Higher Education Finance: Expenditures & Costs

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Higher Education
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Introduction

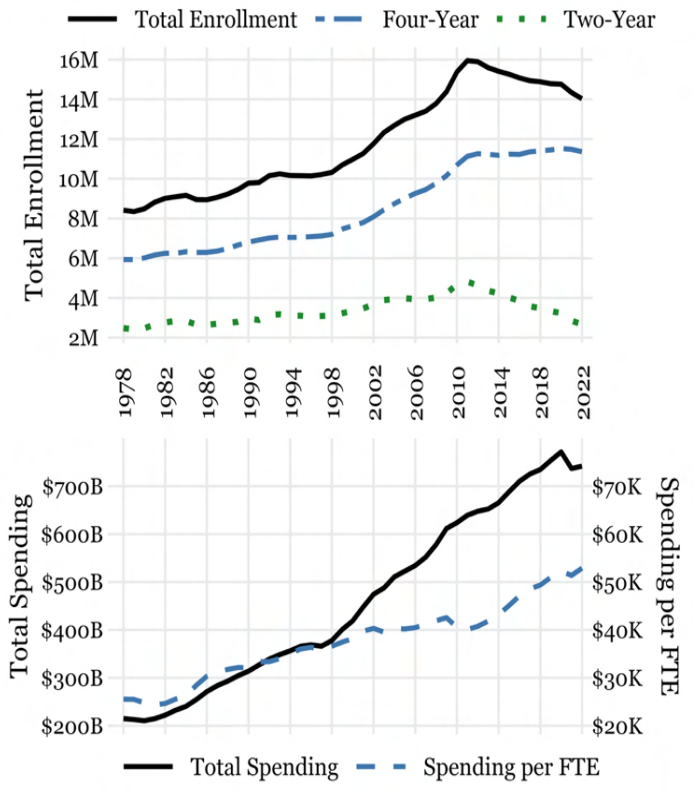
Expenditures for U.S. higher education institutions totaled $712 billion in 2021–22. These expenditures encompass a range of institutional costs related to educational activities, including instruction, student services, and campus facilities. Postsecondary institutions have varying missions, resulting in different core costs and expenditure patterns. Community colleges primarily focus on instruction, while large universities also conduct research, provide housing, and engage in public service. These institutional costs influence, but are distinct from, published tuition prices and the net cost paid by students and families.[1]

All levels of government—federal, state, and local—contribute to higher education revenues, each with distinct roles. Federal funds primarily support research and student financial aid, while state and local governments provide operating funds for public colleges and universities. In state budgets, higher education is the fourth-largest category, on average, 8.5% of direct state and local spending.[2] Differences in state policies, revenue sources, and overall funding levels influence institutional budgeting and spending decisions year over year.

In recent decades, total expenditures for higher education have steadily increased, both in aggregate and per full-time equivalent (FTE) student. Since the Great Recession, total spending has risen due to growing operational and personnel costs. At the same time, enrollment has stagnated or declined, significantly increasing expenditures per student (Figure 1). State funding has fluctuated substantially, with many states reducing their support for public institutions after each recent recession. As a result, the share of the total costs paid by students and families for public higher education has also grown.

Critics argue that rising costs in U.S. higher education have led to soaring tuition prices and mounting student debt, and that stagnant or declining enrollments make the current spending trajectory unsustainable. There is also concern that the steady rise in spending is inefficient, driven by administrative bloat, and does little to improve student outcomes. Conversely, advocates argue that supporting the financial stability of postsecondary institutions is essential for maintaining quality, access, and innovation in higher education. However, critics and advocates can agree on the need to prioritize student outcomes (e.g., degree completion rates) without substantially increasing spending through strategic, evidence-based allocations of public resources.

Figure 1. Postsecondary Enrollments and Institutional Spending, 1978-2022



Notes: Title IV degree-granting institutions, FTE = full-time equivalent; expenditures in constant 2023 dollars. *Sources:* NCES Digest of Education Statistics: 2023 Digest Tables 334.10, 334.50; 2011 Digest Tables 377, 379, 381; 2009 Digest Tables 336, 364; 2006 Digest Table 348; 2001 Digest Table 343. Missing NCES expenditures data for fiscal years 2002 and 2003 were imputed using data tables from the Delta Cost Project.

Key Findings

Key finding #1: Postsecondary students in the U.S. experience very different levels of resources depending on where they study. While average per -student institutional spending is $32,810, this ranges widely.

Differences in revenue sources across institutional sectors mean that specific external factors will drive spending across institutions. Public institutions rely heavily on state support; private nonprofit and for-profit institutions depend more on endowment income, tuition, and federal aid.

Key finding #2: State higher education policies and funding structures drive the total resources available for public institutions and their revenue-generating strategies.

Public institutions rely heavily on state appropriations, and there is substantial variation in funding mechanisms and overall levels across states. State funding cuts and volatility have prompted greater reliance on tuition and other revenue sources. States' use of tuition-control policies limits institutions' ability to increase revenues from in-state students.

Key finding #3: Institutional spending improves student outcomes.

A recent study finds that a 10% increase in total institutional spending is associated with a 3% increase in enrollment and a 6%–9% increase in awards conferred (certificates and degrees). Spending is a crucial component of institutional "quality," with evidence that spending on student services and amenities influences college decisions and academic outcomes.

Key finding #4: Spending patterns also vary within institutions, based on the resources required across departments and programs and broader policy structures.

Some fields are nearly twice as expensive to teach as others due to differences in input prices and the scalability of different types of instruction. Some institutional and state-level practices, such as responsibility-centered management, differential pricing, and cost-based appropriations, likely magnify these differences.

Key finding #5: Federal financial aid and research funding influence institutional behaviors and spending.

Federal student aid indirectly sustains institutional spending by subsidizing and providing liquidity for students to pay tuition and other educational costs. Federal funding subsidizes over half of all university research spending.

Key finding #6: Efforts to substantially rein in institutional spending have been unsuccessful because costs are an ingredient of educational quality.

