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HIGHER EDUCATION SUBSIDIZATION

Why and How Should We Subsidize Higher Education?

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KEY POINTS

- **Subsidies for** higher education have a long and evolving history in the U.S.
- **This paper explains** the most common subsidy justifications, including historically important but now obsolete justifications such as promoting favored religions and reducing the size of the labor force, as well as more modern justifications such as strengthening national defense, redistribution, paternalism, generating positive externalities, and boosting economic growth.
- **When implementing** a subsidy, there are several subsidy design choices to consider, including: targeting (universal or selective subsidization), distribution (whether to fund students or institutions), the appropriate size of the subsidy, and unintended consequences.
- **In light of these** subsidy justifications and design considerations, we offer recommendations to improve and, in some cases, eliminate existing higher education subsidies.

EXECUTIVE SUMMARY

Subsidies for higher education have a long but evolving history in this country. This paper explores the justifications or rationales for these subsidies, including obsolete justifications such as promoting favored religions and reducing the size of the labor force, as well as more contemporary justifications such as strengthening national defense, redistribution, paternalism, generating positive externalities, and boosting economic growth. Even when well-justified, subsidies need to be well-designed to achieve the desired effect. Key subsidy design considerations include targeting—whether the subsidy is universal (providing the same subsidy to everyone), or selective (providing only certain students with subsidies); distribution—whether the subsidy is provided to students in the form of financial aid, or to colleges in the form of appropriations; the appropriate size of the subsidy; and any unintended consequences. In this paper, we explore implications of the various subsidy justifications for subsidy design. Finally, we examine the biggest existing higher education subsidies, such as Pell grants, student loans, and state appropriations, to determine if they are sufficiently justified and whether they are well designed, offering recommendations to reform and, in some cases, to eliminate subsidy programs.

INTRODUCTION

Throughout the nation's history, taxpayers have provided subsidies to colleges. Both the magnitude of and the justifications for subsidization have changed markedly over time. This paper explores the historical and present justifications for college subsidies, the key subsidy design considerations, and the biggest college subsidy programs at both federal and state levels, considering these justifications and design considerations.

THE HISTORICAL AND PRESENT JUSTIFICATIONS FOR SUBSIDIZING COLLEGE

While American governments at the federal, state, and local levels have historically heavily subsidized colleges, the reasons for

subsidization have changed over time. The following subsections list the most important rationales that have been used to justify college subsidization. We follow a loose chronological order, starting with the oldest justifications and moving on to modern justifications. These include:

- Promoting favored religions
- Reducing the size of the labor force
- Strengthening national defense
- Redistribution
- Paternalism
- Generating positive externalities
- Boosting economic growth

Promoting Favored Religions

Before the U.S. won its independence and for many years after, one of the primary functions of colleges was to promote religion and train religious ministers. For example, Harvard's original mission statement was:

> Let every student be plainly instructed and earnestly pressed to consider well the end of his life and studies is to know God and Jesus Christ, which is eternal life, and therefore to lay Christ in the bottom, as the only foundation of all sound knowledge and learning. (Simpson, 2024)

Many of the colonies had a dominant religion that was closely tied to the colonial government, so many colonies established and subsidized colleges to ensure that the colony's religion had a sufficient pool of religious leaders. This "desire might have been particularly intense in Massachusetts and Connecticut, where Puritans—strict Calvinists with a scriptural rather than sacramental approach to religion—emphasized an educated clergy and a literate flock" (Urquiola, 2020, p. 175). After these colonies established Harvard and Yale, other religions pushed to establish their own colleges (e.g., Presbyterians were instrumental in establishing Princeton, Anglicans in establishing Columbia, and the Dutch Reformed in establishing Rutgers). These early colleges benefitted from religiously motivated government support, if not always sustained funding (Urquiola, 2020).

While this sort of justification for subsidization was dominant for the first century of the country's existence—as late as the 1880s, the majority of college presidents had previously been clergymen (Kimball & Iler, 2023)—these religious motivations and rationales for government subsidization are no longer compelling today, in part because of the widespread adoption of the principle of the separation of church and state. Any attempt to provide subsidies to favored religions today would be widely viewed as illegitimate.

Reducing the Size of the Labor Force

Another justification for college subsidization that was historically important (but is rarely made today) was a desire to reduce the size of the labor force by enrolling more people in college. During the Great Depression and again after World War II, many believed that the country suffered from too many people in the labor force competing for scarce jobs, thus driving up the ranks of the unemployed. In this light, college enrollment was viewed as a mechanism to reduce the number of people looking for work. For example, the work study program was launched during the Great Depression as "an effective way to 'take thousands of young people out of the ranks of job seekers' while keeping them off the dole" (Shermer, 2021, p. 42). Similar reasoning was evident during World War II, when it was feared that the millions of returning soldiers, sailors, and airmen would swell the ranks of the unemployed, thus restarting the Great Depression. As leading economist Paul Samuelson warned,

> "We shall have some 10 million service men to throw on the labor market. We shall have to face a difficult reconversion period during which current goods cannot be produced and layoffs may be great. Nor will the technical necessity for reconversion necessarily generate much investment outlay in the critical period under discussion whatever its later potentialities. The final conclusion to be drawn from our experience at the end of the last war is inescapable—were the war to end suddenly within the next 6 months, were we again planning to wind up our war effort

> in the greatest haste, to demobilize our armed forces, to liquidate price controls, to shift from astronomical deficits to even the large deficits of the thirties—then there would be ushered in the greatest period of unemployment and industrial dislocation which any economy has ever faced." (Samuelson, 1943, p. 51)

These fears drove support for the first G.I. Bill, which provided grants to pay for college to veterans, which would keep them out of the labor force.

Today, virtually no one argues that we should subsidize colleges for the express purpose of reducing the size of the labor force. Modern economies have shown a remarkable ability to accommodate nearly everyone willing to work at the prevailing wage, so any arguments for subsidization relying on this rationale would be widely viewed as unjustified.

Strengthening National Defense

The need for college subsidies to promote national defense was a dominant argument for subsidization during World War II and for several decades afterward. In fact, the first federal student loan system was launched during the war, requiring borrowers to "promise to join the war effort" (Shermer, 2021, p. 72). While this program ended with the war, after the Soviet Union launched the first satellite (Sputnik 1) into orbit in 1957, leaders in the U.S. feared the country was falling behind scientifically and responded by increasing subsidies for research and education. One of the educational subsidies was the National Defense Student Loan Program, which required borrowers to affirm that they "intended to study math, science, or foreign languages," (p. 119) as these subjects were thought to be vital to the national defense.

Since the end of the Cold War, national defense justifications for subsidies have become uncommon, as few of the international conflicts in which America has recently engaged have involved technologically advanced opponents. However, if heightened tensions with China and Russia draw into question America's technological edge, it is likely that national defense justifications for subsidies will return. One could plausibly argue that this has already started, with the Chips and Science Act of 2022 providing subsidies for domestic computer chip manufacturing to ensure a sufficient supply if conflict with China cuts off the supply of computer chips from Taiwan, the world's leading producer of advanced chips (Ip, 2022).

Paternalism

Another justification for subsidizing colleges is paternalism. The basic idea is that if potential students are routinely making the "wrong" decision by failing to enroll in college or choosing the "wrong" major, then subsidies could encourage them to make the "right" decision by artificially manipulating prices. As Armen Alchian explained (without necessarily endorsing the rationale),

> Even if a college education may be a very profitable investment for some person, he may, because of inexperience or lack of confidence, not appreciate his situation or be willing to borrow at available rates of interest. This presumably is an argument for subsidizing those students who lack confidence or understanding of their possibilities. (Alchian, n.d.)

Today, the leading academic approach along paternalistic lines focuses on the uncertain payoffs of attending college combined with risk aversion. Risk aversion implies a willingness to forgo positive expected payoffs if there is a potential for loss. For example, when flipping a coin, if you win 10¢ for heads but lose 5¢ on tails, the expected return is positive (i.e., 5¢, derived from a 50% chance of gaining 10¢ and a 50% chance of losing 5¢). However, some risk-averse individuals will not want to flip because they place more weight on the possible loss of 5¢ than the possible gain of 10¢. With respect to college attendance, "a risk-averse student (or parent) is less likely to invest in education if there are uncertain returns" (Bulman & Cunha, 2021, p. 317). And the returns to college are highly uncertain—they've been estimated to be as "low as - 31.56% and as high as 51.02%" (Carneiro et al., 2010, p. 14). And "even among college graduates, there is a substantial fraction (37%) who earn *ex post* negative returns" (Carneiro

& Heckman, 2003, p. 38). More recent studies are consistent with these findings. One recent study found that "over a quarter of programs have negative ROI [return on investment]" (Cooper, 2021, "Key Sections" section). The possibility of these negative outcomes could discourage many risk-averse students from enrolling.

While paternalistic concerns are discussed among scholars, they are not often explicitly invoked by policymakers.

Redistribution

Taking root in the 1960s and continuing to today, a common rationale for government subsidization of college is redistribution. There are three main groups of people for whom this rationale is routinely invoked.

The first group consists of students from low-income families who would not be able to afford college without financial assistance. College can be expensive, putting students from low-income families at a disadvantage. Thus, for over half a century, a prime motivation for subsidy programs was the belief that "*every* student with the ability to pursue a higher education should be able to do so regardless of his income" (U.S. Department of Health, Education, and Welfare, 1969, p. 3). Subsidies for these students tend to be justified in the name of ensuring equality of opportunity and promoting social mobility.

The second group consists of students from middle-income families. These families have been squeezed by two trends in recent decades: the increasing importance of college degrees in securing good jobs and rising college costs. These trends have made college attendance more expensive at precisely the time when it feels more necessary, providing a politically potent demand for widespread subsidization. Thus, subsidies are meant to improve college affordability by reducing the cost of attending college.

The third group that relates to redistribution is focused on a measure of merit rather than socioeconomic status. For instance, students with high GPAs, high test scores, or high musical or athletic abilities are sometimes offered additional subsidies to encourage and reward achievement along those dimensions.

Generating Positive Externalities

Among economists, a classic justification for providing subsidies is the presence of positive externalities. Externalities occur when people that did not participate in a transaction are nevertheless affected by it. Externalities can be negative (e.g., noise pollution from a factory would have negative effects on those living nearby) or positive (e.g., getting a flu shot reduces the chances you spread the flu to others). People make decisions based on their private costs and benefits, but externalities create a wedge where private costs and benefits differ from social costs and benefits, meaning that the market will typically not produce the optimal amount of the good or service. When there are negative externalities, production will tend to be too high. For example, even if the private and social costs of the noisy factory continuing to produce late into the evening exceed the private benefits to the factory by staying open late, the factory will stay open so long as the private benefits of the factory owners exceed their private costs. This decision follows from the fact that the owners do not observe or pay for the (external) social costs incurred by their neighbors. Similarly, when there are positive externalities, there will tend to be underproduction (e.g., people do not consider the reduced chance of spreading the flu to others from getting a flu shot). To remedy these market imperfections, many economists argue that activities with negative externalities should be taxed, reducing production and eliminating the excess. Conversely, activities with a positive externality should be subsidized to encourage more production, solving the underproduction problem.

Many believe that education, including college education, generates positive externalities. College is thought to produce new information and knowledge, which are public goods. These positive externalities benefit society, hence justifying subsidization.

Boosting Economic Growth

Another common justification for subsidizing colleges is that it will spur economic growth. If college attendance improves productivity or leads to technological breakthroughs, increased economic growth may result. By 1969, the federal government concluded that higher growth would require a more educated population (U.S. Department of Health, Education, and Welfare, 1969).

This justification is by far the most popular today, perhaps in part because existing subsidies have (or are perceived to have) already addressed other goals, such as promoting equality of opportunity. In contrast, boosting economic growth lacks an agreed-upon limit. Politicians and colleges are so enamored with framing increased subsidies for higher education as an investment in the economy that "we have almost forgotten that education ever had any purpose other than to promote growth" (Wolf, 2002, p. xiii).

SUBSIDY DESIGN: TARGETING, DISTRIBUTION, SIZE, AND UNINTENDED CONSEQUENCES

Once a justification for government subsidization of higher education is established, there are a number of design choices to consider. Four of the most important are 1) targeting—whether the subsidies should be universally or selectively targeted, 2) distribution—whether the subsidy should go to students or institutions, 3) the size of the subsidy, and 4) whether there are unintended consequences. We briefly discuss each of these implementation issues and then examine how they interact with the various subsidy justifications.

Should Subsidies be Universally or Selectively Targeted?

One of the first questions to answer when providing a college subsidy is whether it should be universally available or whether the subsidy should be selectively targeted to a subset of students. Universally available subsidies would provide the same subsidy to each student, whereas selective targeting provides different students with different subsidies. For any given subsidy justification, there is usually a clear preference in targeting. For example, the whole point of a redistributive subsidy is to preferentially benefit some students by providing them with additional subsidies, so selective targeting is clearly more appropriate than universal targeting for redistributive subsidies.

Subsidy Distribution: Fund Students or Colleges

There are essentially two methods of providing college subsidies. Subsidies can be provided directly to institutions in the form of payments to colleges and universities (often called appropriations) or to students in the form of financial aid. Each method has different advantages and disadvantages, so the optimal subsidy design depends on the circumstances, including the goal of the subsidy.

Advantages of the Institutional (Appropriations) Design

Appropriations given directly to colleges are likely to be the better method (meaning more likely to achieve the stated goal than other options) under some conditions, most notably in the face of infrastructure dependence, economies of scale, agglomeration economies, or potentially high administrative costs relative to the amount of aid.

- *Harness Infrastructure Dependent Knowledge Generation or Dissemination*

  If the education or research relies upon rare and expensive infrastructure, then subsidies provided through direct appropriations can be better than student aid. Consider graduate education in astronomy. The number of observatories is constrained by geography, land use (which determines light interference), and budgetary constraints. Assuming that scholars of astronomy are likely to benefit from being co-located with these observatories, then the infrastructure (the observatories) heavily influences the quality of the education and research produced. Thus, providing subsidies to build observatories is likely better than providing existing and aspiring astronomers with the same funding in the form

of financial aid and hoping that enough of them congregate on the same campus to finance an observatory.

Another example of infrastructure-based knowledge generation is the existence of federally funded research and development centers, many of which are operated by colleges. For example, the Jet Propulsion Laboratory (JPL) is operated by the California Institute of Technology and employs thousands of people with a budget exceeding a billion dollars annually. Providing direct funding to the JPL is likely better than providing funding to each individual doing research in the area of jet propulsion.

- *Realize Economies of Scale*

  Direct appropriations can also be the better choice when there are sufficient economies of scale or high fixed costs. Economies of scale apply when an activity becomes less costly (on a per unit basis) as the amount produced increases. For example, most colleges will have a library and an auditorium. These facilities can often handle a wide range of potential users, so a college with 1,500 students will be able to spread the fixed costs of a library among more students than a college with only 1,000 students.

  Small colleges are also likely to face relatively higher costs. Smaller colleges will not have as fine of a division of labor and the resulting specialization, which means that individual employees will devote more time to activities that would be done by lower-cost employees at bigger institutions. For example, grading quizzes can be done by low-cost graduate students at many large institutions but is done by highly paid professors at small institutions without graduate students.

  Thus, if there are sufficient economies of scale, funding institutions rather than students could be preferred and could even lead to lower per-student subsidy levels.

