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COLLEGE COSTS, FINANCIAL AID, AND STUDENT DECISIONS

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ABSTRACT

The increasing tension between the perceived necessity of a college degree and the challenge of paying for it has led to a proliferation of financial aid policy in the U.S. and around the world. More students are receiving more aid today, and more different types of aid, than ever before. Half a century of policy experimentation has led to an equally impressive accumulation of research evidence, facilitated by methodological advances and the widespread availability of student-level administrative data. In this chapter, we present the economic rationale for financial aid, a summary of how aid works in the U.S. context, and common methodological challenges in the study of financial aid. We then review the evidence from both inside and outside the U.S. on the causal impact of a variety of financial aid policies and programs on students' college decisions, attainment, and post-college outcomes, and summarize the overarching themes with respect to margins of impact, mechanisms, and heterogeneity. We conclude with a discussion of future directions for research.

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I. Introduction

Over a half-century ago, the Higher Education Act of 1965 enshrined a significant federal role in college finance in the United States, establishing core federal grant, loan, and work-study programs that remain the foundation of U.S. student aid. When President Lyndon Johnson signed the act into law, he described its goal as ensuring that "the path of knowledge is open to all that have the determination to walk it. It means that a high school senior anywhere in this great land of ours can apply to any college… and not be turned away because his family is poor."[1]

It is no surprise that financial aid policy burst onto the U.S. national agenda when it did. At the time, the U.S. was just beginning its transition to an era of mass postsecondary education (Goldin & Katz, 2010). With its decentralized postsecondary system and no national tradition of completely free public university education, federal financial aid policy was a way to promote mass post-secondary enrollments, with an emphasis on access and choice.

Since then, the earnings premium for a college degree has risen dramatically, and college-going rates have increased (unevenly) for students across the income distribution. Yet over the same period, college tuition has also risen substantially in real terms – in large part due to a reduction of state and local direct subsidies which traditionally helped keep public tuition below the full cost of provision. The increasing tension between the perceived necessity of a college degree and the challenge of paying for it has led to a proliferation of financial aid policies at the federal, state, and local levels. More students are receiving more aid today, and more different types of aid, than ever before.

The same pressures driving financial aid policy in the U.S.—high returns to college and the "massification" of higher education, alongside rising tuition costs and persistent inequality in attainment—can be seen globally (Heller & Callender, 2013). The potential advantage of the U.S.'s high-tuition, high-aid model is that it makes use of private resources from those students who can afford to pay, while enabling any given level of public subsidies to go further by targeting aid to students who need it most. But evidence suggests the complexity of such a system may be a problem in itself (Dynarski & Scott-Clayton, 2006; Chetty et al, 2020). The low-tuition, low-aid financing model common in many countries offers the advantage of simplicity, but may come at the cost of limited enrollment slots, and/or lower quality (Barr, 2004).

Despite the increased availability of student aid, gaps in college attainment between children from high and low-income families are large and persistent (Bailey & Dynarski, 2011; Chetty et al, 2020). Other countries have seen a similar pattern of increasing postsecondary attainment overall, but large and persistent socioeconomic gaps (OECD, 2017, Indicator A4).

The increasing complexity and risks involved in paying for college in the U.S. have led to calls for more dramatic change, such as making public colleges tuition-free, just as many countries are moving in the opposite direction (Murphy, Scott-Clayton, & Wyness, 2019). In whichever

[1] Lyndon Baines Johnson, "Remarks at Southwest Texas State College Upon Signing the Higher Education Act of 1965," November 8, 1965, archived online by Gerhard Peters and John T. Woolley, The American Presidency Project, URL: https://www.presidency.ucsb.edu/node/241092

direction countries are moving, the stakes have never been higher to understand the effectiveness of financial aid, for the sake of both the students who receive it as well as the stakeholders who provide it.

Half a century of policy experimentation has led to an impressive accumulation of research evidence, facilitated by methodological advances and the widespread availability of student-level administrative data. In this chapter, we review the evidence on the causal impact of a variety of financial aid policies and programs on students' college enrollment decisions, attainment, and post-college outcomes.[2] We focus on experimental and quasi-experimental studies from the past 20 years, with greater attention to the past decade, given coverage of previous reviews. However, in areas of limited empirical research and/or where opportunities for causal evaluation are limited, we will discuss the best available evidence and note the causal limitations. Our review focuses on undergraduate aid and is grounded in the U.S. context given the availability of well-identified research, though we incorporate a growing body of evidence from outside the U.S. as well.

Before turning to our review of the evidence, we first provide in Section II background on the financial aid landscape, including the economic rationale for financial aid and a summary of how aid works in the U.S. context. Section III is the core of our review, in which we first describe common challenges in the study of financial aid, and then synthesize the state of the empirical evidence on the impacts of financial aid. Section IV draws out overarching lessons for policymakers. The final section concludes with a discussion of the future of policy and research on financial aid.

II. Background on the landscape of financial aid

2.1. Government intervention in the market for postsecondary education

Governments subsidize postsecondary students through two primary mechanisms: 1) directly funding public colleges, which then charge students reduced or zero tuition, and 2) providing aid (e.g., grants or loans) to students, who then apply the funds to tuition and/or living expenses to attend their chosen college.

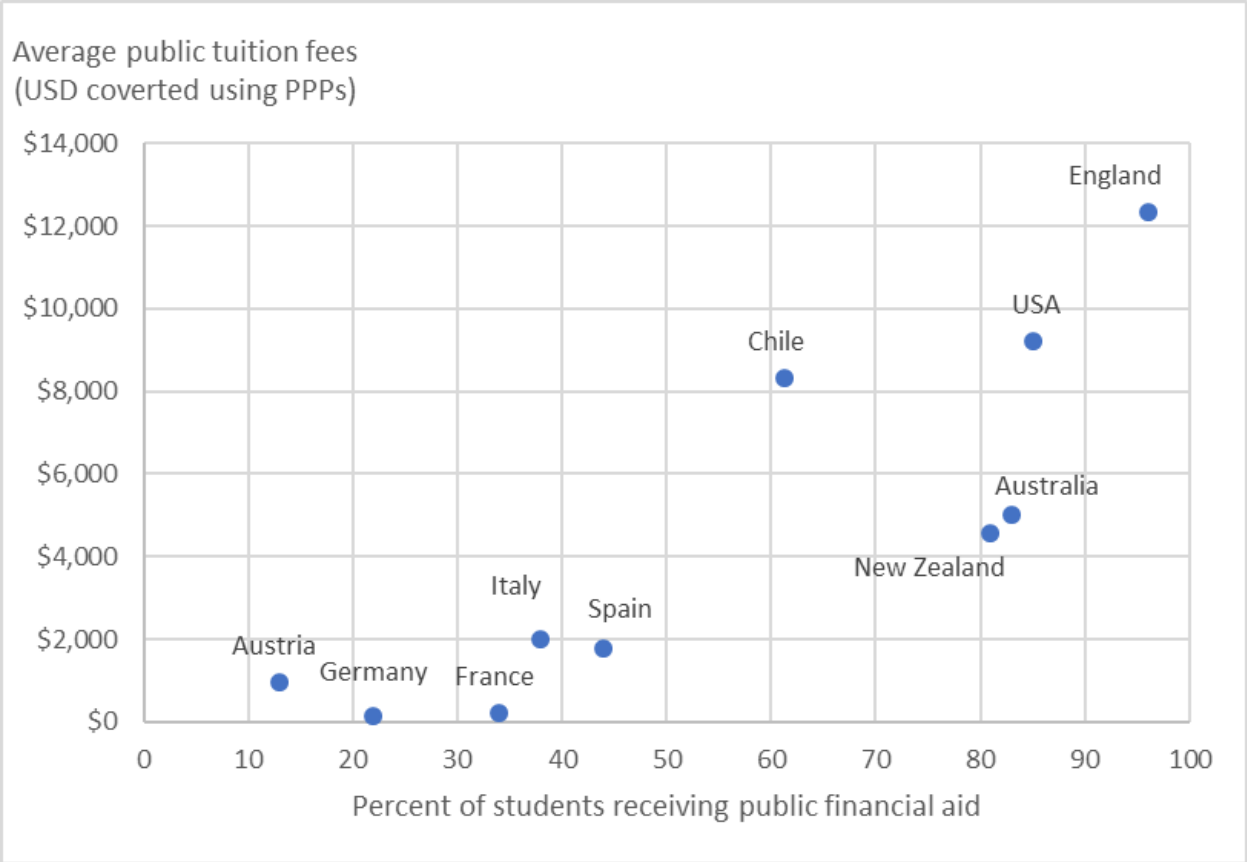
These two channels are not mutually exclusive, generating a spectrum of models of higher education finance. At one extreme, governments fully subsidize colleges and set their price to zero, with no individualized tuition subsidies for students. At the other extreme, colleges have a high "sticker" price and use aid to reduce tuition for targeted students.

As shown in Figure 1, the U.S. is an example of a high-tuition, high-aid system. Many Western European countries (e.g. France, Germany) have historically followed a low-tuition, low-aid model, though shifts toward the US model have occurred in the past few decades, most notably in England. Some countries, such as Brazil (not shown), follow a dual-track model with free college for an academic elite, and the rest paying tuition (see Marcucci, 2013 for detailed information by country).

[2] Policies to promote college access and success more broadly, including those in which financial aid may be a component but is not the primary component, are reviewed in another chapter in Volume 6 of this Handbook (see Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022).

To students and families, government subsidies to schools are largely invisible, and they are not typically included in discussions about financial aid policy. We include them in this chapter because they are one of the largest sources of support for undergraduates. Further, because decreasing support through one channel may be countered by increases in the other, it is important to consider them both.

Figure 1. Average Public Tuition Fees and Percent of Students Receiving Public Financial Aid (Bachelor's Degree Programs, 2019-20)



Source: OECD (2021), Tables C5.1 and C5.2.

Table 1 provides an overview of the current landscape of support for undergraduates in the U.S., as well as trends over the past 30 years.[3] In addition to direct appropriations, which reduce tuition costs but are essentially invisible to students, financial aid takes a multitude of forms. The federal programs established in Title IV of the Higher Education Act of 1965 are known collectively as "Title IV aid" and included the precursors to Pell Grants, Direct Loans, and Federal Work-Study. Title IV aid also includes a variety of smaller federal programs which have come and gone over time (Perkins Loans, SEOG, LEAP, and SMART grants). Veterans' benefits and tax benefits for college are two sources of federal aid outside of the Title IV system; these both grew rapidly

[3] Non-federal loans (totaling $11.7 billion in 2018-19) are not included in this table. These are mainly private loans, which require a cosigner or guarantor with a credit record. In this they more closely resemble consumer credit than government loans.

between 1990 and 2010. Embedded within the state, institutional, and private/employer grant categories in Table 1 are hundreds of separate programs with distinct characteristics.

Table 1 illustrates how the division of labor in higher education finance has shifted over time. The federal investment in student aid has nearly quadrupled over the past 30 years (even after adjusting for inflation, and even if we consider only federal grants). The shift was particularly rapid between 1990 and 2010 (near the nadir of the Great Recession): in 1990, state and local appropriations provided nearly three times as much support as federal student aid, while in 2010 federal aid provided nearly twice as much as state and local appropriations.

Table 1. Support for Undergraduates in the U.S. by Source, Over Time (in Billions, 2020 dollars)

Aid Source	90-91	00-01	10-11	18-19
STATE & LOCAL APPROPRIATIONS*	$77.3	$92.8	$87.0	$90.5
TOTAL FEDERAL, STATE, INSTITUTIONAL & OTHER AID**	$44.9	$88.6	$219.7	$189.4
ALL FEDERAL AID	$28.4	$57.6	$162.9	$109.2
All Federal Grants	$12.0	$14.8	$54.9	$40.6
Pell Grants	$9.8	$12.0	$42.3	$29.3
FSEOG	$0.9	$0.9	$0.9	$0.9
LEAP	$0.1	$0.1	$0.1	$0.0
SMART Grants	$0.0	$0.0	$0.5	$0.0
Veterans and Military	$1.3	$1.8	$10.5	$10.5
Federal Work-Study	$1.1	$1.3	$1.0	$1.0
All Federal Loans	$15.3	$35.6	$84.0	$54.9
Perkins Loans	$1.5	$1.4	$0.8	$0.0
Subsidized Stafford	$12.2	$17.1	$34.3	$20.4
Unsubsidized Stafford	$0.0	$11.6	$36.4	$21.3
ParentPLUS	$1.6	$5.5	$12.5	$13.2
Education Tax Benefits	$0.0	$6.0	$22.7	$12.6
STATE GRANTS	$3.6	$6.9	$10.8	$12.4
INSTITUTIONAL GRANTS	$9.6	$18.2	$35.6	$54.8
PRIVATE & EMPLOYER GRANTS	$3.1	$6.0	$10.4	$13.1
TOTAL FALL FTE ENROLLMENT	**8,624,253**	**9,667,063**	**13,660,597**	**12,463,236**

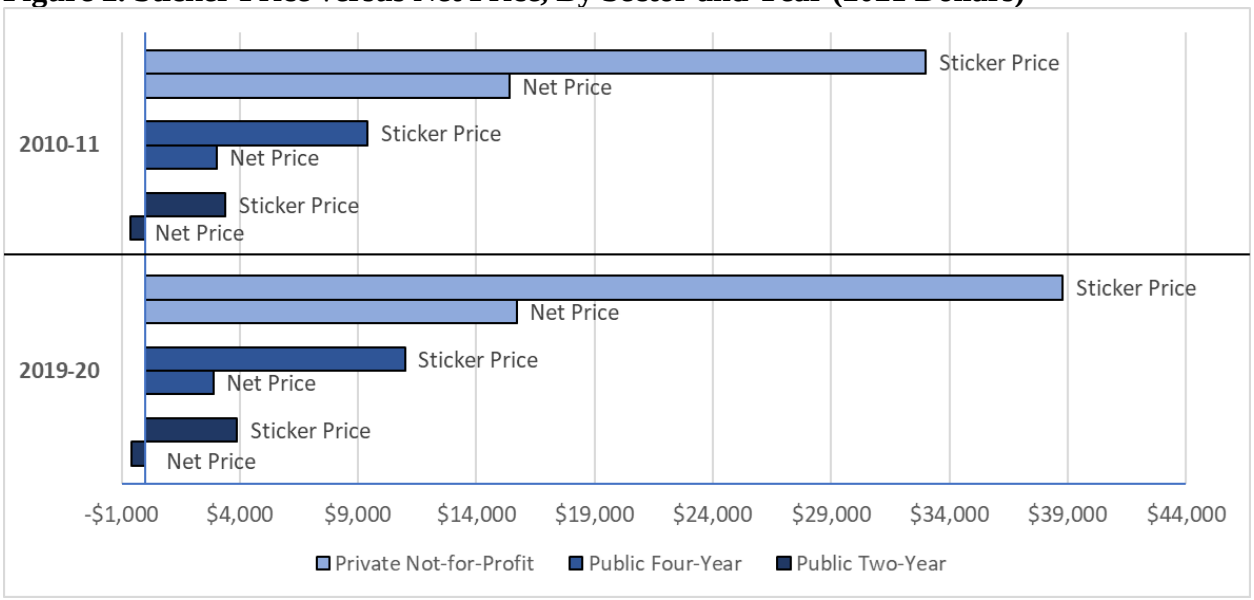
Source: State & local appropriations from NCES (2019). Aid amounts and undergraduate FTE counts from The College Board (2021), Trends in Student Aid, Table 1_UG and Table 3 (online data).
*Appropriations may include graduate education.
**Total aid excludes non-federal loans which total $12 billion in 2018-19.

