Annenberg Institute
BROWN UNIVERSITY

EdWorkingPaper No. 26-1400

The Causal Effects of Federal Work-Study Offers on College Enrollment and Program Participation

Veronica Minaya
Teachers College,
Columbia University

Judith Scott-Clayton
Teachers College,
Columbia University

Adela Soliz
Vanderbilt University

Federal Work-Study (FWS) is a distinctive type of financial aid, originally intended to both reduce financial constraints and improve access to career-relevant job opportunities. Prior research on FWS has primarily focused on post-enrollment, post-program-participation outcomes, leaving potential upstream margins of impact unexplored. Using a unique administrative data source tracking FWS offers, enrollment, and participation from the date of financial aid application, we study the causal impacts of receiving an FWS offer at a large public college system including both two- and four-year campuses. We use a difference-in-differences approach comparing FWS-eligible aid applicants to similar ineligible applicants, who apply before and after an arbitrary date after which FWS availability is limited. Though we find no effects of FWS offers on enrollment or for the full sample, we do find substantial and statistically significant increases in enrollment for community college students and independent students. We find that receiving an FWS offer before the start of the school year increases FWS participation by 27 percentage points – a substantial and statistically significant effect, but far from complete take-up. The offer-induced increase in FWS job holding is also heterogenous across subgroups. Our results provide new insights on which student populations may be most sensitive to an FWS offer, and demonstrate that enrollment impacts can occur even in the context of overall low program take-up.

VERSION: February 2026

Suggested citation: Minaya, Veronica, Judith Scott-Clayton, and Adela Soliz. (2026). The Causal Effects of Federal Work-Study Offers on College Enrollment and Program Participation. (EdWorkingPaper: 26-1400). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/s2mg-nx89

The Causal Effects of Federal Work-Study Offers on College Enrollment and Program Participation

Veronica Minaya[1], Judith Scott-Clayton[2], Adela Soliz

February 2026

Abstract

Federal Work-Study (FWS) is a distinctive type of financial aid, originally intended to both reduce financial constraints and improve access to career-relevant job opportunities. Prior research on FWS has primarily focused on post-enrollment, post-program-participation outcomes, leaving potential upstream margins of impact unexplored. Using a unique administrative data source tracking FWS offers, enrollment, and participation from the date of financial aid application, we study the causal impacts of receiving an FWS offer at a large public college system including both two- and four-year campuses. We use a difference-in-differences approach comparing FWS-eligible aid applicants to similar ineligible applicants, who apply before and after an arbitrary date after which FWS availability is limited. Though we find no effects of FWS offers on enrollment or for the full sample, we do find substantial and statistically significant increases in enrollment for community college students and independent students. We find that receiving an FWS offer before the start of the school year increases FWS participation by 27 percentage points – a substantial and statistically significant effect, but far from complete take-up. The offer-induced increase in FWS job holding is also heterogenous across subgroups. Our results provide new insights on which student populations may be most sensitive to an FWS offer, and demonstrate that enrollment impacts can occur even in the context of overall low program take-up.

[1] Corresponding author, Teachers College, Columbia University, vmm2122@tc.columbia.edu. We are grateful to Tianshu Ma for research assistance in the early stages of this project and gratefully acknowledge our partners at the university system for providing access to the data and valuable insights into the management and operation of the Federal Work-Study program. We also thank conference participants at AEFP and APPAM for their helpful feedback.
[2] Teachers College, Columbia University

1. Introduction

Each year, the U.S. government allocates approximately $1.2 billion to support the Federal Work Study Program (FWS), which funds over 450,000 students at over 2,500 participating postsecondary institutions across the country (College Board, 2025; U.S. Department of Education, 2025). Rather than providing funding directly to students, as in the Pell Grant Program, the federal government sends work-study funds to colleges and universities, which then distribute awards to students. Students are notified that they have been allocated work-study in the financial aid letter they receive from their college (or prospective college) the semester before the year in which the aid will be used, if they enroll, and they receive the work-study funding as wages only if they obtain a FWS-eligible job after enrollment. As a result of this multi-step process by which a student receives FWS, the program functions as both a form of financial aid that could affect how they perceive the affordability of college and as an employment subsidy that could influence the experiences they have while enrolled.

As a form of financial aid, the program could promote enrollment and persistence by alleviating borrowing needs and helping students cover tuition and living expenses during college. In addition, insofar as FWS promotes student employment, program participation may foster stronger attachment to the institution, improve engagement, and mitigate informational or social barriers to persistence by providing students with additional campus contacts (Scott-Clayton, 2011a; St. John, 2004). Moreover, because the program provides early labor-market experience, participation may enhance career readiness and skill development, particularly for students without strong professional networks (Cappelli, 2015; Edwards & Hertel-Fernandez, 2010). On the other hand, the requirement to work while enrolled could reduce time available for coursework, potentially harming academic performance (Stinebrickner & Stinebrickner, 2003; Scott-Clayton, 2011b; Soliz & Long, 2016; Davis, 2025). Understanding the full impact of the

program, however, requires understanding whether and how students may respond to an FWS offer, not just to actual participation in the program. Receiving an offer is no guarantee the student will actually find an FWS job once on campus, but depending on what applicants believe about the program, it's possible the offer alone could affect their enrollment decision.

Though the Federal Work-Study Program has existed since 1965 and hundreds of thousands of college students participate, there is limited empirical evidence on the effects of the program. Most existing studies focus on persistence or other post-enrollment academic outcomes because data on initial offers are rarely available for all aid applicants, including those who never enroll at the institution. Even for those who do eventually enroll, administrative records prepared for institutional research typically capture a single snapshot of financial aid awards, often as of the end of the semester or aid year. If a student declines an FWS offer, or if they accept it but never actually obtain FWS employment, the initial offer may not be retained in the data. As a result, little is known about whether FWS availability influences college enrollment itself—or how take-up unfolds once an offer is made. If the program has low take-up rates or only certain student groups are likely to take up FWS offers, this may limit the program's potential to reduce gaps in college access or completion.

This paper addresses these gaps by providing the first causal evidence on the effects of receiving a FWS offer on enrollment and on actual FWS take-up. We analyze administrative data from 15 institutions within a large, multi-campus public college system (hereafter referred to as the System), and employ a difference-in-differences design comparing those who did or did not indicate interest in work-study on their aid form,[1] before and after an arbitrary date affecting who receives FWS funding.

[1] The System only offers FWS funds to students who have indicated interest in the program on their FAFSA.

Although we find no statistically detectable effects on Fall enrollment or Fall-to-Spring persistence in the full sample of aid applicants, we do find sizable and statistically significant enrollment gains among community-college applicants and independent students. Receiving an FWS offer during the spring packaging season also increases the likelihood of holding an FWS job by about 27 percentage points– a substantial and statistically significant effect, but far from complete take-up. The offer-induced increase in FWS job holding is especially small for new students (about 10 percentage points) and somewhat larger for independent students and four-year college applicants. Together, these patterns shed light on which students are most responsive to an FWS offer and underscore that enrollment impacts can arise even in the context of overall low program take-up.

The paper proceeds as follows. Section 2 briefly introduces the Federal Work-Study program, describes how it is administered in the System, and reviews the relevant literature. Section 3 describes the context, data, and analytic sample. Section 4 outlines our empirical strategy. Section 5 presents the main results and subgroup analyses. Section 6 reports robustness checks. Section 7 discusses implications and concludes.

2. Background & Literature Review

2.1. *The Federal Work Study Program*

The Federal Work Study Program provides part-time employment opportunities for postsecondary students with unmet financial need after all sources of grant aid are applied. The federal government allocates FWS funds to institutions or university systems based on a formula that has changed little since the 1970s (Smole, 2012). These funds are then administered to students. The institutional allocation formula favors colleges and universities with long-standing participation and larger endowments. As a result, public two-year colleges—despite enrolling

over 40% of all undergraduates—receive less than 20% of total FWS funding (Stein, 2025).[2] Once an institution exhausts its annual allocation, no additional students can be offered FWS unless previously awarded funds are declined or go unused. Unused funds may be reallocated within the aid year.

To qualify for FWS, students must file the Free Application for Federal Student Aid (FAFSA). The FAFSA generates an expected family contribution (EFC), which determines eligibility for need-based aid.[3] Students are eligible for FWS only if their cost of attendance exceeds the sum of their EFC and any grant aid received. Given that many more students qualify for FWS than institutions have funds to support, institutions may constrain eligibility further. For example, within the System that we examine, centralized packaging rules specify that students must (1) have an EFC below $1,500; (2) not be selected for verification (or have already been verified prior to the packaging date); (3) demonstrate unmet financial need after accounting for all other grants; and (4) indicate interest in FWS by answering "yes" to the corresponding FAFSA question.

Prior empirical evidence

Empirical evidence on the impact of FWS is limited compared to the large literature on the impacts of grants and loans. As stated above, most prior studies have focused on persistence rather than access. Researchers rarely observe which students are offered FWS prior to enrollment, making it difficult to identify causal effects on access. In the absence of such data, studies have understandably emphasized outcomes that can be observed post-enrollment—credit accumulation, persistence, and completion—rather than the decision to enroll.

[2] This approach to distributing FWS funds to institutions has been criticized by scholars and advocates as outdated and regressive (see, for example, O'Sullivan & Setzer, 2014; Kennefick, 2015; Scott-Clayton, 2017).

[3] The EFC was the predecessor to the current FAFSA formula's output, which is now referred to as the Student Aid Index (SAI).

The only prior evidence relating FWS offers to enrollment comes from Avery and Hoxby (2004), though FWS was not the primary focus of their study. Using data from an original survey of high-achieving high-school seniors from 510 schools nationwide—the College Admissions Project—they were able to directly link detailed information on students' financial aid offers to their subsequent enrollment outcomes. Their analysis, based on multinomial logit models of college choice, compared the effects of equivalent aid amounts in different forms—grants, loans, and FWS—and found that a $1,000 increase in FWS offers increased the likelihood of enrollment by approximately 13 percent, a magnitude statistically indistinguishable from that of grants of the same nominal value.[4] Though their sample focuses on a selective, high-achieving population, their findings underscore that conditional aid such as FWS can influence enrollment when data about aid offers is available.

The available causal evidence on post-enrollment academic impacts of FWS participation is mixed to negative. Stinebrickner and Stinebrickner (2003) estimate the effect of working while enrolled at a work college in Kentucky (Berea) and find statistically significant negative effects on students' GPAs. Scott-Clayton (2011b) studies the impacts of FWS participation using a difference-in-differences instrumental variables approach with administrative data from West Virginia. She finds significant positive impacts on first-year GPA and credits earned for men but significant negative impacts on GPA and probability of earning a bachelor's degree within four years for women. Soliz and Long (2016) replicate Scott-Clayton's approach using data from the Ohio public higher education system. They find that holding a work-study job has a small but significant negative impact on student's first-year GPAs, but a positive effect on the number of credits that students complete by the end of their

[4] Dollar amounts are reported in nominal 2000–01 dollars (the school year corresponding to students' freshman year in the study).

first year. Using national survey data and a matching approach, Scott-Clayton and Minaya (2016) find that work study participation is associated with increases in college persistence, degree completion, and post-college earnings—particularly among students attending public institutions. Kim (2022) uses data from students enrolling in a large, public, selective flagship institution and a regression discontinuity approach to examine the effect of being eligible for FWS. She finds that being eligible for FWS had a statistically significant effect on the hours students worked as well as their average weekly wages. However, none of her estimates are statistically significant. Given the low take-up of FWS in her sample, her study is likely underpowered to detect effects.