- *Exploit Agglomeration Economies*

  Agglomeration economies refer to the efficiencies that arise from well-saturated markets located in the same geographical area. When there are many producers located in the same city, there will be more fertile labor markets, increased competition among suppliers, and supporting specialty businesses, all of which drives down costs relative to the situation facing an isolated producer. Agglomeration economies can also affect demand among students and staff, as students and faculty with many options can move to a new college without having to move to a new city. Agglomeration economies could also affect the quality of research, cost of research, or both. If you are the only person studying international economics on your campus, you will have a harder time finding research funding, research assistants, and co-authors compared to a campus well known for having many experts in international economics.

- *Reduce Administrative Costs*

  Direct appropriations are likely better when administrative costs for student aid would be high relative to the aid. For example, microgrants, often amounting to a few hundred dollars to help a student facing an urgent financial crisis, would be extremely cumbersome and costly to provide via financial aid at the federal level with a universal application and centralized decision-making. In contrast, an equivalent appropriation that allows for local (institutional) decision-making by those who already know the students and the difficulties they face would avoid the high administrative costs of the aid-based approach.

- *Invalid Arguments in Favor of Institutional Aid*

  There are some arguments for institutional aid that are commonly invoked but that we view as invalid. For example, some argue that institutional aid can be better if colleges will make better spending decisions than students (U.S. Department of Health, Education, and Welfare, 1969). Under this view, funding students rather

than institutions would force colleges to spend their resources in a way that panders to students rather than on the optimal requirements for a quality education (as determined by the college). However, there are two glaring problems with this argument.

First, this argument assumes that students are well-informed and wise enough to choose to attend a particular college but are then presumed to be relatively ignorant once they step foot on campus. This reliance on selective student myopia is unsubstantiated.

Second, there are already hundreds of colleges that lack subsidies in the form of appropriations and instead rely almost entirely on student aid-based subsidies, namely, the private nonprofit sector. There is little evidence that the spending priorities of private nonprofit colleges are more distorted by customer pandering relative to the public colleges that receive considerable institutional funding.

Given these counterarguments, we believe the "colleges will make wiser spending decisions than students" argument to be incorrect.

Another argument for institutional aid is the claim that many institutions are underfunded. Under this view, providing institutional funding is a reasonable way to ensure that colleges do not remain underfunded. But there is little reason to believe that colleges are underfunded in general, in large part because there is little reason to expect that higher expenditures have led to higher quality. The United States has increased spending on higher education as a percent of GDP from 2.5% in 2000 to 3.0% by 2020, but there is no convincing evidence that quantity or quality has increased commensurately (Digest of Education Statistics, 2022a). Additional evidence indicates that colleges do not appear to be suffering from underfunding. Public doctoral institutions receive total revenue of just over $31,000 per student, and even community colleges receive just under $16,000 (Ma & Pender, 2023). It is simply not convincing to argue that colleges in general are suffering from a lack of financial resources.

Advantages of the Financial Aid Design

Funding students in the form of financial aid has several advantages relative to institutional subsidies:

- ***Greater Alignment Between the Justification for the Subsidy and the Funding***

  The financial aid design will often lead to a greater alignment between the justification for the subsidy and the activities being subsidized. For example, if you are trying to subsidize students, then providing subsidies directly to students ensures that the entire amount of the subsidy is given to the students. On the other hand, providing the institution a subsidy in the hopes that they pass it along to the students can result in some of the funds being diverted to other students or uses which may be unrelated to the justification for the subsidy.

- ***Enables Selective Targeting***

  Student aid can be much more precisely targeted compared to institutional appropriations. If targeting aid to certain categories of students is desirable, such as to promote equality of opportunity or social mobility, then student aid is clearly superior to appropriations. As the U.S. Department of Health, Education, and Welfare (1969) explained,

  > Student aid is most appropriate if a high weight is given to the objective of improving equality of opportunity for higher education. Aid to students can be directed to those students from low-income families who need financial aid to attend college. … An equal sum spent on institutional aid, by contrast, would have far less effect on equality of opportunity. (p. 20)

  Thus, if selective targeting is desired, student aid is a better approach than institutional appropriations.

- *Reduces Political Interference and Fighting*

The common idiom "he who pays the piper calls the tune" means that whoever is paying will have influence on how the money is spent. This raises uncomfortable questions about the wisdom of the government providing aid directly to institutions, which gives the government an inordinate amount of leverage over colleges. Direct funding of institutions

> means also that the state finances the colleges' activities directly by legislative appropriations, with the students and their parents having less influence on financing and controlling the activities of colleges. Where student aid is in the form of grants-in-aid or scholarships, students and parents paying full tuition to their chosen colleges have a greater role in determining which colleges shall be financed and rewarded for superior performances. (Alchian, n.d.)

While many colleges would like to be free from accountability to both students and politicians, this is not sustainable. In reality, "Either the students pay and control, or the political processes and politicians do" (Alchian, n.d.). Few analysts believe that allowing the government to dictate educational matters will improve college quality, which is another strong argument in favor of student aid.

The structure of subsidies also has profound implications for the nature and intensity of political fights. There are some areas where political compromise is very unlikely. Direct appropriations naturally yield a winner-take-all structure, whereas student aid can allow all sides involved to achieve a partial victory. Consider the solution that Belgium and the Netherlands reached in the 19th and 20th centuries:

> For over a half-century, Belgians fought over whether their schools would be state run and secular, or state funded but mainly Catholic. The two sides battled through elections, protests, and massive school boycotts. By the early twentieth century, Belgians finally opted for state-funded school choice, enabling parents to choose the schools that best fit their values. The Netherlands reached the same compromise in the same era, in what became known as the 1917 "Pacification" of the school struggle. Today Belgium and the Netherlands host publicly funded educational free markets, with high-quality secular, Catholic, Protestant, Jewish, and Muslim schools serving culturally diverse populations that peacefully coexist. (Maranto & Mills, 2023, para. 10)

In the contemporary U.S. landscape, a helpful analogy is how states are dealing with diversity, equity, and inclusion (DEI) programs at public universities. Some states like California are mandating DEI programs, while other states like Florida are banning them. This is possible because these states fund institutions directly, meaning one side will win and the other will lose. But if these states transition to funding students rather than institutions, it will allow California students to avoid DEI programs if they so choose while also allowing Florida students to engage with DEI programs if they so choose.

- *Improves Competition*

Funding students rather than institutions alters the competitive landscape in higher education in desirable ways. When a college is mostly financed by government appropriations, the government is the college's main customer. In this situation, competition among colleges will focus on lobbying and pleasing the government in the hopes of receiving larger subsidies. University leaders have long been aware of this danger. Summarizing the arguments of the Carnegie Commission of the 1960s and 70s, John Aubrey Douglass writes that they argued "fervently against" block funding (another term for appropriations) because "moving toward block funding … would pit states and institutions against each other, making federal funding of financial aid an overtly political process steeped in special-interest advocacy. Funding students,

and not institutions, avoided or mitigated this possibility, while empowering students to choose what institution best met their perceived needs" (Douglass, 2005, p. 7).

- *Reduces Public Relations Problems*

  Providing subsidies via student financial aid also suffers from fewer public relations problems. As Milton Friedman wrote,

  > The subsidization of institutions rather than of people has led to an indiscriminate subsidization of all activities appropriate for such institutions, rather than of the activities appropriate for the state to subsidize. Even cursory examination suggests that while the two classes of activities overlap, they are far from identical. (1962)

  When subsidies are provided by appropriations, all spending by the college becomes subject to intense, but justified, public scrutiny. Indeed, it is trivial to find questionable spending by colleges and use that spending to argue that subsidies should be reduced. For example, a college spending money on a new football stadium while receiving taxpayer subsidies will inevitably raise questions in many people's minds if that is an appropriate use of taxpayer funds. In contrast, if subsidies are provided in the form of student aid, there is less of a direct connection between taxpayer subsidies and questionable spending by colleges.

- *Empowers Students Rather Than Colleges*

  When funding is given directly to colleges, they are empowered with enormous influence over students, both in terms of selectively admitting students and providing services to them. If students are dissatisfied, they can stop attending, but the college retains the funding. In contrast, when financial aid is given to students, it is the students that are empowered. Under this arrangement, if students are dissatisfied, they can take the funding to a different college that better meets their needs. More generally, funding institutions allows colleges to spend on their own priorities, whereas funding students will put pressure on colleges to favor spending on the students' priorities.

  As Alchian notes, student funding yields

  > more variety of educational opportunities and just as much educational opportunity and, presumptively, greater detectability and survival of superior education. It reduces the producers' control over the products that the customers can have. The influence of selecting their colleges and controlling payments is a trait with high survival in the world outside of academia and which should be cultivated. (Alchian, n.d.)

- *Enhances Cost Control*

  Cost control will not be a priority for colleges funded directly by the government unless and until it becomes a priority for the government. As long as the government keeps sending checks, these colleges will keep spending. In contrast, student funding exerts intense and sustained market pressure on colleges, which limits all institutional spending that does not increase value to students. For this reason, student funding leads to "more effective competition among various types of schools and for a more efficient utilization of their resources" (Friedman, 1962).

Subsidy Size

Another subsidy implementation consideration is the size of the subsidy. Subsidies could be too large or too small. A $1 per student subsidy will not address any meaningful justification for subsidization, while a $1,000,000 per student subsidy would be excessive.

This potential subsidy error is exacerbated by two complications. First, new subsidy programs or changes to existing programs should account for the presence of the other subsidy programs. It is possible that "existing subsidies may have already eliminated" (Heckman & Klenow, 1997, p. 3) the justification for further subsidies.

The second complication is the presence of political risks. As Milton Friedman warned, "the danger would always be present that [spending decisions] would become political footballs. … The really serious problem is the political one" (1962) because the opportunity to turn a justified subsidy program into a vote-buying scheme always tempts elected officials to provide extraneous subsidies.

Unintended Consequences

No matter how well-designed a subsidy may be, it can be rendered ineffective by certain unintended consequences. For college subsidies, these usually take the form of colleges responding strategically to the subsidy, thereby partially or fully offsetting the intended impact of the subsidy.

For example, many third parties provide scholarships to students to reward achievement. Yet some colleges reduce the financial aid offered to students who are awarded these external scholarships dollar for dollar, meaning these students end up paying the exact same amount as if they had not won the scholarship. This practice is called scholarship displacement, and colleges that engage in scholarship displacement render these subsidies ineffective. Ultimately, the only beneficiary of the external scholarship is the college, which receives the entire value of the scholarship in the form of additional revenue. Only a handful of states have banned scholarship displacement (Conroy, 2022).

An even more pernicious feature of higher education is Howard R. Bowen's revenue theory of costs (1980). Under this theory, "In the search for quality and excellence, colleges and universities will spend every dollar they get. Their appetite is, therefore, inexhaustible" (Douglass, 2005, p. 4). Since quality in higher education is unobservable (as there are no generally agreed upon measures of quality), the usual cost-benefit analysis that drives spending decisions is not possible. Rather than spending until the point at which costs exceed benefits, colleges will continue to spend any and all available revenue in the pursuit of ostensible improvement, even if costs are greater than benefits. One implication of this habit is that

> increasing student subsidies leads to a corresponding increase in costs. The net effect of more public support for college access is higher costs and increases in tuition that must be addressed with more subsidies. … Additional government funds keep providing revenues that, under the current incentive system, increase costs. (Martin, 2009, p. 12)

In other words, increasing subsidies has the unintended consequence of increasing costs rather than decreasing the price the student pays—effectively counteracting the subsidy.

A corollary of Bowen's revenue theory of costs is the Bennett Hypothesis. This refers to the tendency of colleges to respond to the availability of subsidies by raising prices. President Reagan's secretary of education, William Bennett, floated the idea in the late 1980s, and scholars have debated the validity of the Bennett Hypothesis for decades (Gillen, 2012). While early studies tended to find little supporting evidence, a decisive turn is noticeable over the last decade and a half as better data and more reliable research methods were developed. More recent studies almost always find evidence that colleges either raise tuition or reduce institutional aid (aid financed by the college itself) to exploit financial aid programs. This unintended consequence renders financial aid less effective at lowering costs for students—and in some cases, it completely neutralizes the subsidy.

Given these possibilities, it is important for policymakers to determine if unintended consequences undermine an otherwise justified and well-designed subsidy program.

SUBSIDY IMPLEMENTATION BY JUSTIFICATION

We now have a list of subsidy justifications and a list of key design considerations. We combine these lists to determine the general approach to subsidy design for each justification below.

Promoting Favored Religions

While a key motivating factor for college subsidies in the past, promoting favored religions is no longer considered a valid subsidy justification. However, as a thought experiment, it is enlightening to consider how it should be implemented if it were. Since the goal of such a subsidy is to promote religious beliefs, the subsidy should be selectively targeted to those professing the "correct" religion. For example, if the goal is to promote the Church of England, then Calvinist colleges shouldn't be subsidized. The subsidies should go to the institution rather than the students, since this will help ensure the loyalty of the institution as well as ensure that heretics are not being subsidized.

Reduce the Size of the Labor Force

Like religious considerations, reducing the size of the labor force was once a major justification for college subsidies, but this justification is no longer considered valid. As a thought experiment, however, suppose such a reduction was the goal of a subsidy program. How should such a subsidy be designed? In this case, the subsidy should be universal, unless it is possible and desirable to identify individuals who are more likely to enter the labor force if they do not enroll, in which case selective targeting could be more cost-effective. Additionally, the funding should go to institutions rather than students. If students are funded, they may graduate too quickly and enter the labor force, whereas if institutions are funded, they can slow students' progress by limiting offerings for required courses, thereby keeping students out of the labor force longer. The size of the subsidy should be large enough to induce students to enroll in college rather than work.

Strengthening National Defense

While not a currently utilized justification for college subsidies, promoting national defense was once a common rationale for subsidies, and could be again in the future. The optimal design of subsidies justified on national defense grounds depends on the threats and appropriate responses to those threats. Since there is little clarity other than the probable origin of the threat (e.g., China, Russia, North Korea, or Iran), optimal subsidy design could go in a few different directions.

It is probable that selective targeting of subsidies would be more appropriate than universal subsidies, since vulnerabilities are likely to be concentrated in specific areas. For example, if the cyber-attack capabilities of foreign adversaries threaten the country, selective subsidies for cyber-related fields would be more appropriate than a universal subsidy for all academic fields. A cadre of computer science majors could help fend off or repair damage from a cyber-attack, while a cadre of English majors would be less helpful. Hence, selective targeting of subsidies would be more appropriate to help strengthen national defense.

In terms of subsidy distribution, there are plausible cases for either method.

For example, suppose advances in biotechnology allow for the creation of deadly new viruses, and that it is determined that our national defense requires expanding the nation's capabilities in detecting and neutralizing novel biological agents that have been engineered by a hostile power. To the extent that laboratory research capabilities need to be expanded and universities are fertile grounds for such laboratories, institutional funding would likely be the best subsidy design for establishing these laboratories.

Other national defense needs could favor financial aid. Suppose the nation's rivals increase their cyberwarfare capabilities in the coming years, but the exact threats and targets can't be determined until the conflict starts. In such a case, it may not be feasible or cost effective to attempt to protect everything vital for an indefinite amount of time, and the best approach may be "rapid replacement and repair." This strategy would require redundancy of cyber capabilities, which could be generated and sustained by providing relevant students with financial aid-based subsidies.

The appropriate size of the subsidy will likewise depend on the nature and magnitude of the threat. But even if there is a legitimate national security threat that justifies a subsidy, there are still two dangers to guard against.

The first danger is the tendency to exploit a crisis or emergency to justify unrelated spending. Consider that even though submarines played a minor role in the wars in Iraq and Afghanistan, millions of dollars of funding earmarked for those wars were diverted for submarine propellers (Capaccio, 2015). Similar bait and switch tactics could play out with college subsidies justified on national defense grounds.