Since 2010, the shift has reversed such that in recent years, considering both appropriations and state grants, states and localities provide nearly the same magnitude of support for undergraduates as does the federal government. Grants provided by institutions and other private sources have also increased substantially in the past decade, while reliance on federal student loans has declined by more than a third.

Figure 1 further illustrates how trends in financial aid relate to trends in tuition pricing over the most recent 15-year period, using data from the College Board (2021). Published tuition and fees ("sticker prices") have increased substantially in real terms (beyond the rate of inflation) since 2006, ranging from a 25 percent increase in the public two-year sector to a 39 percent increase in the public four-year sector.

Yet *net* tuition and fees, measured as the difference between published tuition and fees and average grant aid per student, are relatively stable in recent years.[4] This illustrates the increasingly central role of financial aid, but also foreshadows the complexity students and families face in trying to predict what their *individual* cost of college will be.

Figure 2. Sticker Price versus Net Price, By Sector and Year (2021 Dollars)



Source: Authors' tabulations of data from Ma and Pender (2021). Sticker price is published tuition and fees, while net price removes grant aid. Public sector tuition and fees are for in-state / in-district students.

2.2. Economic justification for government intervention

Government intervention in higher education finance can be justified on efficiency grounds, as we discuss in this section. Higher education markets are inherently vulnerable to market failures that lead students to underinvest in college (Barr, 2004). These market imperfections mean that, in the

[4] Importantly, tuition and fees are only one component of the cost of attendance. Housing, food, books, transportation, and other expenses also factor into students' total cost of attendance, and the College Board's data show that increases in grant aid have not been sufficient to offset increases in these overall costs since 2006, except at public two-year institutions.

absence of public subsidies, people will under-invest in college, leaving both private and social returns on the table.

A key market failure is that students cannot typically get loans from private credit markets to finance the direct and opportunity costs of college. Unlike loans for homes or autos, for example, student loans are not secured by an asset that can be seized in the event of non-payment. As a result, private markets are reluctant to lend money for education. This is a classic market failure: the market does not provide loans to fund an investment that will, in expectation, yield positive returns (Long & Riley, 2007).

This particular market failure motivates government intervention to address borrowing (liquidity) constraints. However, loosening liquidity constraints does not counter other market imperfections that lead to underinvestment in education.

Economic theory predicts, and quantitative evidence shows, that there are positive externalities to education. That is, a college education generates benefits to society above and beyond those captured by students themselves. These benefits include improved infant health, reduced reliance on social welfare programs, and increased civic participation (Lochner, 2011; Oreopoulos & Salvanes, 2011; Ma, Pender, & Welch, 2019). These positive externalities provide an economic justification for subsidizing the cost of college.

A growing literature in psychology and behavioral economics also shows that people systematically make decisions that cause them to underinvest when the costs are in the present and benefits far in the future. In making decisions about education (as well as health and retirement), people tend to underestimate the future benefits and overestimate the current costs. They are also likely to procrastinate, avoid complex choices, and exhibit inertia in planning and executing decisions about education (Lavecchia, Liu, & Oreopoulos, 2016).

Note that on efficiency grounds we can also justify the targeting of subsidies to specific groups for whom market failures are particularly acute, or for whom social externalities may be particularly high (e.g. low-income students, first-generation students, and students from minoritized and/or structurally disadvantaged groups). Of course, subsidies may be motivated by other factors including social equity concerns and as a way to counteract systemic discrimination. Still, it is worthwhile to highlight that they can be justified on efficiency grounds alone and this is likely why such programs are widespread globally.

2.3. Institutional and private organizational justifications for aid

Economic efficiency and equity concerns may motivate non-governmental providers of financial aid as well. Many colleges and foundations offer financial aid targeted to low-income applicants and underrepresented groups, either out of a sense of social purpose and/or a belief that diversity along multiple dimensions enhances the undergraduate learning experience for all students.[5] A broader version of the diversity objective may also motivate aid that is targeted to students with unusual backgrounds or particular non-academic talents. Institutions may also use price discounts

[5] This, in fact, is the rationale used by the United States Supreme Court to justify race-based affirmative action (*Regents of Univ. of Cal. v. Bakke*, 438 U. S. 265 (1978); *Fisher v. University of Tex. at Austin*, 579 U. S. 365 (2016)).

to attract students they believe will enhance institutional prestige. Employers may provide aid out of their desire to recruit and retain a skilled workforce.

One motivation for institutional aid is quite distinct from those for government action: colleges may use financial aid as form of revenue-maximizing price discrimination. Charging different prices to different students may allow the institution to capture more revenue from more students than would be possible if all students paid the same price. This is the same discounting strategy used by airlines and other sectors to maximize profits. But colleges' pricing strategies can be far more targeted than in other industries, because they have extremely detailed information on students' financial circumstances, gathered on applications required to access financial aid.

2.4. The aid application process

Government subsidies to colleges benefit students automatically via reduced tuition and fees. But student aid, by contrast, requires students to file applications to determine whether they meet the specified requirements. This section broadly describes application and eligibility for the large federal aid programs. We provide this detail because research has made it increasingly clear that seemingly minor bureaucratic hurdles and tweaks can have an outsized impact on student decisions.

Student eligibility and the FAFSA process. The federal financial aid programs (e.g., Pell Grants and student loans) require students to complete a Free Application for Federal Student Aid (FAFSA). This form, which most students now complete on-line (or via a mobile app), is also required for many state and institutional aid programs. Aid applicants at some selective public and private institutions with substantial institutional aid to distribute may also be required to complete a supplemental form known as the CSS Profile.[6] Whereas the FAFSA is free to file, the CSS Profile has a fee. In addition, place-based and state scholarship programs can also have their own separate eligibility and application processes.

Students complete a FAFSA during the months preceding college enrollment. For a student enrolling in the fall, for example, the FAFSA is completed sometime in the preceding academic year, with the due date varying by school and state. Students who complete the FAFSA late in the process may miss out on eligibility for state aid programs that are distributed on a first-come, first-served basis (Anderson, 2020).[7]

From information collected on the FAFSA, the U.S. Department of Education computes the expected family contribution (EFC), an estimate of how much the family can pay out of pocket for college. The formula itself is complex, but the main determinants of the EFC are the student's

[6] The CSS (College Scholarship Service) Profile is a supplemental financial aid form administered by the College Board that is required by several hundred private colleges (and a handful of public colleges). The PROFILE and other aid applications have received less research attention than the FAFSA, although they create similar barriers.
[7] Until recently, students could not file a FAFSA before January of the year of enrollment, since the form relied upon information from the prior tax year (e.g., 2014 for a 2015-16 enrollee). In 2016-17, the FAFSA shifted to collecting information from the prior-prior tax year (e.g., 2014 for a 2016-17 enrollee), enabling applications to be filed as early as October of the year prior to fall enrollment.

status as dependent upon (or independent of) their parents, their family income, and their family size.[8,9]

Once the EFC is computed, a student's "need" is defined as the difference between the cost of attendance (e.g., tuition, fees, books, living expenses) and their EFC. Financial aid offices at each institution then use the EFC to "package" each student's financial aid awards, including aid from multiple sources. Students must file a FAFSA every year to recalculate eligibility.

The timing of aid application and packaging in the US is such that students receive financial aid packages and learn about their net cost to attend a given college very late in the process of making decisions about where to attend. Students receive final aid offers only after they have applied to a school, been admitted, completed the FAFSA and other aid forms, and received an aid commitment from schools. For a student planning to enroll in the fall, this commitment can arrive anywhere from spring to late summer.

Given that confirmation of aid arrives so late in the decision process, aid may have little effect on students' early, consequential choices about college preparation as well as whether and where to apply, in turn limiting their options later in the process. A student who thinks a given type of college is unaffordable may decide not to prepare for or apply to that type of institution. For example, a student who thinks college is unaffordable may decline to take college preparatory courses in high school. In this way, financial aid and college financing is tied to many other dimensions of college access, discussed in a companion chapter of this Handbook (see Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022, Handbook Vol. 6).

Given that the benefits of college are backloaded, while the costs of academic preparation and application are upfront, process complexity and even seemingly small bureaucratic barriers to accessing aid may put present-minded students off the path to college. Research has consistently found that providing support or reminders to complete the FAFSA (e.g., Bettinger et al, 2012; Page, Castleman & Meyer, 2019) as well as the CSS Profile (Castleman et al., 2017) leads to higher rates of completion and improvements to access and/or persistence. Indeed, the complexity of the aid process is well-documented. For example, the FAFSA includes many difficult-to-answer questions that are relevant only to a very small share of filers (Dynarski & Scott-Clayton, 2006).

Yet another bureaucratic hurdle is FAFSA verification, in which completed aid applications are chosen for auditing. Until recently, upwards of one-quarter of FAFSA filers were selected for verification (Munier, Pacchetti, & Washington, 2019); would-be recipients of the need-based Pell grant are particularly likely to be verified (Page et al., 2019; Wiederspan, 2019). Although limited, existing evidence suggests that while the verification process has little effect on aid it does create a barrier to enrollment. Lee et al. (2021) estimate that those selected for verification are nearly four

[8] Students are automatically considered independent if they are age 24 or older, if they have their own dependents, are married, are a veteran, or are pursuing a graduate degree (though some other situations as well as professional discretion can also classify students as independent).

[9] A change to the process of calculating financial need forthcoming in 2023 is a shift from EFC to a new metric called the Student Aid Index (SAI). The shift to SAI will involve some changes to how the metric is calculated. A likely more important shift will be the allowance for students to have a negative SAI value, whereas the EFC formula did not allow for this and instead grouped together all students with an otherwise negative EFC at a value of zero. This change will allow students with the greatest need to be further differentiated and to potentially receive financial aid greater than their institution's cost of attendance.

percentage points less likely to enroll than similar students not required to complete verification processes.

The federal system of financial aid has inched toward simplification in recent years. The FAFSA Simplification Act, effective in 2023, cuts the questions on the form from over 100 to about 30 (Collins & Dortch, 2022). A subset of applicants can already automatically populate the FAFSA with their tax data from the Internal Revenue Service; FAFSA Simplification Act expands access to this tool. This both makes FAFSA completion faster and reduces the number of items that are subject to verification. The effects of these new simplification efforts will be an important focus of additional research. In Section 4.1.1, we discuss the ways in which complexity, delays, and uncertainty in the financial aid process undermine the effectiveness of the federal financial aid system.

Eligibility for Pell Grants. The Pell Grant, the largest federal grant program, is focused on students from low-income households. Approximately 80% of applicants with family income below $30,000 receive a Pell Grant while fewer than 5% of applicants with family incomes above $70,000 receive any award.[10] Pell Grant eligibility is computed by subtracting the EFC from the Pell Grant maximum.[11] Students can use Pell funds at any eligible college and the award generally will not vary by college. If the Pell exceeds tuition and fees, the remaining amount is refunded directly to students to use for other expenses.

The only academic qualification to receive Pell is to be a high school graduate who has not already earned a bachelor's degree.[12] Pell Grants can fund vocational degrees and certificates as well the traditional two- and four-year degrees, so long as they are credit-bearing programs at accredited institutions. Students can be enrolled less than full-time, with the grant pro-rated accordingly. As of the 2009-10 academic year Pell Grants can be used for year-round enrollment, including summer terms (Liu, 2020). Students can receive Pell Grants for up to six full-time equivalent years.

Eligibility for Federal Loans. Loans are now the main source of federal aid; until a few decades ago, grants were larger.[13] Any undergraduate enrolled at least half time can take out a federal loan. Dependents can borrow up to $31,000 for undergraduate study, while independent students can borrow up to $57,500.[14] As of 2006, graduate students can borrow the full cost of attendance, regardless of need; graduate loans now comprise the majority of student debt.

[10] Statistics on income and Pell receipt comes from authors' tabulations using NPSAS:2016, PowerStats tables.
[11] With some small adjustments, e.g. to account for minimum award size.
[12] A very small fraction of students (about one percent) qualify for aid without a high school credential (author's tabulations using NPSAS:2016, PowerStats tables).
[13] The federal government provides the vast majority of student loans; private loans were 25% of borrowing just prior to the Great Recession, but since 2008-09 have comprised 7-14% of student loans (College Board, 2021).
[14] Parents can borrow even more through the Direct PLUS loan program. Parents can take out PLUS loans to support a child's enrollment, provided that child is eligible for the Direct Loan program. PLUS loans have a fixed interest rate with interest accruing even while the child is enrolled in college. Parents are able to borrow up to a child's full cost of attendance minus other financial aid received. Additional steps are required for parents who have an adverse credit history.

Borrowers who have "financial need" accrue no interest on their loans while in school; these are called "subsidized loans."[15] For students without financial need, as well as for all graduate students, interest accrues during school; these are called "unsubsidized loans."

In recent years, half of all US undergraduates at four-year institutions have borrowed a Direct loan, with 36 percent receiving both subsidized and unsubsidized loans, 7 percent receiving a subsidized loan only, and 7 percent receiving an unsubsidized loan only. For students enrolled in two-year institutions, borrowing is less prevalent, with analogous rates of 11 percent, 4 percent, and 2 percent respectively.[16]

Both subsidized and unsubsidized loans offer low interest rates, income-driven repayment options (with forgiveness after a set number of payments), and other protections that make them more appealing than private student loans.

Students typically pay back their loans on a mortgage-style, ten-year repayment schedule. Borrowers can also opt into programs in which payments vary with income and loan balances are forgiven after a set repayment period. The most recent and most generous income-driven repayment option is the "revised pay as you earn" (REPAYE) plan, in which payments on undergraduate loans are capped at ten percent of discretionary income, with any remaining balance forgiven after twenty years of payments. However, only a fraction of those potentially eligible have had their loans forgiven. This has been attributed to administrative failures by both the Department of Education and the private companies they hire to collect government loans. More than one in four undergraduate borrowers default on their student loans within 12 years of college entry, indicating that the income-based loan repayment programs are not working as intended.[17]

Income-based loan programs have worked smoothly in other countries - most notably, in Australia. There, borrowers make payments on their loans only when their earnings rise above a certain threshold. Payments are then a percentage of earnings and are withheld from paychecks by the Australian tax authority, which adjusts payments automatically as earnings rise and fall. In this sense, loan payments function like paycheck Social Security withholding in the US (Barr, Chapman, Dearden and Dynarski, 2019).[18]

Institutional-level eligibility. Students can only use federal aid (e.g., Pell Grants, loans) at schools that have met a set of federal criteria. These are known as "Title IV" institutions. Schools must be authorized in their home state, exist for at least two years and be certified by an approved

[15] Students with financial need are those whose full cost of attendance is greater than their EFC. Other financial aid received will reduce remaining need before loan eligibility is calculated. Among dependent undergraduates with subsidized loans, median parental income is around $50,000 and 90% have parental incomes below $119,000 (authors' tabulations using NPSAS:2016, PowerStats tables *sinkxoII*).

