Policy Transparency and College Enrollment: Did the Texas Top 10% Law Broaden Access to the Public Flagships?

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Abstract

By guaranteeing college admission to all students who graduate in the top 10% of their high school class, H.B. 588 replaced an opaque *de facto* practice of admitting nearly all top 10% graduates with a transparent *de jure* policy that required public institutions to admit all applicants eligible for the guarantee. The transparency of the new admission regime sent a clear message to students attending high schools that previously sent few students to the University of Texas at Austin and Texas A&M University. Using 18 years of administrative data to examine sending patterns, we find a sizeable decrease in the concentration of flagship enrollees originating from select feeder schools and growing shares of enrollees originating from high schools located in rural areas, small towns, and midsize cities, as well as schools with concentrations of poor and minority students. We also find substantial year-to-year persistence in sending behavior once a campus becomes a sending school, and this persistence increased after the top-10% policy was implemented.

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1. Introduction

In justifying H.B.588, the bill's chief architect, the late Irma Rangel, emphasized that public institutions should be available to all Texas residents, irrespective of socioeconomic circumstances, ethnic group membership, or geographic location (Giovanola, 2005). Yet, with few exceptions (Montejano, 2001; Saenz, 2007; UT-OAR, 2008), attention to the socioeconomic and geographic consequences of the law has been limited. Because the top 10% law was implemented in response to the judicial ban on affirmative action, most evaluations of the uniform admission law have focused on its effectiveness in restoring campus ethno-racial diversity, particularly at the public flagships (see, for example, Horn and Flores, 2003; Kain and O'Brien, 2003; Niu, et al., 2006; Long and Tienda, 2008a; 2008b; Niu and Tienda, 2008; Tienda and Niu, 2006a).

Both because the law is allegedly race neutral (but see Forest, 2002; Tienda and Niu, 2006a) and because it grants college access by rewarding academic achievement (class rank), the top 10% admission regime was initially applauded as a viable alternative to affirmative action. Bi-partisan support for the law has eroded since its enactment (Hughes and Tresaugue, 2007; Monastersky, 2007; Tienda and Sullivan, 2009). That students eligible for automatic admission were qualified on a *school-specific* basis is a key provision behind growing opposition to the law. Given large economic inequities and racial segregation of Texas public schools, this provision is the linchpin for broadening geographic, socioeconomic and ethno-racial diversity as Rangel envisioned. Perceptions that high-achieving students from low-performing schools gain access

to the public flagships at the expense of lower ranked students who graduate from high-performing schools foment resentment from parents who presume their students are being crowded out by less meritorious applicants (Niu and Tienda, 2008; Tienda and Niu, 2006b).[1] As growing numbers of students from affluent suburban districts that have historically been major feeders to the public flagships are denied admission, calls to repeal the law during the 81st legislative session have resurfaced (University of Texas, 2008; Root, 2009; Jaschik 2009).

Most academic research about the top 10% law shows only modest increases in minority representation at the public flagships (Kain and O'Brien, 2003; Forest, 2002; Long and Tienda, 2008a), but there is emergent evidence that the policy changed students' application behavior in ways that depend both on their class rank and type of high school attended (Long and Tienda, 2008b; Koffman and Tienda, 2008). For example, the increasing number of applications to the University of Texas at Austin (UT) from students who graduated in the top-10% of their high school classes increased the shares of the freshman class automatically admitted from 41 to 81 percent between 1997 and 2008 (Schevitz, 2008; University of Texas, 2008). Moreover, high school sending patterns also appear to have changed. Between 1992 and 2002, the number of high schools that sent one or more applicants to the University of Texas at Austin (UT) rose from 678 to 798; at Texas A&M University (TAMU), the comparable increase was from 819 to 925 schools.[2]

These stylized facts provide some evidence that the uniform admission policy broadened geographic access to the two public flagships, a conclusion also consistent with Montejano's

[1] For anecdotal evidence, see the 60 Minutes episode, "Is The 'Top 10' Plan Unfair?", which aired in October 2004.
[2] These estimates are based on tabulations from the THEOP administrative files. Similar patterns obtain for admittee and enrollee pools, except that the absolute numbers are smaller. Over the same period, the number of Texas high schools represented among admittees increased from 635 to 773 at UT, and from 787 to 900 at TAMU. Among enrollees at UT, 547 and 679 high schools were represented in 1992 and 2002, respectively. At TAMU, the enrollee pools in 1992 and 2002 represented 690 and 823 schools, respectively.

(2001) claim that the initial impact of the new admission regime was geographic. Three years after the top 10% policy was in place, Montejano observed an emergent sending pattern involving new high schools that previously had sent few if any students to the University of Texas at Austin (UT). These students hailed from districts that largely served urban minority communities, such as inner city Houston, and poor white communities in northeast and west Texas. Montejano interpreted these incipient trends as evidence that the new admission regime supported one of Rangel's goals of reaching a broader geographic spectrum of the State's residents. More recent data indicate that the trend toward increased representation of high school campuses has continued. In 2007 UT admitted students from over 900 different high schools across the state, up from 674 high schools in 1996, the year before the uniform admission regime was implemented (Saenz, 2007).[3]

Although these changes seem to imply broadened access, it is also conceivable that these increases simply reflect growth in the total number of high schools in Texas. The State's school-age population has been growing much faster than the national average (WICHE, 2008), prompting the opening of new high schools.

Moreover, sending a single enrollee is a weak criterion for measuring a high school's "access" to the flagships. Whether growth in the number of high schools represented among UT and TAMU enrollees truly represents broadened access to "all Texas residents," as Rangel envisioned, also depends on the school's application and enrollment rates. Traditionally, the vast majority of high schools sent none or a handful of enrollees to the flagships, while a few high schools sent very large numbers of students. Tienda and Niu (2006b) distinguish between "sending" schools (those that send one or more applicants) and "feeder" schools (the top-twenty

[3] Forest (2002) examines the impact of using geographic criteria to diversify TAMU, but his data are only for 1998, the first year the law took effect, and rely only on TEA data, which lack information about actual grades, class rank, or student test scores.

high schools based on the number of students admitted to UT and to TAMU as of 2000). Because of substantial overlap in the college destinations of their graduates, these schools represented only 28 unique secondary campuses out of over 1500 statewide. These feeder schools, which are all affluent and mostly located in suburban areas, account for a disproportionate share of enrollment at both public flagships. For example, in 2000 the 28 feeder schools accounted for about 15 and 23 percent of freshman enrollment at TAMU and UT, respectively. Saenz (2007) reports a similar concentration of feeding patterns to UT. He shows that half of UT's 1996 freshman class came from 59 high schools; by 2006, however, half of UT's enrollment came from 104 high schools (Saenz, 2007). The top feeder schools seize on strategic resources, such as well-placed alumni networks, strong counseling offices, and well educated parents, to maintain close relationships with the State's flagship institutions. Thus, we evaluate changes in both the share of high schools sending any students to the flagships as well as changes in the high schools' application and enrollment rates.

These shifts in sending patterns put into context the current controversy about the fairness of the uniform admission law. Specifically, legislators from sparsely settled rural districts allege that the provisions of the law that guarantee admission to rank-eligible graduates "reserves" slots for them that would not be available otherwise; detractors emphasize that students from rural high schools represent less than two percent of total enrollment (see Hughes and Tresaugue, 2007; Monastersky, 2007).[4] These legislative debates about whether the uniform admission law broadened geographic diversity at the public flagships by changing the sending patterns of applicant and enrollment pools show no signs of abating. UT, in particular, has been

[4] Historically, TAMU has drawn from more rural populations compared with UT partly because of its land grant mission, and partly because of its location outside of a major city.

at the center of most controversy about the law as it becomes increasingly saturated with top 10% admits (Paredes, 2006; Tienda and Sullivan, 2009; University of Texas, 2008).

Evaluating competing claims about increased geographic access based on changes in high school sending patterns is crucial, especially in anticipation of the next round of legislative debate about the future of the uniform admission policy (University of Texas, 2008; Root 2009; Jaschik, 2009).[5] Accordingly, we use administrative data from UT and TAMU, the two public flagship institutions, to investigate whether and in what ways the top 10% law modified established high school feeder patterns. Specifically, we first ask whether the share of high schools sending applicants and enrollees has increased and whether the concentration of applicants and enrollees from particular high schools has decreased. Second we ask to what extent applicant and enrollment sending patterns are (1) more expansive geographically; (2) more diverse along socioeconomic lines; and (3) from more diverse high schools under the top 10% admission regime compared with the pre-*Hopwood* period. Third, using a hazard model, we evaluate the extent to which high school campuses continue sending students in subsequent years after becoming a sending school, and how this persistence has changed after the introduction of the top-10% law. Our results have important policy implications beyond the State of Texas because other states (e.g., Michigan) have begun consideration of a percent plan (Fraser, 2008) and because many states are seeking alternatives to diversify their student bodies along many dimensions, including geographic.

