Annenberg Institute
BROWN UNIVERSITY

EdWorkingPaper No. 24-1108

Buying time: Financial aid allows college students to work less while enrolled

Drew M. Anderson
RAND Corporation

Melanie A. Zaber
RAND Corporation

Many empirical studies have established that financial aid improves college attainment. Few have been able to test why. This study used administrative records of employment and earnings to get a more complete picture of students' finances during college and test one potential mechanism, that financial aid buys students time by allowing them to work less in off-campus jobs. We studied recipients of New Jersey's need-based Tuition Aid Grant (TAG). We used the eligibility cutoffs of TAG to identify groups of otherwise similar students who received sharply different amounts of aid. A prior study took the same approach and found that TAG increased on-time graduation rates from public universities. At these schools, 80% of TAG recipients worked at some point during the year. We found that when students received additional aid, on average they reduced earnings dollar for dollar.

VERSION: December 2024

Suggested citation: Anderson, Drew M., and Melanie A. Zaber. (2024). Buying time: Financial aid allows college students to work less while enrolled. (EdWorkingPaper: 24 -1108). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/1vpg-7k07

Buying time: Financial aid allows college students to work less while enrolled

Drew M. Anderson

RAND Corporation

Melanie A. Zaber

RAND Corporation

Draft: October 2024
Contact: drew.anderson.economist@gmail.com

Abstract

Many empirical studies have established that financial aid improves college attainment. Few have been able to test why. This study used administrative records of employment and earnings to get a more complete picture of students' finances during college and test one potential mechanism, that financial aid buys students time by allowing them to work less in off-campus jobs. We studied recipients of New Jersey's need-based Tuition Aid Grant (TAG). We used the eligibility cutoffs of TAG to identify groups of otherwise similar students who received sharply different amounts of aid. A prior study took the same approach and found that TAG increased on-time graduation rates from public universities. At these schools, 80% of TAG recipients worked at some point during the year. We found that when students received additional aid, on average they reduced earnings dollar for dollar.

Highlights:

- New Jersey's Tuition Aid Grant supports low- to middle-income college students.
- 80% of TAG recipients work during college.
- TAG aid allowed public college and university students to work less.

We thank the Higher Education Student Assistance Authority (HESAA), the National Student Clearinghouse (NSC), and the New Jersey Department of Labor (DOL) for assistance with data. This research was approved by the RAND Human Subjects Protection Committee. We thank Jason Lee for helpful comments. This article represents the views of the authors only. This research does not relate to Drew M. Anderson's current employment at Amazon.

1. Introduction

This study seeks to understand why financial aid for college is effective at keeping students enrolled. A recent meta-analysis found that on average, a thousand dollars of grant aid increased rates of college persistence by 1.5 to 2 percentage points for low-income students Nguyen et al. (2019). From a long-term perspective, receiving a thousand dollars during college should not be a decisive factor for so many students, since completing a college education yields potentially hundreds of thousands of dollars over a lifetime (Oreopoulos and Petronijevic, 2013; Barrow and Malamud, 2015; Webber, 2016; Smith et al., 2020; Ma and Pender, 2023a). However, aid could be a decisive factor if it eases short-term financial constraints that prevent students from investing in their education.

Today's college students do face financial constraints, and they have limited access to borrow against their future income. For example, national surveys of college students found that half of students reported being food insecure (Goldrick-Rab and Broton, 2018). Today's students are more likely to work during college than before (Scott-Clayton, 2012; Carnevale et al., 2015). Federal government loans are available regardless of credit and with low interest rates, but the borrowing amount is capped such that many students still drop out because they cannot finance college (Black et al., 2023).

Most students receive grant aid to help overcome financial constraints (Ma and Pender, 2023b). When a student receives financial aid, how is the funding distributed among their needs? Do students spend more on housing and food? Borrow less? Or do they work fewer hours? Knowing how students spend aid funds would help us understand why these programs work, and potentially improve targeting of aid funds. Knowing where students direct their funding would also indicate their most pressing needs, which might guide the development of specific programs to alleviate those needs.

We lack evidence on students' use of aid funds, because most studies of aid lack data on each student's full financial picture. There are some exceptions discussed below, where researchers could measure effects on borrowing, working during college, or both. Our study adds to the research on student work during college.

We studied recipients of the New Jersey Tuition Aid Grant (TAG). Our primary focus is on public universities, the largest sector supported by TAG, though the program also serves

students at two-year colleges and at private colleges and universities. The program targets resources toward students with greater financial need. Each student receives an eligibility score based primarily on household income. There is a stairstep-shaped function that maps the eligibility score into a grant amount, and this function varies by college and year. The stairsteps create cutoffs whereby some students with similar levels of financial need receive sharply different amounts of aid. We used this natural experiment in a previous study to estimate TAG's impact on college persistence and graduation. We found that TAG increased four-year graduation rates from public universities by 2.7 percentage points per $1,000 of aid received, on average, from a base rate of 34.6 percent four-year graduation (Anderson and Zaber, 2021a).

For the present study, we used the state unemployment insurance database to track employment and earnings in New Jersey during school year 2017–18 and 2018–19 for all TAG recipients. We estimated how employment and earnings at off-campus jobs changed when students received more TAG aid. Income eligibility for TAG is based on earnings from two years prior, so the earnings decisions we observed did not affect students' TAG eligibility during our analysis.

For public university students, TAG supported about 20,000 students per year. The grant provided a maximum of $8,200 per student. Most TAG recipients also received a federal Pell Grant of up to $5,920, but that left over $17,500 per year in expenses for the average student. Students were making decisions about how much to work to support expenses not covered by aid. About a fifth of students did not work, three fifths worked part of the year, and a fifth worked for the entire year. On average, students earned $7,538 over a year.

We found that university students reduced earnings dollar-for-dollar when they received TAG aid: $1,000 in additional TAG aid resulted in roughly $1,000 less income during the year. This is an unconditional average of all students affected by aid cutoffs, including zero earnings for non-workers. This impact reflects a mix of taking on fewer jobs, working fewer hours per week, working fewer weeks of the year, and/or accepting lower-wage jobs. We had limited ability to distinguish these different responses, since we had limited measures of the type and intensity of employment besides the total earnings and weeks worked at each job in each quarter. We did not find conclusive evidence of students being less likely

to work at all or working fewer total job-weeks, so we conclude that the main way students responded to TAG aid was that employed students worked fewer hours. Using the multiple eligibility cutoffs, we investigated if student responses differed by income, but the results were inconclusive.

Is a dollar-for-dollar response plausible? In earlier studies, for each dollar of additional financial aid, students reduced earnings from work by an amount ranging from $0.10 to over one dollar (Broton et al., 2016; Denning, 2019; Park and Scott-Clayton, 2018; Evans and Nguyen, 2019; Denning et al., 2019; Kofoed, 2022; Carlson et al., 2022). In studies of borrowing, students reduced borrowing by an amount ranging from $0.20 to over one dollar (Marx and Turner, 2018; Park and Scott-Clayton, 2018; Evans and Nguyen, 2019; Denning et al., 2019; Odle et al., 2021; Carlson et al., 2022). A response more than dollar-for-dollar suggests the presence of fixed costs. The trouble of taking out a loan, getting a job, or adjusting the amount borrowed or hours at work, may not be worthwhile for small amounts of money. In the presence of these frictions, small changes in financial resources push some students past a threshold where they then make large changes in borrowing or earnings. For those students, the passthrough of grant aid to reductions in work is more than dollar-for-dollar; for other students there is no effect. The average impact on earnings depends on the composition of students, their preferences, and the fixed costs they face.

For community college students, the results were less clear. Both this and our prior study were limited by the smaller sample size in this college sector, about 12,000 TAG recipients per year. Also, these students received a smaller amount in TAG aid, on top of Pell Grants that fully covered tuition. The average student earned more than enough to cover their net cost of college, indicating more of a commitment to work and potentially less sensitivity to aid. We did not find evidence that community college students reduced earnings as a result of receiving more TAG aid. Our results are consistent with studies that show community college students typically work and earn more than university students, and they are less likely to reduce earnings in response to aid (Carruthers and Özek, 2016; Carlson et al., 2022).

Our sample was too small in the private college sector, about 7,000 students per year, to estimate impacts at all using our discontinuity design.

The tradeoff we measured helps explain why TAG had a positive impact on graduation.

Students who work more hours tend to have lower rates of credit completion, slowing progress toward graduation (Darolia, 2014; Ecton et al., 2023). TAG aid alleviated the need to work during school. It allowed students in New Jersey more time to focus on their studies without losing financial resources.