The second danger is that once subsidies based on national defense considerations get started, they tend to remain in place for too long. Two historical examples help illustrate this danger.

In the 1950s, mohair (fabric made from goat hair) was used in military uniforms, and the government subsidized the industry to ensure that sufficient uniforms could be made in times of war. Advances in textiles soon eliminated mohair usage in military uniforms, rendering the justification for the mohair subsidy obsolete. Yet the subsidies lingered on for decades before finally being terminated in 1993. The subsidy program was subsequently resurrected in a much-reduced form (Proctor, 2021).

Another example of a subsidy far outliving its justification concerns sugar. As Anne O. Krueger details in a fascinating paper (Krueger, 1988), during World War II, Cuba sold sugar to the Allied Powers at below-market prices to support the war effort. Upon the war's conclusion, America rewarded Cuba with an import quota system that provided Cuba with generous quotas. After the communist revolution overthrew the Cuban government, turning Cuba from an ally to an opponent, the initial justification for the quota system (to reward Cuba) was rendered obsolete. But rather than discard the quota system, domestic and foreign sugar producers lobbied (and obtained approval) for the continuation of the program, with Cuba's former quota redistributed among themselves. Restricting the supply of sugar led to high prices for the substance, which in turn made high-fructose corn syrup (a substitute for sugar made from corn) economically viable in the U.S. This sequence of events explains why soda in the U.S. generally contains high-fructose corn syrup, while sodas in other countries use sugar instead.

Both examples illustrate that the timeframe for subsidies based on national defense is prone to unnecessary prolongation, particularly when developments render the initial justification for the subsidy obsolete.

Redistribution

Subsidies justified on redistributive grounds should use selective rather than universal targeting, since the whole point of the subsidy is to provide additional funding for certain categories of people. A universal subsidy would simply not meet the goal of redistribution.

Redistributive subsidies should utilize the student aid distribution method rather than institutional funding. The main reason student aid is superior in this case is because it allows for more precise targeting and a fairer distribution. Suppose we want to help students from low-income households attend college. Giving the money directly to students in the form of financial aid ensures that all the subsidy goes to the intended beneficiaries. It also ensures that colleges can only benefit from the program if they enroll the targeted students. Neither of these advantages hold for institutional funding. The best a college could do with an institutional subsidy would be to exactly replicate the outcomes of the financial aid design, but this is unrealistic, as it is likely that the college will divert some of the money to its other priorities. In addition, the allocation among colleges would no longer be determined by the number of intended beneficiaries they serve but by their political power, as discussed above. Thus, the student aid distribution method is better for redistributive subsidies because it allows for more accurate targeting and fairer distribution.

The optimal size of subsidies based on redistributive rationales varies based on the targeted population.

For redistribution designed to promote equality of opportunity or to promote social mobility for students from low-income backgrounds, there is an inherent limit on what subsidies can be justified on these grounds. As Eric Hanushek writes, "We pursue our current subsidy programs to promote social mobility, and, while this is definitely worthwhile, its appeal diminishes as we go into higher and higher levels of the income distribution" (1989, p. 50). To account for this limitation, redistributive subsidies for students from low-income families should be restricted to the bottom half of the income distribution and should be large enough to provide for equality of opportunity, which would mean providing these students with enough financial resources so that the financial obstacles to college attendance they face are no greater than those faced by the median student. In other words, students from low-income families should be provided with a large enough subsidy so that their financial capability to pay for college matches the financial resources of the median student.

However, there is no similarly well-defined appropriate size for subsidies based on redistribution to the middle class or as rewards for achievement or effort. Since these goals have no defined point at which success can be declared (e.g., a larger reward can always be provided for hard work), there is no reasonably objective threshold that determines the optimal size of the subsidy in these cases.

Paternalism

Subsidies justified on paternalistic grounds should usually utilize selective targeting. Not all students require a paternalistic nudge, so providing all students with the same nudge in the form of a universal subsidy would be wasteful.

For the same reason, student aid is better than institutional aid for paternalistic subsidies. Since not all students require an intervention to make the "right" decision, the subsidies should be targeted at those students most likely to be swayed, and the student aid design allows for much more precise targeting than the institutional funding approach.

In terms of the size of the subsidy, paternalistic subsidies should be just large enough to induce students into making the "correct" decision. Any less would render the subsidy ineffective and any more would be wasteful.

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It is also worth noting that not all paternalistic interventions entail subsidies. If the reason students are not enrolling in college is because they are ill-informed about the benefits of doing so, then providing sufficient information to students so that they can make informed decisions could be a much more effective way to address the problem, as opposed to manipulating costs via subsidies.

Generating Positive Externalities

The optimal targeting of subsidies based on positive externalities depends on the nature of those externalities. If all college educations produced the same positive externalities, then universal subsidies could be appropriate. However, there is reason to believe that some academic fields have larger externalities than others. For example, some scholars have found "a positive effect of engineers on growth, and a large direct negative effect of lawyers on growth" (Murphy et al., 1991, p. 503). One explanation for this result would be if those trained in law generate negative externalities, while those trained in engineering have positive externalities. If that is the case, then engineering students should be subsidized, while law students should be taxed—an outcome that can only be achieved with selective targeting.

Since there is little reason to assume that all college majors generate the same externalities, and there is some evidence that externalities in fact vary by academic field, the financial aid design is a superior approach because it allows for more precise

targeting of subsidies to fields that generate positive externalities. Moreover, colleges do many things in addition to teaching, including conducting research, providing public service, housing students in dorms, and feeding students in dining halls. Not all of these have the potential to generate positive externalities, and so not all of them have plausible claims for subsidization. Accordingly, a blanket subsidy for college expenses in general is not justified by citing positive externalities.

The size of the subsidy depends on the magnitude of the externalities. Scholars have discussed several types of potential positive externalities from education (Friedman, 1962; Cowen, 2019). We have termed the different types as follows:

1. **Learning or Productivity Externalities**
   These are the traditional educational externalities and occur when non-students learn from the former student (e.g., the former student teaches a co-worker methods and skills learned in school, which increases the co-worker's productivity).

2. **Discovery or Research Externalities**
   These externalities arise when the former student makes a new discovery or advances the scientific or technological frontier.

3. **Civic or Cultural Externalities**
   These externalities arise when education either increases a student's engagement with civic and cultural institutions or improves the quality of their contribution. For example:

   > A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of most citizens and without widespread acceptance of some common set of values. Education can contribute to both. In consequence, the gain from the education of a child accrues not only to the child or to his parents but also to other members of the society. The education of my child contributes to your welfare by promoting a stable and democratic society. (Friedman, 1962)

Learning or productivity externalities are the externality types most commonly attributed to college education, and they are also the easiest type for scholars to measure. However, the literature has consistently found little evidence for substantial learning or productivity externalities:

- "Does the view among theorists of important human capital externalities have a solid empirical basis? The answer is 'No.' … It is entirely plausible that there are no spillovers at all" (Heckman & Klenow, 1997, pp. 3–5).

- After studying the effect of compulsory secondary schooling laws, scholars found "little evidence for sizeable social returns to education" (Acemoglu & Angrist 1999, p. 22), a result that would presumably apply to later college education as well.

- "A careful reading of the evidence finds little evidence of such externalities in Western economies" (Heckman, 1999, p. 5).

- The "empirical evidence for important human capital externalities is, at best, weak." (Lange & Topel, 2006, p. 461).

There are even some scholars who argue that these externalities have been negative in certain times and countries:

> If there are positive externalities to education, average income should rise by even more than the sum of the individual effects. … [But] the estimated growth impact of education is consistently *less* than would be expected (rather than more) from the individual impacts. The cross-national data suggests *negative* externalities. (Pritchett, 2001, p. 368)

Thus, while theoretically plausible, there is very little reason to think that learning or productivity externalities are large enough to justify subsidization.

The discovery or research externality argument at the college level is on much sounder ground. While there are not many convincing investigations of college-specific externalities, William D. Nordhaus estimated that in the broader economy, innovators only capture 2.2% of the social surplus their discoveries generate, indicating massive positive externalities in general from discovery, invention, or innovation (2004, p. 22). But while this is a strong argument for subsidies that encourage discovery, invention, or innovation, it is not a strong argument for widespread college subsidies. To begin with, even among innovators located on college campuses, these discoveries and innovations are most likely to emerge from a limited set of academic fields such as the hard sciences and from a select few practitioners in those fields. Most academic fields and even most scholars within the few relevant fields do not have a high likelihood of making these types of discoveries. For example, subsidizing leading virologists working on coronavirus vaccines has the potential to generate large positive externalities. Subsidizing law professors does not. In addition, there is little reason to suspect that colleges are the only—or even the dominant—institutions where such discoveries are made, so limiting research subsidies to colleges would be an inappropriately targeted subsidy. Thus, discovery or research externalities may justify selectively targeted college subsidies as part of a broader plan to subsidize discovery, invention, or innovation, but they cannot justify across-the-board college subsidies. It is also worth pointing out that such subsidies would generally not target undergraduate education since undergraduates do not typically undertake research on the scientific frontier. As the U.S. Department of Health, Education, and Welfare argued,

> Since the benefits from the acquisition of new knowledge accrue to all members of society … it is desirable that the Federal Government finance a much larger share of the costs of graduate education than it does any other major sector of our educational system. (1969, pp. 17–18)

The civic or cultural externalities argument has not been convincingly quantified in the academic literature for a college education. But even assuming that there are large civic or cultural externalities for education in general, it is likely that these externalities are small at the college level due to diminishing returns. The student's primary and secondary education likely already generated most of these externalities, including the inculcation of common values, literacy, and numeracy. Indeed, one survey of civic literacy found that "from kindergarten through 12th grade, the average student gains 2.3 points per year in civic knowledge, almost twice the annual gain of the average college student" (Enlightened Citizenship, n.d., "Major Findings" section). Moreover, given the nihilistic tendencies among many of today's college graduates, civic or cultural externalities from college education may even be negative, at least among some of the more activist majors and colleges. The same survey seemed to confirm this possibility when it found that at four of the top 12 colleges, "seniors scored lower than freshmen," indicating students were less civically literate at the end of their college education ("Major Findings" section).

In sum, while commonly invoked as justifications for subsidies, externalities cannot justify universal, institutional, or large subsidization for higher education. Externalities almost certainly vary by academic field, which favors both selective (as opposed to universal) targeting and distributing subsidies as student aid (as opposed to institutional funding). Most research has concluded that learning or productivity externalities are small if they exist at all. Research or discovery externalities can be large, but these are concentrated in specific fields and among the most innovative performers in those fields, perhaps justifying selective subsidies, but not widespread subsidies. Even assuming civic or cultural externalities are large for education in general, due to the sequential nature of education, they are likely small at the college level due to diminishing returns. The bottom line is that externalities may justify selectively targeted subsidies, distributed to students, of a small size, but cannot justify universal, appropriations-based, or large subsidies.

Boosting Economic Growth

College subsidies justified on economic growth considerations should be selective rather than universal. As noted earlier, some fields like engineering have a positive effect on economic growth, while other fields like law have a negative effect. Since universal subsidies would provide the same subsidy to both fields, while selective targeting would allow for subsidizing engineering while taxing law, selective targeting is better.

The superiority of selective subsidies in relation to boosting economic growth also means that the financial aid design is superior to the institutional appropriations approach. The financial aid design allows for more precise targeting of students in fields most likely to boost economic growth.

The appropriate size of the subsidy depends on whether more college education would increase economic growth, which in turn hinges on two related questions. First, is a lack of college education a binding constraint on growth, and second, how productive would the additional college investments be?

The answers to both questions indicate that college subsidies justified on economic growth considerations should not be large.

While a lack of education *can* be a constraint on economic growth, at current levels of educational attainment it does not appear to be a *binding constraint*. To elaborate, economists seek to identify constraints that hinder growth. But they also account for whether those constraints are binding or not. For example, suppose the government imposes a price ceiling on bread, forbidding merchants from charging more for a loaf of bread than the amount specified by the ceiling. This would be a constraint on bread sales. But whether it is a binding constraint (whether it truly influences bread sales) depends on where the government sets the ceiling. If the ceiling is set at $100, the constraint would not be binding, because no one would pay that much for a loaf of bread and the price ceiling would thus have no impact on bread sales. But if the ceiling is set at $1, the constraint would be binding, since many loaves of bread would have sold for more than $1.

The economic growth justification for college subsidies argues that insufficient college education is currently acting as a binding constraint on economic growth. According to this argument, a more educated population will generate higher economic growth through a three-step chain of reasoning: 1) college subsidies lead to more college graduates (or at least more education), 2) these college-educated workers do different work than they otherwise would have (or at least do the same work better or faster), and 3) this different, better, or faster work leads to higher economic growth.

This is a plausible chain of reasoning and is almost certainly true when educational attainment is low. When there are few educated workers, their scarcity likely does act as a binding constraint on economic growth because it precludes a wide variety of jobs and tasks that require specialized knowledge and skills. But the U.S. does not have low educational attainment, and this simple fact causes problems for each link in the chain. If a lack of educated workers no longer hinders the growth of the economy, then the constraint is no longer binding.

The first link in the chain is that college subsidies will yield more graduates. But this assumes that there is a population of potential college-ready students that are not already enrolling in college. This does not appear to be the case. The ACT College Readiness Benchmarks provide a useful measure of the share of high school students ready for college. A benchmark score is the "minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about a 75% chance of obtaining a C or higher in the corresponding credit-bearing college courses" (American College Testing, 2022, p. 3). In 2020, only 26% of students met the benchmark in all four areas (English, science, reading, and mathematics), while 36% met at least three of the four benchmarks. Yet the share of high school graduates that enrolled in college in 2020

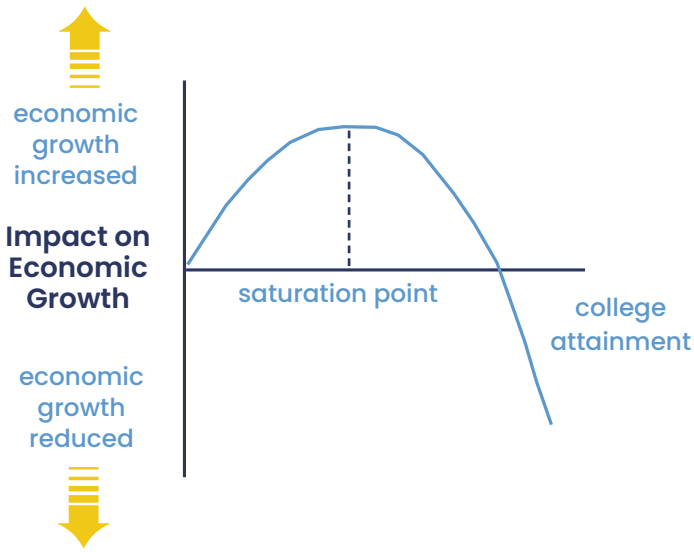
was 63% (Digest of Education Statistics, 2022b). In other words, around 26%–36% of high school graduates are academically prepared to succeed in college, but 63% enroll in college. There are simply many more students going to college than are academically prepared for college. This imbalance has several side effects, such as low graduation rates and excessive student loan debt among dropouts. However, it also means that college subsidies are unlikely to yield a significantly more educated population, as it is unlikely that there are many college-ready students that are not already enrolling.