[16] Statistics from authors' tabulations using NPSAS:2016, PowerStats tables.

[17] Scott-Clayton (2018) analyzes student loan default rates over time and projects that up to 40% of undergraduate borrowers from the 2003-04 entry cohort may eventually experience a default.

[18] These four authors organized a conference on international loan policies in 2016 ("Restructuring Student Loans: Lessons from Abroad"); videos of the presentations, copies of papers, and an annotated bibliography are online at https://sites.google.com/a/umich.edu/susan-dynarski/student-loan-conference-1.

accreditor.[19] They also must report annually to the US Department of Education on data items including enrollment, tuition, financial aid, student persistence, graduation rates, revenues, and expenditures.

Beyond certifying schools for participation in the Title IV aid programs, the federal government has very little involvement in the oversight of colleges and universities. High default rates on federal loans, as well as low graduation rates, have led to political pressure for the federal government to engage in stricter oversight of college quality, particularly at for-profit colleges.[20]

This pressure has produced regulations that revoke the Title IV eligibility of schools whose students default at very high rates on their student loans. The underlying theory is that high-quality schools will produce graduates who earn enough to repay their debts.

To this end, the Department of Education calculates each school's "cohort default rate," or CDR, which is the share of borrowers that default within three years of entering repayment.[21] When a school's CDR exceeds a certain threshold for three consecutive years, punitive action is triggered.

In 2014, the Department of Education established a new "gainful employment" requirement which applied to nearly all programs at for-profit institutions and some programs at community colleges. Under the rule, programs could lose aid eligibility if their graduates' student loan debt was too high relative to their earnings. The rule was rescinded by the Trump administration in 2019, but in 2022 the Department of Education proposed to reinstate it.[22]

As is true in the elementary and secondary sectors, it is challenging to develop accountability metrics that disentangle a school's quality from the characteristics of the students who attend that school. For example, students at community colleges and for-profit schools (where default rates are high) are poorer and have worse academic preparation than students at four-year selective colleges (where default rates are lower).

2.5. Financial aid systems outside the U.S.

Our literature review focuses heavily on the US context, for the simple reason that most of the well-designed studies of the causal impacts of financial aid are situated in the US. But the evidence base outside the U.S. is growing and we include a number of valuable experimental and quasi-experimental studies from around the world.

We cannot describe in this already-long chapter all of the world's systems for funding postsecondary education. We refer the reader to a few key resources. For more detailed international policy context, we refer the reader to two edited volumes discussing financial aid in comparative perspective: Heller & Callender (2013) and Delisle and Usher (2019).

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[19] In 1992, the federal government added a requirement that colleges could not receive more than 85 percent of their revenue from Title IV programs (as of 1998 the cutoff was raised to 90 percent). This resulted in thousands of for-profit colleges being kicked out of the federal aid programs.

[20] See Cellini (2022, forthcoming Handbook of Economics of Education chapter) for more information.

[21] Before 2009, the cohort default rate was measured within two years of entering repayment.

[22] See Scott Jaschik (February 10, 2022), "A Plan to Renew Gainful Employment," *InsideHigherEd.com* https://www.insidehighered.com/news/2022/02/10/education-department-issues-proposal-gainful-employment

One unusual characteristic of the US system is consequential for interpreting the research in this chapter: US student aid for undergraduates is *not* limited to those seeking a baccalaureate degree. It is *also* available to those seeking a sub-baccalaureate degree (or other credential, such as a certificate). In fact, about half of US college students attend sub-baccalaureate institutions.

Outside the US, by contrast, sub-baccalaureate and baccalaureate students are typically funded by separate programs and funding streams. Often, the sub-baccalaureate sector is in the portfolio of the workforce or labor directorate, while the baccalaureate sector is the purview of education.

In interpreting the research evidence below, it is therefore important to understand that in the US the outcomes of "college" enrollment and graduation include students at sub-baccalaureate institutions. Outside the US, these outcomes are typically limited to students at baccalaureate-granting institutions.

We will summarize any further context necessary for specific studies introduced below. We will also note in our discussion some conceptual themes that broadly arise across the literature, including the role of complexity and informational barriers; the role of institutional and program quality, and the role of academic performance requirements.

III. Empirical evidence on the impacts of college costs and student aid

In this section, we first summarize challenges to impact estimation and interpretation that are commonly encountered by researchers in this area. Then, we provide an overview of the experimental and quasi-experimental research on each broad category of aid. We give greater attention to studies published in the past decade, given coverage of previous reviews (Long, 2008; Deming & Dynarski, 2010; Dynarski & Scott-Clayton, 2013; Page & Scott-Clayton, 2016). Given long publishing lags in economics, we sometimes cite high-quality but as-yet-unpublished working papers, noting the paper's status in doing so. Our review focuses on undergraduate aid and is grounded in the U.S. context given the availability of well-identified research, though we incorporate a growing body of evidence from outside the U.S.

We do not go into detail on every important study; rather, our goal is primarily to ensure readers have a comprehensive guide to what has been done and to draw out broad patterns from the findings. In each subsection, we devote additional depth to particularly notable recent work, to highlight the frontiers of research both methodologically and substantively.

3.1. Challenges in studying the impact of college costs and financial aid

Standard models of human capital investment predict that in the absence of liquidity constraints, students will enroll and persist in higher education as long as the marginal benefits of doing so outweigh the costs (e.g., Becker, 1964). Financial aid can both relax liquidity constraints and reduce the cost of attendance. Basic economic theory thus predicts more people will enroll for longer when the price they face is lower.

While the theoretical prediction is straightforward, the magnitude of the impact is an empirical question, and not always an easy one. Because aid is often offered on the basis of characteristics

that may independently affect college enrollment and completion rates, such as income or academic performance, estimating the effect of the aid separate from the effect of other factors can be empirically challenging.

A well-implemented randomized controlled trial (RCT), in which aid offers are randomly assigned to a pool of potential college students, can provide the most credibly causal estimates by ensuring that aid recipients and non-recipients are similar not only on observable characteristics, but on unobservable characteristics as well. Quasi-experimental studies, in which the researcher identifies a source of naturally occurring but idiosyncratic variation in access to aid, can also provide credibly causal impact estimates.

Aid eligibility rules have themselves proved to be a rich source of such plausibly random variation. Sharp cutoffs in income, test score, or grades determine eligibility for many aid programs. Students just above and below these sharp breaks are likely to be very similar, but the aid that they are offered is quite different. In a regression-discontinuity (RD) analysis, researchers compare the schooling decisions of individuals just above and just below these cutoffs and attribute any difference to the causal effect of the difference in aid eligibility. In interpreting RD studies, it is important to remember that estimated effects apply only to those near the cutoff, unless strong assumptions are made.

Difference-in-differences (DD) analyses exploit sharp changes in aid eligibility, often due to the introduction (or elimination) of an aid program for one group of students but not another. A recent literature has identified problems with difference-in-differences designs that rely on the staggered introduction of a program across groups over time (see, e.g., Goodman-Bacon, 2021; de Chaisemartin & D'Haultfoeuille, 2022). Neither the extent to which previously published studies based on this method may be biased, nor the direction of any resulting bias in practice, is yet well understood.

Some additional challenges to interpretation and generalizability are also common in the financial aid literature.

First is the sampling frame: studies that track the impact of aid conditional on enrolling in the first place, and/or conditional on submitting an aid application, may miss some important earlier margins of potential impact (e.g., if the prospect of future aid induces high schoolers to study harder) and could result in biased estimates if the aid under study affects the likelihood that someone appears in the sample.

A second common issue is tracking outcomes broadly enough and for long enough to be confident that any changes in college enrollment, choice, or attainment in the short term are actually productive over the long term. Researchers and research consumers need to consider whether a positive impact on enrollment in one institution or sector might come at the cost of enrollment in another, potentially more productive institution or sector. Similarly, we may worry whether the marginal student induced to enroll by a given aid program will actually persist to completion, and we may wonder whether their enrollment will actually lead to higher earnings or improved outcomes along other dimensions.

Finally, a common challenge in interpreting estimated impacts of aid is the issue of aid displacement: aid given by one source may crowd out aid from another source, leaving students with no additional resources (this may be a particular challenge in the US context, given its mix of private, institutional, state, and federal aid sources). If researchers are unable to report on the amounts and composition of aid actually received, it can be difficult to interpret impact estimates, particularly in the case of null effects.

3.2. Traditional need-based grants

More than forty years of empirical research has examined the impact of traditional need-based financial aid. Early studies generally estimated the conditional correlation between aid and college attendance, and interpreted it as causal. These studies lack an explicit design to deal with omitted variable bias or reverse causation (see Leslie & Brinkman, 1988 for a summary of this early research; see Dynarski, 2002 for a critique of its methodology). Even now, researchers continue to use this approach, which we do not find credible. There are hundreds if not thousands of studies that fall into this category, and we make no attempt to catalog them all.

More recent work applies experimental and quasi-experimental approaches to generate more credibly causal estimates. These studies have examined not only college attendance, but also persistence, degree completion, and post-college outcomes. Because of the volume of work in this area, we group studies below by the most distal outcome examined.

Enrollment and persistence. Several studies take advantage of discrete policy changes to compare enrollment of similar students who receive dramatically different amounts of need-based aid, including Dynarski's (2003) analysis of the Social Security Survivors Benefit, Abraham and Clark's (2006) and Kane's (2007) study of Washington, D.C.'s Tuition Assistance Grant. These studies find that enrollment increases when the net price faced by students is exogenously lowered. Dearden, Fitzsimons, and Wyness (2014) find similarly positive effects of a reform that increased need-based "maintenance grants" for low-income students in the U.K.[23]

The evidence on the impact of the single largest grant program in the U.S., the Pell Grant, is mixed. Early studies comparing enrollment trends by family income before and after the program's introduction found no clear effect overall (Hansen, 1983; Kane, 1996). But Seftor and Turner (2002) find positive impacts of expansions in eligibility on adult enrollment, and Bettinger (2004) finds some evidence of positive effects of larger Pell grants on persistence for students who are already enrolled.

Park & Scott-Clayton (2018) use an RD design based on an EFC cutoff for Pell eligibility among community college students in one state. They find that a small Pell grant induces these students to reduce labor supply (while enrolled) and to modestly increase enrollment intensity.[24] Also using

[23] Two other studies also find positive effects of grant aid in the Danish and German context, though smaller than found in the U.S. and U.K. (see Nielsen, Sørensen, T., & Taber, C. [2010], and Steiner & Wrohlich [2012], respectively). The variation examined in Nielson et al. (2010) comes from the *removal* of means-testing, such that higher-income students were disproportionately affected; this may explain the smaller estimated effect. Neither study uses an explicitly quasi-experimental identification framework, but they do leverage exogenous differences in aid received due to non-linear aid formulae and policy changes, controlling for observable correlates of aid.

[24] These shifts did not translate into significant effects on completion or transfer, though the follow-up time frame was limited and standard errors were too large to rule out meaningful effects.

an RD design, Denning (2019) finds that (conditional on aid application) students who qualify for larger Pell awards are more likely to persist, reduce labor supply, and graduate faster as a result. RD estimates using nationally representative data also indicate that students who receive larger Pell Grants work less while enrolled and earn slightly higher GPAs (Kofoed, 2022).

Carruthers and Welch (2019) provide one of the best-identified studies of the effects of Pell eligibility on initial enrollment and college choices. Using data on high school graduates in Tennessee, the authors use an RD strategy to compare college enrollment and selectivity around the EFC cutoff that qualifies students for the minimum Pell Grant. They find virtually no effect of Pell eligibility on college enrollment, sector, or selectivity.

The lack of consistent positive findings for Pell Grants may be due in part to complexity and confusion surrounding the Pell eligibility and application process, which obscure its benefits and dampen its impact among the individuals who need it most (Dynarski & Scott-Clayton, 2006; Bettinger, Long, Oreopoulos & Sanbonmatsu, 2012). The verification process many Pell-eligible students are subjected to may also be one of the culprits (Lee et al., 2021; Oster, Wiederspan, & DesJardins, 2019). Indeed, an analysis of heterogeneity in the Carruthers and Welch (2019) study suggests that students who faced simplified and earlier application may experience larger impacts of aid.[25] Further, the positive findings for Pell noted above are largely for studies of already-enrolled aid applicants who qualify for larger versus smaller awards (and hence have already navigated the aid application hurdle).

Recent work explores the hypothesis that complex interactions between federal, state and institutional aid programs may explain the mixed results on the Pell program. For example, an increase in aid at the federal level may lead a college to reduce the institutional aid it provides to the affected students. This "crowd-out" would imply that students see a smaller (or no) decrease in their costs when the Pell grows more generous. Turner (2014) finds that private institutions reduce institutional aid for students who receive Pell. Marx and Turner (2018) find that students who just miss eligibility for Pell actually receive *more* in total aid from all sources, on average, because students just ineligible for Pell are much more likely to receive student loans. Park and Scott-Clayton (2018) find evidence that some community colleges use state aid to disproportionately assist students who do not qualify for Pell. We discuss the implications of aid crowd-out in more detail in Section 4.

Degree completion. Nguyen, Kramer, and Evans (2019) conducted a systematic meta-analysis of 43 experimental and quasi-experimental studies of the effect of grant aid on persistence and completion (including both "traditional" aid and merit aid), and found that such programs increased persistence and completion by 2 to 3 percentage points, on average, or about 1.5-2 percentage points per $1,000 of grant aid. They find larger effects for programs with non-financial components (e.g., tutoring), and smaller effects for merit programs. Next, we highlight just a few papers from this literature.

[25] The authors perform several useful additional analyses to test competing hypotheses about the null effects. Effects are not obviously larger in years when the Pell Grant discontinuity was larger, or when less other aid was crowded out. They do find somewhat larger effects for students around the income cutoff to qualify for an "automatic zero" EFC, which simplifies the application process, and for students around the EFC cutoff for a larger state aid award that prioritizes early applicants.

Castleman and Long (2016) use an RD design to examine the effects of a need-based program in Florida that has a strict EFC eligibility cutoff, and find significant increases in both four-year college enrollment and subsequent bachelor's degree completion. Anderson (2020) examines the impact of a state need-based scholarship for technical college students in Wisconsin, using an RD based upon the timing of aid application. He finds significant effects on certificate and degree completion for students who applied just before the aid program ran out of money, with larger impacts for lower-income students.

Fack and Grenet (2015) take advantage of discontinuities in the aid formula for need-based grants in France to examine outcomes from enrollment to degree completion, including at the graduate level. The French context is notable because tuition is already very low; marginal aid in this study is primarily funding living expenses. For both undergraduate and graduate applicants, they find large and statistically significant effects of aid on enrollment and persistence (about 5-7 percentage points per 1500 euros), and even larger effects on completion for continuing students. Effects are largest among students with higher scores but are positive across the score distribution.

