Online Appendix

The Meritocratic Consensus and Stratification in Higher Education

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APPENDIX A: DATA APPENDIX

This project combines annual university-level statistics from the US Biennual Surveys of Education, the College Blue Books, the Higher Education General Information Survey (HEGIS), the College Board Annual Survey of Colleges, the Integrated Postsecondary Education Data System (IPEDS), and the College Mobility Report Cards. This data appendix discusses data availability and construction. All academic years refer to their start year; e.g. 2019-2020 is referred to as 2019.

A1. US Biennial Survey of Education

The United States Office of Education published the Biennial Survey of Education biennially from 1916 until 1958, replacing the earlier (but similarly-detailed) annual Report of the Commissioner of Education. The biennials included annual enrollment by institution until the mid-1940s, but only included institution-level revenue and expenditure data between 1928 and 1940. We restrict attention to the 1928-1930 biennial and digitize the enrollment, expenditure, and revenue statistical tables using ExtractTable in October 2025, hand-correcting a very small number of errors.[17] Per-student instructional expenditures (referred to as "Resident Instruction" expenditures) and total revenues (which is the difference between "Total receipts, exclusive of additions to endowment" and both "private benefactions for increase of plant" and "state and city for increase of plant") are CPI-adjusted to 2025 and defined as the quotients with the total number of students (including preparatory and graduate students). Four-year institutions are defined as those that awarded at least 10 "first degrees" in that year. All reported statistics are winsorized at the top and bottom 5 percent to avoid statistical noise from misreporting and the role of individual institutions.

We winsorize all series 5 percent to reduce the influence of any individual institution. The primary impact of this is to reduce the influence of the City University of New York, which was a significant outlier among public four-year institutions in 1929 in both enrollment (73 percent larger than the next-largest institution) and per-student instructional expenditures (32 percent lower than the next-lowest institution). Both likely reflect high part-time enrollment, but the 1929 data do not permit calculation of enrollment measured in full-time equivalent students.

A2. College Blue Books

The *College Blue Books* were statistical records originally collected by Huber William Hurt, a professor of education at Columbia University. They include detailed institution-level information on universities across the United States. We employ digitized versions of the Blue Books from the years 1923, 1928, 1933, 1939, 1947, and 1962, available through HathiTrust with hand-recorded data provided by Bleemer and Quincy (2025a).

We impute undergraduate enrollment as the product between total enrollment (including graduate students) and the share of undergraduate degrees among all degrees (weighting Masters by 0.5 relative to undergraduate or doctoral degrees). Institutions are marked as requiring standardized tests in admissions if at least 50 percent of students are admitted at least in part by examination (1923-1947) or if the school reports requiring a standardized exam in admissions (1962). Junior colleges are classified as two-year institutions and are omitted; public institutions are those controlled by the federal, state, city, or other local government.

A3. US Office of Civil Rights Reports

The US Office of Civil Rights published biannual reports on the ethnic composition of full-time undergraduate at each US college and university between 1968 and 1984. These are the only known comprehensive data on college ethnic composition prior to 1976. We digitized the main Table 1 of the 1968 volume (McVay, 1969) using ExtractTable

[17] We use the "Statistics of Universities and Colleges" chapter of volume 2, Tables 7, 10, and 21.

in October 2025, hand-correcting a very small number of errors. Enrollments are reported overall and for the following racial groups: "Negro," "American Indian," "Oriental," and "Spanish Surnamed." We take the first, third, and fourth of these as the number of Black, Asian, and Hispanic enrollees at each institution, and divide by the total to get enrollment shares at each school.

A4. HEGIS

A subset of the complete federal 1966-1986 HEGIS database has been digitized and made available as fixed-width files through ICPSR, series 30. We construct financial and enrollment series for 1969, 1970, 1972, 1975, 1978, and 1981. Instructional and student services expenditures are directly reported. Research expenditures before 1975 are the sum of "Sponsored Research" and "Other Separately Budgeted Research"; research expenditures are directly reported starting in 1975. "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR), where the latter two are combined in 1969-1970. Total non-hospital revenue is difference between "Total current funds revenue" and "sales and services of hospitals". University revenues are not reported in a manner that permits reconstruction of the categories used in this paper because government tuition grants included in student tuition payments. All expenditure and revenue measures are CPI-adjusted to 2025.

We collect three enrollment measures for each university: first-time first-year enrollment, full-time undergraduate enrollment, and total FTE enrollment (which is full time enrollment plus one-third of part-time enrollment). The former is used for all cross-university statistical weights; the middle is used for ethnicity shares of the full-time freshman class in 1976 (and is also collected for Black, Hispanic, and Asian students); and the last is used for all measurement of per-student expenditures and revenues.

Universities are linked to IPEDS by a FICE-to-UnitID dictionary available in the replication package. Public, private, and two-year institutions are identified using the link to IPEDS (privileging the 2002 status).

A5. College Board Annual Survey of Colleges

The College Board has conducted annual surveys of all US colleges and universities since 1983; data are available in fixed-width files for license from College Board starting in 1985. We construction admissions and enrollment series for 1985, 1988, 1993, 1996, and 1998. Test-required universities are identified as those which report requiring any standardized test in admissions. Public and private universities are directly observed; universities are linked to IPEDS by a FICE-to-UnitID dictionary available in the replication package. The 25th and 75th percentile of SAT math and reading scores is observed for most test-required universities; we define the average test score as the sum of the mean of the 25th and 75 percentiles of each component. An additional 10-20 percent of institutions only report the 25th and 75th percentile of the school's composite ACT score; we predict those schools' average SAT score using the two ACT components separately in each year ($R^2 \approx 0.8$) and construct predicted SAT scores for those institutions.

We directly measure first-time first-year enrollment and use it to weight cross-university averages.

A6. IPEDS

The complete federal university-level IPEDS database is available for 1980 and 1984-2023 at the website of the National Center for Education Statistics; we construct annual series for each year. Public, private, for-profit, 2000 Carnegie-classification "R1", and two-year institutions are directly observed; we fix institutions' categories in 2002. Tables A-3 and A-4 identify the top-50 private and state flagship universities by IPEDS UnitID.

The 25th and 75th percentile of SAT math and reading scores is observed for most test-required universities annually since 2001; we define the average test score as the sum of the mean of the 25th and 75 percentiles of each component. An additional 10-20 percent of institutions only report the 25th and 75th percentile of the school's

composite ACT score; we predict those schools' average SAT score using the two ACT components separately in each year ($R^2 \approx 0.8$) and construct predicted SAT scores for those institutions. The admissions rate is directly observed for each institution in 2019.

We collect three enrollment measures for each university: first-time first-year enrollment, full-time undergraduate enrollment, and total FTE enrollment (which is full time enrollment plus one-third of part-time enrollment). The former is used for all cross-university statistical weights; the middle is used for ethnicity shares of the full-time freshman class in 1976 (and is also collected for Black, Hispanic, and Asian students); and the last is used for all measurement of per-student expenditures and revenues.

The student-to-faculty ratio is the ratio of total FTE enrollment to full-time faculty employment, including both tenure-track and term faculty. The six-year graduation rate is the share of first-time full-time undergraduates in that year who have earned a degree within six years of enrollment, excluding students who leave the university due to death, permanent disability, military enlistment, Peace Corps enlistment, or church mission, following the definition in IPEDS.

We take care to construct consistent measures of university revenues before and after the 1993 FASB Statement 117 (which changed accounting standards for non-profit private universities) and the 1999 GASB Statement 35 (which changed accounting standards for public universities). "Gross Tuition" is the sum of reported tuition payments collected by the institution and – in years that they are separated out – the portion of governmental and institutional student grants that are applied to tuition and fees. "Net Tuition" is the difference between gross tuition and total governmental and institution student grants (including those which subsidize auxiliary enterprises like housing), resulting in the total amount of money paid by students for tuition (understanding housing subsidies as negative tuition payments). Net tuition is not observed prior to 1988 because student aid receipts are not observed.

"Government Appropriations and Grants" include federal, state, and local block grants *as well as* federal Pell and non-Pell student aid grants and state and local grants (like the CalGrant or the Excelsior Scholarship), resulting in the complete student-oriented funding provided to universities by government. "Government Contracts" includes federal, state, and local grants and contract funding provided for research purposes, which subtracts government student aid grants from the IPEDS fields. Government appropriations and contracts are not observed prior to 1986.