The next section discusses how college aid might affect labor supply during college, and goes into more detail on existing studies of how students use aid and the magnitude of aid passthrough. The following section provides details on TAG. We then discuss our data and our empirical approach to estimating the effects of TAG on labor market outcomes. We then describe the results. We conclude with a discussion of our study's main findings, its limitations, and its implications for future research and policy.

2. Background

2.1. Financial needs and decisions of college students

In theory, if students can borrow against their future income and smooth lifetime consumption, then additional funding during college should not impact their educational investments. The additional funding should contribute only a small amount to increasing consumption, reducing labor, or increasing human capital investment. However, college decisions may not adhere to simple theoretical predictions, as they are not smooth or supported by complete markets.

Borrowing to fund a college education may be unavailable or too costly for several reasons related to informational asymmetry, enforceability, and loan aversion (Palacios Lleras, 2010; Marx and Turner, 2018; Caetano et al., 2018; Boatman et al., 2017; Boatman and Evans, 2017). Subsidized government loans exist to correct these market failures, though the FAFSA application may deter some students (Kofoed, 2017). Government loans rarely cover all college costs; when federal student loan availability is expanded, students borrow more and do better as a result (Denning, 2019; Black et al., 2023). New financing vehicles like income share agreements have not filled all the funding gaps (Zaber and Steiner, 2021).

Many programs offer grant aid that can bridge gaps in funding. This study focuses on need-based aid. Need-based aid currently includes over $9 billion each year from state grant programs, $27 billion each year from the federal Pell Grant, plus much more from local

programs, charitable foundations, and college discounting based on financial need (Ma and Pender, 2023b; National Association of State Student Grant and Aid Programs, 2023).

The federal government and most state aid programs use similar formulas to assess need. The formulas are principally based on the student's household earnings during a recent tax year. For younger students without a spouse or children, the household includes the student's parents.

Aid can be applied toward tuition and the costs for books, supplies, health care, transportation, and living expenses. Aid eligibility and costs are combined by each college to create a financial aid package that covers up to, but not more than, total costs. The student must accept the aid package, decide how intensively to enroll, and decide how much to borrow. The government sends aid dollars to the college, which then applies the funds directly to student charges and sends the remainder in a check to the student to cover indirect costs like living expenses.

There are several ways that need-based aid might fall short: because the program is underfunded and cannot reach all eligible students (Anderson, 2020); because students face higher costs than the formulas assume (Kelchen et al., 2017); because parents do not help as much as the formulas assume (Brown et al., 2012); or because students fail to complete all the steps to gain eligibility each year (McKinney and Novak, 2014; Kofoed, 2017; Scott-Clayton and Schudde, 2016). Published studies of need-based aid show positive impacts on college persistence on average (LaSota et al., 2024), but there are many examples where researchers did not detect impacts, and many pointed to frictions in implementation or lack of resources (Dynarski et al., 2022).

How do students deal with unmet financial need? Some of them suffer material hardship as a result. In a survey of California college students at public universities and community colleges in 2019, the largest challenges that students identified in succeeding in college were the high costs, and balancing school with work responsibilities (California Student Aid Commission, 2019). In that survey, 36 percent of students faced housing insecurity, and 39 percent of students faced food insecurity. By 2023 when the same survey was fielded again, those rates had risen to 53 percent housing insecure and 66 percent food insecure (California Student Aid Commission, 2023). Housing insecurity means students

faced challenges meeting rent or utilities, needed to move frequently, or generally struggled to maintain a safe living situation. Food insecurity means students had difficulty or uncertainty in accessing nutritionally adequate and safe foods. Overall, 60 percent of students worked, and the rates of employment and hours worked were higher among food insecure and housing insecure students. Two national surveys of community college students and two studies of Wisconsin college students over 2009 to 2016 found similar results: at least one third of two-year college students were housing insecure, and approximately half of all college students were food insecure (Goldrick-Rab and Broton, 2018). Not surprisingly, material hardship is associated with worse college attainment, even after controlling for other predictors (Broton, 2021).

Some students work to meet financial needs, but this may place their education at risk. Across several studies, students who worked more intensively and in off-campus jobs progressed more slowly toward graduation than students who worked less intensively or in on-campus work-study, though the effects on grades were mixed (Stinebrickner and Stinebrickner, 2003; Darolia, 2014; Scott-Clayton, 2011; Soliz and Long, 2016; Scott-Clayton and Minaya, 2016; Yu et al., 2020; Ecton et al., 2023).

Receiving funding from need-based grant aid has the potential to reduce work while supporting educational progress. The next section reviews studies that isolate this relationship.

2.2. Research on how need-based aid affects labor market decisions during college

This section reviews several studies that also take on our primary topic, the relationship between student work and grant aid. Each of these studies estimate a passthrough rate, defined as the decrease in earnings (or borrowing) per additional dollar of need-based grant aid. Other studies have estimated impacts on student work from non-need-based scholarships (Carruthers and Özek, 2016; Page et al., 2019; DesJardins and McCall, 2014; DesJardins et al., 2010). To summarize, studies have identified a wide range of passthrough rates and impacts on college attainment.

Denning (2019) studied public university students in Texas who were on the cusp of an age cutoff that significantly increased Pell Grant aid during 2003 to 2013. Students who were just over 24 and could remove their parents' finances from their eligibility calculation

received $930 more in aid for the year, on average. As a result, they reduced their earnings by $529 on average, or $0.57 per dollar of aid, as measured by state unemployment insurance records plus on-campus work-study earnings. The additional grant aid led to students taking more credits without a decrease in grades. Students in their fourth year were 1.8 percentage points more likely to graduate that year, from a baseline rate of 44 percent.

Evans and Nguyen (2019) studied the 2000, 2004, 2008, and 2012 cohorts of a nationally representative sample of university students, and Kofoed (2022) extended this analysis to the 2016 cohort. The research design focused on students with the least financial need who qualified for the smallest Pell Grant amount, compared to those who did not qualify for any Pell funding. Students self-reported the hours they worked in a typical week, excluding on-campus work study and assistantships. An additional $1,000 of Pell Grant aid decreased the average hours worked by 1 hour per week in both studies. Evans and Nguyen (2019) also studied self-reported student earnings. The point estimate implied that students reduced their earnings by $0.47 per dollar of aid, but that finding was not statistically significant. Women reduced their earnings by $0.78 per dollar of aid. Both studies found that additional Pell Grant aid led to small increases in grades. The studies differed in their findings for the effect on having a job. There was no evidence of an effect for earlier cohorts, and there was a five percentage point reduction from a base of 62 percent with a job in the 2016 cohort.

Park and Scott-Clayton (2018) used the same research design to study community college students in a single state. The average annual earnings in this sample was $4,873, drawn from state unemployment insurance records. Students who were eligible for an additional $560 in state and federal aid reduced their earnings by $806, more than dollar for dollar. The additional aid led to small increases in college attainment, including an increase of 7 percentage points in the rate of enrolling full-time in the following fall after the aid was received, from a baseline of 37 percent.

Denning et al. (2019) studied university students in Texas who received Pell Grants during 2008 to 2011. Their research design focused on students with greater financial need who automatically qualified for a maximum award from Pell and additional funding from a state grant, compared to those who qualified for a lower amount of aid. Average annual earnings was $3,882, drawn from state unemployment insurance records. Students received $711 in

additional aid on average. The point estimate implied that students reduced their earnings by $161 on average, or $0.23 per dollar of aid, but that finding was not statistically significant. The additional aid led to increases in college attainment and post-college earnings.

Broton et al. (2016) and Carlson et al. (2022) studied a supplement to the Pell Grant for college students in Wisconsin. A randomized sample of newly enrolled students were offered an additional $3,500 per year at public universities or $1,800 per year at two-year colleges. As a result, for students in the 2008 cohort, self-reported work decreased by 1.7 hours per week, primarily from off-campus work where students had worked 10 hours per week at baseline (Broton et al., 2016). For students in the following eight cohorts, earnings drawn from state unemployment insurance records plus on-campus work-study earnings decreased by about 10 percent among university students who were offered additional aid (Carlson et al., 2022). Students reduced their earnings by $0.08 to $0.17 per dollar of aid received. The aid led to some increases in grades and college persistence. Students at two-year colleges did not significantly reduce work or borrowing. They earned about 70 percent more than university students on average, and they borrowed about 90 percent less.

A related literature has estimated how student borrowing responds to additional financial aid. University students reduced borrowing by $0.39 to $0.42 per dollar of aid received in Marx and Turner (2018), by $0.37 per dollar in Evans and Nguyen (2019), by $0.18 per dollar in Carlson et al. (2022), and by $0.47 per dollar in Denning et al. (2019). Community college students reduced borrowing by $0.20 to $0.31 per dollar of aid received in Odle et al. (2021), and dollar for dollar in Park and Scott-Clayton (2018).

