DISTANCE TO OPPORTUNITY: HIGHER EDUCATION DESERTS AND COLLEGE ENROLLMENT CHOICES

Riley Acton*
Miami University

Kalena E. Cortes
Texas A&M University

Camila Morales
University of Texas at Dallas

This version: March 25, 2024

ABSTRACT: We study how geographic access to public postsecondary institutions influences students' college enrollment decisions across race and socioeconomic status. Leveraging rich administrative data, we first document substantial differences in students' local college options, with White, Hispanic, and rural students having, on average, many fewer nearby options than their Black, Asian, suburban, and urban peers. We then show that students are sensitive to the distance they must travel to access public colleges and universities, but there are heterogeneous effects across students. In particular, we find that White and non-economically disadvantaged students respond to living far from public two-year colleges primarily by enrolling in four-year colleges, whereas Black, Hispanic, and economically disadvantaged students respond primarily by forgoing college enrollment altogether. Lastly, in a series of decomposition and simulation exercises to inform public policy efforts to increase college enrollment, especially among underrepresented minority students, we find that differences in students' *sensitivity* to distance, rather than *differences* in distance to the nearest college, primarily contribute to observed college enrollment gaps across racial and ethnic groups. Specifically, differences in how students respond to distance to two-year colleges contribute to nearly 10 percent of the four-year college enrollment gap.

JEL CODES: I21, I23, I24.

KEYWORDS: college accessibility; college proximity; college choices; college enrollment; college enrollment patterns; two-year colleges; four-year colleges; public postsecondary institutions.

---

* Acton: Department of Economics, Miami University, 800 E. High St., Oxford, OH 45056 (e-mail: actonr@miamioh.edu). Cortes: The Bush School of Government and Public Service, Texas A&M University, 4220 TAMU, 2088 Allen Building, College Station, TX 77843 (e-mail: kcortes@tamu.edu). Morales: Economics Program, University of Texas at Dallas, 800 W Campbell Rd, Richardson, TX, 75080 (email: camila.morales@utdallas.edu).
We thank Rachel Baker, Zachary Bleemer, John Campbell, Joshua Goodman, Kaye Husbands Fealing, James Poterba, Lori Taylor, seminar and conference participants at Texas A&M University, the Association for Education Finance and Policy, and NBER's Financing Higher Education Spring 2024 conference. Institutional support was provided by Miami University, University of Texas at Dallas, Texas A&M University, and Stanford University. This research uses data from the UT Dallas Education Research Center (ERC). The conclusions discussed in this paper do not reflect the opinions or official positions of the ERC, Texas Education Agency, the Texas Higher Education Coordinating Board, or the State of Texas. This paper is in preparation for the NBER Conference on the Financing of Higher Education, funded by the Alfred P. Sloan Foundation (Grant: #G-2022-19354), on April 4-5, 2024, in Cambridge, Massachusetts.

I. INTRODUCTION

In the United States, the economic returns to attending college and completing a postsecondary degree are substantial and tend to increase over one's lifetime (Deming, 2023). However, significant disparities in college enrollment, persistence, and completion persist among socioeconomic and racial groups. For instance, as of 2019, 78 percent of 18- to 24-year-olds from high-income households were enrolled in college, while only 48 percent of those from low-income households were. Similarly, in the same year, 62 percent of White and 84 percent of Asian young adults were enrolled in college, while only 57 percent of Black and Hispanic 18- to 24-year-olds were (Cahalan et al., 2021). Furthermore, when they do enroll in college, low-income and underrepresented minority (URM) students are disproportionately more likely to enroll in open-access, public, two-year institutions (i.e., community colleges), as opposed to more selective, four-year institutions.

These disparities in college enrollment and institution choice result in large, persistent disparities in bachelor's degree completion rates across racial groups. As of 2022, 45 percent of White young adults aged 25 to 29 held a bachelor's degree, compared to just 28 percent of Black and 25 percent of Hispanic young adults (Reber and Smith, 2023). Consequently, a large body of academic research has explored the myriad of factors that contribute to low-income and URM students' low rates of college enrollment and completion, such as credit constraints, lower levels of academic preparedness, and informational barriers (see Dynarski et al., 2022 and Dynarski, Page, and Scott-Clayton, 2022 for comprehensive literature reviews). Building on this prior work, our study investigates the extent to which racial and socioeconomic disparities in college-going can be explained by differences in students' geographic access to colleges, as well as differences in students' sensitivity to distance.

It is well-documented that colleges and universities in the U.S. are unevenly distributed across space (Hillman, 2016; Hillman and Weichman, 2016), leaving many Americans without local access to higher education. Approximately 3.8 million Americans live in a commuting zone with *no* colleges, while an additional 11.2 million live in a commuting zone with only one college option. The statistics are even more stark when considering access to public colleges and universities, which most students attend: 16.5 million (5 percent) Americans live in a commuting zone without a public, two-year college (i.e., a community college) and 35.3 million (11 percent) live in a commuting zone without a public, four-year college.[1] Moreover, a large body of literature spanning different contexts and cohorts consistently shows that geographic distance affects whether and where students apply to and attend college (Card, 1995; Long, 2004; Alm and Winters, 2009; Turley, 2009; Doyle and Skinner, 2016; Skinner, 2019; Cortes and Lincove, 2019; Black, Cortes, and Lincove, 2020; Fu et al., 2022; Morales and Cortes, 2022), particularly for students considering attending community colleges (Rouse, 1995; Mountjoy, 2022).[2]

However, existing work has largely not considered how these relationships vary across racial and socioeconomic groups, nor how changes in the spatial distribution of colleges may affect racial and socioeconomic gaps in postsecondary enrollment and attainment, the closing of which is a priority for state policymakers (Harnisch and Laderman, 2023). This is evident in the structure of various policies, including those governing higher education financing, particularly in the two-year sector. As of 2020, 30 states have implemented an outcomes-based funding scheme to distribute funds to community colleges, by which institutions are rewarded for making progress toward student success such as persistence, transfers to four-year institutions, and degree attainment (Li, 2020). Considering that minority and low-income students are more likely to interact with the two-year sector, improving outcomes for community college students is likely to have a disproportionate impact on these students and the possibility of addressing equity gaps. Consequently, our study informs ongoing policy discussions on effective funding models for community colleges as the geographic diffusion of two-year institutions to their nearest four-year universities will moderate how successful outcomes-based funding mechanisms are, and how they may differentially impact students of various racial and ethnic backgrounds.

We leverage rich, student-level, administrative data from Texas to (a) document disparities in geographic access to colleges by race and socioeconomic status, (b) estimate how access to nearby postsecondary institutions affects students' college enrollment choices across racial and socioeconomic groups, and (c) simulate how changes in geographic access to colleges or sensitivity to distance would affect the number and the characteristics of students enrolling in Texas colleges. Texas is an ideal state in which to conduct this analysis because it is large, racially

---

[1] Author's calculations from 2019 Integrated Postsecondary Education Data System (IPEDS) college location data and U.S. Census Bureau population estimates.

[2] Students may be particularly sensitive to distance in the community college setting because community colleges in 38 states offer lower tuition rates to students to students who live in their local taxing areas or "districts." Denning (2017) and Acton (2021) show that living in a taxing district increases community college enrollment, in Texas and Michigan, respectively, even after holding distance to a community college campus constant.

and socioeconomically diverse, and has the nation's largest, and one of the most racially diverse, rural populations (U.S. Census Bureau, 2022), many of whom live far distances from colleges and universities. Moreover, the state maintains a robust longitudinal data system where we can link students' K-12 academic records with their postsecondary education outcomes, including enrollment, course-taking behavior, transfer, and degree completion.

We first document that, while there are over 200 public college and university campuses in Texas, geographic access to these institutions differs dramatically across the state. Students living in the "Texas Triangle" region surrounding Dallas, Houston, and Austin/San Antonio have access to many more nearby colleges than students in the South and West areas of the state. Given the demographic differences between these areas, these disparities in local postsecondary access also appear along racial lines: White and Hispanic students tend to face more limited local college choice sets than their Black and Asian peers, in part, because they tend to live in more rural areas, where local college access is the most limited.

Next, we show that students are sensitive to how far they must travel to reach a college or university campus. Overall, students are less likely to attend two-year colleges – and less likely to attend a public college overall – when they live further from a two-year college. They are also less likely to attend a four-year college when they live further from one, but in general, distance to a four-year college does not affect whether a student attends a public college overall. However, these effects are quite different across racial groups and socioeconomic status. Conditional on a student's distance to the nearest four-year institution, White and non-disadvantaged students respond to living far from a two-year college primarily by enrolling in four-year colleges, whereas Black and Hispanic, and economically disadvantaged students primarily respond by not enrolling in any type of college. As a result, when White, non-disadvantaged students live in a "community college desert" – 30 miles or more from the nearest public two-year college – they are no less likely to enroll in a public college than comparable peers who do not live in a desert. But when Black, Hispanic, and disadvantaged students do, they are 5-10 percentage points less likely to attend a public college in Texas.

Finally, we conduct a series of decomposition and simulation exercises to inform public policy efforts to increase college enrollment and completion, especially among underrepresented groups. In general, results from the decomposition analyses demonstrate that differences in students' sensitivity to distance, rather than differences in distance to colleges, is a larger contributor to observed college enrollment gaps across groups. Differences in how students respond to distance to two-year colleges, in particular, contribute to nearly 10 percent of the four-year college enrollment gap. We further show that the closure of campuses in predominantly Hispanic regions of Texas would have a large effect on Hispanic college enrollment rates, both because these students tend to be more sensitive to distance than their White peers, and because they tend to have fewer local options available to them than other underrepresented groups, such as Black students. As a corollary, constructing or expanding campuses in Hispanic regions that currently lack them could be an effective way to increase enrollment rates.

Together, our results contribute to the existing literature on geographic access to colleges along three important dimensions. First, we collect location information for *all* campuses of community college systems – as opposed to only the main campuses that are commonly reported in federal databases – to accurately assess students' access to all public college options. Doing so is important to understand the true college choice sets students face when deciding whether and where to enroll in college, and to reduce measurement error in measures of geographic accessibility.

Second, we estimate the heterogeneous effects of distance to both two-year and four-year colleges on enrollment outcomes across different racial and socioeconomic groups. In doing so, we document important differences in how URM and economically disadvantaged students respond to distance, compared to their White and non-disadvantaged peers. Specifically, we show that local access to two-year colleges tends to increase – or *democratize* (Rouse, 1995) – overall college enrollment for URM and disadvantaged students, whereas it tends to divert enrollment from four-year colleges for White and non-disadvantaged students. As a result, we may expect different enrollment responses to the closure or opening of new college campuses, depending on the characteristics of the local student population.

Third and finally, we directly provide simulations that can inform potential state and local policy initiatives related to the opening, closing, merging, or conversion of college campuses. These simulations are timely as states seek to address various challenges currently facing the higher education sector. For example, states with declining populations and high school cohort sizes have increasingly considered merging or consolidating public colleges (Gardner, 2021; Gretzinger, 2024), which may disparately impact geographic access to college across demographic groups. Meanwhile, other states, such as Kentucky (Blake, 2024) and the University of California system (Waxmann, 2024), are considering opening new colleges or "elevating" community colleges to public four-year colleges, which also stand to change students' local college choice sets. Our simulations can provide predictions of how these policy changes will impact college-going, not only overall, but also across demographic groups.

II. Data Sources and Overview of Texas Higher Education Landscape

A. Administrative Records from Texas K-12 and Higher Education Sectors

Our analysis leverages longitudinal, student-level records from the Texas Education Agency (TEA) and the Texas Higher Education Coordinating Board (THECB). The TEA records on K-12 school enrollment and high school graduation allow access to student demographic characteristics (e.g., sex, race and ethnicity, immigrant status, economic disadvantage status) and academic background information (e.g., special education and Limited English Proficiency status, and enrollment in gifted and career and technical education programs), as well as standardized test scores in math and reading at the end of 8^{th} grade.[3] We link these data with THECB records that contain information on student enrollment in all of Texas' public two-year and four-year postsecondary institutions. Throughout our analysis, we define a student as enrolling in a public two-year or four-year institution if they do so within 12 months of their high school graduation date.

Our analytic sample consists of five high school graduation cohorts (2013-2017) who we observe in the higher education enrollment records from 2014-2019. Panel A of Table 1 provides summary statistics on these students, measured in their final year of high school. Our sample is diverse across race and socioeconomic status: 48 percent of students are classified as economically disadvantaged, meaning they are eligible for free and/or reduced-price lunch or other public assistance programs. Forty-nine percent are Hispanic, 32 percent are White, 13 percent are Black, and 4.5 percent are Asian. Black and Hispanic students are more likely to be economically disadvantaged, while Hispanic and Asian students are more likely to be immigrants and identified as Limited English Proficiency. On average, White and Asian students have higher 8^{th} grade test

[3] We do not observe eighth grade test scores for approximately 11 percent of students. For these students, we impute their test scores to be the mean of their high school and graduation cohort and include a binary variable indicating whether we have imputed their math and/or reading test scores in our regression specifications.

scores than Black and Hispanic students, and non-disadvantaged students have higher test scores than economically disadvantaged students.

B. Locations and Characteristics of Texas High Schools

We merge our student-level sample with characteristics of Texas high schools from the National Center for Education Statistics (NCES) Common Core of Data (CCD). Within the CCD, we observe a high school's latitude and longitude, urbanicity, overall student enrollment, student-teacher ratio, and indicators for whether a school is a charter school, magnet school, and/or eligible for Title I funding. In addition, we construct school-by-cohort averages of the demographic variables described in Section II.A. Panel B of Table 1 provides information on the high schools our students attend. The typical student in our sample attends a high school that enrolls just under 1900 students, with a student-teacher ratio of 15.6. Thirty-nine percent of students attend a high school in a city, while 33 percent attend one in a suburb, and 28 percent attend one in a town or rural area. On average, urban and suburban schools are larger than rural ones, and suburban students tend to be less disadvantaged and higher-performing in 8th grade than both their urban and rural peers.

