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The Impact of Enrolling in a Minority Serving Institution in Texas for

Black and Hispanic Students

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The Impact of Enrolling in a Minority Serving Institution in Texas for Black and Hispanic Students

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ABSTRACT

Using state administrative data for multiple cohorts of college enrollees from 1997 to 2008 and incorporating propensity score matching techniques, we examine the effect of attending a Minority-Serving Institution (MSI)—a Historically Black College and University (HBCU) or a Hispanic-Serving Institution (HSI)—on college-completion outcomes in the large MSI market in Texas. We find the gender gap among Black students to be quite stark, with more Black males than females enrolling in HBCUs, although this gap has decreased over time. For Hispanic students, the income gap is arguably the most stark contrast between enrollees, with more economically disadvantaged students enrolling at HSIs and more well-off Hispanics enrolling in traditional institutions, or non-HSIs. Other defining characteristics of students who enter an MSI include attending high schools with a higher level of segregation, as measured by the percentage of Black and Hispanic students, and not having participated in rigorous courses. The results of a propensity score analysis we employed to overcome selection bias in our assessment of college completion indicate that, after including postsecondary controls in our matched set of students who attend and do not attend an MSI, we no longer see a difference in the bachelor's degree completion rates among Hispanic and Black students who do and do not enroll in an MSI for most of the cohorts examined. Where a significant negative effect on college completion does exist for Black students attending an HBCU, the rate is considerably lower in our matched sample. In sum, we find that the effect of attending an MSI does not have a consistent negative or positive effect on college graduation outcomes, despite these schools' serving a larger share of high-need and underprepared students.

Keywords: race, higher education, minority-serving institutions, Hispanic-Serving Institutions, Historically Black Colleges and Universities, college completion

The Impact of Enrolling in a Minority-Serving Institution in Texas for Black and Hispanic Students

I. Introduction

One of the most frequently reported demographic statistics of 2012 was that minority births constituted a majority of all births in the United States in 2011, outnumbering births of White children of European ancestry for the first time in U.S. Census history (Dougherty & Jordan, 2012). These demographics have received significant attention at a time when education policy has shifted its focus from college enrollment to college completion. That is, while scholars have documented a general increase in college enrollment over time, a good deal of research also has documented the stagnant rates in college completion over time (Bound, Lovenheim, & Turner, 2009; Bowen, Chingos, & McPherson, 2009; Melguizo, 2010; Turner, 2004).

One question of interest that has emerged is whether and why completion rates differ so significantly by race and ethnicity. While recent research indicates that level of selectivity in college admissions does have a positive and significant effect on baccalaureate attainment (Melguizo, 2010), we know less about the effect of the institutions that many minority students are likely to attend, other than the community college, such as four-year Minority-Serving Institutions (MSIs). We know even less about how these institutions fare in comparison to their non-MSI peer institutions in a college market where most institutions are primarily non-selective or moderately selective. We focus on MSIs because they represent the postsecondary institutions that a sizeable percentage of minority students have attended and graduated from over the past

30 years.[1] Indeed, the number of institutions serving minority students has grown at an unprecedented rate, from 414 in the 1980s to at least 1,200 by the early 21st century (Li, 2007). These institutions also represent a section of higher education policy that has not yet been evaluated using the quasi-experimental methods widely used for other research examining the effect of selectivity on earning a bachelor's degree. Finally, in an era where a majority of births in the U.S. are of non-Whites, examining the postsecondary education institutions these students are likely to enter seems at the least a necessary policy exercise for the economic welfare of individual states and the nation as a whole.

To understand the state of college completion among the underrepresented student population (Blacks and Hispanics), we focus on Texas, a state with a considerable number of Hispanic-Serving Institutions (HSIs) and Historically Black Colleges and Universities (HBCUs). Specifically, we compare six-year bachelor's degree attainment rates for Hispanic and Black students who enroll in a four-year MSI to those who enroll in a traditional four-year institution—that is, those that do not have a formal historical (HBCUs) or federally designated (HSIs) process for serving underrepresented minority students.[2,3] To further understand the nature of student decisions and successes, we incorporate propensity score matching to deal with selection issues not previously addressed in this area of research on MSIs, building on previous research on the effect of selectivity that does incorporate these methods. We ask:

What is the impact of enrolling in a four-year MSI on the degree attainment of Hispanic and Black students, as compared to similar students who do not enroll in an MSI?

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By examining this research question, we seek to contribute to the extensive literature on college completion by dissecting the postsecondary market in a state that has a large number of MSIs, as it is likely to have implications for other states with similar education landscapes and   underrepresented student populations. In sum, we contribute to the growing body of higher education policy literature in the following manner. Previous empirical work on MSIs often has been conducted separately by individual sector (HSI or HBCU), by single institution, or by national data, often not accounting for distinct state trends such as alternative admissions plans.[4] This analysis contributes to the growing research on MSIs (1) by utilizing unique data, thus providing a larger state portrait of college completion that incorporates the high school context and curriculum information, and (2) uses propensity score matching, a critical quasi-experimental technique not previously used in analyses of MSIs. Moreover, as MSIs become an increasingly salient topic in the conversation on the history of American higher education, we hope to contribute to this conversation by building on previous important work on MSIs while incorporating new methods and data in this area of education research. We acknowledge the traditional limitations of large quantitative databases in evaluating factors that should be but cannot be quantified due to data constraints as they pertain to this analysis, such as the role of student support services and mentoring, the impact of racial identity and campus climate, faculty-student interactions, and non-cognitive measures such as self-esteem (Braxton, Hirschy, & McClendon, 2004; Freeman, 2005; Melguizo, 2010).