The remainder of this paper proceeds as follows. Section 2 reviews prior studies about high school feeding patterns and college destinations, followed by a brief description of the data

[5] For the second consecutive legislative session, in 2007 the Texas legislature considered and scuttled a bill to cap the number of students granted automatic admission at 50 percent, which is comparable to the share of top 10% graduates in 1996, in order to maintain institutional flexibility in shaping their high freshmen classes. The top 10% law will likely be re-debated in 2009, when the Texas legislature reconvenes. The State legislature meets in odd numbered years, except when special sessions are called.

in Section 3. Sections 4 and 5 present both methods and answers to the first and second questions about the nature and magnitudes of changes in feeding and sending patterns to UT and TAMU. In Section 5, which addresses the third question, we present the hazard model results. In the conclusion, we discuss the policy implications for these results, and stress the importance of transparency as a key feature of the top-10% law.

2. Background

A vast literature in sociology and economics shows a strong positive association between students' socioeconomic background and postsecondary outcomes, including enrollment persistence and completion. Comparatively fewer studies examine variation in high school characteristics and post-secondary outcomes, but several recent studies based on Texas are noteworthy exceptions. For example, Niu and associates (2006) demonstrate that graduates from affluent suburban high schools are more likely, and those from schools with large shares of economically disadvantaged students are less likely, to seek admission to selective colleges compared with their statistical counterparts who graduate from typical Texas high schools. Furthermore, these differences in institutional preferences persist among students eligible for automatic admission to any Texas public university of choice. As a partial explanation, Niu, Sullivan, and Tienda (2008) explain that rank-eligible minority students are less likely to know about the provisions of the law than their nonminority counterparts, which results in a potential loss of talented applicants. In addition, high schools differ appreciably in their college going traditions, which is an important context for cultivating postsecondary aspirations (Niu and Tienda, 2008).

Claims that, in addition to individual and family characteristics, attributes of schools also contribute independently to educational outcomes dates back to the controversial 1966 *Coleman Report* (Coleman, 1990), which documented huge inequities in the resources available in minority dominated schools. Although Coleman argued that economically disadvantaged minority students benefitted educationally from attending integrated schools and classrooms, his research was criticized for minimizing the influence of schools on educational outcomes.[6] His subsequent work comparing public and private high schools showed that Catholic schools, although less generously funded than most private schools, were more effective than better-endowed schools on a range of educational metrics (Coleman and Hoffer, 1987; Coleman, Hoffer and Kilgore, 1982).

Since Coleman's pioneering work, relatively few researchers have succeeded in detecting "school effects" on educational outcomes, despite formidable methodological and computational innovations. Two recent studies based on Texas are relevant exceptions. Frost (2007), who uses multi-level modeling to examine whether the socioeconomic and ethno-racial mix of Texas high schools is associated with students' expectations to graduate from a four-year college, finds that both school socioeconomic level and achievement composition influence students' college expectations. Niu and Tienda (2008) evaluate variation in college choice sets among a representative sample of Texas high school seniors. They too find that type of high school attended is far more decisive in shaping college choices than students' academic achievement. Both studies highlight the importance of evaluating whether the top 10% law increased representation at the public flagships from schools populated by low-income and minority students.

[6] Despite polarized scholarly debate about Coleman's research about school inequality, a more balanced interpretation of his findings is that, compared with family socioeconomic background, school attributes exert smaller influences on educational outcomes.

The limited body of research about high school sending patterns indicates that well-developed social networks and access to academic resources are decisive in cultivating high post-secondary aspirations, including admission to the most competitive institutions (Frost, 2007). Established alumni loyalties and parents' institutional affiliations further reinforce feeder patterns across generations by bolstering children's college choices based on their parents' legacy status. Wolniak and Engberg (2007) note that high school feeder patterns to colleges embody long-standing regional and community loyalties that have lasting consequences for an institution's socio-economic and geographic diversity inasmuch as they become self-perpetuating. For example, Perna and Titus (2005) show that some high schools are better at nurturing feeder legacies that can be leveraged effectively for the benefit of future cohorts of graduates. Wolniak and Engberg (2007) find that networks between high schools and colleges can strongly influence students' college aspirations, and hence application and enrollment decisions. Thus, entrenched high school feeder patterns can thus qualify as a "bounding" social influence on college decision-making (McDonough, 1997; Niu and Tienda, 2008).

Established high school feeder patterns also can privilege students from higher socio-economic backgrounds in ways that simultaneously disadvantage students from lower socio-economic and underrepresented populations. For example, Martin, Karabel, and Jaquez (2005) examined admission patterns of high schools with long traditions sending students to the University of California system. As appears to be the case in Texas, they find that a small group of high schools accounted for a disproportionate number of students at the premier UC campuses and these feeder high schools largely enroll affluent white and Asian students. High schools that serve low-income or predominantly minority students send proportionately and numerically fewer applicants and enrollees to the UC campuses. Their findings are consistent with those of

Wolniak and Engberg (2007), who argue that higher education institutions should seek to broaden sending networks from districts whose students are underrepresented on their campuses. This concurs with Rangel's vision of broadening access to Texas public universities to all segments of the State's population.

Social class barriers to college access, whether real or self-imposed due to poor understanding of entry requirements and financial aid opportunities, also restrict geographic and economic diversity at selective institutions (Bowen, Kurzweil and Tobin, 2005; Koffman and Tienda, 2008; Niu, et al., 2008). For example, Astin and Oseguera (2004) find that students from the wealthiest families are overrepresented by a two to one margin relative to peers from the poorest families at selective institutions, and that this socioeconomic enrollment gap has grown over time..

Given the entrenched nature of high school feeder patterns, meaningful changes are likely to evolve slowly. Yet, there is suggestive evidence that the top 10% law altered the sending patterns to the public flagships not only by redistributing the applicant pool among public institutions, but also by explicitly allowing rank-eligible students to select their preferred campus (Long and Tienda, 2008b). Because students are qualified for the admission guarantee on a school-specific basis, eligibility is more transparent than the UC system, where qualification is determined on a statewide basis using a multi-dimensional academic index. In Texas, students need only know their class rank, and school administrators and college counselors need to encourage their top performing students to submit applications—a requirement that often is conducted as part of senior English classes. Thus, the transparency of the admission guarantee for rank-eligible graduates potentially can weaken the social networks that perpetuate the entrenched feeder patterns and consequently broaden geographic diversity, as well as potentially

socioeconomic diversity.[7] In the remainder of the paper we investigate whether and how high school sending patterns of applicants and enrollees to the public flagships changed in response to a more transparent admission policy.

3. Data

The University of Texas administrative data for our research comes from two sources. One consists of individual-level applicant data for the years 1990 to 2003 that have been compiled by the Texas Higher Education Opportunity Project (THEOP, www.theop.princeton.edu). We have collapsed these data to the high school level and focus on the number of students attending regular Texas public high schools that apply to and enroll at UT during the observation period.[8] The second source is publicly available data from the UT-Austin Office of Admissions Research (OAR) for the years 1996 to 2007. These data contain high-school level information on the number of applicants and enrollees for Texas public high schools that sent one or more enrollees to UT. Because these data lack information on the universe of high schools that sent applications to UT, we use this dataset only to evaluate changes in enrollment. For the overlapping years 1996 to 2003, the THEOP and OAR data contain nearly identical numbers of enrollees per high school. Thus, we only use the OAR data for the years 2004 to 2007. The Texas A&M administrative data is individual-level applicant data for the years 1992 to 2002 compiled by THEOP.

[7] As several papers have demonstrated, an admission guarantee does not ensure enrollment for low–income students, hence knowledge of and receipt of adequate financial aid packages is necessary as well (see Niu, et al., 2008).
[8] We exclude alternative high schools and private high schools for different reasons. Alternative high schools have very low college sending programs, as many focus on behavioral problems and vocational programs. The CCD data lack information about private schools, therefore we cannot append comparable attributes for our comparisons. Only one private high school is included in the top 28 feeder schools identified by Tienda and Niu (2006b).

These datasets have been merged with the U.S. Department of Education's Common Core of Data (CCD), which provides information about several high school attributes of interest on a time-varying basis, including location, enrollment, racial composition, and share of students receiving free- or reduced price lunch. The analysis sample excludes private and alternative high schools, as well as public high schools that lacked a senior class, which is the year college applications are submitted.[9] After exclusion restrictions, the analyses universe includes 1,379 unique campuses for the observation period. Because the most recent CCD data correspond to the 2005-06 school year, we replicate CCD data for the last school year available and merge it with the 2007 OAR data. Implicitly, this assumes that the composition and characteristics of high schools did not change between these two years.

