Work-study Financial Aid and Student Outcomes: Evidence from Community Colleges in Texas

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Abstract

This paper considers the effect of federal work-study, a need-based financial aid program, on educational outcomes for individuals in two-year colleges in Texas. We find that both working in school (with any job) and participating in the federal work-study program (in a work-study job) are associated with a 12-15% increase in the probability of persisting to a second year of community college. Additionally, working in a position through the federal work-study program is associated with a higher probability of transferring to a four-year college by 3-4%. We also attempt to measure the effect of student federal work-study participation using an instrument of lagged average federal work-study earnings at the student's institution, but this strategy does not yield precisely estimated outcomes due to the limited number of cohorts available.

Introduction

Each year, more students rely on financial aid to attend institutions of higher education as tuition costs increase. The objective of government subsidies for college is to encourage individual investments in education given both the perceived positive externalities associated with education investments and credit constraints faced by a number of students. Financial aid consists of a variety of types of funding assistance, and aid packages are highly tailored for specific students. In general, financial aid includes need-based grants, merit-based awards and subsidized loans. A mix of federal, state and local governments, as well as private organizations finance these programs, and many of these funding sources are contingent on student behaviors or characteristics. The ramifications of the diversity of funding programs within aid packages has received little attention

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in public policy, though certain programs may have auxiliary behavioral consequences for students beyond decreasing the cost of attendance.

In this paper, we explore one contingent funding program, work-study funding. Work-study funding provides funds to students conditional on working while in school, and this job and time requirement may affect student performance. We use administrative data from the Texas Educational Resource Center (ERC) Database to analyze the effects of work-study funding on performance for community college students that graduated from high school in 2008 and 2009.[1] We analyze two primary outcomes: persistence to a second year of study and transfers to four-year colleges. Because students choose to participate in the federal work-study program after receiving information on their total financial package, we are able to control for all other components of financial aid and consider the treatment of a student who works through this program, given a fixed level of financial aid through other sources.

Analyzing the efficacy of the federal work-study program is important because it may have deleterious effects on student outcomes if working involves a meaningful time trade-off with learning. At the same time, working while in school may provide a means for students to gain knowledge and skills that reinforce their academic experience and prepare them for academic success and the labor market.

It is likely that the effect of work-study program participation is heterogeneous by post-secondary school type, and that community colleges and four-year colleges should be separately considered. In our examination of this financial aid program, we study students in community colleges in Texas. We focus on community colleges because they are an important setting for studying the work-study program because community college students are more likely to work in school than students in four-year universities, and degree programs at community colleges and technical schools are typically more oriented towards specific jobs than degree programs at four-year universities. Targeted work experience while attending community college may create better trained individuals and increase employment opportunities for students with job-specific degrees. In general, financial aid opportunities may be more important for community college students given that these students are more likely to be financially constrained; students in community colleges typically receive lower levels of financial aid and work-study programs that induce additional

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employment create meaningful tradeoffs and opportunities for these students. The work study program could have a much bigger impact on two-year students than on four-year ones.

Because participation in the federal work-study program is elective, and, as a result, different types of people are likely to choose to enroll relative to those who don't, we employ two methods to handle a possible positive selection bias among participants. First, we utilize a rich set of controls that may approximate unobserved individual ability and motivation characteristics. These controls include standardized test scores from the TAKS high school exit exam, detailed demographic information and levels of merit based financial aid grants. Second, we construct an instrument of lagged average earnings of federal work-study participants at a school to predict current student federal work-study participation. This instrument exploits institution level variation in total available federal work-study funds as well as institution level differences in program participation that may relate to the culture and community at different community colleges.

We find that both working in school (with any job) and participating in the federal work-study program (in a work-study job) are associated with a 12-15% increase in the probability of persisting to a second year of community college. Conversely, while working in school is associated with a lower probability of transferring to a four-year college by 3-5%, working in a position through the federal work-study program is associated with a higher probability of transferring to a four-year college by 3-4%. We also employ an instrumental variables strategy that instruments for student federal work-study participation using lagged average federal work-study earnings of students at the same institution, but unfortunately the estimates from this approach are imprecisely estimated given the limited number of cohorts in our data.

The paper is organized as follows: Section 1 describes the work-study program, Section 2 discusses the related literature, Section 3 delineates the model, Section 4 details the data, Section 5 analyzes the results and Section 6 concludes.

1. Description of Work-Study

Established in 1964, the federal work-study program subsidizes the wages of student jobs. The program encourages students to work while in school and also allows colleges to partner with the government to fill campus jobs at lower cost to college institutions. At many schools, students may also use their work-study grant through jobs off-campus at non-profit organizations, government agencies or private firms.