To our knowledge, Yu et al. (2020) is the only study to explicitly focus on the effect of participating in FWS on community college student outcomes. Using administrative data from a large, urban community college system in Texas and a matching model, these authors find that holding a FWS job is associated with a higher GPA, higher probability of credential completion and higher probability of transfer for the students in their sample. However, their model does not allow them to rule out selection bias.

Because the FWS Program is both a form of financial aid and a work subsidy, the impact of participation on labor market outcomes is as important for policy evaluation as the effect on academic outcomes. To our knowledge, only the Scott-Clayton and Minaya (2016) study has examined the relationship between work-study participation and post-graduation labor market outcomes in the U.S. They find that, when compared to students who are working at non-FWS jobs, participating in work study has a positive effect on academic outcomes but no effect on future employment outcomes. On the other hand, when compared to students who did not work at all, work-study participants experience null or negative effects on academic outcomes but positive effects on employment outcomes.

Le Barbanchon et al. (2023) estimate the effect of a student employment program in Uruguay on labor market outcomes.[5] More students apply to the program than are able to be placed, so applicants are chosen for jobs via a lottery. Le Barbanchon et al. (2025) estimate that students who were assigned jobs have 8 percent higher earnings than those who did not receive job placements, two years after finishing the program. They also find that students who were placed in jobs were 12 percentage points more likely to persist in school. The authors did not find any negative effects of working while enrolled on students' grades, as has been found in some U.S. studies. Ferrando et al. (2025) conduct a follow-up study on the same students. They find that students who were assigned to jobs earn 11 percent more than comparison group students 7 years out and that the higher earnings are driven by a 4 percent increase in the probability of being employed and a 6 percent increase in average monthly wages. Vulnerable (i.e. low-income) students and men experienced the largest impacts (Fernando et al., 2025).

Our paper builds on this literature, first, by providing a more detailed look at take-up. Due to data limitations few extant studies are able to document both who is offered FWS funding and who ultimately obtains a work-study job, despite the importance of take-up for understanding policy effectiveness. Next, we provide the first causal evidence on both enrollment and post-enrollment outcomes. The previous literature has focused on post-enrollment outcomes such as persistence and credit accumulation. However, a FWS offer could also increase access and enrollment if it affects students' perception of college affordability. Finally, ours is one of the few FWS studies that includes community colleges in the sample and

[5] The program is similar to FWS in the U.S. in that students are required to be enrolled in school while they participate in this program which places them in part-time, mainly clerical or support staff-type jobs. The program differs in that students are only able to participate for one year, it targets both secondary and post-secondary students (specifically ages 16-20), and students are assigned to jobs in the publicly owned companies (such as the national electricity company and bank), rather than the opportunity to go out and find an on-campus, work-study job, as in the U.S. FWS Program.

examines students attending community colleges as a subgroup, despite the essential role these institutions play in increasing postsecondary access.

3. Context, Data, and Sample

3.1. *Study Context*

The setting for our study is the System, which comprises 11 primarily bachelor's degree-granting institutions (which we will refer to as four-year colleges) and 7 community colleges. The custom data extract used for this study covers both new and returning FAFSA applicants across all of these campuses during a single aid year, 2018 (covering the 2017-18 academic year), though we can track enrollment and other outcomes beyond that.

The federal government makes a single centralized allocation of FWS funds to the System, and at the time of our study the System then allocated their funds to individual institutions primarily based on institutional patterns of historical FWS usage, with some adjustments based on current conditions. Thus, different campuses have different FWS budgets. Once campus-level FWS allocations are set, the System then applies uniform criteria during the early-spring "mass packaging" process to determine student eligibility and priority within campuses. At the time of our study, students were eligible for an automatic FWS package only if they (1) had an 'official' (processed) EFC on file below $1,500; (2) were not selected for verification; (3) had unmet need after accounting for other grants; and (4) indicated interest in work-study by answering 'yes' on the FAFSA (given limited funds, at this institution a 'don't know' response was treated equivalently to 'no'). Because many students qualified, the System (at that time) automatically packaged FWS only for FAFSA filers who had indicated interest in work-study. To account for some students declining offers, the System typically over-packaged at roughly 200% of available FWS funds. Since each campus receives a distinct annual allocation, the point at which packaging ceases varies by campus and over time. Initial packaging

often begins in the early-March[6] priority cycle; some campuses exhaust funds quickly, while others continue packaging as awards are declined, canceled, or reallocated. Students may submit a FAFSA and be packaged aid at more than one campus (and indeed this is common for new college applicants), but cannot accept an aid offer or enroll at more than one institution in the system.

Students may accept or decline the FWS award after it appears in their financial aid letter. However, actual participation requires securing an eligible FWS position. Employment begins only after the student is enrolled and hired. Campus coordinators advertise positions and handle basic onboarding, while supervisors define roles, provide training, and oversee day-to-day work.

In 2017-18, the System offered eligible students part-time employment opportunities through FWS, typically up to 20 hours per week during the academic term and up to 40 hours during breaks. Nearly 5,000 FWS jobs were offered across the university system, with approximately one-third located at community colleges. The vast majority of these positions were on-campus and concentrated in administrative departments, including student services, IT and communications, and business and finance. Academic placements were also common at the four-year colleges. The average hourly wage was $13, and students earned an average of $2,000 over the course of the year (both amounts in 2017-18 current dollars).

3.2. *Data*

We analyze a custom administrative data extract from the System which includes FAFSA records, including the timing of aid application and aid offers for both new and returning aid

[6] As a FWS requirement, students must enroll at a campus for at least half-time. On the seventh day into the semester, called the census day, the university system cleans up the FWS awards and cancels the awards to students who do not meet the enrollment requirement. After the cleanup, each individual institution may re-assign the funds available based on its own criteria, subject to FWS eligibility rules.

applicants, payroll records for FWS participants, and academic transcripts. Our sample begins with the 11 senior colleges and 7 community colleges in the System for aid year 2018, which covers the fall 2017 semester and the spring 2018 semester. We ultimately restrict the analytic sample to 15 of these 18 institutions, for reasons detailed below. The FAFSA data includes application date, institutions to which students applied, EFC, unmet need, and dependency status. The FAFSA for 2017-2018 opened on October 1, 2016, following the Department of Education's shift to an earlier filing calendar (U.S. Department of Education, 2015). The FWS offer data includes information on when the offer was made, whether the offer was accepted, the offered amounts, and the accepted amounts for each student. The payroll data cover all students who worked in FWS jobs in aid year 2018, including their hourly wage, job location, total hours worked, and total FWS earnings. These data capture students' actual take-up of FWS offers. We measure take-up primarily as the FWS job rate, defined as the share of students holding a work-study job upon enrollment.

Finally, student administrative education records include college enrollment and degree awards, high school performance, and demographic information for all students who have enrolled at any campus. For this analysis, we examine a range of academic outcomes from fall 2017 (the first semester following aid year 2018 FAFSA filing) through spring 2023, including full-time enrollment in the first term, fall-to-spring persistence (enrollment in both Fall 2017 and Spring 2018), credits attempted and earned across Fall 2017 and Spring 2018, and degree completion within 3 and 6 years (by spring 2020 and spring 2023, respectively).

Sample

We start with a sample of 106,439 undergraduate aid applicants who submitted a FAFSA for 2017-18, had an official EFC below $1,500, and were not selected for verification. We retain

students regardless of whether they expressed interest in FWS.[7] Within this otherwise-eligible sample, we treat those answering "yes" to the work-study interest question as eligible for an FWS offer during mass packaging in our setting, and those answering "no" or "don't know" as ineligible for an offer. [8] This eligibility definition reflects the system's mass packaging cycle, not federal FWS eligibility per se.

To ensure that we consider only aid offers made prior to fall enrollment, we limit the sample to applicants who filed the FAFSA within 273 days of the application opening date—October 1, 2016 through July 1, 2017—before the start of the fall semester. This restriction excludes 16,417 late filers, leaving 90,022 students. Because filing cutoffs differ across campuses, we further limit the sample to the common support of FAFSA submission timing across institutions.[9] Finally, our identification strategy relies on cross-campus variation in the timing of FWS award decisions, so we drop applicants at two community colleges and one senior college where we were unable to reliably determine campus-specific cutoff dates—defined as the earliest FAFSA submission threshold for which the coefficient on the pre-cutoff indicator is statistically different from zero at the 1% level ($p < 0.01$), as described in the next section.[10] This final restriction yields an analytic sample of 66,360 FAFSA applicants for the 2018 aid year.

Figure 1 shows the distribution of FAFSA submission timing (relative to the application opening date) for applicants in our analytic sample for the 2018 aid year. Figure 2 plots the daily

[7] We do not exclude students based on zero unmet need, as only 3% of students in the sample appear to have zero unmet financial need and the timing of when unmet need was calculated relative to when FWS offers were made could not be confirmed.

[8] This sample also excludes a small number of applicants (<200) with inconsistent FAFSA data across separate campus applications.

[9] The common support of FAFSA submission timing is the overlapping range of days relative to each campus's cutoff date that is observed at the 15 campuses. For each campus, we identify the minimum and maximum values of this running variable and then keep only applicants whose relative timing falls within the range observed at all campuses.

[10] Our main results are robust to the inclusion of these three institutions (See Appendix Table A2).

likelihood of receiving a Federal Work-Study (FWS) offer by FAFSA application date. The top curve shows the offer rate among eligible applicants (interest = "Yes"), while the bottom curve shows the offer rate among ineligible applicants (interest = "No/Don't know"). For eligible students, there is a sharp decline in offer rates between day 160 and day 180, suggesting a common period after which campus budgets begin to constrain FWS availability. Offer rates among eligible applicants do not reach 100 percent even before the apparent cutoff because FWS is a capped, campus-based award. In practice, campuses package awards in batches and must allocate a finite pool across many eligible students; as a result, not all eligible filers receive an offer, and marginal differences in packaging priority or timing can determine who is awarded before funds are exhausted.

By contrast, FWS offer rates for ineligible students remain flat throughout the application window, consistent with expectations and suggesting that the observed pattern among eligible students reflects institutional award constraints rather than changes in student composition.

4. Empirical Strategy

4.1. *Detection of Campus-Specific Cutoffs*

To estimate campus-specific application-day thresholds, we focus on students who satisfy the system's packaging criteria and indicated "Yes" to work-study interest on the FAFSA—our offer-eligible sample. By focusing on this subsample, we isolate variation driven by campus-level budget constraints, allowing us to identify the threshold date that reflects each campus's limits on award availability.

We identify application day thresholds as the points at which the likelihood of receiving an FWS offer discontinuously declines, reflecting the day when campus-level FWS funds begin to run short. Although these institutional cutoffs are not formally documented, they can be

inferred empirically by searching for discontinuities in the relationship between application timing and receipt of an FWS offer. Following Porter and Yu (2015) and its applications (e.g., Miller, 2025), we apply their method for estimating treatment effects when the location of the discontinuity is unknown, which allows for valid inference under threshold uncertainty and, as they show, results in negligible loss of precision in the final treatment effect estimates. Implementation details are in Appendix B.

We identified campus-specific cutoff dates at 15 institutions—10 senior colleges and 5 community colleges. Figure 3 shows the estimated FAFSA submission cutoffs in binned scatterplots for each of the 15 institutions in our analytic sample. Negative values on the x-axis represent applications submitted before the estimated campus-specific cutoff (i.e., early applicants), while positive values indicate submissions after the cutoff. Students who applied after the threshold were substantially less likely to receive a FWS offer. The observed discontinuities in FWS offer rates—interpreted as significant drops at the estimated cutoffs—are notably larger for senior colleges than for community colleges, suggesting greater sensitivity to budget constraints at senior campuses. Cutoffs occur, on average, around day 169 since the FAFSA application opened on October 1 (roughly mid-March) and are similar across senior and community colleges.

