Labor Market Returns for Graduates of Hispanic Serving Institutions

Toby J. Park
Florida State University

Stella M. Flores
New York University

Christopher J. Ryan, Jr.
Vanderbilt University

The data for this study include administrative records from the Texas Education Agency, the Texas Higher Education Coordinating Board, and the Texas Workforce Commission. The conclusions of this research do not necessarily reflect the opinions or official position of the Texas Education Agency, the Texas Higher Education Coordinating Board, the Texas Workforce Commission, or the state of Texas.

Executive Summary

It is a well-known fact that Hispanics have become the largest minority group in the nation (Ennis, Rios-Vargas, & Albert, 2011). A significant demographic shift also has occurred in the U.S. higher education population, as Latinos have replaced Blacks as the largest minority group attending two- and four-year institutions (Fry & Lopez, 2012). A majority of these students now attend two- or four-year Hispanic-Serving Institutions (HSIs), a category of institution that is accredited, grants degrees, and whose full-time-equivalent undergraduate enrollment is at least 25% Hispanic (Santiago & Andrade, 2010; U.S. Department of Education, 2009). While HSIs have not received much attention in terms of policy analysis, their growing presence as first-choice institutions for a majority of Latino students highlights their importance in the Latino postsecondary trajectory (Benitez & DeAro, 2004; Flores & Park, 2013; Laden, 2004; Núñez et al., 2011; Provasnik & Shafer, 2004). In sum, no other set of postsecondary institutions educates the number of Latino students as a proportion of the college-going population than HSIs.

To date, little to no research exists on the effect of attending a particular type of institution on the individual wages earned by Latinos. That is, once a college degree is earned, do wages differ by type of four-year institution attended by Latinos? Previous work examining the effect of attending a selective public flagship university in Texas found that Whites were more likely to benefit from attending this institution as compared to their Black and Latino student peers in regard to wages (Andrews, Li, & Lovenheim, 2012, 2014). However, Latinos are not likely to attend a selective four-year institution in Texas; instead, Latinos are more likely to attend HSIs (Flores & Park, 2013). In addition, the research on labor market return for wages has often been assessed from the perspective of comparing Whites to non-whites as opposed to comparing Latinos to other Latinos using institutional type as the treatment variation within the four-year sector.

Research Questions. We sought to expand upon these studies by constructing an analytic model using data from a comprehensive student-level dataset in Texas in order to understand the effect of attending an HSI on labor market earnings for Hispanic students. Specifically, we asked:

1. Is there a difference in the student characteristics and labor market outcomes among Hispanics for HSI graduates compared to non-HSI graduates in Texas?
2. What is the net effect of attending an HSI on earnings of Hispanic college graduates in Texas?

Data Sources. Data for this paper came from the Education Research Center housed at the University of Texas at Dallas (UTD-ERC). The UTD-ERC manages student-level from the Texas Education Agency, the Texas Higher Education Coordinating Board, and the Texas Workforce Commission. We included three cohorts of Hispanic students who graduated from high school in the spring of 1997, 2000, and 2002, analyzing each of these cohorts separately. Our independent variable of interest was having graduated from an HSI. Our other independent variables included measures of: *student background characteristics, high school academic preparation, community context, economic capacity, major area, years of experience,* and *job location.* For our dependent variable—labor market return as represented by wages—we defined annual earnings as the total earnings reported in a calendar year (four-quarter) cycle beginning in

January, 10 years following high school graduation. These data were available from the Texas Workforce Commission.

Analytic Approach. To answer the first research question, we compiled a detailed descriptive portrait of Hispanic college graduates who attended HSIs compared to non-HSIs, with a focus on labor market earnings. Then, in order to identify the net effect of graduating from an HSI on earnings, we employed an earnings model containing the variables specified above. We addressed college selectivity by performing two iterations of the model, one of which using restrictions based on Barron's selectivity index. First, we modeled the results using all public universities in Texas and compare outcomes for Hispanic students attending HSI to non-HSIs. Then, we restricted our sample to include only those Hispanic students attending a "non-selective" or a "somewhat selective" institution. We did this in order to provide a more reasonable comparison between HSIs and non-HSIs as there are currently no HSIs in the top Barron categories. In essence, we provided comparisons with comparably ranked institutions. Given this and the effect of selectivity on labor market earnings, we restricted the model in this manner to compare HSIs to only those non-HSIs that are of the same selectivity level.

Findings. We identified the following key findings:

1. **The share of male graduates was higher at non-HSIs compared to HSIs.** While approximately 40% of each of the cohorts was male, the percentage of males graduating from non-HSIs in the 2002 cohort, for example, was 2.41 percentage points higher than HSIs.
2. **The wage differential has expanded between HSI graduates and non-HSI graduates.** In the 1997 cohort, graduates of non-HSIs held a $6,227.50 average wage premium over HSI graduates, a number that fell to $5,375.13 in the 2000 cohort but ballooned to $7,667.13 in the 2002 cohort (all expressed in constant, CPI-adjusted, 2002 dollars).
3. **Graduates of HSIs were nearly twice as likely to be classified as economically disadvantaged, compared to graduates of non-HSIs.** In 2002, for example, 54.89% of graduates from HSIs were classified as economically disadvantaged, compared to 29.94% of graduates of non-HSIs.
4. **After accounting for college selectivity, there was no difference in the earnings of Hispanic graduates from HSIs and non-HSIs.** There is no statistically significant difference between the earnings of graduates of HSIs compared to graduates of non-HSIs—Hispanic graduates from HSIs earn just as much as non-HSIs of similar selectivity.

This last finding is important, as HSIs are often criticized for low graduation rates and poor labor market outcomes. Not only has previous research demonstrated that Hispanic students graduate from college at equal rates at HSIs compared to non-HSIs after controlling for student and institutional characteristics (Flores & Park, 2014), this analysis suggests similar outcomes in regard to labor market outcomes: Hispanic students graduating from HSIs have comparable earnings to graduates from non-HSIs after accounting for selectivity. This fact is made even more relevant by considering that the majority of Hispanic students in Texas tend to enroll at non-selective or moderately selective institutions and HSIs in general tend to be funded at 66 cents per dollar compared to all other postsecondary institutions (Hispanic Association for Colleges and Universities, 2012). HSIs will continue to be important in the postsecondary

education and earnings story for Hispanics in America; this paper has laid a strong foundation and continued research is warranted in this arena.

Recommendations for Additional Research

1. ***Additional studies on HSIs in other state contexts***. For instance, California, New York, and Florida all have sizeable Hispanic populations and databases similar to Texas with which similar studies could be conducted.
2. ***Support for data access***. Without adequate resources—both funding and time—in place, papers like this are not possible. That said, Texas' data system is arguably one of the best in the nation so resources to support this level of data maintenance are understandably needed and required.
3. ***Building closer agency-researcher partnerships***. Investment in state agency-researcher partnerships is an investment in identifying more accurate, efficient solutions to improving educational policy and programming across the K-16 trajectory of American education.
4. ***Making broader data linkages across states.*** Although expanding data linkages to other states has many challenges, only by moving in this direction will we ever be able to tell a complete story of the role of education in the well-being of individuals in the United States.
5. ***Longitudinal data analysis.*** Measuring the effect of postsecondary education on labor market outcomes and other more long-term outcomes cannot be accurately done in a narrow window following graduation.
6. ***Acceptance of and attention to a changing demography in US higher education.*** A changing demography in our state contexts and institutions requires unifying our efforts for educational opportunity for the good of states and the nation.

Conclusion. While we have laid a strong foundation upon which additional studies can be built, not enough research exists studying the effect of HSIs, and MSIs more generally, on outcomes such as labor market returns and graduate degree acquisition. How does the effect of attending an HSI vary based on state context? Within Texas, what is the role of HSIs in both the acquisition of graduate degrees and the effect of graduate degrees on labor market outcomes? Answering these questions and others is only possible with enhanced access to and availability of high quality data. We urge state agencies, funding agencies, and other scholars to see the importance of state education data systems and their power in research. It is only through continued research using these datasets and the funding required to support this work that we will better understand the role of HSIs and, in turn, better evaluate and offer recommendations for state and federal policy that could improve educational outcomes for *all* students.

Labor Market Returns for Graduates of Hispanic Serving Institutions

It is a well-known fact that Hispanics[1] have become the largest minority group in the nation (Ennis, Rios-Vargas, & Albert, 2011). A significant demographic shift has also occurred in the U.S. higher education population, as Latinos have replaced Blacks as the largest minority group attending two- and four-year institutions, totaling over 2.4 million postsecondary students in 2012 (Fry & Lopez, 2012; Krogstad & Fry, 2014;). As of 2013, 58.9 percent of Hispanic college students now attend two- or four-year Hispanic-Serving Institutions (HSIs), a category of institution that is accredited, grants degrees, and maintains a full-time-equivalent undergraduate enrollment of at least 25% Hispanic students (Hispanic Association of Colleges and Universities, 2015; Santiago & Andrade, 2010; U.S. Department of Education, 2009, 2013). While HSIs have not received much attention in terms of policy analysis, their growing presence as first-choice institutions for a majority of Latino students highlights their importance in the Latino postsecondary trajectory (Benitez & DeAro, 2004; Flores & Park, 2013; Laden, 2004; Núñez et al., 2011; Provasnik & Shafer, 2004). In sum, no other set of postsecondary institutions educates the number of Latino students as a proportion of the college-going population than HSIs.

While the unprecedented growth of Latino students in U.S. postsecondary education has received increasing attention—for example, from 1996 to 2012, the number of Latinos enrolled in college grew more than 240 percent, far outpacing growth among Blacks, Asians, and Whites—so has the value of the college degree (Krogstad & Fry, 2014). The cost of college has risen at rates that have led to public alarm across many states and nationally, yet the value of the degree, particularly the four-year degree, has sustained its relevance in the U.S. economy (Carnevale, Smith, & Strohl, 2010; Perna & Finney, 2014). For example, Carnevale and colleagues (2010) estimate the lifetime earnings of those with a college degree to be $1.6 million higher than those with only a high school diploma, representing greater than a 191 percent increase in lifetime earnings over high school graduates. High school graduates can expect to earn 68 percent more than non-high school graduates, while those with associate's degrees or some college are likely to earn 26 percent more than high school graduates. In states where Latinos already comprise the majority-minority group, and the majority population in general in some school districts, the cost of not educating this population goes beyond the matter of individual wages and threatens state and national economic welfare (Smith, 2011). These figures suggest that the points in the educational pipeline most likely to result in a big jump in Latino wages are graduation from high school, enrolling in any college, and obtaining a bachelor's degree. It is this latter milestone that we seek to explore in this paper—the effect of a four-year college degree for Latino students in the schools they are most likely to attend: Hispanic Serving Institutions.