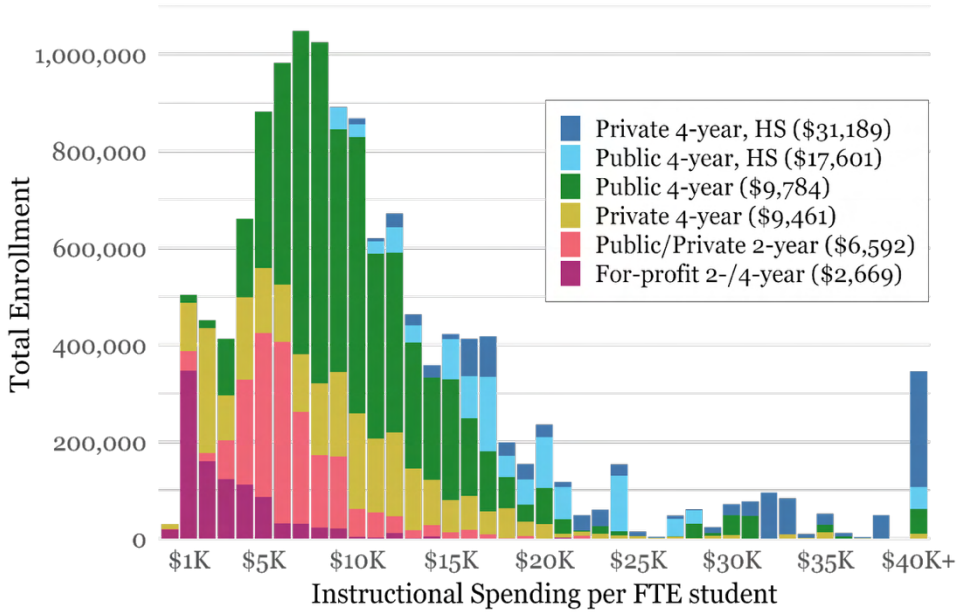
Longstanding efforts to reduce institutional costs have confronted the reality that spending buys institutional quality and prestige, and cost escalation may be inevitable in service industries whose primary input is skilled professional staff. Institutions and policymakers may have greater success in reducing spending per graduate by improving completion rates and economizing on time -to -degree.

Evidence

Key Finding #1: *Postsecondary students in the U.S. experience very different levels of resources depending on where they study.*

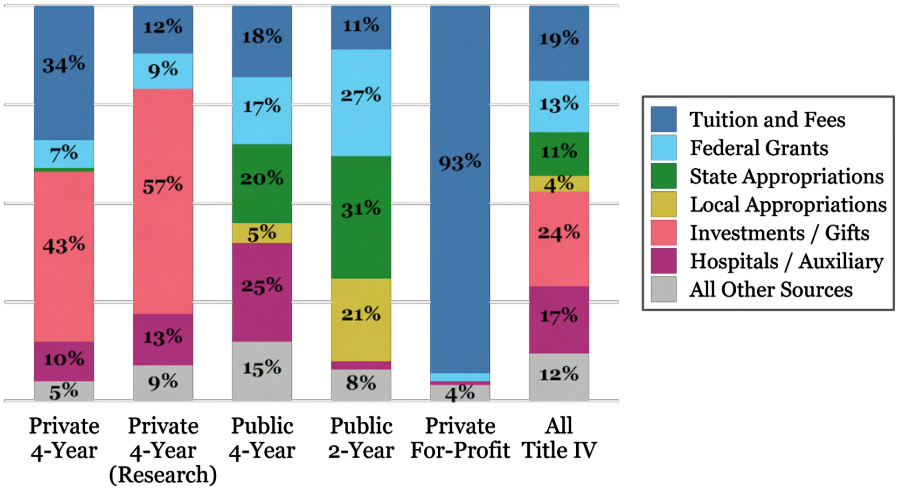
Compared to other countries, the funding and governance of American higher education is highly decentralized. Each state determines how (and how much) to allocate across different types of public institutions and can influence institutions' ability to obtain revenues from tuition and other sources. Private institutions (nonprofit and for-profit) have near-complete autonomy over internal fund-raising and spending decisions. As a result, there is tremendous variation across institutions in the total level of resources available and in how much is spent on core educational activities. In 2021–22, the median total spending per student was $32,810, but one-quarter of students attend a college spending less than $25,000 per student, while 10% attend an institution spending nearly four times that amount.

Figure 2. Postsecondary Enrollment by Instructional Spending, Sector, and Selectivity, FY 2022



Notes: Title IV degree-granting institutions enrolling at least 50 students (n = 3,848); FTE = full-time equivalent; HS - highly selective (undergraduate acceptance rate < 30%). Median per-student instructional spending in legend parentheses. Sources: Integrated Postsecondary Education Data System and Barron's Selectivity Index.

Figure 3. Distribution of Revenue Sources by Postsecondary Sector, FY 2022



Notes: Federal Pell Grants and loans are reported under "Federal Grants" for public institutions and "Tuition and Fees" for private and for-profit institutions. The "Other" category includes revenues from sources not categorized elsewhere (e.g., independent operations, sales of educational services). Investment returns were negative and completely offset by gifts in 2022 for public four-year institutions, but typically account for 5-6% of total revenue. Source: NCES 2023 Digest of Education Statistics Tables 333.10, 333.50, 333.55.

Variation in instructional spending

Figure 2 shows the U.S. postsecondary enrollment distribution in 2021–22 by instructional spending per full-time student. This budget category is core to students' postsecondary experience and relatively comparable across sectors. The figure also separates enrollment between public and private nonprofit institutions, distinguishing between highly selective (undergraduate acceptance rate < 30%) and less selective (undergraduate acceptance rate > 30%).[3] Most enrollments are in public institutions that spend between $5,000 and $15,000 per student on instruction, but a nontrivial number of students are enrolled in schools with very low instructional spending, and a long tail of schools with very high spending levels. There are also notable differences by sector and selectivity, with selective private 4-year institutions outspending their public counterparts two-to-one. The highest-spending institutions are very selective private institutions, some smaller graduate-focused schools, and a few public flagship universities. Underappreciated in the discourse is the overlap across sectors: many students enroll in public two- and four-year institutions with similar levels of instructional spending, and less-selective public and private four-year institutions have almost identical expenditures. The lowest levels of instructional spending are concentrated in the for-profit sector.

Variation in revenue streams

Each postsecondary sector relies on a distinct combination of revenue sources. These varied revenue portfolios, shown in Figure 3, mean that different external factors will influence institutional resources and spending fluctuations.

- Public four-year: Institutions draw on the most diverse mix of sources, including direct state support (20%), Federal Pell and research grants (17%), and tuition revenue (18%).
- Public two-year: Community colleges rely heavily on state and local appropriations (52%), along with Federal Pell Grants to students (27%).
- Private nonprofit: These institutions rely disproportionately on investment returns and gifts (43-57%), especially at research-intensive institutions (which tend to be more selective).[4]
- Private for-profit: These institutions are almost entirely dependent on tuition revenue (93%), composed primarily of Federal student aid.