Using these estimated cutoffs, we identify students who applied before and after their campus-specific FWS threshold, separately for eligible and ineligible applicants. Table 1 presents descriptive statistics by eligibility and application timing. Across all groups, approximately 90% of students have zero EFC, and over 60% are classified on the FAFSA as dependent students, with earlier applicants being at least 10 percentage points more likely to be classified as dependent than later applicants. Students who applied after the cutoff are slightly more likely to be continuing students and, relatedly, less likely to have submitted the FAFSA to

multiple campuses. Nearly half of the sample applied to a single four-year college within the System. Before the cutoff, about 21% of eligible students received an offer and 7.4% held a FWS job, implying a take-up rate of 28%. These students worked an average of 160 hours in FWS jobs over the academic year. In contrast, FWS offer and job rates fall to nearly zero for students who applied after the cutoff or were ineligible for FWS. This sharp decline supports the validity of using a difference-in-differences approach to estimate causal effects, under the assumption that, absent the change in FWS availability at the cutoff, the likelihood of receiving an FWS offer would have followed similar trends for FWS-offer-eligible and ineligible applicants.

Table 1 also reports the share of students receiving other forms of financial aid—such as Pell Grants, state aid, and student loans—as well as a range of student academic outcomes. Receipt of other aid varies modestly across groups, with Pell and state aid more common among FWS-eligible students, while student loan take-up remains low overall. Across most outcomes, students who applied after the cutoff, particularly who are not prioritized for FWS, tend to have better academic outcomes than earlier applicants.

4.2. *Difference-in-Difference Approach*

We make use of a difference-in-differences model to compare offer-eligible students to observationally similar ineligible students, focusing on those who submitted their FAFSA applications before and after the arbitrary campus-specific date when FWS funds availability became constrained. We begin by estimating the reduced-form difference-in-differences equation:

$$Y_{ick} = \beta_0 + \beta_1 \, Eligible_i * Before_{ck} + \beta_2 \, Eligible_i + \beta_3 \, Before_{ck} + \gamma_k + \delta_c + \eta \, X_i + u_{ick} \quad (1)$$

where y_{ick} is the academic outcomes of student i who applied to campus c in day k. Academic outcomes include initial enrollment in fall 2017, full-time enrollment status, fall-to-

spring persistence, credits attempted and earned during the first year, and degree completion within three and six years. The indicator *Eligible* represents a student i being interested in FWS. The indicator *Before* indicates that day k is before the arbitrary campus-specific cutoff date after which FWS availability becomes limited. We include week and campus fixed effects, $\gamma_k + \delta_c$. X_i is a vector of available student-level controls, including student i's EFC, dependency status, whether the student applied only to a single community or senior college (with multiple-college applicants as the reference category), and whether the student was continuing enrollment at the time of FAFSA. Standard errors are clustered at the week–campus level for single applicants. For multiple applicants—who are pooled into a single pseudo-campus—standard errors are clustered by application week.[11] The coefficient on the interaction term, β_1, is our coefficient of interest and represents the difference-in-differences estimate between FWS-eligible and ineligible students before and after the FWS availability cutoff.

While plausibly exogenous variation in $Eligible_i*Before_{ck}$ is what permits a causal interpretation, $Eligible_i*Before_{ck}$ is only of interest to the extent that it affects the likelihood of actually receiving an FWS offer. When Equation (2) is estimated with receipt of an FWS offer as the dependent variable, it represents the first stage of a two-stage least squares (2SLS) or instrumental variables (IV) analysis. In this specification, the interaction between a student's interest in FWS and whether they submitted the FAFSA before the campus-specific cutoff date ($Eligible_i*Before_{ck}$) serves as an instrument for receiving a FWS offer. We do not attempt to instrument for actual FWS take-up since doing so would violate the exclusion restriction: an FWS offer may affect enrollment, and thus subsequent outcomes, even if the offer never results

[11] Appendix Table A3 reports the same specifications with unclustered standard errors. The results are consistent with our main estimates.

in actual work-study participation. The second-stage equation replaces the interaction term with the predicted probability of receiving an FWS offer, as estimated in Equation (2):

$$Y_{ick} = \alpha_0 + \alpha_1 \, PredictedFWSOffer_i + \alpha_2 \, Eligible_i + \alpha_3 \, Before_k + \gamma_k + \delta_c + \eta \, X_i + u_{ick} \quad (2)$$

The same set of fixed effects and covariates is included in both the first- and second-stage equations to ensure that identification relies solely on the variation in FWS offer induced by the exogenous instrument.

4.3. *Specification Checks*

To assess the validity of our identification strategy, we conduct a series of specification checks aimed at probing the key assumptions underlying our difference-in-differences and instrumental variables estimates. First, we test whether the interaction between FWS eligibility and early application (i.e., submission before the campus-specific cutoff date) is spuriously correlated with pre-treatment student characteristics. Specifically, we estimate a version of Equation (1) without covariates, using available student-level controls, including EFC, dependency status, whether the student applied only to a single community or senior college, and whether the student was continuing enrollment at the time of FAFSA as dependent variables. The identifying variation should not predict these characteristics if the instrument is exogenous. As shown in Table 2, we find no significant differences in any of the observed characteristics except for dependency status. The interaction term indicates that eligible students applying before the cutoff are 2 percentage points more likely to be dependent students. While statistically significant, the imbalance is small in magnitude—approximately a 3% difference relative to the baseline rate—and thus unlikely to meaningfully bias the estimates. As an additional balance check that can test this directly, we construct covariate-predicted values for each outcome by estimating models of the outcome on baseline characteristics in the full sample, and then re-estimate Equation (1) using these predicted outcomes as dependent

variables. The coefficients on the eligibility-by-early-application interaction are close to zero and statistically indistinguishable from zero (Appendix Table A1). We then repeat the same predicted-outcome balance test within subgroups. Across most subgroups, the discontinuity estimates remain close to zero and not statistically significant, providing little evidence of meaningful compositional shifts at the cutoff.[12] We include these baseline covariates as controls in both the full-sample and subgroup analyses, and our estimates are robust to the inclusion of these pre-treatment characteristics.

Second, we visually examine the first-stage relationship between FAFSA application timing and receipt of a FWS offer. Figures 4 plots FWS offer rates by FAFSA application week relative to campus-specific cutoff dates, in an event study framework. We estimate these models using the same set of fixed effects and standard error clustering (by week-institution) as in Equation (1). The interaction term between a student's interest in FWS and whether they submitted the FAFSA before the campus-specific cutoff date is positive and statistically significant for students who applied before the cutoff, and close to zero and statistically insignificant afterward. We find that offer rates are substantially higher in the weeks leading up to the cutoff and markedly lower thereafter, consistent with FWS funds becoming constrained at the cutoff. The implied shift is sizable—applicants filing several weeks before the cutoff are roughly 10–15 percentage points more likely to receive an offer than those filing just after—indicating that the design generates meaningful variation in offer receipt. As an additional check, we replicate this event-study specification using baseline covariates as outcomes.

[12] In particular, among community-college applicants, dependent and independent students, and new entrants, the coefficients on the eligibility-by-early application interaction term are uniformly close to zero and statistically insignificant across all outcomes. We do detect statistically significant discontinuities for multiple applicants, continuing students, and four-year applicants. However, even where statistically significant, the magnitudes are generally very small ranging from 0.0003 to 0.011 in binary outcomes and from under 0.11 credits to about 0.26 credits in credit accumulation, suggesting little evidence of sorting on pre-treatment characteristics around the cutoff.

Consistent with the balance tests in Table 2, we find no evidence of significant discontinuities in observable characteristics around the cutoff, further supporting the validity of the identification strategy (See Appendix Figure A1). This pattern supports the exclusion restriction, as the discontinuity in FWS offers aligns with the cutoff, while no comparable shifts are observed in baseline characteristics, suggesting that the instrument affects outcomes primarily through FWS award receipt rather than through other institutional or student-level factors. Overall, these specification checks provide evidence that the interaction between eligibility and early application is a valid instrument for receiving a FWS offer, and that the key assumptions underlying the difference-in-differences design are plausible.

5. Main Results

5.1. *First Stage: FWS Offer*

Table 3 presents the first stage estimation of the difference-in-differences model. Results show that submitting FAFSA before the arbitrary cutoff date significantly increases students' chance of receiving an FWS offer before the start of the Fall term. Specifically, the probability of receiving an FWS offer is nearly 18 percentage points higher for eligible students who apply before the cutoff. The results are statistically significant at the 0.01 level. The corresponding first-stage F-statistics are 607 (Model 1) and 620 (Model 2), indicating a strong first stage.

Table 4 presents subgroup-specific first-stage estimates, displaying the probability of receiving a FWS offer. Across all subgroups, FWS-eligible applicants who submitted the FAFSA before the campus-specific cutoff experienced a significant increase in offer rates, though the magnitude of these effects varies by subgroup. Continuing FWS-eligible students exhibit strong first-stage effects, with offer rates approximately 20 percentage points higher for early applicants. In contrast, independent students and community college applicants show smaller first-stage effects—around 10 percentage points for offers, or roughly half the overall

first-stage estimate. Multiple-college applicants display large first-stage effects on offers (approximately 19 percentage points). Dependent students and single senior college applicants exhibit relatively large first-stage effects on offers.

5.2. *Reduced Form Impacts of Applying for Aid Prior to Mass Packaging*

Table 3 presents reduced-form estimates of the impact of early FAFSA submission on academic outcomes. Columns (1) and (2) report results from our baseline specification (Model 1) and a version that includes covariates (Model 2), respectively. Offer-eligible students exhibit take-up rates about 5 percentage points higher for early applicants. Applying before the cutoff increases enrollment among FWS-eligible students by approximately one percentage point; however, this effect is marginally insignificant ($p=0.15$). We find no evidence that early application affects any other enrollment or performance outcomes for our full sample.

Table 4 presents reduced-form estimates by student subgroup based on Model 2 only. Independent students and community college applicants show take-up effects that are comparable to or slightly higher than the average, indicating relatively strong responsiveness to receiving an offer. Multiple-college applicants display only modest increases in take-up (about 2 percentage points), suggesting weaker responsiveness. Continuing students and four-year college applicants exhibit relatively large early application effects on take-up. These patterns reinforce the distinction between eligibility, offers, and take-up in the administration of FWS. First-stage estimates vary across subgroups, indicating meaningful heterogeneity in both the likelihood of receiving an offer and the probability of subsequent participation.

Results also suggest positive and statistically significant effects on enrollment for independent students and community college applicants, but we do not detect corresponding effects for these groups on subsequent academic outcomes such as fall-to-spring persistence, credits, or degree completion. We find suggestive evidence of improved outcomes for new

students and higher degree completion among four-year applicants. In contrast, we estimate negative effects for multiple-college applicants—statistically significant at the 10 percent level—including reductions in enrollment and credits attempted. However, baseline balance checks indicate some imbalance for this subgroup, so we interpret these estimates cautiously.

5.3. IV estimates of impact of receiving an FWS offer during mass packaging

Table 5 presents the estimated impacts of receiving a FWS offer on academic outcomes. As expected, the point estimates are larger than the reduced-form results, since they are scaled by the inverse of the first-stage estimate; however, for the full sample, these estimates remain statistically insignificant and consistent in direction with the reduced form. Table 6 shows IV estimates by student subgroup, along with corresponding first-stage F-statistics. Across subgroups, the IV results generally reinforce the reduced-form findings, with the same qualitative pattern of heterogeneity. Inference is less precise for multiple-college applicants due to the smaller sample and a comparatively weaker first stage relative to other groups.[13] Overall, we observe substantial heterogeneity in take-up and enrollment responses, including large and statistically significant increases in enrollment for community-college applicants and independent students.