The CCD identifies the "urbanicity" of high schools in eight categories. We reduce this categorization into four types:

- "Urban" = Within the city limits of the principal city of a large urban area (Austin, Corpus Christi, Dallas-Fort Worth-Arlington, El Paso, Houston, or San Antonio).
- "Suburban" = Within the urban area of these large cities, but not within the city limits.
- "Rural" = Rural area outside of a Metro or Micropolitan Statistical Area.
- "Town or Midsize City" = Any area not otherwise captured above, including midsize cities and towns.

We further re-categorize any high school that lies within a 20-mile radius of the center of the large cities as "Suburban". Thus "Rural" and "Town or Midsize City" only consists of areas outside those radii and outside of these large cities' Metropolitan Statistical Areas. Given its

[9] Not all public high schools include senior classes; some are separated according to class standing, with one notable large school that only includes seniors.

rapid population growth during the observation period, the "Town or Midsize City" category is of particular interest because it likely includes many new schools.

4. Findings: Has High Schools' Application and Enrollment Patterns Changed?

As presaged by Montejano's (2001) early assessment, Figure 1 shows that the share of public Texas high schools sending applicants and enrollees to UT increased over time. The share sending at least one applicant to UT remained stable between 1992 and 1996, a period when affirmative action was permitted, but plummeted in 1997, when the *Hopwood* decision went into effect. The chilling effect of the *Hopwood* decision on applications proved temporary, however. In 1998, the first year the top 10% law was in force, the share of high schools sending applications rebounded and remained above the pre-*Hopwood* level until 2001, when the share of sending schools spiked upwards again. Enrollment trends followed suit, except that the share of public high schools represented is 8 to 10 percentage points lower, on average, than the share sending applications, and the annual fluctuations are less pronounced.

Figure 1 About Here

Unlike at UT, there is no evidence of increased access at TAMU, where the share of high schools represented among applicants rose under affirmative action, sharply fell in 1997 when it was banned, and then stabilized following a modest rebound in 1998. The share of high schools represented in the applicant pool did not return to the pre-*Hopwood* peak, much less exceed it as occurred for UT's applicant pool. Furthermore, the share of high schools represented among enrollees to TAMU increased gradually, with little evidence of any spike after the uniform admission policy was implemented.

Gini indexes permit a more definitive assessment of whether the applicants and enrollee sending pattern became less concentrated.[10] These results, shown in Figure 2, reveal clear evidence of reduced concentration of enrollees at UT under the top 10% policy.[11] Between 1990 and 1997, application and enrollment to UT became more concentrated at particular high schools, which squares with earlier claims that a handful of high schools sent disproportionately large numbers of graduates to UT (Montejano, 2001; Tienda and Niu, 2006b; Saenz, 2007). After the top-10% policy was enacted, the trend toward increased concentration of applicants from a relatively few high schools halted, evident in the lower enrollment Gini ratio between 2000 and 2007. The steep fall in 2002 reflects the rescission of a temporary increase in the size of the undergraduate class in 2000 that proved unsustainable because it exceeded the carrying capacity of the university (Tienda and Sullivan, 2009).

Figure 2 about Here

For TAMU, which drew upon a larger number of sending high school before the top 10% law, there is no evidence reduced concentration of high school feeding patterns. Instead, the College Station campus witnessed increased concentration of applications after 1997. Furthermore, the high school concentration of enrollment spiked sharply during the first year of the top-10% law (1998) and then fell steadily, converging to the 1997 level. Given the shorter observation period for TAMU, it is not clear whether the decline after 1998 is a reaction to the top-10% law.

[10] Gini indexes range from zero to one. A value of zero indicates perfect equality of high schools in terms of their enrollment (or admittees or enrollees). A value of one would indicate that all of the state's enrollment (or admittees or enrollees) are located in a single high school.

[11] The UT-Applicant time-series only extends through 2003; because the OAR data only includes high schools that sent at least one enrollee to UT, therefore it cannot be used to compute Gini indexes for applicants after 2003. For all subsequent analysis beginning with Figure 2, high schools are weighted by their 12th grade enrollment.

It is also worth noting that the top-10% law has created a greater admission squeeze on UT than on TAMU (Tienda and Sullivan, 2009). The share of admitted UT students who were in the top-10% of a Texas high school ranged from 41 to 54% between 1998 and 2002, surged to 70% in 2003 and reached 81% in 2008 (Schevitz, 2008; University of Texas, 2008). At TAMU, the share of admitted students who graduated in the top-10% of their Texas high school class rose from 42% to 47% between 1997 and 2002 (THEOP data) and has since receded back to 44% by 2007 (THECB, 2009). UT's growing enrollment saturation with top-10% students, coupled with less concentrated sending patterns suggests that the characteristics of high schools sending enrollees to UT likely changed. Specifically, we consider whether the sending schools are more diverse in their geographic, ethno-racial composition and socioeconomic characteristics.. In the interest of parsimony, we focus on enrollees but the patterns are quite similar for applicants.[12]

5. Findings: Has the Characteristics of Sending Schools Changed?

Representation by High School's Urbanicity

Because of unsubstantiated claims that the top 10% law has increased access to students from sparsely populated regions of the state, we first consider whether feeding patterns have changed by level of urbanization. To address this question, we compute the shares of UT's enrollees originating from urban, suburban, rural, and other midsize cities or towns as well as the shares of total 12th grade enrollment coming from each area. The ratio of each area's share of UT enrollees and its share of 12th graders indicates over/under-representation by level of urbanicity. A ratio greater than one indicates over-representation for that category.

[12] These results are available from author on request. Because TAMU did not witness appreciable deconcentration in sending patterns or saturation with applicants whose admission was guaranteed, we do not included TAMU in these analyses.

Figure 3 shows that suburban and urban high school students have been overrepresented among enrollees in all years, but especially those from suburban areas. The degree of suburban overrepresentation among enrollees increased steadily between 1990 and 1997, and then fell gradually, but continuously between 1997 and 2007. By contrast, graduates from rural areas and small- and mid-sized cities were severely underrepresented during the first half of the 1990s, and their underrepresentation modestly worsened by 1997. Under the top-10% admission regime, the underrepresentation of these students improved gradually, especially for graduates from rural high schools. By contrast, the *Hopwood* decision and the top-10% law appears to have lowered access for students from urban high schools, whose relative overrepresentation declined steadily from 1991 to 2007. Thus, the top10% law appears to have effected a shift in UT's enrollment representation away from suburban students toward those from rural and small- and mid-sized cities, precisely as proponents (and critics) have suggested.

Figure 3 About Here

Representation by High School's Poverty

To address whether the deconcentration of UT's sending involved greater numbers of students who attended low-income schools with large minority populations, as envisioned by the architects of the top 10% law, we replicate these analyses for several high school strata. We first divide high schools by the percentage of their students receiving free- or reduced price lunch (FRPL), which serves as a proxy for student poverty. We average the high school's percentage of FRPL students over the period 1990 to 2006, and classify them into four tiers: <20%, 20-40%, 40-60%, and >60%. We repeat this procedure using the share of the high school's students who were black, Hispanic, or Native American.

Figure 4 reports trends in over- and underrepresentation of high schools according to their share of low-income students. Throughout the period students from low-poverty high schools are overrepresented among UT enrollees and students from high schools with more then 20% of their students receiving free- or reduced price lunch are underrepresented. Yet after 1998, the overrepresentation of students from low-poverty high schools began a downward trend, as the share of UT enrollment from the highest poverty schools inched upward. More impressive is the growing representation of students from schools where 40 to 60% of students were on free or reduced lunches.[13] Thus, there is further evidence that the top 10% law broadened access to students attending less affluent schools.

Figure 4 About Here

Representation by High School's Minority Student Share

As demonstrated by many studies, white students enjoyed disproportionate representation at the state's top public flagship. Figure 5 shows that high schools with less than 40% of their students from members of underrepresented minority groups (black, Hispanic, or Native American) are overrepresented among enrollees at UT, while students from high schools with more than 60% of their student body consisting of minority groups (URMs) were underrepresented throughout the period. Between 1990 and 1997, the lowest-URM schools increased their enrollment overrepresentation at UT, but this trend reversed after with the introduction of the top-10% law. By contrast, the highest-URM schools gained representation among freshman enrollees, but particularly after 2002. The rapid convergence in representation

[13] We find a greater increase in representation of high poverty schools among enrollees than among applicants (through 2003). One plausible explanation is the efficacy of the Longhorn Opportunity Scholarships in permitting rank-eligible students from schools with historically low representation at UT to enroll. The Longhorn Opportunity program is targeted to urban public schools with high concentrations of low income students and low college-going traditions (Domina, 2007). The program involves targeted outreach to the designated schools, which simultaneously raises awareness of the admission guarantee and the prospects of a tuition subsidy. An additional interpretation is that the top-10% plan continued to crowd out students from affluent high schools who did not qualify for automatic admission (Niu and Tienda, 2008).

between high- and low-URM schools in 2003 reflects the sudden contraction in total undergraduate enrollment following a temporary expansion between 2000 and 2002.