Since endowment revenue fluctuates, private nonprofit institutions may be susceptible to stock market fluctuations despite practices meant to smooth endowment spending.[5] Research shows that average per-student revenues at private nonprofits exceed average expenses by about 16% per year, termed excess revenue, which may be in response to these fluctuations.[6] For-profit institutions' reliance on tuition revenue supported by federal aid means their spending and operations will be influenced primarily by changes in federal aid policy and regulations. Tuition dependency is also associated with more extreme changes in instructional spending; for-profit institutions show the most volatile spending, while public institutions are more stable.[7] Institutions with strong endowments and investment returns use these revenue streams as a budgetary buffer. Changes to state policy regarding appropriations and tuition-setting, described in the next section, are most impactful for public institutions.

Key Finding #2: *State higher education policies and funding structures drive the total resources available for public institutions and their revenue-generating strategies.*

In fiscal year 2023, state spending on higher education totaled $116.4 billion, with local governments in 32 states contributing an additional $13.4 billion (mostly for community colleges).[8] Direct education appropriations to public colleges and universities fund general operating and instructional expenses. These subsidies allow state residents to attend public institutions and pay lower tuition than out-of-state students. Higher education expenditures are a significant share of state budgets, averaging about 9% of state and local spending for the last four decades.

In an economic downturn, higher education spending must compete with other budget categories, particularly healthcare and K-12 education funding. Because postsecondary institutions can generate revenue through student tuition, they are more susceptible to budget cuts.[9] Empirical research uses fluctuations in funding levels and cross-state policy differences over time to understand the impacts on institutional resources, budgeting decisions, and degree production.

State funding formulas

States allocate appropriations for public higher education using three types[10] of funding models:

1. Traditional: Under these funding mechanisms, institutions cannot directly influence funding levels through operational decisions. These models include "base-adjusted" (annual increases based on prior-year levels) or no explicit funding formula.

2. Incentive: Given a fixed amount of state resources, these models incentivize competition using institutional enrollment or performance measures. Enrollment models often tie funding to annual headcount or full-time enrollment, while performance-based funding (PBF) policies incentivize institutions to align their behaviors with state-defined outcome metrics. Some states build PBF into the base appropriations budget, while others set aside an allocation in a separate fund to serve as a financial bonus beyond the base amount.

3. Hybrid: These formulas combine elements of both the traditional and incentive models, balancing state objectives and institutional stability by guaranteeing a portion of funding from the prior year. Hybrid models are now the most common, accounting for 63% of two-year and 47% of four-year systems, followed by traditional models (19% of two-year and 46% of four-year systems).

A recent landscape analysis uses a detailed longitudinal dataset on state PBF policies to document trends in the growth and features of PBF systems.[11] A new wave of PBF adoption occurred in the 2010s after the Great Recession. As of 2020, over half of states used a PBF metric to tie a portion of appropriations to outcomes related to student progress, including credit completion, time to degree, university transfer, or degree completion. A growing number are adding components based on post-graduate outcomes, such as job placement and earnings. The institutions and sectors covered under a PBF scheme vary: 22 states apply it to both sectors, eight to two-year colleges, and two to four-year colleges. The median percentage of funds at stake has grown to around 7% in the two-year and 6.6% in the four-year sector.

Evidence for PBF and categorical funding policies

A review of the empirical literature covering four decades of PBF[12] concludes that the PBF (in various forms) has little to no impact on bachelor's degree completion. State and national studies analyzing associate degree completions at community colleges also point to no meaningful changes in degree outcomes. The consistent, insignificant effects of PBF are in part due to the persistence of this standard performance metric. Institutional graduation rates are most strongly related to first-year student characteristics and other stable institutional characteristics (e.g., Carnegie classification) and only weakly associated with factors that institutions can directly control.[13] The first study to examine student earnings as a PBF outcome found modest, positive earnings effects for students already enrolled in college when PBF was implemented, but these effects faded out for later cohorts.[14] PBF also comes with substantial compliance costs in management, administration, and reporting, and appears to increase stratification among colleges by favoring more prestigious institutions.[15] Additionally, it is challenging to generate credible evidence on PBF's effects because the incentives it creates in practice are relatively weak. Variability in PBF models across states also makes it difficult to define the "PBF treatment," complicating assessments of PBF using data from multiple states.

Despite attention to state formulas, leading scholars argue that overall funding for colleges and universities is more consequential than the allocation approach.[16] On average, community colleges and minority-serving institutions receive less state funding per enrollee. In many states, existing funding models sustain these disparities. Almost two-thirds of community college systems receive state allocations based on full-time enrollment, disadvantaging those that enroll a large share of part-time students.[17] Many states have incorporated equity-based metrics into their formulas (e.g., enrolling and graduating low-income and racially minoritized students) or implemented equalization procedures; however, these measures have yet to address historical funding gaps.

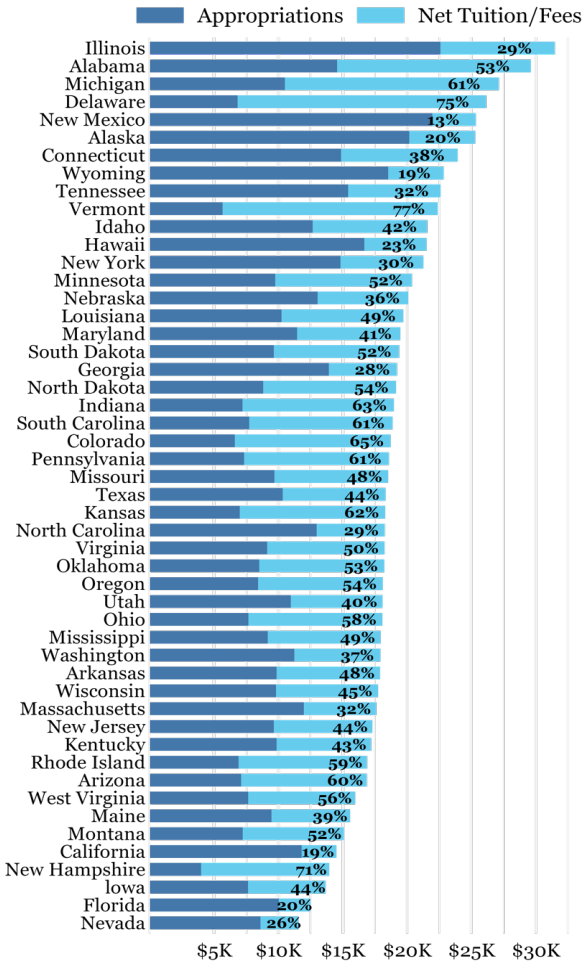
Some states use categorical funding streams to allocate resources directly to institutions to support designated priorities, such as career and technical education or wraparound services for low-income student populations. These programs, particularly common in community college systems, have been used to fund advising, tutoring, transportation, and other student-facing services. One study finds that, in California, categorical allocation formulas include fixed base amounts distributed equally across colleges, regardless of enrollment or student need, resulting in lower per-student funding at larger, higher-need institutions.[18] When designing targeted programs, policymakers should consider "equity" in two respects: the quantity of funding institutions receive (quantity equity) and their capacity to implement the target programming effectively (quality equity).[19] Without complementary investments in staffing and infrastructure, even well-targeted dollars may lead to uneven implementation. Compared to performance-based funding, empirical research on the allocation and impact of categorical programs remains limited.