Section II provides a portrait of MSIs in the nation, and in Texas specifically, in terms of general postsecondary enrollment. Section III describes our conceptual framework, including our theoretical motivation and additional research contributions relating to college completion. In Section IV we provide a detailed description of our research design, including the quasi-experimental methods we used to assess the effect of attending an MSI. Section V presents our results, and Section VI offers our concluding thoughts and implications, based on these analyses.

II. A National and State Portrait of MSIs: HBCUs and HSIs in Texas

To begin to understand the larger higher education policy portrait of MSIs, we use definitions from the U.S. Department of Education that define HSIs as institutions that are accredited, grant degrees, and have a full-time equivalent undergraduate enrollment that is at least 25 percent Hispanic (U.S. Department of Education, n.d.). Of particular importance is the fact that HSIs are rather new institutions in U.S. postsecondary education, having developed over the last 35 years (Gasman, Baez, & Turner, 2008). HBCUs, on the other hand, were established well before 1960 with the mission of serving Black students, although admissions were open to students of all races (Fletcher & Webster, n.d.). In terms of student "customers," MSIs currently enroll more than 2.3 million students, or approximately 14 percent of all higher education students in the U.S. (Harmon, 2012). HBCUs alone enroll about 16 percent of Black students, while HSIs serve approximately 42 percent of all Hispanic students—a percentage that is significantly higher in states with a high percentage of Hispanic students (Harmon, 2012). The Texas MSI context, which is the focus of this paper, includes nine HBCUs with an

undergraduate enrollment of 19,781 as of 2004, a number that has grown since then and does not include graduate and professional student enrollment (Li, 2007).[4] The students enrolled at Texas HBCUs are 62 percent African American, 21 percent Hispanic, and 14 percent White; the remaining percentage is "other"—students of Asian origin or foreign students (Fletcher & Webster, n.d.).[5] In the HSI sector, Texas boasts 64 such institutions, with an undergraduate enrollment of 188,785 as of 2004 (Li, 2007). It is second to California in the number of HSIs and Hispanic student enrollment, and accounts for nearly 35 percent of the total Hispanic enrollment in the U.S. (Li, 2007). The population enrolled at Texas HSIs is 55 percent Hispanic, 27 percent White, 9 percent African American, and 9 percent Asian American, students of unknown race, and foreign students (Fletcher & Webster, n.d.).

While HSIs and HBCUs both have a significant presence in Texas higher education, they differ from each other in a few key dimensions. One is that the majority of HBCUs are four-year institutions, whereas a greater percentage of HSIs are two-year institutions, a pattern that also applies nationally (Li, 2007).[6] As for enrollment and graduation patterns as they relate to access, a significantly higher percentage of MSIs, including HSIs and HBCUs, have open admissions policies, lower graduation rates on average, are more likely to serve women, and serve double the percentage of students who are Pell Grant recipients than their non-MSI peer institutions (Li, 2007). While a number of four-year HBCUs have maintained selective admissions standards, the portrait of MSIs as the institutions likely to serve those who are most often underrepresented in American higher education and are low-income has been a consistent trend. For this reason, we examine

their critical location in the story of U.S. education at the turn of the 21st century. We argue that few other institutions in higher education have the economically and historically important charge of increasing the level of human and social capital of this underserved population.

III. Conceptual Framework

Our conceptual framework emerges from the perspective of a high school to college-completion pipeline that includes students' demographic characteristics, their high school context and curriculum participation, and the quality of the postsecondary institution they attend, based on available state administrative data (Adelman, 2006; Bound, Lovenheim, & Turner, 2009; Perna, 2006). Using this foundation, we incorporate three bodies of literature relating to (1) the theoretical traditions used to explain college access and completion, which are grounded in human capital theory in terms of the individual decision to attend college, as well as the capacity of institutions to respond to college enrollees with the goal of graduating them; (2) empirical analyses that note the particular factors that have been shown to play an important role in the enrollment of African American and Latino students at HBCUs and HSIs, respectively; and (3) the effect of pre-college characteristics and measures of college quality on the odds of completing college. We supplement this literature with considerations of policy changes in the Texas higher education context. While our data provide advantages not available in other datasets, they do contain some limitations, which we will discuss. In sum, the high school to college-completion process is long, and it is influenced by a variety of factors that we

attempt to capture using available administrative data on students, their course-taking behavior, the high schools they attend, and the state's postsecondary institutions.