"Private Funding" is the sum of private gifts, grants, and contracts, contributions from affiliated entities (like fundraising foundations), and all revenue from university endowment funds. Private funding is not observed prior to 2002.

"Instructional Expenditures," "Research Expenditures," and "Academic Support Expenditures" are directly observed. "Administrative Expenditures" are the sum of "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR). We omit expenditures on public service (like community education programs), auxiliary enterprises (like dormitories and cafeterias), hospitals, and other independent operations from our main expenditure categories. "Total Non-Hospital Revenues" are the difference between total revenues and revenues from hospitals. All revenue and expenditure measures are CPI-adjusted to 2025.

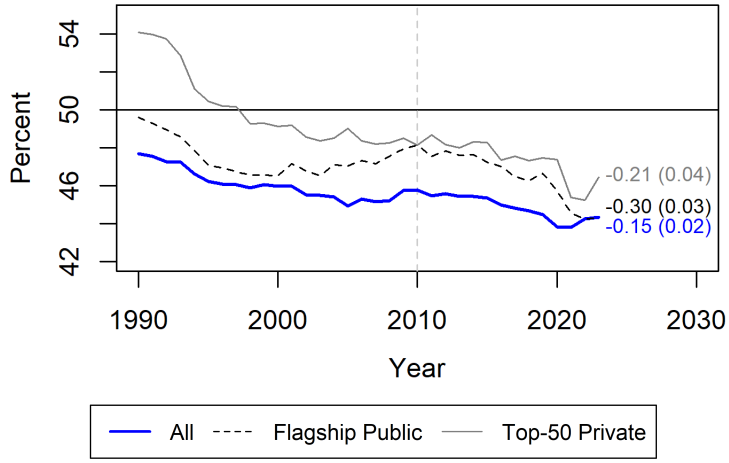
A7. Parental Income

We employ parental income data produced by Chetty et al. (2020), who in turn constructed parental income quintile shares by cohort and institution using data from the Internal Revenue Service. Parental income rank is measured for the 1980-1982 or 1989-1991 birth cohort by students' modal institution. Institutions are assigned (by necessity) to the lowest tier of all institutions sharing their IRS tax ID.

APPENDIX B: MALE AFFIRMATIVE ACTION

Bielby et al. (2014) provide evidence that male college applicants were no more likely to attend a highly-selective university than academically-similar female applicants in the mid-2000s. However, the continued decline in the male

Figure BB-1. Male Enrollment Among Freshmen at Top-50 Private Universities



Note: This figure shows that top private universities have seen slightly less of a trend toward majority-female enrollment than state flagship universities since 2010 ($p = 0.10$). The annual share of freshman students who are male at all four-year universities, state flagship institutions, and all top-50 private institutions. Numbers on the plot report the average annual change in the male share between 2010 and 2023 (with robust standard error). The difference in mean slopes between state flagships and top-50 privates is 0.091, with an approximate standard error of 0.055. Source: IPEDS.

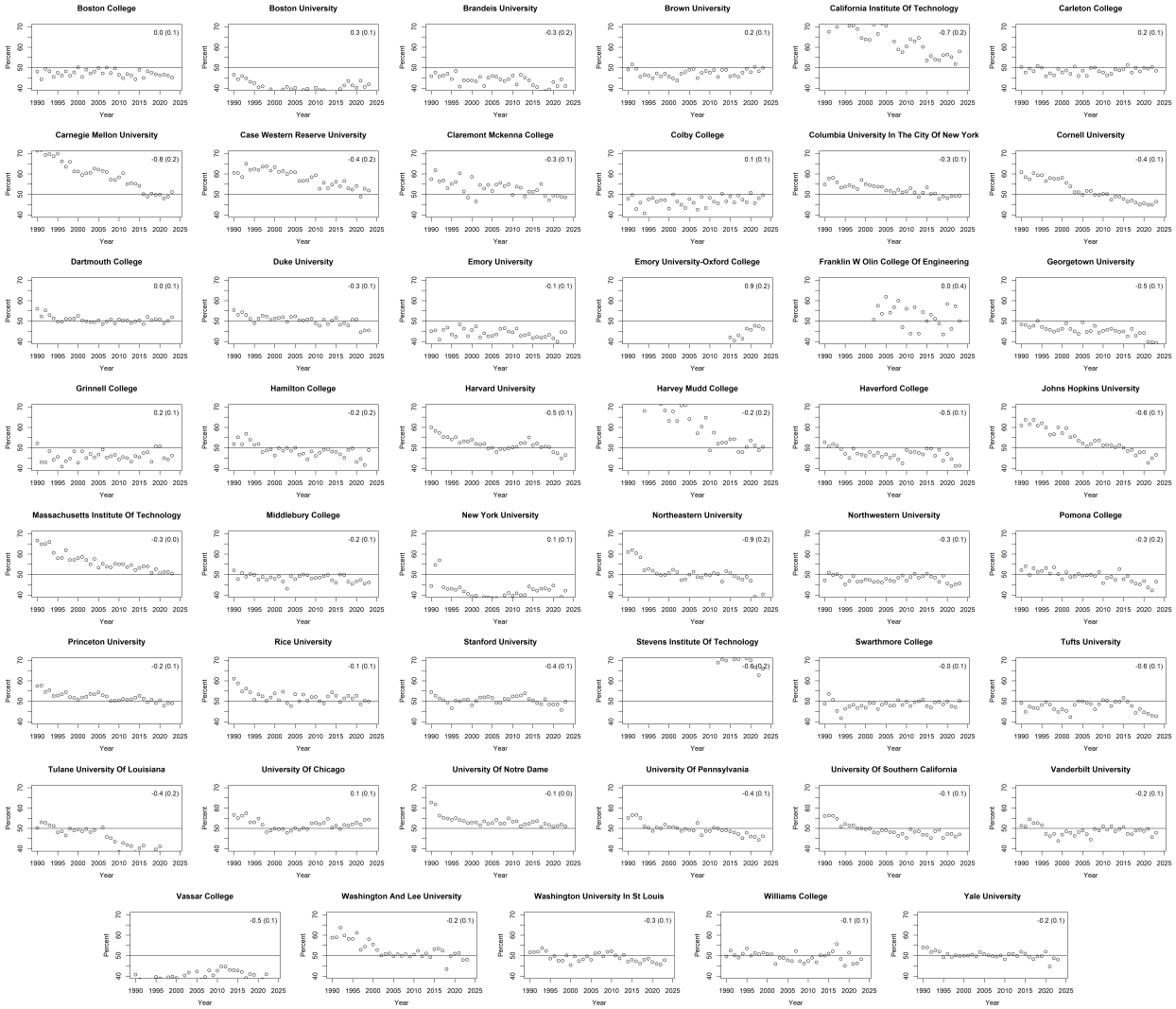
share of all four-year college-goers – to 44.3 percent in 2023 – provided increasing an incentive for colleges with an interest in approximate gender balance to provide admission preference to male students. Figure BB-1 shows the annual share of male first-year students at flagship public universities – where gender-specific admissions preferences are believed to have been weak since the University of Georgia's were found to violate Title IX in *Johnson v. Board of Regents* in 2000 – and at top-50 private universities. Top-50 private universities had disproportionate male enrollment until 2010, when flagship state and top-50 private universities each enrolled about 48 percent male students. Since 2010, flagship public universities have become about 0.30 percentage points more female each year, whereas top-50 private universities have become about 0.21 percentage points more female each year. Treating flagship public enrollment as reflecting the characteristics of the student body eligible for top-50 private enrollment, this suggests that male affirmative action could explain as much as 1 to 2 percentage points – 0.09 percentage points per year over 14 years – of augmented male enrollment at top-50 private universities.

Figure BB-2 visualizes the male shares of first-year students at each of the top-50 private universities, excluding three all-female institutions. Some universities, like Brandeis University, have student gender compositions that closely mirror the average flagship public university. Others, like Dartmouth University and Swarthmore College, have gender compositions that are closely reflect those of institutions that impose a 50-50 gender quota, which has likely required a steadily-growing preference for male applicants since 2010 in order to maintain. Yet other schools – see Tulane and Northeastern University – appear to have implemented admissions policies that maintained an approximate gender quota for many years before policy changes led to increased female enrollment. These various patterns confirm the possibility that a subset of Top-50 universities implemented admissions policies in the 2010s that aggregate up to result in a small increase in male enrollment at top-50 private universities in recent years.