Murphy and Wyness (2022) examine institutional financial aid (IFA) in England. As in the French program just discussed, marginal aid is in this context going to living expenses, rather than tuition: income-contingent loans fully cover tuition costs and low-income students also receive government grants. Because eligibility for the aid under study is determined *after* a student has enrolled, the authors can isolate its effects on completion. Using jumps and kinks in the IFA formulae, they find that an additional £1000 increases first-year persistence by 1.4 percentage points, improves grades, and increases the likelihood of graduating with a "good" degree by 3.4 percentage points.[26] Impacts are largest for students with low income and strong preparation, which the authors interpret as evidence of credit constraints.

Post-college outcomes. Two studies of aid in California examine earnings and graduate enrollment, as well as BA completion. Bettinger et al. (2019) use an RD design to examine impacts of the Cal Grant, which requires both a minimum high school GPA (around 3.0 in most years under study) and a maximum income ($53,000 to $74,000, depending on family size and year of application). The multiple running variables allow them to examine heterogeneity in aid's effects by both income and GPA. For the lower-income, lower-GPA students bound by the GPA cutoff, they find positive effects on BA completion, graduate degree completion, and post-college earnings. For the higher-income, higher-GPA students bound by the income cutoff, they find no significant effects.

Gurantz (2022) examines the Competitive Cal Grant, which like the Cal Grant has both merit and income eligibility criteria, but which is for non-traditional students who graduated from high school at least two years before college entry. They find positive effects on degree completion only for students enrolling at for-profit colleges, but no subsequent impacts on earnings.

Several articles have examined the effect of random assignment of privately-funded, need-based grants in Wisconsin. The Wisconsin Scholars Grant (WSG) provided up to $17,500 over five years to Pell-eligible, entering students at Wisconsin public colleges. Early studies of the first cohort

[26] In this context, good degrees are defined as degrees earned with a First-Class or Upper-Second-Class distinction, which roughly corresponds to a "B+" average or above (see this explainer here: https://www.ucl.ac.uk/students/certificates-results/uk-honours-degree-system-undergraduates)

found some positive effects (Goldrick-Rab, Kelchen, Harris, & Benson, 2016), but follow-up studies of multiple cohorts ultimately found no effects on persistence, completion, or graduate enrollment for the full sample (Anderson, Broton, Goldrick-Rab, & Kelchen, 2020). Evidence suggests that the award crowded-out other aid (primarily student loans) for low-income students (Goldrick-Rab et al., 2016), and "complex and changing" requirements created administrative frictions that may have undermined the program's effectiveness (Anderson et al, 2020).

Two recent studies have examined Pell's impact on both post-college earnings and college completion of continuing students. Denning, Marx, and Turner (2019) examine outcomes for students at four-year colleges in Texas, exploiting an income cutoff for a maximum Pell grant.[27] The authors find significant impacts on bachelor's degree completion and post-college earnings. Using the same cutoff in nationwide data, Eng and Matsudaira (2021) find a positive, but smaller, effect on degree completion and none on earnings. Eng and Matsudaira (2021) posit that interactions between federal and state aid explain the difference findings in the two studies: Texas's state aid program "crowds in" more aid for Pell students, thereby intensifying its impact.

3.3. State merit aid and other performance-based grants

Though about three-quarters of state grant aid is *predominately* need-based (even if some other criteria are considered), less than half is based *exclusively* on need (NASSGAP, n.d.). Non-need-based aid grew particularly quickly between 1995 and 2010. Dozens of states introduced merit aid programs that award up to full tuition and fees at state public universities to in-state resident students who meet modest academic criteria, such as a high school GPA of 3.0 and an above-average ACT or SAT score. These programs appealed to policymakers for their typically simple eligibility criteria, the potential to motivate higher pre-college achievement, and the potential to keep already higher-achieving students in-state. Since 2010, the growth of merit-based aid has slowed.

While literature reviews often set merit-based aid in contrast to need-based aid, in practice the wide variation in the design of programs discussed below is sufficiently large to call into question whether merit-based eligibility is really their primary defining characteristic. The generosity of aid provided, transparency of eligibility criteria, and institutional context are additional dimensions of program distinction which may matter as much or more in determining program effectiveness. We return to a discussion of possible mechanisms influencing aid effectiveness in Section 4.

Enrollment, persistence and completion. An explosion of research followed the introduction of the state merit-aid programs described above. The first papers used difference-in-differences and national surveys such as the Current Population Survey and IPEDS to examine the effect of the Georgia HOPE Scholarship, one of the first state programs (e.g., Dynarski, 2000; Long, 2004; Cornwell, Mustard, & Sridhar, 2006).[28] A second round of papers examined the effects of programs that followed Georgia's, again using difference-in-differences and survey data (e.g.,

[27] The authors also examine students attending two-year colleges, but here they find evidence that Pell affects *initial* enrollment. This potentially biases estimates of the effect of Pell on outcomes that are downstream of enrollment (note that the authors only have data on enrollees).

[28] A pair of studies using Census data to examine a broader set of merit-aid programs has called into question whether single-state, early estimates of the impact of merit aid may overstate the impacts experienced more generally (Fitzpatrick & Jones, 2016; Sjoquist & Winters, 2012).

Dynarski, 2004 and 2008; Sjoquist & Winters, 2012; Fitzpatrick & Jones, 2016).[29] A third round of papers has used RD and administrative data to estimate effects using sharp discontinuities in eligibility at achievement thresholds (e.g., Scott-Clayton, 2011; Cohodes & Goodman, 2014).

The literature to date has shown that these merit programs can lead to improvements in college readiness (Pallais, 2009); increases in college enrollment and performance (Bruce & Carruthers, 2014; Carruthers & Özek, 2016;); higher rates of degree attainment (Scott-Clayton, 2011); decreases in the loss of talented students to other states (Zhang & Ness, 2010); and even decreases in military enlistment in favor of college attendance (Barr, 2016). But a recent study of Florida's Bright Futures scholarship finds very small impacts on enrollment and attainment (Gurantz & Odle, 2022).

Researchers have identified unintended consequences in several merit aid programs. The Adams Scholarship in Massachusetts shifted towards in-state, public schools away from better-resourced options, reducing students' their rate of degree attainment (Cohodes & Goodman, 2014). Long (2004) finds that Georgia colleges raised room and board costs when HOPE was introduced.. And, in states where public colleges have more price-setting authority (e.g., Kentucky), schools have increased tuition after the introduction of state merit aid programs (Kramer, Ortagus & Lacy, 2018; Upton, 2014).

Institution-level performance-based scholarships operate at a different scale than state merit aid, and are often targeted differently as well, but add further to our understanding of how students respond to academic effort incentives. MDRC has conducted a number of RCTs on performance-based scholarships targeted to low-income students, and has documented positive effects on persistence and graduation, conditional on initial enrollment (Patel & Valenzuela, 2013; Richburg-Hayes et al. 2009). Further research suggests that performance-based scholarships influence students' time use during, but not after the incentives are provided (Barrow & Rouse, 2018).

A recent evaluation of the Buffett Scholarship provides the only experimental evidence on merit scholarship programs (Angrist, Autor, & Pallais 2021). The Buffett Scholarship offers an annual scholarship roughly equivalent to tuition and fees plus a $500 book credit, renewable for up to five years, at public colleges in Nebraska. Students need a 2.5 high school GPA to qualify for the program, and they must also show financial need (by falling below a certain EFC threshold). The scholarship requires a special application, including a high school transcript, essays, and letters of recommendation.[30] The authors find that the scholarship increased bachelor's degree completion rates by 8 percentage points among students who had applied to four-year schools, with the largest effects among lower achieving students.

Post-college outcomes. Scott-Clayton & Zafar (2019) use an RD to examine the long-term effects of West Virginia's PROMISE scholarship. Longer-term effects of eligibility included increased graduate school enrollment, homeownership and likelihood of living in a higher-income

[29] Several studies in this literature, including Fitzpatrick and Jones (2016) and Dynarski (2004), use two-way fixed effects for estimation, and thus may be susceptible to bias from dynamic treatment effects, although the direction of any potential bias is not clear (see Goodman-Bacon, 2021; de Chaisemartin & D'Haultfoeuille, 2022).

[30] For the purpose of the experimental design, applicants were ranked based on academics, need, and other factors prioritized by the funder, with the top 15% all receiving the scholarship with certainty, the middle 75% randomized to receive the scholarship, and no students in the bottom 10% receiving the scholarship.

neighborhood (Scott-Clayton & Zafar, 2019).[31] In contrast, One MDRC RCT of a year-long performance-based scholarship program for low-income mothers in Ohio found that while the program increased credit attainment and reduced time to degree, it did not have a detectable effect on earnings (Mayer, Patel, & Gutierrez, 2016).

3.4. Place-based "promise" programs

Promise programs typically provide several years of postsecondary funding to students who live in a specified geographic area - typically a school district (for a comprehensive review of evidence on place-based scholarship programs, see Anderson, 2019). These programs have sprouted up around the country over the past two decades, supported by a mix of public and private funding. While the nomenclature of "promise programs" is relatively new, the model is similar to the state-level merit aid programs just discussed (and the pledge programs discussed later).

One of the first programs implemented with the promise nomenclature was the Kalamazoo Promise in Kalamazoo, Michigan. In 2005, the Kalamazoo Promise began offering full in-state college tuition to Kalamazoo Public School graduates who had been enrolled in the district for at least four years (Bartik & Lachowski, 2014). Since then, over 100 communities have implemented promise programs across the country.[32]

Promise programs have many goals. They aim to spur local economic development by persuading families who value college to move to, or stay in, a local community. They hope to foster a college-going culture in the school district. Finally, they intend to increase educational attainment by subsidizing its cost (Swanson, Watson, & Ritter, 2020).

Promise programs vary in their qualification criteria, generosity, and eligible colleges. Generally, students must be enrolled in a promise district, with the required length of enrollment varying by program (Swanson, et al., 2020). Promise programs may have minimum GPA requirements (as in the Pittsburgh Promise) or income criteria (as in Achieve Atlanta). In terms of generosity, some are "last dollar," with promise funds kicking in after a student has exhausted other federal, state and institutional grant aid. Others are "first-dollar" programs which provide funding regardless of other aid (Swanson, et al., 2020). Lastly, programs vary in the freedom that they afford students in selecting a college. Some support enrollment only in four-year colleges; others include community colleges. For example, funds from the Pittsburgh Promise can be used to enroll in any accredited public or private institution in Pennsylvania (Swanson, et al., 2020).

Overall, as discussed below, promise programs have been shown to have positive impacts on college enrollment. Future research should focus on understanding why, as well as examining long-term effects. Swanson and colleagues (2020) conclude that program generosity and flexibility (in terms of eligible institutions) are linked to the magnitude of program effects.

[31] Note that we discuss Bettinger et al.'s (2019) study of the hybrid need-and-merit based Cal Grant program in the section on need-based aid above.

[32] See W.E. Upjohn Institute for Employment Research, "The Kalamazoo Promise and Place-Based Scholarships," https://www.upjohn.org/about/research-initiatives/promise-investing-community/kalamazoo-promise-and-place-based-scholarships

Multiple researchers have concluded find that the Kalamazoo, Pittsburgh, New Haven, and Knox Achieves promise programs have increased enrollment, persistence, and completion (Andrews, DesJardins & Ranchhod, 2010; Gonzalez, et al., 2014; Swanson & Ritter, 2020; Bartik, et al., 2021; Carruthers, et al., 2020; Page, et al., 2019; Daugherty & Gonzalez, 2016; Bozick, et al., 2015; Bell & Gandara, 2021; Ruiz, et al., 2020). As with state-level merit aid programs (e.g., Pallais, 2009), promise programs have been found to lead to improved K-12 outcomes, including reduced suspensions, increased credits earned, and improved measures of academic achievement, including GPA and standardized test scores (Bartik & Lachowska, 2014; Ash, et al., 2020). Knox Achieves provides both funding for college and mentoring; future research should parse the separate effects of these program components on high school graduation and college enrollment (Carruthers and Fox, 2016; Swanson, et al., 2020).

Few studies have looked at long-term outcomes, largely because promise programs are relatively new. Hershbein, McMullen, Pittelko and Timmeney (2021) use Michigan wage data to investigate labor market effects of the Kalamazoo Promise, and find no effects on wages up to ten years after high school. The authors hypothesize that graduates tend to leave the state to find work, a pattern also supported by qualitative interviews. Preliminary findings from Carruthers, Fox and Jepsen (2020) find that students eligible for Knox Achieves (which supports community college attendance) were more likely to remain in Tennessee and may have higher wages years later. As these two papers indicate, a key challenge in this research area is accounting for cross-state mobility. More educated workers are more likely to migrate across state lines; this tends to bias estimates of earning effects that are measured using only data from the state where the program is located (Scott-Clayton & Wen, 2019).

Several promise programs have been shown to increase local population, through increased in-migration and reduced out-migration (LeGower & Walsh, 2017, Bartik & Sotherland, 2015, Sohn, et al., 2017). Evidence is more mixed on any effect on housing prices (Sohn, et al., 2017; Bartik & Sotherland, 2015; Miller, 2018).

3.5. Statewide "promise" programs and related "free college" efforts

Entire states have also moved more recently in the direction of implementing promise programs or programs with the heading of "free college." Here, we place "free college" in quotation marks to acknowledge that we group these programs in terms of how they are branded and communicated, though they may or may not actually make college "free." These state-level programs are similar in design to local, place-based promise programs but expanded to a broader population. They can be distinguished by their emphasis on providing a simple guarantee of free tuition to a broad population of students. Recently, these programs have focused more on supporting and promoting two-year college attendance, although efforts are expanding to four-year college provision. As with local programs, there is variation across state-level programs in whether they have need and/or merit eligibility criteria.

Early commitment "pledge" programs predate the recent wave of state-level promise or free-college programs. Oklahoma and Indiana implemented programs in the 1990s, while Washington State followed in 2007. Pledge programs can have intense eligibility conditions and complicated application procedures that together may blunt their impact. The Washington College Bound Scholarship (CBS) program was intended to support college-going among students from low-

income backgrounds. Students were required to sign a college-bound pledge in middle or early high school, commit to a set of "good" behaviors, and complete the FAFSA. The CBS operated as a last-dollar scholarship, up to the cost of tuition and fees; the typical student received $2,000 in CBS funding. Using a triple-difference specification, Goldhaber, Long, Gratz and Rooklyn (2019) find largely null effects of the CBS program on academic and behavioral outcomes during high school.

Other state-wide promise or free-college programs have simpler messaging and more straightforward processes than Washington's. The Tennessee Promise, modeled after Knox Achieves, was implemented in 2015 as a last-dollar scholarship. It guarantees free community college tuition and fees to high school seniors who sign up, apply for financial aid, and meet with a mentor. Several studies conclude that the Tennessee Promise program increases student enrollment at community colleges (Bell, 2021; Nguyen, 2020; House & Dell, 2020). Bell (2021) finds that the program led to increases in tuition prices, while Odle, Lee and Gentile (2021) found it reduced first-time, full-time students' borrowing.