Earlier studies of labor market returns to college tended to focus on college as a mostly homogenous treatment, making any divisions only along broad categorizations such as two-year versus four-year schools (e.g., Kane & Rouse, 1997). More recently, however, researchers have begun to untangle the heterogeneous nature of college and explore how different types of universities may have differential returns for graduates in the labor market. Studies in the last five years have provided additional analytic detail by assessing the value of a selective college

[1] This study utilized the same definitional construction of the term "Hispanic" as is used by the 2010 U.S. Census. That is, an individual's self-identification of Hispanic origin, regardless of race, triggers their inclusion in this group. For purposes of this study, the terms "Latino" and "Hispanic" are used interchangeably.

degree (Long, 2010), and most recently, the value of attending a selective flagship public university[2] along with certain majors (Andrews, Li, & Lovenheim, 2012, 2014; Hoekstra, 2009). This vein of exploring the role of selectivity includes substantial research to back up the convention that attending a more selective institution yields greater earnings in the labor market for graduates (Dale & Krueger, 2002; Zhang, 2005;). One particular measure of college selectivity that has been used in previous studies investigating labor market returns to higher education is Barron's selectivity index. Studies using Barron's index have consistency found that students attending more selective universities have greater earnings after graduation (Brewer & Ehrenberg, 1996; Brewer et al., 1999).

Another vein of exploring the heterogeneous nature of college and its labor market returns is that of the returns to attending a Historically Black College or University (HBCU). Two studies have framed the outcomes to date on the effect of attending an HBCU on individual wages. Fryer and Greenstone (2010) utilized three large datasets (the National Longitudinal Survey of the High School Class of 1972, Baccalaureate and Beyond, and the College and Beyond data sets) in order to examine labor market consequences of HBCU attendance and found changes in the labor market returns to HBCU attendance over time. In fact, over the two decades between the 1970s and the 1990s, there was a 20 percent decline in relative wages of HCBU graduates that, by the 1990s, resulted in a wage penalty as compared with attending a traditionally white institution. Additionally, Strayhorn's (2008) analysis, using Baccalaureate and Beyond longitudinal survey data from the 1993 and 1997 cohorts, examined the labor market outcomes for African American college graduates attending HBCUs and found a moderate negative statistically significant effect between attending an HBCU and post-baccalaureate earnings. While these studies do not represent the definitive answer on the effect of attending an HBCU on wages, they are helpful in understanding how analysts may construct research questions relating to the various configurations by which we can understand the differential effects of attending other Minority Serving Institutions (MSIs) on different groups of students.

To date, little to no research exists on the effect of attending a particular type of institution on the individual wages earned by Latinos. That is, once a college degree is earned, do wages differ by type of four-year institution attended by Latinos? Previous work examining the effect of attending a selective public flagship university in Texas found that Whites were more likely to benefit from attending this institution as compared to their Black and Latino student peers with regard to wages (Andrews, Li, & Lovenheim, 2012, 2014). However, other studies have demonstrated that Latinos are not likely to attend a selective four-year institution in Texas; instead, Latinos in Texas were over 350 percent more likely to attend either a two- or four-year HSI than to attend a four-year non-HSI university (Flores & Park, 2013). In addition, the research on labor market return to wages has often been assessed from the perspective of comparing Whites to non-whites as opposed to comparing Latinos to other Latinos using institutional type as the treatment variation within the four-year sector.

[2] Reducing a university's decision to admit or deny students to both observable—standardized test scores and GPA—and unobservable variables, Dale & Krueger (2002) intuitively define selective institutions as those with higher thresholds necessary for admissions acceptance. Thus, the present study operationalized "selective flagship public universities" as the premier institutions of their respective university systems, such as University of Texas at Austin and Texas A&M University at College Station, which correspondingly have the lowest, and therefore most selective, acceptance rates in the State of Texas.

We sought to expand upon these studies by constructing an analytic model using data from a comprehensive student-level dataset in Texas in order to understand the effect of attending an HSI on labor market earnings for Hispanic students. Specifically, we asked:

1. Is there a difference in the student characteristics and earnings among Hispanics for HSI graduates compared to non-HSI graduates in Texas?
2. What is the relationship between attending an HSI and earnings for Hispanic college graduates in Texas?

We proceed as follows: First, we discuss the theoretical foundations that guide our investigation as well as previous research that has explored labor market returns to higher education and our specific research questions. Second, we provide more detailed information about the demographic and educational landscape of Texas, our focal state. Third, we present our research design, including a description of the student-level state dataset used for the analysis as well as our analytic approach. Fourth, we present our findings in terms of both a descriptive portrait of the data as well as the results from our econometric model. Fifth, we provide a discussion around these findings, offering a general conclusion. Finally, we provide recommendations for future research, highlighting the challenges and the importance of data access and continued research on HSIs and MSIs more generally.

Two key points are relevant in this analysis. First, postsecondary education in the United States is increasingly more diverse—both in terms of the students enrolled and also in terms of the different types of institutions serving these students—and the role of these institutions on long-term outcomes such as wages with the advent of new data sources is under-examined. Second, previous research suggests that the minority students account for the greatest growth in the number of students attending college, many of which enroll in MSIs (Flores & Park, 2013; Conrad & Gasman, 2015). Despite this trend, little is known about the labor market outcomes of minority students from MSIs such as HBCUs and HSIs as compared to other minority students who attend similarly ranked but less racially diverse institutions. This paper seeks to fill that void by examining the earnings of graduates of Hispanic Serving Institutions.

Conceptual Framework

A number of empirical studies have confirmed that college graduates earn more than high school graduates (Card, 1999; Pascarella & Terenzini, 1991, 2005; Smart, 1986). Indeed, Goldin and Katz (2007) have found that the correlation between education and labor market outcomes continues to increase in the United States. Although some have questioned the extent to which education truly is the causal mechanism behind increased earnings, many have demonstrated that—net of other factors—education still has a strong impact on labor market outcomes (Hout, 2012). In particular, previous research has demonstrated that students from socially or economically disadvantaged backgrounds tend to show the greatest gains from advanced education—a theory known as negative selection (Brand & Xie, 2010; Hout, 2012).

One lens to investigate the relationship between education and earnings is human capital theory, which suggests that the education and skills acquired by individuals will result in greater earnings in the labor market (Becker, 1964, 1967, 1993). As such, we controlled for measures of academic ability, major area of study, and years of experience, all known to have an effect on labor market earnings; specific details regarding these measures are contained later in this

manuscript (Pascarella & Terenzini, 2005; Mincer, 1974). Further, additional research has demonstrated that an important extension to human capital theory is conditioning earning functions by the location of individuals, as local prices and economic health also influence local wages (Black, Kolesnikova, & Taylor, 2009). In addition to human capital theory, another lens through which to investigate differences in labor market outcomes is social and cultural capital theories, which suggest that information available via formal and informal networks as well as normative structures put in place by local context may also influence earnings (Bourdieu & Passeron, 1997; McDonough, 1997). As such, and as has been done in several previous studies, we include proxies for social and cultural capital through measures of community context and economic capacity (Núñez & Bowers, 2011; Perna, 1998, 2004; Strayhorn, 2008; Zhang, 2005).

Given that Hispanic postsecondary students are over 151 percent more likely to attend two-year colleges than to attend four-year universities (Flores & Park, 2013), we argue that these students stand to benefit greatly from postsecondary education, inline with the negative selection theory (Hout, 2012). Furthermore, because evidence finds that Hispanic students graduate at equal rates from HSIs as compared to Hispanic students who attend non-HSIs after controlling for similar measures of capital as defined above (Flores & Park, 2014), we now evaluate how wages of graduates of HSIs compare to graduates of non-HSIs ten years after baccalaureate degree receipt—an area that has received very little scholarly attention to date, due in part to policy interest, data access, and availability.

Previous Literature

Few reports exist relating to the economic consequences of attending an MSI, and none seem to employ econometric models to examine the individual return on investment of attending an MSI. What is known about MSIs and especially HSIs, to date, is largely descriptive. For instance, a report commissioned by the Center for Urban Education at the University of Southern California has indicated that Hispanic students in California are disproportionately enrolled in community college, and thus, the majority of HSIs within the state are two-year institutions (Malcom-Piquex, et al., 2013). However, two concurrent studies—Flores & Park (2013) and Rodriguez & Calderón-Galdeano (2013)—employed a more rigorous approach to compare HSIs to non-HSIs, using propensity score matching based on the outcomes of an institution's graduates, including its graduation rates. These studies suggest three principal findings: First, HSIs and non-HSIs are different in terms of student compositions, institutional resources, and finance structures; for instance, HSIs tend to enroll more total students than non-HSIs. Second, propensity score matching on institutional characteristics yields mixed results; for example, some HSI institutions by sector did not have non-HSI matches. Finally, once matched, HSIs and non-HSIs had comparable outcomes, going against the notion that HSIs underperform (Flores & Park, 2013; Rodriguez & Calderón-Galdeano, 2013). Still, little is known about the economic effect of attending MSIs, and especially HSIs.

In fact, much of the research focusing on MSIs to date has dealt with the economic impact of the institutions themselves. For instance, Humphreys & Korb (2006), through the Institute for Education Sciences, issued a descriptive report analyzing the collective economic impact of HBCUs at the local, state, and national level. The American Indian Higher Education Consortium (AIHEC, 2000) produced a report, describing the economic development efforts of the Tribal Colleges and Universities and arguing that these colleges in fact do affect local community development. Lastly, the National Commission on Asian American and Pacific Islander Research in Education (2014) issued a brief, descriptive report that provides evidence

for the impact of federally-funded campus programs on persistence, degree attainment, and transfer to four-year institutions for low-income Asian American and Pacific Islander students enrolled at Asian American, Native American, and Pacific Islander Serving Institutions. As yet, there has not been a major study discussing the economic impact of HSIs or the individual return on investment of attending an HSI.

