Testing, Ranking and College Performance:
Does High School Matter?

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Acknowledgments

This research was supported by grants from the Ford, Mellon and Hewlett Foundations and NSF (GRANT # SES-0350990). We gratefully acknowledge institutional support from Princeton University's Office of Population Research (NICHD Grant # R24 H0047879).

September, 2009

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Abstract

Using administrative data for five Texas universities that differ in selectivity, this study evaluates the predictive power of two key indicators used by college admissions officers to predict college success: high school class rank and standardized test scores. The empirical analyses warrant three conclusions. First, consistent with many other studies, we demonstrate that high school class rank is a better predictor of college performance than standardized test scores. Second, at all universities considered, test score advantages do not insulate low ranked students from underperformance. Third, simulations reveal that, for UT-Austin, capping automatic admits based on high school class rank would have roughly uniform impacts across schools that differ in economic status, but imposing minimum test score threshold would greatly reduce the admission eligibility of the highest performing students from poor high schools with low college going traditions while not jeopardizing that of feeder and affluent high school graduates.

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Introduction

As the baby boom echo intensifies demand for admission to selective institutions, controversies about the assessment of academic merit have continued to swirl, particularly in states with diverse and rapidly growing college-age populations, such as California, Texas and Florida. The college merit debate largely pivots around use of standardized test scores for purposes of admissions because Hispanic, black and low-income students average lower scores than their Asian, white and affluent counterparts (Bowen and Bok, 1998; Clarke and Shore, 2001; Carnevalle and Rose, 2004; Espenshade and Chang, 2005). Advocates of standardized tests consider them a rigorous measure of academic preparedness that does not suffer from variation in grading standards across schools (Camara and Michaelides 2005) and interpret the movement away from the SATs as the demise of meritocracy (Barro 2001). Race, ethnic and income gaps in standardized test scores presumably indicate that minority students are less well prepared to succeed in college (Thernstrom and Thernstrom, 1996). That admissions officers have increased their reliance on test scores for screening applicants is ironic, however, in light of extensive empirical evidence that standardized test scores have lower predictive validity for college success compared with high school grades or class rank (Crouse and Trusheim, 1988; Bowen and Bok, 1989; Rothstein, 2004; Alon and Tienda, 2007).

Several recent empirical studies support claims about the superior predictive power of high school grades on college success at selective public institutions.

Examining nearly 80,000 students enrolled in California's UC system during the late 1990s, several studies show that show that for all academic disciplines, campuses and freshman cohorts, high school GPA is the best predictor of freshman GPA (Kowarsky, Clatfelter and Widaman, 1998; Geiser and Studley, 2003) and also four year GPA and graduation (Geiser and Santelices, 2007). These studies also find that high school GPA has less adverse impact on admission prospects of economically disadvantaged students compared with the SAT because it is much less correlated with student socioeconomic characteristics than standardized tests. In fact, Rothstein (2004) concludes that much of the SAT's predictive power derives from its correlation with socioeconomic background and high school attributes.

During the late 1990s, when affirmative action was under assault by groups seeking to overturn the 1978 *Baake* decision,[1] most researchers understandably focused on race and ethnic differences in admission to selective institutions, to the relative neglect of institutional arrangements that perpetuate academic disparities, such as high school quality (Tienda and Niu, 2006a; Rothstein, 2004). Partly this reflects the dismal yield from studies attempting to establish "high school effects" using multi-level modeling strategies (see Pike and Saupe, 2002), but also the paucity of data to evaluate links between high school attributes and college performance. By modeling high school fixed effects, Fletcher and Tienda (forthcoming) find that quality of high school attended largely eliminates and in some cases reverses college achievement gaps between minority and nonminority students. This insight is important both because minority students are more likely than their white or Asian counterparts to attend underperforming schools, and

[1] University of California Regents v. Bakke, 438 U.S. 265 (1978)

because certain aspects of school quality, unlike family background, is amenable to policy intervention.

This study pursues three objectives that build on recent insights linking high school quality to collegiate academic achievement using Texas as a case study. First, we estimate the relative influence of two key academic metrics—high school class rank and standardized test scores—on four measures of post secondary performance to assess whether the relative predictive power of each metric changes when considered in tandem with economic status of the high school attended. Second, we empirically evaluate criticisms that high performing students from low performing schools are not destined to succeed in college, particularly at institutions with selective admissions, by comparing their academic achievement with that of lower ranked students with high test scores. Finally, we simulate the consequences of a recent amendment to the top 10% law that imposes a minimum SAT threshold for students ineligible for automatic admission if it was imposed on students qualified for automatic admission.

To make our case we first discuss the special relevance of using Texas as a case study to evaluate links between high school quality and college performance. The data description that follows includes a profile of the five universities analyzed, a socioeconomic typology of Texas high schools, and a detailed description of the outcome variables and the analytical methods. Subsequently we present the empirical findings. The concluding section summarizes key findings and situates them against the state and national policy debate about testing and ranking as criteria for college admissions.

Texas Case Study

Texas is particularly well suited for evaluating the significance of high school socioeconomic status for collegiate academic performance because, in response to the 1996 judicial ban on the use of race or ethnic origin in college admission decisions,[2] the Texas legislature passed the uniform admission law (HB 588).[3] By guaranteeing admission to any public post-secondary institution to all high school seniors who graduate in the top 10 percent of their class, the law eliminates the SAT filter that has limited access to selective institutions to hundreds of qualified poor and minority students.

Popularly known as the top 10% law, the admission regime is predicated on research showing that high school grades better predict college success than standardized test scores (Klitgaard, 1985; Crouse and Trusheim, 1988; Bowen and Bok, 1998). Architects of the uniform admissions law also were concerned that a handful of large, suburban "feeder" schools dominated enrollees at the public flagships (Montejano, 2001; Tienda and Niu, 2006b). In their attempt to broaden access by geographic, socioeconomic and ethno racial lines, Texas legislators sought to design a system that not only rewards merit based on a uniform criterion, namely class rank, but also broadens access by drawing high-achieving students from all Texas high schools—rich or poor, large or small, urban or rural. Important to the law's success in leveling the playing field is the stipulation that high schools, not colleges, determined which students qualified for the admission guarantee. This provision implies that students compete with their same-school classmates rather than students from other schools, to qualify for automatic admission.

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[2] *Hopwood v. Texas*, 78 F.3d 932 (5th Cir. 1996), cert. denied.

[3] The law was passed in May, 1997, by which time the admission season for 1997-1998 school year was virtually completed. The law was fully in force for the 1998 admission season.

Initially the law was applauded as a race neutral alternative to affirmative action, especially when the fate of the affirmative action was highly uncertain. But as demand for access to the selective institutions surged, criticism of the law surged, even among college administrators who had strongly endorsed the percentage plan (Faulkner, 2000, 2002). One major criticism of the top 10% law is that it unfairly privileges high achieving students who attend underperforming schools at the expense of allegedly better-qualified students from competitive high schools who graduate slightly below the cut point (Barr, 2002; Flores, 2003; Nissimov, 2000; Glater, 2004). To bolster claims that the law eroded academic standards, opponents argued that average test scores of top decile enrollees at UT-Austin fell below those of lower ranked students by 2003 (The University of Texas at Austin, 2008). These criticisms assume that top 10% enrollees with low test scores, and those who graduated from low quality high schools, will underperform academically.

Concerns about the erosion of standardized test scores were incorporated in the 2009 revision to the uniform admission law. After two failed attempts to rescind or revise the law, the Texas legislature agreed to cap the number of students automatically admitted to the University of Texas at Austin (UT) at no more than 70 percent of the entering class. This amendment responds to UT's growing saturation with students admitted automatically, which exceeded 80 percent in 2008. In addition, the legislature imposed a minimum SAT threshold of 1000 for students who did not rank in the top 10% of their class, but fell short of requiring that students qualified for automatic admission also achieve the SAT minimum. This threshold falls below the institutional averages for all but one of the five institutions considered in our analysis, which also is the only institution with noncompetitive admissions. In view of growing worries about test score erosion at the selective institutions, we simulate the implications of extending the SAT minimum to top 10% enrollees.