Schools must apply to participate in the program each year, and in 2012 approximately 3,400 schools had federal work-study programs. The Department of Education allocates work-study funds to higher education institutions through a statutory formula that includes the institution's funding level in the prior year. This condition creates a "legacy" aspect to the work-study program, whereby older institutions may receive larger work-study grants (Scott-Clayton, New York Times, 2011). In 2011, $978 million was appropriated for work-study grants and the average student work-study award was $1,642 ("Federal work-study," Department of Education, 2013). Program participation has been small in recent years; though approximately 50% of students receive some federal need based aid each year, between 1-6% of students receive work-study grants ("Digest of Education Statistics: 2011", NCES, 2013).

After the grant is provided to a school, the school allocates funds to students who qualify for other need-based grants. Schools have flexibility in setting the employer subsidy, restrictions on jobs that qualify for the grant and the student allocation method. Work-study grants are nested in need-based packages that may also be set by schools for students that qualify.

From the perspective of students, the work-study program is partially elective. To be considered for an award, students must qualify for need-based aid based on their family income and indicate that they are interested in the work-study program on their FAFSA (Free Application for Federal Student Aid) form. Because the work-study program is small, interest in this grant exceeds the number of awards that are allocated and allocation procedures differ across schools. Some schools may use a lottery to assign funds, while others may consider certain student characteristics. After the grant is awarded, schools vary in the amount of assistance that they offer to students to find a work-study job. Some schools may assign jobs directly to students on campus, others encourage students to apply to jobs via a work-study jobs platform and some may offer little to no assistance. Additionally, some schools have grandfathering provisions that allow students to keep work-study jobs and grants after the first year of assignment. Without a work-study job, students cannot earn work-study funding. Students are also free to decline the grant and forgo the funds or find a job that is unaffiliated with the work-study program. In deciding whether or not to participate, students will weigh the time commitment associated with working in a federal work-study program job, the total financial aid package awarded and other potential employment opportunities.

The selection process of students into the work-study program is complex, and one of the aims of this paper is to investigate this process. In the results section, we discuss selection in

greater detail. Our main strategy to address selection is to enlist a rich set of covariates including TAKS standardized test scores and merit-based financial aid that may proxy for unobserved ability characteristics. We also utilize an instrument of the average earnings of work-study participants at the same school in the prior year to predict a new student's participation in the program. This instrument incorporates institutional differences in funding across community colleges and aims to mitigate the possibility of systematic differences between work-study participants and non-participants.

2. Literature Review

This paper contributes to the intersection of two literatures: studies on financial aid and the effects of working in school. A small body of work has focused specifically on the treatment effect of working while in school. DeSimone (2008) finds that working during college has mostly negative grade effects for students at Harvard, though he uses instruments of parental schooling and Jewish background to predict working, and these instruments may not satisfy the relevant exclusion restriction. Kalenkoski and Pabilonia (2010) measure the effects of working while in school on grades by instrumenting for hours of work using parental transfers and schooling costs, though as in the DeSimone paper, these instruments may not satisfy the exclusion restriction. Using detailed information on a small school, Berea College, that requires all students to work while in school, Stinebrickner and Stinebrickner (2003) instrument for hours worked using initial randomized job assignments and find that an increase in hours worked has a negative effect on grades. Our paper expands on this literature by focusing on the effects of working through the federal work-study program for a large population of lower-income students in all of the community college systems in Texas.

A number of education economics papers have examined the role of need-based financial aid and merit aid on student application and enrollment decisions, as well as persistence and graduation rates.[2] The study most pertinent to our paper is work by Scott-Clayton (2011) that directly

[2]This work has largely focused on application and enrollment decisions (Avery and Hoxby, 2003; Abraham and Clark, 2006; Kane, 2003; Kane, 2007; Lovenheim and Owens, 2013), and persistence and graduation (Dynarski, 2003; Bettinger, 2004; Castleman and Long, 2013). Generally, this work finds that there are price effects of need-based financial aid that encourage enrollment and attendance. Increased persistence and graduation rates are also associated with the availability of financial aid. Related to our setting of aid for students in community colleges, work by Cellini (2010) finds that increases in need-based grant sizes through the CalGrant program do not encourage switching from public to for-profit community colleges, but does increase enrollment in for-profit community colleges. Studies on the effects of large-scale state merit aid programs on college completion find that these programs increase enrollment (Cornwell et. al., 2006) and persistence conditional on enrollment (Dynarski, 2008). Long (2004) finds limited evidence that the Hope and Lifetime Learning Tax Credits increased enrollment patterns and that these tax credits were most pertinent to relatively wealthy families.

assesses federal work-study in West Virginia schools and finds that participation in work-study has positive effects on grades for men and negative effects on grades for women. In her paper, Scott-Clayton (2011) addresses the work-study selection process using an instrumental variables strategy based the federal formula that allocates work-study funding to institutions. Scott-Clayton constructs an instrument of the total federal allocation to a school divided by the number of students eligible for work-study (those that receive need-based aid) to predict work-study participation. Because the federal work-study funding formula distributes funds to institutions based on the funds they received in the prior year, Scott-Clayton's instrument exploits legacy funding differences in work-study allocations across institutions.