Background and Institutions

From the mid-1990s to 2004, the number of HSIs grew from 2% to 9% of total postsecondary institutions (Li, 2007). In 2014, there were a total of 409 HSIs in the United States, a 116 percent increase from 189 institutions in 1995 (Excelencia in Education, 2015a). Of these 409 HSIs nationally, 81 were four-year public universities, 190 were two-year public colleges, 125 were four-year private not-for-profit institutions, and 13 were two-year private not-for-profit institutions (Excelencia in Education, 2015b). The institutions are typically located in the Far West and the Southwest of the United States. Because of its classification requirements, the designation *HSI* does not mean that the institutions were founded to specifically focus on promoting the education and growth of Hispanic students (Harmon, 2012). Regardless, HSIs serve 42% of all Hispanic students, a figure that grows every year, with a concentration of institutions in Florida, Texas and California (Gasman et al., 2008; Harmon, 2012). In addition, the students attending HSIs are more likely to be first-generation college students, from low-income backgrounds, and those students with lower levels of academic preparation (Flores & Park, 2014; Gasman, et al., 2008; Harmon, 2012; Institute for Higher Education Policy, 2004; Li, 2007). For instance, in 2003, approximately 44% of Hispanic students attending HSIs were low-income versus the 30% attending non-minority serving institutions (Li, 2007).

Texas HSIs

Focusing on the Texas context, Texas contained 64 HSIs (including for-profit institutions) in 2004 that educated 23% of the Hispanic students in American postsecondary education. Further, Texas contains the second largest amount of HSIs after California, with the majority of those institutions at the two-year level (Li, 2007). The racial/ethnic breakdown of students attending eligible HSIs in 2008, for example, were: 55% Hispanic, 9% African American, 27% White, and 9% Asian American. From 2010 to 2020, the Texas Hispanic population is projected to grow by 31%, far outpacing the White population's projected growth of 2% (Fletcher & Webster, 2010). As the designation for an HSI is determined by its enrollment percentage of Hispanic students, this suggests that the number of HSIs in Texas will increase over the next decade. Therefore, studying their effect on graduation rates in comparison to non-HSIs has become critical to ensuring that the policy goals of increased attainment held by the President and varying grant-disbursing organizations (e.g., the Lumina Foundation) are met.

Table 1 provides a list of the four-year public universities included in our analysis, by selectivity and HSI designation. We included all four-year public universities in Texas from which students in our cohorts graduated.[3] Only institutions that awarded primarily Bachelor's degrees at the time of our analyses were included. Thus institutions that have since begun awarding BA degrees in addition to their primary purpose of awarding Associate degrees were

[3] UT-Tyler is not included in the 1997 cohort as, at that time, this institution only enrolled upper-division (junior and senior) students; freshman were first admitted to UT-Tyler in 1998. UT-Brownsville is not included in the 1997 and 2000 as, at that time, the database did not record baccalaureate degree graduates from this institution.

excluded. At the time our cohorts graduated from high school, Texas was home to 9 four-year public HSIs[4], all of which were classified as either "non-selective" or "somewhat selective." All of the institutions classified as "more selective" or "selective" are non-HSIs and include the two major flagship universities in the state: The University of Texas at Austin and Texas A&M University in College Station.[5] As noted, Hispanic students in Texas experience labor market gains from attending a state flagship university, yet these "more selective" institutions are also the institutions where Hispanic students in Texas are the least likely to attend (Andrews, Li, & Lovenheim, 2012, 2014; Flores & Park, 2013). For these reasons, we introduce sample restrictions by selectivity of institution attended in order to provide a more accurate and fair comparison of earnings for graduates of HSIs compared to non-HSIs, as discussed in more detail in the research design section.

Texas Economic Regions

Texas' regional economies are classified by state agencies into: economic regions, which is the classification used by the Texas Comptroller's Office (see Figure 1); and workforce development areas by the Texas Market and Career Information, a program of the Texas Workforce Commission. In many cases, economic regions are synonymous with or are comprised of multiple workforce development areas. The HSIs used in our analysis are located in the following economic regions: Alamo (University of Texas at San Antonio); Coastal Bend (Texas A&M University-Corpus Christi and Texas A&M University-Kingsville); Gulf Coast (University of Houston-Downtown); South Texas Border (Texas A&M International University, University of Texas Pan-American, and University of Texas at Brownsville); and Upper Rio Grande (Sul Ross State University, and University of Texas at El Paso).

On the whole—and with the exception of the Gulf Coast economic region, which encompasses Texas' largest city, Houston—these regional economic areas tend to support service industry jobs, as opposed to professional industry jobs, and lower average weekly wages than the state average. The top three industries by number of employees in these regions are: (1) trade, transportation, and utilities; (2) education and health services; and (3) travel and leisure. While unemployment rates vary among these regions and are occasionally above state averages, average weekly wages in these regions are well below state weekly wage averages (Texas Workforce Commission, 2015, June). Importantly, none of the HSIs used in our analysis are located in two of Texas' largest economic regions, after the Gulf Coast region—the Metroplex, and the Capital.

Research Design

Our research design is divided into two main sections: a description of the data sources used for this paper as well as the analytic approach used to answer our research questions. Included with the description of the data sources is a section on how we defined post-graduation earnings, our inclusion criteria, as well as some limitations of these data.

Data Sources

[4] UT-Permian Basin is not flagged as an HSI as it did not meet the 25% threshold in 1997; future analyses will allow for time-varying HSI indicators. Further, we do not include Brazosport College, Midland College, or South Texas College as HSIs; although these institutions meet the 25% threshold, they primarily award associate degrees.

[5] Selectivity rankings come from Barron's 1997 index and are time-invariant in cohort analyses.

Data for this paper came from the Education Research Center housed at the University of Texas at Dallas (UTD-ERC). The UTD-ERC manages student-level from the Texas Education Agency, the Texas Higher Education Coordinating Board, and the Texas Workforce Commission. Through the use of a de-identified student indicator, we were able to link these data together and include information on students from high school to college and on into the workforce.

Our independent variable of interest, whether a student graduated from an HSI, was defined using the federal designation of any institution that is accredited, grants degrees, and whose full-time-equivalent undergraduate enrollment is at least 25% Hispanic (Santiago & Andrade, 2010; U.S. Department of Education, 2009, 2013). Despite selecting this independent variable, we also acknowledge recent work that has begun to examine the heterogeneity within HSIs that has properly questioned whether the HSI designation enrollment criteria of 25% or more accurately represents the variation within the HSI institutional community (Núñez & Bowers, 2011; Núñez, Sparks & Hernandez, 2011). Our other independent variables included measures of:

1. *Student background characteristics [S]:* sex (coded as 1 for male) and limited English proficiency status. English learner status is coded as 1 for a student having been designated by the student's K-12 school district at the time of high school graduation. We note that English Learner designation at 12th grade is distinct from being identified as an English Learner in earlier grades;[6]
2. *High school academic preparation [ACAD]:* taking an Advanced Placement or International Baccalaureate course (coded as 1 for taken), taking a trigonometry course (coded as 1 for taken), state mathematics exam score (a linear measure), and whether the individual dual-enrolled at a college while still in high school (coded as 1 for those students who dual-enrolled);
3. *Community context [COMM]*: high school pupil-teacher ratio (a simple ratio), high school enrollment (included in the model as 1000s of students), high school minority percentage (a percentage of Hispanic and Black students), high school per-pupil expenditures (logged), urbanicity (as defined by the U.S. Census), county unemployment rate (a parentage), and binary indicator of whether the student's high school was within 25 miles of a postsecondary institution;
4. *Economic capacity [ECON]*: a binary indicator for high school free or reduced lunch status (FRL) and binary indicator whether the individual worked while still in high school;[7]
5. *Years of experience [EXPER]:* defined as the number of calendar years following graduation from high school in which an individual earned at least $100 in at least one quarter of the year;
6. *Major area [MAJ]:* included in the model as fixed effects defined by the two-digit Classification of Instructional Programs (CIP) for the program from which an individual graduated (all graduates regardless of major area are included in the analysis); and

[6] For a more detailed description of the identification of English Learners in Texas at the point of classification, see Flores, Batalova & Fix, 2010.

[7] Unfortunately, our data do not include financial aid information for respondents so we are not able to measure issues of affordability. Instead, the analysis focuses on level of economic disadvantage.

7. *Job location [LOC]:* included in the model as fixed effects for state of Texas's Economic Regions.

Defining Earnings

For our dependent variable—labor market return as represented by wages—data were available from the Texas Workforce Commission and were reported quarterly with separate records for individuals reporting income from more than one source. First, we determined the sum earnings for individuals reporting more than one source in a given quarter to achieve a total quarterly earnings figure. Then, we defined annual earnings as the total earnings reported in a calendar year (four-quarter) cycle beginning in January, 10 years following high school graduation. Thus, earnings for the 1997 cohort come from 2007, earnings for the 2000 cohort come from 2010, and earnings for the 2002 cohort come from 2012. We selected this timeframe based on Mincer (1974) who showed that the return to schooling could be underestimated if done so before enough time has passed. Specifically, Mincer (1974) and others have suggested that using earnings data from an individual's early twenties could be problematic as the return to attending postsecondary education may not yet be realized in the labor market (Andrews, Li, Lovenhiem, 2012, 2014; Hoekstra, 2009; Mincer, 1974). As we have investigated each cohort separately and as we were interested in the difference in earnings between HSI and non-HSI graduates, we did not adjust wage figures for inflation in our models; however, we do present constant, CPI-adjusted 2002 dollars in our descriptive portrait. Finally, due to the distribution of the earnings data, we took the natural log of wages for use in our analytic model.