The second link in the chain is that the newly educated will in some sense use their education by doing different work than they otherwise would have (or doing the same work better or faster). There is little reason to doubt that moving a society from no college education to some college education would increase growth, but overinvestment in college education is possible as well. A society in which 100% of people have a Ph.D. is not likely to be better off than one in which 90%, 80%, or even 25% have one. There are simply not that many jobs for those with a Ph.D., and once those jobs have been filled, the "surplus" Ph.D. graduates would largely not be able to "use" their education. Once the market for college-educated workers is saturated, further increases in educational attainment will merely increase the competition for jobs requiring a college degree without increasing economic growth. This has at least three negative consequences. First, resources are squandered providing the surplus education. Second, heightened competition for scarce college jobs can incentivize even more education as students seek to differentiate themselves by earning even more degrees, resulting in credential inflation. Third, it can fuel resentment among graduates. As Joseph Schumpeter wrote,

> The man who has gone through a college or university easily becomes psychically unemployable in manual occupations without necessarily acquiring employability in, say, professional work. … [This will] occur more frequently as ever larger numbers are drafted into higher education … Discontent breeds resentment. (Schumpeter, 1950, p. 152–153)

Figure 1

College Attainment's Effect on Economic Growth



The main implication of this argument is that there will not be a stable relationship between college attainment and its impact on economic growth. Instead, the relationship between college attainment and economic growth will likely have an inverted "U" shape, as shown in **Figure 1**. When college attainment is low, increases in college attainment will increase economic growth as those graduates fill jobs that require a college degree. But because there is a limited (though not fixed[1]) number of such jobs, diminishing returns eventually set in and each incremental increase in college attainment boosts growth by less than the previous increase. Once the saturation point is reached, further increases in attainment have a negative marginal impact on growth (though the average impact can remain positive, at least for a while).

There is reason to believe that the United States is already beyond the saturation point. Scholars analyzing Department of Labor data concluded that around 18% of jobs require a bachelor's degree, and another 5%–10% require a graduate degree

1 The number of such jobs will be affected by wages, so as the supply of college graduates increases, their wages will fall, increasing the number of such jobs that can be profitably filled by college graduates.

(Gittleman et al., 2016, p. 12). Yet in 2022, 23% of the U.S. population age 25 and older had a bachelor's degree as their highest degree and 14% had a graduate degree (U.S. Census Bureau, 2023). This means that 23%–28% of jobs require at least a bachelor's degree, but 37% of people had at least bachelor's degree. While some oversupply is likely desirable to account for life circumstances and individual preferences, the supply of college educated workers is substantially greater than the demand, and as a result, there are not enough "college jobs" for all college graduates. This forces college graduates to play a game of musical chairs for the limited supply of college jobs, where those that don't get a college job cascade down the occupational ladder, competing for jobs with fewer educational requirements. The result is a phenomenon known as underemployment, where workers take jobs that require less education than they possess (e.g., a bachelor's degree holder working in a job that requires a high school diploma), thereby displacing those with less education. For example, "Only nine percent of secretaries had four-year college degrees in 1990," but by 2021, the "proportion had nearly quadrupled to 33 percent" (Cooper, 2023, "Secretaries and administrative professionals" section). As of 2023, one third of college graduates are underemployed (Federal Reserve Bank of New York, 2023), indicating that at the nation's current levels of educational attainment, further increases in the number of college graduates will not increase the number of the people using a college education but rather increase the number of underemployed workers.

The third link is that college educated workers' jobs will increase economic growth. But even if subsidies create more college graduates, and those graduates use their education (avoiding the underemployment or musical chairs problem), this will not automatically translate into a boost to economic growth. William J. Baumol noted that entrepreneurial activity (and economic activity in general) can be categorized in one of three ways: productive, unproductive, or destructive (1990).

Education that increases productive activity, such as making and selling goods and services or starting a new business, will increase economic growth. On the other hand, education that increases unproductive or destructive activity will not increase growth and may even shrink the size of the economy.

Unproductive activity neither produces anything new nor destroys anything. The prime example is what economists call rent-seeking. Rent-seeking occurs when there is competition to secure a fixed supply of rents. By way of analogy, if there is a pie to be shared among a group of people, rent-seeking refers to the bribery, corruption, and lobbying that occurs as people jockey for bigger slices of the pie. Yet because the overall size of the pie is fixed, a bigger slice for one person necessarily entails a smaller slice for someone else. Since rent-seeking does not create any more pie, all the resources, time, and energy devoted to the competition are wasted from society's perspective. Rent-seeking can be substantial. Anne O. Krueger estimated that in the late 1960s, rent-seeking over import licenses in the country of Turkey amounted to 15% of the size of the whole economy (1974, p. 294).

Destructive activity doesn't merely squander resources on unproductive activity but actively shrinks the economy. For example, piracy reduces the size of the economy, as the violence it entails can result in outright destruction and death. Even the threat of piracy is unproductive, since it diverts resources, time, and effort away from production to prevent predation.

Education can contribute to productive, unproductive, or destructive activity. Whether education primarily contributes to productive activity (such as starting a new business) or destructive activity (such as piracy) depends on the rates of return to each activity. As Peter Boettke explains,

> Whether social life exhibits Adam Smith's human propensity to "truck, barter, and exchange" or Thomas Hobbes's human capacity to "pillage and plunder" is a function of the *institutional framework* within which social life is played out. It is the *framework* that determines the marginal benefit/marginal cost calculus that individuals

> face in pursuing sociability. If the rewards for productive specialization and peaceful cooperation exceed those of predation and confiscation, then the Smithian expansion of commercial and civil society will follow. But if the calculus tends the other way, then the Hobbesian depiction of life as being "nasty, brutish and short" will materialize. (2018, p. 942)

A society that rewards unproductive or destructive behavior more than productive behavior can expect more unproductive and destructive behavior and less productive behavior, which will in turn lead to a smaller economy. For example, "If the highest rate of return in an economy is to piracy we can expect that the organizations will invest in skills and knowledge that will make them better pirates" (North, 2005, p. 61). If the educational system is merely producing more educated pirates, it will make society poorer, not wealthier.

So, are college jobs productive, unproductive, or destructive? Murphy et al. argued that some academic fields increase growth, while other fields such as law reduce growth (1991). This could be explained, in part, by the unproductive or destructive activity that some lawyers engage in, such as patent trolling, nuisance-value lawsuits (where the litigants offer to settle for less than the cost of defending against the lawsuit), and strategic lawsuits against public participation (SLAPPs) which aim to impose legal costs on those who exercise their free speech rights. Murphy et al. found that as the proportion of graduates engaged in rent-seeking activities increases, growth decreases, and argued that,

> The allocation of talent to rent seeking is damaging for several reasons. First … [rent seeking] absorb[s] labor and other resources … Second, the tax imposed by the rent-seeking sector on the productive sector reduces incentives to produce, and therefore also reduces income. … Finally, if the most talented people become rent seekers, the ability of entrepreneurs is lower, and therefore the rate of technological progress and of growth is likely to be lower. (pp. 505–506)

In sum, college subsidies that are justified by the desire to increase economic growth should be selectively rather than universally targeted, because different academic fields have different impacts on growth. These subsidies should also be distributed to students in the form of financial aid (rather than to institutions in the form of appropriations) because it allows for more precise targeting. At the same time, the size of these subsidies should be small—perhaps even zero. The nation's high educational attainment has already saturated the job market with graduates, with 37% of Americans having a bachelor's degree or more but only 23%–28% of jobs requiring that amount of education. As a result, college subsidies are more likely to contribute to a game of vocational musical chairs, resulting in underemployed college graduates rather than an increase in economic growth. The main exception would be if there is an academic field where there is a shortage of graduates (meaning there could be a binding constraint) as well as convincing evidence of positive externalities or other growth enhancing effects from the field. In that case, subsidizing students in that field could be justified on economic growth grounds.

ASSESSING CURRENT COLLEGE SUBSIDY PROGRAMS' DESIGN

In this section, we will evaluate the biggest subsidy programs currently in use at both the federal and state levels, focusing on their justifications and implementation.

Federal Government Subsidies

The federal government provides five main types of subsidies for higher education: Pell grants, student loans, tax benefits, campus-based aid, and research funding. Except for campus-based aid programs and some research funding, the federal government has chosen to mostly provide subsidies to students in the form of financial aid given to students. While we argue below that this is the correct design for most of these subsidy types, the federal government stumbled into this correct design by historical accident. When the federal government started providing subsidies for higher education, two factors ensured that it would use the student aid method:

> First, colleges were wary of the strings that they feared would come with federal funding. Some colleges viewed federal involvement as a dangerous centralization of power … And some colleges feared they would be forced to admit or provide aid to women, Jews, Catholics, immigrants, or blacks all of whom faced substantial discrimination if not outright bans on many campuses. The other obstacle was segregation. Any direct funding of colleges could not avoid either requiring desegregation (unacceptable in the South) or subsidizing, and therefore implicitly endorsing, segregated colleges (unacceptable in the North).
>
> These two obstacles all but assured that prior to 1965, any federal funding would not go directly to colleges, but rather would be given to students, and that is exactly what we see with the early federal aid programs such as federal work-study (first introduced during the Great Depression), the first GI Bill (introduced after World War II), and the student loan programs for national defense fields (introduced during World War II and again in 1958). (Gillen, 2022a)

What can we say about the justifications and design of the various federal college subsidy programs?

- *Pell Grants*

  Pell grants are a type of subsidy targeted at undergraduate students from low-income families. Recipients receive a grant (essentially a cash gift) to pay for college that does not need to be repaid. Each year, around 6.2 million students receive an average of nearly $4,200 in Pell grants, with total annual spending of $25.8 billion (National Association of Student Financial Aia Administrators, 2024, p. 2).

  The justification for Pell grants is redistribution—specifically, the desire to promote equality of opportunity and social mobility by providing funding for students from low-income families. In fact, when the program was first introduced in 1973, the grants were called Basic Educational Opportunity Grants.

However, the scholarly consensus on the impact of the program has a bizarre history, which raises legitimate questions about the validity of this justification among some.

A decade after Pell grants were first awarded in 1973, W. Lee Hansen compared undergraduate enrollment for low-income students in the years before and after the program's inception (1983). He found that even though the grants provided substantial funding for low-income students to enroll in college, their introduction did not increase enrollment among low-income students. Later scholars questioned Hansen's results because he only used four years of data (two years before and two years after the program's establishment) and because the end of the Vietnam war draft may have led to a drop in male enrollment rates (college students could avoid the draft, so the draft may have artificially raised the male enrollment rate in the pre-Pell grant years). Thomas J. Kane addressed both concerns by using eight years of data (four years before and four years after the program's establishment) and looking at only female enrollment, since females were not subject to the draft and its potential distorting effects on enrollment (1995). Kane found that "after the establishment of the Pell Grant program in 1973, college enrollment did not increase disproportionately for low-income youth" (p. 3).

In light of this persuasive evidence that the Pell grant program did not disproportionately increase low-income enrollment, the scholarly consensus (with which we agree) is to treat these findings as "a persistent puzzle in the financial aid literature" (Dynarski, 1999, p. 8) and conclude instead that Pell grants do in fact increase low-income enrollment.

Scholars have three strong reasons for essentially ignoring scholarly evidence on this issue.

First, standard economic reasoning would note that when the price of something declines, the quantity demanded increases. Accordingly, Pell

grants, which effectively lower the price of college for students from low-income families, should increase demand among that group. Another way to think through this causal relationship is that if Pell grants truly have no impact on low-income enrollment, then eliminating the program would not change the enrollment of low-income students. That result strikes us and other scholars as implausible, meaning that we should instead conclude that Pell grants do affect the enrollment of low-income students (today at least, though perhaps not in the mid-1970s when they were first introduced).

Second, there is very convincing evidence that similar grant programs do in fact increase enrollment. The best example is the old Social Security Student Benefit Program, which provided large grants to those enrolling in college who were children of deceased, disabled, or retired Social Security beneficiaries. The program operated from 1965 to 1982 and provided very large grants (more than triple the average Pell grant) to up to 12% of college students. After the program was terminated, Susan Dynarski showed that every $1,000 in aid increased enrollment rates by about 3.6 percentage points (2003). Studies of different grant programs tend to find similar enrollment effects, where a $1,000 grant increases enrollment by three to four percentage points.

Third, there are plausible explanations for why the Pell grant initially had a muted enrollment response. In particular, scholars argue that when Pell grants were first introduced, "low program visibility, the complexity of the application process, and intimidating audit procedures contributed to limiting" (Long, 2008) the initial enrollment response. In other words, perhaps Pell's initial take-up was lacking because the target population generally did not know about the grants, and even if they did, they were difficult to apply for.

This is a case where we argue the most reasonable interpretation should largely ignore the empirical evidence. One could legitimately rely on the literature documenting the lack of an enrollment effect when Pell grants were introduced to argue that Pell grants do not have a convincing justification because they failed to increase enrollment rates among the low-income population when established. But the alternative explanations for this finding are plausible and the evidence of other similar programs affecting enrollment are persuasive enough to essentially outweigh the studies documenting the lack of Pell's impact. Therefore, we argue that the most reasonable conclusion is that while Pell grants did not initially increase low-income enrollment, today the grants do increase low-income enrollment , and the program thus has a compelling justification in promoting equality of opportunity and social mobility.

When it comes to the structure of Pell grants, they are largely well-designed.

Because the justification for Pell grants is to promote equality of opportunity and social mobility by providing funding for students from low-income families to attend college, the Pell grant should be selectively (rather than universally) targeted at students from low-income families and should be distributed as financial aid (rather than institutional support), as this allows for selective targeting. Pell grants are properly designed on both accounts. The grants are awarded to students as financial aid and they are means-tested, with students from low-income families (generally) being eligible while those from high-income families are (generally) not. The grants are mostly targeted at students from low-income families in practice, with 65% of recipients in the 2020–2021 school year coming from households earning less than $30,000 per year and 93% coming from households earning less than $60,000 per year (National Association of Student Financial Aid Administrators, 2024). The main exceptions are some students from high-earning families that also had several siblings in college, as the aid formula historically divided parental ability to pay by the number of students in college, allowing high-earning

While there is room for disagreement, since the justification for Pell grants is to improve equality of opportunity, the lack of parental contributions for college costs constitutes the financial disadvantage faced by students from low-income families.

families with multiple children in college to also receive Pell grants. Recent changes in the aid formula will likely eliminate most of these exceptions (Gigante, 2023).

However, the size of the Pell grant—the maximum Pell grant is $7,395 for the 2023–24 academic year (Federal Student Aid, n.d.)—is likely non-optimal.

While there is room for disagreement, since the justification for Pell grants is to improve equality of opportunity, the lack of parental contributions for college costs constitutes the financial disadvantage faced by students from low-income families. Therefore, Pell grants should fill in for these "missing" parental payments. In particular, the size of the maximum Pell grant should both:

1. Be equal to the median potential student's parental contribution to college costs.

2. Vary by credential and academic field (e.g., a bachelor's degree in nursing) to account for differences in the cost of providing different educational programs.

There are two key complications in implementing this recommendation. The first is defining and measuring parental contributions, which can come from current income, past income (savings), or future income (borrowing). Unfortunately, there is no authoritative source of parental payments for the median student by credential and academic field. The closest proxy we have found is Sallie Mae's annual *How America Pays for College* series, which reports student and parent contributions to college costs (2023). This is not a perfect proxy. We want the median among all potential college students, while this survey only covers those who enrolled, thus missing out on students and families who did not enroll for financial reasons. We also want the median by credential and academic field. But the survey instead gives the average by type of institution. In addition, when there is a lower bound ($0) but no upper bound, the average can be wildly different from the median. Nevertheless, the Sallie Mae survey provides the best available proxy for how much parents contribute to their children's college costs.