C. Locations and Characteristics of Texas College Campuses

To create measures of distance between all Texas high schools and their nearest postsecondary higher education institutions, we obtain information on the locations of all public and private, not-for-profit colleges in both the two-year and four-year sectors from several data sources.[4] First, we collected the latitudes and longitudes of all colleges reported in the Integrated Postsecondary Education System (IPEDS). IPEDS is a comprehensive survey carried out annually by the National Center for Education Statistics under the U.S. Department of Education. This system collects data from all colleges, universities, technical, and vocational institutions involved in federal student financial aid programs. However, institutions often report their data under one

[4] Throughout the text, we use the phrase "two-year college" to refer to Texas' public community and technical colleges and "four-year college" to refer to the state's public universities, as defined by the THECB: http://www.txhighereddata.org/Interactive/Institutions.cfm. Some community colleges in Texas do award bachelor's degrees, but before a policy change in 2017, fewer than 500 per year were awarded across the state (compared to 80,000 per year or more associate degrees awarded): https://databridge.highered.texas.gov/degree-dashboard/. Thus, for the time frame of our analysis, the primary educational purpose of Texas' community colleges was to offer two-year degrees and certificates and provide transfer pathways to four-year universities.

primary campus location, rather than disaggregating across campus sites. For example, Houston Community College reports one latitude and longitude to IPEDS, despite having 21 unique campus locations across the Houston metropolitan area. As such, we supplement the IPEDS data with individual campus locations from other sources: (a) the Texas Higher Education Coordinating Board (THECB), (b) the American Association of Community Colleges (AACC) website, and (c) the Texas Association of Community Colleges (TACC) website.

These additional sources along with IPEDS enabled us to obtain the precise locations of all two- and four-year postsecondary institution campuses in Texas. Appendix Figure A.1 shows the locations of campuses when we only use IPEDS data (Panel A) versus when we use the supplementary sources (Panel B). In the two-year sector, we obtain the locations of 87 additional community college campuses from our supplementary sources, more than doubling the number of two-year college campuses in the state from 82 to 169.

D. Texas Higher Education Landscape

The public postsecondary educational landscape in Texas is unique in several features. First, over the past decade, the state's demographic landscape has changed rapidly, with more racially and ethnically diverse students graduating from high school. In 2004, Texas became a majority-minority state, with the growth rate of Hispanic, Black, and Asian populations overtaking the growth rate of non-Hispanic Whites. Second, the 254 counties in the state are represented by ten state-defined higher education regions: High Plains (region 1), Northwest (region 2), Metroplex (region 3), Upper East (region 4), Southeast (region 5), Gulf Coast (region 6), Central Texas (region 7), South Texas (region 8), West Texas (region 9), and Upper Rio Grande (region 10). Third, there are six distinct public university systems: University of Houston, University of North Texas, University of Texas, Texas A&M University, Texas State University, and Texas Tech University. In total, there are 37 public universities in the state, two of which are Historically Black Colleges and Universities (HBCUs) and 25 of which are Hispanic Serving Institutions (HSI). In addition, there are 50 community college districts, most of which contain multiple campuses and a public, two-year technical college system (Texas State Technical College) with ten campuses throughout the state. Together, these institutions provide a broad set of postsecondary opportunities for college-bound Texans.

III. Geographic Access to College and University Campuses

We begin our analysis by documenting the geographic dispersion of college and university campuses in Texas with respect to a variety of county-level demographic characteristics in order to illustrate the spatial patterns of access to higher education and the demographic groups that are predominantly impacted by disparities in access. We first construct several maps overlaying the location of all public two-year colleges and all public and private, not-for-profit four-year universities in Texas on county demographic characteristics, which we obtain from the U.S. Census. Specifically, we plot the locations of colleges over county-level quartiles of the share of the youth (aged 5-24) population that is White, Black, Hispanic, and Asian, as well as the child poverty rate and the share of households with broadband internet access.

Figure 1 presents these maps. Colleges and universities in Texas are highly concentrated around the "Texas Triangle" – the area formed by the state's largest metropolitan areas of Dallas-Fort Worth, Houston, San Antonio, and Austin, which has experienced some of the nation's largest population and employment growth over the past forty years (Thompson and Hines, 2023). Compared to the state as a whole, these areas tend to have larger Black and Asian populations, have lower rates of child poverty, and have more households with broadband internet, representing a higher degree of urbanization. In contrast, the southern and western areas of the state – which have far fewer postsecondary options – are heavily Hispanic, have higher rates of child poverty, and are more rural, with less broadband internet access.

Appendix Figure A.5 further illustrates the disparities in local college access across the regions of Texas. First, we plot the average number of institutions within 30 and 60 miles of a high school, by region. The average high school in Texas has approximately 6.9 public two-year colleges and 1.3 public four-year colleges. However, in the Central (Austin/San Antonio), Metroplex (Dallas-Fort Worth), and Gulf Coast (Houston) regions, an average high school has 8.6 public two-year, 1.9 public four-year, and 3 private four-year colleges within a 30-mile radius. Elsewhere in the state, such as West Texas, an average high school has fewer than 1 college *of any type* within a 30-mile radius and fewer than 3 of *any type* within a 60-mile radius. As a result, students in southern and western areas of the state have to travel much further to reach a postsecondary institution. For example, in the Central, Metroplex, and Gulf Coast regions, the average distance from a high school to the nearest two-year college is 9 miles and the distance to the nearest four-year college is 15.6 miles. In contrast, in West Texas, the average distance to the nearest two-year college is 31 miles and the average distance to the nearest four-year college is 39.3 miles.

Next, Table 2 presents descriptive statistics summarizing the distance to the nearest college by sector across racial and ethnic groups, economic disadvantage status, and school urbanicity status. The average student in our sample lives 7.3 miles from the nearest public two-year college and 17.3 miles from the nearest public four-year university.[5] These distances are similar for economically disadvantaged and non-disadvantaged students but vary across racial groups. Asian students tend to live closest to postsecondary options (4.6 miles to two-year, 13.6 miles to four-year), followed by Black students (5.5 miles to two-year, 14.7 miles to four-year), and then Hispanic (6.6 miles to two-year, 16.1 miles to four-year) and White students (9.3 miles to two-year, 20.7 to four-year). As a result, fewer White and Hispanic students live within 30 or 60 miles of a public institution – of any type – than Black and Asian students. In addition, Hispanic students, on average, live much further from the state's flagship institutions (University of Texas – Austin and Texas A&M University – College Station) – 176.2 miles, compared to 151 miles for White students, 119 miles for Black students, and 117 miles for Asian students.

Figure 2 further shows the differences in students' proximate colleges, by student subgroup, by counting the number of public two-year and four-year colleges located within 30 (Panel A) or 60 (Panel B) miles of a student's high school. Across the two panels, we consistently see that White and Hispanic students have fewer colleges located near them than Black or Asian students. These racial differences in geographical accessibility of colleges and universities can be explained, in part, by the fact that White and Hispanic students are more likely to live in rural areas than Black and Asian students, and these areas tend to be located much further from colleges than suburban and urban areas. For instance, only 88 percent of students attending a rural high school have a public, two-year college located within 30 miles of their high school, whereas *all* students in suburban and urban areas do. Even more striking, only 61 percent of students attending a rural high school have a public, four-year college located within 30 miles of their high school, whereas 96 percent of urban and 99 percent of suburban students do. These disparities in geographic access to public four-year universities could explain why a lower share of students from rural high schools attend Texas public four-year colleges (22.8 percent) than students from urban (23.9 percent) and

[5] Throughout the text, we use the phrase "lives" to refer to how far away a student's high school is from a postsecondary institution.

suburban (24.6 percent) schools, despite having similar tests scores and economic disadvantage status as suburban schools. We begin to explore the effects of distance to postsecondary institutions on students' enrollment choices, across race and socioeconomic status, in our analyses in the next section.

IV. ACCESS TO POSTSECONDARY INSTITUTIONS AND COLLEGE ENROLLMENT CHOICES

In this section, we investigate the relationship between the likelihood of enrolling in a Texas public college, generally and by sector, and a student's geographic access to college campuses. We estimate regression models of the following form:

$$Enroll_{ist} = \alpha + \boldsymbol{Distance}_s\boldsymbol{\Gamma} + \boldsymbol{X}_{it}\boldsymbol{\Pi} + \boldsymbol{Z}_{st}\boldsymbol{\Phi} + \lambda_t + \epsilon_{it} \qquad (1)$$

where $Enroll_{ist}$ is a binary enrollment indicator of interest (e.g., 1 if a student enrolls in a Texas public institution, 0 otherwise) for student i, who graduated from high school s, in year t. Specifically, we consider enrollment in any Texas public institution of higher education, as well as separately by sector: two- vs. four-year institutions. The vector $\boldsymbol{Distance}_s$ contains measures of the distance between high school s and various college options, such as distance to the nearest two-year and four-year institutions. In an effort to account for some of the confounding factors that may drive outcome differences across students facing disparities in distance to postsecondary schools, we control for student- and school-level factors represented in vectors $\boldsymbol{X}_{it}$ and $\boldsymbol{Z}_{st}$, respectively. Some of the individual-level characteristics include sex, race and ethnicity, economic disadvantage, Limited English Proficiency status, and academic performance in reading and math captured by students' end-of-grade assessments in 8^{th} grade. Similarly, some of the school-level factors correspond to school-wide characteristics of the student population (race/ethnicity and economic disadvantage), as well as measures of resources, such as the student-teacher ratio and a school's eligibility for Title I funding. Finally, λ_t accounts for secular trends in the likelihood of college enrollment over time.

We estimate multiple regressions following the form described in equation (1), where we vary the distance measures captured by the vector $\boldsymbol{Distance}_s$. We assess the relationship between the likelihood of college enrollment and the linear distance to the nearest public two-year and four-year colleges, as well as non-linear effects established by binning the distance to the nearest colleges in 5-mile intervals, and the effects of living in a college "desert" – which we define as living more than 30 miles from a public two-year and/or four-year college. Lastly, to further examine the extent to which students' sensitivity to distance varies across demographic groups and socioeconomic status, we estimate variants of equation (1) separately by students' race/ethnicity and economic disadvantage status.

A. Linear Effects of Distance on College Enrollment Choices

Table 3 shows the linear effects of distance to a student's nearest two-year and four-year public institution on the likelihood that they enroll in a Texas public two-year college (Panel A), Texas public four-year university (Panel B), or any Texas public postsecondary institution (Panel C). We iteratively add each distance measure, student demographic controls, student test scores, and school-level control variables across the table columns.

Panel A shows that the further a student lives from a public two-year college, the less likely they are to attend a public two-year college. Meanwhile, the further they live from a public four-year university, the more likely they are to enroll in a public two-year option. These effects persist and are highly statistically significant across specifications. In our preferred, most saturated specification shown in column (6), living 10 miles further from a public two-year college reduces the probability of enrollment in a Texas public two-year college by 2.3 percentage points, whereas living 10 miles further from a public four-year university increases enrollment in these colleges by 1 percentage point – or about half the effect of the two-year distance measure.

Panel B shows a similar effect for four-year college enrollment: the further a student lives from a public four-year college, the less likely they are to enroll in a public four-year college, but the further they live from a public two-year college, the *more* likely they are to enroll in a public four-year. However, these effects are smaller than on the two-year college margin, suggesting that distance matters more for two-year college enrollment than four-year college enrollment. In our preferred specification in column (6), our estimates indicate that an increase in distance to a public four-year college of 10 miles reduces enrollment in public four-year colleges by 0.6 percentage points – about a quarter of the size of the "own-distance" effect for two-year colleges. Meanwhile, living 10 miles further from a public two-year college increases enrollment in a public four-year by a larger amount: 1.3 percentage points.

Finally, Panel C shows the effects of distance to a student's nearest public two-year and four-year institutions on overall enrollment in the Texas public higher education system. These effects are a summation of the *own-distance effect* and the *substitution effect* for each distance measure. For example, the public two-year distance effect on overall enrollment is a summation of its effect on public two-year college enrollment and its effect on public four-year college enrollment. Across specifications, we find that living further from a public two-year college reduces overall enrollment in Texas public institutions – meaning, the "own-distance" effect is larger than the substitution effect into four-year colleges. In contrast, we see little effect of four-year distance on overall Texas public enrollment, suggesting that the own-distance and substitution effects for four-year college distance tend to offset one another. Put differently, we find that attending a high school that is far from public four-year universities affects *where* students attend college but not *whether* they do, whereas attending a high school that is far from a public two-year college affects whether students enroll in college at all.

Table 4 then repeats the most saturated specifications in column (6) across racial groups and economic disadvantage status. Looking across groups in Panel A, we see broadly similar reductions in public two-year college enrollment as students attend high schools further away from two-year colleges. The only exception to this pattern is Asian students, who do not meaningfully differ in their two-year college enrollment across our distance measure. In Panel B, we see that, across groups, students are less likely to attend public four-year colleges when their distance to these colleges increases, whereas they are more likely to attend public four-year colleges as their distance to two-year colleges increases. However, this effect is much larger for white and non-disadvantaged students than for Black, Hispanic, and economically disadvantaged students. In Panel C, we see the net effect of these disparate responses: attending a high school that is far away from public two-year colleges reduces overall college enrollment for all groups, but to a larger extent for Black, Hispanic, and economically disadvantaged students. That is, White and non-disadvantaged students are more likely to respond to living far from public two-year colleges by substituting towards four-year colleges, whereas Black and Hispanic and economically disadvantaged students are more likely to forgo college enrollment altogether.