*Sample Inclusion Criteria***.**

Given limitations associated with merging three independent data sources, we included three cohorts of Hispanic students who graduated from a public high school in Texas in the spring of 1997, 2000, and 2002, analyzing each of these cohorts separately. Each year represents a cohort prior to a particular policy change within Texas higher education and as well to have cohorts that meet the required six year graduation rate for our the last year of data available to us at the time of our analyses. For example, 1997 represents a year before the full implementation of the Texas Top Ten Percent Plan. The year 2000 represents a year before the implementation of the in-state resident tuition policy, House Bill 1403, as well as a new influx of state financial aid. Finally, 2002 represents the year before the implementation of deregulation in Texas colleges and universities that significantly increased tuition as compared to other states in the nation (Flores & Shepherd, 2014). In order to be included in the cohorts, individuals must have 1) enrolled in a public four-year university in Texas in the fall immediately following graduating from high school, 2) completed a college degree within 6 years, 3) possessed no missing data on any of the covariates used in the analysis and 4) showed earnings of at least $100 in all 4 quarters in the calendar year (four-quarter) cycle beginning in January, 10 years following high school graduation. Unlike other studies, however, we did not restrict our sample to only include males. We followed similar conventions incorporated previously by Andrews, Li, Lovenhiem, (2012, 2014) and Hoekstra (2009) who also utilized similar data.

Data Limitations

The data were subject to a number of limitations in regard to the availability of a full comprehensive list of variables that may be available in national datasets, such as parental

education and income and generational status in the U.S. Further, we did not have data on private schools or earnings data for individuals working outside of Texas. However, we emphasize the opportunity provided by these individual level state data in that they: (1) are connected to wage records not available nationally; (2) provide a longitudinal perspective on multiple cohorts across various economic periods in the U.S. and Texas; and (3) provide the opportunity to evaluate wages at the individual level accounting for both high school, postsecondary, and community contexts through the ability to incorporate other national datasets due to school and geographic identifiers tied to the student pre-college and postsecondary experience in the state. Thus, while no dataset is perfect, we argue that it is worthwhile to investigate individual level wage returns to attending these particular types of institutions, especially since they have not previously been evaluated in this manner.

Analytic Approach

To answer the first research question, we compiled a detailed descriptive portrait of Hispanic college graduates who attended HSIs compared to non-HSIs, with a focus on labor market earnings. In doing so, we examined not only the earnings data but also the student characteristics of graduates as well as the geographic location where these individuals were working. We conducted this investigation using a series of descriptive tables.

Then, in order to identify the net effect of graduating from an HSI on earnings, we employed an earnings model specified as follows:

$$log(earnings) = \alpha + \beta(HSI) + \theta(S) + \delta(ACAD) + \xi(COMM) + \lambda(ECON) + \pi(EXPER) + MAJ + LOC + \varepsilon$$

Under this specification, β captures the net effect of attending an HSI on earnings controlling for vectors *S, ACAD, COMM, ECON,* and *EXPER,* as identified above, as well as fixed effects for *MAJ* and *LOC;* ε is an individual specific error term. Earnings are logged due to their distribution and in accordance with previous literature (e.g., Cellini & Chaudhary, 2013; Dagdar & Weiss, 2012).

As previous research has indicated that attending a more selective institution has a positive impact on earnings, we have also addressed selectivity by performing two iterations of the model, one of which uses restrictions based on Barron's selectivity index. First, we modeled the results using all public universities in Texas and compared outcomes for Hispanic students attending HSI to non-HSIs. Then, we restricted our sample to include only those Hispanic students attending a "non-selective" or a "somewhat selective" institution. We did this in order to provide a more reasonable comparison between HSIs and non-HSIs as there are currently no HSIs in the top Barron categories. In essence, we made comparisons between comparably ranked institutions. Given this and the effect of selectivity on labor market earnings, we restricted the model in this manner to compare HSIs to only those non-HSIs that are of the same selectivity level.

This approach is built upon earlier studies that investigated the impact of postsecondary education on labor market oucomes (Andrews, Li, Lovenhiem, 2012, 2014; Hoekstra, 2009; Strayhorn, 2008). Further, as noted by Kaymak (2009), without proper statistical controls and carefully chosen comparison groups, it is difficult to identify the effect of education and labor market outcomes due to the spurious relationship between academic ability, college selectivity, and post-graduation earnings. As such, we were careful to construct our model with a number of

controls designed to capture human and social capital factors and then restricted our sample in a manner that provided a more accurate comparison between institutions. What follows is a discussion of the results gleaned from these approaches.

Results

Our results are organized in two parts. First, we present a descriptive portrait discussing the characteristics of Hispanic students graduating from HSIs and non-HSIs, their average earnings post-graduation, and a look at the economic regions in Texas where these students are working 10 years after graduating from high school. Second, we present the results from our analytic model.

Descriptive Portrait.

Tables 2a, 2b, and 2c provide key descriptive statistics, such as mean and standard deviation, or the primary variables of the analysis, organized by the 1997 (N=2,106), 2000 (N=2,781), and 2002 (N=3,196) cohort years. We present these in aggregated totals by year, as well as broken out by institution type (i.e. HSI or Non-HSI), and a differential column lists the difference between institution types. From this table, three main themes emerge and are discussed below.

First, it is worth noting that while the overall samples remain relatively consistent in terms of gender breakdown, with fewer males than females, there is a shift in the comparison by gender for HSIs versus non-HSIs. More specifically, approximately 40% of each of the cohorts is male: 39.65% in 1997, 39.23% in 2000, and 40.05% in 2002. However, only in the 1997 cohort is the proportion of Hispanic male graduates greater at HSIs (39.8%) than non-HSIs (37.62%). In both 2000 and 2002, total HSI graduates (N=1,323, and N=1,636) as compared with total non-HSI graduates (N=1,458, and N=1,560) had proportionally 3.75% and 2.41% more males, respectively. In regard to English Learner status, that the percentage of students classified with limited English proficiency dropped across all cohorts and across HSI designation signaling a potentially more selective cohort over time. The data show that the percentage of students classified with limited English proficiency dropped from 3.38% in 1997 to 1.50% in 2000 to 0.61% in 2002 at HSIs and from 0.64% in 1997 to 0.48% in 2000 to 0.38% in 2002 at non-HSIs.

Second, the story of wage differentials and economic disadvantage among institution types is striking. For instance, in the 1997 cohort, graduates of non-HSIs held a $6,227.50 average wage premium over HSI graduates, a number that fell to $5,375.13 in the 2000 cohort but increased to $7,667.13 in the 2002 cohort (all expressed in constant, CPI-adjusted, 2002 dollars). This widening wage gap trend by institution type is depicted in Figure 2 and is consistent with wage gap differential literature. Along the same lines, the percent of students classified as economically disadvantaged grew by year, as did the gap by institutional type (1997: 45.98% at HSIs and 23.02% at non-HSIs; 2000: 51.85% at HSIs and 28.05% at non-HSIs; and 2002: 54.89% at HSIs and 29.94% at non-HSIs). Put differently, the proportion of HSI graduates who were classified as economically disadvantaged was nearly double that of non-HSI graduates in every cohort.

Third, in terms of academic preparation, we found that, by year, graduates of both HSIs and non-HSIs are better prepared for college entry over time; however, graduates from HSIs remained slightly underprepared in terms of participation in rigorous academic coursework for entry into postsecondary education as compared to graduates from non-HSIs. With regard to

AP/IB courses, participation went from 34.56% in 1997 to 68.32% in 2000 to 65.65% in 2002 at HSIs and 48.59% in 1997 to 71.87% in 2000 to 75.13% in 2002 at non-HSIs. Thus, in terms of differences between the two types of institutions, graduates from HSIs were enrolled in this sort of advanced coursework at 14.03 percentage points lower than non-HSIs in 1997, but only 3.49 and 9.48 percentage points lower in 2000 and 2002, respectively. Further, the percentage of graduates who participated in dual enrollment programs while still in high school are nearly the same in later years, with the differential between HSIs and non-HSIs shrinking from 7.29 percentage points in 1997 to 0.67 percentage points in 2002.

Model Results

Table 3 presents regression results for our cohorts. For each, Model 1 is the full sample and Model 2 is the selectivity-restricted sample. All models include the full array of covariates that account for differences in human capital, social capital, and location of employment (Texas economic region) ten years after graduating from high school. In each cohort, the full model reveals a negative and statistically significant relationship between graduating from an HSI and earnings; however, the restricted model that accounts for selectivity shows no difference in the earnings of Hispanic graduates from HSIs and non-HSIs. As our models used logged wages as the outcome variable, the coefficients in the table are interpreted as a percent change in actual earnings. More specifically, Model 1 shows 7.1%, 6.5%, and 10.8% lower earnings for graduates of HSIs compared to non-HSIs for the 1997, 2000, and 2002 cohorts, respectively. However, in Model 2, there is no statistically significant difference between the earnings of graduates of HSIs compared to graduates of non-HSIs—Hispanic graduates from HSIs earn just as much as graduates non-HSIs with similar selectivity. Significant in most of the models, however, is gender (with males earning more than females), performance on the state math exam (with higher scores associated with higher earnings), and years of experience (which average nearly a 3% increase in wages earned per each additional year of experience).

Discussion

This paper sheds further light on HSIs—a growing segment of American higher education—and the population of students these institutions serve. Descriptively, we find that differences exist between Hispanics who graduate from HSIs compared to non-HSIs in terms of post-graduation earnings as well as pre-college academic preparation and contextual factors, both known to also have an influence on earnings. However, we demonstrate that differences in earnings between Hispanic students graduating from HSIs compared to non-HSIs are driven by selectivity, not HSI designation. When comparing graduates of HSIs versus non-HSIs with similar selectivity, there is no difference in wages after controlling for our measures of human and social capital and the region of Texas where college graduates are employed ten years after finishing high school.

This finding is important, as HSIs are often criticized for low graduation rates and poor labor market outcomes. Not only has previous research demonstrated that Hispanic students graduate from college at equal rates at HSIs compared to non-HSIs after controlling for student and institutional characteristics (Flores & Park, 2014), this analysis suggests similar outcomes in regard to labor market outcomes: Hispanic students graduating from HSIs have comparable earnings to Hispanic graduates from non-HSIs after accounting for selectivity. More selective, institutions, by definition, have more restricted admissions policies and enroll a more

academically prepared body of students. Analyses that compare HSIs to non-HSIs without accounting for the enormous role of selectivity should be questioned or at least acknowledge the important role of selection bias in interpreting such results. Proper comparison groups are the most accurate way to present research when available. If such data are not available, a common limitation in many analyses, we recommend acknowledging this limitation.