Data and Analytical Strategies

Our analyses are based on administrative data for five universities that were assembled as part of Texas Higher Education Opportunity Project. The five universities, which include UT-Austin (UT), Texas A&M (TAMU), Texas Tech (TECH), UT-San Antonio (UTSA) and Southern Methodist University (SMU), are profiled in Table 1. Collectively the institutions represent a considerable range in selectivity of admissions, public/private status, size and tuition sticker price. UT is the most selective among the universities compared, but Barron's (2002) classified both SMU and TAMU as very competitive.[4] Six-year graduation rates, which range from 29 to 77 percent, vary with institutional selectivity

Table 1 about Here

The five institutions differ in the number, composition and size of their graduate programs; therefore freshman enrollment serves as a practical metric for comparison. Enrolling in excess of 50 thousand students, UT is one of the largest campuses in the nation. In 2002, the last year of our administrative data, freshman enrollment TAMU, TECH and UTSA was, respectively, 88 percent, 57 percent and 40 percent that of UT, where nearly 8000 freshman matriculated.[5] Although SMU is on the higher end of the

[4] Rice University, another private institution, is classified as "most competitive," the highest rank assigned in the Barron's classification scheme. Our administrative files for Rice lack the class rank data to include in this analysis.

[5] UT temporarily increased the size of its freshman class from 2000 to 2002 in order to offset growth in the number of students who qualified for automatic admission under the top 10% law, but that expansion proved untenable and was rescinded for the 2003 class.

size distribution of private universities, its freshman class was less than one-fifth as large as UT's. Tuition at the four public institutions ranged between $4600 and $3700, for TAMU and UTSA in 2002, but like most private institutions, tuition at SMU was considerably higher—nearly $20,000 per year.

Each university's administrative data consists of an applicant file and term-specific transcript records for all enrollees. The applicant file contains basic demographic information, high school class rank, standardized test scores, admission and enrollment status, and graduation dates. Transcript files record several academic performance measures, including term-specific GPA and cumulative GPA for each semester enrolled. The analysis sample for each university is restricted to fall semester *enrollees* who graduated from a regular Texas public high school with at least 10 seniors.[6] Using a database maintained by the Texas Education Agency (TEA), we appended to each record the percent of students ever economically disadvantaged at their high school, which we used to construct a typology of Texas high schools.

Explanatory Variables

High school economic strata: Using the TEA measure, "percent of students ever economically disadvantaged", we use annual quartile cut-points to classify high schools into three strata: affluent schools (top quartile); average schools (second and third quartiles); and poor schools (bottom quartile). Based on their college-going traditions, affluent schools are further sorted into two subgroups designating a subset of "feeder schools" and others; similarly, poor schools are sorted into those designated "Longhorn century schools" versus other poor schools.

[6] We use residence as a proxy for high school location when missing. Private high schools are excluded because TEA does not collect information about the economic status of their students and because most do not rank students, unlike public high schools.

Feeder high schools differ from other affluent schools because of their strong college-going traditions, sending particularly large numbers to the State's two public flagships. Operationally, feeder high schools are the top 20 high schools based on the absolute number of students *admitted* to UT and Texas A&M University (TAMU) as of 2000. Because of the considerable overlap between the two sets, the combined list of feeder schools represent only 28 high schools out of a possible 1,644 public high schools in 2000 (TEA, 2001).[7] Most of the feeder high schools qualify as affluent based on criteria defined above, and none is poor.

An admission guarantee does not guarantee matriculation, particularly for low-income students. In order to raise the odds that high-achieving students would enroll at the flagships, both UT and TAMU targeted a subset of low income schools with low college-going traditions for aggressive outreach programs, offering "Longhorn" and "Century" scholarships to a few of their highest ranked graduates (Domina, 2007). The UT's Longhorn Opportunity Scholarship program began in 1999 with approximately 40 high schools and expanded to 60 during the early years of the uniform admission regime. TAMU launched the Century program in 1999 with 20 participating high schools and added new schools in 2000 and 2001, reaching about 50 in 2003. The Longhorn and Century high schools are mostly non-overlapping sets, but 28 high schools participate in both programs. In this paper, schools ever designated for the Longhorn/Century program are coded consistently throughout the observation period. The majority of these schools are classified as poor based on criteria defined above, but a few very large campuses qualify as "average" in the economic classification scheme.

[7] A private mathematics academy is excluded in analyses because the school neither ranks students and lacks information about students' economic status.

Table 2, which provides a snapshot of the five high school strata, shows the pervasiveness of ethnic and racial school segregation and its close correspondence with poverty. About three-in four students from feeder and affluent high schools are white, compared with only 10 to 15 percent of students from poor high schools. Furthermore, the Asian origin students are highly overrepresented at feeder high schools, where their share is over twice the state-wide average 3 percent of Asian high school graduates. Black and Hispanic students comprise the dominant majority at poor and Longhorn/Century high schools—84 to 88 percent, respectively. Over two-thirds of students from these schools are economically disadvantaged. Blacks represent less than 10 percent of the student body at affluent and feeder high schools and Hispanics around 12 percent.

Table 2 about Here

Beyond economic status and demographic composition, the high school strata represent considerable variation in college-orientation, as evident by the share of students who take college entry exams. Over four out of five students from feeder schools do so, compared with less than half of students attending poor high schools. Results from these exams are equally telling, with SAT scores averaging close to 1100 at the feeder schools and less than 850 at the Longhorn/Century high schools.

High school class rank: Under the provisions of the uniform admission law, high schools have great latitude in determining how to calculate grade point averages for purposes of generating a rank distribution. That is, school administrators decide whether and how much to weight honors and advanced placement courses, and whether to include non-academic subjects, such as physical education and vocational courses, in the GPA used to rank students. In order to determine whether an individual applicant qualifies for automatic admission under the top 10% law, high schools report the size of their senior class and exact class standing. For analyses detailed below, we sort students into three categories based on their rank: top decile, second decile, third decile or below.[8]

Test scores: Although standardized test scores are not considered in the admission decisions of students who qualify for automatic admission, all applicants must submit results of college entrance exams, either SAT or ACT, in order for an application to be considered complete. ACT scores are converted to SAT scores based on a conversion table published by College Board, and SAT scores are re-centered for years prior to 1996.

College Performance Outcomes: We examine four achievement outcomes available in the transcript files: freshman year cumulative GPA; 4 year cumulative GPA; freshman year dropout rate; and four year graduation rate. Freshman year attrition includes students who do not enroll for one or more semesters following fall matriculation. Four year cumulative GPA and four year graduation rates are considered only for those cohorts with a four year lapse since their first matriculation.

Summary Statistics

Table 3 reports summary statistics for enrollees at each of the five Texas universities, including the period for which data are available. With the exception of SMU, our data span the period before and after the uniform admission law was in force. SMU is not bound by the admission guarantee and considers test scores of all applicants, irrespective of class rank, in evaluation of applicant files. Its admission selectively is comparable to one of the public flagships and makes a good comparison.

[8] The admission guarantee applies only to public institutions; however, the judicial ban on race preferences that was in force between 1997 and 2003 applied to public and private institutions.

Table 3 about Here

The institutional enrollee pools correspond well to Barron's selectivity rankings in that the highest average test scores correspond to UT (nearly 1200), SMU and TAMU, and the lowest to UTSA, which fall below 1,000 on average. With its freshman cohorts approaching an average SAT score of 1100 over the period, TECH falls between the high and low values. Furthermore, about half of first-time freshman at the two public flagships graduated in the top decile of their class, compared with less than a quarter of TECH students and about one in seven UTSA students. Although SMU is not required to admit top decile applicants, over one-third of its students so qualified. This falls below the average at both public flagships in the period before the top 10% law was passed (Tienda, Alon and Niu, forthcoming).

Both public flagships and SMU draw at least one-fifth of their first-time freshmen from feeder high schools but only 11 percent from poor high schools. By comparison, over one quarter of UTSA enrollees graduate from high schools that serve large numbers of economically disadvantaged students, but only eight percent are feeder high school graduates. Approximately half of first time freshmen at UT and TAMU rank in the top decile of their senior class, but at UTSA only 15 percent of freshmen so qualify.