Levels of state appropriations

All states allocate funding for higher education but differ substantially in the level of their support. Figure 4 shows institutional revenue per FTE student at public institutions in each state from two primary sources: taxpayers and students. The left

portion of each bar, in dark blue, is state higher education spending ("appropriations"), consisting of general operating funds for public institutions, state public financial aid, and state agency funding. The right portion of each bar, in light blue, measures revenue from tuition and fees, excluding state and institutional financial aid. In fiscal year 2023, state higher education appropriations per FTE student ranged from $4,000 in New Hampshire to over $22,000 in Illinois. Public institutions in 14 states had combined revenue exceeding $20,000 per FTE student. Different levels of public investment across states translate into meaningful differences in total institutional resources and in the proportion financed by students versus taxpayers. Institutions in 20 states receive, on average, more revenue from students than the state does.

Figure 4. Revenue per Public FTE Student by State, FY 2023



Notes: Data adjusted for inter-state cost of living, excludes medical schools. Appropriations are state/local support for higher education operating expenses and student aid. "Net tuition /fees" is tuition and fees revenue (including federal student aid) less any state and institutional aid; Source: SHEEO State Higher Education Finance: FY 2023 Report, Figure 2.

Partisanship and state appropriations

Research shows between-state variation in higher education spending partially depends on the political control of the state legislature. Historically, Republican-dominated states have provided lower support than Democratic, independent, or divided governments.[20] There is also evidence that states with Republican governors have provided less generous funding to colleges and universities that enroll a large share of racially minoritized communities.[21] Another study, using a set of experimental conditions, finds that pessimism among constituents about the returns to state spending can lead to less engagement by their representatives on policy issues related to higher education.[22]

State appropriations changes and enrollments

Broad changes in state appropriations can significantly impact college enrollment and degree outcomes. At public universities, a 10% drop in state appropriations is associated with a 2% decrease in in-state undergraduate enrollment and a 4% decrease in bachelor's degree completion.[23] The adverse effects of recent declines in appropriations are greatest for Black and Hispanic enrollment at institutions that rely more on state funding.[24] More selective public universities have an incentive to increase non-resident enrollment to boost net tuition revenue. About one-quarter of states do not formalize non-resident rates at the state level, with such tuition largely set at institutional discretion.[25] One study, using a panel of all U.S. public bachelor's institutions between 2002–03 and 2012–13, finds a strong negative relationship between state appropriations and out-of-state and international student enrollment, particularly at research universities.[26] A related study finds that increases in the enrollment share of non-resident students are associated with a decline in the proportion of low-income students; this trend was stronger at more prestigious universities and at universities in higher-poverty states.[27]

State appropriations changes and tuition

When faced with state spending cuts, public institutions can respond by reducing spending or increasing revenue from other sources, often tuition. One study uses panel data from colleges in New England to examine how funding cuts are passed on to institutions and students.[28] All else equal, each $1 reduction in state appropriations leads to a 17-cent increase in net tuition and fees and a 30% decrease in instructional expenditures at public doctoral institutions. At community colleges, the negative effect is stronger – each $1 in lost appropriations results in a 56-cent reduction in instructional spending. Another study examines the pass-through rate of public funding declines to tuition and fees at four-year public institutions between 1987 and 2014. The author estimates that a $1,000 per-student decrease in state funding translates to an additional $257 cost to students each year, and this pass-through rate increases over time following further state divestment.[29]

Higher state appropriations are generally associated with lower published tuition rates, particularly in the four-year sector.[30] While public institutions have historically been mainly funded by state appropriations, the cuts and volatility in state funding over the last few decades have prompted greater reliance on tuition.[31] Tuition charges as a share of public higher education spending have increased steadily, from 21% in 1980 to 40% in 2023, peaking at 45% in 2011.[32] According to the College Board's annual

report on college pricing, over the last 30 years, published tuition and fees have increased by 150% at public two-year institutions and 200% at public four-year institutions. However, most of these increases occurred between 1994 and 2014; in-state tuition and fees (inflation-adjusted) declined by 6% at two-year colleges and 4% at four-year institutions since then. The increase in per-student appropriations spending during this time likely contributed to this decline. FY 2023 is the eleventh consecutive year of per FTE increases in state education appropriations, which can be attributed, in part, to a sharp decrease in FTE enrollment and to federal stimulus funding during the COVID-19 pandemic.[33] Although education appropriations have recovered nationally from the Great Recession, these aggregates mask considerable differences across states. In half of all states, higher education appropriations remain below pre-2008 levels (in real dollars).

One contributor to the large cross-state variation in net tuition revenue, as shown in Figure 4, is that states rely on various tuition-setting authorities, including the state legislature, a state governing board, a system-level board, or individual institutions.34 Based on evidence from Texas, institutional autonomy to set tuition levels has been shown to increase overall price levels and lead to more differentiated prices and resource use across and within institutions.35

Tuition control policies and institutional responses

In light of affordability concerns, tuition control policies limit how much a college or university can raise tuition each year. The most common control mechanisms are tuition freezes, which hold tuition prices at a prior-year level, and tuition caps, which limit annual increases to a fixed percentage or dollar amount. Tuition freezes were widely implemented as a response to the COVID-19 pandemic.[36] Some states have also adopted tuition guarantee initiatives, primarily in the four-year sector, that provide entering students with a fixed tuition rate for their undergraduate studies, typically for eight semesters.