Theoretical Motivation

For this analysis, we incorporate a model of student decision-making relative to college enrollment and degree completion, as well as institutional responses to students' decisions that are based in human capital theory (Becker, 1957/1971; Bound et al., 2009; Mincer, 1974), meanwhile noting important recent additions to the human capital perspective. For example, according to Becker (1964), a student's decision to attend college would include their assessment that investing in education carries a cost, but also their expectation that the cost might increase their human capital in ways that translate into skills or benefits they can exchange for income in the labor market. Weighing the costs and the benefits, both monetary and non-monetary, would thus be part of the student's decision whether to invest in a college education. Bound, Lovenheim, and Turner (2009) hypothesize that, as the returns to a college degree increase, as they have over the last 30 years, more students may be enticed to enter college, where they compete with students who would have entered college anyway, which could lead to two likely circumstances. First, while the increasing returns to a college degree might be expected to lead to an increase in college completion, the preparation of new students entering the U.S. college system may be quite varied and in some cases inadequate, which will lead to a decrease in the college-completion rate. Second, from the supply-side perspective (the institutions'), an increase in the number of students entering colleges and universities may change the level of resources students have access to at these institutions, especially

if state budgets do not keep up with the changing demand for higher education services. As public colleges and universities comprise the majority of higher education institutions in the U.S. and in Texas, institutional capacity to respond to student demand becomes an essential part of the college-completion question. We therefore observe the roles of both the individual and the institution in the context of declining student resources over time, which is experienced most dramatically at public universities and colleges that are not among the top 50 such institutions in the U.S. (Bound et al., 2009).

"Choosing" to Enroll in a Minority-Serving Institution

Our framework also builds on work that examines the college choice decision as it relates to enrolling in an HBCU or an HSI, although more substantial work has been completed on HBCUs. Freeman and Thomas (2005), for example, conducted a qualitative analysis of how African American high school students who attended an HBCU at the turn of the 21st century are different from similar students who have chosen HBCUs historically, specifically a cohort from the 1970s. The authors found that the characteristics of high-achieving students currently enrolling at HBCUs are not remarkably different from those of cohorts that attended these institutions the 1970s, in that their characteristics included growing up in predominantly Black neighborhoods and attending predominantly Black high schools. The most overwhelming concern emerging from student surveys about attending college was financial need, suggesting that HBCUs with low resources would find themselves in a difficult spot when trying to recruit high-achieving students who might receive more financial aid at other schools. In regard to influences on choice, Freeman (1999; 2002) found the three strongest factors in the college decision were

cultural roots—that is, knowing someone who attended the HBCU; seeking roots in the Black culture; and a lack of cultural awareness. The type of high school attended did not play a big role, but knowing a family member, educator, or friend connected with an HBCU did influence the choice of college. Others (McDonough, Antonio, & Trent, 1995, cited in Freeman, 2005) have documented that a student's religion, the school's reputation, and a relative's influence played a role in the decision to attend an HBCU.

Why students choose to attend an HSI has received less empirical attention in terms of the factors influencing that choice; however, recent work employing a national quantitative perspective incorporates some pre-college and high school context characteristics that previous work on HBCUs has not fully examined. Employing the Educational Longitudinal Survey of 2002, Nunez and Bowers (2012) found that students who chose a four-year HSI likely had the following characteristics: (1) reported choosing the postsecondary institution because it was closer to home; (2) attended high schools with a higher percentage of Hispanic students; and (3) attended high schools with a higher percentage of minority students. Regional characteristics also mattered, as students in the West were more likely to attend an HSI; this pattern is expected, however, given the geographic concentration of HSIs in the Western states with large Hispanic populations. Interestingly, students who had a high standardized math score and and/or were a first-generation Hispanic were more likely to enroll in a non-HSI.

Research on what factors influence college completion has provided important insights in the education field in general, but the tradeoff has often been that only a handful of

HBCUs have been included in national studies and, to our knowledge, no work has examined the HSI in the college-completion story using our methods. We now move toward the factors documented to influence college completion in general and incorporate these to assess completion with the MSI context.. .

Other Key Factors Affecting College Completion: Pre-College Characteristics and College Quality

At the pre-college level, high performance on math measures and taking rigorous courses have been consistent in predicting the likelihood of both entering college and, in particular, completing college. As for the effects of the curriculum, particularly the role of taking mathematics courses in high school, Adelman (2004) found that taking math one level beyond algebra II, such as a trigonometry course, doubles a student's odds of finishing a bachelor's degree. Others have found that engaging in rigorous coursework, such as Advanced Placement/International Baccalaureate (AP/IB) courses, and participating in dual college/high school enrollment programs may increase the odds of gaining access to and, in some cases, completing college, although the causal effect of taking AP/IB courses has yielded mixed results (Adelman, 2004, 2006; Iatarola, Conger, & Long, 2011; McCauley, 2007; Sadler, Sonnert, Tai, & Klopfenstein, 2010). Nevertheless, the infrastructure available to provide advanced-level courses is associated with the academic level of the students available to take such courses, which suggests an effect related to the composition of the high school population (Iatarola et al., 2011). In a well-publicized study of college completion, nationally and in six states, using administrative data, Bowen and colleagues (2009) found that high school grades are a far

better incremental predictor of college graduation rates than standardized SAT/ACT scores, as are scores on achievement tests like AP exams, although the authors still recommend triangulating more than one achievement assessment for a better selection process in college admissions. Finally, while the authors do not examine the impact of working while in high school, other work has paid particular attention to this as a decision that replaces schooling altogether, most prominently for Hispanic students. (Bachmeirer & Bean, 2011; King & Bannon, 2002; Kulm & Cramer, 2006). Bachmeirer and Bean (2011), for example, found that for many Mexican-origin youth, attending school is conditional upon their participation in the labor force, a behavior that is not generally found among other racial and ethnic groups.