Academic performance of enrollees at the two flagships, Texas Tech and SMU are more or less at par, especially after the freshman year, but SMU enrollees enjoy much higher four-year graduation rates—52 percent versus 33 percent for both UT and TAMU. UTSA has the most dismal record based on grade point averages, freshman attrition rates and graduation rates. About one-third of first-time freshmen who enroll at UTSA discontinue their study for at least one semester during or following their freshman year and a meager four percent graduate in four years.

Apparently differences in the composition of the enrollee pools have direct implications for students' academic performance, and in particular claims about the value of testing and ranking for predicting collegiate academic success. That both metrics of high school achievement considered for purposes of admission also co-vary with high school quality raises questions about their overall and unique predictive power across the spectrum of institutional selectivity, which we address below.

Analytical Strategies

First, to evaluate claims that high school attributes, which we focus on economic strata in this study, mediates the influence of test scores and class rank, we use OLS and probit regression techniques to predict the four college performance measures as a function of the three covariates of interest: high school economic strata, high school class rank and standardized test scores. Based on R-Squares and pseudo R-Squares from three baseline specifications and three nested specifications, we decompose the components of variance due to each of the three predictors.

Sequentially, the empirical specifications include:[9]

1. High School economic strata (five discrete categories);
2. High school class rank (three discrete categories);
3. Individual standardized test scores;
4. High school economic strata and high school class rank;
5. High school economic strata and test scores; and

[9] All models include year dummies to monitor changes in covariates that may vary systematically over time.

6. High school economic strata, high school class rank, and test scores.

The R-Square and pseudo R-Square statistics for first three specifications reveal the overall predictive power of high school economic status, high school class rank and individual test scores; the 4th and 5th specifications indicate whether and to what extent high school economic status is confounded with the two high school achievement metrics, and the final specification considers the joint explanatory power of the three key predictors. Institution-specific analyses reveal whether the strength of the associations depend on the admissions selectivity and public/private status of the universities.

Second, to address criticisms that high-ranked students with low test scores underperform academically relative to low rank students who scored high on standardized tests, we compare college performance metrics for non-top decile students from feeder, affluent and average high schools with those of graduates from Longhorn/Century high schools who qualified for automatic admission, and examine whether performance gaps depend on institutional selectivity. Not only do the Longhorn/Century high schools have high shares of economically disadvantaged students, but most have relatively low college-going traditions. For these analyses we estimate interaction terms between the five high school economic strata and three high school class rank categories in model (4).[10] Because prior studies show that high school class rank is a better predictor of college performance than standardized test scores we hypothesize that large test score advantages do not insulate lower ranked students from

[10] For these analyses (4) and (6) we compute interaction terms as 15 dummy categories using five high school economic strata and three high school class rank categories, using top decile Longhorn/Century school students are the reference group. R-Square and pseudo R-Square statistics obtained from the specifications with interaction terms are very similar to those obtained from specification in which high school class rank dummies and high school economic status terms are additive.

academic underperformance. Whether the conditional association between test scores and class rank also depends on high school quality or institutional selectivity is an empirical question for which there is no prior evidence.

Third, to simulate the consequences of extending the minimum SAT threshold to students qualified for automatic admission based on their class rank, we focus on the most selective public institution, the University of Texas at Austin, because it has become saturated with students qualified for the admission guarantee and because criticisms about declining student quality based on the erosion of standardized test scores has largely focused on UT, and because the recent cap on the share of automatic admits only affects UT. Operationally we re-estimate model (4) by restricting the sample of non-top 10% students from feeder, affluent, average, and poor high schools who achieved a minimum SAT equivalent score of 1000 relative to top decile Longhorn/Century high school students whose test scores fell below the threshold.

Finally, to further buttress our findings that test score advantages do not insulate low ranked students from academic underperformance, we use Kernel density estimation to examine the entire distribution of college performance.

Predictive Power of High School Class Rank and Test Scores

Table 4 reports the gross predictive power of each covariate (Models 1-3) for each of the four college performance measures based on the R-Square and pseudo R-Square statistics. Three main findings emerge from these analyses. First, consistent with other studies, high school class rank is an equivalent or better predictor of college performance than standardized tests. The second and the third columns in Table 4 show that the percent of variance in four college performance measures accounted for by high school class rank is comparable to or higher than that attributable to test scores, even using an aggregated, categorical metric for high school class rank. The only exception to this generalization is the model predicting 4th year cumulative GPA for SMU enrollees. If percentile class rank is modeled as a continuous measure, the corresponding statistics increase slightly, rendering our estimates for class rank conservative.

Table 4 about Here

Second, Rothstein's (2004) claim that high school economic status is a proxy for students' standardized test scores finds support in the results for Texas. The influence of test scores on college performance is confounded with high school economic status, but this is not the case for high school class rank. Because test scores are highly correlated with the economic status of high schools, the R-Square statistics from jointly modeling high school economic status with students' standardized test scores are virtually identical to those based on test scores alone (cols 3 and 5). By contrast, when high school economic status and high school class rank are modeled jointly, the associated R-Square statistics are substantially higher than those from the specifications that only include high school class rank (cols. 2 and 4). Substantively this indicates that high school economic status has explanatory power that is independent of students' high school class rank.

Inclusion of standardized test scores yields modest improvements in predicting college achievement beyond that attributable to high school economic status and high school class rank (see cols 4 and 6). Adding high school class rank to a model that includes both high school economic strata and test scores significantly improves predictions of college outcomes, almost doubling R-Square values (cols 5 and 6). Like

Rothstein (2004), our results indicate that the college achievements attributed to test scores are overstated, largely because they function as a proxy for student background characteristics that are correlated with collegiate academic performance (Rothstein, 2004). The explanatory power of high school economic status, although statistically significant, is less than that of either high school class rank or standardized test scores; however. In the main this reflects that the influence of high school economic status is most decisive in predicting college going decisions than performance conditional on enrollment (Niu and Tienda, 2008; Fletcher and Tienda, forthcoming).

Third, the two main findings also obtain for all four postsecondary outcomes; for all selectivity tiers; and for both public and private institutions. That our estimates are robust to variation in institutional selectivity challenges claims that high performing students from low quality high schools are ill prepared for college work, particularly at the most selective institutions. This key premise underlying criticisms of both affirmative action policies nationally and the top 10% law in Texas warrants attention of policy analysts.

Test Score Advantages and Academic Performance

To assess whether high performing students from low performing schools underperform in college, especially at selective institutions, we compare the academic performance of top decile graduates from Longhorn/Century high schools with that of students from affluent and average high schools who do not rank in the top decile of their class but average higher SAT scores.[11] These comparisons are designed to maximize contrasts in that graduates from Longhorn Century high schools are alleged to be least well prepared both because they serve large poor and minority student bodies and because of their low college-going traditions. Although they receive additional academic and social support at the flagships, graduates from Longhorn and Century high schools who enroll at other institutions do not enjoy special treatment, especially at non-competitive, lower-resource campuses like UTSA.

Table 5 reports raw test score gaps (col.1) and college performance differentials for six strata representing students from feeder, affluent and average public high schools ranked in the second or third decile and below relative to top decile students who graduated from Longhorn/Century high schools (cols.2-5). Performance gaps, represented as unstandardized coefficients (OLS) and marginal effects (Probit) are based on model 4, which also includes year fixed effects to control for factors that change over time. The results show that, relative to students who graduated in the top decile of a Longhorn or Century high school, Texas college students who graduated in the second decile of an average high school, and those who graduated in the third decile or below from feeder and affluent high schools underperform academically despite their test score advantages.

Table 5 About Here

For example, at "highly competitive" UT-Austin, second decile graduates from average high schools enroll with an 85-point test advantage compared with top decile Longhorn school students, yet earn lower freshman year and 4th year cumulative GPAs

[11] In the following analyses, we omit reporting results of non-top decile students from poor high schools because they have no or minimum test score advantages over top decile graduates from Longhorn/Century schools.