6. Robustness Checks

6.1. *Effects on Other Aid*

As a robustness check, we test whether the cutoff-based variation used in our design is associated with changes in other forms of financial aid. Specifically, we re-estimate our main specification using indicators for receipt of Pell, state-grant aid, and student loans in Fall 2017 as

[13] These estimates are at best marginal: they are not robust to alternative inference and sample choices (e.g., unclustered standard errors and the expanded 18-campus sample), and their 10 percent significance is sensitive to the bandwidth choice (see Appendix Tables A2 and A3 and Figure 5, respectively).

outcomes. Appendix Figure A2 plots the estimated coefficient on the estimated difference-in-difference coefficient for each aid outcome. We find no detectable discontinuities in Pell, state-grant aid, or loan receipt at the cutoff, suggesting that the instrument shifts FWS offers without coinciding changes in other major aid sources.

6.2. *Regression Discontinuity Results*

As an alternative identification strategy, we implement a regression discontinuity (RD) design and estimate the causal effect of applying earlier among offer-eligible applicants, leveraging campus-specific weeks when FWS funds were exhausted. This design compares students just before versus just after the arbitrary, campus-specific cutoff date, isolating plausibly exogenous variation in receipt of an FWS offer. The resulting first stage is modest—about 6 percentage points in Appendix Table A4—though statistically distinguishable from zero. Given the smaller discontinuity (and corresponding loss of precision relative to our main specification), we treat the RD as a robustness check rather than our preferred specification. Nonetheless, the RD first stage displays a similar pattern of heterogeneity across student groups in the likelihood of receiving an offer around the cutoff.

6.3. *Bandwidth Tests*

Figure 5 shows the sensitivity of our 2SLS estimates to the choice of bandwidth around the cutoff. Each marker reports the estimated treatment effect using a different symmetric bandwidth (±60 to ±100 days). Estimates for FWS take-up (Panel A) and Fall 2017 enrollment (Panel B) are robust to bandwidth choice and vary little across windows. This pattern suggests our results are not driven by a particular bandwidth specification. Across subgroups, the qualitative pattern is similar. The sign and relative magnitude of estimates are generally consistent across bandwidths, though precision declines in narrower windows, especially for smaller subgroups (e.g., new students, multiple applicants).

7. Conclusion and Discussion

Our study provides new causal evidence on an understudied margin of the Federal Work-Study program: whether receiving an FWS offer prior to enrollment affects subsequent enrollment and program participation. We analyze administrative records from a large, multi-campus public higher-education system that uniquely link FWS offers to payroll participation from the FAFSA stage forward. Our difference-in-differences design compares FWS-eligible students to otherwise similar FWS-ineligible students who file the FAFSA just before versus just after an arbitrary cutoff date when FWS availability becomes limited, exploiting the fact that the cutoff shifts offers for eligible students but has no direct effect on comparable ineligible students.

Our first key finding is that while FWS offers appear to have little effect on enrollment overall, the impacts of FWS offers are meaningfully heterogeneous and consistently positive for some groups. In particular, we find that an FWS offer moves the needle on enrollment for two groups that may not be thought of as "typical" FWS recipients: independent students and community-college applicants. A second key finding is that receiving a FWS offer increases the likelihood of holding a work-study job by only about 27 percentage points, with take-up rates differing across student groups. Across subgroups, FWS take-up responses are largest among four-year applicants, independent students, continuing students, and community-college applicants, while take-up is noticeably lower among new students and multiple-college applicants. The fact that most students who receive an FWS offer don't ultimately make use of the program raises important questions about the availability and perceived value of FWS jobs, the matching process, and the frictions of campus hiring.

Our study contributes to the limited literature on causal evaluations of the FWS program and provides suggestive evidence on the mechanisms through which FWS and other financial aid programs may affect students' postsecondary behaviors and outcomes. However, several

limitations shape how these findings should be interpreted. We only examine academic outcomes. The employment experience offered by FWS may also help students with their college-workforce transition. As previous work experience is becoming more important in early career success, FWS may also have longer term impacts on career path and earnings (Scott-Clayton & Minaya, 2016; Le Barbanchon et al, 2025). Unfortunately, we do not have state Unemployment Insurance (UI) records on quarterly employment/earnings. Moreover, our estimates primarily capture the intent-to-treat effect of receiving an FWS offer rather than the effect of actual work-study employment. Low take-up and the possibility that offers affect outcomes through channels beyond payroll participation—most notably enrollment choices—limit what we can infer about the effects of participation per se.

These findings may nonetheless have implications for ongoing policy debates about the distributional fairness of the FWS program. Community college students and independent students appear to be most responsive to and interested in FWS offers, but nationally, the program's funding allocation and job access/participation patterns systematically limit their participation. Because FWS dollars are awarded to institutions—largely based on historical allocations—colleges with fewer legacy funds (including many community colleges) have fewer FWS positions to offer, even when their students have high financial need (Baum, 2019, CCRC, n.d.). FWS funding is disproportionately concentrated at four-year and more selective institutions, while community colleges that serve a larger share of older, independent students (NCES, 2026),[14] receive relatively limited support.

[14] Independent students represent 32.7% of undergraduates at public four-year institutions, compared with 54.1% at public community colleges. Similarly, students ages 24 and older account for 28.3% of undergraduates at public four-year institutions, versus roughly one-half of undergraduates at public community colleges. Authors' calculations from NCES PowerStats tabulations.NCES PowerStats tabulations on February 7, 2026 from NPSAS:UG 2020 (weight WTA000). Retrieval codes: gymyud (DEPEND×LEVEL×CONTROL) and cescbo (AGEGROUP × LEVEL × CONTROL).

Our results provide causal evidence that expanding access to offers may matter most for groups historically less well served by the program, but also suggest that expanding funding alone is unlikely to deliver its full benefits if colleges lack the infrastructure to connect offered students to jobs. From a policy perspective, reforms that increase the share of funds reaching broad-access institutions may need to pair these investments with efforts to raise the conversion rate from FWS offers to jobs. This could include earlier and clearer communication about work-study eligibility, streamlined hiring and onboarding, and more active job matching that reduces search costs for students.

References

Avery, C., & Hoxby, C. M. (2004). Do and should financial aid packages affect students' college choices?. In *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 239-302). University of Chicago Press.

Baum, S. (2019, March). *Rethinking Federal Work-Study: Incremental reform is not enough*. Urban Institute.

Stein, T. (2025, April 7). *Modernizing Federal Work-Study to support work-based learning*. Bipartisan Policy Center.

Cappelli, P. (2015). Skill Gaps, Skill Shortages, and Skill Mismatches: Evidence and Arguments for United States. *Industrial and Labor Relations Review*, 68(2): 251-290.

College Board. (2025). *Trends in student aid 2025* [Report]. College Board. https://research.collegeboard.org/trends/student-aid

Community College Research Center. (n.d.). Participation in Federal Work-Study. Teachers College, Columbia University.

Davis, A. M. (2025). Is working in college worth it? How hours on the job affect postsecondary outcomes. *Educational Evaluation and Policy Analysis*, *47*(2), 329-354.

Edwards, K. A., & Hertel-Fernandez, A. (2010). Paving the way through paid internships: A proposal to expand educational and economic opportunities for low-income college students. Washington, DC: Demos.

Ferrando, M., Katzkowicz, N., Le Barbanchon, T., & Ubfal, D. (2025). *The lasting effects of working while in school: A long-term follow-up* (IZA Discussion Paper No. 18238). IZA Institute of Labor Economics.

Hossler, D., Ziskin, M., Gross, J. P., Kim, S., & Cekic, O. (2009). Student aid and its role in encouraging persistence. *Higher education: Handbook of theory and research*, 389-425.

Kenefick, E. (2015, January). *Improving access to financial aid and career-related work experience for low-income and post-traditional students*. Center for Law and Social Policy (CLASP).

Kim, S. (2022). *Improving Work and Equity for Lower-Income Students: Examining the Effects and Underlying Mechanisms of Federal Work-Study* (Doctoral dissertation).

Le Barbanchon, T., Ubfal, D., & Araya, F. (2023). The effects of working while in school: Evidence from employment lotteries. *American Economic Journal: Applied Economics*, *15*(1), 383-410.

Miller, L. (2025, December 22). *Switching schools: Effects of college transfers* [Working paper]. University of South Carolina.

National Center for Education Statistics. (2026, February 7). *PowerStats tabulations from the National Postsecondary Student Aid Study: 2020 Undergraduate Students (NPSAS:UG)* (Retrieval codes: gymyud [DEPEND, LEVEL, CONTROL] and cescbo [AGEGROUP, LEVEL, CONTROL]; weight: WTA000) [Data tables]. U.S. Department of Education, Institute of Education Sciences. https://nces.ed.gov/datalab/powerstats/

O'Sullivan, R., & Setzer, R. (2014, September). *A federal work study reform agenda to better serve low-income students*. Young Invincibles.

Porter, J., & Yu, P. (2015). Regression discontinuity designs with unknown discontinuity points: Testing and estimation. *Journal of Econometrics*, *189*(1), 132-147.

Scott-Clayton, J. (2011a). The shapeless river: Does a lack of structure inhibit students' progress at community colleges? (CCRC Working Paper No. 25). New York, NY: Columbia University, Teachers College, Community College Research Center.234.

Scott-Clayton, J. (2011b). The causal effect of Federal Work-Study participation: Quasi-experimental evidence from West Virginia. *Educational Evaluation and Policy Analysis*, 33(4), 506–527. doi:10.3102/0162373711421211.

Scott-Clayton, Judith. (2017, June 22). *Federal work-study: Past its prime, or ripe for renewal?* Brookings Institution, *Evidence Speaks Reports, 2*(16).

Scott-Clayton, J., & Minaya, V. (2016). Should student employment be subsidized? Conditional counterfactuals and the outcomes of work-study participation. *Economics of Education Review*, *52*, 1-18.

Smole, D. P. (2012). *Campus-Based Student Financial Aid Programs Under the Higher Education Act*. Congressional Research Service.

Soliz, A., & Long, B. T. (2016). Does working help or hurt college students? The effects of federal work-study participation on student outcomes (CAPSEE Working Paper). New York, NY: Center for Analysis of Postsecondary Education and Employment.

St. John, E. P. (2004). The impact of information and student aid on persistence: A review of research and discussion of experiments. Boston, MA: The Education Resources Institute.