With limited or no ability to increase tuition revenue from in-state students, tuition control policies incentivize institutions to generate revenues from alternative sources. Evidence shows that tuition freezes are associated with increases in the level of required campus fees that are not subject to the control policy.[37] Institutions will take other actions to balance their budget and protect against future losses, including lowering institutionally funded financial aid.[38] Similarly, while greater price transparency has a clear intended benefit for students, guaranteed tuition policies can limit colleges' ability to respond to financial challenges. Analysis of one early state program (Illinois) found that public institutions factor in this uncertainty when estimating each cohort's fixed tuition, leading to higher year-over-year increases than institutions in states without a guaranteed tuition plan.[39] A related study shows that four-year institutions in North Carolina responded by increasing tuition by 5% to 13% for graduate and out-of-state students.[40]

For community colleges, "Promise" programs are the fastest-growing affordability policy, eliminating tuition (and sometimes fees) for qualifying residents of a state or locale. Most Promise funding comes from state and/or local appropriations or private philanthropic support, and the structure for receiving funds varies; many programs rely on reimbursements, requiring colleges to absorb costs upfront.[41] Recent research shows that program design features and funding streams influence how institutions make internal spending adjustments. Colleges with Promise programs supported by

public funding show increased investments in student services, whereas those with private funding tend to increase spending on administrative support.[42] Total institutional spending is essentially unchanged.[43] Colleges often rely on existing staff and infrastructure to manage additional enrollments and advising needs, prompting concerns about institutional strain and sustainability.[44] To date, there is no evidence that tuition rates increase following the adoption of a Promise program, even at community colleges with the authority to set prices.[45]

Key Finding #3: *Institutional spending improves student outcomes.*

The main argument for sustaining spending in postsecondary institutions is that it allows for resources (e.g., more faculty, better student support services, modernized classrooms) that lead to more students completing college credentials, thereby improving skill development and labor force productivity. As in elementary and secondary education, postsecondary education spending influences student choices and outcomes.

Categories of institutional spending

College and university expenditures serve different purposes, and many types of spending can affect student outcomes. Table 1 defines the broad categories for which institutions must report annual spending to the Integrated Postsecondary Education Data System (IPEDS); the columns show sector-specific shares across these categories in 2021–22. Instructional spending should most directly affect students, but even spending on research and public service may shape students' educational environment and experience, ultimately affecting outcomes.

Across all institutions, the share of total spending devoted to instruction has declined from 32% to 27% over the past decade, while the share in academic support and student services has remained constant.[46] Much of the growth in total spending has come from non-core spending: auxiliary enterprises, hospitals, and independent operations. Research shows that institutions increase spending on the core activities of instruction, academic support, and student services (approximately in proportion to) as resources become available through state appropriations.[47] So, the decline in the instructional share does not necessarily mean that colleges are allocating resources away from students; instead, increased spending on hospitals and other services has mostly come from additional revenue generated by these activities.

Instructional and student services spending

Institutions have some flexibility in how they allocate instructional spending budgets and in how they respond to spending cuts. Research shows that relying more on lower-paid adjunct instructors is associated with worse outcomes in the community college sector, but evidence on the same question in four-year colleges is unclear.[48] Institutions may also increase class sizes, although findings on the effects of larger classes have been mixed.[49] Higher spending may also enable better classroom practices, such as active learning practices like group projects and feedback on written work.[50] Understanding how greater resources alter instructional practices across academic fields and their effects on student outcomes requires further research.

Table 1. Categories of institutional spending and share of total spending by sector, FY 2022

Category	*Description*
Instruction*	Expenses for teaching and instruction, faculty salaries, and instructional resources
Research*	Costs of research activities funded by external agencies or within the institution
Public service*	Activities related to non-instructional public services, e.g., outreach programs
Academic support*	Support for academic operations, including libraries, deans, and academic departments
Student Services*	Services contributing to students' emotional and physical well-being
Institutional support*	General administrative costs, including legal services and fiscal operations
Net Grant Aid*	Financial aid provided to students, net of discounts and allowances for tuition/fees
Auxiliary Enterprises	Services for students, faculty, and staff, such as residence halls and food services
Hospital Services	Expenses related to health services provided by university hospitals and facilities
Independent Operations	Expenses unrelated to the institution's primary mission
Other	Miscellaneous expenses not classified in other categories

Notes: Public and private nonprofit Title IV degree-granting institutions; excludes for-profit institutions. Asterisk* indicates "core" spending category. Sources: NCES 2023 Digest of Education Statistics Tables 334.10 and 334.30.

Student services spending appears particularly important for students with less academic preparation at four-year colleges. One study quantifies the effects of spending by category on completion using administrative student-level data from Ohio, comparing students at the same institutions whose enrollment timing exposes them to different levels of spending. Student services had the largest impact on completion for students with below-median ACT scores. For students at or above the ACT median, instructional expenditures are more predictive of completion. A third insight from the Ohio study is that instructional expenditures generally have a larger impact on students in STEM fields than on those in non-STEM fields.[51] Earlier work using institution-level data from nearly all four-year colleges finds that student services spending has the largest association with graduation among students at schools with lower average SAT scores and high financial need.[52]

While these studies may be affected by the correlation between spending changes and the other factors mentioned earlier, their conclusions are bolstered by the accumulating high-quality evidence on the benefits of intensive student support programs.[53] The most high-profile is the Accelerating Study in Associate Program

(ASAP) at CUNY, which provides personalized advising, transportation, financial support, tutoring, and tuition/fee waivers. A randomized experiment showed that ASAP doubled associate degree graduation rates, and these results were also replicated in Ohio.[54] In Fort Worth, Texas, a case-management intervention targeting community college students' academic and non-academic needs increased associate's degree receipt by 31.5 percentage points for women but had no precise effect on men.[55] Intensive and personalized one-on-one academic advising also substantially boosts degree completion.[56] Collectively, these experiments show that greater investment in wraparound student support services can improve student outcomes. Spending on non-instructional amenities, such as dorms, food service, and sports, affects students' institutional choices, but the consequences for student outcomes remain unclear.[57]

Total spending, persistence and completion

Research generally finds that higher total spending by institutions corresponds with higher rates of persistence and degree completion. Many studies compare the outcomes of students attending a college when spending was high to those attending the same college when spending was low. A major challenge in interpreting this evidence is that spending changes often coincide with other factors, such as tuition or economic conditions, which can have independent effects on student outcomes, making it difficult to isolate the effects of higher spending statistically.

A recent study combines data on state budget shocks, institutional differences in reliance on state appropriations, and tuition price caps to separate the influence of these factors on spending and student outcomes.[58] They find that a 10% increase in institutional spending is associated with a 3% increase in enrollment levels and a 6% to 9% increase in certificates and degrees conferred, depending on the time horizon. They interpret the effect as primarily operating through increased persistence among students who would enroll anyway, rather than through new enrollments. This finding is consistent with earlier evidence at the national level that students in larger cohorts of high school graduates experienced resource "crowding" and lower degree completion, primarily because spending does not increase proportionately to enrollment.[59] Declines in average spending per student were an important contributor to the reduction in graduation rates and increased time-to-degree between the 1970s and 1990s.[60] Continued declines in spending likely would have caused these aggregate patterns to continue if grade inflation had not reversed them.[61]

Importantly, the existing evidence does not provide a clear guide on how spending effects differ across institutional types. States, policymakers, and charitable groups would benefit from knowing whether spending an additional dollar in one sector or one institution would be more beneficial than in another. The paper described above finds larger enrollment and completion effects for public two-year schools than for four-year schools, although the differences are not statistically significant. Since the most credible evidence relies on shocks to state support to identify spending effects, there is almost no direct evidence on the return on or effectiveness of spending in private nonprofit and for-profit institutions.