As of 2018, 16 states have enacted programs similar to Tennessee's.[33] Oregon established a statewide promise program that is a need-based, last-dollar scholarship guaranteeing at least $1,000 of support to cover community college tuition and fees for students who have a high school GPA of 2.5. Gurantz (2020) found that the Oregon Promise shifted out of four-year institutions and into community colleges in the first-year of the program. In the second year, however, postsecondary enrollment increased overall for eligible students (Gurantz, 2020). Bell (2021) showed enrollment shifts away from public four-year universities and private institutions, particularly among racial and ethnic minorities. Hodara and Childress (2021) find that the Oregon Promise opportunity improved college persistence and degree completion for students from the Portland area.

In 2017, New York became the first state to include both four-year and two-year colleges in a statewide, free-college program (New Mexico was the second, in 2022). The Excelsior Scholarship is a last-dollar scholarship for students with family incomes up to $125,000. Take-up of the program has been low (Scott-Clayton, Libassi, & Sparks, 2022). Unlike other free college programs, students apply by filing not one but *three* aid applications. They must also sign a contract agreeing to repay their aid if they fail to meet any of the post-award requirements, including residing in New York. The only available study of Excelsior's enrollment effects so far uses IPEDS data in a difference-in-differences design comparing New York's trends to a synthetic composite control state. The study finds negligible effects on enrollment, though small positive effects cannot be ruled out for the four-year public sector (Nguyen, 2019).

An effort implemented and experimentally studied at the University of Michigan helps to shed light on the mechanism underlying the impacts of free-college programs. Dynarski et al. (2021) in collaboration with the University of Michigan at Ann Arbor designed and experimentally tested the High Achieving Involved Leader (HAIL) scholarship program. The university sent targeted, personalized outreach to low-income, high achieving high school seniors in the state to offer an unconditional guaranteed scholarship to cover tuition and fees for four years for those who applied

[33] See Jen Mishory, "The Future of Statewide College Promise Programs," The Century Foundation (2018), https://tcf.org/content/report/future-statewide-college-promise-programs/?session=1&session=1#easy-footnote-bottom-1

and were admitted to the University of Michigan. Although most HAIL students would have had their tuition and fees at the University of Michigan covered anyway, the program eliminated uncertainty by guaranteeing free tuition without the need to file the FAFSA (Dynarski, et al., 2021). While we also discuss this intervention in our related Handbook chapter on college access and success (in the context of informational interventions), we include it here as well since the *guarantee* of aid, similar to some of the state programs described in this section, does have economic value in itself.

Burland (2022) unpacks the mechanisms of Dynarski et al (2021) by adding a third, informational arm to the experiment. Sending students detailed information about a free-tuition program they are *likely* eligible for has only a third of the impact on application rates as a *guarantee* of free tuition. Further, the guarantee increases enrollment by nine percentage points, while the targeted information has no effect.

This suggests the value of removing uncertainty about aid eligibility, even when the amount of additional aid provided may be relatively low. Through the lens of behavioral economics this makes sense; prospect theory (and the attendant evidence) suggests that people react strongly when an option shifts from being probable to being certain, even when probabilities are very high (Kahneman and Tversky). This finding is relevant for considering statewide free college programs: low-income students' enrollment could be influenced by the guarantee even if they don't ultimately receive significant additional aid.

Free college efforts have been discussed at the federal level but have yet to be carried to fruition. In 2015, President Obama proposed to use federal funds to cover 75 percent of tuition and fees for community college students in states that commit to cover the remainder.[34] After the bill died in Congress, President Obama assembled the College Promise Advisory Board to promote promise programs nationally.[35] In 2021, President Biden proposed committing $45.5 billion for tuition-free community college but this proposal also was dropped in Congress. The program would have been an opt-in federal-state partnership where the federal government would fund 100% of tuition, decreasing funding by 5% each year.[36]

As free college programs gain popularity in the United States, England has moved in the opposite direction, shifting from a system of free, state-sponsored higher education to a high-fee, high-aid model (Murphy, Scott-Clayton & Wyness, 2019). The key challenge of a free university system is constrained funding, which can lead to declining quality, caps on quantity, and inefficient allocation of resources to the students most in-need (Barr, 2004). The introduction of deferred tuition fees in England in 1998, along with a system for income-contingent repayment after college, was intended to bring in new resources to improve quality and relax supply constraints, without harming access for low-income students. Murphy et al. (2019) conclude that the policy

[34] Office of the Press Secretary, "Fact Sheet-White House Unveils America's College Promise Proposal: Tuition-Free Community College for Responsible Students," The White House, https://obamawhitehouse.archives.gov/the-press-office/2015/01/09/fact-sheet-white-house-unveils-america-s-college-promise-proposal-tuitio

[35] See Ashley A. Smit, "Obama Steps Up Push for Free," Inside Higher Ed (2015), https://www.insidehighered.com/news/2015/09/09/obama-unveils-new-push-national-free-community-college

[36] See Owen Daugherty, "Biden Administration Official Stress Commitment to Community Colleges," National Association of Student Financial Aid Administrators, https://www.nasfaa.org/news-item/26819/Biden_Administration_Officials_Stress_Commitment_to_Community_Colleges

largely achieved its goals. Importantly, though, although England no longer offers free college, the net liquidity–the cost students face and the resources they have access to up-front– increased. Given the policy change, students now have *more* funds to help pay for all other costs that might stand in the way of enrollment (Murphy, et al., 2019). The English case provides an important lens through which to consider future US efforts in support of free college. Namely, simply providing a free college program will not improve college access and affordability unless the net liquidity for students also increases (Murphy, et al., 2019).

3.6. Tuition prices and subsidies

Another set of studies examines the causal effect of policies to keep public college tuition low in the first place. Three studies exploit natural geographic variation in community college prices resulting from state-level community college taxing districts in Michigan and Texas: students who live within a given district face lower prices than similar students living just outside district boundaries (Acton, 2021; Denning, 2017; Martorell, McCall & McFarlin, 2014). All three studies confirm that students facing lower community college prices are more likely to enroll in college. Taking advantage of particularly granular data on student enrollment from the National Student Clearinghouse (NSC), Acton (2021) further finds significant reductions in private vocational (predominantly for-profit) college enrollment and no significant reduction in four-year enrollment. Acton (2021) is the only study to examine completion outcomes; she finds significantly higher bachelor's degree attainment for students who live just within a geographic boundary making them eligible for reduced community college tuition.

Note that the studies above that find positive effects of lower tuition are identified off of variation in prices *across students*: offering some students lower tuition, while keeping other features of institutional support and resources fixed. In contrast, studies that have examined the effects of tuition variation due to price caps or other forms of price regulation find a more complex pattern of results, because such policies often do not hold "all else fixed." If increases in tuition prices are paired with increased financial aid and increased institutional quality, net effects on student outcomes may be ambiguous or even positive.

Two studies find evidence that tuition deregulation can lead to positive effects. Andrews and Stange (2019) examine tuition prices, financial aid, and enrollment patterns for poor and non-poor students before and after Texas deregulated public university (four-year) tuition prices, allowing individual institutions and programs to set their own tuition. Tuition prices increased substantially overall, as did the variation in tuition prices across programs. Yet the change had no effect on overall enrollment for poor students, and actually *increased* enrollment of poor students at higher-quality programs (despite larger price increases for these programs). They find evidence that tuition deregulation led to both increases in need-based aid and increases in program quality, both of which could contribute to improvements in access for low-income students. These findings are consistent with an analysis of enrollment trends after England instituted tuition fees for the first time by Murphy, Scott-Clayton, and Wyness (2019). The authors find that the introduction of fees coincided with increased institutional resources, relaxed enrollment capacity constraints, and stabilized socioeconomic gaps in enrollment (after years of widening inequality). A third paper examines the imposition of tuition freezes and caps in the U.S. and finds that at four-year colleges, such regulations lead to reductions in institutional financial aid (Miller & Park, 2022).

The studies above highlight that tuition prices do not operate in a vacuum. Relatedly, two recent working papers find evidence that state appropriations have different consequences depending upon whether they go primarily towards increasing quality, or to keeping prices low. Using variation in tuition caps to disentangle these two channels, Deming and Walters (2017) find that enrollment and attainment outcomes for public institutions are more sensitive to college expenditure shocks than to sticker price shocks.[37] Chakrabarti, Gorton, & Lovenheim (2020) find that state appropriation shocks have different effects in the two-year and four-year sector. Public four-years appear to pass higher appropriations along to students in the form of lower tuition, lowering students' debt burden but with limited effects on attainment. Increased appropriations for two-year colleges lead to both lower prices and increased expenditures, and lead to significantly higher baccalaureate and even graduate school attainment.[38]

3.7. Education tax credits and deductions[39]

The delivery of aid for undergraduates through the tax system increased from nothing in 1990-91 to $22 billion in 2010-11, before falling back down to $12.2 billion in 2018-19. The Hope Tax Credit and Lifetime Learning Tax Credit were enacted in 1997. Early work examining the introduction of the credits generated conflicting findings, with Long (2004) finding no effects on college enrollment and Turner (2011) finding positive effects.

The Lifetime Learning Credit provides a credit of 20 percent of tuition and fees, up to $2,000.[40] The American Opportunity Tax Credit (AOTC), which replaced and expanded the Hope Tax Credit in 2009, is worth up to $2,500 per student for education expenses.[41] The AOTC is available for up to four years of undergraduate education for students enrolled at least half-time, and up to $1,000 of the AOTC is refundable for filers with no tax liability. The refundability of the credit and the allowance of expenses for course materials greatly enhances the value of the AOTC for low-income students.[42] Because filers can only claim one benefit per student, and the AOTC is both more generous and has a higher phase-out range, the Lifetime Learning Credit is mainly relevant for post-graduate education or for undergraduates enrolled less than half-time. While the

[37] To examine this, the authors create a measure of exposure by interacting idiosyncratic state budget shocks with a measure of how dependent the state's public institutions are on state funding. To disentangle the effects of raising tuition prices versus cutting expenditures, the authors further consider whether or not the institution faces tuition caps (or other limitations on how much tuition can change from year to year). Institutions that can't adjust tuition when they receive a budget shock are more likely to adjust how much they spend on students.

[38] The authors estimate the effects of state appropriations using a shift-share instrument in which time-varying shocks to state appropriations are interacted with a baseline measure of how dependent a given institution is on state resources (i.e., what percent of total institutional revenues come from state appropriations).

[39] We limit our focus here to the effects of education tax credits and benefits, but two other studies look at the effect of the Earned Income Tax Credit (EITC) on college outcomes. Manoli and Turner (2018) use a regression kink design to find the Earned Income Tax Credit (EITC) had positive effects on college enrollment for low-income households. Bastian and Michelmore (2018) find that exposure to expanded EITC benefits in childhood has long-term effects on college attainment and subsequent earnings. These studies others in the chapter in that they capture an income effect rather than a price effect.

[40] See IRS Publication 970 for details: https://www.irs.gov/publications/p970/ch03.html. The credit phases out for single filers with adjusted gross income between between $55,000 and $65,000 (or between $110,000 and $130,000 for joint filers). The credit is not refundable, meaning that for low-income filers, the value of the credit is also capped at the amount of tax liability.

[41] The AOTC covers 100 percent of the first $2,000 in expenses and 25 percent of the next $2,000.

[42] The AOTC phases out between $80,000 and $90,000 for single filers (or $160,000 to $180,000 for joint filers).

AOTC and the Lifetime Learning Credit are the largest tax benefits for undergraduates, other tax benefits for education include deductions of up to $4,000 for tuition and fees paid.

Two studies examining the universe of tax returns find zero effect of the tax benefits on college enrollment. Bulman and Hoxby (2015) and Hoxby and Bulman (2016) make use of non-linearities in the relationship between income and eligibility to identify effects. They find that the tax credits and deduction have no effect on college enrollment. Bergman, Denning, and Manoli (2019) complement these findings through a randomized control trial at Texas public universities. They find that awareness of the tax credits doesn't affect college enrollment for prospective or current students. This indicates that awareness alone is not the primary barrier to effectiveness of tax-based aid for college. The delayed timing of these benefits, as well as the fact that they disproportionately benefit relatively high-income filers, likely also limit their effects.

3.8. College savings plans

The federal and state governments offer tax incentives to save for college. We describe these programs here because the programs are often (incorrectly, in our opinion) classified as student aid. But these are tax shelters for savings, rather than student aid that changes the price of college for students. There is no evidence that these programs have any impact on educational attainment.

At the federal level, the Coverdell Education Savings Account (ESA) allows families to save for qualified higher education and elementary and secondary education expenses.[43] State governments offer two types of 529 plans: the prepaid tuition plans and the education savings plan.[44] The prepaid tuition plan allows families to prepay tuition and fees at current prices for higher education institutions, but the funds can't be used to pay for future room and board. The education savings plan allows families to save money in an individual investment account for postsecondary, secondary, and primary education and can be used to cover any educational expenses.

We are unaware of any quasi-experimental evidence of the impact of such programs on enrollment, and evidence even on the basic goal of increasing savings is mixed.[45] An evaluation of a 529 savings match program in Oklahoma (OK SEED) found that take-up was low – only 16% took up the offer to open an account with $100 in seed funds – and that disproportionately higher-income families opened and used accounts (Marks et al., 2014). A study of the Michigan SEED program, which offered a $1000 account-opening incentive as well as a match incentive for participants to contribute their own funds, found that while 67% opened accounts, only 22% contributed their own funds. Further, 55% of the amount contributed represented shifts from other types of savings (Engelhardt et al., 2012).

[43] See IRS, "Topic No. 310 Coverdell Education Savings Accounts," https://www.irs.gov/taxtopics/tc310

[44] See U.S. Securities and Exchange Commission, "An Introduction to 529 Plans," https://www.sec.gov/reportspubs/investor-publications/investorpubsintro529htm.html#:~:text=All%20fifty%20states%20and%20the,plans%20and%20education%20savings%20plans%3F

[45] Nam and Ansong (2015) do provide a propensity score analysis of degree completion patterns for children with and without college savings, using NLSY97 data to control for differences in observable student and family characteristics. Still, the endogeneity of savings decisions to college plans may be difficult to fully control for using only observable characteristics.

A study by Long and Bettinger (2017) examines the effect of combining account-opening assistance with a small ($50) account opening incentive. In their study, the program is targeted to families of children much closer to college-age (7^{th}-10^{th} grade). They find that account-opening assistance alone had little impact, but families that received the small financial incentive in addition to assistance were 22 percentage points more likely to open a 529 account and 7 percentage points more likely to sign up for automatic monthly contributions, leading to account balances that were nearly $2,000 higher on average than families who received no assistance or incentive. While they find no impact on college enrollment overall, assistance plus incentives do appear to increase the chances that students enroll in four-year rather than two-year institutions (Long & Bettinger, 2017).

One important caveat is that none of these studies, even the most optimistic ones, find impacts on savings that would be large enough to substantially fund a college degree. Thus, they are unlikely to take the place of a robustly funded and accessible system of student financial aid.