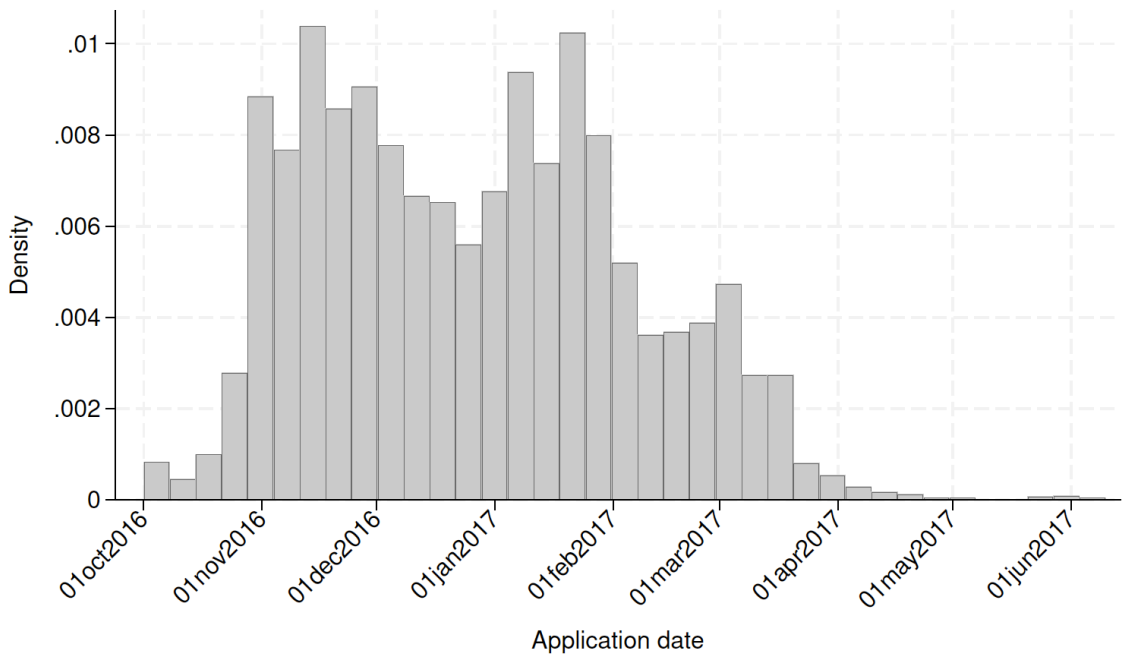
Stinebrickner, T., & Stinebrickner, R. (2003). Working during school and academic performance. *Journal of Labor Economics*, 21(2), 473–491. doi:10.1086/345565.

U.S. Department of Education, Office of Federal Student Aid. (2025, July 30). *Notification of campus-based funding for the 2025–26 award year*. FSA Partner Connect Knowledge Center.

U.S. Department of Education, Office of Federal Student Aid. (2015, September 14). *President's announcement of FAFSA filing changes* (Electronic announcement). Federal Student Aid Knowledge Center.

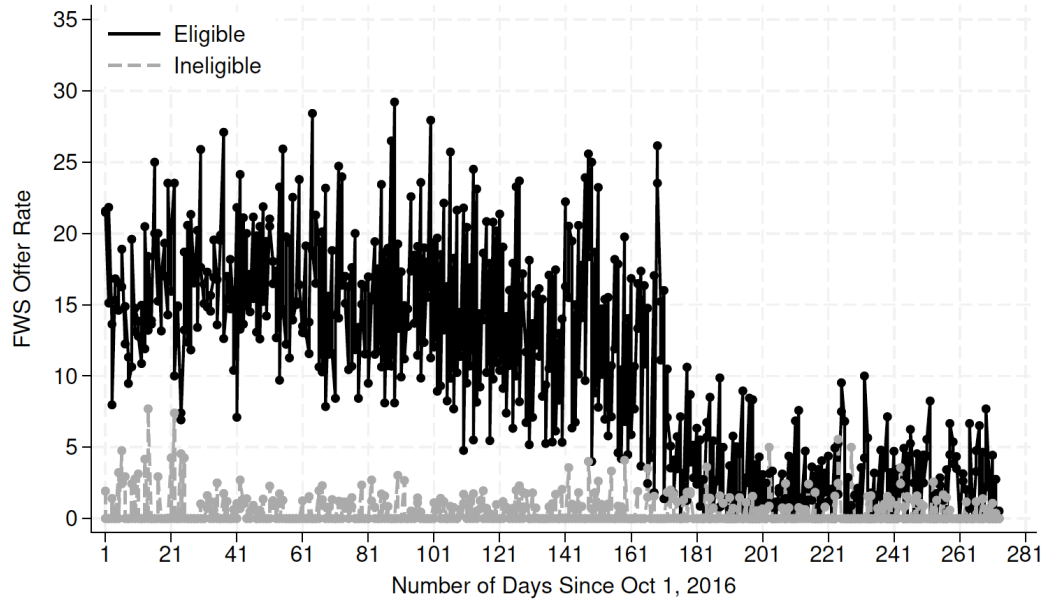
Yu, H., McKinney, L., & Carales, V. D. (2020). Do community college students benefit from Federal Work-study participation?. *Teachers College Record*, *122*(1), 1-36.

Figure 1. Distribution of FAFSA Applications



Notes: Figure shows the distribution of FAFSA applications since October 1, 2016, when the FAFSA application opened. Sample is limited to FAFSA applicants filing within 273 days of the application opening (October 1, 2016–July 1, 2017), then restricted to the common support of FAFSA submission timing across campuses. We exclude two community colleges and one four-year college where campus-specific cutoff dates cannot be reliably identified.

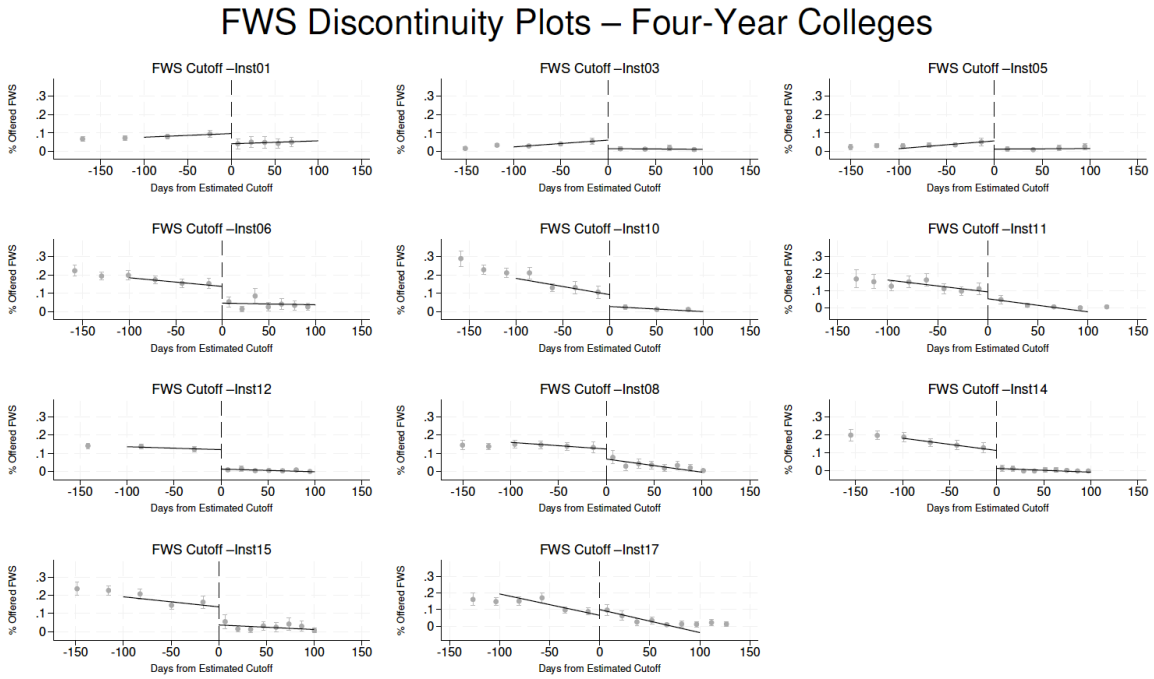
Figure 2. FWS Offer Rates by FAFSA Application Date for Eligible vs. Ineligible Applicants



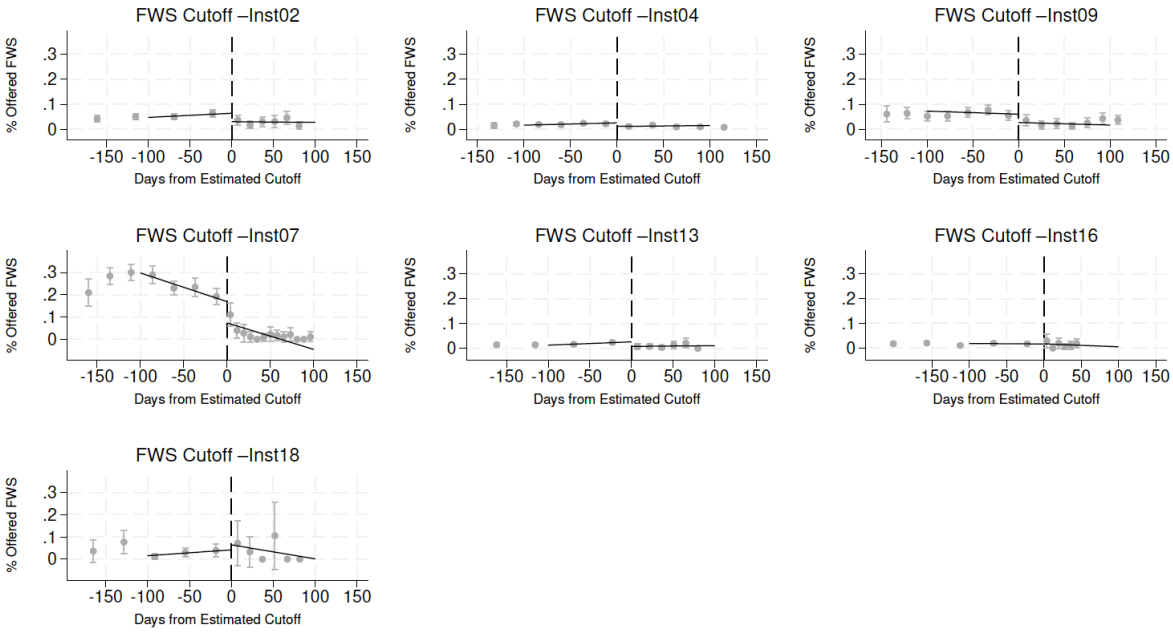
Notes: Figure shows percentage of applicants receiving a FWS offer who submitted a FAFSA within 273 days of the application opening date (October 1, 2016). Sample is then restricted to the common support of FAFSA submission timing across campuses. We exclude two community colleges and one four-year college where campus-specific cutoff dates cannot be reliably identified. Eligible applicants are interest = "Yes" and ineligible applicants are interest = "No/Don't know."

Figure 3. Estimated Campus-Specific Cutoffs

Panel A. Four-Year Colleges

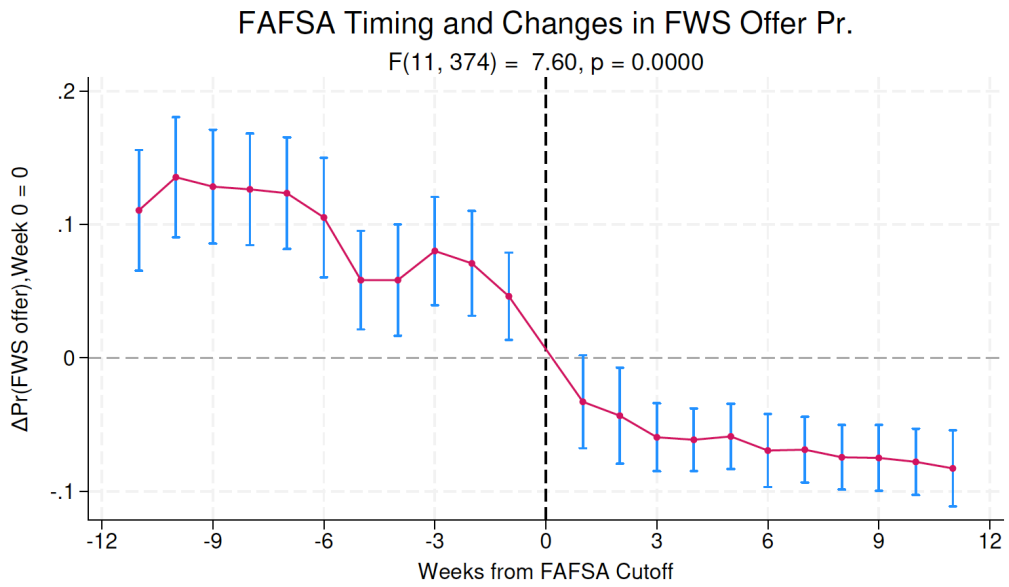


Panel B. Community Colleges



Notes: The cutoff day is: Inst01: 196; Inst02: 185; Inst03: 169; Inst04: 145; Inst05: 165; Inst06: 174; Inst07: 173; Inst08: 165; Inst09: 156; Inst10: 172; Inst11: 141; Inst12: 171; Inst13: 186; Inst14: 170; Inst15: 166; Inst16: 225; Inst17: 139; Inst18: 184. Inst 16, Inst 17, and Inst 18 are excluded from the analytic sample; cutoffs are identified based on the largest increase in the estimated eligibility × before coefficient, regardless of statistical significance.