The second complication in implementing our recommendation is the existence of the Parent PLUS loan program, which allows most parents of dependent students to borrow up to the full cost of attendance, subtracting any other financial aid such as Pell grants. Because Pell grants and Parent PLUS loans both promote equality of opportunity, the existence of Parent PLUS reduces the optimal size of the maximum Pell grant.

Since grants given directly to disadvantaged students are better targeted than loans to their parents, our ideal policy changes would eliminate Parent PLUS loans entirely and then base the maximum Pell grant size on parental contributions from current income, savings, and borrowing. However, if Parent PLUS continues to exist, parental contributions should be defined as parental payments from current income only, since Parent PLUS already addresses parental borrowing. Savings, on the other hand, should be excluded from contributions because from an equality of opportunity perspective, there is no difference between parental contributions from past income (savings) or future income (borrowing). Therefore, accounting for borrowing only would be a biased measure and would unjustifiably discourage savings.

The Sallie Mae survey reports that for students enrolled in public two-year colleges in 2022-23, parents contribute an average of $6,851 annually, composed of $3,443 from current income, $2,548 from savings, and $860 from loans (p. 22). For students enrolled in public four-year colleges, parents contribute an annual average of $14,097, composed of $6,463 from current income, $5,194 from savings, and $2,440 in loans.[2]

A student with zero financial support from their parents would thus be at a $3,443 to $14,097 financial disadvantage depending on the type of college attended and how parental contributions are measured. The Pell grant is designed to promote equality of opportunity by filling this financial hole and has a maximum of $7,395 for the 2023–24 academic year (Federal Student Aid, n.d.).

Unless the Parent PLUS loan program, which accounts for parental borrowing (and indirectly, savings), is eliminated, parental contributions should be based on current income only. Accounting for contributions from income only, associate degree programs should have a maximum Pell grant of around $3,400 (the amount parents contribute from current income), and bachelor's degree programs should have a maximum Pell grant of around $6,500 (though ideally, these would be set by credential and academic field rather than by credential alone). Both maximums are less than the Pell's current maximum of $7,395, meaning that so long as Parent PLUS exists, the maximum Pell grant should be reduced because the combination of Pell and Parent PLUS already ensures that students from low-income families are not at a financial disadvantage relative to the typical student. Alternatively, the Pell amount could be left unchanged and Parent PLUS could be capped at the median parental contribution minus any Pell grant award.

If the Parent PLUS loan program is eliminated, then parental contributions should be based on parent contributions from saving and borrowing as well. In that case, associate degree programs would have a maximum Pell grant of around $6,900 (the amount that parents contribute including saving and borrowing), and bachelor's degree programs would have a maximum Pell grant of around $14,100. Relative to the current maximum Pell of $7,395, this would be a small reduction for associate degree programs) and a significant boost for bachelor's degree programs.

However, Pell grants are also subject to a pernicious unintended consequence in the form of the Bennett Hypothesis. Colleges may raise tuition or reduce institutional aid (financial aid paid for by the college) when students receive Pell grants. The response of colleges to Pell grants with regard to altering tuition has not been studied, but Lesley J. Turner estimates that for every $1 in Pell grants, colleges reduce institutional aid by 12¢ (this figure is 67¢ at selective non-profit colleges and 5¢ at public colleges) (2014). Thus, colleges capture some Pell grant funding at the expense of the program's goal of increasing equality of opportunity and promoting social mobility. Reforms that reduce the extent of the Bennett Hypothesis harvesting of Pell grants would be desirable.

To recap our assessment of the Pell grant program, the justification for Pell grants is to redistribute income with the goal of promoting equality of opportunity and social mobility. There is a scholarly consensus that these grants substantially increase the enrollment of low-income students (though there is evidence that this was not the case in the 1970s when the program was first introduced), so the grants are sufficiently well justified. Pell grants are selectively targeted for this purpose and use

2 As a check on this value, we also utilized the Department of Education's Expected Family Contribution formula (Federal Student Aid, 2022). For families with a household head aged 35–54, median income in 2019 and 2020 was around $88,000 (Shrider et al., 2021, p. 27) and median assets (excluding home equity and retirement accounts) in 2020 was around $60,000 (U.S. Census Bureau, 2020, "Wealth and Asset Ownership" table). Such a family would be expected to contribute around $11,500 per year to a student's college costs. Every additional dollar in income increases this value by about 33¢ and every additional dollar of assets increases this value by about 5¢.

the appropriate distribution method, with aid primarily given to students from low-income families. However, the size of the maximum Pell grant, $7,395, should be altered to better accomplish this goal. The Parent PLUS loan program duplicates the mission of Pell grants, so if Parent PLUS continues to exist, then the maximum Pell grant should be decreased to around $3,400 for associate degree programs and around $6,500 for bachelor's degree programs (though ideally, these limits would be set at the credential and academic field level rather than just by credential). But if the Parent PLUS program is eliminated, then Pell grants would be solely responsible for promoting equality of opportunity, and the maximum Pell grant should then be reduced to $6,900 for associate degree programs but increased to $14,100 for bachelor's degree programs (though again, these would ideally be set by credential and academic field rather than by credential alone). Unintended consequences are a concern, as there is evidence that colleges reduce the institutional aid they award to Pell recipients and may also raise tuition.

- *Student Loans*

  Another substantial subsidy program at the federal level are the student loan programs. Under the current system, the federal government is the lender, loaning funds to individual students and parents who then repay the loan. The government offers four main types of loans: subsidized loans, which do not charge any interest until the student leaves school; unsubsidized loans, which begin charging interest right away; and two types of PLUS loans, the first of which is the Grad PLUS loan when the borrower is a graduate student, and the second being the Parent PLUS loan when the borrower is a parent. Total federal lending amounts to around $83 billion a year, some of which will be repaid, though we won't know how much for decades (Ma & Pender, 2023, p. 32).

  The justification for a government role in student lending is that the lending market for student loans suffers from a market failure. Many college students are recent high school graduates, so financing a college education by borrowing can be difficult, as few lenders are interested in extending loans to those with little income and minimal (if any) assets, even if there are profitable educational investments to be made (Friedman, 1962). Thus, it can be "appropriate for the federal government to facilitate the market for loans" (Hanushek, 1989, p. 50) by addressing the market imperfection, namely, incomplete capital markets.

  The size of this imperfection is debated. Some scholars argue the problem is small:

  - "We find only a limited role for tuition policy or family income supplements in eliminating schooling and college attendance gaps. At most 8% of American youth are credit constrained in the traditional usage of that term" (Carneiro & Heckman, 2003, p. 2).

  - "The case for liquidity constraints is greatly exaggerated" (Heckman & Klenow, 1997, p. 7).

  But while the scale of the problem may be exaggerated, it does exist, meaning that there is some justification for the student loan programs. However, student loans as currently implemented suffer from three severe problems.

  First, facilitating the market for student loans does not require that the federal government be the lender, and yet the federal government currently fills that role (for example, a small private market for student loans exists as well). The main problem with government-as-lender is that the federal government does not have the proper incentives to make appropriate lending decisions—instead, it squanders vast sums on wasteful "education" that is a predictability bad investment. In addition to lacking incentive to prevent the waste of taxpayer dollars, this system will also likely lead to the politicization of lending over time.

The second problem is that facilitating the market for loans does not justify subsidizing those loans. As Alchian wrote,

> There remains an even more seriously deceptive ambiguity—that between the subsidization of college education and provision of educational *opportunity*. Educational *opportunity* is provided if any person who can benefit from attending college is enabled to do so despite smallness of *current* earnings. Nothing in the provision of full educational *opportunity* implies that students who are financed during college should not later repay out of their enhanced earnings those who financed that education. (Alchian, n.d.)

In other words, the market failure (incomplete capital markets) in the lending market for student loans justifies government facilitation of loans to expand educational opportunity. However, that facilitation does not require that those loans be subsidized.

This raises the natural question: Should student loans be subsidized? Note that the justification for student loans—market failure due to incomplete markets—is not one of the commonly used justifications for college subsidies. Indeed, scholars are clear that the market failure justifies government involvement to facilitate the market for loans but does not justify subsidies for loans. As Eric Hanushek wrote, "There is no strong argument for subsidizing these loans" (Hanushek, 1989, p. 50). Susan Dynarski and Daniel Kreisman provide the most concise explanation:

> The government should seek neither to make nor to lose money from student loans. Student loans correct a capital market failure … Federal student loans therefore solve a liquidity problem, not a pricing problem. Student loans are appropriate neither for raising revenue nor for subsidizing college. (Dynarski & Kreisman, 2013, p. 10)

Student loans are not an appropriate method of providing a subsidy because they are poorly targeted. Subsidizing loans provides the subsidy only to those that borrow and provides the greatest subsidies to those that borrow the most.

Unfortunately, student loans are heavily subsidized.

The Congressional Budget Office (CBO) routinely provides estimates of the subsidy rate for student loans. A subsidy rate is the profit or loss as a percent of the loan after accounting for all future payments and converting them into a present value using a discount rate. When student loans are subsidized, they have a positive value for the subsidy rate. A negative subsidy rate, on the other hand, would mean the government makes money from the loan.

However, the CBO's estimate of the subsidy rate is underestimated for two reasons (Gillen, 2022b). First, when making the loans, the Department of Education has systematically overestimated future student loan repayments. Overestimating future repayments artificially lowers the subsidy rate by assuming future payments that fail to materialize. For example, a recent Government Accountability Office report examined actual student loan repayments with Department of Education projections with respect to loans made in the past 25 years (U.S. Government Accountability Office, 2022). If the Department was accurately estimating repayments, it should have overestimated repayments in some years and underestimated repayments in others. Instead, the Department overestimated payments every year. As a result of these overestimates, subsidy rates have been about 15 percentage points higher than they were projected to be when the loans were made.

Second, the CBO is required to use the interest rate on U.S. government bonds as the discount rate (future payments are discounted into their value today using a discount rate). A lower discount

rate corresponds to a lower subsidy rate because future repayments are worth more (e.g., a payment of $100 ten years in the future is worth $82 today at a 2% discount rate but only $61 at a 5% discount rate). The interest rate on U.S. government bonds is an artificially low discount rate for student loans because unlike the government, students can die, move out of the country, or simply not repay their loans (not to mention, the government can simply print more money to repay its debt, an ill-advised option that is nevertheless unavailable to students). A more appropriate discount rate for students is called the fair-value rate, which estimates the discount rate that would prevail for similar lending in the market. Switching to the fair-value discount rate adds around 11 percentage points to the subsidy rate (Congressional Budget Office, 2022).

The CBO estimates the subsidy rate for student loans is 18%, meaning that the government will lose 18¢ for every $1 lent (Congressional Budget Office, 2023). However, accounting for the Department of Education's systematic overestimates of repayments adds 15 percentage points to this value and switching to fair-value discount rates adds around 11 percentage points more, yielding a more realistic subsidy rate of 44%. This means the government will likely lose 44¢ for every $1 it lends. Since the government lends around $83 billion a year, this will entail losses of around $37 billion. Note that these subsidy rates do not account for the Biden administration's recent and forthcoming plans on student loan forgiveness, which would dramatically lower payments and massively increase the subsidy rate (Gillen, 2023).

A third problem with providing subsidies through student loans is unintended consequences. As mentioned earlier, subsidies for higher education, including student loan programs, are subject to the Bennett Hypothesis, which relates to how colleges raise prices to harvest aid. One recent study estimates that colleges raise tuition by 40¢ to 60¢ for every $1 increase in loan limits (Lucca et al., 2017). Thus, the concern of offsetting behavior, in particular, colleges raising tuition to harvest student loan dollars, is valid.

In sum, there is a good case for government facilitation of student loans (to address capital market imperfections) but no convincing case for subsidizing those loans. Unfortunately, student loans are currently heavily subsidized, with the government likely to lose around 44¢ for every $1 it lends. There is also evidence that colleges have raised prices to exploit the availability of student loans. Two reforms are thus warranted: First, replace the government-as-lender model with private lending (Gillen, 2020), and second, regardless of who is doing the lending, stop subsidizing student loans (for example, governments often subsidize private student loan lenders by offering loan guarantees).

- *Tax Benefits*

Tax benefits are another sizable college subsidy and come in the form of tax credits and deductions. Tax credits, such as the American Opportunity Tax Credit and the Lifetime Learning Credit, reduce taxes dollar for dollar. There are also a number of tax deductions which reduce taxable income, such as the tuition and fee deduction, the student loan interest deduction, and college savings accounts such as the 529 and Coverdell savings plans (Internal Revenue Service, 2023). Around 9.5 million taxpayers utilize at least one tax benefit each year, with an average tax savings of around $1,300 (Ma & Pender, 2023). This costs the government about $11 billion in forgone taxes each year. And that may be a significant underestimate—a more comprehensive list of tax subsidies puts that cost at around $30 billion per year (Michel, 2023).

The justification for these tax subsidies is redistribution, mostly aimed at the middle class. Indeed, tax benefits largely fail to substantially *increase* college enrollment rates, instead altering the price for those who were already going to attend. As Thomas J. Kane observed, "Much of this money is a pure transfer, received by students who would have attended college in the absence of

public support" (1995, p. 1). Other scholars found that "93% of President Clinton's Hope Scholarship Funds, which were directed towards middle-class families, were given to children who would attend school even without the program" (Carneiro & Heckman, 2003, p. 22). The 93% value is likely lower today because some more recent tax benefits like the American Opportunity Tax Credit include partial refundability, which increases the value of the tax benefit to lower income families. While this should theoretically have a greater effect on increasing enrollment rates, there is no empirical confirmation yet, nor is the size of such tax benefits—an average of $1,300 across all credits and deductions (Ma & Pender, 2023)—likely to be large enough to dramatically lower the 93% figure.

Tax benefits are poorly designed. Like any program with a redistributive rationale, tax credits should be selectively rather than universally targeted, though many are not. For example, the American Opportunity Tax Credit is available to (almost) all beginning college students attending at least half time. However, near-universal eligibility defeats the very purpose of redistributive support. In addition, redistributive subsidies should be given as financial aid. But tax credits are not given like traditional financial aid. Instead, they are claimed when an individual files their taxes, long after they have paid for college. In other words, the tax credits function more as delayed reimbursement than traditional financial aid, a design choice that introduces a severe mismatch between when the student needs to pay for college (for instance, fall of 2024) and when they receive a tax refund to help them pay (for instance, spring of 2025).

Another significant problem with tax benefits is unintended consequences, namely, Bennett Hypothesis effects. Colleges that raise prices and reduce other financial aid in reaction to tax benefits are essentially harvesting the aid to benefit the college, which leaves students receiving the tax benefit no better off than if they had not received the benefit at all. Tax benefits are particularly likely to fuel increases in tuition because they are so widespread, with around 9.5 million students using at least one credit or deduction (in contrast, an aid program with few recipients would not provide colleges with much room to increase tuition, though they might be able to reduce other financial aid to those students). The ways in which colleges expropriate aid differ. Lower-cost colleges tend to raise tuition directly, particularly those which were initially charging less than the tax credit: "Colleges with many credit-eligible students experienced a 25 percent relative increase in list price in comparison to schools with fewer potential recipients. … This provides further evidence that colleges did react to the credits by raising prices" (Long, 2004, pp. 155–156). But more expensive colleges did not respond by raising prices, because their prices were already more than the credits. Instead, these "colleges and universities substantially offset the intended cost reduction of tax-based aid by reducing institutional grant aid" (Turner, 2010, p. 17). Institutional aid is financial aid that colleges offer to students out of their other revenue. Colleges reduce institutional aid "roughly dollar-for-dollar" (p. 1) with tax benefits. In other words, when the government provides a student with a $500 tax credit, these colleges reduce other scholarships or discounts by around $500, leaving the student no better off.