The analyses do not suggest that Hispanic students should not attend selective institutions. Rather, the analyses illuminate the need for accounting for key elements to reduce selection bias in the analysis of outcomes by institutional types. That is, compared to institutions of similar selectivity, Hispanic graduates of HSIs are earning similar wages as compared to their Hispanic peers in similarly ranked non-HSIs in the Texas labor market. This fact is made even more relevant by considering that the majority of Hispanic students in Texas tend to enroll at non-selective or moderately selective institutions and HSIs in general tend to be funded at 66 cents per dollar compared to all other postsecondary institutions (Hispanic Association for Colleges and Universities, 2013). HSIs will continue to be important in the postsecondary education and earnings story for Hispanics in America; this paper has laid a strong foundation and continued research is warranted in this arena.

Recommendations

In light of these findings and given the limited existing research in this area we offer the following recommendations and insights for the continued study of Hispanic students and HSIs, and minority students at MSIs more generally.

1. *Additional studies on HSIs in other state contexts using student level data.* This study is one of the first to examine how Hispanic students graduating from HSIs fare in the labor market compared to graduates of non-HSIs. While the dataset utilized is rich, provides for longitudinal tracking of students, and is housed in a state with a large number of HSIs and Hispanic postsecondary students, studies conducted in other contexts would help tell a more complete story of labor market returns to HSIs across the country. For instance, California, New York, and Florida all have sizeable Hispanic populations and databases similar to Texas with which similar studies could be conducted.
2. *Access to data and financial support.* Part of the reason studies like this one have not been conducted in other states is the challenge and expense of data access. In Texas, for example, researchers apply for data access through of the Education Research Centers (ERCs) across the state. After internal review, the request is forwarded to the Joint Advisory Board (JAB), comprised of members of the Texas Education Agency, the Texas Higher Education Coordinating Board, and other appointed members from across Texas and the rest of the country. After approval by the JAB, out of state researchers pay a fee (upwards of $45,000) for two years of data access and must travel to the ERC in order to access the data. Thus, without formal process to obtain data access and financial resources to enable researchers to conduct these analyses, papers like this are not possible.
3. *Building closer partnerships.* In order to secure access to state data, researchers often must identify how the proposed work meets the state's objectives, yet the mutually beneficial nature of researchers and state agencies is not always realized. In Florida,

for instance, researchers apply to use the state education data set and are required to demonstrate how the proposed research meets the current educational priorities of the state. While it is clearly important to help inform the state on key issues the state has identified, it could also be important to draw state attention to matters perhaps not directly identified already or not on the state's policy agenda. Agency-researcher partnerships, while difficult to achieve, can have many benefits including being proactive in addressing the forthcoming changes in a state's K-16 higher education system. In addition, as no dataset is perfect, capitalizing on the unique nature of a state's dataset through innovative studies may set new standards for federal data which currently also lack the capacity to answer certain questions only available to state agencies. In sum, investment in agency-researcher partnerships is an investment in identifying more accurate, efficient solutions to improving educational policy and programming across the K-16 trajectory of American education.

4. *Making broader data linkages across states.* The Texas dataset allowed us to track students from the K-12 school system into postsecondary education and into the workforce. As noted, however, the dataset is subject to a number of limitations, including not being able to track students who finish college and/or work outside Texas during our period of study. If, for instance, an individual leaves Texas to pursue work in another state, this individual is not included in our sample. Thus, without the ability to access employment data on individuals who leave Texas, we cannot tell a complete story. Although expanding data linkages to other states has many challenges, only by moving in this direction will we ever be able to tell a complete story of the role of education in the well-being of individuals in the United States. The State Higher Education Executive Officers (SHEEO) has developed reports that show the beginning of partnerships within and across states for linking data between sectors (K-16) and across some states (Garcia & L'Orange, 2010). Researchers should take time to familiarize themselves with possibilities, limitations, and priorities of state governments to more clearly understand if particular research agendas related to underserved students and institutions are part of these current agendas.
5. *Longitudinal data analysis.* In addition to broader linkages, data must be collected and analyzed in a longitudinal manner. As mentioned, measuring the effect of postsecondary education on labor market outcomes cannot be accurately done in a narrow window following graduation. Ideally, earnings data should be collected when students are in their late 20s and early 30s to provide a first glimpse of the return on investment. If possible, multiple years of earnings data from this timeframe could be averaged together to create a more stable figure of earnings, an important next step in our line of inquiry. We intend to follow the precedent to Hoekstra (2009) and others and include additional years of data in our outcome measure to produce a more stable figure for income. In addition, longitudinal data analysis allows researchers to account for other factors beyond postsecondary education such as graduate training. This, too, is a future line of inquiry for our work: to capture not only the effect of graduate degrees on labor market outcomes but also the factors, including HSI attendance, that predict graduate degree completion for Hispanic students.
6. *Acceptance of and attention to a changing demography in U.S. higher education.* U.S. higher education is experiencing a series of profound changes related to

> demography, technology, costs, and outcomes. As policies are suggested, implemented, and retracted, we recommend that precise and sustained attention to the changing student demography of U.S. higher education be a key priority for all states. Unresponsiveness to the evolving national demography is costly and counter to the goals of improving educational opportunity not only for civic and social justice reasons but also for economic survival of states and institutions. A changing demography in our state contexts and institutions requires unifying our efforts for educational opportunity for the good of states and the nation. Further investment in underserved students, data systems and the detailed architecture of said systems, and the evidence-based recommendations that result from these data is likely the overall economic and educational opportunities of all states and populations of the United States. The institutions that educate the largest minority in the nation—Hispanic Serving Institutions—are at the forefront of these strategies.

Conclusion

While we have laid a strong foundation upon which additional studies can be built, not enough research exists studying the effect of HSIs, and MSIs more generally, on more distal outcomes such as labor market returns and graduate degree acquisition. How does the effect of attending an HSI vary based on state context? Within Texas, what is the role HSIs in both the acquisition of graduate degrees and the effect of graduate degrees on labor market outcomes? These answers to these questions and others are only possible with enhanced access to and availability of high quality data. We urge state agencies, funding agencies, and other scholars to see the importance of state education data systems and their power in research as outlined here as well as in a recent special issue of *Educational Evaluation and Policy Analysis* (2015) edited by Susan Dynarski and Mark Berends. Only through continued research using these datasets and the funding required to support the work will we better understand the role of HSIs, allowing us to better evaluate and offer recommendations for state and federal policy that could improve educational outcomes for *all* students.

Tables & Figures

Table 1: Public universities in Texas, by selectivity and HSI designation

More Selective		Selective		Somewhat Selective		Non-Selective	
HSI	**Institution**	**HSI**	**Institution**	**HSI**	**Institution**	**HSI**	**Institution**
no	UT-Austin	*no*	U. North TX	*no*	Tarleton State U.	*yes*	UT-Pan American
no	A&M-College Station	*no*	U. Houston	*no*	Texas Women's U.	*yes*	U. Houston - Downtown
no	Texas Tech	*no*	Stephen F Austin State U.	*no*	UT-Permian Basin	*yes*	UT-El Paso
no	UT-Dallas	*no*	Sam Houston State U.	*no*	TX Southern U.	*yes*	A&M-International
no	A&M-Galveston*	*no*	UT-Arlington	*yes*	Sul Ross State U.	*yes*	A&M-Corpus Christi
		no	Angelo State U.	yes	A&M-Kingsville	*yes*	UT-Brownsville***
		no	West TX A&M	yes	UT-San Antonio		
		no	Lamar U.	*no*	UT-Tyler**		
		no	TX State U.				
		no	Prairie View A&M				
		no	A&M-Commerce				
		no	Midwestern State U.				

Notes: **Degrees from A&M-Galveston are granted through A&M College Station*
***UT-Tyler is not included in the 1997 cohort due to data collection limitations.*
****UT-Brownsville is not included in the 1997 and 2000 cohorts due to data collection limitations.*
Selectivity rankings come from Barron 1997 and are used for all cohorts.

Table 2a: Descriptive statistics for the 1997 cohort

	TOTAL (N=2,106	HSIs (N=1,007)	NON-HSIs (N=1,099)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
1997 dollars	48,080.31 *20,676.12*	45,180.66 *16,683.84*	50,737.22 *23,447.15*	-5,556.56
Constant 2002 dollars	53,885.90 *23,172.71*	50,636.12 *18,698.37*	56,863.62 *26,278.34*	-6,227.50
Student background characteristics				
Sex (percent male)	39.65 *48.93*	39.87 *48.98*	37.62 *48.47*	2.25
LEP status	1.95 *13.82*	3.38 *18.07*	0.64 *7.96*	2.74
High school academic preparation [ACAD]				
AP or IB course	41.88 *49.35*	34.56 *47.58*	48.59 *50.00*	-14.03
Trigonometry course	53.47 *49.89*	43.69 *49.63*	62.42 *48.45*	-18.73
Math exam score	50.77 *8.02*	49.27 *8.08*	52.15 *7.71*	-2.88
Dual enrollment indicator	12.35 *32.90*	8.54 *27.96*	15.83 *36.52*	-7.29
Community context [COMM]				
HS pupil:teacher ratio	15.21 *2.28*	14.94 *2.09*	15.45 *2.42*	-0.51
HS enrollment	1,828.43 *842.57*	1,752.70 *775.77*	1,897.82 *894.17*	-145.12
HS percent minority	70.07 *27.83*	82.45 *19.90*	58.74 *29.20*	23.71
Log HS per pupil expenditures	8.13 *0.11*	8.15 *0.10*	8.11 *0.11*	0.04
HS urbanicity	53.28 *49.90*	56.21 *49.64*	50.59 *50.02*	5.62
County unemployment rate	8.64 *6.33*	10.76 *7.01*	6.69 *4.89*	4.06
Proximity to postsecondary	84.43 *36.27*	86.20 *34.51*	82.80 *37.75*	3.39
Economic capacity [ECON]				
FRL status	34.00 *47.38*	45.98 *49.86*	23.02 *42.12*	22.96
Worked in HS	13.06 *33.70*	10.53 *30.70*	15.38 *36.09*	-4.85

Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 2b: Descriptive statistics for the 2000 cohort