(0.20 and 0.07 points less, respectively); moreover, they are about 3 percentage points more likely to drop out during or right after their freshman year and, conditional on remaining enrolled, about equally likely to graduate in 4 years. At UT-San Antonio, second decile students from average high schools enroll with a 41-point test score advantage (p=0.12), yet their academic performance is comparable to that of top decile Longhorn/Century school students. SMU enrollees who graduated in the second decile of an average Texas public high school average a 32-point test advantage over top decile Longhorn/Century school enrollees. They also average lower freshman year cumulative GPAs, but perform equally well on the other three achievement outcomes. Thus, despite their test score advantages, these three groups of non-top decile students either underperform academically or fare no better than relative to top decile students who graduated from Longhorn/Century schools, irrespective of the selectivity of the post-secondary institution.

Although the model specification includes year fixed effects, it is possible that an abnormality in one or two years, such as the year before the admission guarantee was in force and affirmative action was banned (1997), would skew an average result. Therefore, to further verify our findings, we re-estimated models using annual data. Point estimates fluctuate from year to year, yet the general pattern holds.[12] Year-specific estimates for the two flagships also show that second decile graduates from affluent high schools who matriculate at the two flagship campuses perform about the same as the top decile Longhorn/Century students with lower average test scores. Moreover, as alleged by critics of the Top 10% Law, after 1998 the test score gap widened between non-top decile enrollees from feeder, affluent and average high schools versus top decile enrollees

[12] Results are available upon request.

from Longhorn/Century high schools at both UT and TAMU. Concomitantly the size of the performance gaps narrowed.

Especially at UT-Austin, the mean test scores of top decile Longhorn students eroded slightly and those of non-top decile students rose sharply, which indicates that admission of students ineligible for automatic admission became increasingly more selective on standardized test scores as the share of top 10% graduates rose. For example, compared with Longhorn school students qualified for automatic admission, UT enrollees from affluent high schools who graduated at or below the third decile of their class in 1998 averaged a 51-point test score advantage, yet earned 0.19 points lower in freshman year cumulative GPA. By 2002 the test score gap for these contrast groups rose to 191 points, yet their freshman year cumulative GPA was equivalent. It is striking that top standing in high school class, which captures students' individual motivation and effort in a given environment, "compensates" for as much as a 200 point test score deficit, which largely proxies socioeconomic status.

Incremental Policy: A Cautionary Tale at UT-Austin

That test scores are considered a premier merit criterion for rationing slots in US higher education is evident in the recent amendment of the top 10% law, which instated a SAT score minimum of 1000 points for UT-Austin applicants ineligible for automatic admission.[13] The legislature stopped short of extending the SAT minimum to top 10% graduates, but its inclusion in state law reflects the continued preoccupation with standardized test scores as a metric of academic merit and college preparedness.

[13] It also imposed a cap on the share of students admitted automatically at 70 percent at the Austin campus, this does not affect the data we analyze, which were concluded before the cap will go into effect.

Although the test score filter is not used to screen out applicants qualified for automatic admission, our analyses below show that many highly ranked students from poor high schools would not be admitted if the minimum threshold were required of them.

Figure 1 displays the percentages of UT-Austin enrollees with test score below 1000 by high school economic status and high school class rank for 1990 to 2003. For enrollees from feeder, affluent and average high schools, class rank varies inversely with the share of enrollees with test scores below 1000, as revealed by the level of the respective curves for each school stratum. This association does not obtain for students from poor and Longhorn high schools. In fact large shares of Longhorn graduates fail to reach the 1000 point threshold throughout the class rank distribution. More specifically, between 20 and 30 percent of top decile enrollees from Longhorn high schools scored below the 1000 point threshold before 1998, but that share rose to 45 percent by 2003. A similar pattern emerges for lower ranked students from Longhorn schools, but the data is nosier because UT admits very few students ranked below the top 10% from these high schools, especially after the admission guarantee became effective.

Figure 1 About Here

A detailed examination of the cumulative class rank and test score distributions for enrollees automatically admitted to UT in 2003 is further instructive. The left panel of Figure 2 shows that the class rank distributions of UT enrollees admitted automatically do not differ appreciably according to their high school's economic status, although Longhorn students who graduate in the top 10% of their class are more concentrated in upper percentiles of the top decile compared with feeder school students. The mean percentile class rank for top decile students is nearly 5 for feeder and affluent school students, compared with 4.2 and 3.9 for students from poor and Longhorn schools, respectively.

Figure 2 About Here

The right panel, which displays students with test scores below 1000, reveals large differences among the high school economic strata. Less than 1 percent of top decile feeder school students score below 1000; among top decile graduates from affluent schools, less than two percent of the upper half score that low, and the share is about three to four percent higher for ranks 6 to 10 of the distribution. By contrast about 20 percent of Longhorn school students who graduated in the first percentile of their class score below 1000, and this share rises to about 40 percent for the 5th percentile students. Nearly half (45 percent) of Longhorn school graduates ranked in the 10th percentile achieved test scores below 1000.

Given the growing saturation of the top decile students at UT since the law was implemented, capping automatic admissions became necessary. Our analysis shows that capping based on high school class rank would have roughly uniform consequences across high schools; however, capping based on test scores would greatly reduce the shares of highly ranked students from Longhorn schools while leaving students from feeder and affluent high schools unaffected.

Furthermore, because the number of top decile enrollees at UT differ greatly by high school economic status, releasing automatic admission slots by capping based on high school class rank is a more efficient and equitable policy lever than capping based on test scores. Table 6 reports the number of top decile enrollees at UT in 2003, the number of students with test scores below 1000, and the number of students ranked in the top 9th and 10th percentile.. Capping automatic admissions using the 8th percentile rather than the 10th percentile as the cut-point would free 622 slots, but imposing 1000-point test score minimum as a filter would not only free fewer (N=428) slots, but also would toll disproportionately on students from Longhorn and poor schools. Stated differently, almost two-thirds ([139 + 131] / 428 = 0.63) of "released" seats would come from poor and Longhorn schools if the test score filter were imposed to screen applicants versus 14 percent of their current shares based on class rank.

Table 6 About Here

Lastly, we examine the consequences on college performance of imposing the 1000 SAT point minimum as an exclusion restriction for admission. Under this scenario, at least 80 percent of enrollees who did not graduate in the top decile of their class at feeder, affluent and average high schools would still be admissible, but 30 to 45 percent of top decile Longhorn school students would be rendered inadmissible. Table 7 presents average test scores and college performance differences for students who do and who do not meet the minimum threshold. For this exercise top 10% graduates from Longhorn high schools with test scores below 1000, the hypothetical inadmissible group serve as the reference group, which is compared with students who meet the test score threshold but do not rank in the top 10 percent of their class. As expected, we find numerous instances of collegiate underperformance among "test-eligible" enrollees relative to lower scoring top decile students from Longhorn high schools.

Table 7 About Here

Specifically, UT enrollees from average high schools ranked at or below the third decile who meet the SAT minimum threshold average a test score of 1166. Despite their

265-point advantage relative to top decile Longhorn school students with test scores below the threshold, they fare significantly worse academically in their freshmen year, earning a 0.21 point lower cumulative GPA. Moreover, as a group, they are 5 percentage points more likely to withdraw before their sophomore year. Net of attrition, they achieve a comparable 4th year cumulative GPA and 4 year graduation rate. Relative to top decile Longhorn school students with test scores below the threshold, second decile graduates from average high schools and affluent high school graduates ranked at the third decile or lower who meet the test score threshold matriculate UT with a test score advantage in excess of 250 points, yet they fare about the same in freshman year. This inference is backed not only by statistical significance, but also by the small magnitudes of the coefficients and marginal effects.

In sum, our results indicate that capping automatic admits by imposing an SAT minimum score of 1000 would render ineligible for admission nearly half of top decile graduates from Longhorn schools, yet they perform better academically or equally well in college as students from average high schools ranked at or below the third decile with test score advantages in excess of 250 points. These results strongly caution against imposing test score requirements for top performing students, especially those who graduate from underperforming high schools. Because high proportions of top decile Longhorn school students and fewer non-top decile students from feeder, affluent and average high schools achieve low test scores, excluding those who score below 1000 points would be tantamount to imposing a penalty for family background.