College quality is an important determinant not only of graduation outcomes but also of postgraduate opportunities, such as graduate or professional school and well-connected peer networks (Karabel, 2005). Several studies have examined college choice and completion by institutional type, often a proxy for quality, in the United States (e.g., Bound et al., 2009; Hagy & Staniec, 2002; Manski & Wise, 1983; Ordovensky, 1995; Perna & Titus, 2004; Rouse, 1995). In regard to the influence postsecondary institutional factors have on college completion, the quality debate and associated empirical analyses have focused on the effect that college selectivity has on college-completion rates (Bastedo & Jacquette, 2011; Bowen et al., 2009; Dale & Krueger, 2002; Long, 2008; Melguizo, 2010, 2008). Other institutional characteristics, such as funding per student and the percentage of the faculty that is tenured, also have been explored, particularly for the two- and four-year college sectors. Bound and colleagues (2009), for example, found

that the factors affecting completion rates differ by postsecondary institutional sector, in that institutional characteristics are more likely to explain declining college-completion rates over time at four-year institutions, while students' academic preparation levels are more likely to explain declines in completion rate at two-year institutions. However, Bound and colleagues focus on income levels rather than on race and ethnicity, leaving unanswered the question of how race factors into college-completion outcomes over time. Nevertheless, their attention to students' performance at non-selective institutions provides insight into what factors other than selectivity might also matter in understanding the college-completion puzzle.

The Texas Higher Education Policy Context

Texas higher education has undergone significant policy changes in terms of college readiness, access, and completion (Domina, 2007**)**. A number of changes in state legislation occurred in conjunction with or separate from this plan from 1997 to 2008. These changes ranged from a state alternative admissions policy known as the Top Ten Percent Plan (TTPP), or House Bill 588, which was passed in 1998, to infusions of state financial aid for students who qualify based on need, merit, or in-state residency status in 2001, to a major high school curricular reform in 2006, among others. Passage of the TTPP was particularly important for college admissions, as the state admissions policy deemphasized the role of standardized test scores for college admission and instead privileged high school class rank, allowing the top 10 percent of a high school graduating class to enroll in the Texas public college or university of their choice. For qualifying students, this is the most choice-driven admissions policy in the nation. While innovative

in terms of simplicity and ease of interpretation, the plan still has not yielded a sizable percentage of underrepresented minorities at selective institutions, despite an increase in the percentage of eligible underrepresented students in the state's top 10 percent of graduating classes (Long & Tienda, 2008). Horn and Flores (2012) found that a majority of TTTP-eligible Black and Hispanic students instead enroll in non-selective and, to a lesser degree, moderately selective public institutions in Texas

The passing of Texas House Bill 3015 in 2003 was a particularly significant decision in terms of tuition-related policy. The bill deregulated tuition and allowed the governing boards of public universities to set different tuition rates, a move that led to higher rates at the state's four-year institutions, particularly the elite public institutions (Horn & Flores, 2012). Also in 2003, the U.S. Supreme Court passed the *Grutter* decision, which restored the use of race in college admissions. Consideration of race in college admissions was reinstated at one of the state's elite public institution in 2005, along with the state-mandated TTPP. Finally, 2006 marked an important year for curricular interventions in the state of Texas in terms of college readiness, with the formal implementation of dual credit, an arrangement whereby students can earn up to 12 hours of college credit while still in high school. While formal dual enrollment was not implemented until 2006, a number of schools participated in this practice prior to adoption of the policy. In sum, given the wide activity in state higher education policies related to race and ethnicity, economic need (financial aid), and merit (course-taking behavior), we turn to a matching technique used with various cohorts that represent different policy changes over time in an effort to remove selection bias in examining the

effect of attending an MSI on degree attainment.

IV. Research Design

Self-Selection

Inherent in any study of college completion when comparing different institutional types is the issue of self-selection. Therefore, without using causal inference methods, it remains unclear whether other factors may be influencing student enrollment and degree completion. For instance, a student who enrolls in an MSI may not be as prepared academically, may come from a weaker financial situation, and may not have access to other forms of capital that those enrolling in a traditional institution may have. In essence, a simple comparison between students who did and did not enroll in an MSI would overestimate the impact of enrollment in an MSI on degree attainment. Thus it becomes difficult to capture the "true" impact of MSI enrollment and college completion when self-selection has occurred. To contend with this self-selection, we turn to a counterfactual framework and propensity score matching.