In Marx and Turner (2018) and Park and Scott-Clayton (2018), the reduction in loans was much higher than expected. In Marx and Turner (2018), only three to four percent of students borrowed to begin with. And, recall that students reduced earnings more than dollar for dollar in Park and Scott-Clayton (2018). The authors argued that taking out a loan carries psychological and hassle costs. After receiving additional aid, the loan amounts that would-be borrowers desired were so low that it was not worth it for them to go to the trouble to take out a loan at all. Getting a job likely has a similar up-front cost for many students, which could lead to unconditional average earnings having a large response per dollar of additional aid. Students do not need to understand intricate eligibility rules to

have these reactions. These responses are the result of clear tradeoffs between free time and additional financial resources.

Taken together, these studies indicate a tradeoff between work and aid as sources of funding, which is stronger for university students and varies across settings. Few of these studies were able to estimate how effects varied by student financial need. Carlson et al. (2022) studied a randomized experiment with a large enough sample size to examine differences by financial need, but they did not find significant differences.

Our study adds a new estimate for a large statewide program with demonstrated impacts on graduation, with the potential to evaluate heterogeneous effects by student income level.

3. The Tuition Aid Grant

The Tuition Aid Grant (TAG) is New Jersey's largest financial aid program for college students, and one of the most generous state-level programs in the nation. In school year 2021–22, New Jersey allocated $441 million to the program, providing a larger amount of need-based aid per undergraduate student than any other state besides Washington (National Association of State Student Grant and Aid Programs, 2020). TAG supplements federal grant and loan aid for students from lower-income families attending colleges and universities in the state. This section discusses how TAG works and what we know about its effectiveness.

3.1. TAG structure and implementation

The goal of TAG is to offset financial need. Students with lower household incomes and facing higher tuition costs receive larger aid amounts. To implement this, the state first assesses student incomes through the New Jersey Eligibility Index (NJEI), and then provides grants based on the NJEI and the college.

To receive an NJEI, a student must first submit the Free Application for Federal Student Aid (FAFSA). FAFSA requires information about household income from two years prior, including parental income for younger students. FAFSA requires other information such as household members in college. The NJEI uses FAFSA data, and it offers the New Jersey Alternative Financial Aid Application for certain non-FAFSA-eligible students with undocumented immigration status.

The state publishes the annual TAG Table, which relates NJEI to a TAG amount for each college in the state (see https://www.hesaa.org/Documents/TagTable.pdf). Figure 1 depicts the relationship between NJEI and the TAG amount for any of the seven state colleges in school year 2018–19. The figure shows that NJEI values above a certain threshold receive no aid. Then as NJEI decreases, students receive a level amount of aid in seven different NJEI ranges. Our study of university students also includes four public research universities with higher TAG awards. Results in Appendix A include two-year county colleges and private colleges and universities, each of which have varying TAG Table schedules.

TAG is a first-dollar aid award, so students will receive the full amount of TAG aid for which they are eligible. Colleges might adjust the amount of other scholarships downward for students who get large TAG awards. We cannot observe other scholarships in our data, but we think they are unlikely to be affected by TAG for two reasons. At the sample of public universities we focus on, public aid from TAG and Pell are the primary sources of grant aid. And, it is unlikely that students have completely covered their financial need through TAG and Pell (which would crowd out any other grant aid). We show below that the average TAG recipient still has unmet financial need after TAG and Pell Grants are applied.

3.2. TAG outcomes and policy evolution

TAG has existed for more than 40 years, and it has evolved over time to meet the needs of the state. Until recently, there had not been rigorous external research of the program to evaluate its implementation and effectiveness.

Baum et al. (2021) published a study focused on the way TAG is distributed, pointing out ways in which TAG eligibility formulas, after years of small adjustments, had become less aligned with student needs. For example, the maximum TAG award covered different percentages of tuition across public universities, ranging from 51 percent to 65 percent, without a clear justification for the differences. TAG eligibility differed from that of the federal Pell Grant, particularly for older independent students for whom the NJEI assessed less financial need than the federal formulas did.

Anderson and Zaber (2021a) published an analysis of TAG effectiveness. The study used the idiosyncrasies of the TAG structure and implementation to design a natural experiment.

Like the present study, it was focused on TAG recipients who had enrolled in college and received TAG, but who had received different dollar amounts because of cutoffs in eligibility. The study found that investing additional TAG aid was likely to increase on-time graduation rates in the state, at public universities in particular. At two-year county colleges, additional aid had larger positive impacts for the lowest-income students, even though they already received the largest awards.

The state made policy changes that were consistent with the findings from both research studies. In 2022, there was a historic investment in TAG funding and an adjustment to the TAG Table to increase parity by relatively larger investments at some public universities. The evaluation results gave policymakers confidence that these changes were likely to support greater on-time graduation (Murphy, 2021).

During this same time, the state convened a study commission to evaluate the program and recommend further changes. A third study generated new research to inform the questions before the commission (Anderson and Zaber, 2021b). The commission's report drew on all three studies and made recommendations to better align TAG with the Pell Grant and improve effectiveness (TAG Study Commission, 2022). The state implemented many of these changes in the following years, including adding summer terms similar to Pell Grants, and focusing funding increases on the lowest-income students Murphy (2023).

TAG now has a stronger evidence base for effectiveness than many state-level programs, but it is not clear exactly why it works for students. We sought more data to investigate.

4. Data

4.1. Data sources and measures

We used data from three sources: the New Jersey Higher Education Student Assistance Authority (HESAA), the National Student Clearinghouse (NSC), and the New Jersey Department of Labor (DOL). HESAA administers TAG and tracks every recipient's eligibility and receipt of aid. NSC compiles data on college enrollment and degree completion for students nationwide, which we used in prior studies. NJ DOL administers unemployment insurance and tracks wages at qualifying jobs in New Jersey, which is the focus of this study.

HESAA collaborated with NSC, NJDOL, and researchers at the RAND Corporation to further the mission of each organization by learning about how student work responds to public aid. HESAA gathered data from all three sources and created a longitudinal database where student data could be linked across years using a unique identifier. HESAA removed any personally identifying information from the database and shared files with researchers at RAND.

Our sample consists of TAG recipients for the 2017–18 and 2018–19 school years, a subset of the cohorts used in Anderson and Zaber (2021a). The sample we used to estimate impacts on four-year graduation in Anderson and Zaber (2021a) consisted of students in their first year of college during school years 2012–13 to 2015–16 and potentially completing by 2015–16 to 2018–19. For this analysis, we included any student receiving TAG during 2017–18 and 2018–19. We pooled students across grades and cohorts, with controls for student characteristics we observe: first-year status, dependent status, the school year cohort, and the type of institution they attend (state colleges, research universities, two-year county colleges, or private colleges).

The measures of student work are derived from unemployment insurance records. These data cover all work for pay within the state of New Jersey for covered employers. The covered employers do not include government, the military, certain household and agricultural work, and self-employment. For every job worked in each quarter, we observe earnings, weeks worked, and the industry of employment. We cannot observe occupation nor hours worked. We aligned the employment quarters with the official student aid year, for example defining school year 2017–18 as July 2017 through June 2018.

We defined earnings as the total across jobs for all quarters in the year. We defined labor supply in three categories: no employment, partial-year employment, and full-year employment meaning the student worked at least one job during 52 weeks out of the year. We defined job-weeks worked as the total weeks across all jobs over the year (which can total more than 52 in a year).

4.2. TAG recipients' labor market outcomes and costs during college

Table 1 shows the sample sizes and some key outcomes summarizing student work for our sample of students who received TAG. Our analysis focuses in on students with an NJEI value near one of the eligibility cutoffs. That analysis sample has similar characteristics to the total sample, since we used several NJEI cutoffs spanning the range of family incomes eligible for TAG.

The table is broken down by college sector: public university students (our primary focus and the largest group), two-year county colleges students, and private college and university students. Each group is further broken down by labor supply for the student-year.

Among public university students in the two years, 23 percent did not work. 60 percent worked part of the year, an average of 19.0 job-weeks, earning an average of $6,747 total. The remaining 17 percent worked the full year, an average of 52.7 job-weeks, earning an average of $20,547. The overall unconditional average job-weeks was 20.7, earning an average of $7,538.

The proportion employed was similar across each of the college sectors, at nearly 80 percent of students. Compared to the university students, county colleges students who worked did so more intensively, with more of them working a full year (23 percent) and the partial year workers working more job-weeks (22.9) for a higher overall average earnings in the sector of $9,493. Private college students who worked did so less intensively, with fewer of them working a full year (13 percent) and the partial year workers working fewer job-weeks (16.8) for a lower overall average earnings in the sector of $6,636.