It is possible there are colleges where tax benefits are not expropriated in the form of higher tuition or reduced financial aid. Based on the research literature, this would occur at colleges that charge substantially more than the tax benefits (which rules out raising tuition to the tax benefit amount without reducing enrollment or selectivity) but that do not offer much institutional aid (which rules out offsetting tax benefits with reduced institutional aid). Many public four-year universities are likely to fall into this category. While no research documents that these institutions do not expropriate tax benefit dollars, it is theoretically plausible.

Overall, the unintended consequences appear to render tax benefits ineffective. Colleges have increased tuition and reduced institutional aid in response to tax benefits, which means that students and parents are not receiving the benefits of these programs even though they are the intended beneficiaries. Instead, colleges expropriate much of the money for themselves by raising tuition or reducing other financial aid.

Sadly, the ineffectiveness of tax incentives for higher education has been known since at least 1969:

> In general, the payment of tax credits to families with students in college would provide substantial subsidies to upper and middle income students. ... Moreover ... there would be little impact on the college attendance of any group. The aid given any income group would be small in relation to total income and the most aid would go to higher income students, whose college enrollment is not particularly sensitive to changes in costs. Therefore, when compared with scholarship or subsidized loan plans, tax credits to families are an inefficient policy instrument for furthering higher education objectives. (U.S. Department of Health, Education, and Welfare, 1969, p. 25)

In conclusion, while the best justification for tax credits is to improve college affordability for the middle class, tax credits utterly fail at achieving this goal. The higher education tax credits therefore lack a compelling justification for continued existence. Much of the aid is mistargeted, going to high-income students due to universal rather than selective targeting. Tax benefits also operate more as delayed reimbursement than as financial aid. And even the aid that does make it to the middle class is largely captured by the colleges because many colleges strategically respond to the tax credits by raising tuition or reducing institutional aid, leaving colleges richer but the middle class unassisted. Therefore, higher education tax credits should be eliminated.

- *Campus-Based Aid*

  There are several campus-based aid programs, including Federal Work Study (FWS), Federal Supplemental Education Opportunity Grants (FSEOG), and Perkins loans (currently being phased out after decades of use). The cost of these programs is shared between the federal government and the college, and the college determines which students receive the aid. In the 2020–2021 school year, FSEOG spent about $1.5 billion, with around 1.9 million recipients for an average award of around $775 (National Association of Student Financial Aid Administrators, 2023). FWS spent about $700 million, with around 372,000 recipients for an average award of around $1,900.

  The justification for the campus-based aid programs is redistribution. However, the campus-based aid programs are not well designed. Redistributive subsidies should be selective rather than universal, and campus-based aid programs are selective. However, the funding is distributed to institutions, which then pass it along to students. Institutions are also required to provide a partial match—typically at least 25% of the award must come from institutional (i.e., college) resources. While this does increase the amount of aid available to students, it results in severely distorted overall targeting. Rather than being distributed to colleges based on the number of students with financial need, "the majority of funds are allocated to institutions on the basis of amounts received in prior years" (Smole, 2007, p. 2). In practice, this means that well-endowed colleges with few low-income students often receive more campus-based aid funding than colleges with no endowment which enroll large numbers of low-income students.

  There is also reason to worry about offsetting actions. Since college financial aid offices determine who receives the aid, they can easily adjust institutional aid (aid funded exclusively by the college) for students awarded campus-based aid.

One of the campus-based aid programs, namely, the Perkins loan program, is already being phased out. Given that the other campus-based aid programs are poorly designed (insofar as they utilize the wrong distribution method and likely suffer from unintended consequences), they should be phased out as well.

- *Research Funding*

  Research funding is another category of federal subsidies for higher education, with the federal government having spent $49 billion subsidizing research at American universities in 2021 (National Center for Science and Engineering Statistics, 2022, Table 1). However, this funding was disbursed by a wide variety of departments and organizations. By far the biggest funder was the Department of Health and Human Services, which included the National Institute for Health, with $28 billion (Table 14). Next was the Department of Defense ($7 billion), followed by the National Science Foundation ($5 billion), the Department of Energy ($2 billion), the National Aeronautics and Space Administration ($2 billion), and the Department of Agriculture ($1 billion).

  The justification for these subsidies is positive externalities, in particular, research or discovery externalities. Because these externalities differ by field and researcher, research funding should be selectively targeted at fields with high potential for generating externalities and distributed to researchers with high potential rather than widely disbursed to colleges. Research funding does largely follow this pattern, with science fields accounting for $39 billion, engineering accounting for $9 billion, and other fields just $1 billion, which likely corresponds to science and engineering research having greater potential to generate positive externalities (Table 13). Top schools also receive most of the funding, which is appropriate assuming the faculty at these institutions are the most likely to make discoveries yielding positive externalities.

  However, there are several potential issues.

  First, the $1 billion for non-science or engineering fields included funding for fields like law and visual and performing arts, which have very little potential to generate positive externalities. In fact, as mentioned above, law appears to generate negative externalities (Murphy et al., 1991), which implies that the field should be taxed rather than subsidized.

  Second, even among "science" fields, some areas have little potential to generate positive externalities. For example, the social science fields accounted for $3 billion in funding, which included subsidies for anthropology and political science, fields that are unlikely to generate positive externalities since discoveries in these fields are unlikely to generate productivity spillovers.

  Third, person-specific grants may be better than project-based grants. Historically, most federal funding has utilized the project-based method. As the U.S. Department of Health, Education, and Welfare noted, "The project method of support has been the primary mechanism for financing advances in knowledge. This method of support is designed to assure that the most gifted and qualified individuals receive support" (1969, p. 18). However, scholars have recently found evidence that person-specific funding may be superior. The Howard Hughes Medical Institute (HHMI) funds people, not projects, which encourages researchers to quickly pivot their efforts if their initial research path hits a dead end. In contrast, project-based funding tends to have predefined deliverables, locking researchers into a fixed path. Azoulay et al. compared National Institute of Health (NIH) grants (project funding) to HHMI grants (person funding) and found that funding people instead of projects led to more high impact research (2009). Thus, while project-based funding is superior to institutional funding, funding people rather than projects appears to be even better.

Fourth, application and administrative costs are out of hand, reducing the impact of funding. Recipients of federal grants report spending 16% of their time applying for grants, 20% of their time on administrative tasks, and 8% preparing reports, none of which has the possibility of generating externalities (Schneider, 2020). That leaves only 56% of their time for active research, which is the only activity that can generate the positive externalities that justify subsidies. Applicants also have to wait up to 20 months for a funding decision from the NIH (National Institute of Allergy and Infectious Diseases, 2019). Reducing the application and administrative costs of federal research grants and speeding up approvals could have a large payoff by increasing positive externalities even without increased funding.

Fifth, grant awards have become heavily biased in an ideologically progressive direction. An analysis of National Science Foundation grants found that the share of project abstracts using

> highly politicized terms has been increasing consistently over the last three decades. As of 2020, 30.4% of all grants had one of the following politicized terms: 'equity,' 'diversity,' 'inclusion,' 'gender,' 'marginalize,' 'underrepresented,' or 'disparity.' This is up from 2.9% in 1990. … The results imply that there has been a politicization of scientific funding in the U.S. in recent years and a decrease in the diversity of ideas supported. (Rasmussen, 2021, "Summary" section)

In addition to distorting science by only considering one viewpoint, the politicization of federal science funding poses an existential threat to continued research funding. When conservatives see the National Science Foundation (NSF) devoting 30% of funding to politicized projects, they conclude that they can improve science and save money by cutting the NSF budget.

Sixth, funding is not necessarily being directed toward the projects with the highest potential. Analyzing NSF grants in the field of economics, Cowen and Tabarrock argue that

> the National Science Foundation should support activities that are especially hard to support through traditional university, philanthropic, and private-sector sources. … We ought to see a large difference in the kinds of projects the NSF supports compared to what the "market" sector supports. But what stands out from lists of prominent NSF grants … is how similar they look to lists of "good" research produced by today's status quo. (2016, p. 240)

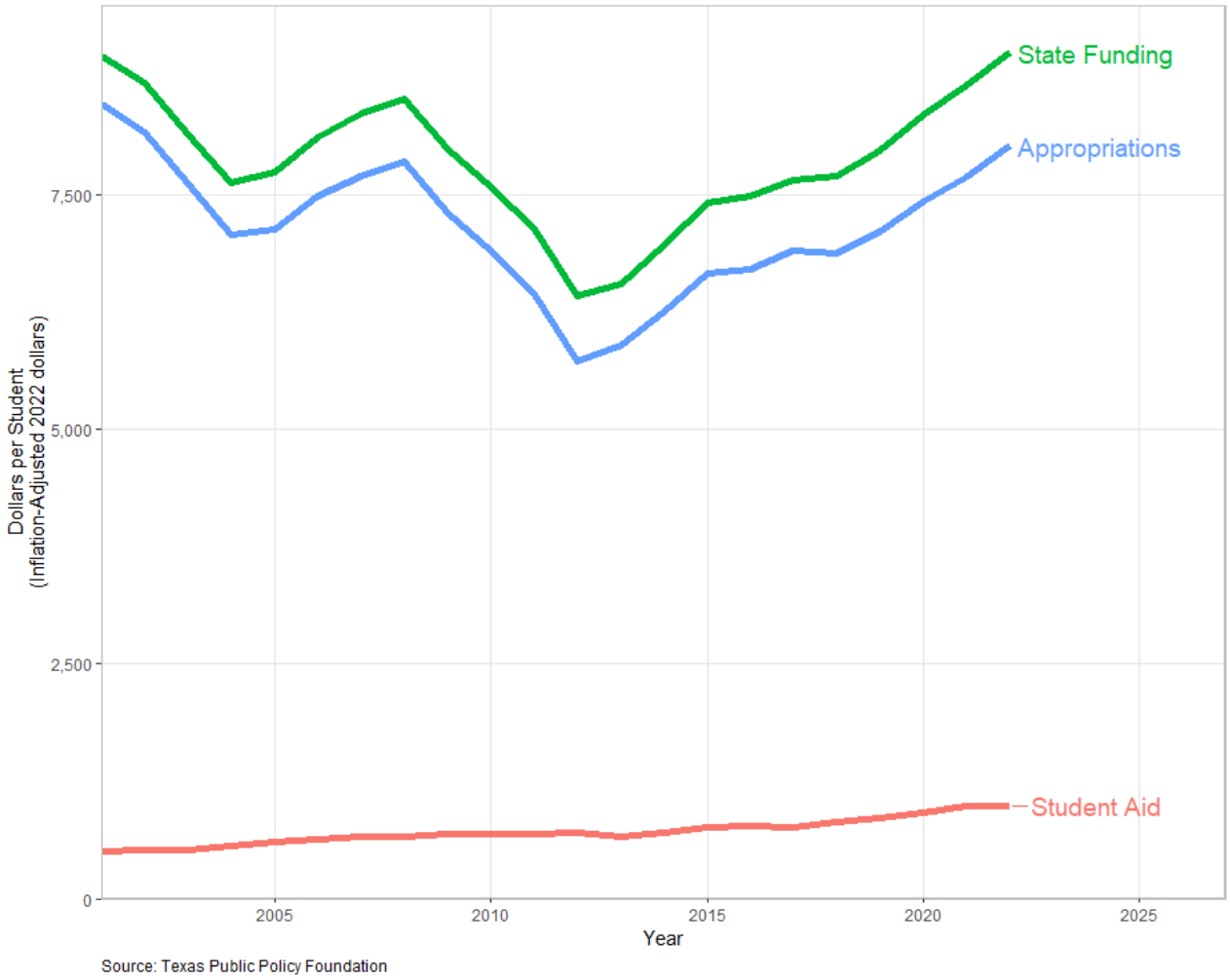
In other words, funding appears to subsidize the types of projects that would have taken place anyway. Instead, funding should be prioritized for projects that would not otherwise be funded. For example, there is little existing incentive for academics to undertake replication projects, so an argument can be made that NSF funding should fill that gap. Similarly, creating datasets likely has the highest potential for generating positive externalities yet is rarely a priority. Ex ante grants are highly concentrated at top colleges, which could be justified if faculty at those colleges are working on the most promising projects. On the other hand, it could be a side effect of the fact that the peer review process is controlled by those at top colleges. Using ex post prizes rather than ex ante grants could subsidize research without relying on a potentially biased peer review system (Cowen and Tabarrock, 2016).

Without better information about the direction and magnitude of externalities, it is not possible to determine if the size of current subsidies is too large, too small, or just right.

The unintended consequences of science funding are also impossible to forecast.

Figure 2

State Higher Education Funding per Student: 2001–2022



Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

State Government Subsidies

State (and many local) governments also provide subsidies for college. These subsidies can be quite complex. Just in the state of Texas, there are four different categories of institutions, with each type having its own funding formula(s). For example, funding for health-related institutions is determined by summing five different formulas (Texas Higher Education Coordinating Board, n.d., "An Overview of Formula Funding"). Meanwhile, the state's technical college system uses a unique formula driven by graduates' labor market outcomes (Valdez & Borrego, 2022).

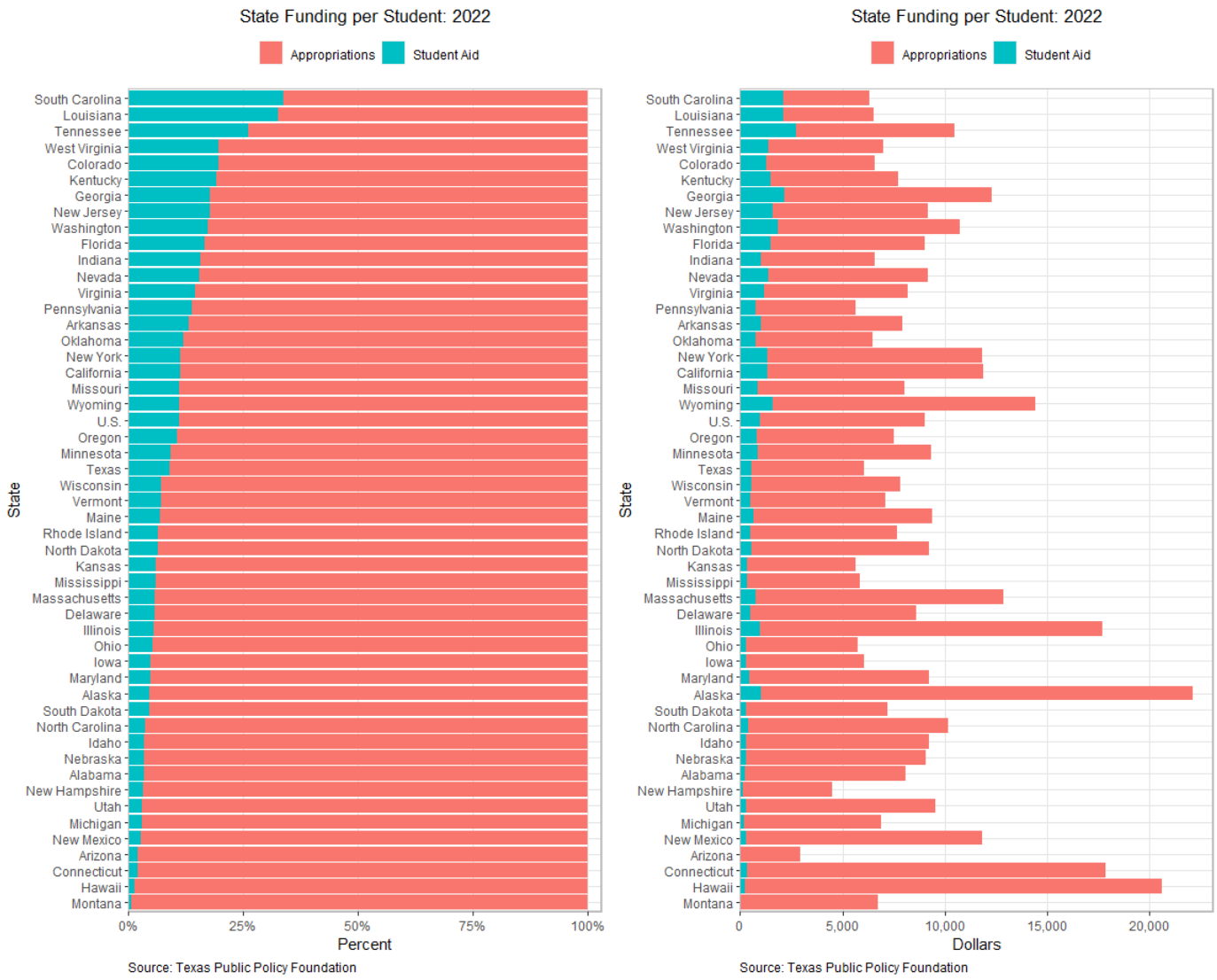
But while the details can be complex, at the conceptual level there are only two main approaches to funding. As noted earlier, funding either goes to the student in the form of financial aid or it goes to the college in the form of payments to the college (often called appropriations).