B. Non-Linear Effects of Distance on College Enrollment Choices

While our previous results suggest that college enrollment decisions are responsive to the distance to a student's nearest public two-year or four-year institution, it is not obvious that we should expect these responses to be linear. For example, if a college that is 5 or 10 miles away can be accessed via public transportation, but a college that is 15 miles away cannot be, we may expect a non-linear response between these distances. We consider these potential non-linear responses by re-estimating equation (1) with our distance measures binned in 5-mile intervals.

Figure 3 considers the non-linear effects of distance for White, Black, and Hispanic students separately. First, in Panel A, we consider how living further from a public two-year college – relative to living within 5 miles of one – affects the likelihood that a student enrolls in a public two-year college, public four-year college, or any public college.[6] For all three groups, we see that students are less likely to attend a public two-year college when they live more than 10 miles from the nearest one and that this response increases with distance, particularly at distances of 30 miles or more. We then see that students are more likely to attend four-year colleges when they live more than 10 miles from a public two-year college – but, as we saw in Table 4, this effect is larger for White students than for non-White students. Combined, these effects produce a larger decrease in public college enrollment for Black and Hispanic students when they live more than 10 miles from the nearest public two-year college, though the magnitude of the effect increases for all groups as distance increases. In Panel B, we see that White and Hispanic students are more responsive to four-year college distance than Black students. However, for all groups, substitution towards two-year colleges only occurs when students live more than 30 miles from the nearest public four-year college.

Figure 4 then considers the non-linear effects of distance for economically disadvantaged and non-disadvantaged students. In Panel A, we see that economically disadvantaged and non-disadvantaged students are both less likely to attend public two-year colleges when they live further from them, but this effect begins at smaller distances for disadvantaged students. In addition, disadvantaged students are less likely to substitute towards four-year colleges when they live far from two-year colleges, resulting in a larger overall decline in public college enrollment

[6] Throughout this analysis, we control for the distance to a student's nearest public four-year college in analogous 5-mile bins. Similarly, when we consider the effects of four-year college distance on students' enrollment outcomes in Panel B, we control for the distance to a student's nearest public two-year college in 5-mile bins.

for disadvantaged students when they live further from two-year colleges. However, in Panel B, we see that disadvantaged and non-disadvantaged students respond similarly to living further from public four-year colleges.

C. Effects of Living in College Deserts

In both Figures 3 and 4, we see that students are particularly responsive to living 30 or more miles from a postsecondary institution. We now formally estimate how living this distance away from an institution affects students' enrollment choices by replacing our distance variable in equation (1) with an indicator for living 30 miles or more from a public two-year or four-year college.[7] We then add interaction terms between this indicator and a student's URM and/or economic disadvantage status to assess how students' responses vary across both race and socioeconomic status.[8]

Table 5 presents these results for public two-year college distance. Recall, from Table 2, that, while all urban and suburban students have access to a public two-year college within 30 miles, over 12 percent of rural students do not. In Panel A, we see that, overall, students who live further than 30 miles from a public two-year college are 10.8 percentage points less likely to attend one. This effect is 2-3 percentage points larger for URM students and 3-4 percentage points larger for economically disadvantaged students. In Panel B, we more clearly see that non-URM and non-disadvantaged students substitute towards four-year colleges at higher rates when they live far from public two-year colleges. Overall, students who live 30 or more miles from a public two-year college are 4.4 percentage points more likely to attend a public four-year college, but this effect is about 8 percentage points for non-URM, non-disadvantaged students. Finally, in Panel C, we see that for non-URM, non-disadvantaged students, living in a public two-year college desert has a small to negligible effect on overall college enrollment, but for URM and economically disadvantaged students, it decreases college enrollment by up to 10 percentage points.

Table 6 then repeats the specifications from Table 5 for public four-year college distance. In Panel A, we see that students who live more than 30 miles from a public four-year college are significantly more likely to enroll in public two-year colleges, though this effect is smaller for

[7] In these specifications, we continue to control for the distance to a student's nearest four-year college (or two-year, in Table 6) in 5-mile bins.

[8] For the purposes of this analysis, we define URM students as Black, Hispanic, and "other" students. Non-URM students are White and Asian students.

economically disadvantaged students. Panel B then shows that, as expected, students who live more than 30 miles from a public four-year college are less likely to attend a public four-year. On net, we see in Panel C that, conditional on distance to two-year colleges, students who live in a four-year college desert are more likely to enroll in a Texas public college overall (because they are more likely to attend a two-year college), but this effect is smaller for URM and, particularly, disadvantaged students.

In summary, our results indicate that (1) students are sensitive to the distance they must travel to reach a college campus; (2) the distance a student must travel to reach a two-year college affects both whether and where a student attends college, whereas the distance a student must travel to reach a four-year college primarily affects where a student will enroll (and to a lesser extent than two-year distance); and (3) White and non-disadvantaged students respond to living far from two-year colleges by enrolling in four-year colleges, whereas Black and Hispanic and economically disadvantaged students primarily respond by forgoing college enrollment. Thus, in the next section, we conduct some simulations of enrollment responses to hypothetical policy changes.

V. POLICY SIMULATIONS

In the final section, we engage in a series of policy simulation exercises that enable us to make predictions involving changes in the likelihood of postsecondary enrollment by racial and ethnic groups as well as changes in the college enrollment gap between White vs. URM students. We conduct these analyses under counterfactual policy scenarios that systematically increase or decrease URM students' distance to college.

A. Oaxaca-Blinder Decomposition

Following the Oaxaca-Blinder (Blinder, 1973; Oaxaca, 1973) decomposition approach, we begin by assessing the extent to which observed gaps in mean college enrollment rates between non-URM and URM students can be attributed to differences between *observed* and *unobserved* factors.[9] We highlight the role of distance to postsecondary institutions as our key observed

[9] An alternative approach (Neumark, 1988) uses common coefficients estimated from a pooled regression of white and URM students. Which modifies the equation slightly. This approach, however, has been shown to systematically

components, among various other demographic, academic, and school-level controls. Specifically, we estimate the following:

$$\left(\overline{Enroll}^1 - \overline{Enroll}^0\right) = (\bar{D}^1 - \bar{D}^0)\hat{\Gamma}^P + (\bar{X}^1 - \bar{X}^0)\hat{\Pi}^P + \bar{D}^1\left(\hat{\Gamma}^1 - \hat{\Gamma}^P\right) + \bar{D}^0\left(\hat{\Gamma}^0 - \hat{\Gamma}^P\right) + \bar{X}^1\left(\hat{\Pi}^1 - \hat{\Pi}^P\right) + \bar{X}^0\left(\hat{\Pi}^0 - \hat{\Pi}^P\right) \qquad (2)$$

where $\overline{Enroll}^d$ indicates the average postsecondary enrollment rate for group d, which takes on the value of 1 for the group of URM students and 0 otherwise; $\bar{D}$ denotes a measure of average distance to various college options; $\bar{X}$ is a row vector of all remaining observable characteristics such as demographic variables, academic background, and school-level characteristics. Lastly, $\hat{\Gamma}$ and $\hat{\Pi}$ are coefficients obtained from regressions of the form described in equation (1) estimated for the subset of students for a given racial and ethnic group, d, as well as estimates from a pooled regression of students across all racial and ethnic backgrounds, p. Estimates of the first term isolate how much of the enrollment gap is explained by differences in distance to college options between URM and non-URM students, while estimates of the third and fourth terms describe the extent to which the enrollment gap can be attributed to differences across students' sensitivity to distance.

We conduct Oaxaca-Blinder decomposition exercises for three sets of outcomes: enrollment in two-year public colleges, enrollment in four-year public universities, and enrollment in any public institution in Texas. Moreover, we separately analyze differences by students' race and ethnicity as well as economic disadvantage status. Results from the decomposition analyses are shown in Table 7.

As reported in column 1 of Panel C, there is a 9.8 percentage point disparity in the college enrollment rates between non-URM and URM students in Texas. This gap is largely attributed to differences in observable characteristics, which contribute to 7.2 percentage points of the observed difference. However, the role of the distance components specifically, both in the explained and unexplained proportions, is notably small compared to other observed characteristics such as demographic factors. Indeed, the decomposition results suggest that if URM students faced the same average distance to four-year institutions as their non-URM peers, the enrollment gap would only narrow by 0.2 percentage points. Conversely, differences in access to two-year colleges widen

underestimate the unexplained portion particularly in instances when there is "high power of the covariates in explaining group membership" (Elder et al., 2010).

the enrollment gap, which is consistent with our finding that some URM students, namely Black students, have access to multiple institutions of both types within a short distance given that a nontrivial share of them reside near large urban centers. Lastly, we find that differences in the coefficients associated with the distance measures explain small and insignificant shares of the overall enrollment gap.

In the context of enrollment rates at four-year colleges, reported in Panel B of Table 7, differences in how URM and non-URM students respond to living far away from two-year institutions explain a sizable proportion of the observed gap. On average, there is a 10.7 percentage point difference in the four-year college enrollment rates between these student groups. Results from the decomposition analyses indicate a 9.3 percent reduction in this gap if URM students' sensitivity to distance from a two-year institution was that of their non-URM peers. In other words, if URM students substituted going to four-year universities at the same marginal rate as their non-URM counterparts, the four-year college enrollment gap would close by nearly 10 percent. By contrast, differences in the observed distances account for only 2.8 percent of the gap. Furthermore, we find notable differences in the relative contribution of sensitivity to distance when considering the four-year enrollment gap across specific pair-wise comparisons, such as White v. Hispanic and White v. Black enrollment. We find it to be most salient among Black students in comparison to White students. The decomposition results examining the factors contributing to the four-year college enrollment gaps between these groups attribute nearly 20 percent of the discrepancy to differences in how Black and White students substitute going to four-year colleges when faced with long distances to two-year institutions.

Finally, we also decomposed differences in college-going rates by students' economic disadvantage. Overall, the findings mirror the patterns observed across student race and ethnicity. As shown in Panel C of Table 7, there is a large college enrollment gap between low- and high-income students: 14.8 percentage points. This difference can be attributed to both explained and unexplained factors by roughly equal proportions, with demographic characteristics contributing to a greater extent relative to distance to postsecondary institutions of any type. With respect to enrollment in four-year universities, in particular, we again observe that differences in the sensitivity to distance to two-year colleges play an important role in explaining the gap. Our findings suggest a 5.4 percent reduction in the four-year college enrollment gap if low-income students substituted being away from two-year colleges by enrolling in four-year universities at the same marginal rate as higher-income peers.

B. Simulated College Enrollment Under Campus Closures

Our second simulation approach involves predicting the change in college enrollment rates across demographic groups following the closure of each two-year and four-year college campus in the state, one at a time. As noted in our introduction, several states have closed or merged college campuses in recent years as a response to declining populations and/or financial challenges. Our analyses provide important policy recommendations to the state of Texas if they were to engage in this approach. Specifically, we can identify college closures that would have the largest (or smallest) effect on overall college enrollment, enrollment across college sectors, and enrollment across race and socioeconomic status.

We conduct our analysis in two steps. First, we re-estimate the minimum distance from each high school to the nearest public two-year and public four-year institution following the hypothetical closure of each campus. Using these hypothetical distances, we predict the expected change in college enrollment for each student in our sample using the estimated coefficients from equation (1) capturing sensitivity to distance, $\hat{\boldsymbol{\Gamma}}$. Specifically, we calculate the following:

$$\frac{\partial Enroll}{\partial(\widetilde{\boldsymbol{D}istance})_{st|J-j}} = \hat{\boldsymbol{\Gamma}} \times \widetilde{\boldsymbol{D}istance}_{st|J-j} \qquad (3)$$

where $\widetilde{\boldsymbol{D}}_{st|J-j}$ corresponds to the distance between a given high school to the nearest two-year and four-year institution calculated from a subset of colleges, namely $\{J-j\}$ where J denotes the universe of postsecondary campuses in Texas and j indicates a single campus. We evaluate equation (3) separately by student race and ethnicity, and also by economic disadvantaged status, for each simulated campus closure, using the linear estimates we present in Table 4. We then average our effects over all students in a given racial or socioeconomic group.

Figure 5 presents the change in statewide college enrollment rates, by race and ethnicity (Panel A) and economic disadvantage status (Panel B), for the ten two-year campus closures that would have the largest effect on overall two-year college enrollment. We see that the closure of Angelina College in east Texas would have the largest effect on two-year enrollment – reducing it by about 0.7 percentage points *statewide*. These effects are largest for White and Black students, who make up the majority of students in the local area.[10] However, we would predict that White students would substitute towards four-year colleges at a higher rate than Black students, generating larger overall reductions in college enrollment for Black students.

These substitution patterns are also relevant for understanding what would happen if two-year colleges in predominantly Hispanic regions were to close. For example, we predict the largest overall reductions in overall public college enrollment to occur if South Texas College, in the Rio Grande Valley, or Texas Southmost College, in the Gulf Coast, were to close. This is because these colleges serve largely Hispanic populations, who respond strongly to distance to two-year colleges, but substitute towards four-year colleges at low rates.[11] We would also see the largest reductions in overall college enrollment for economically disadvantaged students under these closures due to a similarly large own-distance response, and smaller substitution effect, for the large number of disadvantaged students these colleges tend to serve.