The percentage of younger dependent students was lowest at county colleges (69 percent) and highest at private colleges (87 percent) with public universities in between (80 percent). The percentage of first-year students was predictably larger in the four-year sectors (27 and 33 percent) than the two-year sector (56 percent). Students who worked the full year were less likely to be first-year in college and less likely to be dependent on parents, across all sectors.

Table 2 shows some components of the net college cost for students in each sector in school year 2018–19. The average total cost represents the student-weighted average of the official charges for tuition, fees, and estimated costs of books, supplies, health care, transportation, and living expenses. The Pell Grant was calculated based on student eligibility from the

FAFSA, and the TAG award was drawn from administrative data. These students are low-income, with 61 percent eligible for the maximum federal Pell Grant.

Among public university students, the average total cost of college was $28,400. After an average Pell Grant of $5,044 and TAG grant of $5,782, the average student had $17,574 remaining in costs. Referencing Table 1, students who worked the full year would have covered that from their work alone, while others would have needed to draw on loans, savings, or other family member support to pay the bills. The cost of college was lower at county colleges ($13,000 on average) and higher at private colleges ($53,300 on average). County colleges students earned enough to cover all costs on average, while private college students did not.

These data show that TAG recipients are making extensive and intensive margin decisions about working during college, but we cannot draw conclusions about causality. The following sections discuss our approach to estimating a causal relationship between TAG aid and work.

5. Empirical approach

5.1. Regression discontinuity design

The sharp cutoffs illustrated in Figure 1 suggest a regression discontinuity (RD) design. In these designs, sharp changes in eligibility at the cutoffs create counterfactual worlds that can be used to estimate treatment effects for students in the neighborhood of each cutoff (Cattaneo and Titunik, 2022).

Our model is a multi-cutoff cumulative RD. It is cumulative because each individual is subject to a series of cutoffs, and each student will land near at most one cutoff. Our model estimates the impacts for individuals with an NJEI score near one of the NJEI cutoff values with a discontinuous jump in aid. The NJEI cutoff values are the same for all colleges and years, at values of 1,500, 2,500, and continuing at 1,000 intervals up to 4,500 for county colleges and 6,500 for universities, after which a final cutoff drives aid to zero. We did not evaluate the final cutoff, since we only have TAG recipients in our database. Below we discuss the density of students with NJEI values on either side of each cutoff.

We used a two-stage "fuzzy" RD to estimate the effect of TAG aid on work outcomes. An NJEI value just below a cutoff value results in greater TAG aid than an NJEI value just

above it, but the difference in aid varies depending on the cutoff value, college, and year. The two-stage approach scales the impact in effect size per dollar. The first stage is the empirical effect of the NJEI on TAG aid. The second stage is the effect of TAG aid on work outcomes.

To estimate this model, we followed the same approach described in Anderson and Zaber (2021a), using the software from Cattaneo et al. (2020b). The RD effects are only identified at the cutoff points, but the estimation uses observations surrounding those points, so it requires a large enough sample size near cutoffs. We use a robust, data-driven approach to select bandwidth around the cutoffs and calculate bias-corrected estimates and confidence intervals. The RD parameter is the difference at the cutoff between local linear regressions estimated on either side of the cutoff, weighted using a triangular kernel.

In both stages, we control for a set of observable differences between students: their dependent status, their cohort year (2017–18 or 2018–19), whether the student is in their first year of college, and the type of institution (state college or research university). A student can appear in the data multiple times if they received TAG in multiple years. The standard errors allow for correlation between observations of the same individual in multiple years.

The result of the estimation is an effect at each cutoff, as well as an overall effect taking the cutoffs together. Combining the cutoffs leads to a larger sample size and typically better precision. However, each cutoff is a separate, valid estimation. Comparing them can help us understand heterogeneity in effects by financial need.

RD designs are common in studies of financial aid for college (Nguyen et al., 2019). In the case of need-based aid, RD often limits the analysis to a small band of incomes at the upper end of the eligible range. TAG employs cutoffs throughout the distribution of financial need. Because there are multiple cutoffs in our study, we are able to examine a broader range of household incomes than is typical for regression discontinuity studies of financial aid programs. This is valuable, because the results are more likely to be representative of a broader range of recipients, particularly lower-income recipients with the greatest financial need.

5.2. RD validity

The RD approach is valid under the assumption that expected potential outcomes vary smoothly with the eligibility index at cutoff values. The potential outcomes function for each individual maps the treatment (amount of TAG aid) to the outcome (work choices). The expected potential outcomes function at an NJEI value is an average for individuals with the same level of financial need, as measured by the NJEI. That assumption is untestable, but it is more plausible if the density of students and characteristics of students are smooth through each of the NJEI cutoffs.

Figure 2 is the first of several figures with NJEI on the horizontal axis. The vertical lines show the NJEI cutoff values. We chose a constant bandwidth of 150 NJEI points around each cutoff for illustration purposes in these figures. The data-driven bandwidth values for our numerical estimates range from about 100 to 200 NJEI points. In this figure, each bar represents the number of students in our sample within 25 NJEI points.

Figure 2 shows the density of public university students to test for smoothness through the cutoffs. Visually, it is clear that we do not see significant bunching of individuals on the lower side of the NJEI cutoff where students are eligible for more TAG aid. We also tested using the test proposed by Cattaneo et al. (2020a). We could not reject equality of the density on either side of the cutoff (p-value 0.7).

The lack of bunching below cutoffs also suggests that there is not a significant impact of TAG on enrollment in the year of TAG receipt. Since our data set consists of TAG recipients only, an increase in enrollment would appear as a jump in the density of students below the NJEI cutoff. While the offer of TAG does not appear to impact enrollment, we found that receiving TAG has impacts on future persistence and graduation outcomes (Anderson and Zaber, 2021a). This is not surprising, given that students cannot predict their TAG awards until late in the process of enrolling for that school year. Differences in award amounts are unlikely to cause changes in enrollment decisions at that stage.

We also tested for smoothness through the cutoffs in student characteristics that are set at baseline. We did this by applying the estimation approach we used for the outcomes analysis. We estimated the model without covariates, with each observable student feature serving as the dependent variable. We tested dependent student status, first-year status,

and an indicator for attending the state colleges versus research universities. None of these characteristics had statistically significant differences at the TAG cutoffs. The estimated differences were all less than 2 percentage points.

It could still be the case that unobservable features of individuals vary with the NJEI, but we argue that is unlikely. Student characteristics within a small neighborhood of the cutoff ought to be balanced on either side of the cutoff, since students are unable to observe or control the NJEI to land on one side of the cutoff. The NJEI formula is not public, so there is no way for a student to know exactly how inputs map into a score. Even if it were public, the inputs come primarily from tax filings from two years prior. Given the lack of ability to manipulate NJEI, and the results of our testing, we conclude that students who received similar NJEI values are similar in their underlying characteristics and potential outcomes.

Finally, another way the RD assumption could fail is if there were other relevant treatments triggered at the exact same NJEI values. Then the estimated impact should not be attributed only to TAG. This is also unlikely, because TAG is the only program that is based on the NJEI. We do not know the NJEI formula exactly, but based on discussions with New Jersey policymakers and analysis of federal eligibility versus the NJEI data, there is no indication that NJEI cutoff values are aligned with key values that would trigger discontinuous jumps in eligibility for other types of aid. We tested for jumps in Pell Grant aid and did not find evidence of jumps near the NJEI cutoffs (Anderson and Zaber, 2021a).

6. Results

This section discusses the results of estimating the RD approach described above. We find clear evidence of passthrough to student wages, with less clear evidence of impacts on working at all or job-weeks worked. We conclude that employed students tended to work fewer hours when they received additional TAG aid.

The figures in this section are scatter plots. Each bubble represents the average dollar amount (either TAG aid or earnings) for students within a bin of 10 NJEI points. The size of each bubble is proportional to the number of individuals in that bin, reflecting the same data as shown in Figure 2 above. As noted above, we chose a constant bandwidth of 150 NJEI points for illustration purposes in these figures. The bandwidth for our numerical estimates

ranges from roughly 100 to 200 NJEI points. The red lines represent local linear regressions estimated to fit the data in these figures. That is, they reflect all of the observations within the set bandwidth, so they do not necessarily match exactly with the local linear regression estimates reported in Table 3.

Figure 3 represents the first stage of our model, comparing TAG aid to the NJEI. It is the empirical analog of the TAG Table, combining public universities in 2017–18 and 2018–19 (Figure 1 shows the TAG Table for state colleges in 2018–19). In Figure 3, there is clearly a positive and significant jump in TAG aid at each cutoff, ranging from about $500 to $1,000. The weighted average impact was an additional $802 in aid.