Since state funding receives less media and scholarly attention, it will be helpful to provide more background information for these subsidies before evaluating them.

Figure 2 shows average per student state spending on appropriations, student aid, and the combined total (called state funding) from 2001 to 2022. Appropriations are and have historically been much larger than student aid. For example, in 2022, average student aid was $990 per student while the average

Figure 3

Student Aid and Appropriations by State: 2022



Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

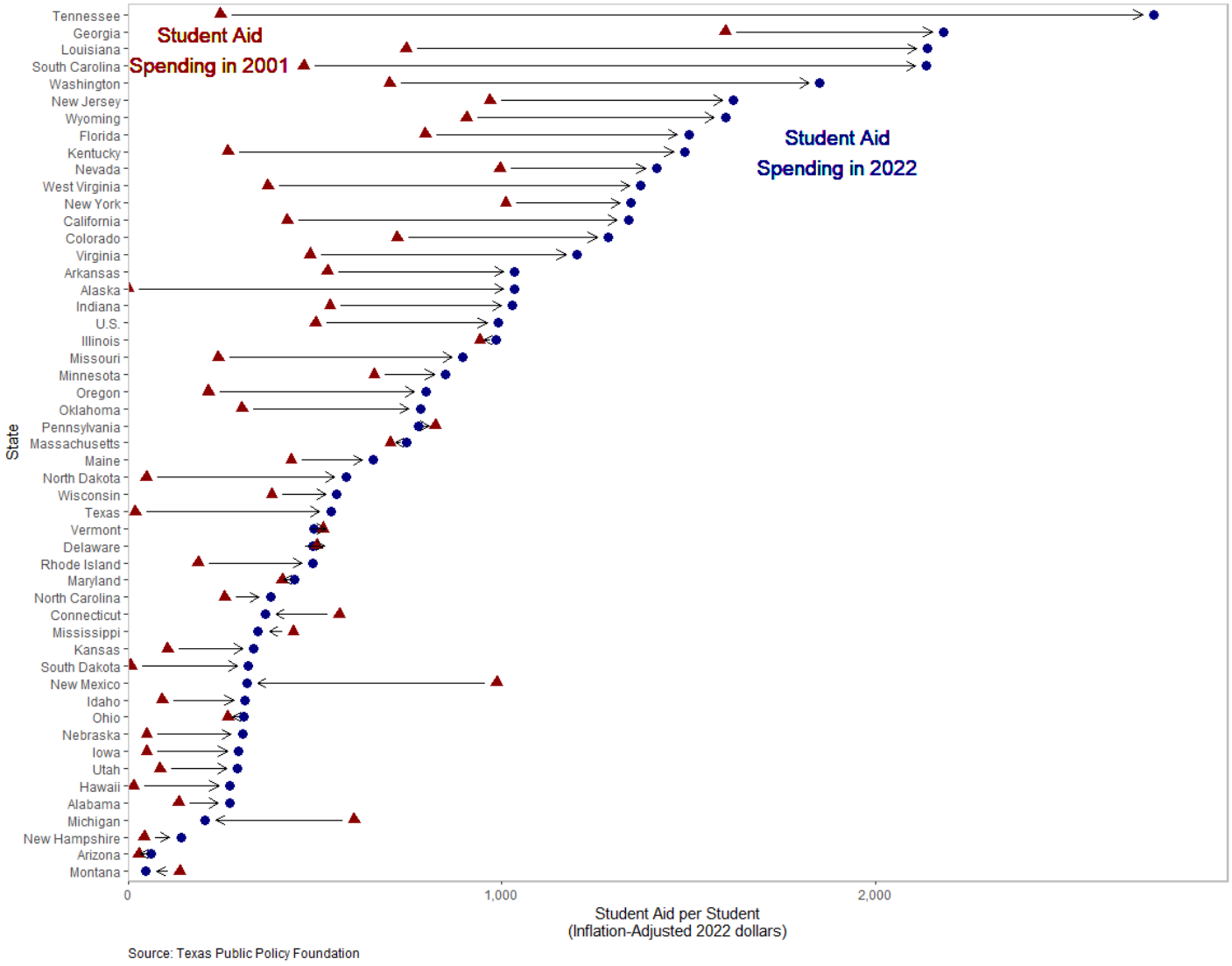
appropriation was $8,022 per student, for total state funding of $9,011.

Figure 3 shows the breakdown of state funding between appropriations and student aid by state in both dollars (right panel) and percentage of state funding (left panel). Student aid is a minority of funding in every state, but a handful of states have either exceeded or are approaching 25% of state funding being devoted to student aid, with South Carolina, Louisiana, and Tennessee devoting the largest share of funding to student aid.

While appropriations are much larger than student aid, there has been a substantial shift toward student aid over time. In 2001, for every $1 of student aid that states provided, they provided almost $17 in appropriations. By 2022, this figure had been cut in half to just above $8. This trend can be seen clearly in **Figure 4**, which shows student aid in 2001 and 2022 by state. The majority of states have substantially increased student aid funding over the past two decades, with Tennessee, Georgia, Louisiana, and South Carolina seeing the highest student aid funding in 2022. Only a few states decreased student

Figure 4

Student Aid per Student by State: 2001 and 2022



Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

aid funding, and only New Mexico and Michigan saw substantial declines.

The justifications for state (as opposed to federal) subsidies are varied, but redistribution and boosting economic growth are the most frequently offered rationales. As Thomas J. Kane observed,

> Over 90% of the state funding is made in the form of across-the-board subsidies to public institutions … But this is an expensive way to promote access, given the large number of inframarginal youth. … Only 11 to 29% of the money invested in keeping public tuition low goes to marginal entrants. (1995, p. 25)

In other words, most state subsidies affect the price paid by those who would have attended anyway (redistributing income to college attendees) with only a small share increasing the number of students enrolled (boosting economic growth).

The reliance on redistribution and boosting economic growth rationales raises concerns regarding subsidy

design, though the concerns vary based on whether the subsidies take the form of appropriations or student aid.

- *Subsidy Design Concerns for Appropriations*

  Appropriations—state funding provided directly to the college—suffer from several design problems. To begin with, the redistribution and economic growth rationales both tend to favor selective rather than universal targeting. Targeting should be based on student characteristics (for redistributive subsidies) or the academic field being studied (for economic growth subsidies), yet when appropriations are given, they are provided universally, regardless of student characteristics or academic field.

  To the extent that appropriations are selective, they are selective on an irrelevant basis, namely, the tax status of the college. Public colleges receive appropriations, but private colleges (generally) do not. This mistake essentially confuses the desire for government financing with the need for government operation of colleges. As Milton Friedman wrote,

  > The administration of schools is neither required by the financing of education, nor justifiable in its own right in a predominantly free enterprise society. Government has appropriately been concerned with widening the opportunity of young men and women to get professional and technical training, but it has sought to further this objective by the inappropriate means of subsidizing such education, largely in the form of making it available free or at a low price at governmentally operated schools. The lack of balance in governmental activity reflects primarily the failure to separate sharply the question what activities it is appropriate for government to finance from the question what activities it is appropriate for government to administer. (Friedman, 1962)

  Friedman also noted that "restricting the subsidy to education obtained at a state-administered institution cannot be justified" (Friedman, 1962) because the rationale for the subsidy depends on the nature of the education being provided, not the tax status of the college. If an educational subsidy is justified, that justification does not somehow cease to exist if the student attends a private rather than public college.

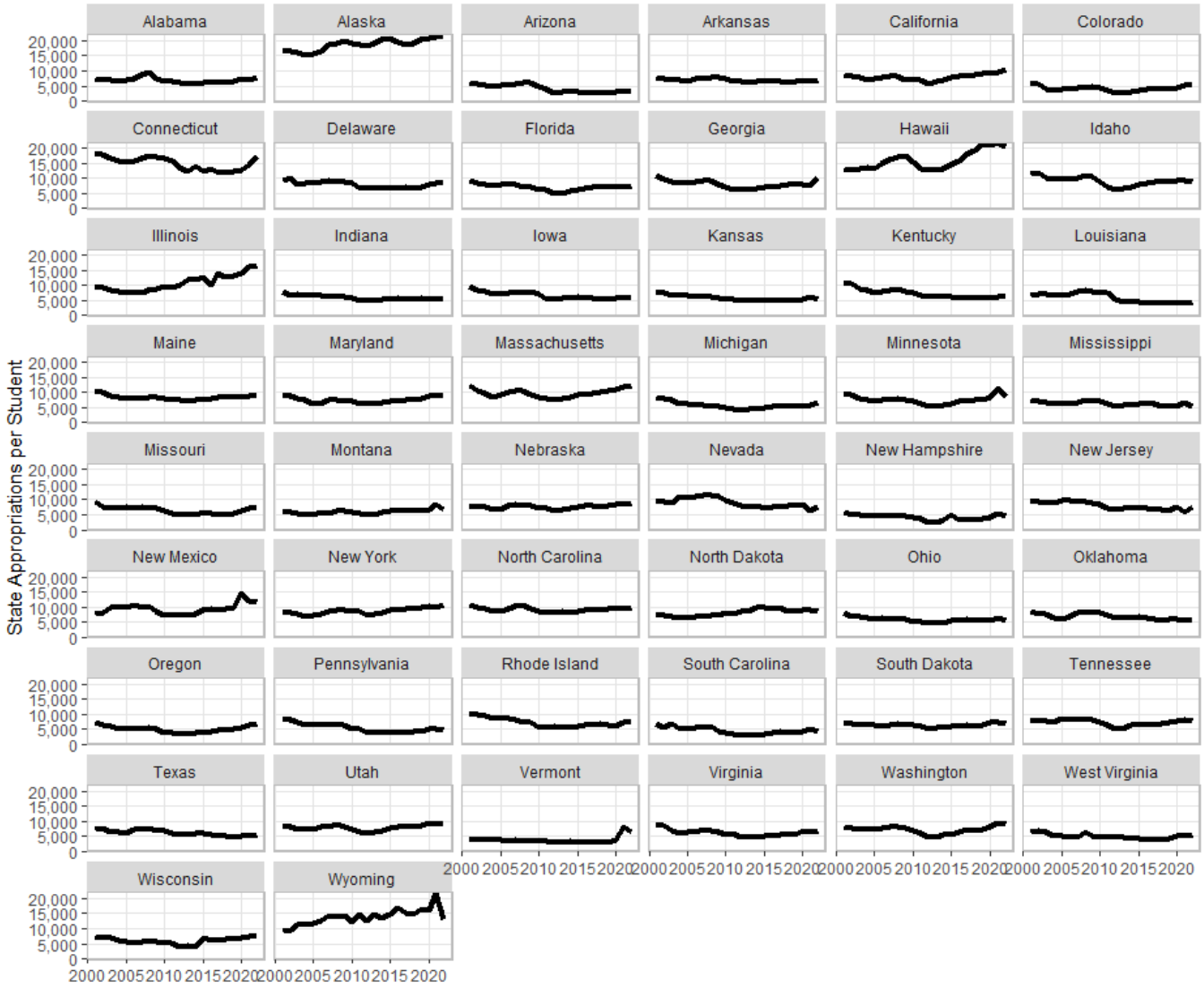
  In addition to being badly targeted, appropriations use the wrong method of distribution. Redistributive subsidies are almost always best delivered in the form of student aid, and economic growth subsidies also tend to operate better as student aid. Yet appropriations distribute funding to institutions instead.

  The size of the subsidy is also likely inappropriate. State appropriations vary too much from state to state to be consistent with the main rationales for subsidization (we note one possible exception to this shortly). **Figure 5** (next page) shows each state's appropriations from 2001 to 2022, revealing vast differences. Some of these differences may have plausible explanations. For example, Alaska, Wyoming, and Hawaii have very high appropriations per student, and some of that is likely driven in part by their sparse populations which prevent colleges in those states from achieving the same economies of scale as larger states (e.g., fewer students to spread fixed costs over). But other differences are harder to explain. Why do the histories of appropriations in New Hampshire and Vermont differ so much? Why are appropriations in Arizona so much lower than in New Mexico? It is unlikely that the rationale for subsidies differs greatly in these states, so it is likely that some states are either overfunding or underfunding appropriations. The one rationale that could avoid this critique is different political preferences for redistribution. For example, perhaps New Mexico has decided it wants to redistribute more income to college students than Arizona wants to.