Figure 6 repeats our analysis for the closure of four-year college campuses. Here, we clearly see that four-year college enrollment would decrease dramatically for Hispanic students (6-8 percentage points) and economically disadvantaged students (5-6 percentage points) if UT-El Paso or UT-Rio Grande Valley were to close. However, if this were to happen, we would expect to see a large increase in two-year college enrollment for these students, generating an overall increase in enrollment in Texas public colleges. Outside of these particular closures, we would not expect to see large changes in college enrollment – in the four-year sector or overall – due to the closure of four-year campuses, in part because students tend to be less sensitive to four-year college distance and in part, because Texas' four-year campuses tend to be clustered around the Texas triangle. Thus, if one campus were to close, the distance to the nearest four-year campus would change minimally for many students.

[10] The 5–24-year-old population in Angelina County, where Angelina College is located, is approximately 50 percent White and 18 percent Black.

[11] South Texas College is located in Hidalgo County, whose 5–24-year-old population is 96 percent Hispanic and Texas Southmost College is located in Cameron County, whose 5–24-year-old population is 95 percent Hispanic.

VI. Discussion and Concluding Remarks

Access to higher education is often seen as a pathway to social mobility in the United States (Chetty et al., 2020). However, due to the strikingly uneven distribution of both two- and four-year public colleges across space, many students across the nation, particularly low-income and rural students, find that attending college is simply not an option for them. Our paper contributes to the growing literature on geographic access to colleges with several important insights. First, we confirm prior work by finding that students' college choices are influenced by the distance they must travel to reach a college or university campus. However, to our knowledge, we are the first to document that the relationship between distance and attendance varies significantly across racial and ethnic lines, and socioeconomic groups as well. When considering a student's proximity to the nearest two-year public institution, White and non-economically disadvantaged students tend to enroll in four-year colleges when they live far away from two-year colleges. In contrast, we observe this "substitution" towards four-year colleges at a much lower rate for Black, Hispanic, and economically disadvantaged students, and they are more likely to forgo college enrollment altogether when they live far from two-year colleges. Our results are particularly striking for students who live in "community college deserts" – we find that White and non-disadvantaged students who live in a desert are no less likely to attend college overall, compared to similar peers who do not live in such areas. However, Black, Hispanic, and economically disadvantaged students who live in these deserts are 5-10 percentage points less likely to attend college overall.

The findings from our regression results, as well as our various policy simulations, could help guide state and local policy initiates regarding the potential *opening*, *closing*, *merging*, or *conversion* of college campuses, and how these policy initiates could impact who enrolls in the U.S. higher education system. These simulations are particularly salient as institutions across the nation grapple with various challenges confronting the higher education sector, such as states experiencing declining college enrollments and colleges facing budget cuts. Our simulations offer insights into how closing of colleges might impact college enrollment, not just overall, but also among underrepresented demographic groups, which the higher education sector has struggled to recruit, retain, and graduate.

Lastly, all together, our findings tie back to the seminal work of Rouse (1995), where she finds that community colleges have the potential to *democratize* postsecondary education access, by drawing in students who would otherwise not attend college, or to *divert* students away from four-year colleges. We add new nuance to our understanding of these democratization and diversion effects. Specifically, we find that geographic access to community colleges democratizes enrollment for many of the groups that have traditionally been underrepresented in U.S. higher education (Black, Hispanic, and low-income students), but may divert enrollment for White and non-disadvantaged students. As a result, renewed investment in community colleges in racially diverse and low-income areas has the potential to broaden participation in the U.S. higher education system and to further social mobility goals.

REFERENCES

Acton, Riley. “Effects of Reduced Community College Tuition on College Choices and Degree Completion.” *Education Finance and Policy* 16, no.3 (2021): 388-417.

Alm, James, and John V. Winters. “Distance and Intrastate College Student Migration.” *Economics of Education Review* 28, no. 6 (2009): 728-738.

Black, Sandra E., Cortes, Kalena E., and Lincove, Jane A. “Apply Yourself: Racial and Ethnic Differences in College Application.” *Education Finance and Policy*, Spring 2020, 15(2): 209-240.

Blake, Jessica. “Kentucky Explores Creating New College in ‘Postsecondary Desert’.” *Inside Higher Ed* (2024).

Blinder, A. S. “Wage Discrimination: Reduced Form and Structural Estimates.” *Journal of Human Resources* 8(4) (1973): 436–455.

Cahalan, Margaret W., Marisha Addison, Nicole Brunt, Pooja R. Patel, and Laura W. Perna. “Indicators of Higher Education Equity in the United States: 2021 Historical Trend Report.” *Pell Institute for the Study of Opportunity in Higher Education* (2021).

Card, David. “Using geographic variation in college proximity to estimate the return to schooling.” (1993). In *Aspects of Labour Market Behavior: Essays in Honour of John Vanderkamp*, ed. Christophides, Grant and Swidinsky, 201-222.

Chetty, Raj, John N. Friedman, Emmanuel Saez, Nicholas Turner, and Danny Yagan. “Income segregation and intergenerational mobility across colleges in the United States.” *The Quarterly Journal of Economics* 135, no. 3 (2020): 1567-1633.

Cortes, Kalena E. and Lincove, Jane A. “Match or Mismatch? Automatic Admissions and College Preferences of Low- and High-Income Students.” *Educational Evaluation and Policy Analysis*, March 2019, 41(1): 98-123.

Deming, David J. *Why do wages grow faster for educated workers?*. Working Paper No. w31373. National Bureau of Economic Research, 2023.

Denning, Jeffrey T. “College on the Cheap: Consequences of Community College Tuition Reductions.” *American Economic Journal: Economic Policy* 9, no. 2 (2017): 155-188.

Doyle, William R., and Benjamin T. Skinner. “Estimating the education-earnings equation using geographic variation.” *Economics of Education Review* 53 (2016): 254-267.

Dynarski, Susan, Aizat Nurshatayeva, Lindsay C. Page, and Judith Scott-Clayton. *Addressing non-financial barriers to college access and success: Evidence and policy implications*. Working Paper No. w30054. National Bureau of Economic Research, 2022.

Dynarski, Susan, Lindsay C. Page, and Judith Scott-Clayton. *College costs, financial aid, and student decisions*. Working Paper No. w30275. National Bureau of Economic Research, 2022.

Elder, Todd E., John H. Goddeeris, and Steven J. Haider. "Unexplained Gaps and Oaxaca–Blinder Decompositions." *Labour Economics* 17.1 (2010): 284-290.

Fu, Chao, Junjie Guo, Adam J. Smith, and Alan Sorensen. "Students' Heterogeneous Preferences and the Uneven Spatial Distribution of Colleges." *Journal of Monetary Economics* 129 (2022): 49-64.

Gardner, Lee. "More States Turn to Public-College Mergers, but Easy Fixes May Remain Elusive." *The Chronicle of Higher Education* (2021).

Gretzinger, Erin. "Wisconsin Is Closing Another 2-Year Campus but Hopes It's Found a Solution to Its Biggest Challenges." *The Chronicle of Higher Education* (2024).

Harnisch, Tom and Laderman, Sophia. "State Priorities for Higher Education in 2023: Survey of SHEEOs." *State Higher Education Executive Officers* (2023).

Hillman, Nicholas. "Geography of College Opportunity: The Case of Education Deserts." *American Education Research Journal* 53, no. 4 (2016).

Hillman, Nicholas, and Taylor Weichman. *Education deserts: The Continued Significance of" Place" in the Twenty-First Century*. American Council on Education Center for Policy Research and Strategy, 2016.

Li, Amy Y. "Four Decades of Performance Funding and Counting." *Higher Education: Handbook of Theory and Research:* Volume 36 (2020): 1-64.

Long, Bridget Terry. "How Have College Decisions Changed Over Time? An Application of the Conditional Logistic Choice Model." *Journal of Econometrics* 121, no. 1-2 (2004): 271-296.

Morales, Camila and Kalena E. Cortes. "A Profile of Community College Students in Texas." Texas Commission on Community College Finance, Texas Higher Education Coordinating Board, (2022).

Mountjoy, Jack. "Community Colleges and Upward Mobility." *American Economic Review* 112, no. 8 (2022): 2580-2630.

Neumark, David. "Employers Discriminatory Behavior and the Estimation of Wage Discrimination." *Journal of Human Resources* 23 (3) (1988), 279–295.

Oaxaca, Ronald. "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review* 14(3) (1973): 693–709.

Reber, Sarah, and Ember Smith. "College Enrollment Disparities, Understanding the Role of Academic Preparation." *The Brookings Institution* (2023).

Rouse, Cecilia Elena. "Democratization or Diversion? The Effect of Community Colleges on Educational Attainment." *Journal of Business & Economic Statistics* 13, no. 2 (1995): 217-224.

Skinner, Benjamin T. "Choosing College in the 2000s: An Updated Analysis Using the Conditional Logistic Choice Model." *Research in Higher Education* 60 (2019): 153-183.

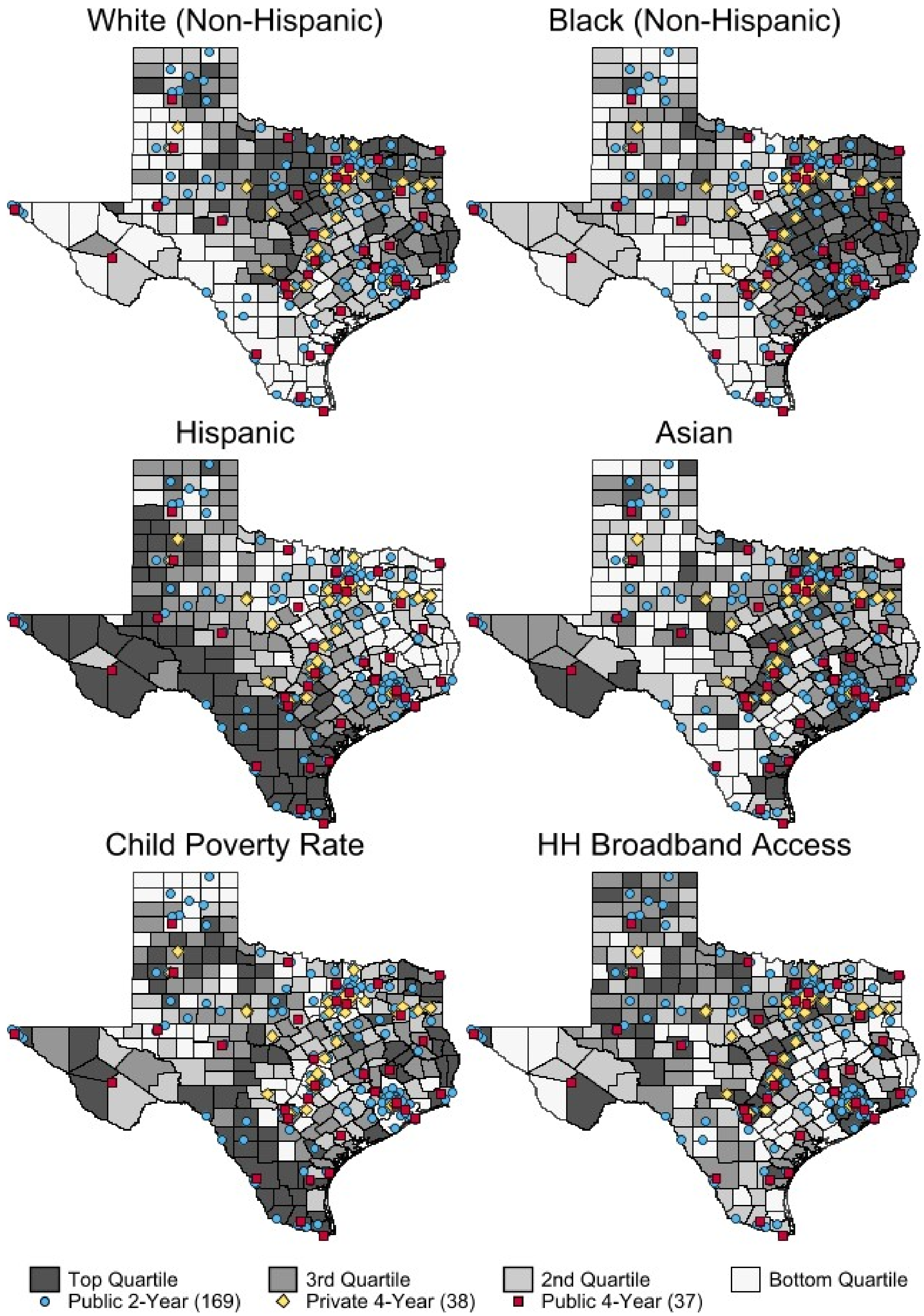
Thompson, Jesse and Keighton Hines. "State Output Remains Distinctly Texan, While Jobs Mix Increasingly Resembles the U.S." Federal Reserve Bank of Dallas (2023). https://www.dallasfed.org/research/swe/2023/swe2313.

Turley, Ruth N. López. "College Proximity: Mapping Access to Opportunity." *Sociology of Education* 82, no. 2 (2009): 126-146.

U.S. Census Burau. "Nation's Urban and Rural Populations Shift Following 2020 Census" (2022). https://www.census.gov/newsroom/press-releases/2022/urban-rural-populations.html.

Waxmann, Laura. "University of California Considers S.F. for Expansion in Wake of Mayor Breeds Plea." *San Francisco Chronicle* (2024).