Institutional spending and college "quality"

The importance of postsecondary spending on student outcomes is also reflected in consistent, credible research evidence that higher "college quality," broadly defined, is associated with better student outcomes: persistence, completion, and labor market success. While "quality" encompasses many inputs, including high-achieving peers, effective faculty, and student-supporting practices, spending per student is a useful summary measure that captures many of these inputs. For instance, colleges with higher levels of spending will be able to offer smaller, more varied classes, higher-quality instructors and support services, and attract high-achieving students with targeted aid. The evidence is clear that attending an institution with greater resources is causally associated with better short- and long-run outcomes—at the four-year versus two-year margin,[62] between flagship and less-selective four-year institutions,[63] and across the spectrum of postsecondary institutions.[64] The overall level of resources available at these different types of institutions is one of the main differences underlying these contrasts, although it is not the only one. One study finds that instructional spending strongly predicts which colleges have higher value-added, especially conditional on selectivity.[65] Many studies use credible methods to compare outcomes for students who were barely admitted to a better-resourced college with those who were barely not admitted. A few studies find minimal differences in outcomes by institutional quality, although they tend to feature limited variation in quality.[66]

Key Finding #4: *Spending patterns also vary within institutions, based on the resources required across departments and programs and broader policy structures.*

While variation in resources across institutions is most salient to students and policymakers, large differences also exist across academic units within institutions. These differences are not as well documented, as systematic within-institution information about spending and resource use is not widely available.[67] Researchers primarily use data from individual institutions, systems, or states to study patterns of resource allocation and use.

Resource differences within institutions

The most recent large-scale study shows substantial differences in resources required by different fields; electrical engineering is about 90% more costly, and math is 25% less costly than English to teach.[68] There are also large differences by level. Analyses of cost data from four large state postsecondary systems (Florida, Illinois, New York-SUNY, and Ohio) show that upper-division instruction is about 40% more costly per credit hour than lower-division instruction and that upper-division engineering, physical science, and visual/performing arts are approximately 40% more costly than the least expensive majors.[69] An earlier cost study concluded that the majority of the variance in instructional cost across institutions (see Figure 2) can be explained by the disciplinary mix.[70] The consequence is that lower-division students subsidize upper-division students, and those in less-expensive majors subsidize students in costly majors. The cost of producing graduates thus also differs by the course pathway taken to graduation.[71]

Production technology by field

The availability and use of resources within institutions can often be traced to differences in the fundamentals of teaching methods and modes across fields, as well

as to market prices for key inputs. For instance, differences in class size explain, statistically, much of the cost differences across fields in the same university, followed by faculty salary differences.[72] Some fields with highly paid faculty can offset high wages with large classes, but others cannot. Differences in production technology, such as how instructional quality deteriorates with class size, determine this tradeoff and thus influence spending by field. Rigidities that prevent institutions from reallocating faculty resources across departments in response to changes in student course-taking can magnify these differences.[73] There is, however, some evidence that departments respond to differences in research and teaching productivity across faculty by allowing larger class sizes and more non-faculty teaching in fields where faculty are expensive and research-productive faculty are allocated less undergraduate teaching.[74] Estimating production functions for postsecondary departments is a longstanding yet elusive research goal for higher education scholars.[75]

Institutional and state policies and resource availability

Some states set institutional appropriations to reflect differences in the cost of providing different types of instruction. For instance, North Carolina and Texas provide funding partly based on weighted enrollment, with weights determined by the relative instructional costs of different fields and levels. Among institutions, a growing number have adopted Responsibility Centered Management (RCM), in which academic units (typically colleges) are responsible for their own bottom lines. This practice was shown to increase overall institutional resources at several institutions and likely increases differentiation across units, which have different opportunities to raise revenue.[76] Many institutions also practice differential pricing, charging higher tuition to students in higher-cost, higher-earning fields. The uniform pricing scheme used at most institutions effectively results in less expensive programs cross-subsidizing more expensive programs. Differential pricing is associated with fewer students majoring in the targeted field.[77] Lastly, institutional preferences for producing different types of majors may also influence how budgets are allocated to instruction across fields, thereby altering resources and demand.[78]

Implications for public returns and institutional incentives

The large within-institution differences across units and fields mean that the public return on investment in different postsecondary fields does not neatly track the earnings returns across fields. Many observers assume that the fields with the highest earnings returns also have the greatest social benefit per dollar invested. However, analysis of the costs and outcomes associated with many postsecondary programs in Florida revealed that high-earning fields such as engineering and health sciences are also much more expensive.[79] Business and computer science programs offer the highest net returns to public investment, given their relatively high earnings and low costs. Resource differences across fields also influence how easily institutions can respond to their environment; it may be easier for institutions to add instruction in low-cost fields or courses in response to increased demand. However, these may not necessarily be what is best for students.

Key Finding #5: *Federal financial aid and research funding directly impact institutional behaviors, spending, and research output.*

The U.S. federal government is a major funder of postsecondary education, providing grant and loan aid directly to eligible students under Title IV and to select resource-limited or minority-serving institutions under Titles III and V of the Higher Education Act of 1965. In 2022–23, the federal government disbursed $111 billion in student grants and loans.[80] The federal government also supports higher education research and development (R&D), funding 55% of the $98 billion in university R&D expenditures in FY2022.[81] The share of total institutional revenues from federal appropriations, grants, and contracts has increased across all types of public institutions since 2015, particularly at non-doctoral colleges.[82]

Scholars have examined how federal funding streams influence institutional behaviors and expenditures, with an eye toward unintended consequences. Emerging evidence suggests that, following steady declines in state support, the federal role has grown from primarily supporting students to also aiding in stabilizing institutional budgets. While federal aid is channeled to students rather than given directly to institutions, it indirectly sustains institutional spending through tuition and fee revenue from students. Federal funding directly supports a significant portion of the research conducted at American universities.