Figure 4 represents the reduced form of the model, comparing earnings to the NJEI. The earnings data are much more variable than TAG aid and do not follow a clear stairstep pattern. In general, the students with higher NJEI (signifying higher family income two years prior) tend to have higher individual earnings during the year of TAG receipt. This can be seen in the general upward trend of the scatter plot. The linear fit endpoint is lower on the left hand side than on the right hand side of the cutoff, particularly at the lowest two cutoffs with the largest density of students. This indicates that more aid is passed through to lower earnings.

Table 3 reports the estimated values from our two-stage fuzzy RD model, with confidence intervals. The table also reports the effective sample size, which is determined by bandwidth selection and the density of observations around the cutoffs. It shows the estimated effect on earnings summarizing Figure 3 and Figure 4, as well as the effects on employment and on job-weeks worked.

The first outcome is the change in dollars of total annual earnings from work across all jobs, per additional dollar of TAG aid. At every cutoff, the coefficient estimate on total earnings was negative, suggesting that an additional dollar of aid leads to reduced earnings in off-campus jobs. Combining the cutoffs, the overall effect was statistically significant at -1.03 per dollar of TAG aid.

The multiple cutoffs allow us to evaluate heterogeneity in the impacts of TAG aid across students with different levels of family income. There was not a clear pattern. The smallest passthrough estimates were at the 1,500 and 4,500 cutoffs (-0.43 and -0.41 in earnings per

dollar of TAG aid). The largest passthrough estimate was at the 6,500 cutoff, corresponding to the highest household income (-2.52 per dollar).

The second outcome is the change in the rate of employment, scaled as the change in percentage points per $1,000 of TAG aid. The baseline rate of any employment in the sample was 67 percent (see Table 1). The estimates varied across cutoffs, but they were generally negative and led to an overall negative estimate of -2.85 percentage points. However, the estimate has a wide confidence interval including no effect and ranging from -7.40 to +1.24 percentage points.

The third outcome is the change in the number of job-weeks per $1,000 of TAG aid. The baseline average job-weeks in the sample was 20.7. The estimates varied across cutoffs, but they were generally negative and led to an overall negative estimate of -1.80 job-weeks. However, the estimate has a wide confidence interval including no effect and ranging from -4.24 to +0.52 job-weeks.

Appendix A reports the same results for county colleges students and for all students pooled together (public universities, county colleges, and private colleges and universities). The results for those samples do not provide clear evidence of passthrough.

7. Discussion and conclusion

Many researchers and policymakers have posited that one way that financial aid might improve academic attainment is by allowing college students to spend less time working at jobs off-campus. We tested for evidence of this mechanism, among recipients of TAG in New Jersey during 2017–18 and 2018–19. Our results showed that TAG aid allowed public university students to work less while enrolled. We estimated a passthrough rate of one-to-one. That implies that the average TAG recipient made adjustments to keep their financial resources constant, while freeing up time by working less.

7.1. Limitations

We inferred that students made a tradeoff between aid and work, but we do not have student-level stories on how these decisions are made. There is no need for a student to understand the workings of TAG to take fewer work shifts in response. The student only needs

to react to their total financial resources as the year goes on. However it would potentially help guide TAG policy and communications to know more about how students think about financial decisions. We have general evidence on student financial knowledge (Anderson et al., 2018), and studies show that financial knowledge can make students approach aid decisions differently (Boatman and Evans, 2017).

We focused on how college students who receive more aid make short-term financial decisions. We are leaving aside the question of how financial aid programs affect the choice of whether to attend college at all and where to enroll, or how they impact borrowing and post-college finances.

We explored potential effects of TAG aid on the broad industry in which students work, with a hypothesis that less need for earnings might allow students to choose industries with a closer alignment to college degrees. Our measures of industry are general and do not allow us to identify student occupation, so these results were inconclusive.

7.2. Implications

TAG is important within New Jersey, but it also provides insights for programs in other states and at the federal level, since they are structured similarly. These insights would not have been possible without the cooperation of New Jersey policy makers. This project demonstrates that states can learn about their financial aid programs by linking data across educational and workforce agencies.

TAG buys a significant amount of time for the average student. The average additional aid triggered by cutoffs in our analysis was roughly $800 dollars from TAG, resulting in roughly $800 less in earnings. The minimum wage in New Jersey during this period ranged from $8.44 to $10.00 per hour (FRED Economic Data, 2024). Taking the high end of that range, TAG allowed students to work 80 fewer hours, or about two full-time weeks less than they otherwise would have.

New Jersey Administrative Code Section 9A:1-1.2 defines a semester credit hour as 50 minutes in class and 100 minutes out of class per week for 15 weeks. Each credit is a total of 37.5 hours, so TAG buys a student time equal to 2 additional credit hours. A baccalaureate degree program consists of at least 120 semester credit hours.

These results help explain our earlier estimates of TAG's effectiveness. Anderson and Zaber (2021a) estimated that $800 in TAG aid, triggered by eligibility in the first year of college, would increase the rate of 4-year graduation by 2.2 percentage points among first-year students at public universities. The present study found that receiving $800 in TAG aid would allow the average student to take 2 more credits, or 1.7 percent of a 4-year degree. These effect sizes are similar, and they support that buying time is an important mechanism through which TAG helped students succeed in college.

References

Anderson, Drew M. 2020. When financial aid is scarce: The challenge of allocating college aid where it is needed most. *Journal of Public Economics* 190:104253.

Anderson, Drew M., Johnathan G. Conzelmann, and T. Austin Lacy. 2018. The state of financial knowledge in college: New evidence from a national survey. Working paper wr-1256, RAND Corporation.

Anderson, Drew M. and Melanie A. Zaber. 2021a. Cutting the college price TAG: The effects of New Jersey's Tuition Aid Grant on college persistence and completion. Report rr-a101-1, RAND Corporation.

———. 2021b. The future of New Jersey's Tuition Aid Grant: A review of options and evidence. Report rr-a101-2, RAND Corporation.

Barrow, Lisa and Ofer Malamud. 2015. Is college a worthwhile investment? *Annual Review of Economics* 7: 519–555.

Baum, Sandy, Kristin Blagg, and Macy Rainer. 2021. New Jersey's state grant program: Strengths, weaknesses, and pathways to achieving the state's goals. Research report, Urban Institute.

Black, Sandra E., Jeffrey T. Denning, Lisa J. Dettling, Sarena Goodman, and Lesley J. Turner. 2023. Taking it to the limit: Effects of increased student loan availability on attainment, earnings, and financial well-being. *American Economic Review* 113, no. 12: 3357–3400.

Boatman, Angela and Brent J. Evans. 2017. How financial literacy, federal aid knowledge, and credit market experience predict loan aversion for education. *The ANNALS of the American Academic of Political and Social Science* 671, no. 1.

Boatman, Angela, Brent J. Evans, and Adela Soliz. 2017. Understanding loan aversion in education: Evidence from high school seniors, community college students, and adults. *AERA Open* 3, no. 1.

Broton, Katharine M. 2021. Poverty in American higher education: The relationship between housing insecurity and academic attainment. *Journal of Postsecondary Student Success* 1, no. 2: 18–45.

Broton, Katharine M., Sara Goldrick-Rab, and James Benson. 2016. Working for college: The causal impacts of financial grants on undergraduate employment. *Educational Evaluation and Policy Analysis* 38, no. 3: 477–494.

Brown, Meta, John Karl Scholz, and Ananth Seshadri. 2012. A new test of borrowing constraints for education. *Review of Economic Studies* 79, no. 2: 511–538.

Caetano, Gregorio, Miguel Palacios, and Harry A. Patrinos. 2018. Measuring aversion to debt: An experiment among student loan candidates. *Journal of Family and Economic Issues* 40: 117–131.

California Student Aid Commission. 2019. 2018–19 student expenses and resources survey: Initial insights. Survey report, California Student Aid Commission.

———. 2023. Food and housing survey: Understanding students' basic needs. Survey report, California Student Aid Commission.

Carlson, Deven, Alex Schmidt, Sarah Souders, and Barbara Wolfe. 2022. The effects of need-based financial aid on employment and earnings: Experimental evidence from the Fund for Wisconsin Scholars. *Journal of Human Resources* 58, no. 6.

Carnevale, Anthony P., Nicole Smith, Michelle Melton, and Eric W. Price. 2015. Learning while earning: The new normal. Center on Education and the Workforce, Georgetown University, McCourt School of Public Policy.

Carruthers, Celeste K. and Umut Özek. 2016. Losing HOPE: Financial aid and the line between college and work. *Economics of Education Review* 53: 1–15.

Cattaneo, Matias D., Michael Jansson, and Xinwei Ma. 2020a. Simple local polynomial density estimators. *Journal of the American Statistical Association* 115, no. 531: 1449–1455.