3.9. Veterans' education benefits

The mid-century GI Bills for veterans of World War II and the Korean War provided "the largest direct scholarship program for higher education in American history" (Stanley 2003, p. 671). A similar program benefited WWII veterans in Canada. Several studies (Card & Lemieux, 2001; Bound & Turner, 2002; Stanley, 2003) find substantial effects of GI benefits on college enrollment and attainment, using cohort-based variation in enlistment rates.

Between 1985 and 2009, the main source of education aid for veterans was the Montgomery GI Bill, which provides a monthly allowance (currently around $1,300 for full-time students) for up to 36 months of enrollment (Barr, 2016). Although the MGIB is still available, many service members now benefit from a substantially more generous program implemented under the Veterans Educational Assistance Act of 2008 (often called the Post 9/11 GI Bill). This program pays a benefit equal to the maximum tuition and fees charged by public institutions in the veteran's state of residence, plus a generous housing allowance.[46] Although just 4 percent of undergraduates receive these benefits, the average benefit is so high among those who qualify that annual federal expenditures on veterans' education benefits after 9/11 were as large or larger than Pell Grants were before 9/11 (in inflation-adjusted dollars; see Table 1). Veterans' benefits can be used for a wider range of educational programs than Title IV aid (including on-the-job training and apprenticeships), including some not bound by Title IV regulations.

Several recent studies have examined the effects of the more generous Post 9/11 GI Bill on college enrollment, attainment, and post-college earnings. Barr (2016) uses a difference-in-differences approach to examine how veterans' enrollment responded to the introduction of the Post 9/11 GI Bill, using the enrollment trends of demographically similar non-veterans as a comparison group. He finds the new program increased college enrollment among veterans by 2 percentage points. Barr (2016) notes that his estimates, along with earlier findings from Simon, Negrusa, and Warner

[46] Since 2011, the maximum benefit for enrollment at private institutions is set at a flat rate nationally.

(2010) imply a lower enrollment effect per dollar of aid than has been found in other contexts.[47] Barr argues that the smaller effect could be due both to the older population as well as to the higher baseline level of benefits prior to expansion.

Barr (2019) looks at the effect of the Post-9/11 benefit expansion on degree attainment. Using administrative data on veterans linked to attainment data from the National Student Clearinghouse, he finds degree completion increases about 0.4 percentage points per $1000 in additional benefits. Barr et al. (2021) examines impacts of the Post 9/11 GI Bill benefit expansion on earnings. Effects on earnings 7 to 9 years after separation from the military are *negative*, suggesting that any return to the additional schooling is outweighed by the loss of working experience.[48] In probing effect heterogeneity, the authors find that the negative effects are concentrated among the "least skilled" veterans (as measured by military experience and AFQT scores), who disproportionately use their benefits to enroll in for-profit institutions, which other research finds to have low to zero value-added (Deming, Goldin, & Katz, 2012; Cellini & Turner, 2019).[49]

3.10. Work-study programs

The Federal Work-Study (FWS) program subsidizes up to 75 percent of the wages of students engaged in on-campus employment for up to 20 hours per week. While much smaller than federal Pell Grants or student loans, FWS still reaches over half a million students each year, including one out of every 10 full-time undergraduates. The program is a federal "campus based" aid program, meaning students must complete a FAFSA to establish eligibility, but individual institutions get different amounts of funding and have some discretion over how to prioritize and distribute funds, as long as recipients have documented financial need. Since need is simply the difference between the full cost of attendance (including books, transportation, and living expenses) and other aid received, even relatively high-income undergraduates can qualify for FWS if they attend sufficiently expensive institutions. A relatively-high income student might qualify for FWS at an institution with a large funding allocation, while a low-income student might not receive any FWS at an institution with a low funding allocation. The inequitable distribution of campus-based allocations has been a policy concern for several decades, but efforts to modify the allocation formula have had only minimal effects (Kelchen, 2017).

Work-study programs have the potential to divert students' effort away from school, with potential negative consequences for college outcomes. On the other hand, the majority of today's undergraduates already work while enrolled, often in low-skill, off-campus jobs with no connection to students' majors, and often with little consideration for students' academic schedule and goals (Scott-Clayton, 2017). Work-study programs thus could reduce scheduling frictions and provide students with access to better-quality, more career-relevant jobs.

[47] Simon, Negrusa, and Warner (2010) find benefit uptake increases by about 5 percentage points per $10,000 in additional benefits; however, their strategy relies completely on time variation among service members, without controlling for broader patterns of enrollment.

[48] The authors' simulations suggest that the returns to educational investments made in this context are unlikely to overcome the negative earnings effects of lost work experience even in the longer term.

[49] Further, a recent working paper finds evidence that the generosity of veteran's benefits affected tuition prices at for-profit colleges, but not those in other sectors (Baird, Kofoed, Miller, & Wenger, 2020).

Similar programs exist in other countries, including Canada and Uruguay. The program in Uruguay, *Yo Estudio Y Trabajo* (YET, translates as "I study and work") provides part-time jobs at state-owned firms to young people age 16-20 who are enrolled in school and have not worked in the previous three months. Eligible applicants are selected via a lottery, and a recent working paper by Le Barbanchon, Ubfal and Araya (2020) makes use of this in a causal evaluation. The authors find the program both increased educational attainment (by 0.17 years) and increased earnings by 8% two years after participation. Importantly, effects did not seem to depend upon the relationship between the job sector and the student's field of study. Although many participants were in secondary rather than postsecondary education, a subgroup analysis of university participants found a similar pattern of effects.

FWS in the U.S. has not yet been evaluated via a randomized-control trial (RCT), though one is currently underway.[50] But three relevant studies have used quasi-experimental methods (Stinebrickner & Stinebrickner, 2003; Scott-Clayton, 2011; Soliz & Long, 2016) and a fourth study carefully matched participants with observably similar non-participants (Scott-Clayton & Minaya, 2016) to provide suggestive evidence on the program's consequences.[51] These studies consistently suggest that compared to not participating in FWS, FWS employment may reduce first year grade point averages (GPAs), though the effect was small in three of the four studies and statistically insignificant in two of the four.

Modest negative effects in the short term, however, may be outweighed by positive effects over the longer term. Matching-based estimates from Scott-Clayton and Minaya (2016) using nationally representative survey data suggest that FWS participation is associated with a 3 percentage-point increase in the likelihood of completing a bachelor's degree and an increased likelihood of being employed six years after initial enrollment, with larger effects for low-income students and students at public institutions. A separate matching-based study using administrative data from a single community college also found positive effects on credential completion and/or transfer (Yu, McKinney, & Carales, 2020). Still, the potential for bias due to students' selection into FWS participation means these matching-based estimates should be interpreted with caution.

3.11. Emergency grant aid

As described in Evans, et al. (2019), the rationale behind emergency aid is to provide extra funds with a quick turnaround to prevent students from dropping out of school due to unexpected crises such as a necessary vehicle repair, housing disruption, or child care expense. These "just in time" aid programs appear to be proliferating at campuses around the country, and during the COVID-19 pandemic, the federal government provided three stimulus packages that included funds for emergency financial assistance for students.[52] An early analysis of nationally representative data during the pandemic found that 22 percent of students with Pell Grants received emergency

[50] See https://ies.ed.gov/funding/grantsearch/details.asp?ID=4500.

[51] Scott-Clayton & Minaya (2016) argue that the selection-on-observables assumption is more plausible for FWS participation than it is for program evaluation in general, since the main determinants of students' FWS eligibility are observed, and variation in similar students' access to funds is largely influenced by differences in federal allocations to institutions, which are set by a historical formula.

[52] Funds for emergency financial assistance were allocated in the HEERF CARES Act in March 2020, the Coronavirus Response and Relief Supplemental Appropriations Act in December 2020, and the American Rescue Plan Act in March 2021. Institutions had to allocate at least 50% of their federal allocation to provide emergency financial aid grants to students.

financial assistance from their institution in 2019-20, as did 9 percent of students without Pell Grants (Cameron et al., 2021).

Prior to the pandemic, the small size and scattered nature of these programs has made them a challenge to evaluate rigorously. One recent RCT, however, included an emergency aid treatment arm, as part of a broader evaluation of the impact of the Stay the Course (STC) program, an intensive case-management service for low-income community college students at Trinity River Campus of Tarrant County College (Evans et. al, 2019, 2020). The authors find that while the full STC treatment significantly increased student persistence and degree completion, students who received access only to the emergency aid fund saw no increase in persistence or completion after six semesters (the authors note, however, that small positive effects cannot be ruled out). It is possible that emergency aid could play some role in the comprehensive treatment, but that without the additional mentoring supports students are not able to make the best use of the funds. In addition, the challenge of requiring students to proactively seek resources while in crisis may present a barrier to the effectiveness of such programs. Evans et al. (2019) note that out of 299 students offered access to the emergency aid fund, only 126 enrolled and only 74 ever made a claim; only 5% received the maximum emergency aid over three semesters (up to $500 per semester for a total of $1500). Further research into the effectiveness of broad-based emergency funding, such as was distributed during the COVID-19 pandemic, will provide needed contributions to this nascent area of research.

3.12. Student loans

A full discussion of student loan policy would require its own separate handbook chapter. In Volume 5 of this Handbook, Lochner and Monge-Naranjo (2016) review theory, evidence, and policy up to that date. But until relatively recently, only a handful of studies had directly examined how student loans affect college enrollment, performance, or completion, let alone post-college outcomes such as earnings, homeownership, and family formation. In just the past five years, the research evidence has blossomed not only to examine these questions, but also to explore other contextual factors such as what drives students' decisions about whether or how much to borrow, what drives vast racial disparities in student loan outcomes in the U.S., and how the structure of repayment options can affect students' financial wellbeing.

Impacts on enrollment and persistence. The evidence examining the causal effect of student loans on *initial* college enrollment is most robust outside the U.S., where several regression-discontinuity (RD) studies find generally large positive impacts. For example, in Chile, access to student loans is determined by both income quintile and test score. Examining college applicants around the test score cutoff, Solis (2017) finds that college enrollment is 16 percentage points higher for college applicants who just barely qualify for loans (from a baseline college enrollment rate around 30 percent); he also finds that the program virtually eliminates the income gradient in college enrollment for students above the cutoff. Subsequent research on the same program by Bucarey, Contreras, & Muñoz (2020) finds, however, that student loans in the Chilean context *reduced* eventual degree completion and earnings, by inducing students to switch from higher quality vocational institutions to lower quality universities.[53] Examining college applicants just

[53] For additional background on Chilean student loan program design, see Beyer et al. (2015). Two as yet unpublished working papers examine other elements of the Chilean student loan program. Montoya, Noton, & Solis

above and below a credit score cutoff for loan access in South Africa, Gurgand, Lorenceau, and Mélonio (2011) find a large, 20 percentage point increase in college enrollment for students with access to loans (from a baseline enrollment rate of about 50 percent). Melguizo, Sanchez, and Velasco (2016) also find that beneficiaries of student loans in Colombia had substantially higher enrollment and lower dropout rates (a 20 percentage point increase and 7 percentage point decrease, respectively), using an RD strategy based upon a high school exit exam cutoff for loan eligibility.

It is empirically challenging to estimate the effects of loan access on initial college enrollment in the U.S., where federal loans have been available for many decades, regardless of income or test score.[54] Most of the evidence on student loans from the U.S. is based on three sources of variation: 1) whether or not community colleges automatically include ("package") loans in students' initial aid award letters, 2) differences in the amount of loans available due to discontinuities in the eligibility formula and policy changes over time, and 3) differences in borrowing induced by informational or framing interventions. Most of this research is limited to students already enrolled in college, so effects on persistence, graduation, and post-college outcomes are typically estimated conditional on students' having enrolled in the first place.

One notable exception here is Marx and Turner (2019), who run an RCT with financial aid applicants at one large community college, including both new and returning aid applicants. Like many community colleges in the U.S., this institution did not normally package student loans automatically in their aid award letters, even though most students were eligible to receive them. The authors thus randomly assigned some aid applicants to receive a loan offer (which they could then choose to accept or decline). They find no effects on enrollment, but do find effects on loan uptake as well as on credit accumulation, GPA, and transfer to four-year colleges (estimated effects on degree completion were small and statistically insignificant, though the follow up window was only one year).

Persistence, completion, and post-college outcomes. Marx and Turner's (2019) RCT results are in line with other RCT and quasi-experimental evidence that student loans generally improve outcomes for U.S. community college students. For example, earlier quasi-experimental studies that used institution-year level variation in whether or not community colleges offer access to federal loans and found that loan access led to increased enrollment intensity and persistence, conditional on initial enrollment (Dunlop, 2013; Wiederspan, 2016). Another RCT study of a text message intervention, intended to prompt more active and informed borrowing decisions, reduced student loan borrowing and found that students completed fewer credits and were significantly more likely to default after college as a result (Barr, Bird, & Castleman, 2019).[55] Denning's (2019) study (cited in Section 3.2 above) also finds that already-enrolled low-income students who gained

(2018), working contemporaneously with Bucarey et al. (2020), find a similar pattern of results but note that the earnings effects are dynamic over time, and could eventually turn positive. Aguirre (2019) performs an RD analysis around a lower loan threshold for technical college enrollment, and finds small positive effects on enrollment and degree completion (around 1-1.5 percentage points).

[54] Heller (2008) reviews the non-experimental literature on whether loans increase college access and concludes that college enrollments are not as sensitive to loans as to grants, but cannot conclude whether or not they may still be cost-effective (given they cost the government only a few cents on the dollar to provide). An unpublished working paper by Dynarski (2005) finds suggestive, but ultimately inconclusive evidence that student loan expansions in the United States in the early 1990s led to increased college attendance.

[55] Effects on persistence and degree completion were negative, but small and statistically insignificant.

access to increased loan eligibility (based on the age cutoff for independent student status) completed college faster as a result. Outside the U.S., Card and Solis (2022) study the effects of student loan access on persistence and completion, for university students who initially enrolled without such access. After retaking an eligibility exam, those who just barely passed and got access to loans as a result were 20 percentage points more likely to re-enroll the next year, and approximately 12 percentage points more likely to eventually complete a Bachelor's degree.

Two recent studies examine the effects of student loans not only on college outcomes but also on post-college earnings, and find significant positive effects. A study of New Zealand (NZ) bachelor's degree enrollees by Chu & Cuffe (2021) examines the impact of continued loan access for students on the margin of failing an academic performance standard after approximately their second year of study. Students failing more than half their classes at that point were at risk of losing access to loans, which are virtually the only form of student support in NZ. The policy led to a discontinuity in loan uptake around the passing threshold for women but not for men, so estimates are only obtained for women.[56] The authors find enormous impacts of continued loan access on persistence and graduation of 8-12 percentage points in the reduced form analysis, implying 50-70% of those who maintained access to the loan were able to complete a degree. They find similarly large impacts on earnings, of about $2000NZ per month for those whose loan access was affected by the policy. The authors argue that the central role of student loans in the NZ context, as well as the general high quality of postsecondary programs in NZ, can help explain the large magnitude of the results.