We conclude that while male affirmative action may operate at some highly-selective private universities, its enrollment effects even at those schools are on the order of a few percentage points, and there is little reason to believe that male affirmative action is a first-order determinant of university allocation in the US.

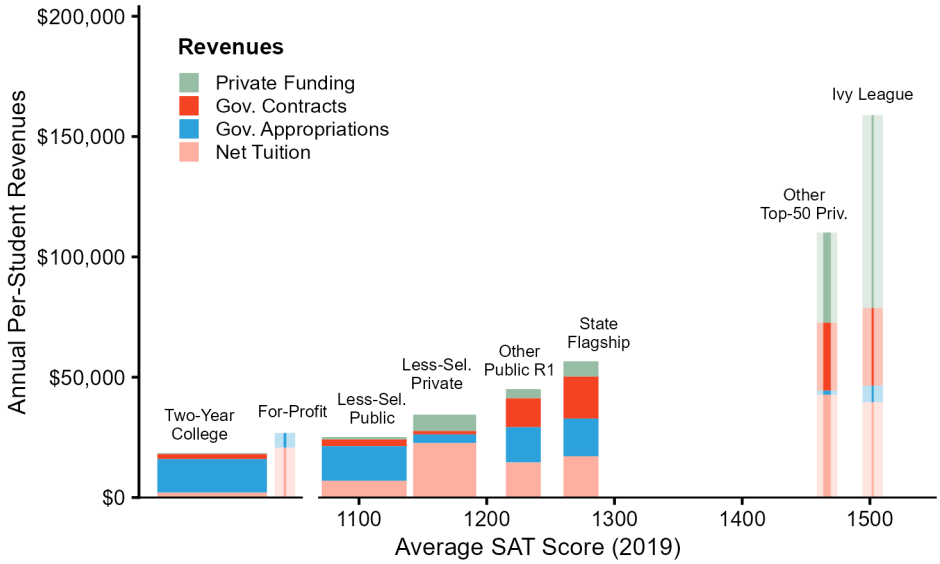
APPENDIX FIGURES AND TABLES

Figure BB-2. Male Enrollment Among Freshmen at Top-50 Private Universities



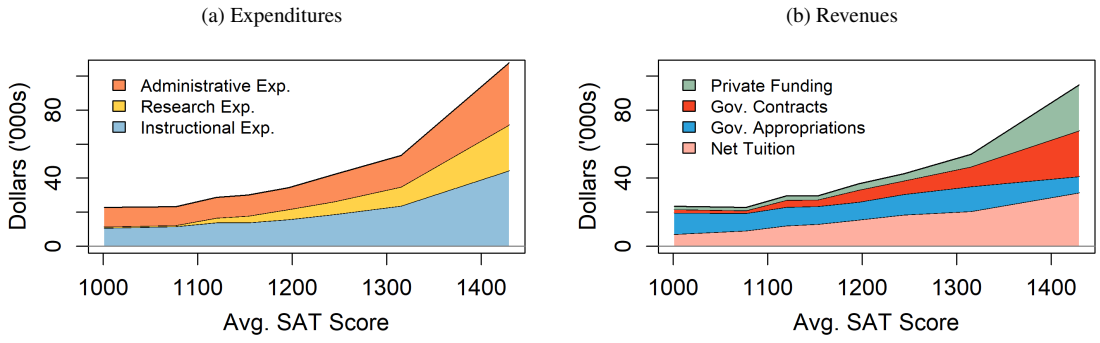
Note: The annual share of freshman students who are male at each of the top-50 private institutions. Numbers on the plot report the average annual change in the male share between 2010 and 2023 (with robust standard error). Source: IPEDS.

Figure A-1. Universities' 2019 Revenues by Tier



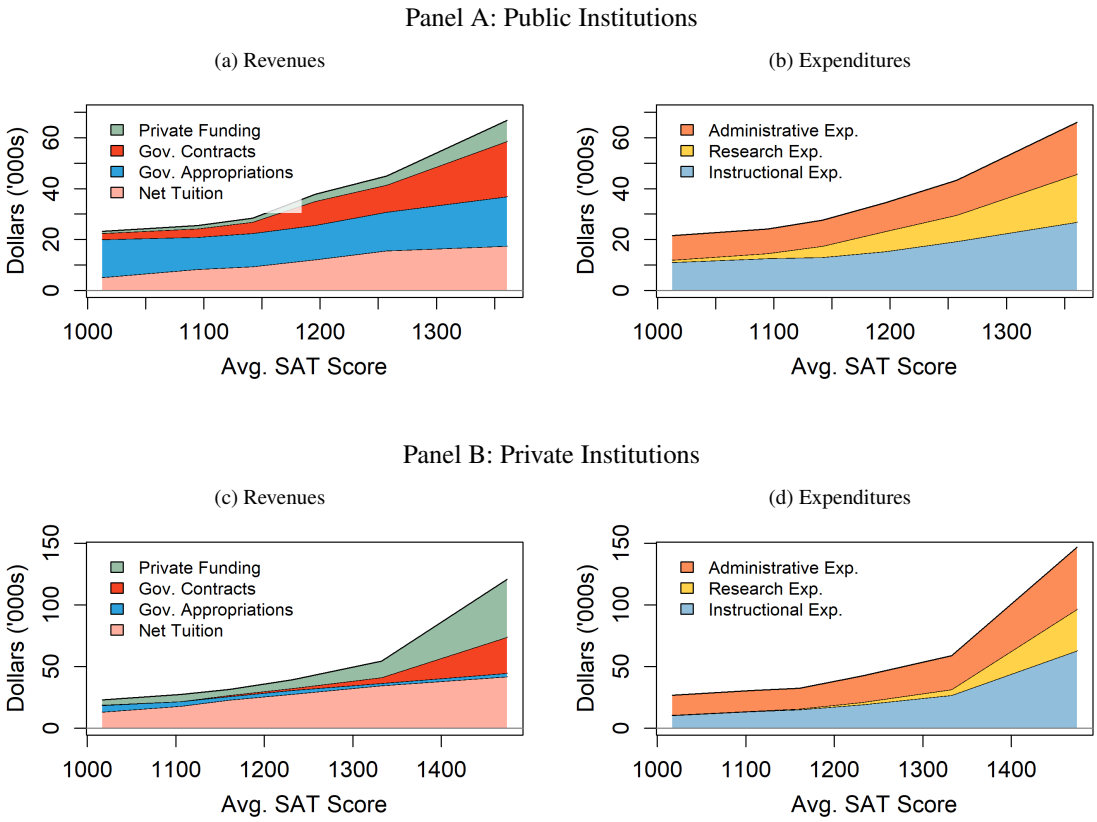
Note: This figure shows that the larger expenditures at selective institutions are financed by substantially higher net tuition funding (gross tuition payments minus gross financial aid), private funding (including alumni donations, affiliated groups like booster clubs, and endowment returns), and government research contracts. This figure shows average 2019 revenues per full-time equivalent student by tier of institution and source of revenue. "Net Tuition" is the difference between gross tuition and total governmental and institution student grants (including those which subsidize auxiliary enterprises like housing). "Government Appropriations and Grants" include federal, state, and local block grants *as well as* federal Pell and non-Pell student aid grants and state and local grants (like the CalGrant or the Excelsior Scholarship). "Government Contracts" includes federal, state, and local grants and contract funding provided for research purposes. "Private Funding" is the sum of private gifts, grants, and contracts, contributions from affiliated entities (like fundraising foundations), and all revenue from university endowment funds. Schools' revenues may not exactly equal expenditures due to cross-subsidization from hospitals and auxiliary enterprises (like dormitories and dining halls) and intertemporal substitution. Students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. All dollar amounts are CPI-adjusted to 2025. Source: IPEDS.