Our strategy is similar to that of Scott-Clayton in that we also use a funding instrument to predict work-study participation, but differs in important respects. Because our state setting is larger, we are able to restrict the sample to only students who may be eligible for federal work-study funding because they already receive a Pell grant, and we focus only on students at community colleges, a population that may be more responsive to changes in work opportunities while in college. The size of our sample allows us to restrict our analysis in a way that will not meld outcomes for a heterogeneous group of students across post-secondary institution types and students that receive need-based financial aid versus students that do not receive need-based aid. Scott-Clayton (2011) uses outcomes of freshman year grades, credits earned and graduation. Because of our larger dataset we are able to focus on student persistence to a second year of study and transfers to four-year institutions, which may have a larger impact on eventual employment opportunities than other intermediate measures of post-secondary education. Additionally, Scott-Clayton uses potential federal work-study awards given a school's total allocation from the federal work-study program as an instrument; our instrument is the average earnings of work-study participants in the year before a student enrolls. This distinction may incorporate aspects of student working culture at a school as well as differences in total school work-study funds given the federal work-study allocation formula, further isolating the effect of work-study funds from other factors. Both of these improvements allow us to focus on an important segment of the student population that ex-ante would not respond to the program the same way as four-year students might.

3. Empirical Model

Our empirical strategy is based on the idea that the employment component of work-study financial aid has a positive effect on the educational outcomes of students. While work-study funding loosens credit constraints like other types of need-based financial aid, being employed also helps develop other traits, perhaps time management or employment experience or people skills, that encourage students to get more years of education. These skills then encourage students to stay in their current school or transfer to pursue more education elsewhere. To test this, we estimate the effect of work-study relative to other types of aid on persistence to a second year of education at their two-year school or transferring into a four-year college to see if the program has such a positive impact.

We propose two models to estimate the effects of participation in federal work-study on our main outcomes of interest: persistence in community college and transfer to a four-year institution. The treatment we consider is how working in a federal work-study job affects student outcomes given a fixed financial aid package excluding work-study earnings that is assigned to students before student participation is determined. We do not observe which students are extended the offer to participate in the federal work-study program as a component of their financial packages, and we are only able to observe which students choose to accept this program offer and participate by working through the program. However, because this program is contingent on receiving need-based financial aid, our sample restriction of Pell grant aid recipients reduces the sample to those eligible and likely to receive an federal work-study offer.

After limiting our sample to those individuals who are enrolled in two-year institutions with pell grant need-based financial aid, our main specifications are:

$$\begin{aligned} 1(persistence_{ij,t+1}) &= \beta_0 + \beta_1 \cdot 1(FederalWorkstudy_{ijt}) + \beta_2 PellAid_{it} \\ &\quad + \beta_3 NonPellAid_{ijt} + \beta_4 MeritAid_{ijt} + \beta_5 Loans_{ijt} \\ &\quad + \beta_6 Demographics_i + \beta_7 TAKS_i \\ &\quad + Cohort_i + SemesterStart_{it} + Institution_{ij} + u_{ijt} \end{aligned}$$

$$\begin{aligned} 1(Transfer4Year_{ij,t+x}) &= \delta_0 + \delta_1 \cdot 1(FederalWorkstudy_{ijt}) + \delta_2 PellAid_{it} \\ &\quad + \delta_3 NonPellAid_{ijt} + \delta_4 MeritAid_{ijt} + \delta_5 Loans_{ijt} \end{aligned}$$

$$+\delta_6 Demographics_i + \delta_7 TAKS_i$$
$$+Cohort_i + SemesterStart_{it} + Institution_{ij} + v_{ijt}$$

We begin by estimating linear probability model (LPM) regressions of our binary outcomes of interest, whether an individual continued to the second year of study and whether an individual transferred to a four-year college within our sample period (2009-2012). Because of the timing of our data, we do not investigate 6 year graduation rates of students given that our cohorts graduate from high school in 2008 and 2009. Likewise, we do not observe the labor market outcomes for the complete sample given that some students transfer to four-year colleges and do not graduate before 2012, the last year of our observed TWC data. Given these limitations, we consider the outcomes of persistence to a second year of study and transfers to a four-year college institution in this study.