In the U.S., a working paper by Black et al. (2020) examines public two- and four-year college enrollees in Texas who borrowed in their first year of enrollment and also finds positive effects on earnings. The authors implement a difference-in-differences design comparing cohorts of "constrained" and "unconstrained" students before and after an increase in student loan limits, under the rationale that the increase should only affect constrained students. Constrained students are defined as those who borrowed the pre-policy max or more in their first year of college, while unconstrained students are those who borrowed less than the pre-policy max in their first year. The authors conclude that the larger loan limit increased bachelor's degree attainment by six percentage points, and also led to higher post-college earnings (a 4-6% increase 6-8 years after college entry) and a reduced likelihood of student loan default (an 18% reduction within 4 years of entry). The study reinforces findings from the community-college context above that increased access to student loans can improve college outcomes, at least in the public sector. Caution should be taken in generalizing these results beyond the public sector, and it's also worth noting that students defined as "constrained" in this study had higher incomes and were less likely to be Black, Hispanic, American Indian, or Native Alaskan than "unconstrained" students. Another open question is to what extent earnings effects may be partly due to differential career choices for those with higher levels of debt (a la earlier research by Rothstein & Rouse, 2011) versus increased human capital alone.

At least one study has found null effects of increased access to student loans in the U.S. context. Denning and Jones (2021) use an RD strategy that takes advantage of a course-credit cutoff that determines whether students are classified as third-year versus second-year undergraduates, where

[56] The policy was not strictly enforced, and among those who failed the academic performance criteria, men were more likely than women to obtain a loan regardless.

third-year status gives students access to larger limits. They find no effects on academic performance, persistence, or completion for their sample of public university students in Texas (although the persistence and completion results are too imprecise to rule out small effects). It could be that university students around this cutoff are sufficiently committed to college and have other options for financing the rest of their studies; still, the reasons for this disparate finding are not fully clear.

A common question in policy and public discourse is what role student debt plays in post-college decisions such as career choice and homeownership. The question is a complex one given that student debt may affect decisions on numerous different margins, and it's not always clear what is to be "held fixed" when considering the effects of higher student debt. For example, if increased access to student loans increases student enrollment, persistence, and completion as several studies discussed above conclude, this could increase post-college earnings and associated financial and wellbeing outcomes through a human capital channel, even if loans decrease homeownership for any fixed level of educational attainment.

Rothstein and Rouse (2011) leverage a discrete change in a selective private institution's aid policy that substantially lowered student debt among graduates, and found that this led more graduates to pursue public interest jobs. More recently, Mezza et al. (2020) use a national credit report database to find substantial reductions in homeownership for those with higher loans, of approximately 1.8 percentage points per $1000 in additional debt.[57] Their empirical approach uses changes in public-in-state tuition levels as an instrument for student loan debt, for a sample of younger individuals. The authors present evidence that the instrument affects only debt levels, and not educational attainment or other confounding factors. These results are consistent with an analysis by Bleemer et al. (2021) which examines the role of tuition costs across states and time for more recent cohorts, and also finds a negative relationship with homeownership in the context of little effect on attainment.

As federal policymakers in the U.S. consider proposals for broad-based student loan forgiveness, direct causal evidence regarding the potential impacts on borrower outcomes is unfortunately thin. We are aware of only one recent study which uses a quasi-experimental approach to estimate the effects of student debt forgiveness. Di Maggio, Kalda, and Yao (2020) use a difference-in-difference approach to examine distressed private student loan borrowers facing collections lawsuits, who had their debts discharged because the debt holder could not prove chain of title. The comparison group is comprised of borrowers whose debts were held by the same company and who were similarly facing collections, but whose debts were not discharged by the end of the sample period.[58] They find that affected borrowers, who received over $7,000 in debt forgiveness, had fewer delinquencies on other accounts, were more geographically mobile, and earned about $3,000 more over three years than did the comparison group. Their analysis of mechanisms suggests the effects operated through the elimination of "debt overhang," allowing borrowers to take better advantage of career opportunities.

[57] Mezza (2020) also provides a useful review of the descriptive evidence on how student debt correlates with post-college decisions including marriage, fertility, and parental cohabitation; these studies document suggestive correlations but we omit them here due to lack of strong causal interpretation.

[58] The authors conduct a number of sensitivity tests with alternate comparison groups and find consistent results.

The impacts of loan repayment plan design. Another strand of literature highlights that student loans may affect borrowers differently depending on how repayment plans are structured. Evidence from an RCT by Field (2009) provides evidence that students experience negative psychological costs from carrying debt: law school graduates were more likely to pursue public interest careers when offered conditional grants that would convert to loans if graduates opted out of public service, than when offered loans that would convert to grants if their service obligations were fulfilled (even though the two options are financially equivalent).

Two studies document that income-driven repayment (IDR) plans can not only help those experiencing current financial distress, but also can act as a form of insurance protecting borrowers against unexpected future financial distress.[59] For example, Mueller and Yannelis (2019) find that the introduction of a new IDR plan in 2009 protected borrowers from default when they were exposed to recession-related local income shocks. Specifically, they find that student loan defaults increased more in areas where housing prices declined more during the Great Recession, but that this relationship was attenuated after the introduction of IDR for borrowers who enrolled in these plans (but not for those who didn't).

Herbst (2019), using data from 2013 to 2017 on already-delinquent borrowers, finds that those who enrolled in an IDR plan were 25 percentage points less likely to be delinquent 10-16 months later, compared to those who remained enrolled in the Standard plan. Two years later, they also had higher credit scores and were more likely to have purchased a home. The author uses two strategies to estimate a causal effect of IDR enrollment, as opposed to a mere correlation. First, rather than simply comparing IDR and non-IDR enrollees, he compares trends in outcomes for IDR and non-IDR borrowers over time, and shows that the effects only appear after actual IDR enrollment. Second, he takes advantage of the fact that loan servicers' call agents vary in their effectiveness at enrolling borrowers in IDR, and there is some randomness in which agent calls a given borrower. He finds that borrowers who received a call from an agent who happened to be very effective at IDR enrollment were significantly more likely to enroll in IDR, and experienced improved outcomes as a result.

Though some analysts worry that IDR plans may lead borrowers to pay off their loans too slowly, a working paper by Herbst (2019) finds that delinquent borrowers who enrolled in IDR actually paid *more* towards their total debt in the 30 months following enrollment than similar borrowers who did not enroll. Even though their minimum required payments were substantially smaller, borrowers were also more likely to actually make their minimum payments under the IDR plan, resulting in a net increase in average payments overall.

The availability of IDR options may also interact with the effectiveness of other college finance policies. The introduction of tuition fees in the UK, for example, might have had very different consequences for college access if an income-contingent repayment system had not been introduced at the same time, meaning no fees had to be paid by students upfront (Murphy, Scott-Clayton, & Wyness, 2019). Indeed, a recent working paper finds that German voters, when surveyed about their support for various policy options, are much more likely to say they support

[59] A variety of different IDR plans have been introduced over time in the U.S., generally with increasing generosity and eligibility, but all share the common feature that they limit monthly payment amounts, potentially decreasing required payments to zero, for borrowers who have low incomes while in repayment.

increases in tuition fees when the experimenters paired the policy with income-contingent repayments post-college (Lergetporer & Woessmann 2022).

In this context, many researchers and policymakers have been puzzled by the relatively low take-up in the U.S. of these apparently highly beneficial IDR plans. Another recent paper by Cox et al. (2020) provides a plausible explanation: borrowers are heavily influenced by the default (i.e., status quo option) repayment plan when making their initial choice of plans. Using an incentivized lab experiment, the authors find that hypothetical enrollment in the Standard (10-year, mortgage-style) repayment plan drops by nearly half - from 63% to 34% - when the default option is changed from the Standard plan to an IDR plan. Purely informational interventions had much smaller effects, a theme echoed elsewhere in the financial aid take-up literature.

Loans are likely to remain a substantial feature of postsecondary finance globally, given they offer policymakers the potential to expand access at much lower cost than an equivalent amount of grants. Given the prevalence of loans, there is a lot more to learn. Especially compared to the deep literature on grants and scholarships, we still know very little about how key elements of loan policy affect student choices.

IV. Lessons from the literature

In a review of the literature, we are necessarily bound by the evidence that exists up to this point. But there is enough of it to begin to draw broader generalizations which may be of use to policymakers wondering about the effects of a new program that hasn't yet been evaluated, or a proposed program that hasn't yet been designed. While we already touch upon all of these issues in our discussions of specific studies above, here we pull them together to highlight key insights from the research thus far.

4.1. Potential mechanisms

4.1.1. Complexity, uncertainty, and timing of aid application and delivery

Complexity, uncertainty, and delayed timing are increasingly understood as barriers not only to college access in general, but also to the effectiveness of financial aid specifically (Dynarski & Scott-Clayton, 2006). A number of interventions seeking to provide students with better, earlier information on aid eligibility and/or to make the application process simpler and less uncertain are reviewed in detail in another chapter of this Handbook (Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022, Volume 6).

In general, our review of this evidence indicates that informational interventions alone have limited impacts (such as, for example, the passive provision of net price calculators on college websites, or even proactive communication of eligibility for tax benefits; see, e.g., Levine, 2014; Bergman, Denning, & Manoli, 2019), while interventions that provide application support and/or provide upfront guarantees of aid eligibility without complex applications show more promising results (see, e.g., Bettinger et al., 2012; Dynarski et al., 2021; Burland et al. 2022).

Complexity, uncertainty and backloaded information about aid eligibility may help explain why the evidence on the impact of Pell Grants is less decisive, particularly on the initial enrollment

margin (as opposed to post-enrollment outcomes conditional on enrollment, where a few studies have found positive effects), than for other types of grant aid that don't require a FAFSA. This may explain the lack of impact of education tax benefits: the value of the benefit is not known in many cases until several months after enrollment, and many households fail to optimize which of the available benefits they claim. It can also help explain the underutilization of complex income-driven loan repayment options in the U.S., despite the success of simpler IDR programs in other countries.

The recent growth of "free college" programs can be viewed in part as a response to increasing frustration with the complexity of understanding college costs. These programs themselves, though, encompass a variety of different designs, with different levels of eligibility, coverage, and renewal requirements, and many if not most still require students to file a FAFSA to qualify. New York's "free college" Excelsior Scholarship program, for example, covers tuition but not mandatory college fees, and requires students to fill out three applications to establish initial eligibility (the FAFSA, a state aid application, and the Excelsior application) and sign a contract committing to repay the aid if certain conditions are not met (Scott-Clayton, Libassi & Sparks, 2022). As evidence expands on the impact of these types of programs, it will be important to assess how design variation may moderate impacts. It also remains to be seen how recent efforts to simplify the FAFSA may improve the effectiveness of federal aid.

4.1.2. The role of institutional quality

The critical role of institutional quality - whether as part of the baseline context in which aid programs operate, or as a potential mechanism of impact when aid creates incentives to attend certain types of institutions - is another clear thread to emerge across the literature. It's also a critical aspect to keep in mind when attempting to generalize from one context to another: it may be a particular factor in countries like the U.S. where government aid often can be used at a wide variety of institutions, including community/technical colleges and for-profit colleges.

To the extent that aid programs push students into better resourced, high-quality institutions, this may improve subsequent outcomes. For example, the private Buffett Scholarship program appears to have increased degree completion primarily by shifting applicants to enroll in and complete more credits in four-year colleges instead of two-year colleges (Angrist, Autor, & Pallais, 2021), even though it had no effect on postsecondary enrollment (at any institution) overall. Finally, the particularly large earnings impact of student loan access in New Zealand may be partly explained by the high quality of institutions attended (Chu & Cuffe, 2021).

In contrast, to the extent that students are induced into lower quality institutions, this could reduce the impact of financial aid or even cause it to become negative. For example, Massachusetts' Adams Scholarship, actually reduced college degree completion, by inducing students to enroll in in-state, public institutions rather than the higher-resourced institutions they would have attended otherwise (Cohodes & Goodman, 2014). Bucarey, Contreras, & Munoz (2020) found that a loan program in Chile reduced degree completion and earnings by creating incentives for students to attend lower-quality institutions. Similarly, two papers finding null or negative earnings effects of financial aid, even despite positive enrollment effects, occurred in contexts in which the induced enrollment was primarily at for-profit institutions (see, e.g. Barr et

al., 2021 on the PGIB veterans benefits, and Gurantz, 2022 on Competitive Cal Grants for non-traditional students).

Bettinger et al.'s RD study of Cal Grants (2019) shows that understanding institution quality is not always so simple as measuring whether students switch sectors. They found that higher-income students were more likely to switch sectors to attend private institutions, which were more expensive, but lower-quality on metrics such as per-student expenditure. In contrast, lower income students (who ultimately saw bigger degree completion and earnings effects than higher income students) showed little evidence of switching institutional sectors, but the institutions they shifted into did appear to be higher quality on metrics such as graduation rates and research expenditures.

The role of institutional quality will be an important factor to consider in tracking the longer-term outcomes of new statewide free community college programs, if these programs induce some students who otherwise would have attended a four-year college to switch to often lower-resourced community colleges. Early evidence on both Knox Achieves and Tennessee Promise (Bell, 2021; Carruthers, Fox, and Jepsen 2020 working paper) as well as on the Oregon Promise (Gurantz, 2020) suggests that some such switching does occur, though not necessarily enough to outweigh the positive effects on enrollment overall.

Finally, most studies in the financial aid literature examine the effects of aid, holding broader institutional resource policy fixed. But as discussed in Section 3.6, the impact of tuition costs and financial aid policy when implemented at scale cannot always be disentangled from simultaneous choices about institutional resources (e.g., per-student expenditures). Evidence suggests that improvements in institutional resources, combined with well-designed aid programs, can lead to improved postsecondary access even when sticker prices go up (Andrews & Stange, 2019; Murphy, Scott-Clayton, & Wyness, 2019).

4.1.3. Where the money goes (the Bennett hypothesis, crowd-out, labor supply and other effects)

Understanding where aid money goes can also help interpret the pattern of effects for a given program under examination. In the U.S. especially, decentralized tuition-setting and numerous aid programs at the federal, state, institutional, and private level may increase the potential for unintended interactions.

A common question is whether increases in financial aid simply encourage institutions to raise tuition prices in response, capturing resources intended for students. This is referred to as the "Bennett Hypothesis" after former U.S. Secretary of Education William Bennett, who famously raised this concern. There is some evidence to support this, but primarily among for-profit colleges, perhaps because of their high reliance on federal financial aid funded students.[60] For example, for-profit schools that are eligible to receive federal Title IV aid charge significantly more than similar institutions that are not eligible for federal aid (Cellini & Goldin, 2014). Further, a recent working paper finds that a 2010 change in the generosity of veteran's PGIB

[60] In 2019-20, nearly half (45%) of for-profit Title IV-eligible schools derived more than 70 percent of their revenue from Title IV aid. See: https://studentaid.gov/data-center/school/proprietary

benefits–which increased the maximum benefit in some states, and lowered it in others—affected tuition prices at for-profit colleges, but not in other sectors (Baird, Kofoed, Miller, & Wenger, 2020). An analysis of Tennessee Promise finds some evidence that eligible public institutions raised tuition more than ineligible institutions after the start of the program, but the finding is not robust to alternative specifications (Bell, 2021). Kelchen (2019, 2020) finds little evidence that large expansions in graduate PLUS loan availability had any effect on tuition prices among law schools, business schools, or medical schools.