Figure A-2. Universities' 2019 Per-Student Revenues and Expenditures by Average SAT Score



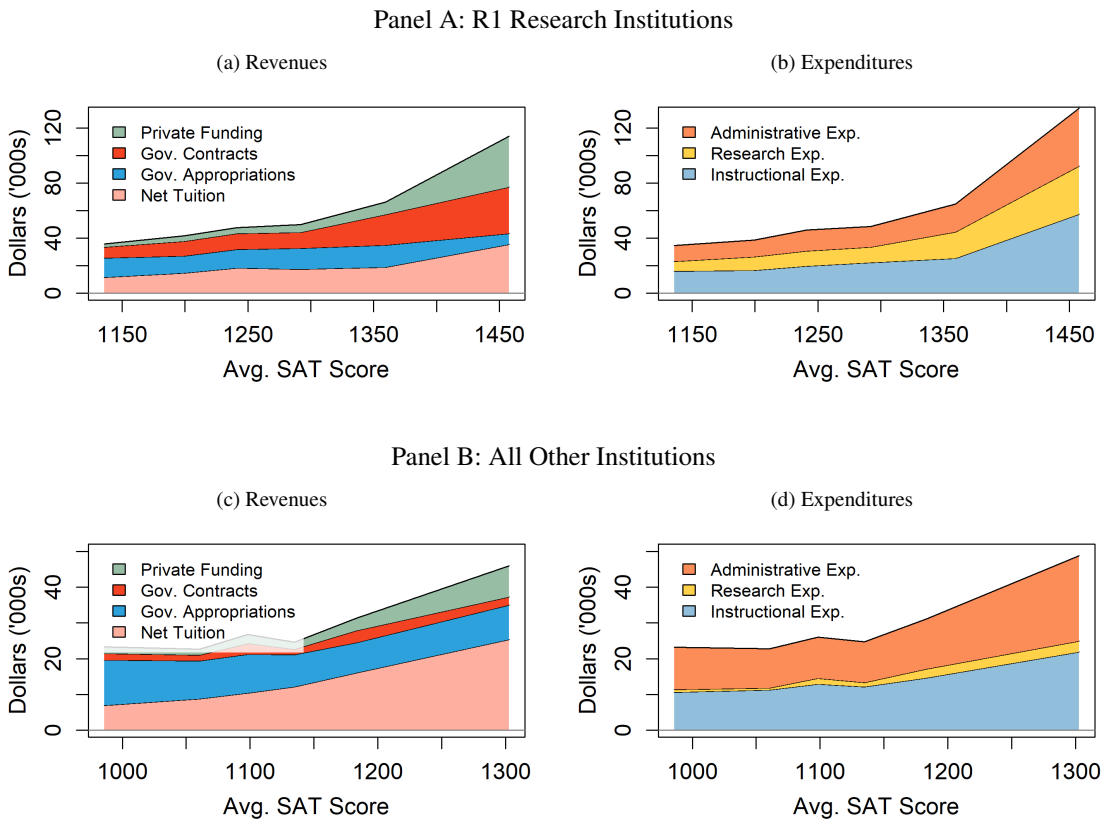
Note: This figure organizes universities by SAT quantile instead of tier, showing that revenues and expenditures sharply rise by average SAT score. The 1,162 four-year institutions with reported test scores, enrollments, revenues, and expenditures are divided into eight quantile bins by their average 2019 SAT scores; this figure shows mean expenditures and revenues per FTE pupil by SAT bin. See notes to Figure 1 and A-1 for definitions of expenditure and revenue categories. Institutional average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students, with equating for ACT schools as discussed in Appendix A. All dollar amounts are CPI-adjusted to 2025. Schools' revenues may not exactly equal expenditures due to cross-subsidization from hospitals and auxiliary enterprises (like dormitories and dining halls) and intertemporal substitution. Source: IPEDS.

Figure A-3. Universities' 2019 Per-Student Revenues and Expenditures by Average SAT Score, by Public/Private



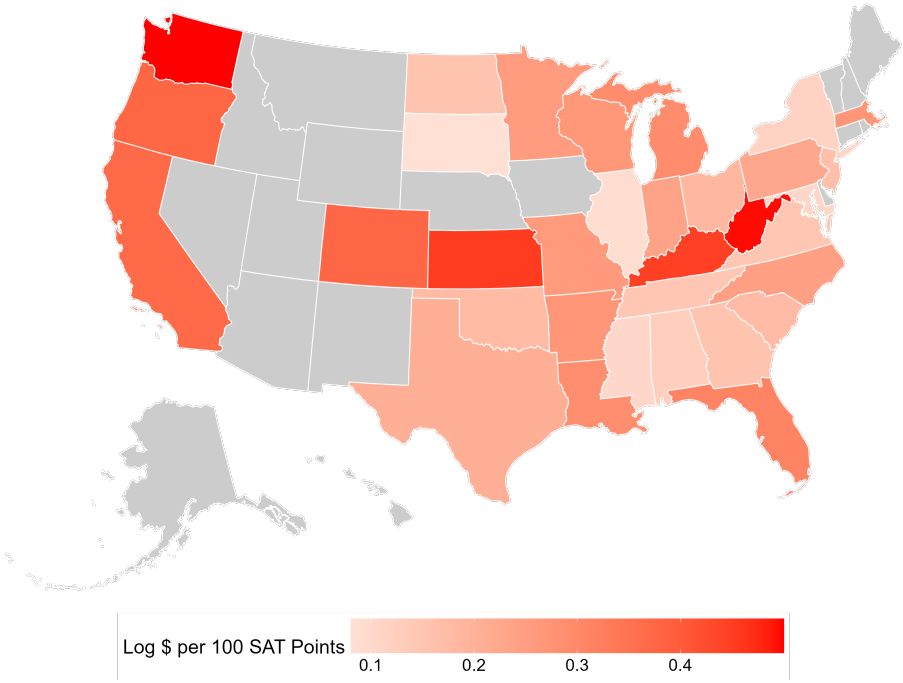
Note: This figure shows reasonably similar revenue and expenditure patterns by institutions' average SAT scores between public and private institutions, though the differences are larger at private universities and the higher per-student revenues of high-SAT public universities are driven relatively more by research-oriented government contracts and less by private funding. Average 2019 per-student revenues and expenditures in primary categories by eight quantile bins of institutions' average 2019 SAT score, among the 434 public and 728 private institutions with reported test scores, enrollments, revenues, and expenditures. 'Net Tuition' is gross tuition payments minus gross financial aid (from both government and institutional sources, including non-tuition aid). 'Government Appropriations and Grants' include both direct appropriations and all governmental financial aid programs (like Pell and state grant programs). 'Government Contracts' include all other government grants and contracts, largely for research purposes. 'Private Funding' includes private gifts, grants, and contracts, contributions from affiliated entities like booster clubs, and investment returns. 'Instructional expenditures' include expenditures for general academic instruction and departmental research. 'Instructional Expenditures' include expenditures for general academic instruction and departmental research. 'Research Expenditures' include all expenditures for research commissioned by an external organization or an internal organizational unit. 'Administrative Expenditures' include "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR). FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students. Private institutions include all non-public institutions. All dollar amounts are CPI-adjusted to 2025. Source: IPEDS.

Figure A-4. Universities' 2019 Per-Student Revenues and Expenditures by Average SAT Score, by Research Status



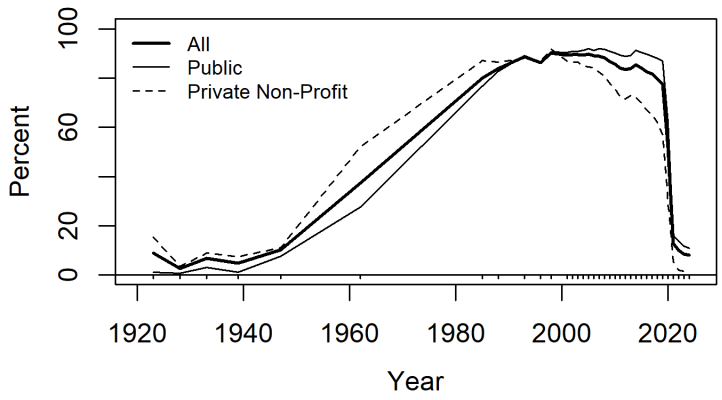
Note: This figure shows that the strong relationships between institutions' average SAT scores and both overall revenues/expenditures and instructional expenditures are present for both research-oriented R1 and non-research-oriented universities, suggesting that high-testing universities' research mission is not the sole driver of stratification across higher- and lower-testing universities. Average 2019 per-student revenues and expenditures in primary categories by eight quantile bins of institutions' average 2019 SAT score, among the 141 institutions classified by the Carnegie Foundation as "R1: Doctoral/Research Universities–Extensive" in 2000, and 1,021 non-R1 institutions with reported test scores, enrollments, revenues, and expenditures. 'Net Tuition' is gross tuition payments minus gross financial aid (from both government and institutional sources, including non-tuition aid). 'Government Appropriations and Grants' include both direct appropriations and all governmental financial aid programs (like Pell and state grant programs). 'Government Contracts' include all other government grants and contracts, largely for research purposes. 'Private Funding' includes private gifts, grants, and contracts, contributions from affiliated entities like booster clubs, and investment returns. 'Instructional Expenditures' include expenditures for general academic instruction and departmental research. 'Research Expenditures' include all expenditures for research commissioned by an external organization or an internal organizational unit. 'Administrative Expenditures' include "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR). FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students. All dollar amounts are CPI-adjusted to 2025. Source: IPEDS.