College Performance: Beyond Averages

The previous sections established that top decile Longhorn/Century school students outperform lower-ranked students from feeder, affluent and average schools based on bolster mean comparisons with controls. To further our claims, we examine the entire distribution of college performance. Figures 3 and 4 display Kernel density estimates, which are essentially smoothed histograms of freshman and 4^{th} year cumulative GPA's earned by UT-Austin enrollees in 2000. This is the latest cohort for which 4^{th} year cumulative GPA is available in our data.

Top two graphs in Figure 3 compare the freshman cumulative GPA distribution of top decile Longhorn school students with those of lower ranked students from feeder, affluent and average high schools. Kolmogorov-Smirnov tests for equality of the distribution functions show that the distributions do not differ statistically between top decile Longhorn school students and second decile students from affluent high schools. However, the distributions for second decile graduates from average schools, and all students ranked at the third decile or lower do differ from that of top decile Longhorn school students and also contain lower GPA values. For the bottom two graphs in Figure 3, which compare 4^{th} year cumulative GPA distribution, the Kolmogorov-Smirnov test results are similar to those based on the freshman year GPA distribution with one exception – feeder school students ranked at the third decile or lower have a statistically similar grade distribution as top decile Longhorn school students. This reveals that the performance gap narrows over college career.

Figure 3 About Here

Graphs in Figure 4 compare freshman and 4^{th} year cumulative GPA distribution of the subgroups using the 1000-point test score minimum as a screen. Top upper two graphs portray freshman year cumulative GPA distributions for top decile Longhorn school students with test scores below 1000-point threshold and for lower ranked students from feeder, affluent and average high schools who meet the minimum test score requirement. Kolmogorov-Smirnov tests for equality of distribution functions indicate that the distributions do not differ statistically between top decile Longhorn school students with sub-par test scores and the three groups that score at or above 1000 points: second decile graduates from affluent and average high schools and feeder school students ranked at the third decile or lower. However, the grade distributions for affluent and average school students ranked at the third decile or lower do differ from that of top 10% Longhorn school students and contain also lower GPA values. Over their college careers, these lower rank students from feeder, affluent and average high schools improve their college performance. Kolmogorov-Smirnov tests can not reject the hypothesis that students from these schools who ranked at or below third decile affluent and also meet the test score threshold have statistically identical distributions for 4th year cumulative GPA as top decile Longhorn school students who do not meet test score threshold.

Figure 4 About Here

Our Kernel density estimates are entirely consistent with findings based on point estimates from on regression and probit analyses. Moreover, despite statistical differences for some paired GPA distribution comparisons, the Kernel density estimates reveal remarkable overlap among the curves. For example, freshman year cumulative GPA distribution for top decile Longhorn high schools differs significantly and contains lower GPA values than that of second decile feeder school students. Yet, about 38 percent of the former earn a freshman cumulative GPA better than 3.3 – the mean of the latter group; and about 47 percent of latter group earn a freshman year cumulative GPA below 3.0 – the mean of the former group.

Even for the test-score subgroups that fall above and below the 1000-point threshold, Kernel density estimates show considerable overlap in the respective cumulative GPA distributions. For example, the 4th year cumulative GPA distribution for top decile Longhorn school students with test scores below the 1000-point threshold differs significantly and contains lower GPA values than that for feeder school students ranked at the third decile or below who meet the test score threshold. Yet about 59 percent of the former group earn a 4- year cumulative GPA better than 2.9, which is the mean of the latter group, and about 20 percent of the latter group earn a 4- year cumulative GPA below 2.7, the mean of the former group. Substantively this indicates that test score advantages and competitive high school attendance do not ensure college success for students who receive average grades in high schools indicated by a class rank at or below the third decile. Yet many top decile Longhorn school students take their opportunity and rise to the bar set before them, including those with test scores below 1000 points.

Conclusion and Discussion

This study evaluates the predictive power of two key indicators used by college admissions officers to predict college success. Our analysis is unique in its use of administrative data for institutions that differ in the selectivity of their admissions as well as the economic status of high schools attended by enrollees. The empirical analyses warrant three major conclusions. First, consistent with many other studies, we demonstrate that high school class rank is a better predictor of college performance than standardized test scores. These results hold for all four college performance measures and across selectivity tiers and public/private status of universities. Considered alone, high school class rank predicts college success as well as or better than test scores; unlike class rank, however, the predictive power of test scores is confounded with high school economic status. This follows because every high school—large or small, rich or poor—has a full class rank distribution, but the test score distribution, which is normal for a national population, is truncated at low performing schools. As such, our finding that rank is an equivalent or better predictor of college success is all the more remarkable

Second, at all universities considered, test score advantages do not insulate students from academic underperformance. Relative to enrollees who graduated in the top decile from Longhorn or Century high schools, college students ranked in the second decile of average high schools, or the third decile and below from feeder and affluent high schools matriculate with substantial test score advantages, yet perform academically about the same or worse in college.

Third, a large share of top decile Longhorn school students and few non-top decile students from feeder, affluent and average high schools score below 1000 on their college board exams, which is a new minimum threshold imposed for applicants to UT who do not qualify for automatic admission. Simulations reveal that capping automatic admits based on high school class rank would have roughly uniform impacts across schools that differ in their economic status, but imposing minimum admission thresholds based on test scores would greatly reduce the admission eligibility of the highest performing students from poor high schools with low college going traditions while not jeopardizing the admission eligibility of graduates from feeder and affluent high schools. Yet, on average, top decile Longhorn school students who score below 1000 perform better than third decile or lower rank students from average high schools who score at least 1000 points.

In situations where high school class rank and test score provide conflicting evaluations of students' academic excellence and readiness for college work, we endorse high school class rank as a preferred admission criterion over test scores based on their ability to predict collegiate performance. Academic merit for purpose of evaluating likely success in college should emphasize class rank over test scores because, as a behavioral measure of achievement, excellence, rank captures drive and other unobservable attributes that are highly correlated with academic success, irrespective of social background. Our results confirm that students from poor high schools who rank at the top of their class, despite of their low test scores, are highly likely to succeed at selective post secondary institutions. As far as their future performance is concerned, what high ranked students from disadvantaged social backgrounds lack is not merit, but the opportunity to succeed – that opportunity is what the uniform admission criteria based on class rank can provide.

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Table 1. Insitutional Chararcteristics (Fall 2002)

	UT-Austin	Texas A&M	Texas Tech	UT-San Antonio	SMU
Insitutional Characteristics					
Barron's Selectivity	Highly Competitive	Very Competitive	Competitive	Non Competitive	Very Competitive
Public/Private Status	public	public	public	public	private
Freshman Enrollment	7,918	6,949	4,533	3,141	1,380
Total Enrollment	52,261	45,083	27,569	22,016	10,955
In-State Full Time Tuition	4,527	4,602	4,001	3,702	19,466
6 Year Graduation Rate (2001 Cohort)	77%	77%	56%	29%	71%

Source: Texas Higher Edcuation Coordinating Board, Institutional Reports.
http://www.thecb.state.tx.us/Reports
Southern Methodist University Common Data Set 2002-2003.
http://smu.edu/ir/CDS/Archive/cds2002.pdf
Barron's College Profile for 2002.

Table 2. Selected Characteristics of Texas Public High Schools in 2002

	Feeder	Affluent	Average	Poor	Longhorn / Century
N	27	240	514	206	89
Total seniors[a]	603	242	151	135	278
(s.d.)	(174)	(201)	(152)	(139)	(125)
Race/Ethnicity Composition[b]					
% Black	8	8	14	9	30
% Hispanic	11	13	27	75	58
%White	72	74	56	15	10
% Asian	10	4	3	1	2
% Students ever economically disadvantaged[b]	9	12	33	70	63
% taking college entry exam[b]	83	71	61	53	51
Average SAT[c]	1094	1007	980	894	842
Average ACT[d]	23	21	20	18	17

Source: Texas Education Agency (TEA).