Federal student aid and college pricing

A longstanding theory in higher education finance, the *Bennett hypothesis*, posits that postsecondary institutions will respond to increases in federal financial aid by raising tuition prices to capture some of the aid as additional revenue.[83] This response could mean that policies intended to improve college access and affordability instead increase institutional spending and quality. A comprehensive review of the early empirical literature concluded that evidence for the Bennett hypothesis is ambiguous at best,[84] but later studies have identified scenarios where institutions appear to capture federal aid through higher tuition. One study exploits discontinuities in the Pell Grant eligibility formula and estimates that institutions capture a significant portion of federal grant aid, between 11% and 20%, through higher tuition or spending less on institutional grants.[85] Public institutions capture much less, around 5%, than private nonprofit institutions, which can capture over two-thirds of the aid received by students. The author also finds evidence of a Pell Grant "labeling" effect, such that institutions may be more inclined to adjust prices for students labeled as needy. A different study finds support for the Bennett hypothesis by comparing tuition charges between sub-baccalaureate institutions whose students are eligible for Title IV federal student aid and institutions offering similar programs but without access to federal assistance.[86] Authors show that Title IV-eligible institutions charge tuition about 78% higher than comparable programs at non-Title IV institutions. The general equilibrium response of institutions to financial aid expansions may reduce the effect of the aid on college enrollment.[87]

To some extent, the influence of federal student aid on institutional behaviors will depend on the level of funding available to students. The maximum Pell Grant award for undergraduates for 2023–24 was $7,395. While annual increases have roughly kept pace with inflation, tuition has risen faster—the maximum Pell corresponds to 66% of average in-state tuition and fees, a 21 percentage point decrease over 20 years.[88] The maximum amount undergraduate students can borrow annually in federal loans varies by year in school (between $5,500 and $7,500 for dependent students), and these

limits have been in place since 2008. Graduate students, conversely, do not have a federally imposed cap on how much they can borrow. Instead, graduate students can borrow up to the full cost of attendance for the academic year through the PLUS Loan program, effectively allowing *institutions* to determine student borrowing limits.[89]

Federal aid and incentives for graduate program expansion

Concerns about declines in undergraduate enrollment have prompted many four-year institutions to launch or expand graduate and professional programs to stabilize institutional budgets and diversify revenue streams.[90] There is an incentive for institutions to adjust their enrollment strategies to attract graduate students whose access to federal aid makes it easier for them to pay full price for their education. In 2021–22, the average graduate tuition and required fees at public institutions was $12,596, 31% higher than the average in-state charge for a bachelor's degree.[91] (At private institutions, average graduate tuition and fees is 21% lower, perhaps because graduate programming is more common at less expensive private colleges.) Emerging evidence shows that not all master's degree programs pay off for students or taxpayers—some newer programs leave students with high debt burdens relative to their post-graduate earnings.[92] These high -debt-to-earnings programs are primarily concentrated in lower-earning fields, such as social work and counseling, at private nonprofit universities. In 2021–22, graduate students accounted for 21% of all students enrolled in higher education and 47% of all federal student loan disbursements.[93]

Federal research funding and institutional expenditures

In 2021-22, Federal support for research and development at higher education institutions totaled $54 billion.[94] This funding comes from various departments and agencies, but most significantly:

- The Department of Health and Human Services ($30 billion, mostly through the National Institutes of Health),
- The Department of Defense ($8 billion), and
- The National Science Foundation ($6 billion), plus
- Smaller grants under other agencies, e.g., Energy, Agriculture, Education.

This annual investment is about twice the $24.5 billion universities spend on research from institutional and other external sources. The Federal Government funds scientific research primarily through competitive grants and contracts for specific projects, rather than through general operating funds. Federal grants typically include funding for the "indirect" costs of research-related expenditures shared across research units and projects at a university. Subsidized resources range from laboratories and libraries to high-performance computing infrastructure and may include support for regulatory compliance and reporting, human subject protection, and administrative staff. The indirect cost reimbursement rate is negotiated periodically between institutions and the Federal government and covers 42% of total direct costs on average; it has been fairly constant over time and is similar across institutions.[95]

Participation in federally funded R&D leads to changes in administrative expenditures. One study examines this relationship using public universities that shifted to research university status between 2004 and 2012.96 Institutions aiming to gain or improve their research status show larger increases in their administrative spending, particularly academic support services, as they compete for federal research grants. This spending is part of the broader efforts to build research capacity—hiring faculty, improving infrastructure (e.g., research offices and labs), and enhancing research support services. As universities receive more research funding, investment in research-related management and personnel (e.g., grant and compliance managers) also increases costs. A related study finds the institutions with the highest research output, as measured by research expenditures, face significant cost pressures related to faculty salaries and the maintenance of research facilities, which federal research revenue helps offset but also inflates due to the competitive nature of research funding.[97]

Federal research funding (direct subsidies to investigators and labs with support for institutional indirect cost recovery) provides the foundation for most research activity at U.S. universities. Since the Cold War, these Federal investments have steadily grown—a longstanding geopolitical strategy for maintaining the nation's technological prowess on the world stage.[98] One study finds that a $10 million increase in NIH funding leads to a net gain of 2.7 patents.[99] Another finds that Federal funding cuts reduce high-tech entrepreneurship, publications, and patent quality and shift innovations out of the public realm.[100] Another recent study estimates that reducing the indirect cost rate to 15% (from around 42%, on average) would result in a 15% to 20% decline in overall NIH funding for most research institutions.[101] Federally funded university research is a major driver of the knowledge and innovation that have shaped the modern companies, medicines, technologies, services, and products we interact with every day.[102]

Federal support for minority-serving institutions

Federal programs under Title III of the Higher Education Act are designed to strengthen the institutional capacity of colleges and universities that enroll a high proportion of racially minoritized and low-income students, including Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), and other designated Minority-Serving Institutions (MSIs). Title V assists Hispanic-Serving Institutions (HSIs). Over 800 institutions in the U.S. qualify for the MSI designation; the majority are HSIs.[103] In FY2023, MSIs were appropriated $1.29 billion through discretionary and mandatory funding streams, which two- and four-year institutions use to invest in areas such as administrative management, academic programming (e.g., STEM), and technology infrastructure.[104]

Although most MSIs are public institutions, federal support has become an increasingly important component of their overall funding portfolios. In FY2022, federal appropriations, grants, and contracts accounted for between 18 and 25 percent of total revenue at Title III and V grantee institutions.[105] Core institutional grants under Title III are awarded based on statutory formulas tied to enrollment and other institutional metrics. Several Title III and all V programs distribute funding through grant competitions that typically require detailed proposals aligned with federal priorities. These grant opportunities often favor better-resourced institutions, reinforcing existing gaps in institutional resources; some Title V-eligible colleges report opting out of the competitive application process entirely due to limited support staff and strategic planning capacity.[106]

Federal support during economic downturns

In recent decades, state appropriations for higher education have decreased during economic downturns and steadily increased as the economy and tax revenues improve—a phenomenon referred to as the "balance wheel" hypothesis.[107] Using a national dataset, earlier research finds robust evidence for this cyclical relationship between 1985 and 2004, with states disproportionately cutting funding to public colleges and universities during recessions to protect other sectors such as K-12 education and healthcare.[108] State support often does not return to pre-recession levels, and education appropriations reached a record low in 2012 following the cumulative effects of the 2001 and 2008 recessions.[109] In response to the COVID-19 pandemic and the 2020 recession, the federal government provided stimulus funding[110] to help stabilize state and local sources of revenue for higher education, mitigating some of the worst cuts.[111] While this injection of federal funds reversed the substantial decline in education appropriations in the years following a recession, it did not fully offset state budget shortfalls in many states. With the end of federal stimulus funding, the full impact of the COVID-19 economic shock on higher education funding remains to be seen.