Figure A-5. State-Level Relationship Between Instructional Expenditures and SAT



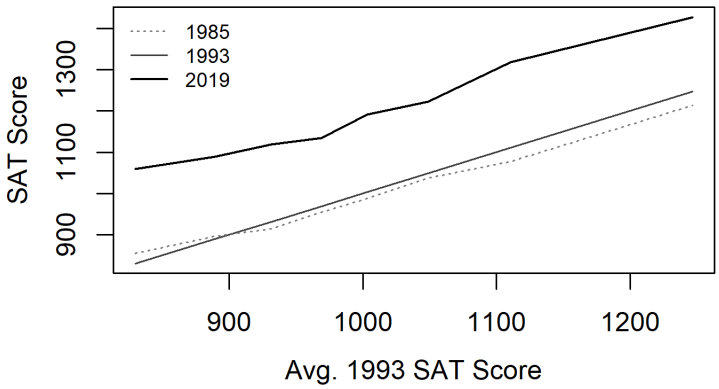
Note: This figure shows substantial heterogeneity across US states in the degree of instructional expenditure stratification between higher- and lower-testing public universities, with lower stratification in the Southeast (10-20 percent higher per-student expenditures per 100 average SAT points) and higher stratification in the West (30-50 percent per 100 SAT points). The state-level OLS coefficient from a regression of 2019 log per-student instructional expenditures on average SAT score, across enrollment-weighted four-year public institutions in the state. States with fewer than 5 public institutions with observed test scores are omitted. SAT scores are predicted within-year for institutions that only report ACT scores ($R^2 \approx 0.8$). The national relationship is 0.24 log dollars per 100 SAT points. Source: IPEDS.

Figure A-6. Share of Four-Year Institutions Requiring Tests for Admissions



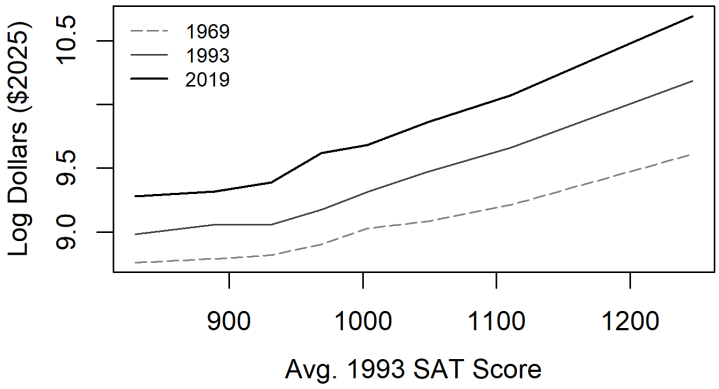
Note: This figure shows that the share of universities requiring standardized tests in admissions rose from about 10 to about 90 percent between the 1940s and the 1980s, before precipitously falling during the Covid-19 pandemic. This figure shows the enrollment-weighted share of four-year colleges and universities that require standardized tests for admission, overall and by public/private status. Statistics are available in years demarcated by ticks in the x-axis. Prior to 1960, colleges and universities are counted as requiring tests if at least 50 percent of students are admitted 'by exam' or by 'both exam and certificate.' Enrollment is defined as total enrollment prior to 1970 and total FTE enrollment thereafter. Source: College Blue Books, College Board Annual Survey of Colleges, and IPEDS.

Figure A-7. Universities' Average SAT Score in Different Years by Average 1993 SAT Score



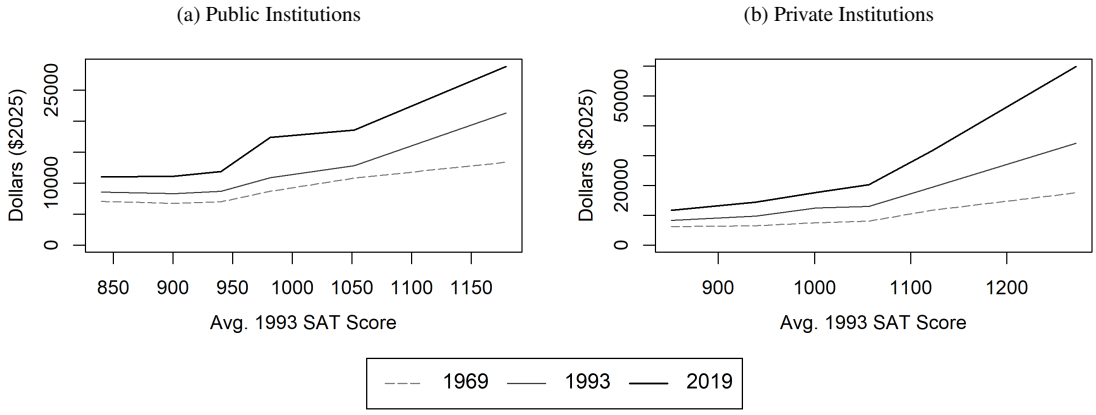
Note: This figure shows that the relative ranking of colleges and universities by average SAT score has remained largely unchanged, with very minimal mean reversion, since the mid-1980s, though average SAT scores rose considerably following College Board's 1995 'recentering'. Average freshmen-enrollment-weighted SAT score by eight quantile bins of institutions' average 1993 SAT score, among the 666 four-year institutions with reported 1985, 1993, and 2019 test scores and enrollments. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 195 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

Figure A-8. Universities' Average Log Instructional Expenditures Per Student by Average 1993 SAT Score



Note: This figure shows that the growth in stratification of per-student instructional expenditures by institutions' average SAT score holds in percent terms as well as real dollar terms (Figure 4). Average freshmen-enrollment-weighted log instructional expenditures per FTE student by eight quantile bins of institutions' average 1993 SAT score, among the 157 public and 384 private four-year institutions with reported 1993 test scores and 1969, 1993, and 2019 enrollments and instructional expenditures. Instructional expenditures include expenditures for general academic instruction and departmental research and are CPI-adjusted to 2025. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 165 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

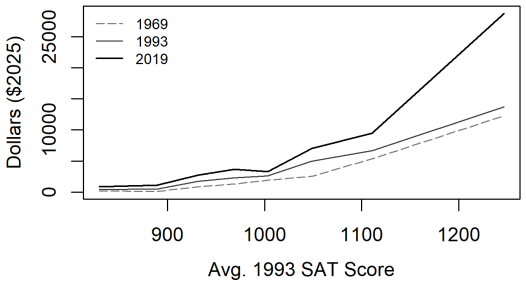
Figure A-9. Universities' Per-Student Instructional Expenditures by Average 1993 SAT Score By Control



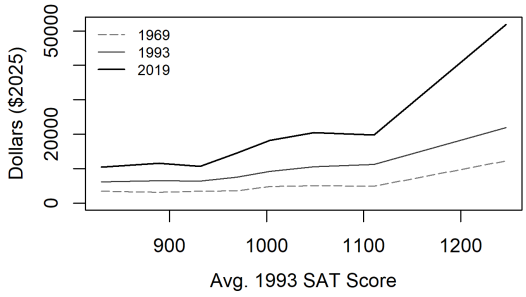
Note: This figure shows that the growth in stratification of per-student instructional expenditures by institutions' average SAT score has occurred at both public and private institutions since 1969, though to a greater degree at private institutions. Average freshmen-enrollment-weighted instructional expenditures per FTE student by eight quantile bins of institutions' average 1993 SAT score and by whether the institution is public or private, among the 559 (169 public and 390 private) four-year institutions with reported 1993 test scores and 1969, 1993, and 2019 enrollments and instructional expenditures. Instructional expenditures include expenditures for general academic instruction and departmental research and are CPI-adjusted to 2025. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 165 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Private institutions include all non-public institutions. Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