Figure 5 About Here

Representation by High School's Region

To further consider the geographic dimensions of less concentrated sending patterns, we examine changes in the regional composition of UT enrollment. It is conceivable that the top-10% law might have its biggest effect in changing the application and enrollment behavior of students at high schools from regions of Texas that are distant from the capital because these schools likely had less consistent sending patterns to UT. Therefore, we first classify high schools into 13 regions, defined by the Texas Comptroller and then collapse the categories into five.[14] Figure 6 displays the degree of representation for the five following regions: Alamo (including San Antonio), Capital (including Austin), Gulf Coast (including Houston), Metroplex (including Dallas), and the other nine regions combined. For simplicity of exposition, we use a different metric for comparisons – namely the difference (rather than the ratio) between share of UT enrollment and share of 12th grade enrollment for each group of high schools.

Figure 6 About Here

Representation by High School's Region

In 1990, the Capital and Gulf Coast regions were greatly over-represented among UT enrollees, which partly reflects the historical feeding patterns facilitated by geographic proximity to the flagship institution. Students from the Alamo and Metroplex regions had enrollment at UT comparable to their 12th grade enrollment, and the other nine regions were underrepresented at the Austin campus. For perspective, in 1990, the share of UT enrollment coming from the Capital region in 1990 was three times as large the region's share of 12th grade enrollment.

[14] http://www.window.state.tx.us/ecodata/regional/regions.html.

The overrepresentation of schools from the Capital and Gulf Coast regions rose through 1996 and has since fallen steadily. Representation of schools from the Metroplex region hovered around parity over the period, dipping slightly after 2000, but recovering their relative enrollment share after 2003. Representation of Alamo region schools among UT enrollees remained at par throughout the period. As the Capital and Gulf Coast region schools were gaining representation during the early 1990s, the other nine regions lost representation. Collectively these regions contributed only 19% of UT enrollment in 1996 despite yielding 42% of Texas' high school graduates in 1996. The tides turned in 1997, and when students from these regions continued to increase their shares on the UT campus.

Collectively, these results consistently show increased access to UT from high schools that traditionally have had low representation, namely those serving students from rural, mid-size cities, and regions of the state that previously produced fewer enrollees. Also, students from schools serving underrepresented minorities and low-income students also increased their shares of UT enrollment after 1997. The widening of access appears to have accelerated in 2003, coincident with the second surge of UT enrollees eligible for automatic admission under the top-10% law, and the reduction in total enrollment. For the most part, these gains were reversals of pre-H.B. 588 trends, and in alignment with the intent of the law.

Change in Share Enrolling at UT as a Function of High School Characteristics

Because low income and minority-dominated schools are disproportionately located in large urban districts, we evaluate the changes in a regression framework both to assess whether the observed trends are statistically significant and to determine which school characteristics are the most salient when considered jointly. The dependent variable for this analysis is the change in the share of the high school's graduates enrolling in UT between 1996 and 2007. We restrict

the analysis to high schools in existence in both years. Given that the prior figures show pre-policy trends favoring students from suburban schools, low-poverty schools, low-minority, and schools in the Capital and Gulf Coast regions, the regression results are conservative estimates of the effect of *Hopwood* and the top-10% law on high school representation. The results are shown in Table 1.

Table 1 About Here

Column (1) reveals a significant decline in the share of students from urban high schools enrolling at UT (as reflected by the constant). Suburban schools' enrollment rate declined more than urban schools, but the difference was not significant. Conversely, the enrollment rates of students from rural schools and schools in small to mid-size cities significantly increased relative to urban schools. Column (2) shows a significant gain in enrollment of students from high-poverty schools, but a loss in enrollment from students attending schools with higher shares of URMs, *controlling for the high school's poverty*. Column (3) reveals a significant loss in enrollment share at Capital and Gulf Coast region schools (relative to schools in the Alamo region, as reflected by the constant). The enrollment rates of high schools in the other nine regions increased relative to the Alamo region, but the difference was not significant. The final analysis (shown in Column (4)) combines geographic, socioeconomic, and population composition attributes to determine whether the bivariate associations capture co-variation among school attributes. Most bivariate relationships shown in columns 1-3 persist, while some do not. Notably, controlling for other characteristics of the school, enrollment rates of students in suburban schools are rising relative to urban schools, and minority-dominated schools increased their relative share of enrollment at UT. There continues to be no evidence of schools in the "other" regions gaining representation relative to schools in the Alamo, Gulf Coast,

Metroplex, and Capital regions controlling for the schools different economic, demographic, and urbanicity attributes.

6. Findings: Has Persistence as a Sender School Changed?

Given that the top-10% policy appears to have broadened access to the University of Texas for high schools that traditionally sent fewer students to UT, particularly high-poverty and rural schools, we next consider how long a high school remains a sender of enrollees, conditional on becoming a sender. For this analysis, we have constructed a dataset of "sending spells" where each "spell" represents the duration of the time that the school remains a sender of enrollees to UT. We then evaluate what factors increase or decrease the "hazard" of the sending spell ending (i.e., the hazard that the high school sends zero enrollees to UT in a given year). The hazard analysis poses one major challenge: for a high school that sent enrollees to UT in 1990 (the first year of our data), we lack information about the number of "sending" years before 1990 (i.e., the data is "left-censored"). As a result, we conduct the hazard analysis both including and excluding the spells that begin in 1990.

Figure 7, which plots the Kaplan-Meier survival functions, shows that nearly half of all high schools that sent enrollees to UT in 1990 sent enrollees continuously through 2007. The survival sending rate falls more quickly for sending spells that began after 1990, such that within four years less than one-quarter of these spells remain. The higher hazard rate for spells that begin after 1990 is as expected; by definition, these spells originate from high schools that have less attachment to UT as sender schools.

Figure 7 About Here

We next estimate the hazard rate as a function of school characteristics using a Weibull distribution.[15] Results reported in Table 2 present coefficients in exponentiated form, where those less than one indicate factors that lower the hazard that the high school's spell will end, and coefficients larger than one identify factors that raise the hazard rate. Columns (1)-(3) include all spells, including those "beginning" in 1990. The first set of results show that spells end faster for schools with more poor students and schools in the Metroplex region; however the hazard rate is lower for larger enrollment schools, suburban schools, schools with more black, Hispanic, or Native American students, and those located in the Alamo, Capital, or Gulf Coast regions. Consistent with Figure 7, the hazard rate is lower for spells that "began" in 1990. Estimates in Column (2) include a dummy variable for 1997 (the year that the *Hopwood* decision began to be in force) and another dummy variable that indexes the years when both *Hopwood* and the top-10% law (H.B. 588) were in force (1998-2007). These results indicate that the hazard of the sending spell ending is significantly lower during the H.B. 588 period, which suggests that the top-10% law may have increased sending persistence. The interaction of the H.B. 588 period dummy with other control variables reveals that the higher persistence in sending patterns largely involves urban, high minority, and Gulf Coast high schools.

Table 2 About Here

To address left censoring, Columns (4)-(6) repeat these analysis using only spells that began after 1990. The results are virtually unchanged. One advantage of restricting the analysis in this way is that we can incorporate into the analysis the number of students who enrolled at UT from the prior year's graduates for each high school. Even controlling for the high school's 12th grade enrollment, having a higher number of students from the prior class enroll at UT

[15] Since we may have multiple spells from single high schools, we incorporated high school-level shared frailty into the model. The incorporation of this shared frailty is analogous to incorporating a random effect in an analysis of panel data.

lowers the hazard that the high school will send no enrollees in the current year. This result indicates that high schools with a strong feeding history significantly influence the enrollment behavior of subsequent cohorts of students. Combined with the finding that the top-10% law has reduced the hazard rate (and thereby increased sending persistence), our results suggest that the law's impact on sending patterns could magnify over time as the high school accumulates a sending history. Thus, to some extent, the decreasing concentration of enrollment at UT from particular high schools, which gained momentum beginning in 2003 (five years after the beginning of the top-10% law), could partly result from this dynamic cross-cohort relationship.

7. Conclusion

In this paper we sought to evaluate whether a state-level college admission policy that targets high schools and guarantees admission to a designated percentage of graduates can both weaken entrenched sending patterns and increase geographic and socioeconomic diversity. We find that the number and share of high schools represented among University of Texas applicants and enrollees rose areas after the introduction of the top-10% law, reversing a pre-policy trend towards more concentration. We find no evidence for similar effects at Texas A&M University. A second key finding is that the new policy increased the representation at UT-Austin of students from high-poverty schools, those with greater shares of minority students, those located in rural areas as well as and small- and mid-sized cities, and schools located in regions that traditionally were underrepresented at UT. Further, we show that the number of consecutive years that a high school sent enrollees to UT increased after the introduction of the top-10% law. Thus, schools that become new senders of enrollees to UT are likely to persist in sending enrollees for longer periods of time, potentially creating a historical legacy that will increase the likelihood of enrollment by future cohorts of students at these new sending schools. Our results suggest the

potential value of strengthening institutional linkages between new sending schools and public universities as a strategy to deepen college-going traditions in the new sending schools—actions that may become even more important in the future if the top 10% law is rescinded.