Note: a. Include only regular public high schools with at least 10 seniors.

b. Results weighted by class size.

c. Missing for 16% of average high schools and 33% of poor high schools.

d. Missing for 16% of poor high schools.

Table 3. Summary Statistics: Enrollees from Texas Public High Schools

	UT-Austin	Texas A&M	Texas Tech	UT-San Antonio	SMU
Years Avaliable	1990-2003	1992-2002	1991-2003	1990-2003	1998-2004
N	75,541	58,341	28,029	25,091	3,620
High School Class Rank (Col. %)					
Top Decile	50	52	23	15	37
Second Decile	24	26	21	19	22
Third Decile or Lower	26	22	56	66	41
Test Score Means	1189	1152	1087 [a]	977 [a]	1162
(S.D.)	(147)	(139)	(139)	(145)	(152)
High School Economic Strata (Col. %)					
Feeder	27	19	14	8	20
Affluent	34	37	40	34	43
Average	26	31	36	27	24
Poor	7	8	6	18	2
Longhorn/Century	4	3	2	9	8
Missing	2	2	2	2	2
College Performance					
Freshman Year CGPA	2.94	2.78	2.92	2.19	3.04
4th Year CGPA	2.99	2.98	3.04	2.48	3.13
Freshman Year Attrition	11%	9%	13%	34% [b]	11%
Graduated in 4 Years	33%	33%	25%	4%	52%

Source: Texas Higher Education Project (THEOP) administrative data.

Note: a. 1996+ only.

b. 1992-2002 only, sophomore year fall semester data not available for 2003 cohort.

Table 4. College Perfomance Variation Explained by High School Outcomes
(R-sq and Pseudo R-sq)

Models	(1)	(2)	(3)	(4)	(5)	(6)
Predictors	**High School Economic Strata**	**High School Class Rank**	**Test Score**	**High school Economic Strata and Class Rank**	**High School Economic Strata and Test Score**	**High School Economic Strata, Class Rank and Test Score**
			UT-Austin			
Freshman Year CGPA	0.07	0.16	0.17	0.24	0.17	0.29
4th Year CGPA	0.04	0.14	0.13	0.21	0.14	0.25
Freshman Year Attrition	0.014	0.026	0.019	0.045	0.022	0.047
Graduated in 4 Years	0.021	0.034	0.028	0.060	0.033	0.063
			Texas A&M			
Freshman Year CGPA	0.03	0.14	0.15	0.20	0.15	0.26
4th Year CGPA	0.02	0.14	0.13	0.19	0.14	0.24
Freshman Year Attrition	0.007	0.019	0.012	0.032	0.014	0.034
Graduated in 4 Years	0.014	0.034	0.017	0.045	0.020	0.046
			Texas Tech			
Freshman Year CGPA	0.01	0.19	0.10	0.22	0.11	0.23
4th Year CGPA	0.01	0.20	0.13	0.22	0.14	0.25
Freshman Year Attrition	0.003	0.015	0.008	0.020	0.009	0.020
Graduated in 4 Years	0.006	0.030	0.012	0.040	0.014	0.041
			UT-San Antonio			
Freshman Year CGPA	0.04	0.11	0.10	0.18	0.11	0.21
4th Year CGPA	0.01	0.11	0.08	0.16	0.08	0.18
Freshman Year Attrition	0.007	0.016	0.002	0.021	0.004	0.017
Graduated in 4 Years	0.022	0.047	0.030	0.071	0.038	0.074
			SMU			
Freshman Year CGPA	0.03	0.21	0.21	0.27	0.21	0.33
4th Year CGPA	0.04	0.18	0.23	0.29	0.23	0.34
Freshman Year Attrition	0.008	0.020	0.010	0.024	0.013	0.030
Graduated in 4 Years	0.023	0.030	0.026	0.050	0.032	0.051

Source: Texas Higher Education Project (THEOP) administrative data.

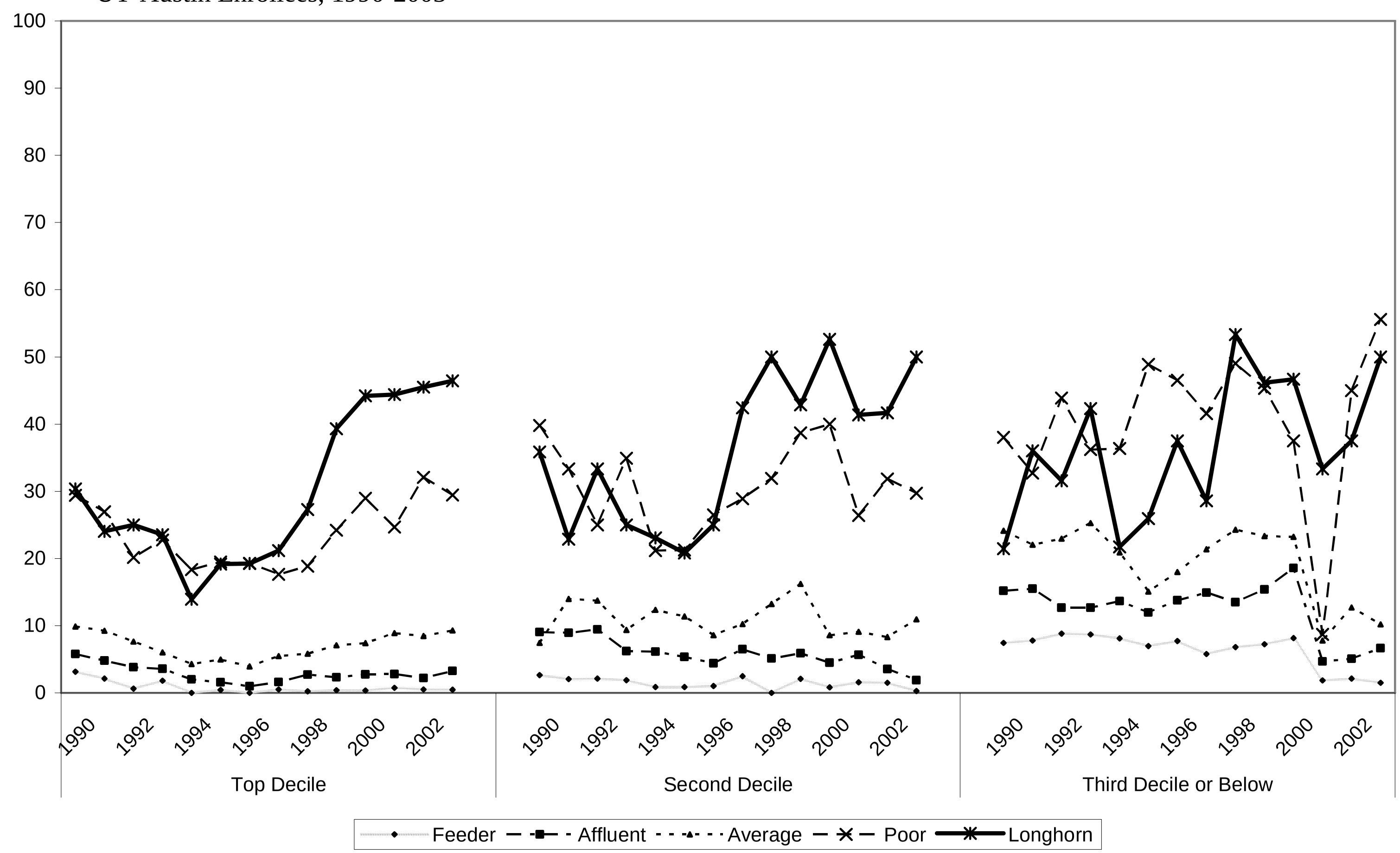
Table 5. Academic Performance of Enrollees
Relative to Top Decile Longhorn/Century School Students
(Coefficients from regressions, Marginal Effects from probit models)