Figure A-10. Universities' Average Other Per-Student Expenditures by Average 1993 SAT Score

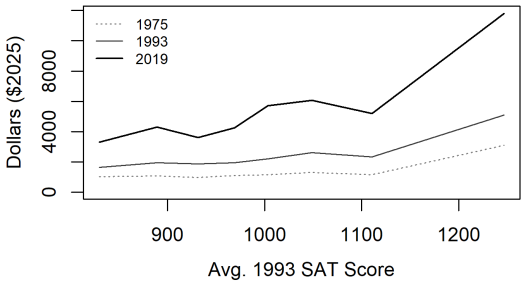
(a) Research Expenditures



(b) All Administrative Expenditures

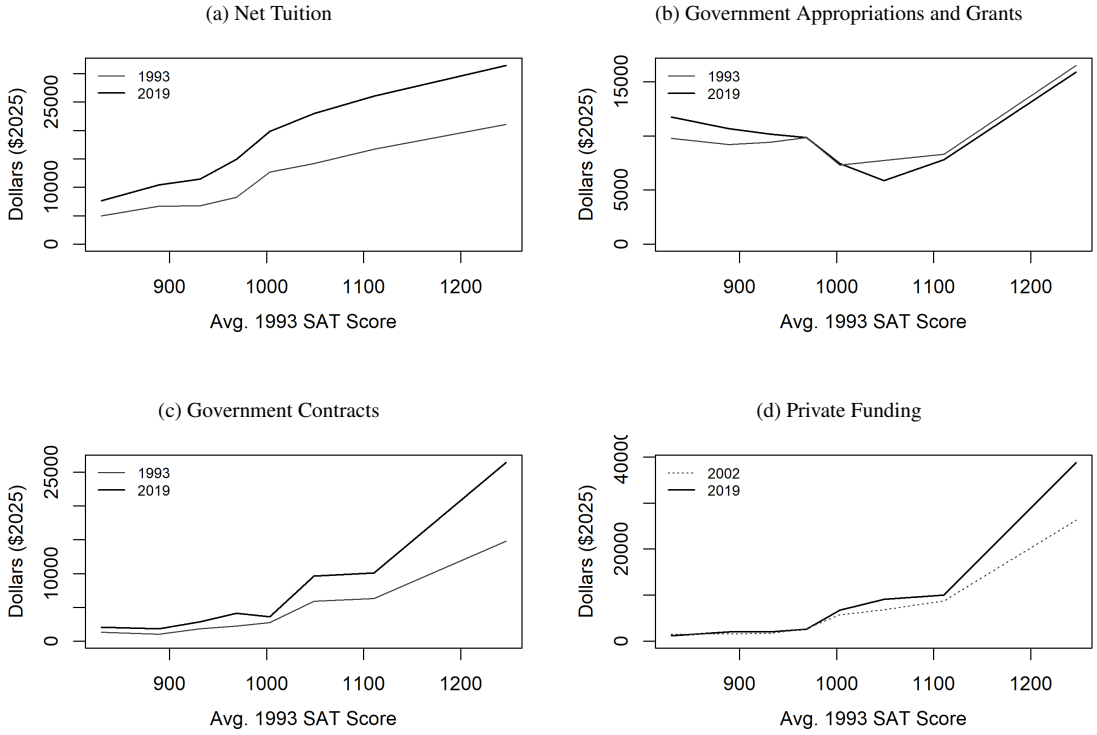


(c) Student Services Admin. Expenditures



Note: This figure shows that per-student research and administrative expenditures have also stratified by institutions' average SAT score since 1969, especially at the top quantile of institutions and largely since 1993. Average freshmen-enrollment-weighted expenditures per FTE student by eight quantile bins of institutions' average 1993 SAT score, among the 559 four-year institutions with reported 1993 test scores and 1969 (or 1975 for student services), 1993, and 2019 enrollments and expenditures. 'Research Expenditures' include all expenditures for research commissioned by an external organization or an internal organizational unit. 'Administrative Expenditures' include "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR). 'Student Service Expenditures' include only administrative expenditures that support student development and well-being ("Student Services"), including admissions, registrar, financial aid, counseling, and health services. All expenditures are CPI-adjusted to 2025. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 165 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

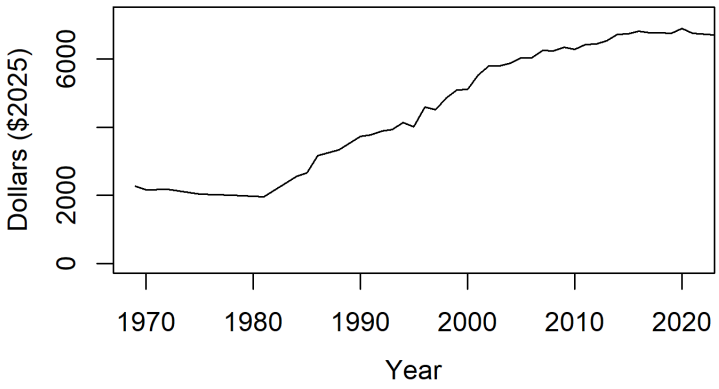
Figure A-11. Universities' Average Revenues Per Student by Source and Average 1993 SAT Score



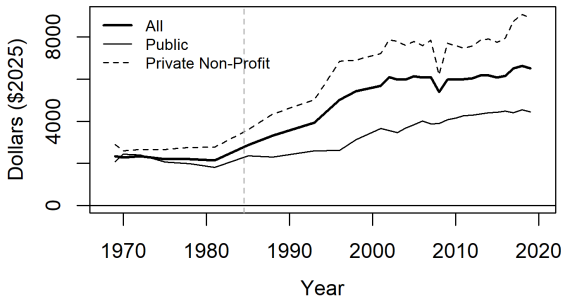
Note: This figure shows that the relative tuition, government research funding, and private funding received by higher-testing universities has risen since the mid-1990s, whereas government appropriations and grants have become slightly more evenly distributed over that period. Average freshmen-enrollment-weighted source-specific revenues per FTE student by eight quantile bins of institutions' average 1993 SAT score, among the 559 four-year institutions with reported 1993 test scores and 1969, 1993, and 2019 enrollments and revenues. Due to changes in revenue reporting, no revenue data are available prior to 1988. 'Net Tuition' is gross tuition payments minus gross financial aid (from both government and institutional sources, including non-tuition aid). 'Government Appropriations and Grants' include both direct appropriations and all governmental financial aid programs (like Pell and state grant programs). 'Government Contracts' include all other government grants and contracts, largely for research purposes. 'Private Funding' includes private gifts, grants, and contracts, contributions from affiliated entities like booster clubs, and investment returns. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 165 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Source: IPEDS and the College Board Annual Survey of Colleges.