Counterfactual Framework

While random experiments have become the gold standard in education research and would alleviate the concern of self-selection, this particular setting—where students choose to enroll in various types of institutions—does not easily lend itself to experimental design, nor is it ethical to induce such experiments. Thus, in the absence of an experiment where a counterfactual group would be established by randomization, we

turn to simulating a counterfactual group based on the observable characteristics of

Hispanic and Black students. Ideally, we would like to compare outcomes for minority

students who simultaneously did and did not enroll in an MSI. While this actual

comparison is impossible, economists have turned to a non-parametric approach known

as propensity score matching (Rubin, 1974, 1976). This sort of matching can overcome

the problem of selection bias by creating a counterfactual group similar to the treatment

group, and it has become increasingly popular in the field of education research (e.g.,

Agodini & Dynarski, 2004; Doyle, 2008). What follows is a discussion of this method as

it relates to our question of interest, the impact of attending an MSI on bachelor's degree

attainment.

Propensity Score Matching

Empirically, the difference between Hispanic and/or Black students enrolled at an MSI

and those enrolled at a traditional institution is defined by $\Delta = y_1 - y_0$, where y_1 represents

the outcome of a group of students who enrolled at an MSI, and y_0 represents the

outcome for those same students had they enrolled in a traditional institution. More

specifically, the average treatment effect (ATE) in this instance is defined as (Smith &

Todd, 2001):

$$A TE = E(\Delta \mid x,\ z{=}1) = E(y_1 - y_0 \mid x,\ z{=}1) =$$

$$E(y_1 \mid x,\ z{=}1) - E(y_0 \mid x,\ z{=}1)$$

In this case, $z=1$ represents the presence of the treatment (enrolling an MSI) and x represents a vector student characteristics. In any analysis of this nature, data typically are available for the outcomes among the treated individuals [$E(y_1 \mid x, z=1)$]. Unknown, however, is the counterfactual outcome [$E(y_0 \mid x, z=1)$]. In controlled randomized trials, the counterfactual is obtained through the use of randomization with respect to the observed characteristics x (Heckman, 1979). In the absence of an experiment, many have turned to propensity score matching as a way to simulate random assignment based on the propensity to receive treatment (e.g., Agodini & Dynarksi, 2004; Doyle, 2008; Rubin, 1974, 1976). [7] With propensity score matching, the ATE is defined as (Smith & Todd, 2001):

$$\text{ATE} = E(y_1 \mid z=1) - E_{p|z=1}E_y(y \mid z=0, p)$$

In this specification, p is defined as the probability (propensity) that a student will enroll in an MSI, based upon a number of individual characteristics, such that $\Pr(z=1 \mid x) < 1$ for all x. To compute the propensity score, we employ probit regression using our array of pre-college characteristics. We utilize a one-to-one matching technique where a treated (MSI student) is matched to a single control (traditional institution student) who has a very similar probability (within a caliper of $10\sigma_p$) of enrolling in an MSI. Students in the control group can be matched to more than one student in the treatment group, and if a match cannot be found, the individual is discarded from the analysis. To the extent that we have effectively captured the propensity to enroll in an MSI with our array of pre-college characteristics, we will be able to provide unbiased comparisons between the

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treatment and control groups using a logistic regression model on the matched students, with an indicator for treated students (Smith & Todd, 2011). To check the balance of the two groups—that, is the extent to which the matched samples differ only by virtue of enrolling in an MSI—we conduct t-tests between the matched groups along our array of pre-college covariates. A successful match will yield no statistically significant results. In our results section, we first provide logistic regression estimates from the full, unmatched sample with an indicator for MSI status. Then we provide logistic regression estimates using only the matched students.

As a robustness check, we present an additional model on the matched students, incorporating such postsecondary characteristics as the Barron selectivity index, the faculty-student ratio, the percentage of tenured faculty members, and the overall enrollment of the institution. We conduct this robustness check as we acknowledge that not all MSIs (or traditional institutions) are completely homogeneous in their composition of factors known to influence college completion. Put differently, the treatment may not be uniform, as MSIs may differ from one another. To ameliorate this concern, we include a final model with these postsecondary characteristics in an attempt to control for variation within the MSI and traditional sectors.

Data

We employ a confidential and longitudinal state administrative dataset from the Texas Higher Education Coordinating Board and the Texas Education Agency through the University of Texas at Dallas Education Research Center. We also include regional

controls and additional publicly available data from the National Center for Education Statistics (the Common Core of Data and Integrated Postsecondary Education Data System) and the Bureau of Labor Statistics to build our full models. To observe changes over time, we examine outcomes for three cohorts of students who graduated from high school in the spring of 1997, 2000, and 2002, and entered college in the fall of their graduating year. All students were tracked for a total of six years to determine degree completion within 150 percent of a baccalaureate degree. We include variables available in the data that have been shown to influence the odds of college completion, conditional on college enrollment, that relate to individual characteristics, high school academic preparation, high school context, working while in high school, community context, and postsecondary characteristics.