Cattaneo, Matias D. and Rocío Titunik. 2022. Regression discontinuity designs. *Annual Review of Economics* 14: 821–851.

Cattaneo, Matias D., Rocío Titunik, and Gonzalo Vazquez-Bare. 2020b. Analysis of regression discontinuity designs with multiple cutoffs or multiple scores. *Stata Journal* 20, no. 4: 866–891.

Darolia, Rajeev. 2014. Working (and studying) day and night: Heterogeneous effects of working on the academic performance of full-time and part-time students. *Economics of Education Review* 38: 38–50.

Denning, Jeffrey T. 2019. Born under a lucky star: Financial aid, college completion, labor supply, and credit constraints. *The Journal of Human Resources* 54, no. 3: 760–784.

Denning, Jeffrey T., Benjamin M. Marx, and Lesley J. Turner. 2019. ProPelled: The effects of grants on graduation, earnings, and welfare. *American Economic Journal: Applied Economics* 11, no. 3: 193–224.

DesJardins, Stephen L., Brian P. McCall, Molly Ott, and Jiyun Kim. 2010. A quasi-experimental investigation of how the Gates Millennium Scholars program is related to college students' time use and activities. *Educational Evaluation and Policy Analysis* 32, no. 4: 456–475.

DesJardins, Steven L. and Brian P. McCall. 2014. The impact of the Gates Millennium Scholars program on college and post-college related choices of high ability, low-income minority students. *Economics of Education Review* 38: 124–138.

Dynarski, Susan, Lindsay C. Page, and Judith Scott-Clayton. 2022. College costs, financial aid, and student decisions. Working Paper 30275, National Bureau of Economic Research.

Ecton, Walter G., Carolyn J. Heinrich, and Celeste K. Carruthers. 2023. Earning to learn: Working while enrolled in tennessee colleges and universities. *AERA Open* 9.

Evans, Brent J. and Tuan D. Nguyen. 2019. Monetary substitution of loans, earnings, and need-based aid in postsecondary education: The impact of Pell Grant eligibility. *Economics of Education Review* 70: 1–19.

FRED Economic Data. 2024. State minimum wage rage for New Jersey. Series sttminwgnj, Federal Reserve Bank of St. Louis.

Goldrick-Rab, Sara and Katharine M. Broton. 2018. Going without: An exploration of food and housing insecurity among undergraduates. *Educational Researcher* 47, no. 2: 121–133.

Kelchen, Robert, Sara Goldrick-Rab, and Braden Hosch. 2017. The costs of college attendance: Examining variation and consistency in institutional living cost allowances. *The Journal of Higher Education* 88, no. 6: 947–971.

Kofoed, Michael S. 2017. To apply or not to apply: FAFSA completion and financial aid gaps. *Research in Higher Education* 58, no. 1: 1–39.

———. 2022. Pell Grants and labor supply: Evidence from a regression kink. Discussion Paper 15061, IZA Institute of Labor Economics.

LaSota, Robin R., Joshua R. Polanin, Laura W. Perna, Melissa A. Rodgers, and Megan J. Austin. 2024. Does aid matter? a systematic review and meta-analysis of the effects of grant aid on college student outcomes. *Review of Educational Research* Forthcoming.

Ma, Jennifer and Matea Pender. 2023a. Education pays 2023: The benefits of higher education for individuals and society. Report, The College Board.

———. 2023b. Trends in college pricing and student aid 2023. Report, The College Board.

Marx, Benjamin M. and Lesley J. Turner. 2018. Borrowing trouble? human capital investment with opt-in costs and implications for the effectiveness of grant aid. *American Economic Journal: Applied Economics* 10, no. 2: 163–201.

McKinney, Lyle and Heather Novak. 2014. FAFSA filing among first-year college students: Who files on time, who doesn't and why does it matter? *Research in Higher Education* 56: 1–28.

Murphy, NJ Governor Phil. 2021. Governor Murphy signs Fiscal Year 2022 Appropriations Act into law. Press release, State of New Jersey.

———. 2023. ICYMI: Murphy Administration's financial aid expansion supports student success in new jersey. Press release, State of New Jersey.

National Association of State Student Grant and Aid Programs. 2020. 50th annual survey report on state-sponsored student financial aid. Survey report 2018-2019 Academic Year, NASSGAP.

———. 2023. 53rd annual survey report on state-sponsored student financial aid. Survey report 2021-2022 Academic Year, NASSGAP.

Nguyen, Tuan D., Jenna W. Kramer, and Brent J. Evans. 2019. The effects of grant aid on student persistence and degree completion: A systematic review and meta-analysis of the causal evidence. *Review of Educational Research* 89, no. 6: 831–874.

Odle, Taylor K., Jason C. Lee, and Steven P. Gentile. 2021. Do promise programs reduce student loans? evidence from Tennessee Promise. *The Journal of Higher Education* 92, no. 6.

Oreopoulos, Philip and Uros Petronijevic. 2013. Making college worth it: A review of the returns to higher education. *The Future of Children* 23, no. 1: 41–65.

Page, Lindsay C., Stacy S. Kehoe, Benjamin L. Castleman, and Gumilang Aryo Sahadewo. 2019. More than dollars for scholars: The impact of the Dell Scholars Program on college access, persistence, and degree attainment. *The Journal of Human Resources* 54, no. 3: 683–725.

Palacios Lleras, Miguel. 2010. *Investing in human capital*. Cambridge University Press.

Park, Rina Seung Eun and Judith Scott-Clayton. 2018. The impact of Pell Grant eligiibility on community college students' financial aid packages, labor supply, and academic outcomes. *Educational Evaluation and Policy Analysis* 40, no. 4.

Scott-Clayton, Judith. 2011. The causal effect of federal work-study participation: Quasi-experimental evidence from West Virginia. *Educational Evaluation and Policy Analysis* 33, no. 4: 506–527.

———. 2012. What explains trends in labor supply among U.S. undergraduates? *National Tax Journal* 65, no. 1: 181–210.

Scott-Clayton, Judith and Veronica Minaya. 2016. Should student employment be subsidized? conditional counterfactuals and the outcomes of work-study participation. *Economics of Education Review* 52: 1–18.

Scott-Clayton, Judith and Lauren Schudde. 2016. The consequences of performance standards in need-based aid: Evidence from community colleges. *The Journal of Human Resources* 55, no. 4: 1105–1136.

Smith, Jonathan, Joshua Goodman, and Michael Hurwitz. 2020. The economic impact of access to public four-year colleges. Edworkingpaper, Annenberg Institute at Brown University.

Soliz, Adela and Bridget Terry Long. 2016. Does working help or hurt college students? the effects of federal work-study participation on student outcomes. CAPSEE working paper, Center for Analysis of Postsecondary Education and Employment.

Stinebrickner, Ralph and Todd R. Stinebrickner. 2003. Working during school and academic performance. *Journal of Labor Economics* 21, no. 2: 473–491.

TAG Study Commission. 2022. Tuition Aid Grant Study Commission: Final report. Tech. rep., Presented to Governor Phil Murphy and The New Jersey State Legislature.

Webber, Douglas A. 2016. Are college costs worth it? how ability, major, and debt affect the returns to schooling. *Economics of Education Review* 53: 296–310.

Yu, Hongwei, Lyle McKinney, and Vincent D. Carles. 2020. Do community college students benefit from federal work-study participation? *Educational Evaluation and Policy Analysis* 122, no. 1: 1–36.

Zaber, Melanie A. and Elizabeth D. Steiner. 2021. Are income share agreements fair? a close look at the potential risks and benefits of an emerging financial aid option. Perspective pe-a1141-12, RAND Corporation.

Tables and figures

Table 1: Employment and earnings during year of TAG receipt

Value for row:	Pct. of students	Avg. job-weeks	Avg. total earnings	Pct. first-year	Pct. dependent
Public university students, N = 40,392					
No employment	23%	0.0	$0	31%	80%
Partial-year employment	60%	19.0	$6,747	29%	82%
Full-year employment	17%	52.7	$20,547	14%	70%
Total	100%	20.7	$7,538	27%	80%
County colleges students, N = 23,351					
No employment	21%	0.0	$0	58%	64%
Partial-year employment	56%	22.9	$8,246	58%	74%
Full-year employment	23%	54.1	$21,024	50%	64%
Total	100%	25.4	$9,493	56%	69%
Private college students, N = 13,802					
No employment	22%	0.0	$0	39%	88%
Partial-year employment	65%	16.8	$6,008	34%	89%
Full-year employment	13%	55.0	$20,391	17%	77%
Total	100%	18.3	$6,636	33%	87%

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Table 2: 2018–19 Charges and aid

Value for row:	Avg. cost of college	Avg. Pell Grant	Avg. TAG	Net cost
Public university students				
Total	$28,400	$5,044	$5,782	$17,574
County colleges students				
Total	$13,000	$5,575	$1,771	$5,654
Private college students				
Total	$53,300	$4,734	$9,252	$39,314

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

.