Interactions between different types of aid offered is another complicating factor. Some interactions come from students' own choices: Marx and Turner (2018) find that students who just barely qualify for the minimum Pell Grant were less likely to take out a larger student loan, meaning they could actually have *less* cash on hand than students who did not qualify for the minimum Pell. Other interactions come from institutional aid policies: one study finds that up to three-quarters of Pell Grant awards are clawed back from students through reductions in institutional grant aid at selective private institutions (Turner, 2017). However, the same study found that only about 5 percent of Pell grants were "clawed back" at the public institutions most Pell recipients attend. Community colleges often don't have significant institutional aid to claw back, but Park and Scott-Clayton (2018) nonetheless find that community colleges in one state prioritized Pell-ineligible students in their awarding of limited state aid dollars, potentially having the same effect as a claw-back.

In contrast, some state aid programs are pegged to Pell eligibility such that Pell eligibility "crowds in" additional aid. Matsudaira (2021) hypothesizes that this could help explain some of the apparent variation in Pell's impacts across states: Denning, Marx, & Turner's (2019) finding that Pell eligibility increases post-college earnings in Texas, could partly be attributed to a state program which piggybacks on Pell.

Concerns about the interactions of federal and state aid are likely to increase in the future, with the rise of last-dollar free college and promise programs that cover the difference between Pell Grants and tuition costs. There is already some evidence that state governments take federal support into account when setting their higher education budgets. For example, when "maintenance of effort" provisions were inserted into the American Reinvestment and Recovery Act of 2009, requiring states to commit at least as much postsecondary funding as they had in 2006 if they wanted to receive the maximum in higher-education-related federal stimulus dollars, many states opted to reduce their expenditures to almost exactly the required minimum (Alexander, 2010).

A few studies provide insight into what students do with increased resources, when they have them. Several studies have found at least suggestive evidence that grant aid reduces' student labor supply while enrolled (Scott-Clayton, 2011; Broton, Goldrick-Rab, and Benson, 2016; Park & Scott-Clayton, 2018; Denning, 2019; Kofoed, 2022), potentially freeing students up to devote more time to school. Cornwell and Mustard (2007) also find that the Georgia HOPE scholarship increased vehicle purchases. Note that because students must support regular living expenses while enrolled, increases in consumption (food, housing, transportation, and leisure activities) may support students' persistence and completion, even if the expenses are not explicitly education-related.

4.1.4. The role of performance requirements

Performance standards are ubiquitous in practice, even in need-based aid programs such as Title IV federal aid (Pell Grants, student loans, FWS). Yet evidence on the role of performance requirements - either as an upfront eligibility criterion, or as a condition of aid renewal - is less straightforward than the other mechanisms above. In the best-case scenario, performance requirements in aid programs can provide valuable signals regarding academic expectations, and provide additional incentives for student effort. In the worst-case scenario, they add additional complexity, cause unintended distortions, and limit the reach of financial aid, potentially restricting access to those who could benefit most.

The research summarized in Section 3 above suggests that performance-based aid can be effective. For example, stringent credit-completion thresholds in WV's PROMISE scholarship appear to have contributed to its impacts on on-time completion and post-college outcomes (Scott-Clayton, 2011; Scott-Clayton & Zafar, 2019), and explicit performance-based scholarships such as those evaluated by MDRC have found positive effects on academic outcomes (Patel & Valenzuela, 2013; Richburg-Hayes et al. 2009; Barrow & Rouse, 2018; Mayer, Patel, & Gutierrez, 2016).

Other studies have found less encouraging, or even negative effects of performance criteria. For example, the Canadian STAR performance-based scholarship had only limited positive effects on academic outcomes (Angrist, Oreopoulos, and Williams, 2014). Quasi-experimental studies of academic performance requirements in Tennessee's HOPE scholarship (Carruthers & Özek, 2016) as well as of Satisfactory Academic Progress (SAP) rules for federal aid recipients (Schudde & Scott-Clayton, 2016; Scott-Clayton & Schudde, 2020) find that when students lose access to financial aid because of performance requirements, they complete fewer credits and appear to leave college more quickly. How this affects students' future labor market outcomes is less clear; Carruthers & Özek (2016) find that those who lose HOPE earn slightly more in the near term, while Scott-Clayton and Schudde (2020) find reductions in quarterly earnings over six years.[61] In New Zealand, Chu and Cuffe (2021) find clear evidence that women who lose access to student loans due to academic performance suffer large earnings losses as a result.

Academic performance requirements can also potentially distort behavior in unproductive ways, as students seek lower-effort pathways to meet the requirements (see, e.g. Casey et al. [2018]). Two studies find that state merit aid programs caused students to reduce courseloads and seek out easier majors (Cornwell, Lee & Mustard, 2005; Sjoquist & Winters, 2015). Scott-Clayton (2011) finds no such evidence for WV PROMISE, perhaps because the combination of both GPA and minimum credit completion requirements reduced the scope for gaming the rules.

Estimating the full policy effect of performance standards requires observing all students exposed to the requirement itself, not just the consequences for those who may ultimately fail, in order to detect potential incentive effects. Yet one reason for the mixed findings may be that performance requirements can add complexity, and incentives must be salient to students in

[61] Ost, Pan, and Webber (2018) relatedly find that students pushed out of college because of general academic performance standards (which apply regardless of financial aid status) have lower post-college earnings as a result.

order to be effective. Angrist, Oreopoulos, and Williams (2014) found that the Canadian STAR program's effects were stronger among students who could more accurately describe program requirements. Schudde and Scott-Clayton (2016) suggest that many students may not be aware of federal SAP standards until they fail to meet them, when it may be too late to recover.

Another tradeoff to consider with performance requirements is that they can dramatically limit the pool of eligible students. A recent working paper by Harris and Mills (2021) suggests this could be a major factor in explaining the limited effects of a large scholarship program in Milwaukee. Similarly, a recent report finds that fewer than 5 percent of first-year undergraduates at the City University of New York benefitted from New York's statewide free college program, and even fewer retained the scholarship into a second year - due to restrictive eligibility rules and the complex application process these rules necessitated (Scott-Clayton, Libassi, & Sparks, 2022).

4.2. Margins of impact: access vs. completion vs. post-college outcomes

In the early days of financial aid policy and research, one concern raised by some economists was that the marginal student induced to attend college by financial aid might not have very high returns to college, such that their enrollment might not lead to any longer-term improvements in future outcomes (see, e.g., Carneiro & Heckman, 2002).

But with a wealth of research now examining degree completion and post-college outcomes, the literature convincingly shows that lowering the cost of college can induce productive postsecondary attainment, not just wasteful enrollments. Indeed, the evidence shows that financial aid can impact a wide range of outcomes, from initial entry, to persistence and degree completion, to post-graduate degrees, and later-life earnings (with some positive but more sparse evidence on homeownership). This is consistent with a complementary body of quasi-experimental evidence indicating that academically marginal college enrollees, potentially similar to those induced to attend by financial aid policies, earn degrees and have higher post-college earnings as a result of their enrollment (Zimmerman, 2014; Ost, Pan, and Webber, 2018).

Of course, this doesn't mean that every program works on all of these margins, or that every program will have the same pattern of effects. Whether this holds true for a particular program will depend upon both the specifics of program design and the population targeted for aid, as we elaborated in the section above.

If a policymaker must make judgments about a financial aid policy without longer term evidence beyond enrollment impacts, the literature suggests a few considerations: First and perhaps most importantly, longer-term impacts may depend less on the marginal *student* who enrolls, and more on the marginal *institution* attended. Second, whether post-enrollment impacts accelerate or deteriorate may depend on the complexity and uncertainty of the aid renewal process. Third, post-enrollment effects of aid may depend on whether any associated academic requirements are designed as salient incentives to encourage student effort, or are designed primarily to contain costs. Finally, evidence reviewed in our companion chapter on non-financial interventions suggests that post-enrollment impacts may be most likely when financial aid is paired with other supports (Dynarski et al. 2022 handbook chapter).

4.3. Heterogeneity by student characteristics

The evidence on heterogeneity by family income is suggestive of larger effects for low-income students, all else equal. To be fair, much of the aid impact literature is explicitly focused on low-income populations, so it is not always possible for a single study to directly compare impacts for students with different incomes. But, a few studies that can do this have found larger effects for lower-income students (Bettinger et al., 2019; Scott-Clayton & Minaya, 2016; Murphy & Wyness, 2022; Solis, 2017; Card & Solis, 2022), and some programs targeted to particularly high-income families (such as tax credits and savings incentives) have shown no effect on college enrollments.

Evidence from state merit aid programs nonetheless indicates that there is room for financial aid to impact outcomes even among middle- and higher-income families. And one of the earliest regression-discontinuity papers in economics examined the effect of purely merit based aid for a higher-income sample: van Der Klaauw (2002) found that applicants at one selective private institution who qualified for larger scholarships by virtue of meeting certain academic performance cutoffs were more likely to enroll. Even here, however, effects were concentrated among applicants who *also* applied for need-based financial aid.

The evidence on heterogeneity by students' incoming academic performance and race/ethnicity is not entirely consistent, but is suggestive of possibly larger effects for lower-achieving and/or minoritized groups. Several studies find larger effects for lower-achieving students (including Angrist, Autor, & Pallais, 2021; Carruthers, Fox, & Jepsen 2020; Bettinger et al. 2019), though Murphy & Wyness (2022) find larger effects of institutional bursaries for higher-ability students. Many studies are underpowered to examine racial/ethnic heterogeneity in aid impacts, but Carruthers, Fox, & Jepsen (2020) is an example of a study finding larger effects for Black and Hispanic beneficiaries of the Knox Achieves scholarship.

The evidence on heterogeneity by gender (being easiest to examine, in most studies) is consistently inconsistent: while some studies find larger effects for men or women, the patterns are not consistent across the literature and many studies find no clear patterns of heterogeneity by gender.

To return again to the theme from above, the clearest patterns of heterogeneity in the impacts of financial aid appear to relate more to institutional context and program design, rather than depending in any consistent way on student characteristics. In fact, to the extent that an aid program does have larger effects for lower-income, lower-achieving, or racial/ethnically minoritized groups, these patterns may simply reflect that these groups have more room to upgrade the quality of institutions attended, and may benefit more from aid simplicity and certainty than more advantaged groups.

V. Conclusions and directions for future research

After more than a half-century of research on the impacts of financial aid, with a profusion of new, rigorous work just in the past decade, it's fair to say that we know a great deal now not just about

whether aid works, but what different types of aid work, on what outcomes, why, and for whom. Given the wide and deep span of research, it's also fair to say that there is a fair amount of consensus regarding the basic patterns of evidence: in general, students and prospective students respond to financial aid in accordance with what we would expect from economic theory. When the cost of enrollment is lower, students are more likely to enroll, to persist, to complete degrees, and to experience better financial outcomes after college.

While there are exceptions to these general findings, the exceptions themselves are instructive. We have also learned that the details of implementation matter. Seemingly small bureaucratic details can dramatically alter students' behavioral response to a given dollar of subsidy. Complex and uncertain eligibility and application procedures, such as those historically required to access Pell Grants, can prevent aid from effectively reaching those who most need it. Interactions between aid programs can mean that a dollar of aid given does not always translate to a dollar of aid received. How aid interacts with institutional quality is also a critical factor for outcomes: programs that induce students to upgrade to higher quality institutions tend to have larger benefits while those that induce quality downgrading or new enrollments primarily in the for-profit sector appear to have less positive or even negative effects.

The possibility that student aid programs could cause some students harm - by inducing them into low-quality institutions when their time might have been better spent in the labor market, or by inducing them to take on debt for programs that don't pay off - implies that future research and policymakers should pay close attention to program quality, risk, and heterogeneity in assessing the impacts of a given program.

Returning to the big picture with which we motivated this review – persistent inequality in postsecondary access and attainment – what, if anything, can we conclude about the effects of financial aid on postsecondary inequality, or even economic inequality overall? This is a thornier question than looking at the impacts of any given aid program, holding all else equal. Certainly, our review of the evidence suggests that grant assistance, tuition subsidies, and even loans and work-study can improve access for students from low-income backgrounds, and there is some direct evidence that aid can narrow socioeconomic gaps in enrollment (e.g. Solis, 2017).

But it is also the case that aid policy cannot, alone, eliminate inequality in postsecondary attainment. Inequality in educational outcomes begins in childhood, and grows with each transition from elementary school to secondary school. Even if the direct costs of college are equalized for all, students' academic preparation, networks, and family supports are not.

The COVID19 pandemic starkly demonstrated the persistent inequalities that characterize postsecondary education. Students (and schools) with fewer resources were less able to weather the shutdown of in-person schooling than their better-off peers. In the US, enrollment at community colleges plunged. High school graduation rates dropped, as well. We expect that the generation schooled during COVID will attend college at lower rates, and need more academic support than their predecessors.

Without financial aid, postsecondary outcomes would almost surely be more unequal than they are. Whether the impacts of aid are sufficient to keep pace with rising demand for postsecondary

education among higher income families is harder to assess causally, especially as those with economic means pursue even higher levels of education and training. While evidence from the 20th century suggests that increases in postsecondary attainment will tend to reduce economic inequality (Goldin & Katz, 2010), clearly it is not a panacea that eliminates the role of labor market institutions and policies.

In terms of conflicting findings and open questions, a ripe area for future research will be to continue to push on how to get the most "bang" from the financial aid "buck." It is not clear that the impacts of financial aid are linear; indeed, recent work suggests that relatively small amounts of aid could be highly impactful if used to provide students with a guarantee that they won't have to pay out of pocket for tuition. Combined with other evidence that students react differently to student loan debt depending on how it is framed, this suggests room for policy creativity in the future to experiment with aid programs that optimize how students experience student aid, for any given dollar received.

Along these lines, more research is needed on whether and how students may respond differently to in-kind support such as meal plans, free textbooks, housing and/or transportation vouchers. Some of these components are included in the City University of New York's highly successful ASAP program, a comprehensive intervention discussed in detail in another chapter of this Handbook (see Dynarski, Nurshatayeva, Page, & Scott-Clayton, 2022, Handbook Vol. 6). Understanding whether and how in-kind supports may impact students outside of such a comprehensive program would be valuable for state and local decisionmakers. Relatedly, it would be valuable to better understand how student aid may be effectively linked with other social assistance programs, such as subsidized housing, food stamps, unemployment and other social assistance programs.

In countries like the U.S. that are already well into a transition to mass postsecondary education, we expect attention will turn in future years to graduate education, which already accounts for an increasing proportion of student loan outlays in recent years. Finally, as more countries navigate major expansions of their postsecondary systems and seek to buffer increases in tuition with new forms of student support, we expect that financial aid research in the coming decades will become increasingly globalized.

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