In computing the propensity score, we predict the likelihood of Hispanic and Black students enrolling in an MSI, based on individual characteristics, high school preparation, and high school and community context, including an indicator for whether the student worked during his or her senior year of high school. In terms of individual characteristics, we include race, sex, and limited English proficiency status. In terms of high school preparation, we include covariates for the successful completion of a trigonometry course, and either an AP or an IB course. We also include student performance on the state math exam and whether a student was dual enrolled—that is, simultaneously enrolled in high school and doing college coursework. High school context variables include the pupil-teacher ratio, school enrollment, the percentage of minority (Black and Hispanic) students in the school, per-pupil expenditures, and whether the high school is

located in an urban setting, as defined by the U.S. Department of Education. An indicator for working during high school is included as an indicator of whether a student worked during his or her spring semester in high school immediately preceding graduation. We also identify the match using indicators for community context, including the unemployment rate in the county where a student attended high school and whether a student's high school is located within 25 miles of a postsecondary institution. In our final robustness check, we add controls for such postsecondary characteristics as selectivity (as measured by Barron Index), the percentage of tenured faculty members, the faculty-student ratio, and full-time equivalent enrollment.

Notable limitations of the dataset include variables such as SAT or ACT, level of parental education, and generational status. Responding to these limitations, we first argue that the SAT/ACT variable is not as relevant for college enrollment in Texas as it might be for other states, due to the Top Ten Percent Plan. Second, a lack of information on parental education and generational status in state administrative data is quite common and is an unfortunate tradeoff when using these data, rather than national datasets. However, the economic disadvantage variable in our data accounts for parental income, as defined by federal standards for meeting free and reduced-price lunch requirements (Garcia & L'Orange, 2010). The advantages of these state administrative data include the seamless connection between educational sectors (from high school to college completion) and the ability to capture all students in Texas schools. That is, these data can be linked from K-12 to the state's postsecondary system without losing students, unless they moved out of the state or country. In contrast, longitudinal datasets such as the National Education Longitudinal Study, the Education Longitudinal Study of 2002, and the Beginning

Postsecondary Student Longitudinal Study must track students using other methods and then hope they will agree to participate in the data collection multiple times. As a result, these longitudinal surveys suffer from significant sample attrition over time.

V. Results

Our results section is organized into two sections. First, we present the descriptive landscape of college enrollment by student characteristics across MSIs in Texas. Second, we present results on completion from a descriptive perspective and then from our propensity score analysis, including a robustness check designed to account for heterogeneity of treatment. We remind the reader that, to our knowledge, this is the first quasi-experimental analysis of college completion that accounts for MSI status for multiple student cohorts.

Descriptive Portrait

Table 1 provides data on the number of Hispanic and Black students enrolled in Texas four-year public postsecondary institutions, by MSI status. Across the three time periods, roughly half of Hispanic students enrolled in HSIs, while roughly one-third of Black students enrolled in HBCUs. While MSIs are clearly enrolling a sizeable portion of Hispanic and Black students in Texas, there are notable differences in completion rates. Table 2 provides completion rates over time, by race and MSI designation. On average, across time, minority students at MSIs tend to show completion rates 10 percent lower than minority students enrolled at traditional institutions. This relationship, however, is not causal and merely suggests that there may be completion differentials by MSI status.

Table 3 provides descriptive statistics on a select number of pre-college characters over time, by race and MSI designation. Overall, we see that Hispanic and Black students who enroll in MSIs tend to be substantially academically underprepared for college and come from high schools with high minority enrollments located in urban environments. Specifically, in 2002, only 26 percent of Black students enrolled in an HBCU took an AP or IB course in high school, compared to 50 percent of Black students enrolled in a traditional institution. Additionally, 66 percent of Black students enrolled in an HBCU came from an urban high school, compared to 57 percent of Black students enrolled in a traditional institution. Hispanic students present similar gaps in enrollment in rigorous coursework, such as AP/IB and dual enrollment, also based on enrollment into an HSI. For example, data for this group indicate that 46 percent of Hispanic students in traditional institutions or non-HSIs enrolled in AP/IB courses, compared to 25 percent of Hispanic students who enrolled in an HSI. A similar 20-point gap exists between the percentage of students who took trigonometry (55 percent of Hispanics not enrolled at an HSI, compared to 35 percent of Hispanics enrolled at an HSI). The dual enrollment participation is also twice as high for Hispanics not enrolled at an HSI as for those enrolled at an HSI (15 percent versus 7 percent). Interestingly, two major differences exist between Black and Hispanic students enrolled in all of these sectors. The gender gap for Black students is quite stark, with more Black males than females enrolling in HBCUs, although this gap has decreased over time. For Hispanic students, the income gap is arguably the most stark contrast among student enrollees, with more economically disadvantaged Hispanic students enrolling at HSIs and more well-off Hispanics enrolling in traditional institutions, or non-HSIs. The higher segregation levels represented by the

percentage of Black and Hispanic students in a high school are also a defining

characteristic of students who enter an MSI. To overcome the selection issues presented

by these data, we now turn to propensity score matching.