To some extent, our finding that the number of high schools represented among UT's applicant and enrollee pools increased under the top 10% regime compared to the pre-*Hopwood* era should be viewed as surprising. This is because even before the H.B. 588 became law, virtually all applicants who graduated in the top decile of their high school class were admitted to UT-Austin (Long and Tienda, 2008a). Presumably, many seniors ranked highly in their class failed to apply because of the opaqueness of UT's admissions policy; as is the case at most institutions, students have no way of knowing whether they qualify for admission or the likelihood of being admitted. This opaqueness would be acute for students at high schools with low sending rates to UT – a student at such a high school would not have the experience of seeing their older peers' application results. Thus, the apparent increases in access may be due, in part, to the rendering of an opaque *de facto* policy that admitted nearly all top 10% students to a transparent *de jure* policy that clearly stipulated the criteria for automatic admission. Not only did this change in admission policy influence the number of applicants to UT, but also diversified their geographic and socioeconomic origins, which is consistent with Irma Rangel's vision when crafting the law.

The consistency of the law's provisions guaranteeing access to all public universities -- that it applies a uniform merit criterion uniformly to all Texas high schools -- speaks to the transparency of the Texas admission regime and differentiates it from other percent plans (e.g., California and Florida) as well all the myriad variants of "full file review" currently used by public and private institutions.

Our results have broad implications for public policies where transparency may matter for broadening access to government services. For example, Currie's (2004) research shows that take-up rates of various programs, such as 401k plans and Medicare, rise when participants are automatically enrolled by their employer or through their participation in other social programs such as welfare. Additionally, program complexity and lack of information on the part of potential participants has been shown to lower participation in public programs such as welfare, Medicare, or the State Children's Health Insurance Program (Kleven and Kopczuk, 2008; Aizer, 2007; Bansak and Raphael, 2007), further suggesting that policy transparency (and simplicity) may raise participation rates.

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Figure 1:
Share of Texas Public High Schools
Sending at Least One Applicant / Enrollee to UT-Austin or Texas A&M

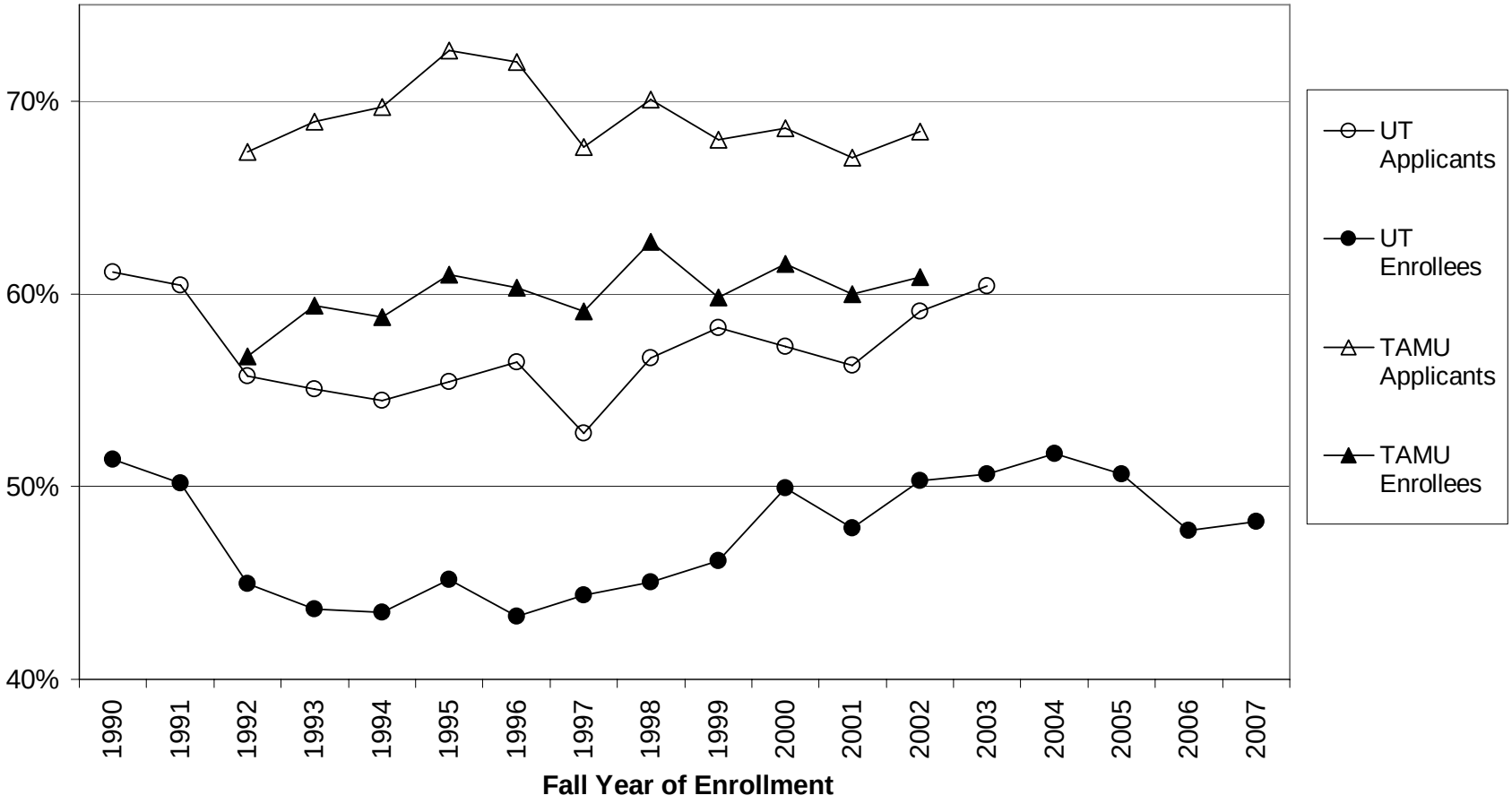

Figure 2:
Concentration of HS Enrollment and UT and TAMU Applicants and Enrollees Coming from Particular Texas Public High Schools