	Testscore Advantage	Freshman Year CGPA	4 Year CGPA	Freshman Year Attrition	Graduated in 4 Years
2nd Decile Feeder					
UT-Austin	183 ***	0.37 ***	0.28 ***	-0.06 ***	0.21 ***
Texas A&M	78 ***	0.18 ***	0.12 ***	-0.04 ***	0.07 ***
Texas Tech	110 ***	0.32 ***	0.11 †	-0.08 ***	0.16 **
UT-San Antonio	128 ***	0.66 ***	0.58 ***	0.00	0.09 **
SMU	167 ***	0.30 ***	0.41 ***	0.04	0.22 ***
2nd decile Affluent					
UT-Austin	117 ***	0.03 †	0.07 ***	-0.01	0.09 ***
Texas A&M	33 ***	-0.07 ***	-0.05 ***	-0.01 †	0.02 *
Texas Tech	42 *	0.05	-0.11 *	-0.07 ***	0.10 *
UT-San Antonio	97 ***	0.36 ***	0.20 ***	-0.02	0.04 ***
SMU	100 ***	0.17 ***	0.25 ***	-0.03	0.22 ***
2nd Decile Average					
UT-Austin	85 ***	-0.20 ***	-0.07 ***	0.03 ***	-0.01
Texas A&M	-10 *	-0.28 ***	-0.20 ***	0.02 ***	-0.05 ***
Texas Tech	16	-0.09 †	-0.18 ***	-0.07 ***	0.03
UT-San Antonio	41	0.04	0.00	0.01	0.01
SMU	32 *	-0.11 *	0.03	-0.01	0.07
3rd Decile or Lower Feeder					
UT-Austin	125 ***	-0.07 ***	-0.04 **	0.01	0.05 ***
Texas A&M	47 ***	-0.15 ***	-0.14 ***	0.00	-0.04 ***
Texas Tech	28	-0.24 ***	-0.33 ***	-0.06 **	0.03
UT-San Antonio	62 *	-0.02	-0.15 **	0.15 ***	0.00
SMU	88 ***	-0.08	0.06	0.02	0.12 *
3rd Decile or Lower Affluent					
UT-Austin	82 ***	-0.27 ***	-0.16 ***	0.04 ***	-0.04 **
Texas A&M	11 **	-0.32 ***	-0.26 ***	0.03 ***	-0.10 ***
Texas Tech	-16	-0.34 ***	-0.41 ***	-0.04 *	-0.03
UT-San Antonio	17	-0.27 ***	-0.19 ***	0.08 ***	0.00
SMU	34 **	-0.21 ***	-0.08	0.01	0.06
3rd Decile or Lower Average					
UT-Austin	55 ***	-0.44 ***	-0.27 ***	0.08 ***	-0.14 ***
Texas A&M	-33 ***	-0.47 ***	-0.36 ***	0.06 ***	-0.14 ***
Texas Tech	-44 *	-0.45 ***	-0.44 ***	-0.02	-0.06 †
UT-San Antonio	-24	-0.46 ***	-0.31 ***	0.13 ***	-0.01 †
SMU	-2	-0.47 ***	-0.25 ***	0.04	-0.06

Source: Texas Higher Education Project (THEOP) administrative data.
Note: ***: p<0.001, **: p<0.01, *: p<0.05, †: p<0.10

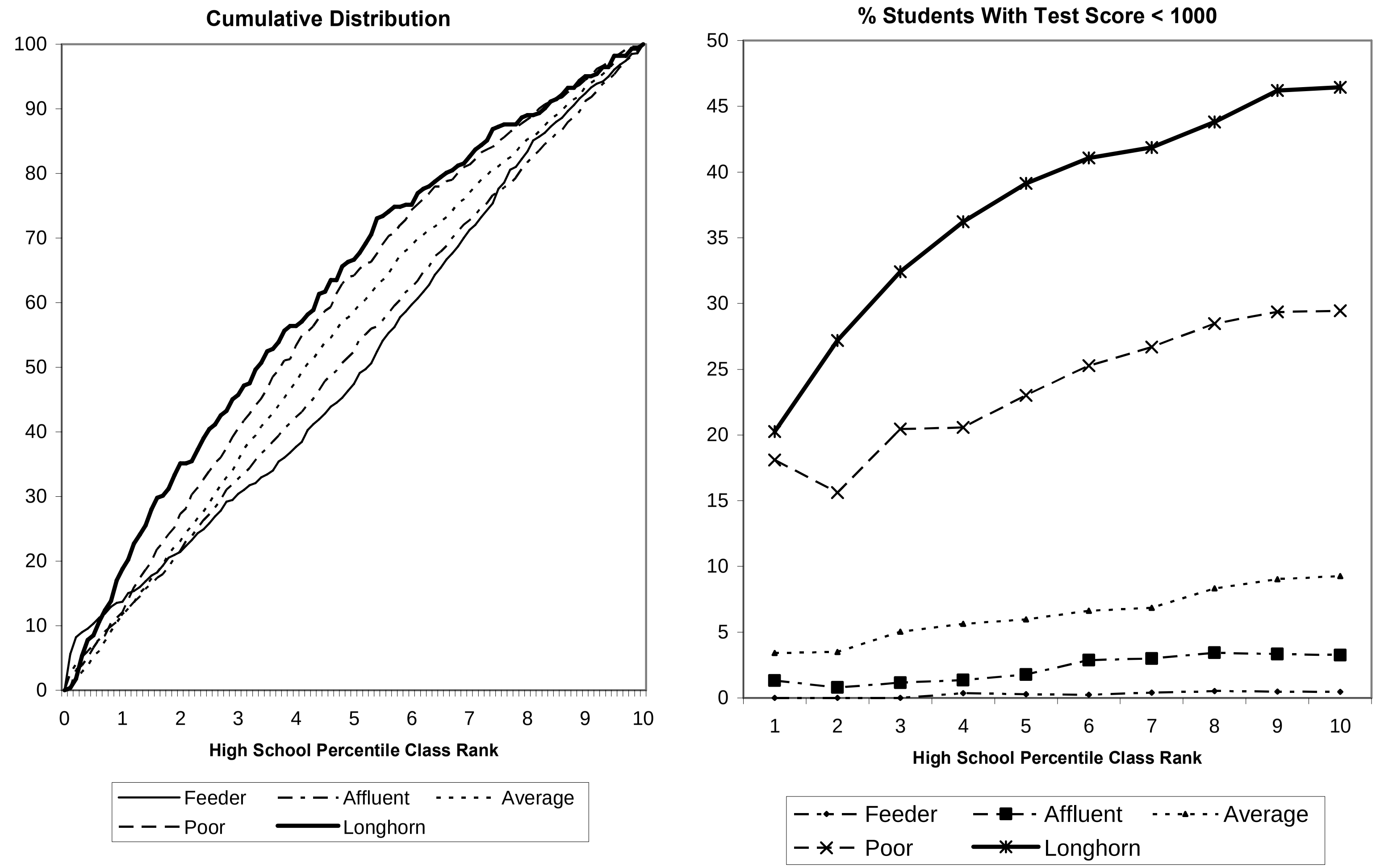
Figure 1. Percent Enrollees With Test Score less than 1000 by High School Economic Strata and Class Rank

UT-Austin Enrollees, 1990-2003



Source: Texas Higher Education Project (THEOP) administrative data.

Figure 2. UT-Austin Top Decile Enrollees in 2003: Distributions by High School Economic Status



Source: Texas Higher Education Project (THEOP) administrative data.

Table 6. Number of Top 10% Enrollees at UT-Austin, 2003

	Top decile students	Test Score Less than 1000		Top 9th and 10th percentile class rank	
	N	**N**	**%**	**N**	**%**
Feeder	658	3	0.5	109	16.6
Affluent	1385	45	3.3	253	18.3
Average	1186	110	9.3	174	14.7
Poor	472	139	29.5	55	11.7
Longhorn	282	131	46.5	31	11.0
Total	*3983*	*428*	*10.8*	*622*	*15.6*

Source: Texas Higher Education Project (THEOP) administrative data.