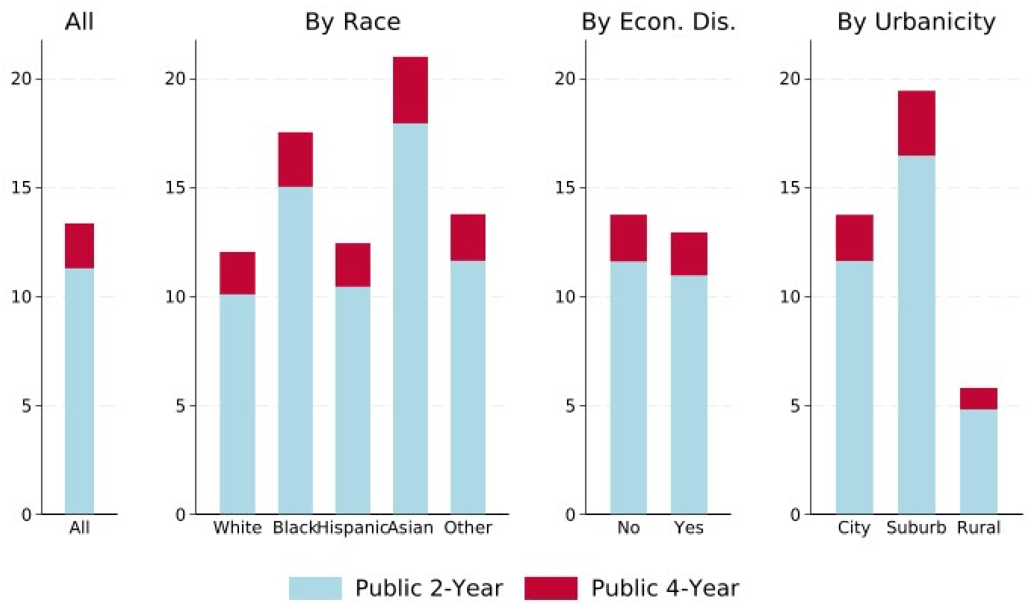
Figure 1: Spatial Distribution of Texas Higher Education Institutions



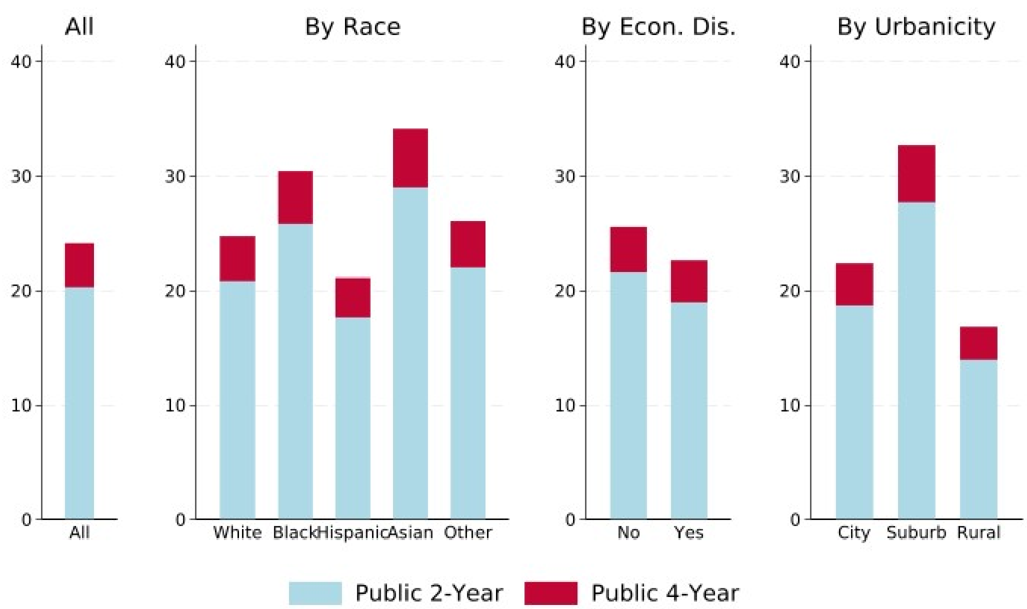
Notes: This figure plots the location of each public two-year, public four-year, and private four-year postsecondary institution campus in Texas. Each subfigure overlays the locations on various county characteristics, which we measure in quartiles.

Figure 2: Number of Proximate Colleges by Demographic Characteristics

Panel A. Colleges Within 30 Miles



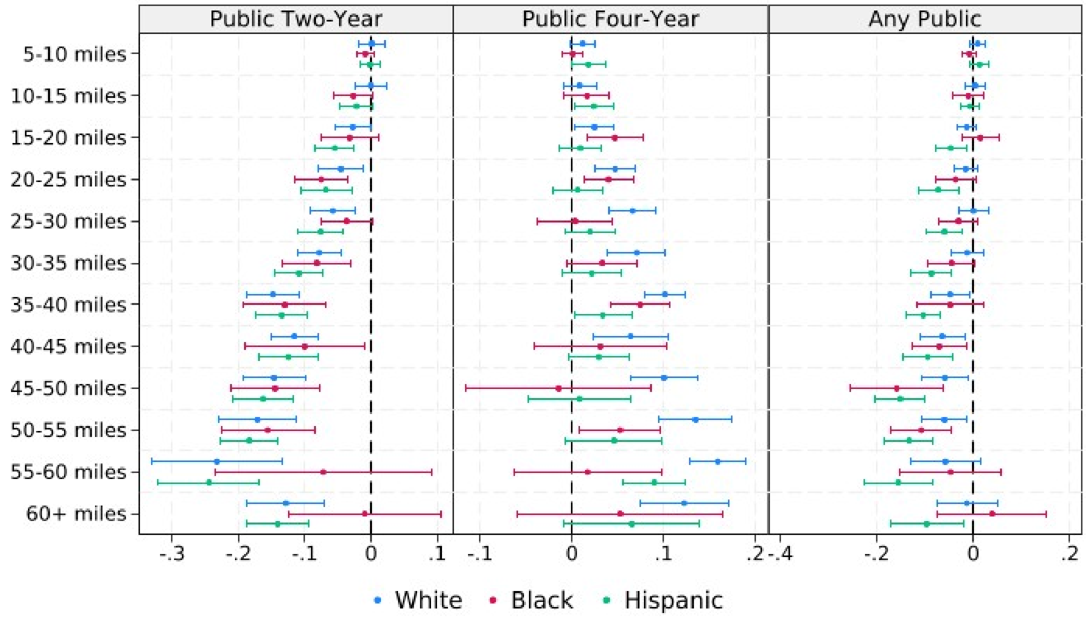
Panel B. Colleges Within 60 Miles



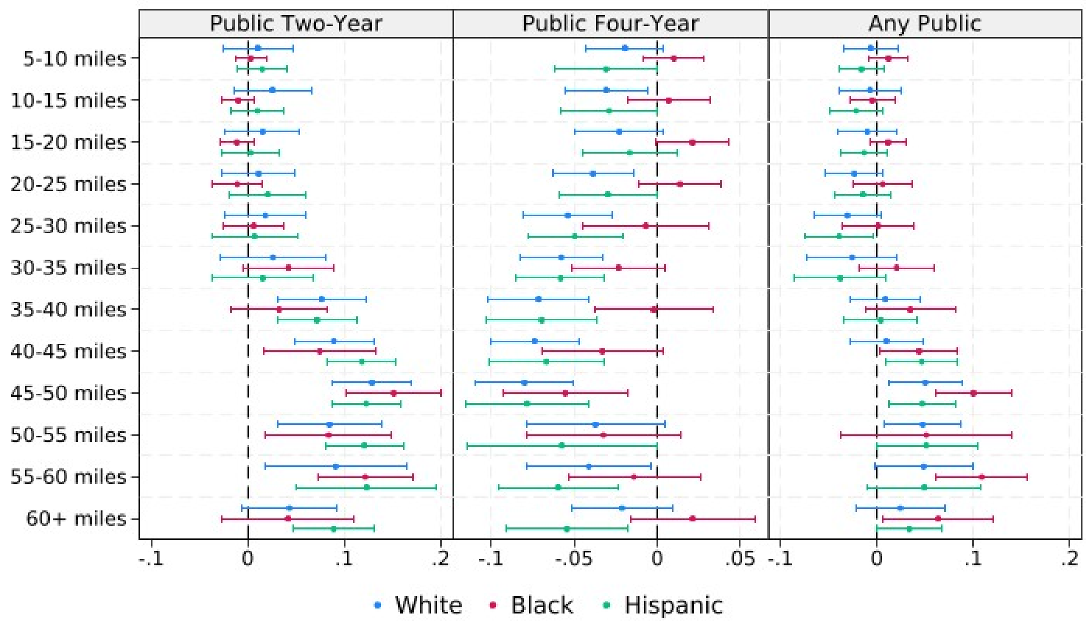
Notes: These figures summarize the number of public two-year and four-year college campuses within 30 (Panel A) or 60 (Panel B) of a student's high school, averaged over all students and all students of a particular demographic group.

Figure 3: Non-Linear Effects of Distance on Enrollment by Race and Ethnicity

Panel A. Effects of Distance from Nearest Public Two-Year College



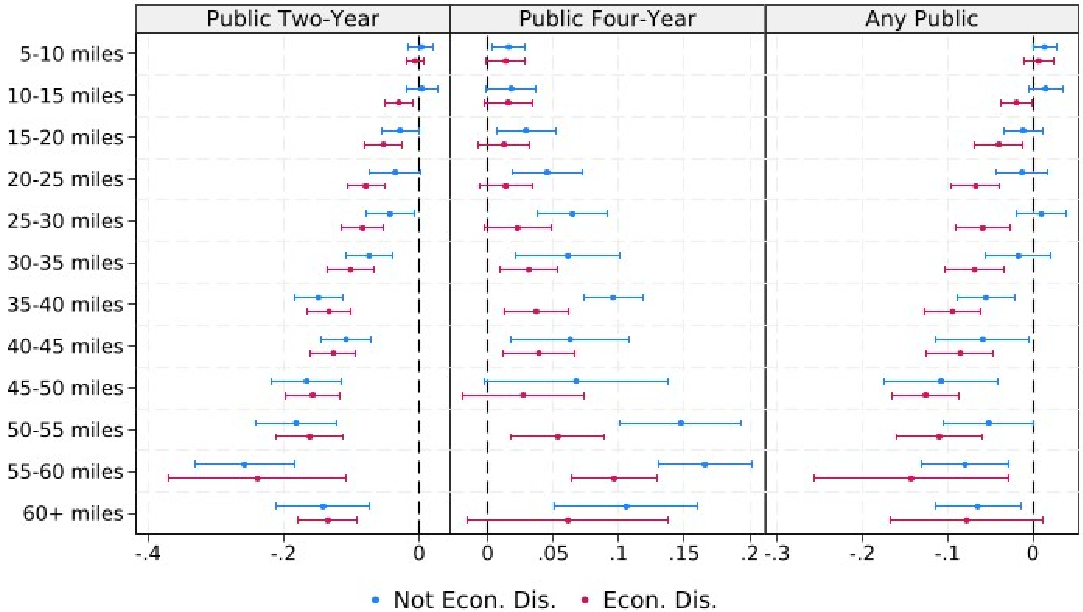
Panel B. Effects of Distance from Nearest Public Four-Year College



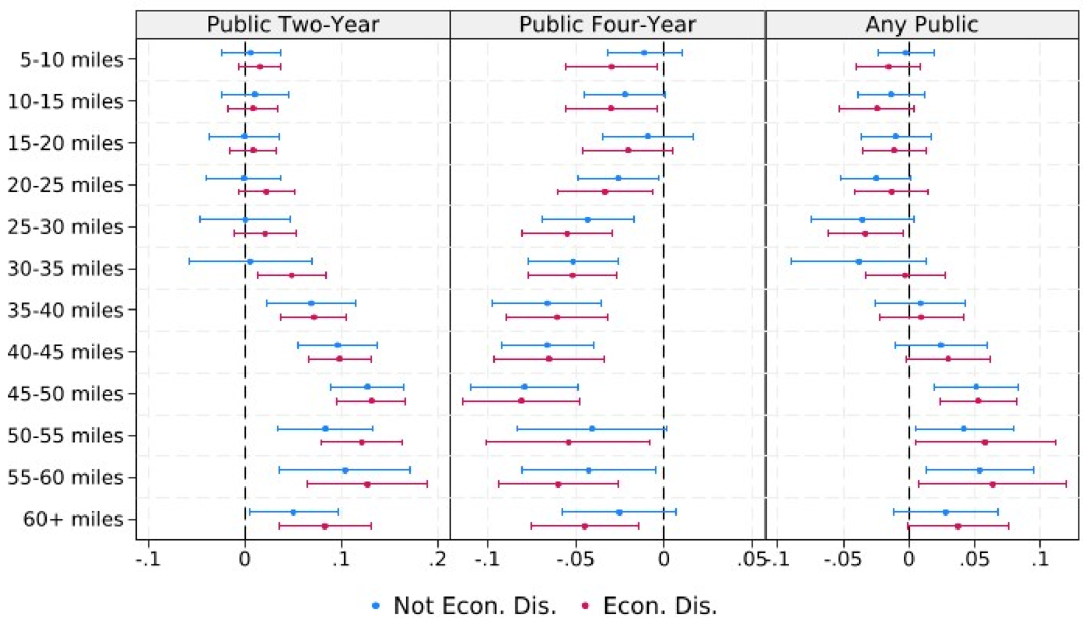
Notes: These figures plot the estimated coefficients from equation (1), where we measure distance to public two-year and four-year colleges in 5-mile intervals. Each regression controls for student demographic characteristics, 8th grade test scores, school-level characteristics, and cohort indicators. Standard errors are clustered at the school district level and we present 95% confidence intervals.

