composite	English	Math	Reading	Science
B T Washington	15.7	16.3	15.1	15.2	15.6
Carver	15	14	15.4	14.8	15.5
Central	18.4	18.8	17.5	18.7	18.2
Cordova	20.4	20.5	19.6	20.7	20.3
Craigmont	18.4	18.8	17.4	18.7	18.3
East	16.6	16.4	16.2	16.4	16.6
Fairley	15.4	14.7	15.1	15	15.9
Frayser	15.3	14.8	15.1	15.6	15.6
Hamilton	15.3	14.5	15.2	15.1	16.2
Hillcrest	15.1	14.1	15.2	14.8	15.8
Kingsbury	17.1	17	16	17.1	17.5
Kirby	16.3	15.7	15.9	16.3	16.9
Manassas	14.5	13.2	14.6	14.6	15.3
Melrose	15.3	14.7	15.1	15	15.8
Middle College	16.1	15.6	15.4	16.3	16.5
Mitchell	14.5	13.6	14.5	14.6	14.9
Northside	15.2	14.6	15.2	15.1	15.7
Oakhaven	15.5	14.2	15.4	15.8	15.6
Overton	18.5	18.9	17.6	18.5	18.6
Raleigh-Egypt	15.8	15.6	15.4	15.1	16.6
Ridgeway	19.7	20.3	18.7	19.6	19.4
Sheffield	15	14.1	15.1	14.7	15.9
South Side	15.6	16	15.3	15.1	15.4
Treadwell	15.8	14.9	15.5	15.7	16.4
Trezevant	15.4	14.6	14.9	15.5	15.9
Westside	14.9	13.2	15.4	14.7	15.9
Westwood	15.6	15.2	15.2	15.5	16.1
White Station	23.5	24.2	22.8	23.7	22.5
Whitehaven	16.7	16.8	16.2	16.5	16.7
Wooddale	16.5	16	16	16.8	16.9
Arlington	n/a	n/a	n/a	n/a	n/a
Bartlett	20.9	21.4	20.2	21	20.7
Bolton	20.6	20.8	19.9	20.8	20.4
Collierville	22.7	23.2	22	22.8	22.2
Germantown	20.8	21.4	19.8	21.1	20.2
Houston	23.5	24.2	22.9	23.8	22.7
Millington	18.9	19.1	18.2	18.8	19

Appendix B

2004-2005 Gateway Exam Averages by High School

School	Algebra I	Biology I	English I	English II	Math Foundations
Avon Lenox	394.5	n/a	n/a	n/a	n/a
B T Washington	504.8	501.3	468.6	487.8	n/a
Carver	502.3	494	478.2	494.9	n/a
Central	503.2	537	517.2	527.3	n/a
Cordova	528	551.8	524.3	535	n/a
Craigmont	488.5	519.9	496.7	514.5	n/a
East	499.5	494.1	486.4	506.5	n/a
Fairley	490.4	499.7	479.1	489.5	n/a
Frayser	495.5	498.4	491.8	499.4	n/a
Hamilton	500.4	484.4	486.6	495.7	n/a
Hillcrest	504	507.4	483	498.9	n/a
Kingsbury	499.7	516.2	486.5	503.3	n/a
Kirby	497.9	523.4	486.5	508.4	n/a
Manassas	505	480.7	466.8	481.2	n/a
Melrose	491	500.6	476.9	494.6	n/a
Middle College	510.7	512.7	510.2	517.8	n/a
Mitchell	520.5	481.5	476	495.3	n/a
Northside	475	500.4	473.4	492	n/a
Oakhaven	494.2	480.5	475.8	490.1	n/a
Overton	515.4	529.9	505.1	520.5	n/a
Pyramid Academy	462.8	478.8	470.5	468.1	n/a
Raleigh-Egypt	503.5	491.9	488	499.2	n/a
Ridgeway	513.3	544.3	514.4	529.2	n/a
Sheffield	506.4	493.3	478.9	491.4	n/a
South Side	478.1	497.6	470.8	489.1	n/a
Treadwell	495.6	491.6	472.1	494.2	n/a
Trezevant	501.5	490.8	481.9	497.4	n/a
Westside	518	501.5	474.4	474.5	n/a
Westwood	474.6	487.6	478.7	478.5	n/a
White Station	518.1	557.1	526.9	549.9	n/a
Whitehaven	505.1	528.5	504.3	519	n/a
Wooddale	486.9	515.8	490.2	505.1	n/a
Arlington	570.8	586.7	531	n/a	549
Bartlett	539.2	551	527	543.6	530.9
Bolton	535.6	550.4	518.1	538.9	514.5
Collierville	561.6	576.1	539.4	547.9	552.7
Germantown	542	559.2	518.7	540.8	523.3
Houston	555.7	571.4	538	556.7	537
Millington	515.5	531.5	501	521.4	524.7

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