Table 3: Effects of additional TAG aid at eligibility cutoffs, for public university students (fuzzy RD)

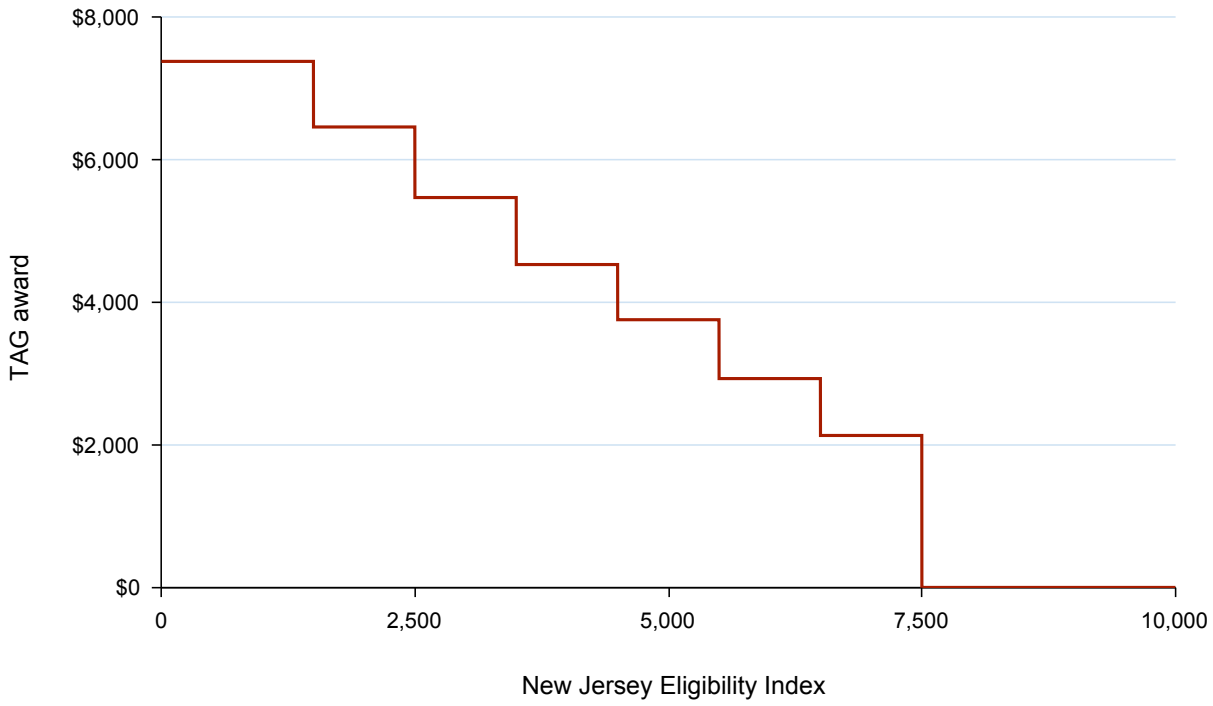
	Effective sample size	Effect estimate	95% Conf. int.
Change in total annual earnings, dollars per dollar of TAG aid (passthrough rate)			
Overall	12,752	-1.03	**(-2.18, -0.09)
1,500 cutoff	2,997	-0.43	(-2.14, 1.27)
2,500 cutoff	2,196	-1.35	(-4.05, 0.73)
3,500 cutoff	2,580	-0.69	(-2.79, 1.50)
4,500 cutoff	2,020	-0.41	(-3.72, 2.96)
5,500 cutoff	1,426	-1.72	(-5.00, 1.27)
6,500 cutoff	1,533	-2.52	*(-6.26, 0.47)
Change in rate of employment, percentage points per $1,000 of TAG aid			
Overall	14,141	-2.85	(-7.40, 1.24)
1,500 cutoff	3,836	-0.65	(-8.40, 7.90)
2,500 cutoff	3,253	0.45	(-8.37, 9.01)
3,500 cutoff	2,296	-1.80	(-12.39, 7.29)
4,500 cutoff	2,168	-3.46	(-16.34, 9.25)
5,500 cutoff	1,208	-14.86	***(-30.08, -2.79)
6,500 cutoff	1,380	-7.07	(-22.04, 7.10)
Change in total annual labor supply, job-weeks worked per $1,000 of TAG aid			
Overall	12,920	-1.80	(-4.24, 0.52)
1,500 cutoff	3,650	0.40	(-3.47, 4.43)
2,500 cutoff	2,210	-2.46	(-8.97, 2.91)
3,500 cutoff	2,580	-2.03	(-6.83, 2.89)
4,500 cutoff	1,655	1.51	(-6.09, 10.81)
5,500 cutoff	1,285	-5.66	(-13.39, 1.56)
6,500 cutoff	1,540	-5.96	*(-13.87, 0.48)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

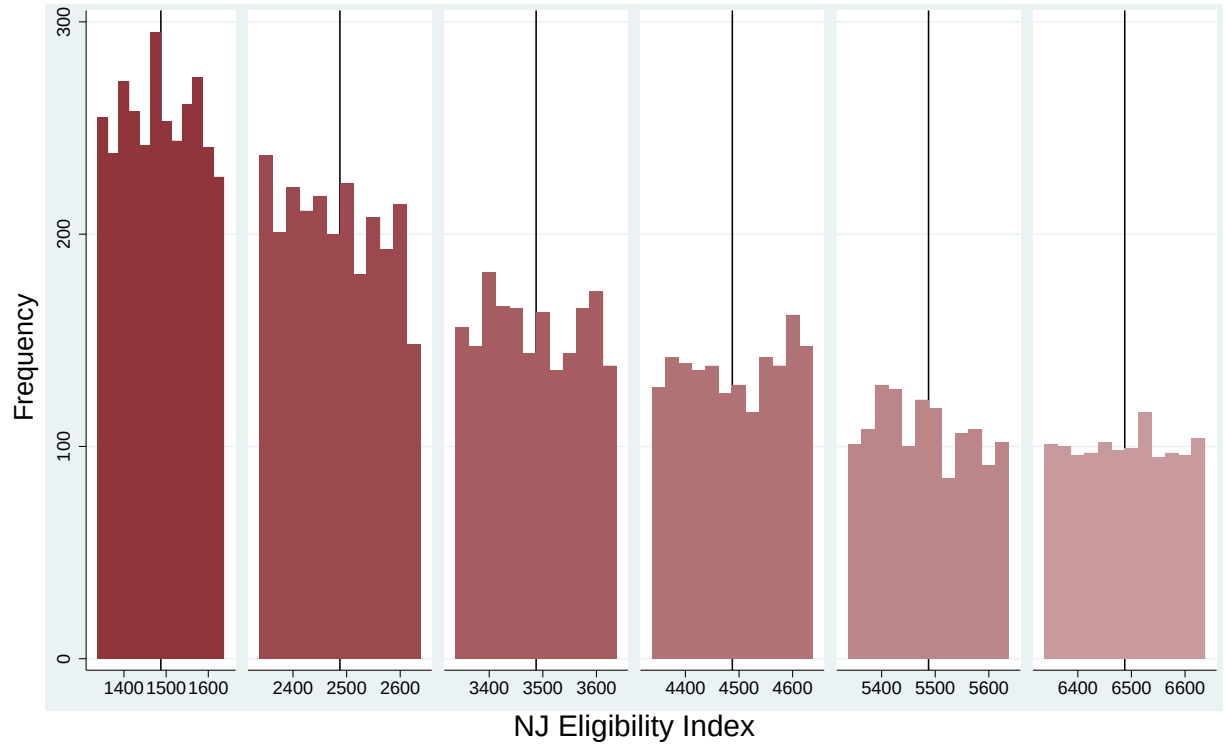
Notes: We implemented the estimation using the multiple cumulative regression discontinuity design and software from Cattaneo et al. (2020b). The standard errors allow for correlation across records for the same student appearing in multiple school years. Effective sample size is the number of students within a data-driven bandwidth around each cutoff.

Figure 1: TAG eligibility example: State colleges in school year 2018–19



Source: New Jersey Higher Education Student Assistance Authority (HESAA).