Figure 4: Non-Linear Effects of Distance on Enrollment by Economic Disadvantage Status

Panel A. Effects of Distance from Nearest Public Two-Year College



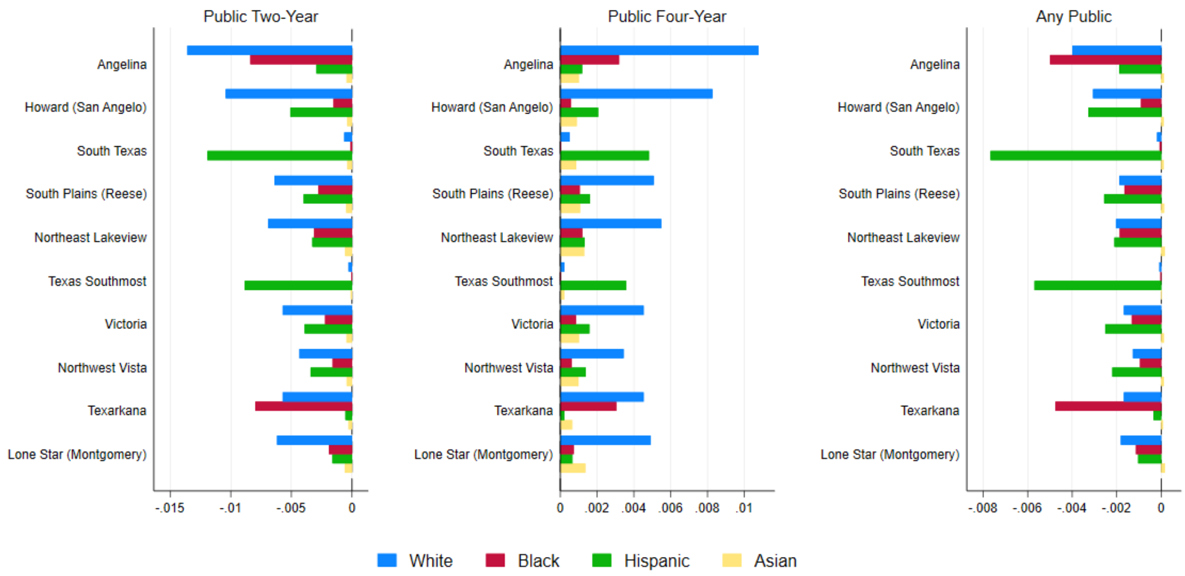
Panel B. Effects of Distance from Nearest Public Four-Year College



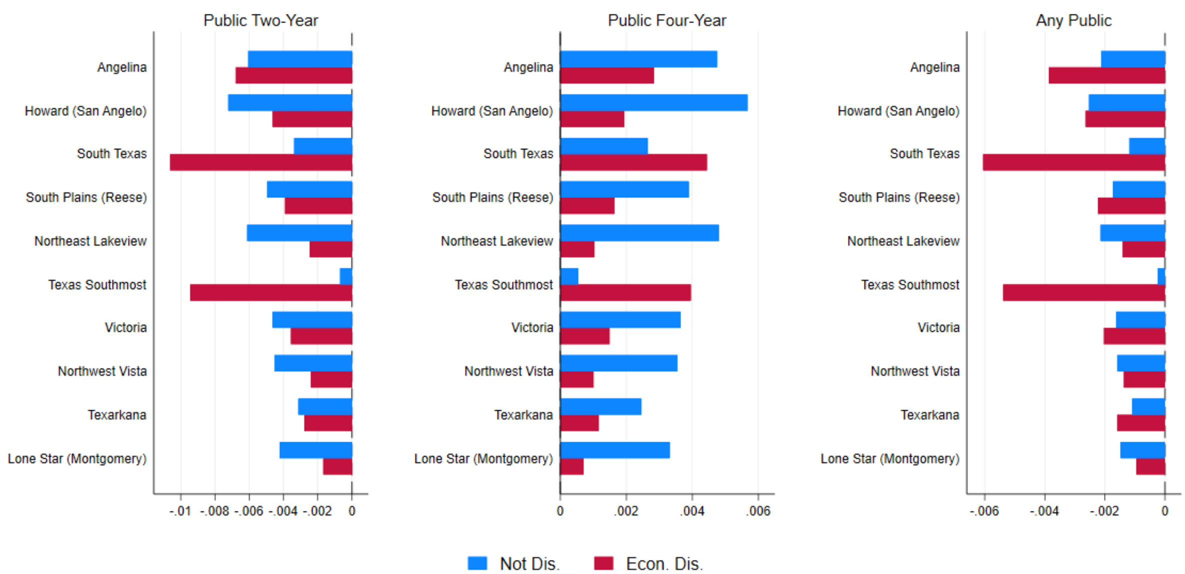
Notes: These figures plot the estimated coefficients from equation (1), where we measure distance to public two-year and four-year colleges in 5-mile intervals. Each regression controls for student demographic characteristics, 8th grade test scores, school-level characteristics, and cohort indicators. Standard errors are clustered at the school district level and we present 95% confidence intervals.

Figure 5: Predicted Enrollment Changes of Two-Year College Campus Closures

Panel A. Predicted Enrollment Changes by Race and Ethnicity



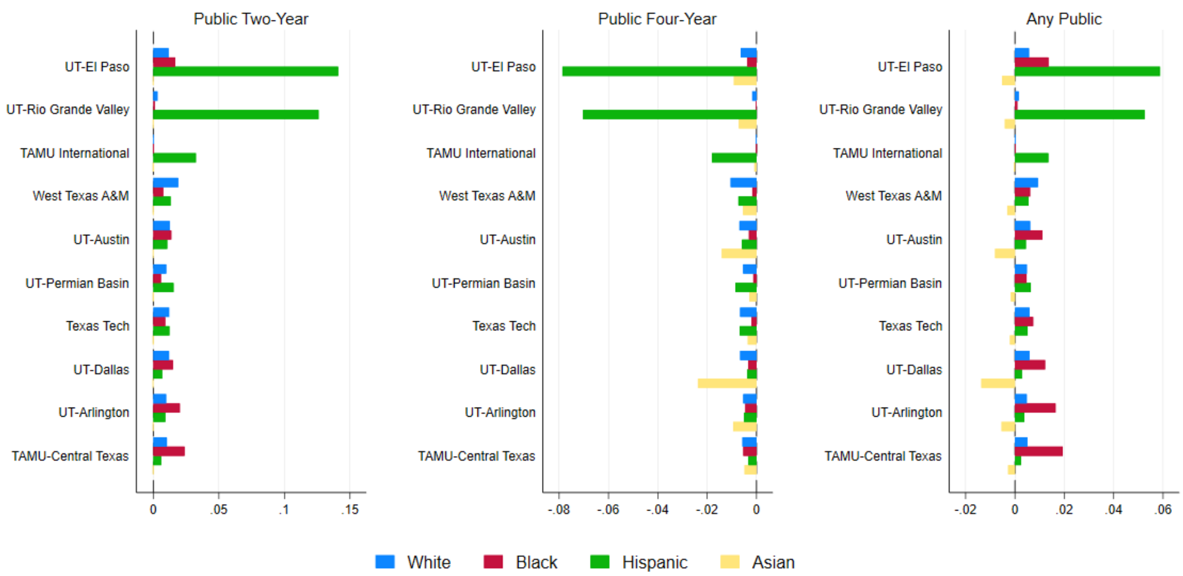
Panel B. Predicted Enrollment Changes by Economic Disadvantage Status



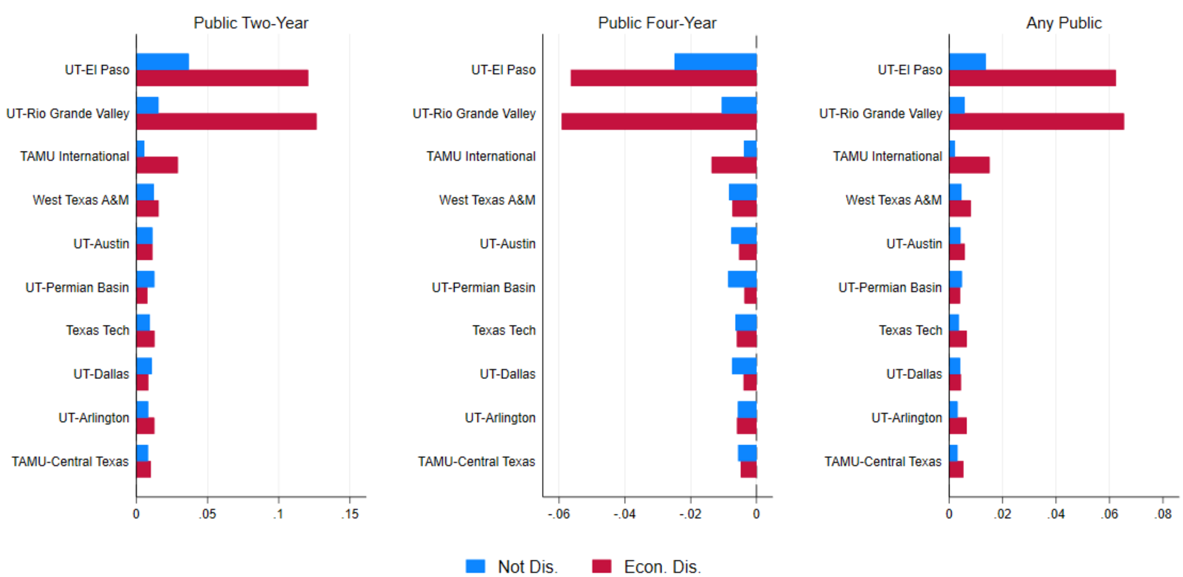
Notes: These figures plot the estimated statewide changes in college enrollment, across race (Panel A) and economic disadvantage status (Panel B) if each listed two-year college campus were to close. Details of the exercise are provided in Section V.B.

Figure 6: Predicted Enrollment Changes of Four-Year College Campus Closures

Panel A. Predicted Enrollment Changes by Race



Panel B. Predicted Enrollment Changes by Economic Disadvantage Status



Notes: These figures plot the estimated statewide changes in college enrollment, across race (Panel A) and economic disadvantage status (Panel B) if each listed four-year college campus were to close. Details of the exercise are provided in Section V.B

Table 1: Summary Statistics by Student and High School Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All	White	Black	Hispanic	Asian	Econ. Dis.	Not Econ. Dis.	Urban	Suburban	Town/ Rural
Panel A: Student Characteristics										
Economic Disadvantage	0.481	0.192	0.599	0.665	0.313	1.000	0.000	0.549	0.420	0.456
Non-Hispanic White	0.323	1.000	0.000	0.000	0.000	0.129	0.503	0.209	0.339	0.465
Non-Hispanic Black	0.126	0.000	1.000	0.000	0.000	0.157	0.097	0.138	0.146	0.086
Hispanic	0.485	0.000	0.000	1.000	0.000	0.671	0.313	0.586	0.426	0.412
Non-Hispanic Asian	0.045	0.000	0.000	0.000	1.000	0.029	0.059	0.050	0.064	0.016
Non-Hispanic Other	0.021	0.000	0.000	0.000	0.000	0.015	0.027	0.018	0.024	0.021
8th Grade Reading Score	0.106	0.237	0.016	0.025	0.230	-0.002	0.205	0.064	0.144	0.120
8^{th} Grade Math Score	0.054	0.189	-0.105	-0.013	0.238	-0.036	0.137	0.011	0.082	0.082
Panel B: High School Characteristics										
Total Enrollment	1894.250	1755.168	1981.147	1912.400	2425.192	1798.404	1983.091	2025.001	2375.563	1150.690
City	0.394	0.255	0.431	0.476	0.435	0.450	0.342	1.000	0.000	0.000
Suburb	0.326	0.342	0.378	0.286	0.467	0.284	0.364	0.000	1.000	0.000
Town/Rural	0.280	0.404	0.191	0.238	0.098	0.265	0.294	0.000	0.000	1.000
Student-Teacher Ratio	15.630	15.217	15.857	15.741	16.734	15.462	15.785	16.337	16.408	13.732
Charter	0.038	0.021	0.046	0.050	0.028	0.054	0.024	0.075	0.019	0.010
Magnet	0.063	0.024	0.112	0.078	0.051	0.084	0.043	0.147	0.014	0.001
Title I	0.742	0.562	0.825	0.867	0.514	0.897	0.599	0.780	0.637	0.811
Observations	1,382,751	446,450	174,139	670,919	62,168	665,155	717,596	545,226	450,219	387,306

Notes: Variables are summarized over our sample of 2013-2017 Texas high school graduates, as measured in their final year of high school. The number of observations shown in columns (2) - (5) do not add up to the number in column (1) because we exclude the "Other race/ethnicity" column (N=29,075). Please refer to Appendix 1 for the summary statistics related to this category.

Table 2: Summary Statistics by College Distance Characteristics

	(1) All	(2) White	(3) Black	(4) Hispanic	(5) Asian	(6) Econ. Dis.	(7) Not Econ. Dis.	(8) Urban	(9) Suburban	(10) Town/ Rural
Panel A: Distance to Nearest Colleges										
Any Public	6.607	8.543	5.040	5.943	4.231	6.325	6.867	3.219	4.511	13.812
Public Two-Year	7.279	9.292	5.525	6.643	4.611	7.000	7.538	3.787	4.582	15.330
Public Four-Year	17.347	20.740	14.680	16.101	13.592	16.722	17.925	10.220	14.356	30.855
Public Flagship	151.120	132.360	118.660	176.228	117.002	165.151	138.115	168.731	131.245	149.433
Panel B: College Presence in 30 Miles										
Any Public	0.972	0.962	0.987	0.972	0.996	0.971	0.973	1.000	1.000	0.900
Public Two-Year	0.966	0.952	0.981	0.968	0.995	0.965	0.967	1.000	1.000	0.877
Public Four-Year	0.870	0.804	0.915	0.894	0.970	0.873	0.868	0.958	0.988	0.609
Public Flagship	0.067	0.085	0.053	0.056	0.079	0.051	0.081	0.081	0.043	0.075
Panel C: College Presence in 60 Miles										
Any Public	0.997	0.998	1.000	0.997	1.000	0.997	0.998	1.000	1.000	0.991
Public Two-Year	0.996	0.997	1.000	0.995	0.999	0.996	0.997	1.000	1.000	0.987
Public Four-Year	0.973	0.970	0.990	0.969	0.995	0.971	0.975	0.991	1.000	0.917
Public Flagship	0.136	0.191	0.119	0.101	0.133	0.097	0.172	0.122	0.104	0.192
Observations	1,382,751	446,450	174,139	670,919	62,168	665,155	717,596	545,226	450,219	387,306

Notes: Variables are summarized over our sample of 2013-2017 Texas high school graduates, as measured in their final year of high school. Distances are calculated using the latitude and longitude of a student's high school. The number of observations shown in columns (2) - (5) do not add up to the number in column (1) because we exclude the "Other race/ethnicity" column (N=29,075). Please refer to Appendix Table A.1 for the summary statistics related to this category.