  A final consideration with subsidies via appropriations is unintended consequences. Appropriations

Figure 5

State Appropriations by State: 2001–2022

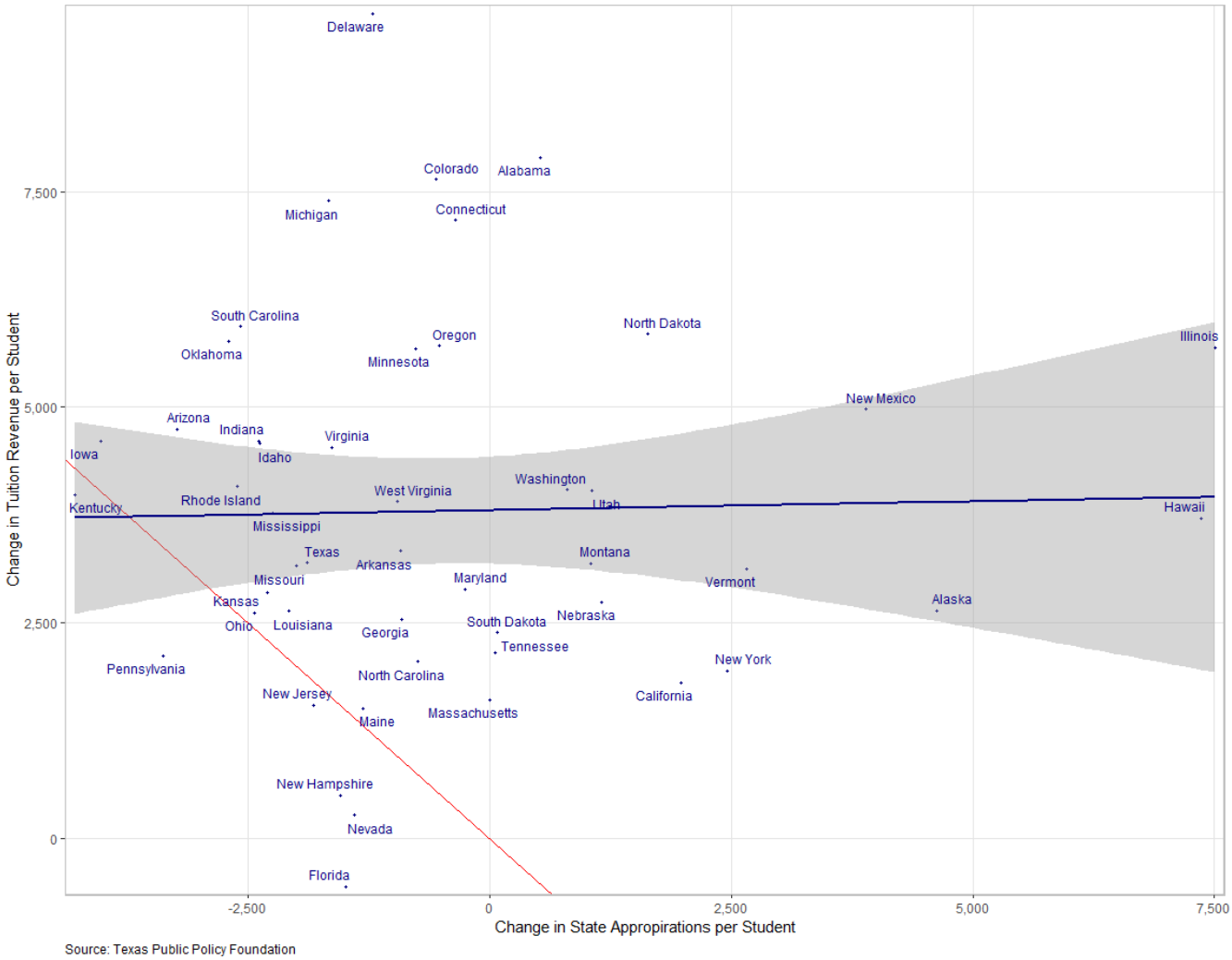


Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

are often justified by claiming that high appropriations will keep college tuition low, on the assumption that if the college gets one more dollar in state appropriations, it needs one less dollar from tuition. The flaw with this assumption is that colleges' costs adjust to their revenues, which means that higher appropriations will not necessarily "buy" lower tuition. When appropriations increase, colleges can (and often do) pocket the state appropriations and then increase tuition anyway. Consider **Figure 6** (next page), which shows the change in state appropriations and tuition revenue by state from 2001 to 2022. If increases in appropriations "bought" decreases in tuition revenue, then each state should fall along the red line, which shows a $1 decline in tuition revenue for every $1 increase in appropriations. The actual relationship is shown by the blue line (with the shaded regions surrounding it representing the confidence interval) and shows no consistent (i.e., statistically significant) relationship between changes in appropriations and changes in tuition

Figure 6

Change in State Appropriations and Change in Tuition Revenue: 2001–2022



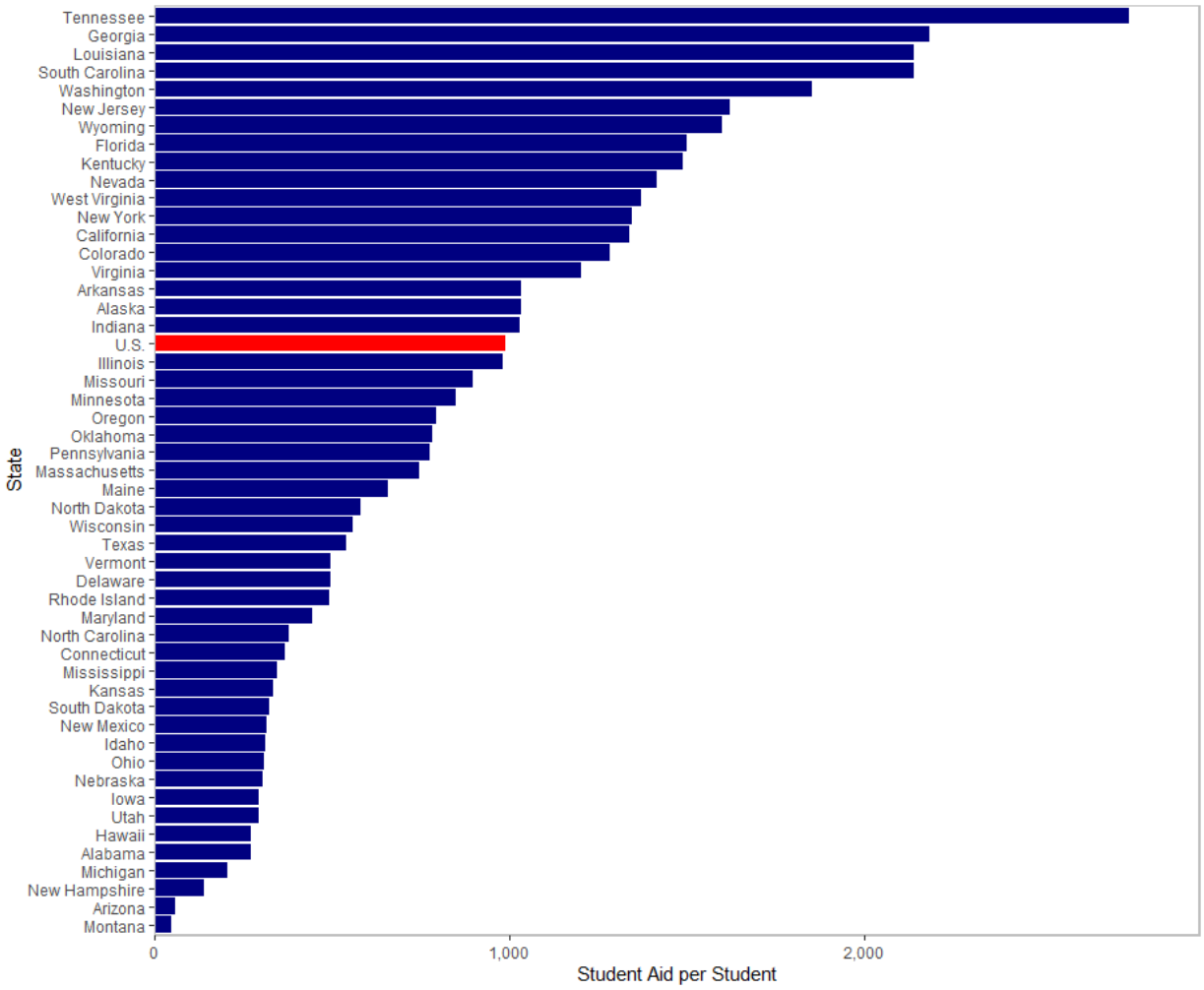
Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

revenue (the 95% confidence interval for the slope is -0.22 to +0.26). For example, between 2001 and 2022, per student appropriations fell by $4,292 in Kentucky, $2,615 in Rhode Island, $2,250 in Mississippi, and $953 in West Virginia, and rose by $798 in Washington, $1,055 in Utah, and $7,362 in Hawaii. Yet despite these vast differences in changes in appropriations, all these states saw essentially the same increase in tuition revenue (between $3,712 and $4,078). The unfortunate reality is that lower tuition cannot be bought with higher appropriations because colleges tend to pocket the appropriations and then increase tuition anyway.

In sum, state subsidies in the form of appropriations suffer from a severely flawed design. Given that redistribution and economic growth are the most cited rationales for such subsidies, subsidies should be selectively targeted and provided in the form of student aid. But appropriations are universally rather than selectively targeted among public colleges, while at the same time they are not available to private colleges at all. They are also distributed to the colleges rather than to students. The size of the subsidies varies too much as well, meaning that some states may be over subsidizing while others may be under subsidizing. Lastly, offsetting actions and

Figure 7

Student Aid per Student by State: 2022



Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations. The red bar indicates the average for the country.

behaviors on the part of colleges diminish the effectiveness of appropriations.

- ***Subsidy Design Concerns for Student Aid***

Subsidies distributed as student aid suffer from less severe design flaws than subsidies distributed as appropriations. The redistribution and economic growth rationales for state funding both favor selective aid delivered to students via financial aid (as opposed to universal aid delivered to institutions), and state student aid policies meet both of those criteria.

The main subsidy design flaw for student aid is the size of the subsidy. **Figure 7** shows student aid per student by state for 2022. It is improbable that the optimal amount of student aid per student is more than $2,700 in Tennessee and just $46 in Montana. This means that some states are likely either over or under subsidizing student aid.

There is also a concern about offsetting actions and behavior. As noted earlier, student financial aid programs are often undermined by Bennett Hypothesis effects (colleges harvesting financial aid dollars either by raising tuition or cutting institutional financial aid) which convert the beneficiary of the aid from the student to the

college. While no comprehensive studies have documented the extent of the Bennett Hypothesis for state-provided student financial aid, as discussed earlier, the evidence from federal student loans and federal tax benefits indicates that a substantial portion of student financial aid is captured by colleges, and this is likely to be true for state-funded financial aid as well.

States Should Transition to Funding Students Rather Than Institutions

While the federal government has chosen to mostly provide subsidies to students in the form of financial aid, states have chosen to provide most subsidies to institutions in the form of appropriations. As the previous section made clear, neither approach is perfect, but subsidies in the form of financial aid are generally the better approach, so states should transition their subsidy programs from appropriations to student aid. States could realize several benefits from transitioning from appropriations to student aid.

- *Student Aid Is Better for Selective Targeting*

  The most discussed justifications for state subsidies for college are redistribution and economic growth. Both rationales imply that subsidies should be selective—universal subsidies would not be redistributive and different academic fields have different effects on economic growth, meaning their subsidies should vary. Subsidies in the form of student aid allow for the necessary selective targeting, whereas appropriations apply subsidies universally.

- *Student Aid is Better for Subsidy Distribution*

  Redistribution and increasing economic growth justifications also favor student aid. Given the goal of selective targeting, student aid allows for much more precise targeting of aid than institutional appropriations.

- *Student Aid is More Stable and Less Pro-Cyclical*

  Another advantage of the student aid approach relative to appropriations is that student aid is less volatile and is not pro-cyclical. States have historically responded to national recessions by cutting appropriations, at times quite dramatically. Yet student aid funding does not exhibit the same pattern. **Figure 8** shows the annual change in student aid (top panel) and appropriations (bottom panel). Appropriations are very volatile, increasing or decreasing by hundreds of dollars. Moreover, the decreases tend to occur during and immediately after recessions (indicated by the gray shaded bars), making appropriations pro-cyclical (pro-cyclical variables move in the same direction as the economy). This pro-cyclical feature is an added stress to colleges because the reduced appropriations hit colleges while families cannot afford to pay as much (due to the recession). In contrast, student aid generally sees small steady increases each year (though note the different annual change scale for each panel). Moreover, when student aid funding does decline, it is not in response to recessions (student aid is not pro-cyclical), which makes it easier for colleges to find alternative sources of revenue.

- *Student Aid Does Not Suffer From the Bennett Hypothesis as Much as Appropriations*

  There is also reason to believe that student aid is more effective. Subsidies via student aid and subsidies via appropriations are both subject to unintended consequences in the form of the Bennett Hypothesis. But there is reason to believe the problem is worse for appropriations.

  When states increase appropriations by $1 per student, this tends to be correlated with a 10¢ to 20¢ decrease in tuition (Gillen, 2015). In other words, colleges appear to capture about 80¢ to 90¢ of every dollar devoted to appropriations.

  For student aid, the capture rate varies based on the aid program. For Pell grants, which are means tested, colleges capture about 12¢ of every $1 (Turner, 2014) by reducing institutionally funded financial aid, with no estimates of the amount they capture from raising prices.

Figure 8

Annual Change in Student Aid and Appropriations

Note. Data from SHEF State Higher Education Finance FY 2022, by State Higher Education Executive Officers Association, 2023 (https://shef.sheeo.org/data-downloads/) and author's calculations.

For student loans, colleges capture 40¢–60¢ through increases in tuition and up to 20¢ more from lowering institutional aid (Lucca et al., 2017). There are some cases of colleges capturing all 100¢ (e.g., tax benefits at low cost colleges; Turner, 2010) and for-profit colleges raising tuition by the entire amount of the aid increase (Cellini & Goldin, 2012). However, the typical result is in the 60¢–80¢ range.

Thus, in general, the Bennett Hypothesis is worse for appropriations than for student aid. Colleges appear to capture about 80¢–90¢ for every $1 increase in appropriations, but around 60¢–80¢ for every $1 increase in student aid. While Bennett Hypothesis problems affect both student aid and appropriations, the problem is more severe for appropriations, which means that student aid is more effective.

CONCLUSION

This paper aimed to explain the justifications or rationales for higher education subsidies, determine key design considerations for subsidy programs, and evaluate existing subsidy programs.

The most common justifications for subsidies have changed over time. Early in America's history, promoting favored religions was the dominant reason for government subsidies. By the 1930s and 1940s, reducing the size of the labor force had become the dominant rationale. Strengthening national defense emerged as a primary justification during and after World War II. By the 1960s,

redistribution emerged as a favored justification. Today, in addition to the national defense and redistribution rationales, subsidies are often justified by paternalistic concerns, positive externalities, and/or the desire to boost economic growth.

There are several key subsidy design considerations. First, should the subsidy be universally available or selectively targeted? Second, should the subsidy be distributed to students or directly to colleges? Third, how large should the subsidy be? And fourth, are there any unintended consequences that affect the subsidy's effectiveness?

Existing subsidies vary in how well justified and how well designed they are.

Pell grants are largely well designed (they utilize selective targeting via student aid), but the size should be adjusted, with the adjustment depending on whether the duplicative Parent PLUS loan program is continued or eliminated.

Student loans are poorly designed, in large part because of the government-as-lender model, which is not necessitated (or justified) by the rationale for government involvement in student loans (namely, addressing liquidity problems). Loans are also heavily subsidized, which is not justified due to improper targeting (only subsidizing borrowers and doing so in direct proportion to how much they borrow). Student loans should exist, but the current system should be substantially reformed.

Tax benefits should be eliminated because they are poorly designed and unintended consequences render them ineffective. The main rationale for tax benefits is redistribution to the middle class, but near-universal eligibility renders them poorly targeted. Their timing is also less than ideal insofar as they provide reimbursement many months after the student has already paid their college costs. While these flaws could potentially be remedied, tax benefits suffer from debilitating unintended consequences in the form of strategic behavior from colleges, which tend to raise prices and/or lower other scholarship aid in response to tax benefits, rendering them ineffective.

Campus-based aid programs should also be eliminated. These subsidies are poorly designed. The most significant problem is that they are distributed to colleges rather than students, and the colleges' allocation is not based on how many needy students they have, but rather on the college's historical allocation (read political power). The result is that well-endowed institutions have disproportionate allocations relative to their enrollment of targeted students.

Research funding is reasonably well designed, as it is selectively targeted and distributed to individual researchers rather than institutions, which are both the preferred design features given a justification of generating positive externalities. However, there are concerns about the accuracy of the targeting and the politicization of funding.

At the state level, most subsidies are distributed as appropriations, but this is a poor design given that the redistribution and boosting economic growth justifications both favor the student aid approach. Student aid allows for selective targeting based on student characteristics (for redistribution) or academic field (for boosting economic growth), whereas appropriations provide the same subsidy to all students and all fields. States should transition from financing dominated by appropriations to a model that distributes student financial aid instead.

Deliberately considering a subsidy's justification and design is crucial to ensuring that students and taxpayers receive the most benefit from subsidies to higher education. ■

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