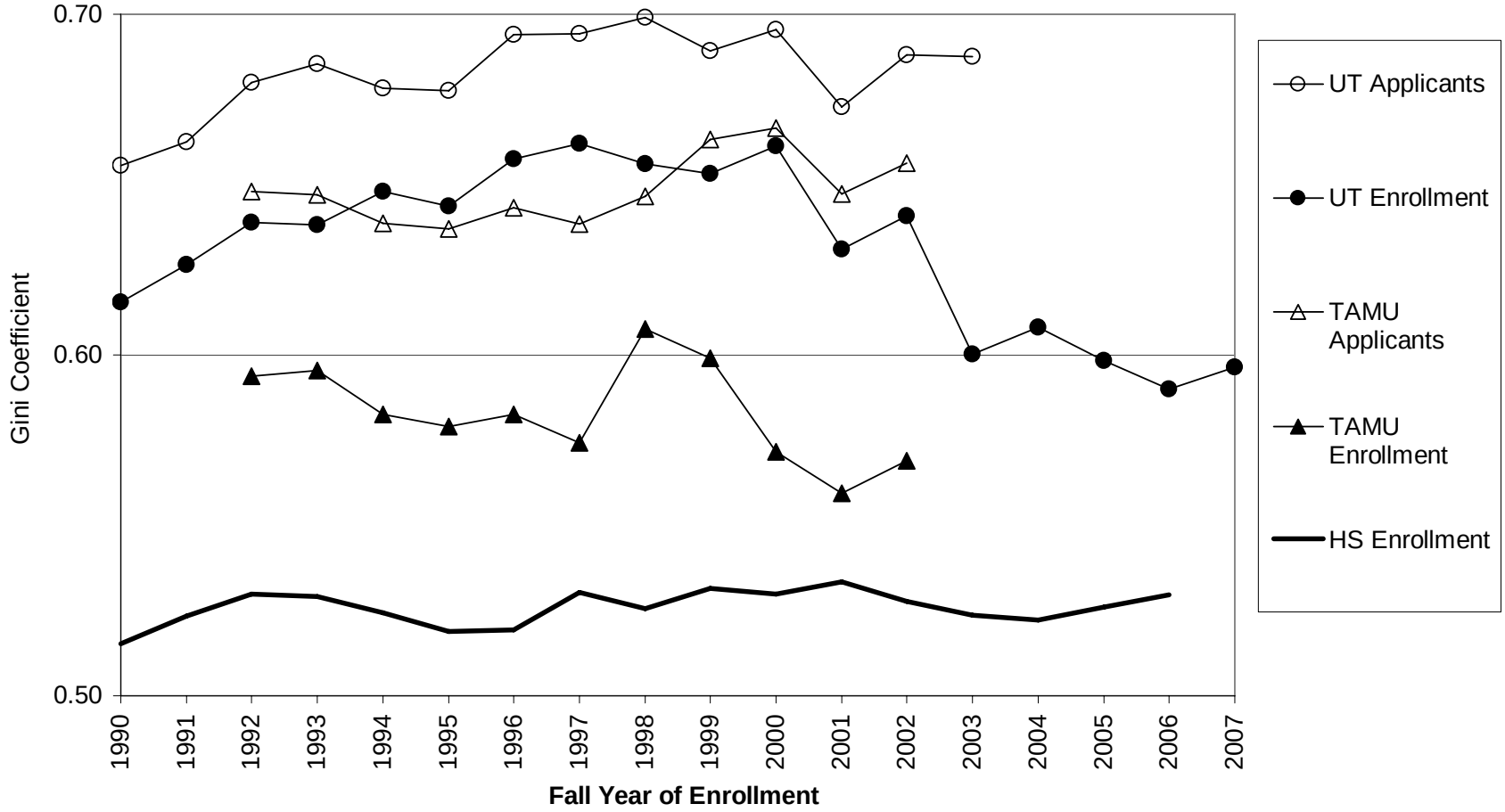

Figure 3:
Over/Underrepresentation Among Enrollees at UT, by High School's Urbanicity

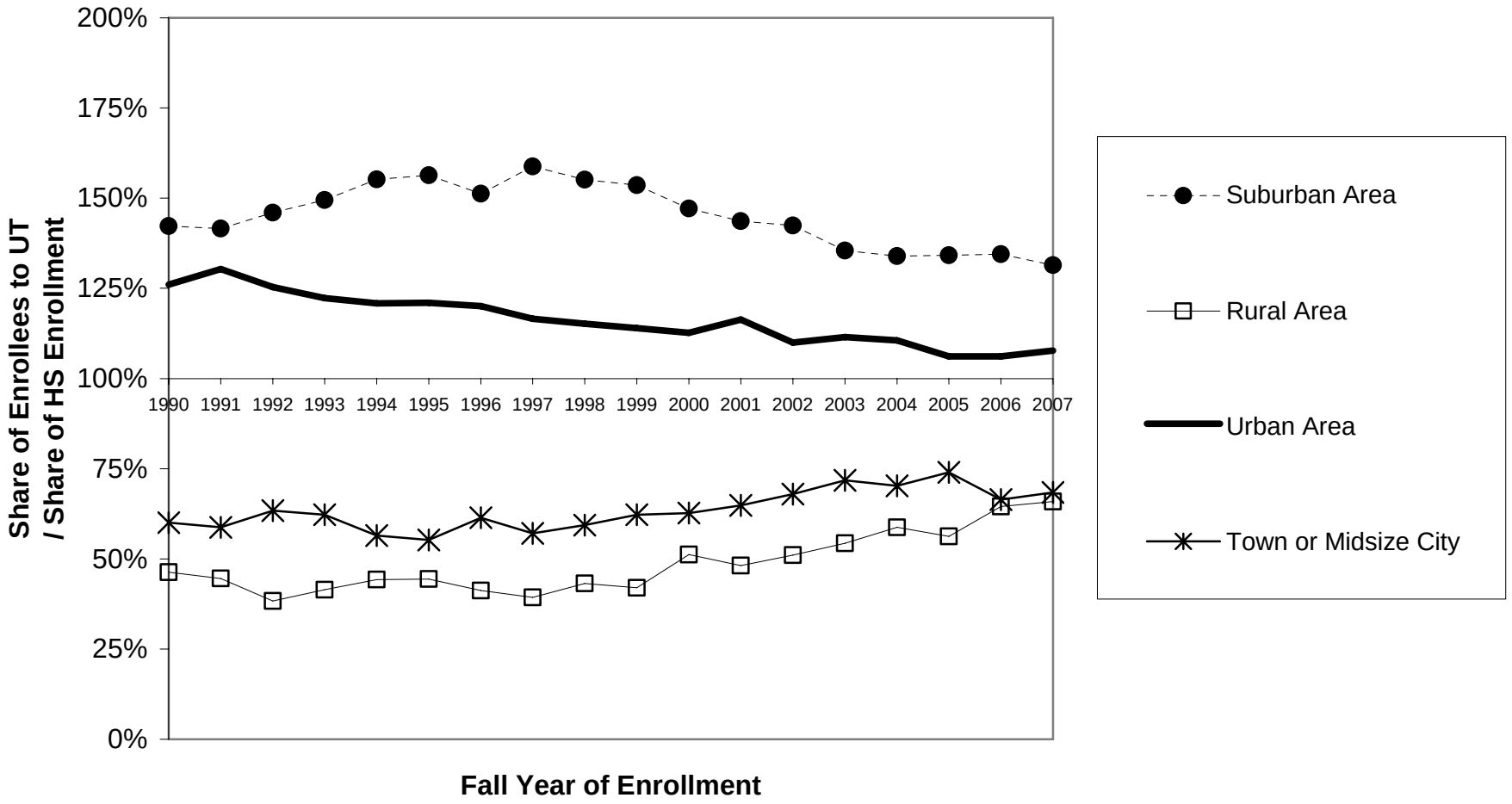

Figure 4:
Over/Underrepresentation Among Enrollees at UT,
by High School's Poverty

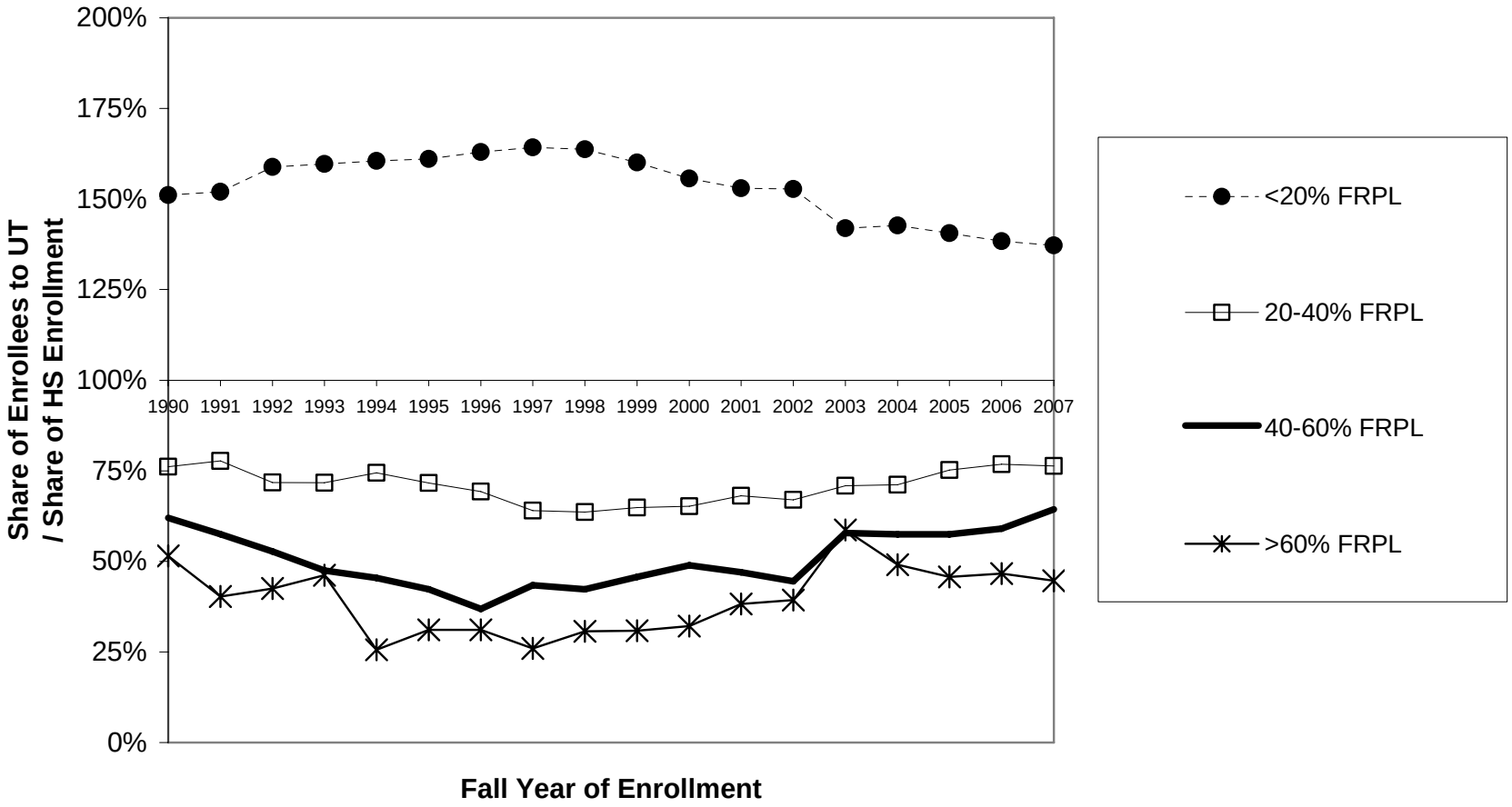

Figure 5:
Over/Underrepresentation Among Enrollees at UT,
by High School's Minority Student Share