	TOTAL (N=2,781)	HSIs (N=1,323)	NON-HSIs (N=1,458)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
2000 dollars	49,200.85 *22,559.10*	46,503.14 *19,227.95*	51,648.78 *24,959.14*	-5,145.64
Constant 2002 dollars	51,395.17 *23,565.22*	48,577.15 *20,085.50*	53,952.28 *26,072.30*	-5,375.13
Student background characteristics				
Sex (percent male)	39.23 *48.84*	37.26 *48.37*	41.02 *49.20*	-3.75
LEP status	1.01 *9.99*	1.59 *12.50*	0.48 *6.91*	1.11
High school academic preparation [ACAD]				
AP or IB course	70.30 *45.70*	68.63 *46.42*	71.81 *45.01*	-3.18
Trigonometry course	69.76 *45.94*	64.32 *47.92*	74.69 *43.49*	-10.37
Math exam score	52.91 *6.60*	51.87 *7.24*	53.85 *5.80*	-1.98
Dual enrollment indicator	22.76 *41.94*	18.59 *38.92*	26.54 *44.17*	-7.95
Community context [COMM]				
HS pupil:teacher ratio	15.01 *2.39*	14.71 *2.20*	15.28 *2.53*	-0.57
HS enrollment	1,791.75 *827.45*	1,670.17 *702.38*	1,902.08 *912.77*	-231.91
HS percent minority	70.04 *29.10*	85.37 *17.76*	56.12 *30.37*	29.25
Log HS per pupil expenditures	8.29 *0.10*	8.30 *0.10*	8.29 *0.11*	0.01
HS urbanicity	53.97 *49.85*	59.11 *49.18*	49.31 *50.01*	9.79
County unemployment rate	5.54 *2.63*	6.42 *2.96*	4.73 *1.98*	1.69
Proximity to postsecondary	84.75 *35.95*	86.70 *33.97*	82.99 *37.58*	3.71
Economic capacity [ECON]				
FRL status	39.37 *48.87*	51.85 *49.98*	28.05 *44.94*	23.80
Worked in HS	14.42 *35.13*	9.15 *28.84*	19.20 *39.40*	-10.06

Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 2c: Descriptive statistics for the 2002 cohort

	TOTAL (N=3,196)	HSIs (N=1,636)	NON-HSIs (N=1,560)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
2002 dollars	50,316.46 *22,559.10*	46,574.06 *19,227.95*	54,241.19 *24,959.14*	-7,667.13
Student background characteristics				
Sex (percent male)	40.05 *49.01*	38.88 *48.76*	41.28 *49.25*	-2.41
LEP status	0.50 *7.06*	0.61 *7.80*	0.38 *6.19*	0.23
High school academic preparation [ACAD]				
AP or IB course	70.28 *45.71*	65.65 *47.50*	75.13 *43.24*	-9.48
Trigonometry course	70.53 *45.60*	64.49 *47.87*	76.86 *42.19*	-12.37
Math exam score	53.81 *7.13*	53.15 *6.87*	54.51 *7.34*	-1.36
Dual enrollment indicator	33.89 *47.34*	33.56 *47.23*	34.23 *47.46*	-0.67
Community context [COMM]				
HS pupil:teacher ratio	15.01 *2.39*	14.71 *2.20*	15.28 *2.53*	-0.57
HS enrollment	1,818.04 *837.92*	1,735.33 *735.37*	1,904.77 *925.78*	-169.44
HS percent minority	71.71 *27.93*	84.23 *19.64*	58.58 *29.29*	25.64
Log HS per pupil expenditures	8.37 *0.10*	8.38 *0.11*	8.36 *0.10*	*0.02*
HS urbanicity	53.72 *49.87*	58.99 *49.20*	48.21 *49.98*	10.78
County unemployment rate	7.27 *2.38*	8.01 *2.67*	6.50 *1.71*	1.51
Proximity to postsecondary	82.13 *38.31*	84.60 *36.11*	79.55 *40.35*	5.05
Economic capacity [ECON]				
FRL status	42.71 *49.47*	54.89 *49.78*	29.94 *45.81*	24.95
Worked in HS	12.36 *32.92*	9.78 *29.71*	15.06 *35.78*	-5.28

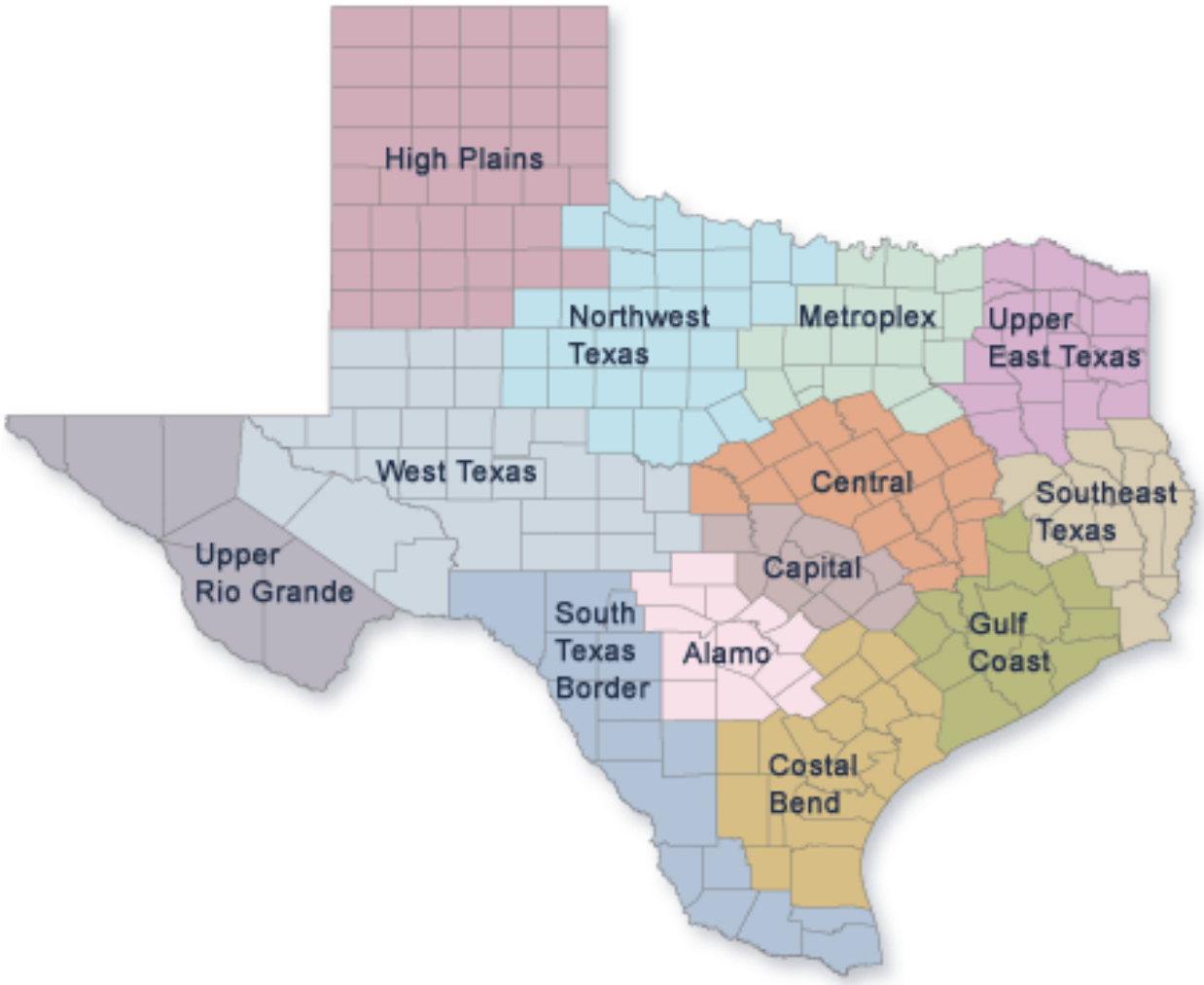
Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 3: Regression model results predicting log(earnings)

	1997		2000		2002	
	Model 1	Model 2	Model1	Model 2	Model 1	Model 2
HSI designation						
HSI	-0.071***	-0.088	-0.065**	0	-0.108***	-0.085
	[0.02]	[0.07]	[0.02]	[0.07]	[0.02]	[0.06]
Student background characteristics						
Sex (percent male)	0.041*	-0.001	0.084***	0.069*	0.068***	0.063**
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
LEP status	0.101	0.136*	0	0.018	-0.147	-0.280*
	[0.06]	[0.07]	[0.09]	[0.09]	[0.11]	[0.14]
High school academic preparation [ACAD]						
AP or IB course	0.017	0.032	0.021	-0.019	0.038*	0.045
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Trigonometry course	0.022	0.026	0.056**	0.029	0.004	0.007
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Math exam score	0.003**	0.002	0.004**	0.004*	0.003*	0.005***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Dual enrollment indicator	0.022	0.057	0.04	0.053	0.054**	0.066**
	[0.03]	[0.04]	[0.02]	[0.03]	[0.02]	[0.03]
Community context [COMM]						
HS pupil:teacher ratio	0	-0.011	0	0.002	-0.001	0.002
	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]
HS enrollment (1,000s)	0.004**	0.007**	0.001	-0.004	0.002	0.002
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
HS percent minority	0.046	0.079	0.01	0.065	0	0.062
	[0.04]	[0.07]	[0.04]	[0.07]	[0.04]	[0.06]
HS per pupil expenditures	0.203*	0.285	-0.138	-0.028	-0.13	-0.048
	[0.10]	[0.15]	[0.10]	[0.14]	[0.09]	[0.12]
HS urbanicity	-0.055**	-0.032	-0.011	0	-0.013	-0.009
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
County unemployment rate	0.002	0.002	0.007	0.003	0.004	-0.004
	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.01]
Proximity to postsecondary	0.044	0.005	0.034	0.031	-0.033	-0.034
	[0.03]	[0.04]	[0.03]	[0.04]	[0.02]	[0.03]
Economic capacity [ECON]						
FRL status	-0.035	-0.034	-0.057**	-0.048	-0.035*	-0.049*
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Worked in HS	0.069**	0.076	0.052*	0.096*	0.019	0.039
	[0.03]	[0.04]	[0.02]	[0.04]	[0.02]	[0.04]
Years of experience [EXPER]						
Years	0.021***	0.014	0.035***	0.035***	0.028***	0.031***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]
Includes major area fixed effects [MAJ]	yes	yes	yes	yes	yes	yes
Includes economic region fixed effects [LOC]	yes	yes	yes	yes	yes	yes
N	2,106	1,046	2,780	1,376	3,196	1,711
R-squared	0.171	0.14	0.174	0.175	0.195	0.201