Propensity Score Analysis Results

Tables 4a and 4b provide the results from our propensity score analysis. For ease of

interpretation, we provide predicted probabilities of college completion, by race and MSI

status. Point estimates and results from the first-stage probit regression used in

computing the propensity score and the t-tests conducted to ensure sample balance are

available from the authors upon request. The first column of Table 4 is the mean

difference in graduation rates by MSI status. The second column contains the predicted

probability after the matching analysis, and the third column presents the results from the

matched sample after incorporating postsecondary controls. With regard to HSIs, we find

that, in years 1997 and 2000, the matching estimates continue to produce statistically

significant, though smaller, difference in completion rates for Hispanic students at HSIs

and those at traditional institutions. After including postsecondary controls, however, we

no longer see a difference in the completion rates of Hispanic students between these two

sectors. With respect to Black students in HBCUs, we see the effect of enrolling at an

HBCU vanish for years 1997 and 2002. In addition, for the 2000 cohort, when we

continue to find an effect after matching, this effect is smaller than in the basic,

unmatched sample. Overall, Black students tend to perform equally well in an HBCU in

comparison to a non-HBCU in regard to six-year college graduation rates after

accounting for sample selection bias.

VI. Implications and Conclusion

Using state administrative data that examines a K-16 pipeline, our results suggest that the effect of attending an MSI does not have a consistent negative or positive effect on college graduation outcomes. MSIs are more likely than non-MSIs to serve more students who have received Pell Grants and have less rigorous academic preparation. While these demographic characteristics also remain true in the Texas context, it does not appear that attending an MSI hinders graduation outcomes in the Texas postsecondary market for Black students who attend an HBCU or Hispanic students who attend an HSI in most of the years of our analysis, all other factors being equal in terms of student profiles and academic preparation. However, the entering student profile is deeply linked with the high school attended, which seems to be the most significant and powerful factor in this analysis. That is, students who come to college academically prepared for the rigor of higher education are likely to graduate regardless of whether or not they attend a four-year MSI or a traditional institution in Texas. However, we note three particular nuances in this analysis that also matter a great deal to the subsequent assessment of college graduation rates and the policies that lead to higher performance on these rates.

First, our cohorts represent somewhat more advantaged students in the larger college enrollment story regardless of their economic background because they have chosen to enroll in four-year institution over a two-year institution (Doyle, 2009; Rouse, 1995). We have not addressed transfer rates or the effect of attending a two-year MSI, or the

subsequent transfer patterns that may or may not lead to graduation from a four-year institution or bachelor's degree attainment.

Second, our data at the time did not allow for a clear examination of the role of financial aid in the overall completion process. It is not clear whether similarly matched students received similar financial aid packages, if such aid was received, or if institutional capacity to award aid is also a factor in this assessment. Linking financial aid data to college enrollment and completion studies remains a difficult task, and accounting for selection issues related to the application of aid by students represents another methodological task that is outside of the scope of this analysis (Goldrick-Rab, Harris, & Trostel, 2009)

Ultimately, our research provocatively suggests that, given the amount of responsibility and the limited resources at many of the MSIs examined, these institutions are not underperforming in regard to well-prepared students, using graduation as an outcome, and therefore are not "harming" students as some critics suggest. Non-MSIs, on average, do have higher college graduation rates for minority students, but the pool of students entering MSIs, as our research shows, are qualitatively different with regard to income and academic preparation. However, our research suggests that, on average, graduation rates at MSIs don't differ after accounting for selection bias using measurable constructs available in our data. As the data do not measure intangible benefits, such as personal development or peer and alumni networks, there are likely additional benefits at the MSIs that are not documented in even the most advanced of administrative datasets. The most

daunting finding concerns what institutions with fewer resources will need to do to

prepare the highly underprepared, and this is a task MSIs, based on selectivity issues, will

be most charged with well into the future, and there will be enormous consequences if

they are not able to do so. In this regard, we recommend that additional attention be given

to these institutions so they do not reduce the level of success they have now as they

prepare for the larger tasks ahead, in an era where race and ethnicity may be considered

an unnecessary benefit at more selective colleges and universities, given current attacks

on affirmative action.

Notes

1. The most populous MSIs in Texas are HSIs and HBCUs, due to demographics and postsecondary institutional history. We use Texas as a case study to help understand states with alternatively diverse markets, such as those in the West that serve Tribal Colleges and Universities and institutions serving Asian American and Native American Pacific Islanders.
2. We use the terms *Latino* and *Hispanic* interchangeably in this analysis. We do the same for *Black* and *African American.*
3. We note that we do not use the term "predominantly White institutions" (PWIs); due to the demography of Texas, many institutions in the state are not necessarily predominantly White, even if they are not officially an MSI.
4. For an expanded review of HSI and HBCU development, including the educational and legal history of what federal programs they were developed under and were reassigned to, see Gasman, Baez, and Turner (2008) and Olivas (2005).
5. Texas is third in the nation, after Alabama and North Carolina.
6. The U.S. Department of Education notes the growing importance of Black-Serving Institutions (BSIs); that is, non-HBCUs whose undergraduate student body comprises at least 25 percent Black students, while other minority groups do not comprise more than 25 percent of that same population (Li, 2007). While relevant to a larger discussion of MSIs, we focus our discussion on Texas HBCUs, since there are significantly more undergraduates in the HBCU sector than the non-HBCU, BSI sector. We nonetheless acknowledge the growing importance of BSIs in the policy discussion (Li, 2007).
7. A more detailed description of multinomial logit models is available from Greene (1990). Low enrollment numbers of Asian students in MSIs in the state, particularly HSIs and HBCUs, prevents their inclusion in these models.