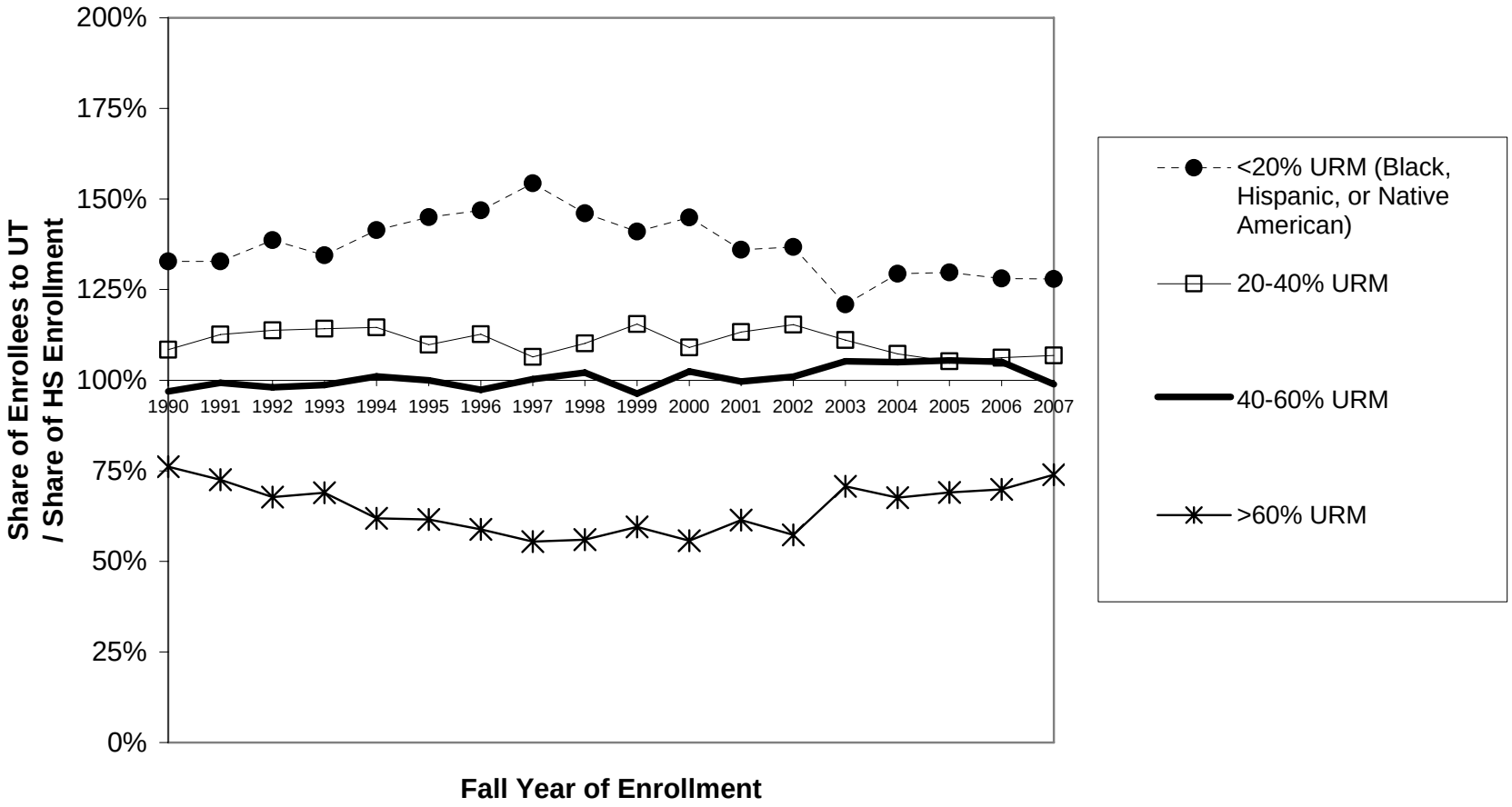

Figure 6:
Over/Underrepresentation Among Enrollees to UT,
by High School's Region

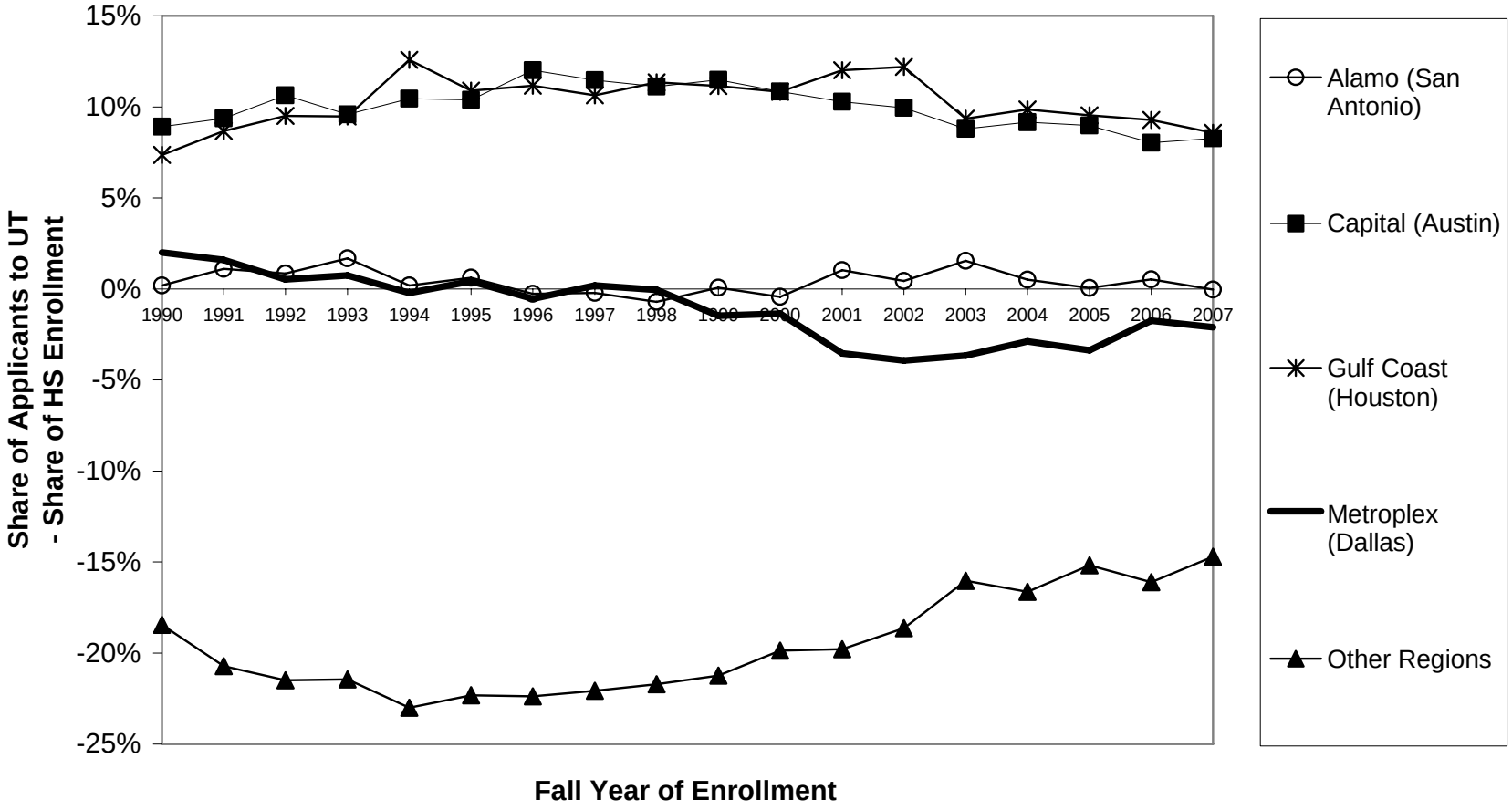

Table 1: 1996 to 2007 Change in the Share of the High School's Students Enrolling at UT-Austin