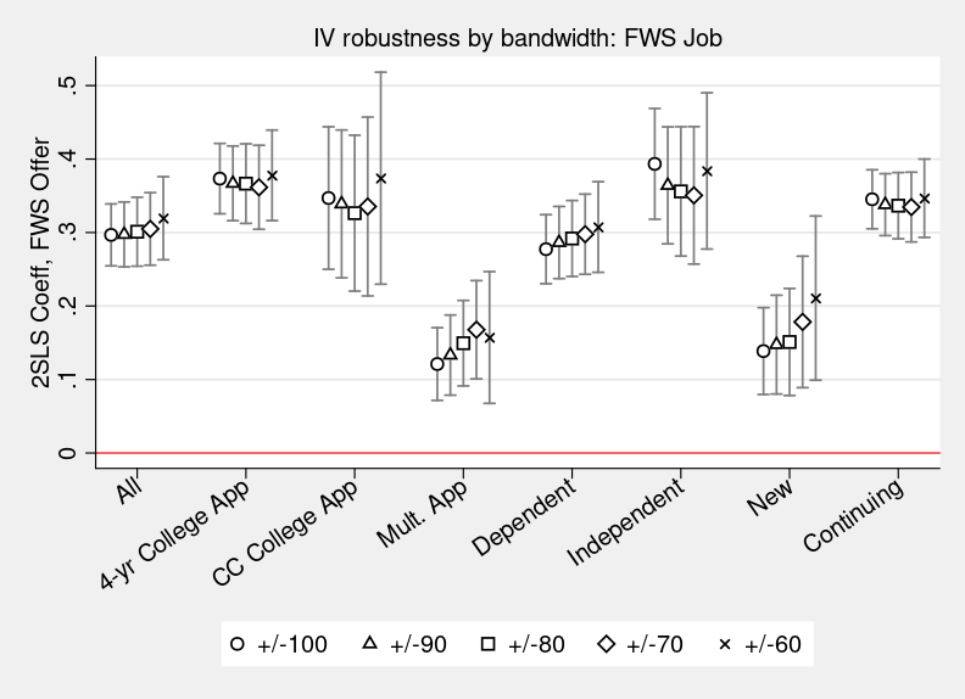
Figure 4. Event Study of FAFSA Submission Timing



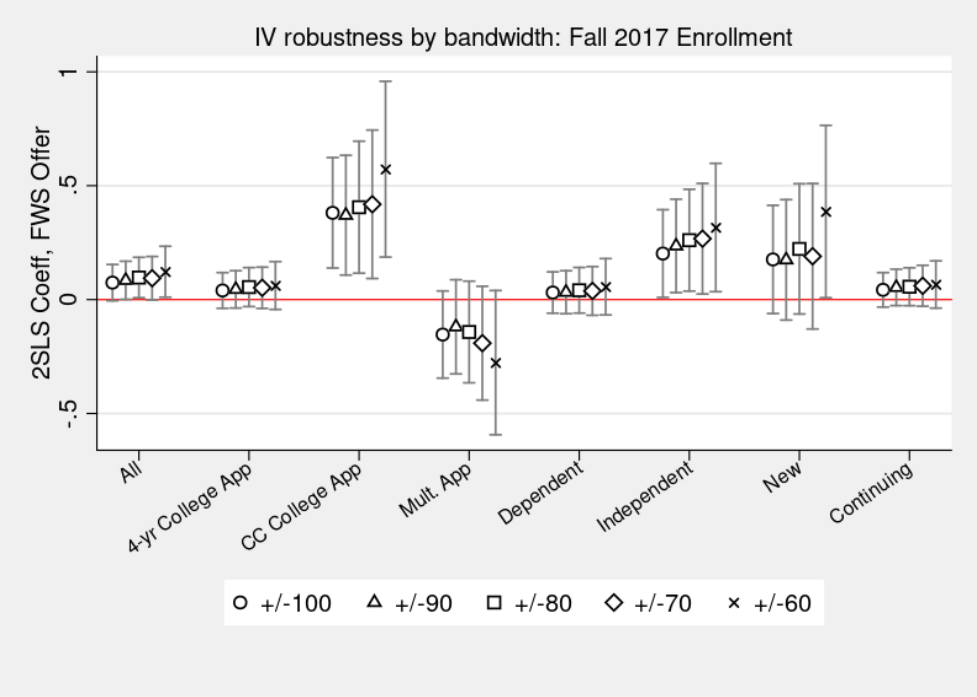
Note: This figure plots event-study estimates of the offer rate by FAFSA application week relative to each campus's cutoff, normalized to zero in the cutoff week (week 0). Vertical bars denote 95% confidence intervals.

Figure 5. IV Estimates by Bandwidth and Subgroups (Effect of Receiving FWS Offer)

Panel A. FWS Job



Panel B. Fall 2017 Enrollment



Note: Vertical bars denote 95% confidence intervals. Each marker reports the 2SLS estimate from the baseline specification, with bandwidths ranging from ±60 to ±100 days.

Table 1. Descriptive Statistics

	Before		After	
	Offer Eligible	Offer Ineligible	Offer Eligible	Offer Ineligible
Student Characteristics (FAFSA)				
Federal EFC	54.930	64.834	28.803	40.455
	(216.169)	(234.078)	(152.767)	(174.824)
Zero EFC	0.899	0.875	0.927	0.899
	(0.301)	(0.330)	(0.260)	(0.302)
Dependent Student	0.793	0.707	0.716	0.660
	(0.405)	(0.455)	(0.451)	(0.474)
Continuing Student	0.676	0.836	0.714	0.848
	(0.468)	(0.371)	(0.452)	(0.359)
Four-Year College Applicant	0.441	0.544	0.484	0.577
	(0.496)	(0.498)	(0.500)	(0.494)
Community College Applicant	0.228	0.294	0.302	0.316
	(0.419)	(0.456)	(0.459)	(0.465)
Applicant at Multiple Institutions	0.332	0.162	0.214	0.108
	(0.471)	(0.368)	(0.410)	(0.310)
FWS Program				
FWS Offer	0.208	0.001	0.016	0.000
	(0.406)	(0.036)	(0.125)	(0.011)
FWS Job	0.074	0.005	0.027	0.004
	(0.261)	(0.074)	(0.161)	(0.066)
FWS Take-Up	0.282	-	-	-
	(0.450)	-	-	-
Total FWS hours worked	160.133	-	-	-
	(87.592)	-	-	-
Other Aid				
Pell Grant	0.377	0.435	0.366	0.443
	(0.485)	(0.496)	(0.482)	(0.497)
State Aid	0.299	0.328	0.258	0.309
	(0.458)	(0.469)	(0.438)	(0.462)
Student Loans	0.032	0.035	0.047	0.047
	(0.175)	(0.184)	(0.212)	(0.213)
Student Academic Outcomes				
Enrollment, Fall 2017	0.736	0.785	0.800	0.851
	(0.441)	(0.411)	(0.400)	(0.356)
Full-Time Enrollment, Fall 2017	0.650	0.654	0.679	0.684
	(0.477)	(0.476)	(0.467)	(0.465)
Fall-Spring Persistence	0.635	0.665	0.667	0.699

	Before		After	
	Offer Eligible	Offer Ineligible	Offer Eligible	Offer Ineligible
	(0.482)	(0.472)	(0.471)	(0.459)
Credits Attempted, Year 1	17.082	17.551	17.620	18.129
	(11.789)	(11.268)	(10.844)	(10.415)
Credits Earned, Year 1	14.959	15.917	15.184	16.344
	(11.737)	(11.327)	(10.936)	(10.583)
Any Degree Completed, by Spring 2020	0.354	0.451	0.415	0.496
	(0.478)	(0.498)	(0.493)	(0.500)
Any Degree Completed, by Spring 2023	0.529	0.609	0.557	0.639
	(0.499)	(0.488)	(0.497)	(0.480)
Observations	27,975	20,569	9,329	8,487

Note: Sample is limited to FAFSA applicants filing within 273 days of the application opening (October 1, 2016–July 1, 2017), then restricted to the common support of FAFSA submission timing across campuses. We exclude two community colleges and one four-year college where campus-specific cutoff dates cannot be reliably identified. Continuing student status is defined as any prior system enrollment since Fall 2000. Take-up and hours worked are suppressed for groups with offer rates below 1%. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018 (i.e., the first academic year observed in the data).

Table 2. Balance Checks

Coeff.	*ELIGIBLE*BEFORE*
Federal EFC	1.843
	(3.218)
Dependent Student	0.020**
	(0.008)
Continuing Student	-0.000
	(0.008)
Single applicant: Senior College	0.010
	(0.011)
Single applicant: Community College	-0.011
	(0.009)
Multiple Applicant	0.001
	(0.005)
Observations	66,360
F-Statistic	54.72

Notes: *** p<0.01, ** p<0.05, * p<0.1. Sample is limited to FAFSA applicants filing within 273 days of the application opening (October 1, 2016–July 1, 2017), then restricted to the common support of FAFSA submission timing across campuses. We exclude two community colleges and one four-year college where campus-specific cutoff dates cannot be reliably identified. Joint test p-value reports the p-value from an F-test of the joint null that the coefficients on the interaction term *Yes*Before* are zero for all baseline covariates listed in the table.