Table 7. Academic Performance of UT-Austin Enrollees with Testscore ≥1000 Relative to Top Decile Longhorn School Students with Testscore <1000

(Coefficients from regressions, Marginal Effects from probit models)

	Test score	Testscore Advantage	Freshman Year CGPA	4 Year CGPA	Freshman Year Attrition	Graduated in 4 Years
2nd Decile Feeder	1245	344 ***	0.58 ***	0.52 ***	-0.07 ***	0.34 ***
2nd Decile Affluent	1190	289 ***	0.25 ***	0.31 ***	-0.03 ***	0.22 ***
2nd Decile Average	1169	268 ***	0.03	0.18 ***	0.00	0.12 ***
3rd Decile or Lower Feeder	1202	301 ***	0.15 ***	0.20 ***	-0.02 †	0.19 ***
3rd Decile or Lower Affluent	1173	272 ***	-0.05 *	0.10 **	0.01	0.09 **
3rd Decile or Lower Average	1166	265 ***	-0.21 ***	0.00	0.05 ***	-0.03

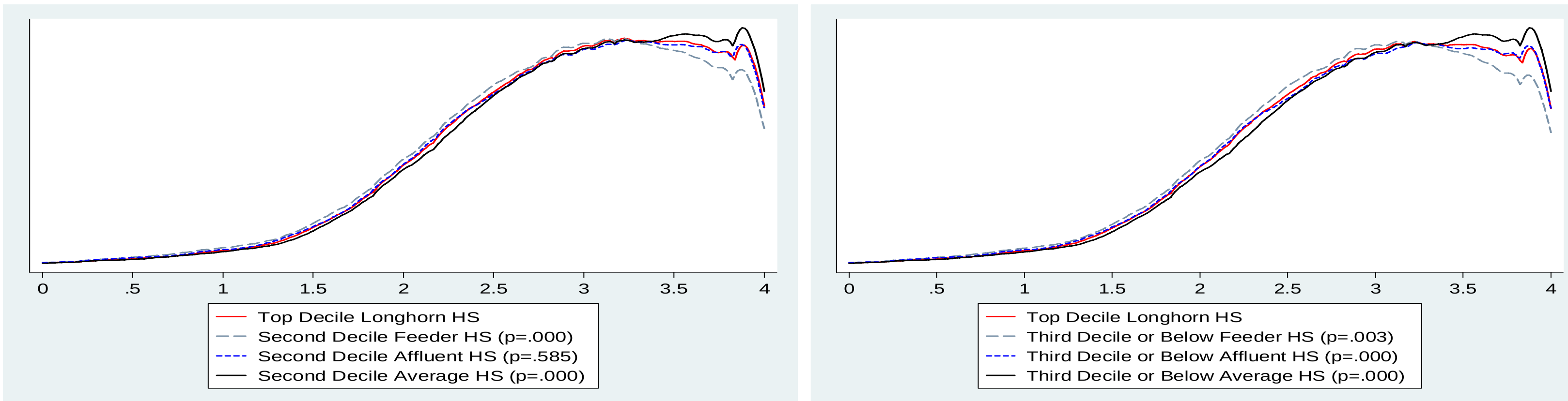
Source: Texas Higher Education Project (THEOP) administrative data.

Note: ***: $p<0.001$, **: $p<0.01$, *: $p<0.05$, †: $p<0.10$

Figure 4. Kernel Density Estimation for Groups Defined by High School Class Rank, High School Economic Status, UT-Austin Enrollees in 2000

Statistics of Kolmogorov-Smirnov test for equality of distribution functions are in parentheses,
Reference group is top decile Longhorn school students

Freshman Year Cumulative GPA



4th Year Cumulative GPA

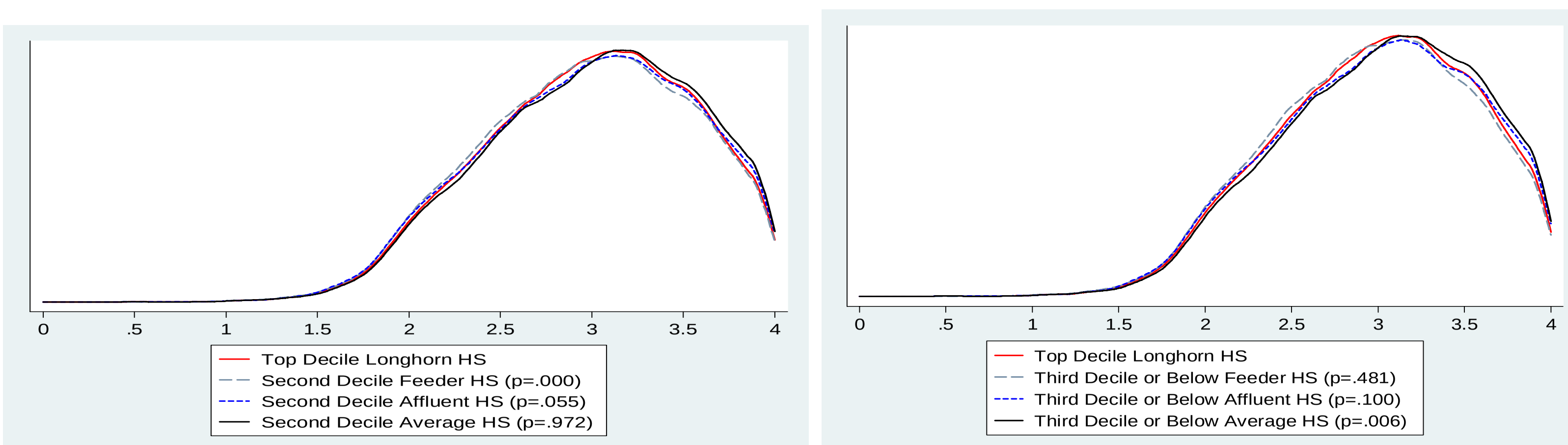
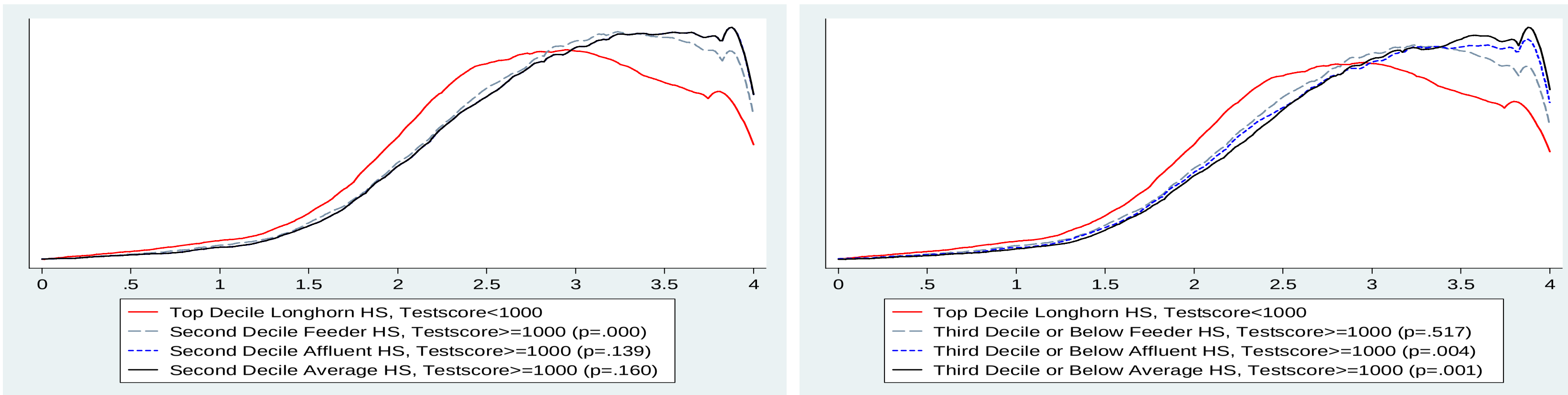


Figure 4. Kernel Density Estimation for Groups Defined by High School Class Rank, High School Economic Status and Test Score, UT-Austin Enrollees in 2000

Statistics of Kolmogorov-Smirnov test for equality of distribution functions are in parentheses,
Reference group is top decile Longhorn school students with test score less than 1000 points

Freshman Year Cumulative GPA



4th Year Cumulative GPA