	(in percent)			
	(1)	(2)	(3)	(4)
Urbanicity				
If in suburban area	-0.12%			0.76% **
	[0.38%]			[0.36%]
If in rural area	1.02% ***			1.48% ***
	[0.32%]			[0.35%]
If in town or mid-sized city	0.78% **			0.65% *
	[0.33%]			[0.36%]
Percent of students who were black, Hispanic, or Native American		-0.96% *		1.07% *
		[0.50%]		[0.59%]
Percent of students receiving Free- or Reduced-Price Lunch		5.49% ***		2.55% ***
		[0.96%]		[0.88%]
Region				
If in Capital region (Austin)			-3.30% ***	-2.90% ***
			[0.83%]	[0.78%]
If in Gulf Coast region (Houston)			-0.78% *	-0.46%
			[0.46%]	[0.41%]
If in Metroplex region (Dallas)			-0.06%	0.33%
			[0.39%]	[0.35%]
If in other region (excl. Alamo, Capital, Gulf Coast, Metroplex)			0.48%	0.14%
			[0.34%]	[0.34%]
Constant	-0.93% ***	-1.60% ***	-0.38%	-2.28% ***
	[0.29%]	[0.24%]	[0.33%]	[0.46%]
Observations	1143	1143	1143	1143
R-Squared	3.5%	8.9%	12.4%	19.5%

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Figure 7:
High schools' peristence in sending enrollees to UT

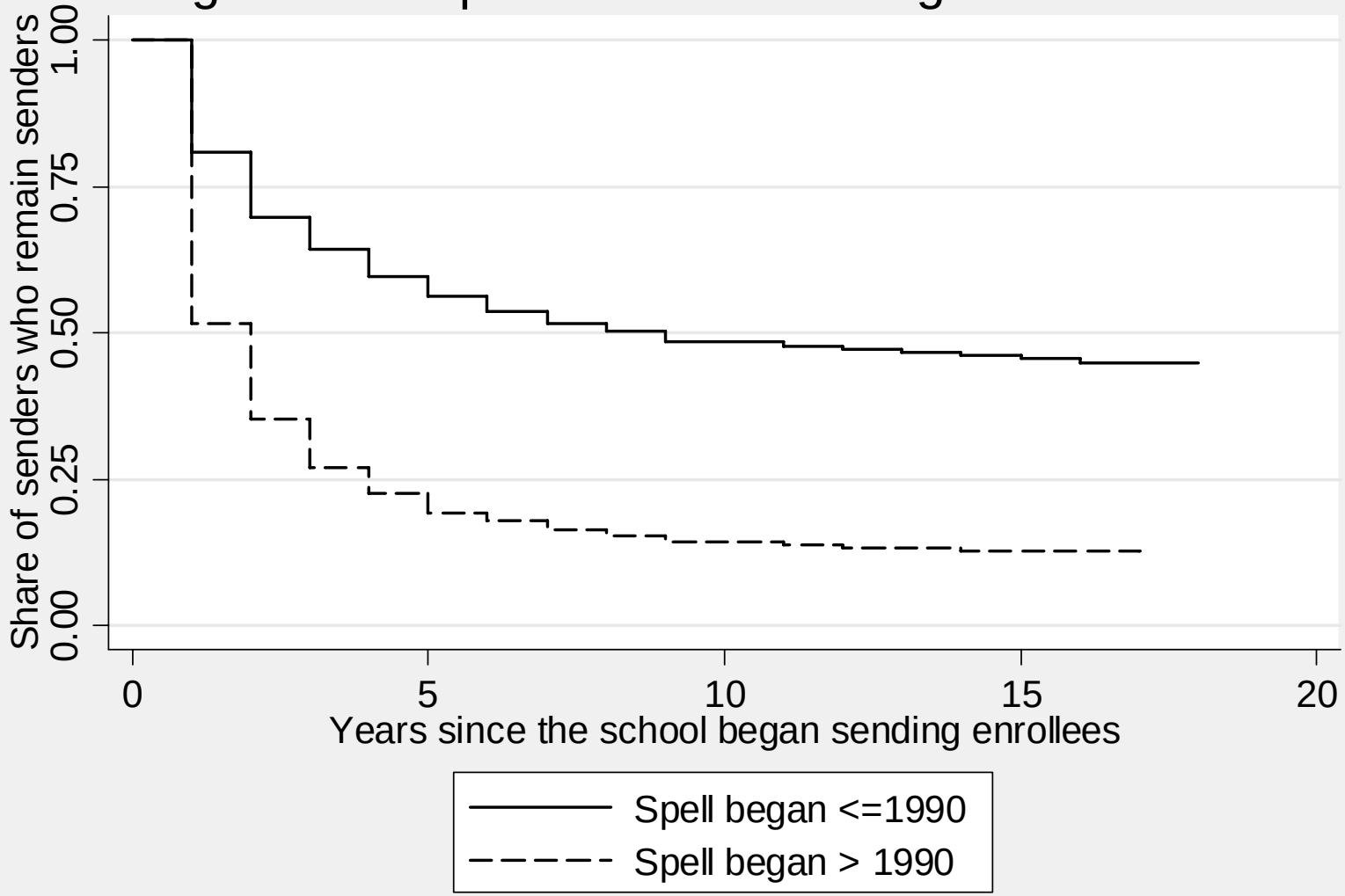

Table 2: Survival Analysis: Years that a High School Remains a Sender of Enrollees to UT-Austin

	All "Spells"			"Spells" beginning after 1990		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of enrollees in prior year				0.534***	0.533***	0.533***
				[0.015]	[0.015]	[0.015]
12th grade enrollment	0.094***	0.115***	0.108***	0.182***	0.183***	0.165***
	[0.009]	[0.010]	[0.010]	[0.017]	[0.017]	[0.016]
Located in suburban area	0.540***	0.525***	0.312***	0.504***	0.473***	0.248***
	[0.088]	[0.082]	[0.062]	[0.083]	[0.080]	[0.054]
Located in rural area	0.896	0.918	0.569***	0.864	0.883	0.546***
	[0.149]	[0.146]	[0.113]	[0.145]	[0.151]	[0.119]
Located in town or mid-sized city	0.898	0.857	0.593***	0.796	0.769	0.512***
	[0.144]	[0.131]	[0.114]	[0.129]	[0.126]	[0.108]
Percent of students who were black, Hispanic, or Native American (URM)	0.791***	0.766***	0.969	0.805***	0.783***	0.939
	[0.060]	[0.056]	[0.091]	[0.060]	[0.060]	[0.094]
Percent of students receiving Free- or Reduced-Price Lunch (FRPL)	1.513***	1.535***	1.350***	1.422***	1.463***	1.333***
	[0.117]	[0.114]	[0.127]	[0.108]	[0.113]	[0.133]
Located in Alamo region (San Antonio)	0.678**	0.690**	0.827	0.757*	0.755*	0.890
	[0.105]	[0.102]	[0.151]	[0.116]	[0.118]	[0.173]
Located in Capital region (Austin)	0.215***	0.237***	0.275***	0.338***	0.326***	0.366***
	[0.042]	[0.044]	[0.065]	[0.067]	[0.067]	[0.097]
Located in Gulf Coast region (Houston)	0.704**	0.728**	0.946	0.709**	0.726**	1.027
	[0.101]	[0.100]	[0.164]	[0.101]	[0.106]	[0.190]
Located in Metroplex region (Dallas)	1.281**	1.285**	1.212	1.221*	1.251**	1.179
	[0.137]	[0.132]	[0.166]	[0.129]	[0.135]	[0.174]
Hopwood (1997)		0.825*	0.802**		0.971	0.960
		[0.085]	[0.082]		[0.101]	[0.101]
H.B. 588 Years (1998+)		0.447***	0.212***		0.578***	0.287***
		[0.025]	[0.048]		[0.031]	[0.068]
HB588 * Suburban			2.657***			3.136***
			[0.650]			[0.812]
HB588 * Rural			2.392***			2.257***
			[0.566]			[0.560]
HB588 * Other Area			1.950***			2.012***
			[0.461]			[0.498]
HB588 * Percent URM			0.665***			0.733***
			[0.072]			[0.083]
HB588 * Percent FRPL			1.252**			1.166
			[0.137]			[0.133]
HB588 * Alamo			0.673*			0.687*
			[0.143]			[0.151]
HB588 * Capital			0.679			0.742
			[0.197]			[0.226]
HB588 * Gulf Coast			0.633**			0.546***
			[0.132]			[0.117]
HB588 * Metroplex			1.065			1.052
			[0.164]			[0.170]
Spell Began in 1990	0.674***	0.385***	0.345***			
	[0.059]	[0.035]	[0.033]			
Constant	0.127***	0.215***	0.310***	0.206***	0.272***	0.383***
	[0.020]	[0.033]	[0.058]	[0.032]	[0.044]	[0.077]
Ln (p)	1.706***	1.778***	1.840***	2.092***	2.169***	2.234***
	[0.037]	[0.037]	[0.038]	[0.040]	[0.041]	[0.041]
Number of spells	2,685	2,685	2,685	2,583	2,583	2,583

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1