Table 3. First Stage and Reduced Form Results (Effect of Eligible*Before=1)

Coeff.	Model 1	Model 2
*ELIGIBLE*BEFORE*		
FWS Offer	0.178***	0.178***
	(0.007)	(0.007)
FWS Job	0.048***	0.048***
	(0.003)	(0.003)
Enrollment, Fall 2017	0.010	0.010
	(0.007)	(0.007)
Full-time Enrollment, Fall 2017	0.003	-0.000
	(0.008)	(0.008)
Fall-Spring Persistence	0.002	0.000
	(0.009)	(0.009)
Credits Attempted, Year 1	0.017	-0.053
	(0.197)	(0.198)
Credits Earned, Year 1	0.104	0.057
	(0.201)	(0.203)
Any Degree Completed, by Spring 2020	0.005	0.007
	(0.009)	(0.008)
Any Degree Completed, by Spring 2023	0.006	0.007
	(0.009)	(0.009)
Observations	66,360	66,360
F-Stat	606.840	619.880
Covariates	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Sample is limited to FAFSA applicants filing within 273 days of the application opening (October 1, 2016–July 1, 2017), then restricted to the common support of FAFSA submission timing across campuses. We exclude two community colleges and one four-year college where campus-specific cutoff dates cannot be reliably identified. Model 1 does not include covariates. Model 2 includes the following covariates: EFC, dependency status, an indicator for applying only to a single community or senior college (with multiple applicants as the reference category), and an indicator for whether the student was continuing enrollment at the time of FAFSA submission. F-Stat gives the F statistic from a test that the coefficient on the excluded instrument is equal to zero. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018. Standard errors are clustered at the week–campus level for single applicants. For multiple applicants—who are pooled into a single pseudo-campus—standard errors are clustered by application week

Table 4. First Stage and Reduced Form Results, by Student Subgroup (Effect of Eligible*Before=1)

Coeff.	Dependent Students	Independent Students	New Student	Continuing Student	Four-Year College Applicant	Community College Applicant	Applicant at Multiple Institutions
*YES*BEFORE*							
FWS Offer	0.191***	0.134***	0.155***	0.190***	0.204***	0.112***	0.193***
	(0.008)	(0.006)	(0.013)	(0.007)	(0.007)	(0.011)	(0.020)
FWS Job	0.049***	0.047***	0.016***	0.062***	0.072***	0.034***	0.022***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Enrollment, Fall 2017	0.000	0.033**	0.026	0.005	0.008	0.041***	-0.028*
	(0.008)	(0.013)	(0.017)	(0.007)	(0.008)	(0.013)	(0.017)
Full-time enrollment, Fall 2017	-0.001	0.015	0.026	-0.005	0.001	0.017	-0.024
	(0.009)	(0.016)	(0.017)	(0.008)	(0.010)	(0.014)	(0.016)
Fall-Spring Persistence	0.004	-0.002	0.033*	-0.009	-0.003	0.019	-0.010
	(0.010)	(0.016)	(0.019)	(0.010)	(0.011)	(0.015)	(0.015)
Credits Attempted, Year 1	-0.047	0.135	0.535	-0.150	-0.082	0.525	-0.874*
	(0.238)	(0.328)	(0.450)	(0.206)	(0.241)	(0.326)	(0.469)
Credits Earned, Year 1	0.133	0.007	0.874*	-0.163	0.001	0.399	-0.352
	(0.243)	(0.332)	(0.450)	(0.209)	(0.251)	(0.327)	(0.425)
Any Degree Completed, by Spring 2020	0.007	0.012	0.011	-0.000	0.022**	-0.016	-0.012
	(0.010)	(0.016)	(0.016)	(0.010)	(0.011)	(0.015)	(0.017)
Any Degree Completed, by Spring 2023	0.008	0.007	0.013	0.001	0.020*	-0.008	-0.022
	(0.010)	(0.015)	(0.020)	(0.009)	(0.011)	(0.016)	(0.020)
Observations	49,003	17,357	16,407	49,953	32,926	17,913	15,521
F-Stat	506.52	448.32	140.10	686.43	746.02	102.34	89.58

Notes: *** p<0.01, ** p<0.05, * p<0.1. First stage and reduced form results using Model 2 specification. Model 2 includes the following covariates: EFC, dependency status, an indicator for applying only to a single community or senior college (with multiple applicants as the reference category), and an indicator for whether the student was continuing enrollment at the time of FAFSA submission. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018. Standard errors are clustered by week×campus for single applicants and by application week for multiple applicants (pooled into a pseudo-campus).

Table 5. IV Estimates (Effect of Receiving FWS Offer)

Coeff.	Model 1	Model 2
FWS Offer		
FWS Job	0.269***	0.270***
	(0.020)	(0.021)
Enrollment, Fall 2017	0.057	0.054
	(0.040)	(0.040)
Full-time Enrollment, Fall 2017	0.054	0.017
	(0.040)	(0.043)
Fall-Spring Persistence	0.009	0.000
	(0.048)	(0.048)
Credits Attempted, Year 1	0.095	-0.298
	(1.102)	(1.112)
Credits Earned, Year 1	0.584	0.318
	(1.128)	(1.140)
Any Degree Completed, by Spring 2020	0.028	0.041
	(0.049)	(0.046)
Any Degree Completed, by Spring 2023	0.033	0.039
	(0.049)	(0.048)
Observations	66,360	66,360
F-stat	606.8	619.9
Covariates	No	Yes

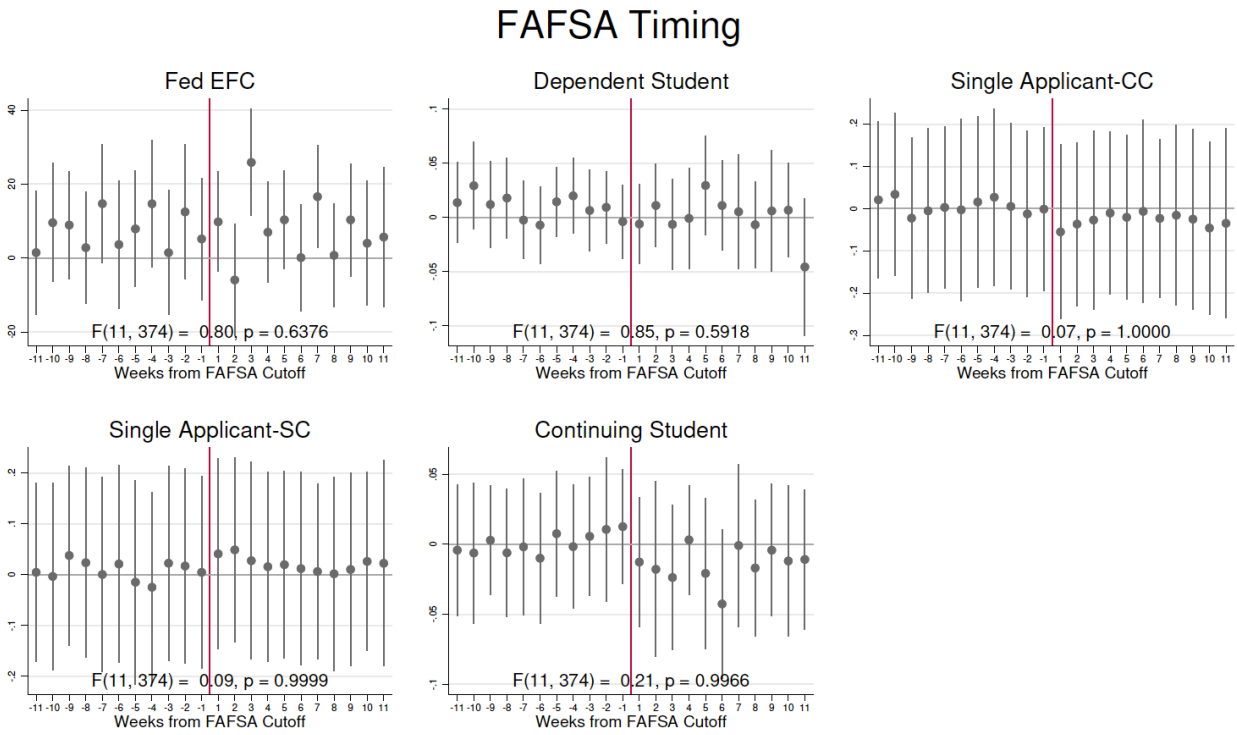
Notes: *** p<0.01, ** p<0.05, * p<0.1. 2SLS estimates of the effect of receiving an FWS offer, instrumented by application timing relative to the FAFSA cutoff. The instrument is *Eligible* × *Before* (Before = submitted prior to the cutoff). The first stage is FWS offer receipt; the second stage instruments offers with *Eligible* × *Before*. First-stage F-statistics reported. Models include campus and week fixed effects. Model 1 does not include covariates. Model 2 includes the following covariates: EFC, dependency status, an indicator for applying only to a single community or senior college (with multiple applicants as the reference category), and an indicator for whether the student was continuing enrollment at the time of FAFSA submission. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018. Standard errors are clustered by week×campus for single applicants and by application week for multiple applicants (pooled into a pseudo-campus).

Table 6. IV Results, by Student Subgroup

Coeff.	Dependent Students	Independent Students	New Student	Continuing Student	Four-Year College Applicant	Community College Applicant	Applicant at Multiple Institutions
FWS Offer							
FWS Job	0.256***	0.348***	0.106***	0.327***	0.356***	0.301***	0.113***
	(0.023)	(0.036)	(0.028)	(0.019)	(0.022)	(0.042)	(0.024)
Enrollment, Fall 2017	0.000	0.246**	0.169	0.025	0.039	0.363***	-0.147*
	(0.044)	(0.096)	(0.113)	(0.038)	(0.040)	(0.123)	(0.089)
Full-time Enrollment, Fall 2017	-0.005	0.113	0.168	-0.024	0.006	0.156	-0.123
	(0.046)	(0.120)	(0.110)	(0.044)	(0.049)	(0.124)	(0.083)
Fall-Spring Persistence	0.020	-0.018	0.210*	-0.049	-0.016	0.171	-0.054
	(0.050)	(0.117)	(0.122)	(0.051)	(0.054)	(0.132)	(0.079)
Credits Attempted, Year 1	-0.245	1.007	3.453	-0.789	-0.401	4.680	-4.533*
	(1.247)	(2.452)	(2.928)	(1.079)	(1.180)	(2.944)	(2.493)
Credits Earned, Year 1	0.699	0.054	5.643*	-0.857	0.006	3.552	-1.827
	(1.277)	(2.480)	(2.961)	(1.095)	(1.228)	(2.936)	(2.198)
Any Degree Completed, by Spring 2020	0.037	0.091	0.073	-0.003	0.110**	-0.140	-0.064
	(0.051)	(0.120)	(0.103)	(0.050)	(0.055)	(0.131)	(0.087)
Any Degree Completed, by Spring 2023	0.042	0.050	0.081	0.003	0.097*	-0.067	-0.112
	(0.051)	(0.116)	(0.132)	(0.050)	(0.052)	(0.143)	(0.103)
Observations	49,003	17,357	16,407	49,953	32,926	17,913	15,521
F-Stat	506.5	448.3	140.1	686.4	746.0	102.3	89.6

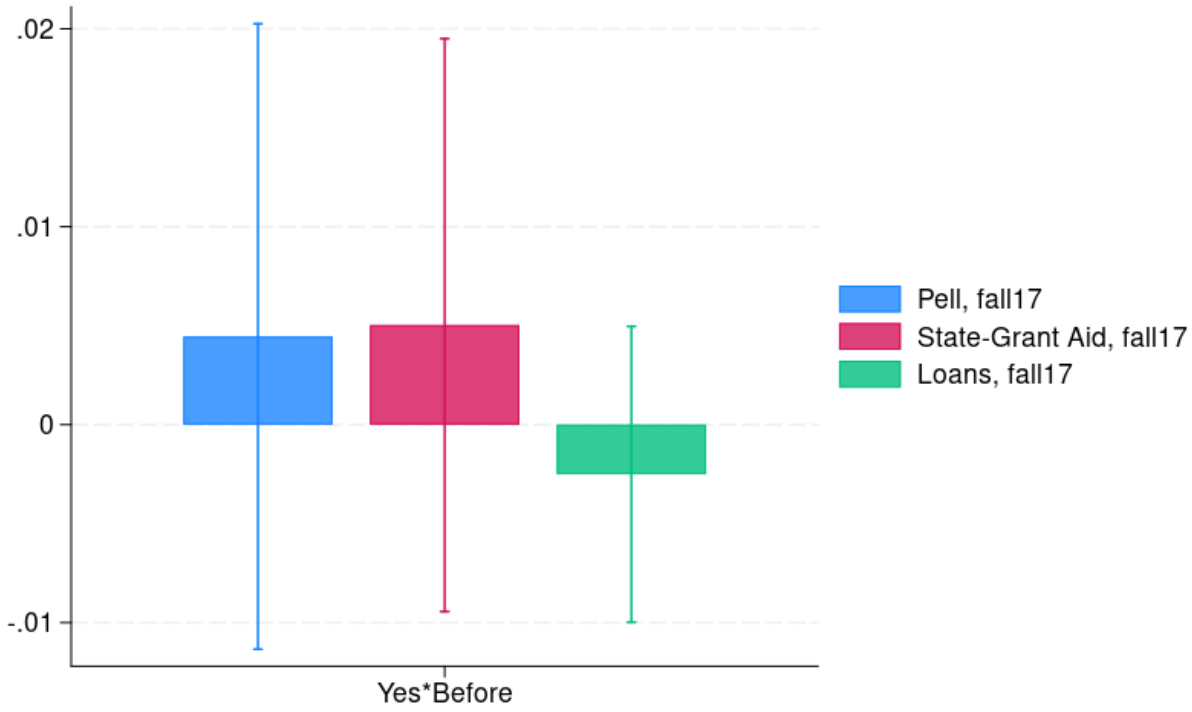
Notes: *** p<0.01, ** p<0.05, * p<0.1. 2SLS estimates of the effect of receiving an FWS offer, instrumented by application timing relative to the FAFSA cutoff. First-stage F-statistics reported. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018. Standard errors are clustered at the week–institution level, with all multiple applicants grouped into a single cluster. Coefficients estimated using Model 2 (with covariates).