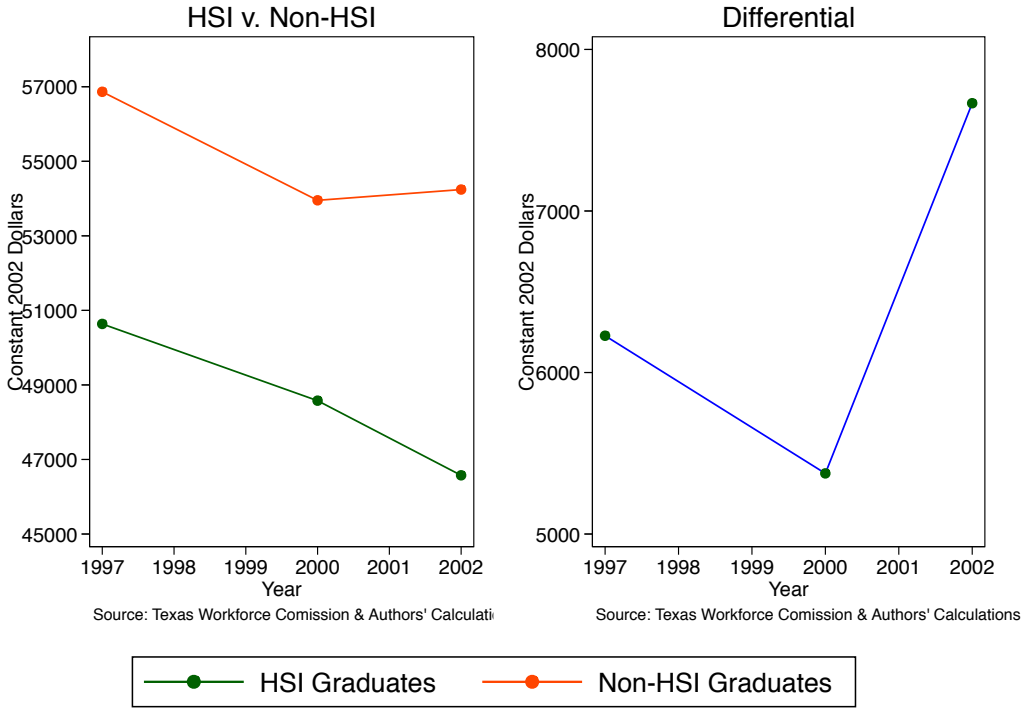
** p<0.05, ** p<0.01, *** p<0.001*
Standard Errors are in brackets.
Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Figure 1: Texas Comptroller's Economic Regions Map



Courtesy: Texas Politics Project at the University of Texas at Austin. Available at: http://texaspolitics.utexas.edu/archive/html/pec/features/0302_02/regmap.html.

Figure 2: Earnings by HSI designation and differential



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Tables & Figures

Table 1: Public universities in Texas, by selectivity and HSI designation

More Selective		Selective		Somewhat Selective		Non-Selective	
HSI	**Institution**	**HSI**	**Institution**	**HSI**	**Institution**	**HSI**	**Institution**
no	UT-Austin	*no*	U. North TX	*no*	Tarleton State U.	*yes*	UT-Pan American
no	A&M-College Station	*no*	U. Houston	*no*	Texas Women's U.	*yes*	U. Houston - Downtown
no	Texas Tech	*no*	Stephen F Austin State U.	*no*	UT-Permian Basin	*yes*	UT-El Paso
no	UT-Dallas	*no*	Sam Houston State U.	*no*	TX Southern U.	*yes*	A&M-International
no	A&M-Galveston*	*no*	UT-Arlington	*yes*	Sul Ross State U.	*yes*	A&M-Corpus Christi
		no	Angelo State U.	yes	A&M-Kingsville	*yes*	UT-Brownsville***
		no	West TX A&M	yes	UT-San Antonio		
		no	Lamar U.	*no*	UT-Tyler**		
		no	TX State U.				
		no	Prairie View A&M				
		no	A&M-Commerce				
		no	Midwestern State U.				

Notes: **Degrees from A&M-Galveston are granted through A&M College Station*
***UT-Tyler is not included in the 1997 cohort due to data collection limitations.*
****UT-Brownsville is not included in the 1997 and 2000 cohorts due to data collection limitations.*
Selectivity rankings come from Barron 1997 and are used for all cohorts.

Table 2a: Descriptive statistics for the 1997 cohort

	TOTAL (N=2,106	HSIs (N=1,007)	NON-HSIs (N=1,099)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
1997 dollars	48,080.31 *20,676.12*	45,180.66 *16,683.84*	50,737.22 *23,447.15*	-5,556.56
Constant 2002 dollars	53,885.90 *23,172.71*	50,636.12 *18,698.37*	56,863.62 *26,278.34*	-6,227.50
Student background characteristics				
Sex (percent male)	39.65 *48.93*	39.87 *48.98*	37.62 *48.47*	2.25
LEP status	1.95 *13.82*	3.38 *18.07*	0.64 *7.96*	2.74
High school academic preparation [ACAD]				
AP or IB course	41.88 *49.35*	34.56 *47.58*	48.59 *50.00*	-14.03
Trigonometry course	53.47 *49.89*	43.69 *49.63*	62.42 *48.45*	-18.73
Math exam score	50.77 *8.02*	49.27 *8.08*	52.15 *7.71*	-2.88
Dual enrollment indicator	12.35 *32.90*	8.54 *27.96*	15.83 *36.52*	-7.29
Community context [COMM]				
HS pupil:teacher ratio	15.21 *2.28*	14.94 *2.09*	15.45 *2.42*	-0.51
HS enrollment	1,828.43 *842.57*	1,752.70 *775.77*	1,897.82 *894.17*	-145.12
HS percent minority	70.07 *27.83*	82.45 *19.90*	58.74 *29.20*	23.71
Log HS per pupil expenditures	8.13 *0.11*	8.15 *0.10*	8.11 *0.11*	0.04
HS urbanicity	53.28 *49.90*	56.21 *49.64*	50.59 *50.02*	5.62
County unemployment rate	8.64 *6.33*	10.76 *7.01*	6.69 *4.89*	4.06
Proximity to postsecondary	84.43 *36.27*	86.20 *34.51*	82.80 *37.75*	3.39
Economic capacity [ECON]				
FRL status	34.00 *47.38*	45.98 *49.86*	23.02 *42.12*	22.96
Worked in HS	13.06 *33.70*	10.53 *30.70*	15.38 *36.09*	-4.85

Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 2b: Descriptive statistics for the 2000 cohort

	TOTAL (N=2,781)	HSIs (N=1,323)	NON-HSIs (N=1,458)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
2000 dollars	49,200.85 *22,559.10*	46,503.14 *19,227.95*	51,648.78 *24,959.14*	-5,145.64
Constant 2002 dollars	51,395.17 *23,565.22*	48,577.15 *20,085.50*	53,952.28 *26,072.30*	-5,375.13
Student background characteristics				
Sex (percent male)	39.23 *48.84*	37.26 *48.37*	41.02 *49.20*	-3.75
LEP status	1.01 *9.99*	1.59 *12.50*	0.48 *6.91*	1.11
High school academic preparation [ACAD]				
AP or IB course	70.30 *45.70*	68.63 *46.42*	71.81 *45.01*	-3.18
Trigonometry course	69.76 *45.94*	64.32 *47.92*	74.69 *43.49*	-10.37
Math exam score	52.91 *6.60*	51.87 *7.24*	53.85 *5.80*	-1.98
Dual enrollment indicator	22.76 *41.94*	18.59 *38.92*	26.54 *44.17*	-7.95
Community context [COMM]				
HS pupil:teacher ratio	15.01 *2.39*	14.71 *2.20*	15.28 *2.53*	-0.57
HS enrollment	1,791.75 *827.45*	1,670.17 *702.38*	1,902.08 *912.77*	-231.91
HS percent minority	70.04 *29.10*	85.37 *17.76*	56.12 *30.37*	29.25
Log HS per pupil expenditures	8.29 *0.10*	8.30 *0.10*	8.29 *0.11*	0.01
HS urbanicity	53.97 *49.85*	59.11 *49.18*	49.31 *50.01*	9.79
County unemployment rate	5.54 *2.63*	6.42 *2.96*	4.73 *1.98*	1.69
Proximity to postsecondary	84.75 *35.95*	86.70 *33.97*	82.99 *37.58*	3.71
Economic capacity [ECON]				
FRL status	39.37 *48.87*	51.85 *49.98*	28.05 *44.94*	23.80
Worked in HS	14.42 *35.13*	9.15 *28.84*	19.20 *39.40*	-10.06

Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 2c: Descriptive statistics for the 2002 cohort

	TOTAL (N=3,196)	HSIs (N=1,636)	NON-HSIs (N=1,560)	DIFFERENCE
	Mean *St. Dev.*	Mean *St. Dev.*	Mean *St. Dev.*	
Wages				
2002 dollars	50,316.46 *22,559.10*	46,574.06 *19,227.95*	54,241.19 *24,959.14*	-7,667.13
Student background characteristics				
Sex (percent male)	40.05 *49.01*	38.88 *48.76*	41.28 *49.25*	-2.41
LEP status	0.50 *7.06*	0.61 *7.80*	0.38 *6.19*	0.23
High school academic preparation [ACAD]				
AP or IB course	70.28 *45.71*	65.65 *47.50*	75.13 *43.24*	-9.48
Trigonometry course	70.53 *45.60*	64.49 *47.87*	76.86 *42.19*	-12.37
Math exam score	53.81 *7.13*	53.15 *6.87*	54.51 *7.34*	-1.36
Dual enrollment indicator	33.89 *47.34*	33.56 *47.23*	34.23 *47.46*	-0.67
Community context [COMM]				
HS pupil:teacher ratio	15.01 *2.39*	14.71 *2.20*	15.28 *2.53*	-0.57
HS enrollment	1,818.04 *837.92*	1,735.33 *735.37*	1,904.77 *925.78*	-169.44
HS percent minority	71.71 *27.93*	84.23 *19.64*	58.58 *29.29*	25.64
Log HS per pupil expenditures	8.37 *0.10*	8.38 *0.11*	8.36 *0.10*	*0.02*
HS urbanicity	53.72 *49.87*	58.99 *49.20*	48.21 *49.98*	10.78
County unemployment rate	7.27 *2.38*	8.01 *2.67*	6.50 *1.71*	1.51
Proximity to postsecondary	82.13 *38.31*	84.60 *36.11*	79.55 *40.35*	5.05
Economic capacity [ECON]				
FRL status	42.71 *49.47*	54.89 *49.78*	29.94 *45.81*	24.95
Worked in HS	12.36 *32.92*	9.78 *29.71*	15.06 *35.78*	-5.28