Table 3: Linear Effects of Distance on Enrollment Choices

	(1) Baseline	(2) Baseline	(3) Baseline	(4) + Dem.	(5) + Test	(6) + School
	Panel A: Public Two-Year Enrollment					
Distance to Nearest	-0.007**		-0.016***	-0.020***	-0.021***	-0.023***
Two-Year (10 miles)	(0.003)		(0.003)	(0.003)	(0.003)	(0.004)
Distance to Nearest		0.010***	0.014***	0.012***	0.012***	0.010***
Four-Year (10 miles)		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	Panel B: Public Four-Year Enrollment					
Distance to Nearest	0.003		0.010***	0.010***	0.010***	0.013***
Two-Year (10 miles)	(0.003)		(0.003)	(0.003)	(0.003)	(0.002)
Distance to Nearest		-0.008***	-0.010***	-0.009***	-0.009***	-0.006***
Four-Year (10 miles)		(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
	Panel C: Any Public Enrollment					
Distance to Nearest	-0.005		-0.008**	-0.012***	-0.012***	-0.011***
Two-Year (10 miles)	(0.004)		(0.004)	(0.004)	(0.004)	(0.004)
Distance to Nearest		0.003	0.005	0.003	0.003	0.004**
Four-Year (10 miles)		(0.003)	(0.003)	(0.003)	(0.003)	(0.002)

Notes: *Baseline controls:* year fixed effects (2013-2017). *Demographic student-level controls*: economic disadvantage, race and ethnicity, at-risk for dropout, gifted, immigrant status, Limited English Proficient (LEP) status, sex, special education, Career and Technical Education (CTE) enrollment (all measured in last year of high school). *Test score controls*: 8th grade reading test score (standardized) and 8th grade math test score (standardized). *High school-level controls*: total enrollment, % of each race and ethnicity, % economic disadvantage, % at-risk for dropout, % gifted, % immigrant, % LEP, % special education, % CTE enrollment, city/suburb/rural, student/teacher ratio, charter dummy, magnet dummy, and Title I dummy. Columns (1) - (5) include 1,382,751 student-by-year observations and column (6) includes 1,376,952 student-by-year observations. Standard errors shown in parentheses are clustered at the school district level. * p<0.10, ** p<0.05, *** p<0.010.

Table 4: Linear Effects of Distance on Enrollment Choices by Race and Economic Disadvantage Status

	(1) All	(2) White	(3) Black	(4) Hispanic	(5) Asian	(6) Not Econ. Dis.	(7) Econ. Dis.
	Panel A: Public Two-Year Enrollment						
Distance to Nearest Two-Year (10 miles)	-0.023***	-0.029***	-0.022***	-0.019***	-0.006	-0.024***	-0.021***
	(0.004)	(0.003)	(0.005)	(0.004)	(0.009)	(0.004)	(0.004)
Distance to Nearest Four-Year (10 miles)	0.010***	0.009***	0.014***	0.011***	-0.000	0.008***	0.013***
	(0.003)	(0.003)	(0.005)	(0.003)	(0.007)	(0.003)	(0.003)
Observations	1,376,952	444,902	173,099	668,168	61,844	714,981	661,971
	Panel B: Public Four-Year Enrollment						
Distance to Nearest Two-Year (10 miles)	0.013***	0.023***	0.008**	0.008***	0.013	0.019***	0.009***
	(0.002)	(0.003)	(0.004)	(0.003)	(0.010)	(0.003)	(0.002)
Distance to Nearest Four-Year (10 miles)	-0.006***	-0.005***	-0.003	-0.006**	-0.008	-0.006**	-0.006***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.006)	(0.003)	(0.002)
Observations	1,376,952	444,902	173,099	668,168	61,844	714,981	661,971
	Panel C: Any Public Enrollment						
Distance to Nearest Two-Year (10 miles)	-0.011***	-0.008***	-0.013***	-0.012**	0.002	-0.008***	-0.012**
	(0.004)	(0.003)	(0.005)	(0.005)	(0.012)	(0.003)	(0.005)
Distance to Nearest Four-Year (10 miles)	0.004**	0.005	0.011***	0.005**	-0.005	0.003	0.007***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.007)	(0.003)	(0.002)
Observations	1,376,952	444,902	173,099	668,168	61,844	714,981	661,971

Notes: All regressions shown in columns (1) - (7) control for year fixed effects (2013-2017), demographic student-level characteristics, 8th grade test scores, and high school-level characteristics. See Notes in Table 3 for a detail description of these controls. Standard errors shown in parentheses are clustered at the school district level. * p<0.10, ** p<0.05, *** p<0.010.

Tables 5: Effects of Living in a Community College Desert on Enrollment Choices

	(1)	(2)	(3)	(4)
	Panel A: Public Two-Year Enrollment			
Community College (CC) Desert	-0.108***	-0.092***	-0.089***	-0.082***
	(0.010)	(0.012)	(0.012)	(0.013)
CC Desert × URM Status		-0.031***		-0.020*
		(0.010)		(0.010)
CC Desert × Econ. Dis. Status			-0.039***	-0.032***
			(0.009)	(0.009)
	Panel B: Public Four-Year Enrollment			
Community College (CC) Desert	0.044***	0.070***	0.066***	0.080***
	(0.008)	(0.009)	(0.011)	(0.011)
CC Desert × URM Status		-0.050***		-0.039***
		(0.010)		(0.010)
CC Desert × Econ. Dis. Status			-0.044***	-0.031***
			(0.009)	(0.009)
	Panel C: Any Public Enrollment			
Community College (CC) Desert	-0.064***	-0.024**	-0.026**	-0.006
	(0.010)	(0.011)	(0.012)	(0.012)
CC Desert × URM Status		-0.075***		-0.055***
		(0.011)		(0.011)
CC Desert × Econ. Dis. Status			-0.076***	-0.057***
			(0.010)	(0.010)

Notes: Students are classified as living in a "community college desert" if there is no public two-year college within 30 miles of their high school. Underrepresented Minority (URM) students include all Black, Hispanic, and "Other race/ethnicity" students. All regressions shown in columns (1) - (4) control for year fixed effects (2013-2017), demographic student-level characteristics, 8th grade test scores, and high school-level characteristics. See Notes in Table 3 for a detailed description of these controls. In these specifications, we continue to control for the distance to a student's nearest four-year college in 5-mile bins. Columns (1) - (4) include 1,382,751 student observations. Standard errors shown in parentheses are clustered at the school district level. * p<0.10, ** p<0.05, *** p<0.010.

Tables 6: Effects of Living in a Four-Year College Desert on Enrollment Choices

	(1)	(2)	(3)	(4)
	Panel A: Public Two-Year Enrollment			
Four-Year College Desert	0.066***	0.069***	0.079***	0.077***
	(0.014)	(0.017)	(0.020)	(0.020)
Four-Year Desert × URM Status		-0.006		0.006
		(0.010)		(0.008)
Four-Year Desert × Econ. Dis. Status			-0.028*	-0.030**
			(0.015)	(0.014)
	Panel B: Public Four-Year Enrollment			
Four-Year College Desert	-0.033***	-0.019***	-0.024***	-0.016**
	(0.006)	(0.007)	(0.007)	(0.007)
Four-Year Desert × URM Status		-0.027***		-0.023***
		(0.008)		(0.008)
Four-Year Desert × Econ. Dis. Status			-0.020***	-0.012**
			(0.006)	(0.006)
	Panel C: Any Public Enrollment			
Four-Year College Desert	0.033***	0.048***	0.055***	0.059***
	(0.012)	(0.015)	(0.017)	(0.018)
Four-Year Desert × URM Status		-0.030***		-0.014
		(0.011)		(0.009)
Four-Year Desert × Econ. Dis. Status			-0.048***	-0.043***
			(0.014)	(0.013)

Notes: Students are classified as living in a four-year college desert if there is no public four-year college within 30 miles of their high school. Underrepresented Minority (URM) students include all Black, Hispanic, and "Other race/ethnicity" students. All regressions shown in columns (1) - (4) control for year fixed effects (2013-2017), demographic student-level characteristics, 8th grade test scores, and high school-level characteristics. See Notes in Table 3 for a detailed description of these controls. In these specifications, we continue to control for the distance to a student's nearest two-year college in 5-mile bins. Columns (1) - (4) include 1,382,751 student observations. Standard errors shown in parentheses are clustered at the school district level. * p<0.10, ** p<0.05, *** p<0.010.

Table 7: Oaxaca-Blinder Decomposition

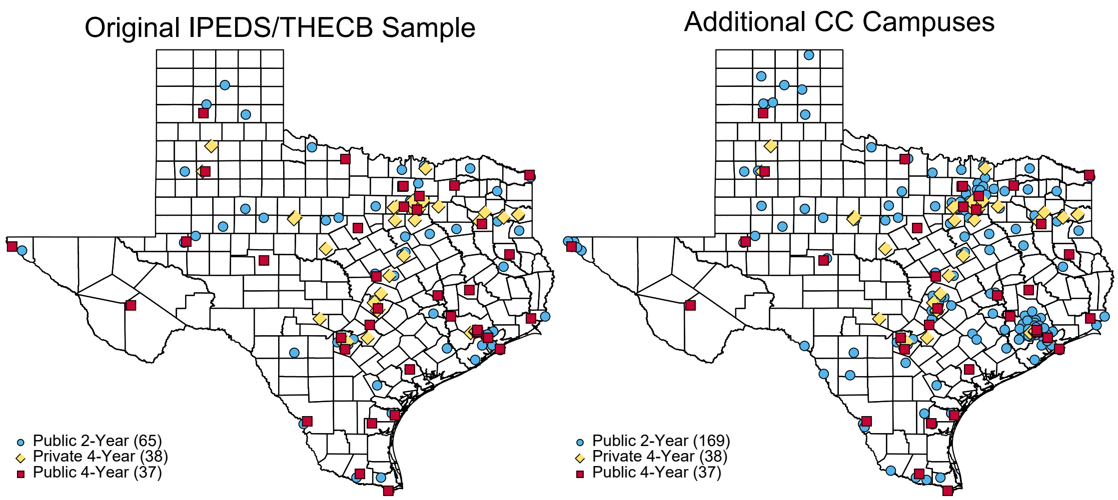
	Difference	Characteristics: Distance to Nearest Two-Year	Characteristics: Distance to Nearest Four-Year	Coefficients: Distance to Nearest Two-Year	Coefficients: Distance to Nearest Four-Year
	Panel A: Public Two-Year Enrollment				
Non-URM v. URM	0.001	-0.005***	0.004***	-0.006*	-0.004
	(0.006)	(0.001)	(0.001)	(0.003)	(0.005)
White v. Hispanic	0.007	-0.006***	0.005***	-0.008**	-0.003
	(0.006)	(0.001)	(0.002)	(0.004)	(0.005)
White v. Black	0.027***	-0.010***	0.006***	-0.004	-0.008
	(0.007)	(0.002)	(0.002)	(0.003)	(0.006)
By Econ. Dis. Status	0.034***	-0.001	0.001	-0.002	-0.008**
	(0.006)	(0.001)	(0.001)	(0.003)	(0.004)
	Panel B: Public Four-Year Enrollment				
Non-URM v. URM	0.107***	0.003***	-0.002**	0.010***	0.002
	(0.007)	(0.001)	(0.001)	(0.002)	(0.005)
White v. Hispanic	0.104***	0.003***	-0.003**	0.013***	0.002
	(0.008)	(0.001)	(0.001)	(0.003)	(0.005)
White v. Black	0.042***	0.008***	-0.003**	0.008***	-0.003
	(0.008)	(0.001)	(0.001)	(0.003)	(0.005)
By Econ. Dis. Status	0.130***	0.001	-0.001	0.007***	0.001
	(0.006)	(0.000)	(0.001)	(0.002)	(0.003)
	Panel C: Any Public Enrollment				
Non-URM v. URM	0.098***	-0.003***	0.002*	0.003	-0.001
	(0.008)	(0.001)	(0.001)	(0.004)	(0.005)
White v. Hispanic	0.101***	-0.003***	0.002*	0.004	0.000
	(0.009)	(0.001)	(0.001)	(0.005)	(0.005)
White v. Black	0.059***	-0.003***	0.004**	0.003	-0.011**
	(0.008)	(0.001)	(0.002)	(0.003)	(0.005)
By Econ. Dis. Status	0.148***	-0.001	0.001	0.003	-0.006
	(0.007)	(0.000)	(0.000)	(0.004)	(0.004)

Notes: Regressions control for year fixed effects (2013-2017), demographic student-level characteristics, 8th grade test scores, and high school-level characteristics. See Notes in Table 3 for a detail description of these controls. Standard errors shown in parentheses are clustered at the school district level. * p<0.10, ** p<0.05, *** p<0.010.