Key Finding #6: *Efforts to substantially rein in institutional spending have been unsuccessful because costs are an ingredient of educational quality.*

As shown in Figure 1 (pg. 1), inflation-adjusted college expenditures continue to rise, and policymakers and researchers debate how the sector can promote sustainability, efficiency, and greater value for students and taxpayers. Estimates suggest that the number of degrees granted per dollar invested in public colleges has declined over the long term.[112] Critics argue that the sector is rife with wasteful spending, while advocates contend that a modern postsecondary sector needs even greater resources. At the same time, higher education must contend with its changing role amid technological and demographic shifts, as well as the implications for financing public goods such as education. The question is how to provide the same quality and quantity of educational services at a lower cost, or, conversely, to offer higher quality or quantity at the same cost. This tension is longstanding—the U.S. Congress established the National Commission on the Cost of Higher Education nearly thirty years ago, and the question persists. Critical to progress on this issue is an understanding of why spending is increasing despite stagnant enrollment. There are two primary theories:

- Cost disease: The tendency for costs to rise disproportionately in labor-intensive service industries over time.[113] Postsecondary institutions raise employee wages in line with the broader economy, leading to higher costs without proportional increases in productivity or output.[114]
- Revenue theory of costs: This theory suggests that colleges and universities spend as much as they can raise in revenues.[115] Institutions will adjust their spending based on available funding streams (tuition, appropriations, donations), so spending decisions are driven more by resource availability than cost efficiency.

As higher education relies heavily on personnel and infrastructure, rising operating costs for maintaining aging facilities, providing health insurance, and supporting historically underfunded pension systems have also driven costs to increase faster than inflation.[116] Additionally, in-depth case studies focusing on highly selective

institutions (Chicago, Duke, Harvard, Carleton, and Cornell) concluded that spending by institutions continues to rise due to an increase in the cost of purchased inputs as well as a desire to maximize excellence in all the dimensions in which colleges operate: educational experiences of students, research contributions of faculty, and the technology and facilities in use.[117] Researchers have observed a similar pattern as institutions strive to improve their position in national rankings and become more research-intensive.[118] An increase in institutional autonomy (from a state governing board) is associated with greater spending on executive compensation, full professor salaries, and research activity.[119] In a competitive national market, higher education institutions continue to expand in ways that enhance quality, prestige, and influence. These actions increase spending in potentially helpful ways for both students and overall institutional productivity.

The notion of "administrative bloat" is frequently linked with the rapid rise in institutional spending. Critics cite an ever-expanding bureaucracy as an unnecessary cost driver. In contrast, others argue that personnel growth enables institutions to address a wide range of student needs, advance institutional priorities, and meet regulatory requirements. Since the early 1990s, colleges have steadily expanded non-faculty positions to provide additional services to students outside the classroom. New positions, particularly in student services—e.g., athletics, admissions, psychological counseling, and career counseling—drove a nearly one-third expansion of the higher education workforce from 2000 to 2012.[120] All sectors increased administrative positions and shifted toward greater use of part-time faculty, and over this period, faculty salaries were essentially flat.[121] While other industries have found ways to outsource services distant from their core business, higher education has done the opposite, bundling a suite of services with the instructional side. Interpreting these trends is not straightforward: it is impossible to distinguish quality-enhancing from efficiency-decreasing growth in employees and expenditures using the available data.

Looking ahead, a policy goal that both critics and advocates of higher education share is the importance of promoting "productivity" across sectors. A recent comprehensive study computed the productivity of all U.S. higher education institutions as the discounted lifetime earnings impact on students relative to the social investment (in dollars).[122] The author finds large differences in the efficiency with which institutions use their resources to create student outcomes. More selective institutions are more productive than non-selective institutions, and importantly, large differences exist even within selectivity categories. Non-selective institutions exhibit particularly wide dispersion in the extent to which they use their resources to improve their students' labor market outcomes. Similar, although noisier, patterns emerge when incorporating other important outcomes of postsecondary education, e.g., public service and research. One interpretation is that these institutions face less competitive pressure to maximize quality relative to their resource costs.

Student progress toward degree or program completion contributes to institutional efficiency, and this is one area where colleges and universities have a fair amount of control. Students who drop out, "stop out," or enroll for longer than the typical time-to-degree increase the resources expended on each program completion. Given that expenditure is a key input of educational quality, there is an inherent tension between efforts to improve completion rates and substantially increasing costs. Evidence-based approaches to economize student progress toward college completion include:

- *Promoting efficient pathways to and through college.* Many state policies and institutional initiatives can support students' "academic momentum."[123] These policy tools include dual enrollment[124] and summer bridge programs[125] to support access and

credit accumulation, developmental education reform[126] to improve college readiness, and articulation and transfer agreements[127] that ease credit transfers so that students do not need to repeat coursework.

- *Targeting aid for specific programs and populations.* A growing number of states are targeting populations with some college coursework but no credentials through "reconnect" programs,[128] short-term credentials in priority workforce areas,[129] and building on-ramps to high-demand (sometimes high-return) sub-baccalaureate options. These programs may reduce costs by issuing shorter-duration credentials tailored to specific labor -market needs.

- *Online instruction.* Some proponents hope that the growth of online postsecondary education, whether individual courses or entire degrees, will lower costs. The evidence is mixed, with some positive[130] and some negative findings.[131] Online degrees may, however, help meet the demand for mid-career training for certain populations and fields,[132] but so far, they have not disrupted the cost structure of much of the higher education sector.

The efficacy of these interventions, much less their cost-saving efficiency, is not well known. Future research should take steps towards a more complete understanding of the postsecondary budgeting and education production process across fields to identify and assess potential strategies to reduce costs while maintaining or enhancing the quality of the education provided.

Endnotes and references

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