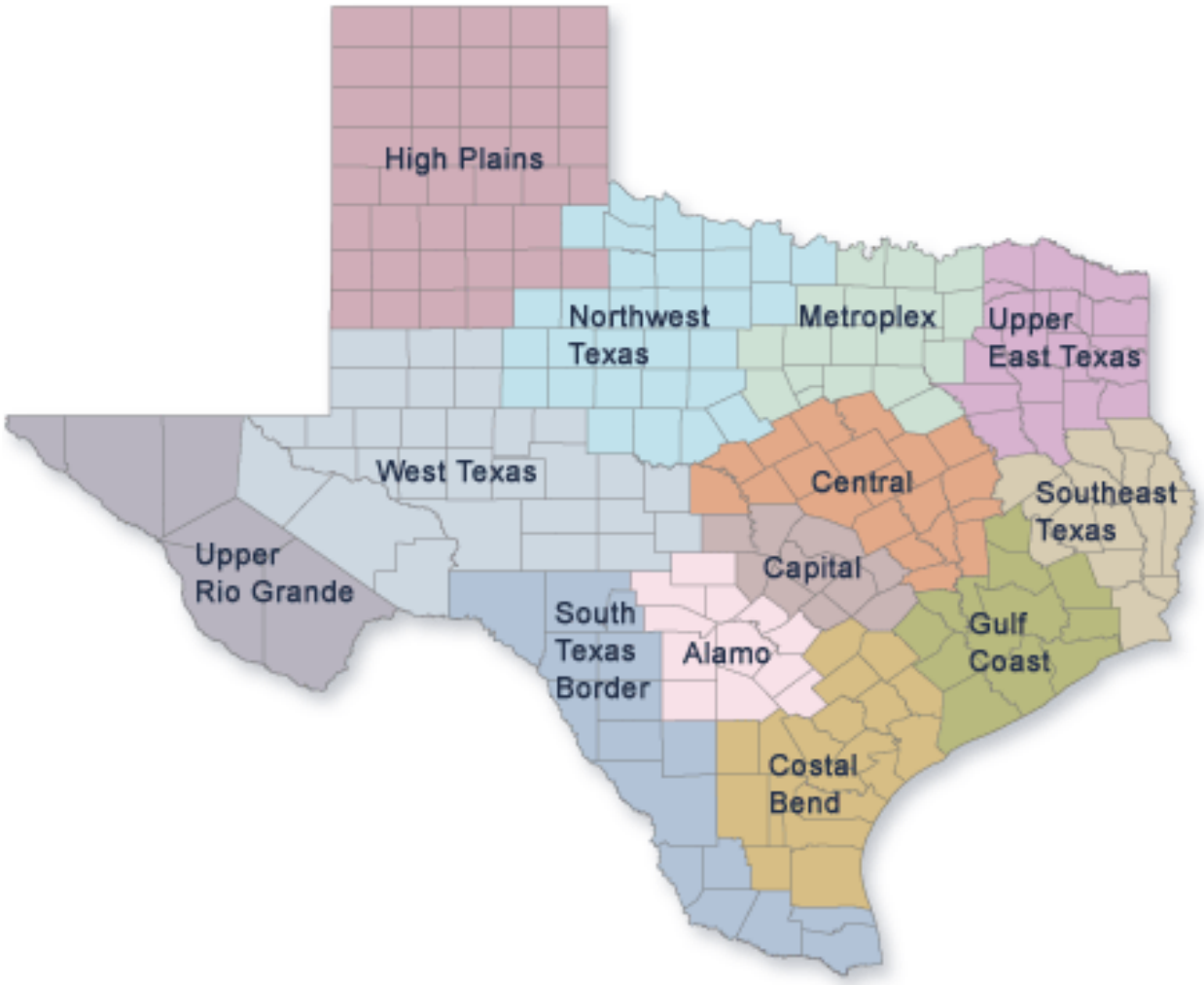
Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Table 3: Regression model results predicting log(earnings)

	1997		2000		2002	
	Model 1	Model 2	Model1	Model 2	Model 1	Model 2
HSI designation						
HSI	-0.071***	-0.088	-0.065**	0	-0.108***	-0.085
	[0.02]	[0.07]	[0.02]	[0.07]	[0.02]	[0.06]
Student background characteristics						
Sex (percent male)	0.041*	-0.001	0.084***	0.069*	0.068***	0.063**
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
LEP status	0.101	0.136*	0	0.018	-0.147	-0.280*
	[0.06]	[0.07]	[0.09]	[0.09]	[0.11]	[0.14]
High school academic preparation [ACAD]						
AP or IB course	0.017	0.032	0.021	-0.019	0.038*	0.045
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Trigonometry course	0.022	0.026	0.056**	0.029	0.004	0.007
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Math exam score	0.003**	0.002	0.004**	0.004*	0.003*	0.005***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Dual enrollment indicator	0.022	0.057	0.04	0.053	0.054**	0.066**
	[0.03]	[0.04]	[0.02]	[0.03]	[0.02]	[0.03]
Community context [COMM]						
HS pupil:teacher ratio	0	-0.011	0	0.002	-0.001	0.002
	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]
HS enrollment (1,000s)	0.004**	0.007**	0.001	-0.004	0.002	0.002
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
HS percent minority	0.046	0.079	0.01	0.065	0	0.062
	[0.04]	[0.07]	[0.04]	[0.07]	[0.04]	[0.06]
HS per pupil expenditures	0.203*	0.285	-0.138	-0.028	-0.13	-0.048
	[0.10]	[0.15]	[0.10]	[0.14]	[0.09]	[0.12]
HS urbanicity	-0.055**	-0.032	-0.011	0	-0.013	-0.009
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
County unemployment rate	0.002	0.002	0.007	0.003	0.004	-0.004
	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.01]
Proximity to postsecondary	0.044	0.005	0.034	0.031	-0.033	-0.034
	[0.03]	[0.04]	[0.03]	[0.04]	[0.02]	[0.03]
Economic capacity [ECON]						
FRL status	-0.035	-0.034	-0.057**	-0.048	-0.035*	-0.049*
	[0.02]	[0.03]	[0.02]	[0.03]	[0.02]	[0.02]
Worked in HS	0.069**	0.076	0.052*	0.096*	0.019	0.039
	[0.03]	[0.04]	[0.02]	[0.04]	[0.02]	[0.04]
Years of experience [EXPER]						
Years	0.021***	0.014	0.035***	0.035***	0.028***	0.031***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]	[0.01]
Includes major area fixed effects [MAJ]	yes	yes	yes	yes	yes	yes
Includes economic region fixed effects [LOC]	yes	yes	yes	yes	yes	yes
N	2,106	1,046	2,780	1,376	3,196	1,711
R-squared	0.171	0.14	0.174	0.175	0.195	0.201

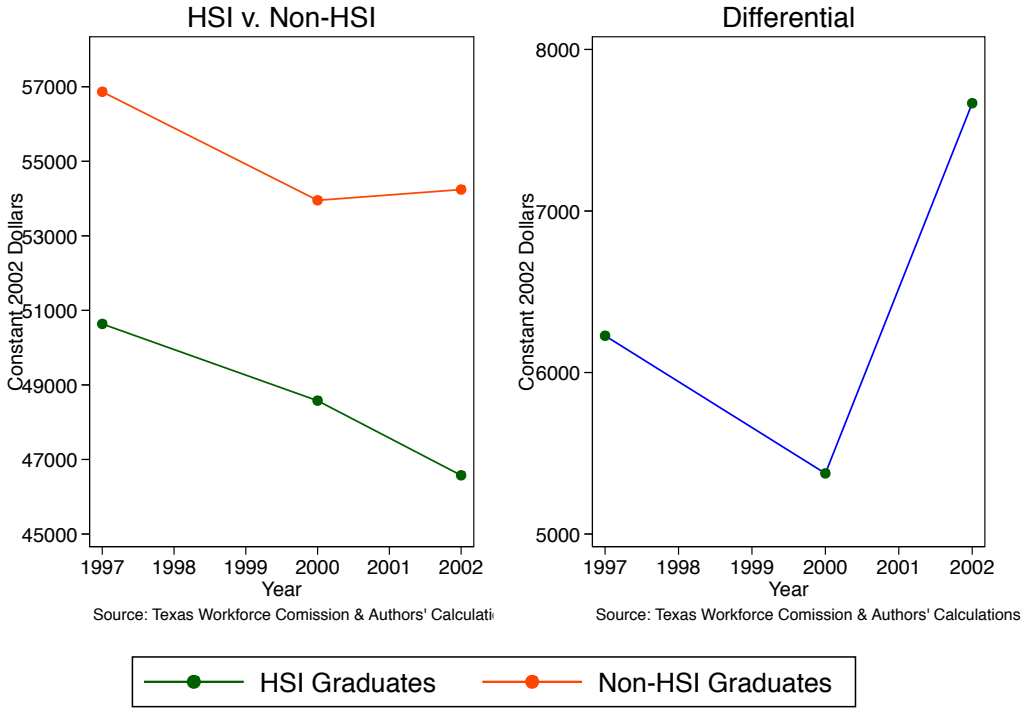
** p<0.05, ** p<0.01, *** p<0.001*
Standard Errors are in brackets.
Notes: LEP refers to Limited English Proficiency; AP refers to Advanced Placement; IB refers to International Baccalaureate; and FRL refers to Free and Reduced Lunch

Figure 1: Texas Comptroller's Economic Regions Map



Courtesy: Texas Politics Project at the University of Texas at Austin. Available at: http://texaspolitics.utexas.edu/archive/html/pec/features/0302_02/regmap.html.

Figure 2: Earnings by HSI designation and differential



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