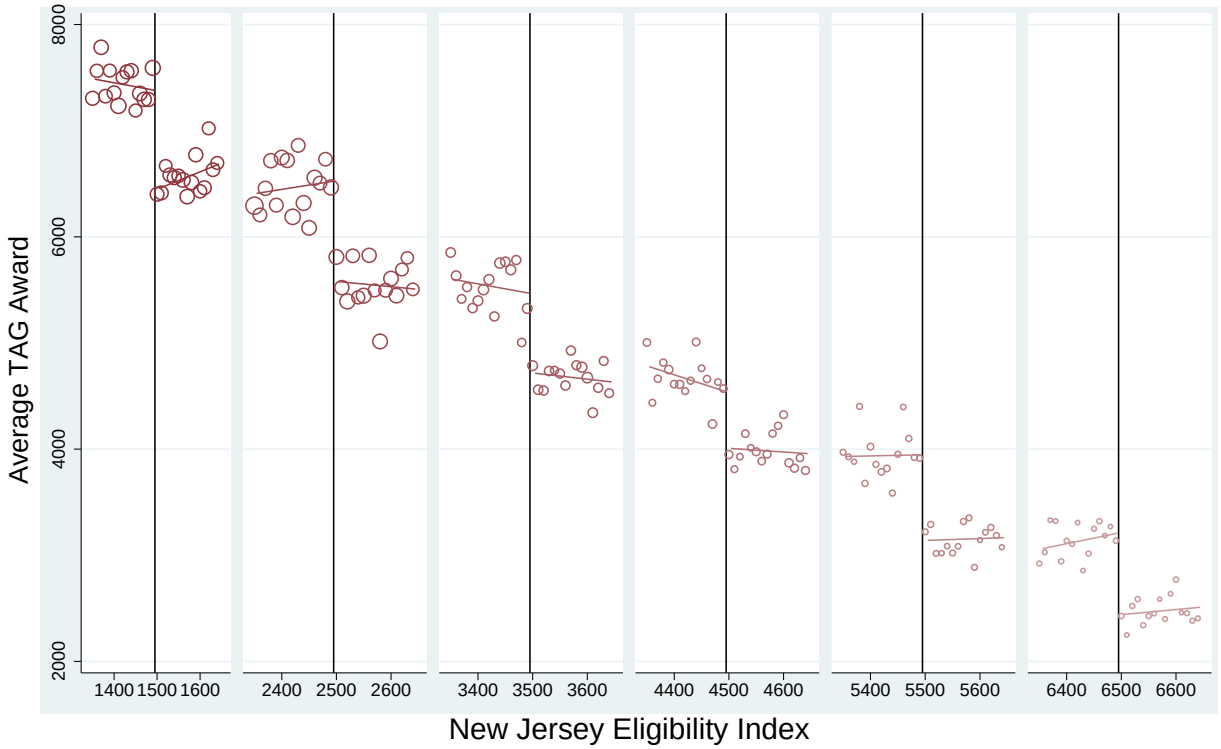
Figure 2: Histogram of TAG recipients by eligibility index near TAG cutoffs, for public university students (validity test)



Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Sample: TAG recipients at public universities in 2017–18 and 2018–19 school years, restricted to NJEI values near eligibility cutoffs.

Figure 3: TAG aid by eligibility index near TAG cutoffs, for public university students (first stage)



Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Sample: TAG recipients at public universities in 2017–18 and 2018–19 school years, restricted to NJEI values near eligibility cutoffs.

Notes: Bubble size is proportional to the number of students with that New Jersey Eligibility Index (NJEI) value.

Figure 4: Total earnings by eligibility index near TAG cutoffs, for public university students (reduced form)

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Sample: TAG recipients at public universities in 2017–18 and 2018–19 school years, restricted to NJEI values near eligibility cutoffs

Notes: Year 1 refers to the school year of TAG receipt. Bubble size is proportional to the number of students with that New Jersey Eligibility Index (NJEI) value.

Appendix A. Supplemental results

This appendix provides supplemental results for county colleges and for all sectors together. The analysis in this section uses only the lowest four cutoffs. There are only four cutoffs for the county colleges, and therefore also only four that are shared by all institutions.

These samples are valid for our RD approach. As described above for the public university sample, we tested for discontinuities in the density of students and the observable characteristics of students in the county colleges and all-sector samples, and we did not find significant discontinuities.

These samples had a significant first-stage effect of $257 in additional TAG aid for county colleges and $578 in additional TAG aid overall.

Table A.1 shows the results for county colleges students. The point estimate for the passthrough rate was $0.85 per dollar of TAG aid, indicating more earnings for students receiving more TAG aid. However, the confidence interval around that is wide and includes zero passthrough and large negative values. The point estimate for reduction in employment rate (-2.51 percentage points) was the expected sign and close in magnitude to the estimate for public university students. Overall, we cannot conclude from these estimates whether county colleges students respond similarly or differently to TAG aid than university students do. We do not view these estimates as ruling out a relationship between TAG aid and work at county colleges.

Table A.2 shows the results for all sectors together. The point estimate for the passthrough rate was $0.35 per dollar of TAG aid. The confidence intervals are narrower than the county colleges sample, but they do not allow us to reject zero passthrough. The point estimates for reduction in employment rate (-1.41 percentage points) and job-weeks (-1.15 job-weeks) were the expected sign and smaller in magnitude to those for public university students. The mix of sectors increases sample size, but it also introduces heterogeneity in impacts that may lead to inconclusive estimates. We found similar conclusions in the estimates of effects on college persistence for all sectors together in (Anderson and Zaber, 2021a).

Supplemental tables

Table A.1: Effects of additional TAG aid at eligibility cutoffs, for county colleges students (fuzzy RD)

	Effective sample size	Effect estimate	95% Conf. int.
Change in total annual earnings, dollars per dollar of TAG aid (passthrough rate)			
Overall	5,565	0.85	(-4.59, 7.66)
1,500 cutoff	1,368	4.66	(-5.09, 17.92)
2,500 cutoff	1,398	-0.94	(-12.06, 7.29)
3,500 cutoff	1,372	-1.20	(-17.77, 17.60)
4,500 cutoff	1,427	0.91	(-6.10, 10.64)
Change in rate of employment, percentage points per $1,000 of TAG aid			
Overall	5,855	-2.51	(-23.69, 21.21)
1,500 cutoff	1,614	8.72	(-22.34, 50.64)
2,500 cutoff	1,360	1.85	(-35.03, 37.06)
3,500 cutoff	1,393	-12.24	(-83.79, 56.40)
4,500 cutoff	1,488	-9.54	(-37.42, 20.75)
Change in total annual labor supply, job-weeks worked per $1,000 of TAG aid			
Overall	6,265	-3.78	(-18.52, 8.67)
1,500 cutoff	1,569	4.68	(-14.33, 28.08)
2,500 cutoff	1,518	-9.34	(-31.61, 7.85)
3,500 cutoff	1,681	-12.37	(-57.60, 23.26)
4,500 cutoff	1,497	2.66	(-13.30, 20.29)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Notes: We implemented the estimation using the multiple cumulative regression discontinuity design and software from Cattaneo et al. (2020b). The standard errors allow for correlation across records for the same student appearing in multiple school years. Effective sample size is the number of students within a data-driven bandwidth around each cutoff.

Table A.2: Effects of additional TAG aid at eligibility cutoffs, for all sectors together (fuzzy RD)

	Effective sample size	Effect estimate	95% Conf. int.
Change in total annual earnings, dollars per dollar of TAG aid (passthrough rate)			
Overall	15,638	-0.35	(-1.64, 1.04)
1,500 cutoff	4,140	0.32	(-1.67, 2.63)
2,500 cutoff	4,532	-0.94	(-3.76, 1.08)
3,500 cutoff	3,702	-0.80	(-3.57, 2.09)
4,500 cutoff	3,264	0.12	(-2.85, 4.14)
Change in rate of employment, percentage points per $1,000 of TAG aid			
Overall	16,666	-1.41	(-4.35, 6.55)
1,500 cutoff	5,979	-0.07	(-9.00, 7.46)
2,500 cutoff	3,601	0.34	(-12.45, 11.66)
3,500 cutoff	3,912	-2.70	(-8.58, 14.86)
4,500 cutoff	3,174	-4.34	(-9.73, 17.36)
Change in total annual labor supply, job-weeks worked per $1,000 of TAG aid			
Overall	15,617	-1.15	(-4.36, 1.84)
1,500 cutoff	4,657	1.05	(-3.49, 6.24)
2,500 cutoff	3,625	-3.92	(-11.53, 1.55)
3,500 cutoff	4,215	-3.18	(-9.66, 2.62)
4,500 cutoff	3,120	1.54	(-5.61, 9.99)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Sources: Authors' calculations using data from New Jersey Higher Education Student Assistance Authority (HESAA) and New Jersey Department of Labor (DOL).

Notes: We implemented the estimation using the multiple cumulative regression discontinuity design and software from Cattaneo et al. (2020b). The standard errors allow for correlation across records for the same student appearing in multiple school years. Effective sample size is the number of students within a data-driven bandwidth around each cutoff.