Appendix Figure A1. Event Study of FAFSA Submission Timing, by Student Subgroup



Notes: We report coefficients on event-time indicators from a panel event-study; the baseline (omitted) period is week −1. Week 0 indicates the FAFSA campus-specific cutoffs. Points show estimates with 95% confidence intervals; standard errors are clustered by week×institution. Pre-trends p-value reported in the figure (Wald test of all pre-event coefficients = 0).

Appendix Figure A2. Reduced Form, Other Aid



Note: Vertical bars denote 95% confidence intervals.

Appendix Table A1. Balance Test (Effect of Eligible*Before=1)

Coeff.	All	Dependent Students	Independent Students	New Student	Continuing Student	Four-Year College Applicant	Community College Applicant	Applicant at Multiple Institutions
*ELIGIBLE*BEFORE*								
FWS Job	0.000	0.000	0.000	-0.000	0.000**	0.000	-0.000	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Enrollment, Fall 2017	0.000	0.001	0.000	-0.001	0.002**	0.002	-0.003	0.009***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Full-time enrollment, Fall 2017	0.000	0.000	0.001	-0.001	0.006***	0.006**	-0.000	0.010***
	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)
Fall-Spring Persistence	0.000	0.001	0.000	-0.001	0.003**	0.003*	-0.002	0.009***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)
Credits Attempted, Year 1	0.000	-0.001	0.013	-0.032	0.128**	0.136**	-0.014	0.244***
	(0.053)	(0.043)	(0.027)	(0.075)	(0.051)	(0.063)	(0.083)	(0.083)
Credits Earned, Year 1	0.000	0.004	0.014	-0.040	0.109**	0.111*	-0.039	0.263***
	(0.051)	(0.052)	(0.035)	(0.071)	(0.045)	(0.057)	(0.076)	(0.088)
Any Degree Completed, by Spring 2020	0.000	0.001	0.000	-0.002	-0.000	-0.001	-0.005	0.011**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.003)	(0.004)	(0.005)
Any Degree Completed, by Spring 2023	0.000	0.001	0.000	-0.002	0.001	0.001	-0.005	0.011**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)	(0.005)
Observations	66,360	49,003	17,357	16,407	49,953	32,926	17,913	15,521

Note: *** p<0.01, ** p<0.05, * p<0.1. Predicted outcomes are fitted values from regressions of each outcome on pre-treatment covariates, estimated on the full analytic sample. We then use these fitted values as the dependent variable in balance tests around the FAFSA timing cutoff and report the coefficient on the eligibility-by-early-application interaction term. Subgroup tests re-estimate the balance specification separately within each subgroup. Fall-to-spring persistence is defined as enrollment in both Fall 2017 and Spring 2018. "Year 1" credits are measured as the sum of credits attempted/earned in Fall 2017 and Spring 2018. Standard errors are clustered as in the main specifications.

Appendix Table A2. IV Results, by Student Subgroup (Including all 18 campuses)

Coeff.	All	Dependent Students	Independent Students	New Student	Continuing Student	Four-Year College Applicant	Community College Applicant	Applicant at Multiple Institutions
FWS Offer								
FWS Job	0.275***	0.257***	0.356***	0.142***	0.326***	0.358***	0.339***	0.061**
	(0.023)	(0.026)	(0.042)	(0.035)	(0.022)	(0.024)	(0.049)	(0.026)
Initial Enrollment, Fall 2017	0.086*	0.034	0.268**	0.262*	0.054	0.026	0.580***	-0.110
	(0.050)	(0.055)	(0.118)	(0.154)	(0.048)	(0.048)	(0.164)	(0.116)
Initial full-time enrollment, Fall 2017	0.011	0.031	0.039	0.226	-0.007	-0.035	0.337**	-0.042
	(0.056)	(0.058)	(0.151)	(0.146)	(0.058)	(0.062)	(0.164)	(0.119)
Fall-Spring Persistence	0.038	0.076	-0.044	0.304*	-0.009	-0.018	0.328*	0.034
	(0.064)	(0.066)	(0.154)	(0.162)	(0.068)	(0.070)	(0.186)	(0.103)
Credits Attempted, Year 1	-0.223	0.354	-0.939	4.756	-0.523	-1.481	8.110**	-2.967
	(1.475)	(1.604)	(3.207)	(3.910)	(1.474)	(1.544)	(4.049)	(3.222)
Credits Earned, Year 1	0.512	1.417	-1.844	5.505	-0.239	-0.680	6.401	-0.198
	(1.484)	(1.651)	(3.205)	(4.045)	(1.482)	(1.571)	(3.895)	(2.957)
Any Degree Completed, by Spring 2020	0.085	0.081	0.161	0.086	0.053	0.133*	0.021	0.004
	(0.059)	(0.064)	(0.154)	(0.140)	(0.066)	(0.071)	(0.159)	(0.135)
Any Degree Completed, by Spring 2023	0.103*	0.092	0.161	0.178	0.068	0.106	0.245	-0.048
	(0.059)	(0.060)	(0.153)	(0.163)	(0.062)	(0.065)	(0.178)	(0.132)
Observations	66,068	49,076	16,992	16,140	49,928	32,338	19,029	14,701
F-Stat	1,492	309	363	69	505	539	93	41

Appendix Table A3. IV Results, by Student Subgroup (S.E. not Clustered)

Coeff.	All	Dependent Students	Independent Students	New Student	Continuing Student	Four-Year College Applicant	Community College Applicant	Applicant at Multiple Institutions
FWS Offer								
FWS Job	0.270***	0.256***	0.348***	0.106***	0.327***	0.356***	0.301***	0.113***
	(0.017)	(0.019)	(0.039)	(0.035)	(0.018)	(0.021)	(0.043)	(0.038)
Enrollment, Fall 2017	0.054	0.000	0.246**	0.169	0.025	0.039	0.363***	-0.147
	(0.040)	(0.044)	(0.102)	(0.123)	(0.040)	(0.044)	(0.124)	(0.106)
Full-time enrollment, Fall 2017	-0.001	-0.005	0.113	0.168	-0.024	0.006	0.156	-0.123
	(0.046)	(0.049)	(0.120)	(0.125)	(0.047)	(0.052)	(0.139)	(0.111)
Fall-Spring Persistence	0.000	0.020	-0.018	0.210*	-0.049	-0.016	0.171	-0.054
	(0.046)	(0.050)	(0.119)	(0.128)	(0.047)	(0.053)	(0.141)	(0.110)
Credits Attempted, Year 1	-0.298	-0.245	1.007	3.453	-0.789	-0.401	4.680	-4.533
	(1.086)	(1.226)	(2.563)	(3.180)	(1.092)	(1.241)	(3.129)	(2.814)
Credits Earned, Year 1	0.318	0.699	0.054	5.643*	-0.857	0.006	3.552	-1.827
	(1.075)	(1.211)	(2.545)	(3.034)	(1.102)	(1.254)	(3.089)	(2.682)
Any Degree Completed, by Spring 2020	0.041	0.037	0.091	0.073	-0.003	0.110*	-0.140	-0.064
	(0.045)	(0.049)	(0.119)	(0.086)	(0.051)	(0.057)	(0.138)	(0.087)
Any Degree Completed, by Spring 2023	0.039	0.042	0.050	0.081	0.003	0.097*	-0.067	-0.112
	(0.046)	(0.051)	(0.116)	(0.119)	(0.049)	(0.053)	(0.142)	(0.109)
Observations	66,360	49,003	17,357	16,407	49,953	32,926	17,913	15,521
F-Stat	1,492	1,055	409	183	1,444	1,101	325	166

Appendix Table A4. Regression Discontinuity Results, First Stage

	N	Coef.		Std. Err	BW Left	BW Right
All	43,887	0.063	***	0.019	28.677	28.677
Dependent Students	11,073	0.051	**	0.025	31.308	31.308
Independent Students	20,168	0.095	***	0.026	24.235	24.235
New Student	12,646	0.025		0.034	32.745	32.745
Continuing Student	33,527	0.070	***	0.024	30.061	30.061
Four-Year College Applicant	10,360	0.084	***	0.019	39.849	39.849
Community College Applicant	30,113	0.045	*	0.024	22.399	22.399
Applicant at Multiple Institutions	13,774	0.048	*	0.026	27.775	27.775

Note: This table reports regression discontinuity (RD) estimates of the effect of applying earlier among offer-eligible applicants at the cutoff. Point estimates are local polynomial RD estimates evaluated at the cutoff using a local linear specification and a triangular kernel. The bandwidth is selected using the mean-squared-error (MSE) optimal procedure, implemented via the rdrobust package. Reported standard errors, p-values, and confidence intervals are based on robust bias-corrected (RBC) inference following Calonico, Cattaneo, and Titiunik. The running variable is centered at the cutoff; observations are restricted to the indicated bandwidth on each side.

Appendix B.

We implement this procedure by estimating campus-specific thresholds using the empirical distribution of FAFSA submission dates and FWS award patterns. Because FWS awarding practices may differ across institutions, we conduct the search separately by institution. Within each institution, we evaluate a grid of potential application-day thresholds—typically ranging from day 80 to day 260 of the FAFSA cycle—by estimating the following local linear regression with a uniform kernel and a 100-day bandwidth on either side of each candidate cutoff.

$$FWSoffer_{ic} = \beta_0 + \beta_1 (FAFSAapp_i \geq T_c) + f(FAFSAapp_i) + \varepsilon_{ic} \quad (1)$$

where $FWSoffer_{ic}$ is an indicator for whether FAFSA applicant i received an FWS offer from campus c. T_c denotes a candidate application-day threshold used in FWS awarding decisions at campus c. The coefficient β_1 captures the magnitude of any discontinuity in the likelihood of receiving an offer at threshold T_c. We retain thresholds where the estimated discontinuity in receiving a FWS offer is statistically significant at the 0.01 level. If multiple candidate thresholds satisfy this criterion, we select the one associated with the largest t-statistic. This approach ensures that the selected cutoffs correspond to the most substantial declines in FWS availability observed in the FAFSA application and aid offer data. Given that FAFSA applicants may apply to a single campus or multiple campuses, we assign a threshold based on the earliest estimated campus-specific cutoff among the institutions to which each applicant applied.