Figure A-12. Annual Association Between Per-Student Instructional Exp. and Average SAT Scores

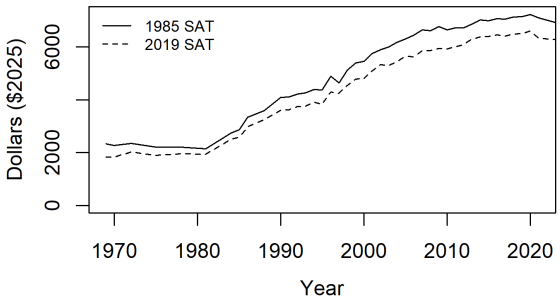
(a) SAT Fixed in 1993



(b) Contemporaneous SAT

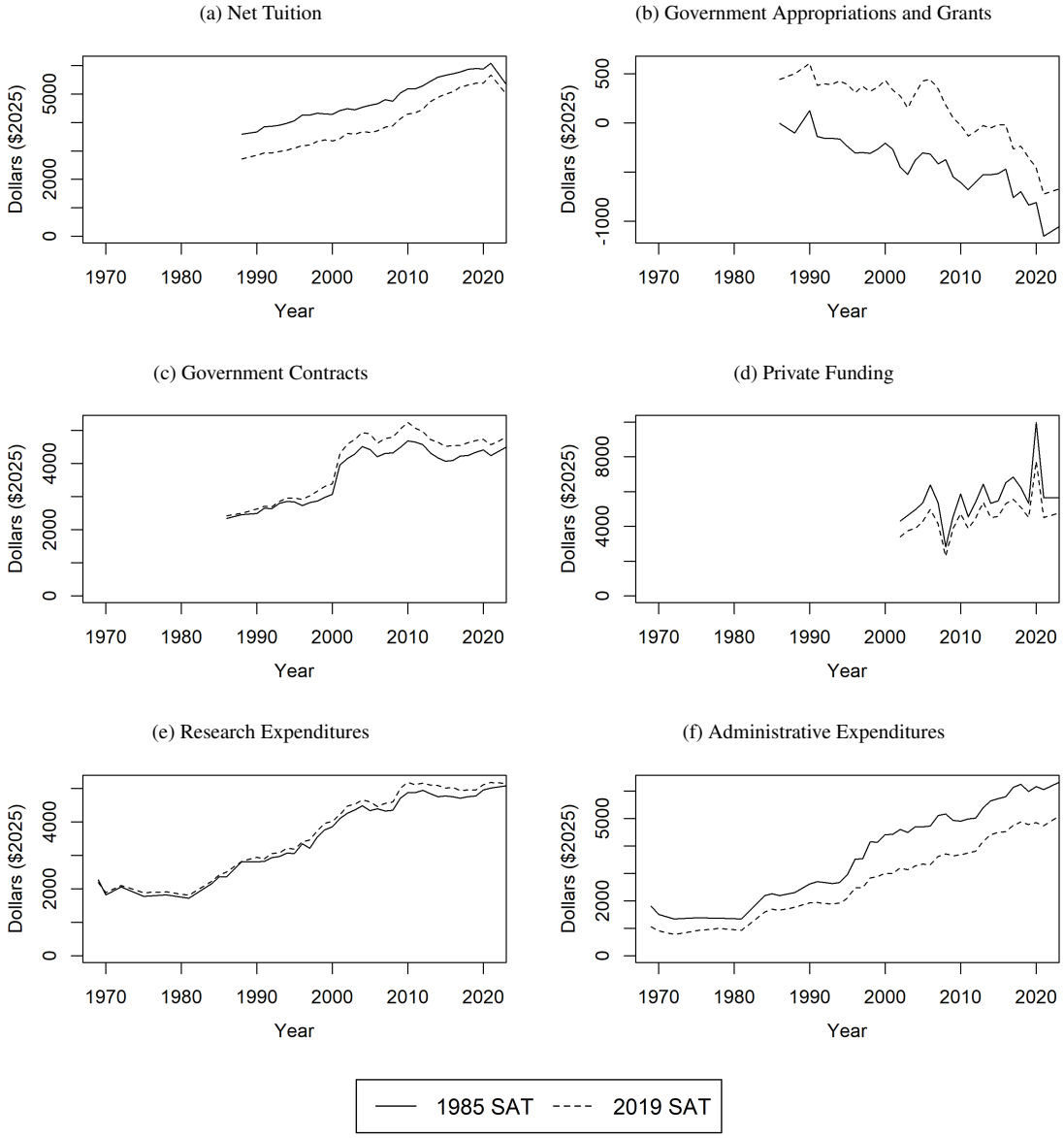


(c) SAT in Other Fixed Years



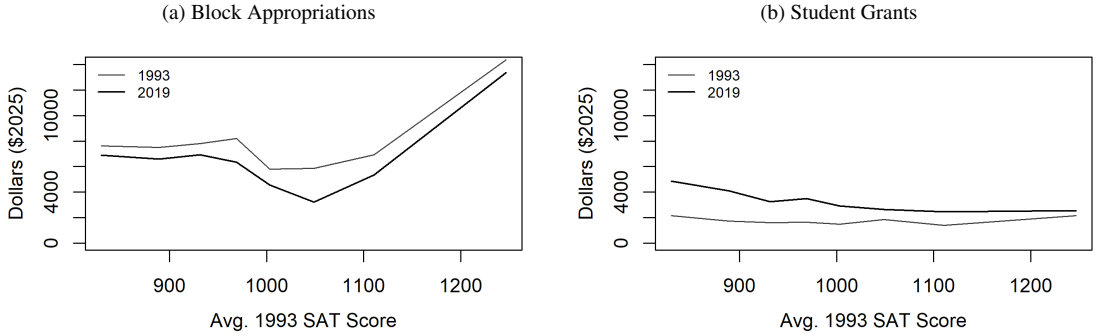
Note: This figure presents the annual student-weighted cross-institution relationship of per-student instructional expenditures per 100 additional points of 1993 SAT score, showing that the relationship considerably strengthens between 1980 and 2010 before flattening in recent years. It then recapitulates the pattern using contemporaneous SAT scores (after 1985) overall and by public-private control as well as using 1985 or 2019 SAT scores, showing a similar trend overall (though the leveling-out may have occurred slightly before 2010) and in each sector (though the overall association is consistently much weaker in the public sector). Annual freshman-enrollment-weighted OLS relationship between average instructional expenditures per FTE student (in 2025 dollars) and either contemporaneous average SAT score divided by 100, across four-year institutions overall and by public/private control, or average 1985, 1993, or 2019 SAT score divided by 100. For example, in 2019, a 100 point increase in universities' average SAT score was associated with higher per-student instructional expenditures of about $6,300. 'Instructional expenditures' include expenditures for general academic instruction and departmental research. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles (R^2 is between 0.77 and 0.83). Prior to 1985 (the dotted line), SAT scores are not observed and are replaced by 1985 scores. All dollar amounts are CPI-adjusted to 2025 and annually winsorized at 1 percent. Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

Figure A-13. Annual Association Between Per-Student Revenues and Expenditures and Average SAT Score



Note: This figure shows that while the association between SAT scores and both per-student net tuition and private funding continued to rise in the 2010s, an accelerated decline in the SAT association with per-student government appropriations and grants may help to explain the leveling-out of the SAT association with per-student instructional expenditures in that period. Annual freshman-enrollment-weighted OLS association between per-student revenues or expenditures per FTE student and average 1985 or 2019 SAT score across four-year institutions. 'Government Appropriations and Grants' include both direct appropriations and all governmental financial aid programs (like Pell and state grant programs). 'Government Contracts' include all other government grants and contracts, largely for research purposes. 'Private Funding' includes private gifts, grants, and contracts, contributions from affiliated entities like booster clubs, and investment returns. 'Research Expenditures' include all expenditures for research commissioned by an external organization or an internal organizational unit. 'Administrative Expenditures' include "Academic Support" (like the library), "Student Services" (like the Registrar and athletics), and "Institutional Support" (like general management and HR). FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles (R^2 is between 0.77 and 0.83). All dollar amounts are CPI-adjusted to 2025 and annually winsorized at 1 percent. Source: HEGIS, IPEDS, and the College Board Annual Survey of Colleges.

Figure A-14. Universities' Average Government Revenues Per Student by Average 1993 SAT Score



Note: This figure shows that the reason government appropriations have become less correlated across universities with average SAT scores since the 1990s is that growth in state financial aid programs (like the Excelsior Scholarship and CalGrant) has provided disproportionate funding to lower-testing institutions. Average freshmen-enrollment-weighted source-specific revenues per FTE student by eight quantile bins of institutions' average 1993 SAT score, among the 559 four-year institutions with reported 1993 test scores and 1969, 1993, and 2019 enrollments and revenues. 'Block Appropriations' include direct appropriations from federal, state, and local governments to colleges and universities; 'Student Grants' include Pell grants and all other federal, state, and local financial aid programs that subsidize student tuition. The sum of these two equals total 'Government Appropriations and Grants' as defined elsewhere. FTE students are defined as full-time (undergraduate and postgraduate) students plus one-third of part-time students. Average SAT score is the sum of the averaged 25th and 75th percentile of SAT math and verbal exam scores among enrolled freshman students; for the 165 institutions where only ACT scores are reported, we impute average SAT scores by a cross-institution linear regression of average SAT score on the interaction between the 25th and 75th ACT score percentiles ($R^2 = 0.83$). Source: IPEDS and the College Board Annual Survey of Colleges.