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Table 1:
Descrptive Enrollment Figures by Year, Race, and MSI Designation

	1997		2000		2002	
Hispanic	Enrolled	Percent	Enrolled	Percent	Enrolled	Percent
HSI	3618	55.23%	3752	52.90%	6415	56.14%
Traditional	2933	44.77%	3340	47.10%	5011	43.86%
Black						
HBCU	1096	32.36%	1250	33.17%	2226	36.57%
Traditional	2291	67.64%	2518	66.83%	3861	63.43%

Source: Authors' calculations, Texas Higher Education Board, and Texas Education Agency

Table 2
Completion Rates by Race and MSI Designation

1997		Hispanic (HSI)	Black (HBCU)
	Traditional	47.73%	44.01%
	MSI	37.04%	37.32%
	Difference:	10.69%	6.69%
2000			
	Traditional	65.20%	55.56%
	MSI	52.00%	41.60%
	Difference:	13.20%	13.96%
2002			
	Traditional	51.72%	45.55%
	MSI	43.40%	33.63%
	Difference:	8.32%	11.92%

Source: Authors' calculations, Texas Higher Education Board, and Texas Education Agency

Table 3:
Select Group Descriptives Over Time, by Race and MSI Designation

	Male	Economic Disadvantage	AP/IB Course	Trig-onometry Course	Math Exam Score	Dual Enrollment	HS Percent Minority	HS Urbanicity	County Unemp
				Group Descriptives					
1997									
Hispanic, traditional	45.82%	24.99%	45.76%	55.54%	51.56	15.31%	58.39%	50.19%	6.42%
Hispanic, HSI	45.68%	47.98%	25.48%	34.99%	46.47	7.13%	83.16%	57.99%	10.44%
Black, traditional	34.83%	24.09%	31.08%	38.72%	46.32	7.68%	57.31%	57.88%	5.01%
Black, HBCU	42.70%	24.45%	14.60%	22.54%	40.62	2.83%	70.02%	67.15%	5.06%
2000									
Hispanic, traditional	45.63%	28.42%	71.71%	71.65%	53.73	26.38%	56.69%	50.88%	4.67%
Hispanic, HSI	42.49%	51.49%	58.10%	56.29%	50.39	16.61%	84.42%	62.20%	6.10%
Black, traditional	37.17%	25.74%	50.40%	51.85%	49.47	11.14%	58.51%	56.07%	4.31%
Black, HBCU	42.22%	29.17%	24.90%	31.10%	44.38	4.79%	71.36%	64.30%	4.29%
2002									
Hispanic, traditional	45.90%	33.15%	71.63%	70.33%	54.01	33.94%	59.77%	49.14%	4.91%
Hispanic, HSI	44.40%	57.79%	55.11%	54.14%	51.42	25.64%	84.45%	60.59%	7.79%
Black, traditional	38.59%	28.68%	50.47%	56.33%	50.95	16.65%	62.40%	56.80%	6.35%
Black, HBCU	41.52%	32.88%	25.92%	31.03%	46.98	7.66%	72.38%	66.30%	6.25%

Source: Authors' calculations, Texas Higher Education Board, and Texas Education Agency

Table 4a
Predicted Probabilities for HSIs

		1	2	3
				Matched with Institutional Controls
		Basic Model	Matched Model	
1997				
	Traditional	47.73%	45.60%	--
	HSI	37.04%	35.18%	--
	Difference:	10.69%	10.42%	--
2000				
	Traditional	65.20%	61.17%	--
	HSI	52.00%	53.01%	--
	Difference:	13.20%	8.16%	--
2002				
	Not HSI	51.72%	--	49.55%
	HSI	43.40%	--	42.35%
	Difference:	8.32%	--	7.20%

Differences are not reported for coeffceints that are not statistically significant

Source: Authors' calculations, Texas Higher Education Board, and Texas Education Agency

Table 4b
Predicted Probabilities for HBCUs

		1	2	3
		Basic Model	Matched Model	Matched with Institutional
1997				
	Not HBCU	44.01%	--	--
	HBCU	37.32%	--	--
	Difference:	6.69%	--	--
2000				
	Not HBCU	55.56%	54.07%	55.02%
	HBCU	41.60%	46.29%	44.95%
	Difference:	13.96%	7.78%	10.07%
2002				
	Not HBCU	45.55%	--	--
	HBCU	33.63%	--	--
	Difference:	11.92%	--	--

Differences are not reported for coefficeints that are not statistically significant

Source: Authors' calculations, Texas Higher Education Board, and Texas Education Agency