Appendix Figures and Tables

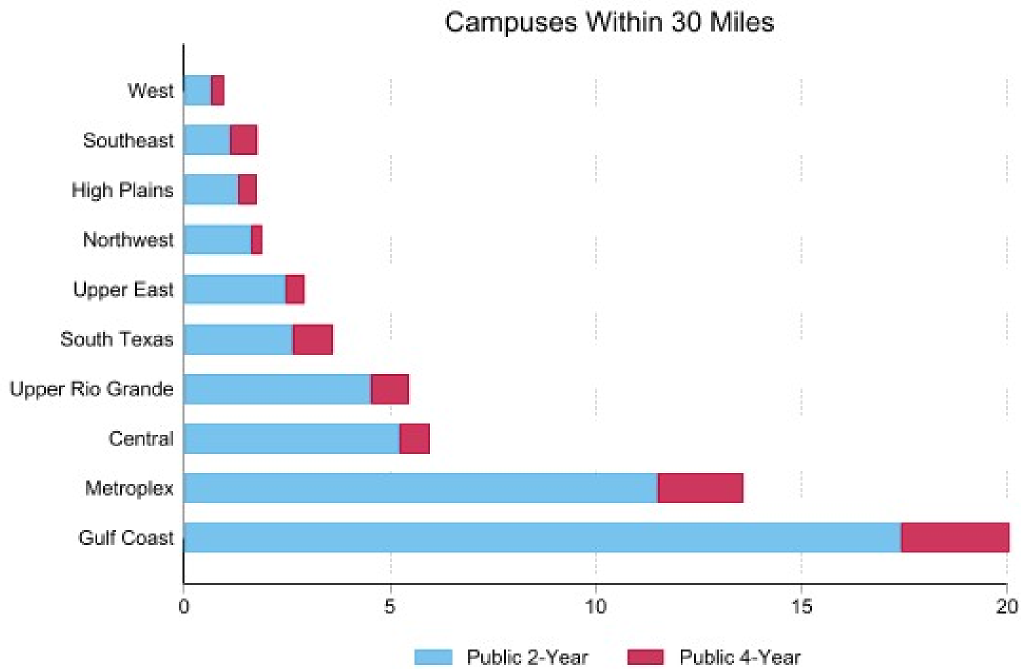
Appendix Figure A.1:

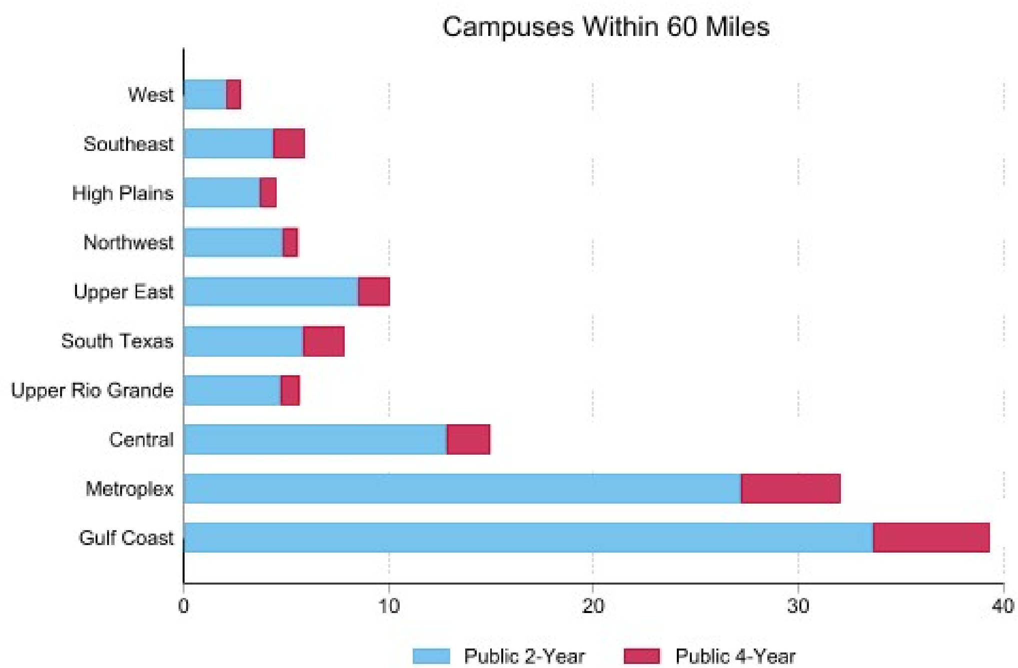
Additional Community College Campuses



Notes: These figures show the locations of public two-year, public four-year, and private four-year college campuses in Texas. The figure on the left only uses geographic information in Integrated Postsecondary Education System (IPEDS), while the panel on the right uses additional supplementary sources described in the text.

Appendix Figure A.2: Higher Education Access by Texas Region





Notes: These figures summarize the number of public two-year and four-year college campuses within 30 (Panel A) or 60 (Panel B) of Texas high schools, averaged over high schools in each Texas higher education region.

Appendix Table A.1: Summary Statistics

	(1) All	(2) White	(3) Black	(4) Hispanic	(5) Asian	(6) Other	(7) Econ. Dis.	(8) Not Econ. Dis.	(9) Urban	(10) Suburban	(11) Town/ Rural
Panel A: Student Characteristics											
Economic Disadvantage	0.481	0.192	0.599	0.665	0.313	0.334	1.000	0.000	0.549	0.420	0.456
Non-Hispanic White	0.323	1.000	0.000	0.000	0.000	0.000	0.129	0.503	0.209	0.339	0.465
Non-Hispanic Black	0.126	0.000	1.000	0.000	0.000	0.000	0.157	0.097	0.138	0.146	0.086
Hispanic	0.485	0.000	0.000	1.000	0.000	0.000	0.671	0.313	0.586	0.426	0.412
Non-Hispanic Asian	0.045	0.000	0.000	0.000	1.000	0.000	0.029	0.059	0.050	0.064	0.016
Non-Hispanic Other	0.021	0.000	0.000	0.000	0.000	1.000	0.015	0.027	0.018	0.024	0.021
Underrepresented Minority (URM)	0.632	0.000	1.000	1.000	0.000	1.000	0.842	0.438	0.742	0.597	0.519
At-Risk for Dropout	0.432	0.283	0.529	0.528	0.236	0.347	0.560	0.313	0.481	0.405	0.394
Gifted	0.096	0.127	0.048	0.077	0.201	0.112	0.065	0.125	0.107	0.094	0.083
Immigrant	0.010	0.003	0.006	0.012	0.048	0.005	0.013	0.007	0.012	0.010	0.006
Limited English Proficient (LEP)	0.061	0.005	0.010	0.109	0.113	0.015	0.101	0.024	0.082	0.056	0.037
Male	0.503	0.511	0.498	0.498	0.514	0.494	0.494	0.511	0.497	0.504	0.510
Special Education	0.084	0.080	0.128	0.082	0.025	0.079	0.106	0.065	0.084	0.076	0.095
Career & Technical Education (CTE)	0.782	0.771	0.780	0.801	0.665	0.758	0.804	0.762	0.748	0.756	0.860
Early College High School	0.053	0.013	0.022	0.090	0.019	0.014	0.088	0.021	0.069	0.044	0.038
8th Grade Reading Score	0.106	0.237	0.016	0.025	0.230	0.216	-0.002	0.205	0.064	0.144	0.120
8^{th} Grade Math Score	0.054	0.189	-0.105	-0.013	0.238	0.098	-0.036	0.137	0.011	0.082	0.082
Observations	1,382,751	446,450	174,139	670,919	62,168	29,075	665,155	717,596	545,226	450,219	387,306

Notes: As in Table 1, variables are summarized over our sample of 2013-2017 Texas high school graduates, as measured in their final year of high school.

Appendix Table A.1: Summary Statistics (continued)

	(1) All	(2) White	(3) Black	(4) Hispanic	(5) Asian	(6) Other	(7) Econ. Dis.	(8) Not Econ. Dis.	(9) Urban	(10) Suburban	(11) Town/ Rural
Panel B: High School Characteristics											
Total enrollment	1894.250	1755.168	1981.147	1912.400	2425.192	1955.32	1798.404	1983.091	2025.001	2375.563	1150.690
Percent White	0.323	0.532	0.243	0.198	0.346	0.424	0.218	0.420	0.209	0.339	0.465
Percent Black	0.126	0.095	0.297	0.100	0.151	0.135	0.137	0.116	0.138	0.146	0.086
Percent Hispanic	0.485	0.297	0.384	0.658	0.325	0.344	0.598	0.381	0.586	0.426	0.412
Percent Asian	0.045	0.048	0.054	0.030	0.151	0.059	0.031	0.057	0.050	0.064	0.016
Percent Other	0.021	0.028	0.023	0.015	0.027	0.038	0.016	0.026	0.018	0.024	0.021
Percent Economic	0.481	0.325	0.522	0.593	0.336	0.371	0.611	0.360	0.549	0.420	0.456
Percent At-risk	0.432	0.349	0.473	0.489	0.329	0.383	0.497	0.372	0.481	0.405	0.394
Percent Gifted	0.096	0.097	0.089	0.094	0.124	0.096	0.090	0.101	0.107	0.094	0.083
Percent Immigrant	0.010	0.007	0.010	0.011	0.015	0.009	0.010	0.009	0.012	0.010	0.006
Percent LEP	0.061	0.030	0.058	0.085	0.050	0.040	0.083	0.041	0.082	0.056	0.037
Percent Special Education	0.084	0.084	0.091	0.085	0.066	0.084	0.090	0.080	0.084	0.076	0.095
Percent CTE	0.782	0.782	0.770	0.792	0.718	0.765	0.794	0.771	0.748	0.756	0.860
Percent Early College High School	0.062	0.030	0.034	0.092	0.030	0.031	0.089	0.036	0.069	0.069	0.043
City	0.394	0.255	0.431	0.476	0.435	0.341	0.450	0.342	1.000	0.000	0.000
Suburb	0.326	0.342	0.378	0.286	0.467	0.375	0.284	0.364	0.000	1.000	0.000
Town/Rural	0.280	0.404	0.191	0.238	0.098	0.284	0.265	0.294	0.000	0.000	1.000
Student-Teacher Ratio	15.630	15.217	15.857	15.741	16.734	15.675	15.462	15.785	16.337	16.408	13.732
Charter	0.038	0.021	0.046	0.050	0.028	0.027	0.054	0.024	0.075	0.019	0.010
Magnet	0.063	0.024	0.112	0.078	0.051	0.044	0.084	0.043	0.147	0.014	0.001
Title I	0.742	0.562	0.825	0.867	0.514	0.621	0.897	0.599	0.780	0.637	0.811
Observations	1,382,751	446,450	174,139	670,919	62,168	29,075	665,155	717,596	545,226	450,219	387,306

Notes: As in Table 1, variables are summarized over our sample of 2013-2017 Texas high school graduates, as measured in their final year of high school.

Appendix Table A.1: Summary Statistics (continued)

	(1) All	(2) White	(3) Black	(4) Hispanic	(5) Asian	(6) Other	(7) Econ. Dis.	(8) Not Econ. Dis.	(9) Urban	(10) Suburban	(11) Town/ Rural
Panel C: College Enrollment											
Public Two-Year Enrollment	0.339	0.350	0.323	0.343	0.272	0.332	0.321	0.356	0.319	0.348	0.358
Public Four-Year Enrollment	0.238	0.288	0.247	0.184	0.435	0.263	0.171	0.301	0.239	0.246	0.228
Any Public Enrollment	0.555	0.610	0.551	0.509	0.672	0.572	0.478	0.627	0.534	0.574	0.564
Panel D: Distance to Nearest Colleges											
Any Public	6.607	8.543	5.040	5.943	4.231	6.649	6.325	6.867	3.219	4.511	13.812
Public 2-Year	7.279	9.292	5.525	6.643	4.611	7.244	7.000	7.538	3.787	4.582	15.330
Public 4-Year	17.347	20.740	14.680	16.101	13.592	17.967	16.722	17.925	10.220	14.356	30.855
Public Flagship	151.120	132.360	118.660	176.228	117.002	127.196	165.151	138.115	168.731	131.245	149.433
Panel E: College Presence in 30 Miles											
Any Public	0.972	0.962	0.987	0.972	0.996	0.977	0.971	0.973	1.000	1.000	0.900
Public 2-Year	0.966	0.952	0.981	0.968	0.995	0.971	0.965	0.967	1.000	1.000	0.877
Public 4-Year	0.870	0.804	0.915	0.894	0.970	0.865	0.873	0.868	0.958	0.988	0.609
Public Flagship	0.067	0.085	0.053	0.056	0.079	0.091	0.051	0.081	0.081	0.043	0.075
Panel F: College Presence in 60 Miles											
Any Public	0.997	0.998	1.000	0.997	1.000	0.999	0.997	0.998	1.000	1.000	0.991
Public 2-Year	0.996	0.997	1.000	0.995	0.999	0.999	0.996	0.997	1.000	1.000	0.987
Public 4-Year	0.973	0.970	0.990	0.969	0.995	0.977	0.971	0.975	0.991	1.000	0.917
Public Flagship	0.136	0.191	0.119	0.101	0.133	0.201	0.097	0.172	0.122	0.104	0.192
Observations	1,382,751	446,450	174,139	670,919	62,168	29,075	665,155	717,596	545,226	450,219	387,306

Notes: As in Table 1, variables are summarized over our sample of 2013-2017 Texas high school graduates, as measured in their final year of high school. Distances are calculated using the latitude and longitude of a student's high school.