Table A-1—Changes In Cross-University Per-Student Total Current Revenues Over Time

	1929	1969	1984	1996	2008	2019
Panel A: Average Total Non-Hospital Revenues Per Student ($2025)						
All Four-Year Institutions	10,500	24,300	32,700	40,500	48,800	57,800
Ivy League	20,700	89,200	107,100	144,300	229,500	264,800
State Flagship	12,500	38,900	42,600	56,900	73,400	83,900
Public Non-Flagship	10,500	18,800	29,500	34,100	39,900	45,200
Ivy vs. Flagship Gap (%)	65	129	151	154	213	215
Flagship vs. Non-Flagship Gap[1] (%)	9	54	51	61	70	69
Panel B: Coefficient of Variation of Per-Student Total Non-Hospital Current Revenues (%)						
Public Institutions	46	45	56	58	56	54
All Four-Year Institutions	58	51	52	59	59	59

Note: This table mirrors Table 2 but replaces per-student total current revenues with per-student instructional expenditures, showing similar trends overall and by tier over the past 100 years. Panel A shows the enrollment-weighted average total current revenues per FTE student at all, Ivy League, state flagship, and public non-flagship four-year institutions for six selected years. Panel B shows the across-institution coefficient of variation (the standard deviation divided by the mean) for the per-student total current revenues of public four-year institutions and all four-year institutions, weighted by enrollment. All dollars are reported in CPI-adjusted 2025 dollars. Total revenues exclude revenues from hospitals, revenues earmarked for capital expenditures, and direct endowment contributions. All series are winsorized at 5 percent to limit the contribution of any single university. Enrollment is measured as total enrollment in 1929 and total FTE enrollment in other years (counting part-time enrollees as 1/3). State flagship public institutions are defined in Table A-4.

[1]The flagship/non-flagship gap is measured via an OLS regression of log expenditures on a flagship indicator, including state fixed effects to isolate within-state comparisons.

Source: Biennial Survey of Education, 1928-1930 (Cooper, 1931), HEGIS, and IPEDS.

Table A-2—Racial Composition by Tier Over Time

	1968	1976	1984	1996	2008	2019
Panel A: Percent of Students Black						
All	6.0†	9.0	8.7	10.3	11.5	10.7
Ivy League	2.7	6.0	5.7	6.1	7.3	7.2
Other Top-50 Private	2.5	5.5	4.5	5.4	5.7	5.8
State Flagship	1.6	3.6	4.1	5.3	5.4	5.2
Panel B: Percent of Students Hispanic						
All	1.8†	2.5	3.2	5.9	7.9	15.1
Ivy League	0.6	2.0	3.3	5.6	7.2	12.2
Other Top-50 Private	0.7	2.4	3.2	6.1	7.1	12.1
State Flagship	1.0	1.6	2.3	4.4	5.8	10.2
Panel C: Percent of Students Asian						
All	1.1†	1.6	3.0	5.8	6.4	7.5
Ivy League	1.0	2.7	6.9	15.9	16.2	19.6
Other Top-50 Private	1.5	3.0	5.9	14.3	15.2	17.2
State Flagship	1.3	2.8	4.2	8.2	9.1	10.3

Note: This table presents numerical statistics mirroring those shown in Figure 3. Share of full-time undergraduate students who are Black, Hispanic, or Asian at all four-year universities and by university tier. Tables A-3 and A-4 identify the top-50 private and state flagship universities. †'All four-year universities' includes some two-year institutions (those that do not have 'junior' or 'community' in their name) in 1968.
Source: McVay (1969), HEGIS, and IPEDS.

Table A-3—Top-50 Private Institutions

State	University	UnitID	State	University	UnitID
CA	California Institute of Technology	110404	MA	Williams College	168342
CA	Claremont Mckenna College	112260	MD	Johns Hopkins University	162928
CA	Harvey Mudd College	115409	ME	Colby College	161086
CA	Pomona College	121345	MN	Carleton College	173258
CA	Scripps College	123165	MO	Washington University in St Louis	179867
CA	Stanford University	243744	NC	Duke University	198419
CA	University of Southern California	123961	NH	Dartmouth College*	182670
CT	Yale University*	130794	NJ	Princeton University*	186131
DC	Georgetown University	131496	NJ	Stevens Institute of Technology	186867
GA	Emory University	139658	NY	Barnard College	189097
GA	Emory University	487092	NY	Columbia University*	190150
IA	Grinnell College	153384	NY	Cornell University*	190415
IL	Northwestern University	147767	NY	Hamilton College	191515
IL	University of Chicago	144050	NY	New York University	193900
IN	University of Notre Dame	152080	NY	Vassar College	197133
LA	Tulane University of Louisiana	160755	OH	Case Western Reserve University	201645
MA	Boston College	164924	PA	Carnegie Mellon University	211440
MA	Boston University	164988	PA	Haverford College	212911
MA	Brandeis University	165015	PA	Swarthmore College	216287
MA	Franklin W Olin College of Engineering	441982	PA	University of Pennsylvania*	215062
MA	Harvard University*	166027	RI	Brown University*	217156
MA	Massachusetts Institute of Technology	166683	TN	Vanderbilt University	221999
MA	Northeastern University	167358	TX	Rice University	227757
MA	Tufts University	168148	VA	Washington And Lee University	234207
MA	Wellesley College	168218	VT	Middlebury College	230959

Note: This table lists the 50 private institutions with the highest summed 25th percentile SAT math and reading scores in 2019 (with the cutoff at 1340). Asterisks denote the eight Ivy League institutions; the other colleges of Cornell (190433) are also considered part of the Ivy League. Two public universities – the Universities of Michigan and Virginia – also have scores above this cutoff but are omitted from this tier.

Table A-4—State Flagship Universities

State	University	UnitID	State	University	UnitID
AK	University of Alaska, Fairbanks*	102614	MT	University of Montana, Missoula*	180489
AL	University of Alabama	100751	NC	University of North Carolina, Chapel Hill	199120
AR	University of Arkansas	106397	ND	University of North Dakota*	200280
AZ	University of Arizona	104179	NE	University of Nebraska, Lincoln	181464
CA	University of California, Berkeley	110635	NH	University of New Hampshire	183044
CO	University of Colorado, Boulder	126614	NJ	Rutgers University, New Brunswick	186380
CT	University of Connecticut	129020	NM	University of New Mexico	187985
DE	University of Delaware	130943	NV	University of Nevada, Reno	182290
FL	University of Florida	134130	NY	SUNY Stony Brook	196097
GA	University of Georgia	139959	OH	Ohio State University	204796
HI	University of Hawaii, Manoa	141574	OK	University of Oklahoma, Norman	207500
IA	University of Iowa	153658	OR	University of Oregon	209551
ID	University of Idaho	142285	PA	Pennsylvania State University	214777
IL	University of Illinois, Urbana-Champaign	145637	RI	University of Rhode Island	217484
IN	Indiana University, Bloomington	151351	SC	University of South Carolina, Columbia	218663
KS	University of Kansas	155317	SD	University of South Dakota*	219471
KY	University of Kentucky	157085	TN	University of Tennessee	221759
LA	Louisiana State University	159391	TX	University of Texas, Austin	228778
MA	University of Massachusetts, Amherst	166629	UT	University of Utah	230764
MD	University of Maryland, College Park	163286	VA	University of Virginia	234076
ME	University of Maine	161253	VT	University of Vermont	231174
MI	University of Michigan, Ann Arbor	170976	WA	University of Washington	236948
MN	University of Minnesota, Twin Cities	174066	WI	University of Wisconsin, Madison	240444
MO	University of Missouri, Columbia	178396	WV	West Virginia University	238032
MS	University of Mississippi	176017	WY	University of Wyoming	240727

Note: This table lists the designated flagship institution of each US state, following the College Board designation. SUNY Stony Brook was founded in 1957; the University at Buffalo is omitted as a second flagship institution in New York. Rutgers University was a private institution prior to 1945, but remains designated as the flagship in earlier years. Universities marked by asterisks are designated as R2 institutions; all others are R1.