The variable of interest in the model is participation in the federal work-study program, or $1(FederalWorkStudy_{ijt})$. We also control for other elements of the financial aid package and include levels of Pell grants received, $PellAid_{it}$, need-based aid from other sources, $NotPellAid_{int}$, merit awards, $MeritAid_{ijt}$, and loans, $Loans_{int}$. Financial aid information is included only for the first year of study or the initial package of aid. A complete list of which programs are included in these aggregate variables is included in the Appendix. These variables are indexed to the initial start semester time, t, and sometimes to the institution, j, as funding packages and disbursement may differ by the community college system.

We also condition the model on a large array of demographic characteristics of individuals to control for the fact that those students who receive work-study aid may be different from those who don't. These include gender, race, age at enrollment, limited English proficiency status (LEP), and whether a student participated in special education programs in high school. Exit TAKS standardized test scores in Math and Reading are also included to help to control for aptitude differences between students. Family income and whether or not the family had a zero expected family contribution to the cost of college ($ZeroEFC_{ijt}$) are also included in the set of conditioning covariates. Finally, a set of fixed effects for high school graduation cohort (2008 or 2009), $Cohort_i$; enrollment semester, $SemesterStart_{it}$; and first primary institution attended, $Institution_{ij}$, are also included.

Because, selection into the federal work-study program is not random, we also consider spec-

ifications using an instrumental variables (IV) approach. We observe both whether the student was employed in a position through the work-study program and how much the student earned in their first year of employment. The participation that we observe is determined by both the institution's federal work-study allocation choices and by the student's choice to accept a federal work-study grant by seeking a position through this program. It is reasonable to be concerned that institutions may be partial to allocating work-study grants to students they most want to attend their institutions and that the students that accept these grants and seek work-study jobs may be more motivated or harder-working than those that decline these grants. If this is the case, there will be positive selection into the program and it will be difficult to interpret β_1 and δ_1 as causal coefficients. We introduce a third specification:

$$\begin{aligned} 1(FederalWorkstudy_{it}) &= \alpha_0 + \alpha_1 AverageWorkStudyEarned_{j,t-1} \\ &+\alpha_2 PellAid_{it} + \alpha_3 NonPellAid_{ijt} + \alpha_4 MeritAid_{ijt} \\ &+\alpha_5 Loans_{ijt} + \alpha_6 Demographics_i + \alpha_7 TAKS_i \\ &+Cohort_i + SemesterStart_{it} + Institution_{ij} + \epsilon_{ijt} \end{aligned}$$

To address this selection problem, we instrument for federal work-study participation using the average work-study wages earned by students participating in federal work-study at the same institution in the prior year. This instrument is the average grant awarded to students by an institution in the prior year which also encapsulates information about how popular work-study jobs are at a particular institution. We expect the instrument to have strong predictive power in the participation decision because this lagged quantity reflects both available grant funds and "work-study culture" at the school that may encourage participation.

The instrument is not correlated with the endogenous student selection into the federal work-study program because it is a lagged average quantity that relates to a different population of students and grant funds that have already been disbursed. Even if it is the case that institutions use the exact same rules to allocate federal work-study grants to students each year, our instrument should not be related to the selection characteristics of individual students because the lagged average earnings of students at a school are aggregated and averaged across all students in the prior year. Further, the instrument is based off of ex post earnings of students through the work-

study program and reflect the awards of students that accepted the work-study grant, but not the exact set of students that were given the opportunity to participate by the institution according to its disbursement rule. In practice, institutions may also vary their methods of distributing federal work-study funding to students over time. The instrument satisfies the exclusion restriction because there is no reason to believe that the level of earnings obtained by students in the preceding year should affect current student outcomes directly.

4. Data

Data for this project was collected from the Texas Education Resource Center (ERC), which houses administrative data from the Texas Education Agency (TEA), the Texas Higher Education Coordinating Board (THECB), the Financial Aid Database (FADs), and the Texas Workforce Commission (TWC). These resources allow us to construct a longitudinal dataset for the 2008 and 2009 high school graduating cohorts that links students' high school records, post-secondary enrollment and attendance information, post-secondary financial aid and earnings from jobs in Texas.

The files from the TEA include information on all students at public high schools in Texas on student demographics; race, gender and age; courses completed while in high school, scores on the Texas Assessment of Knowledge and Skills (TAKS) exit exam, and graduation information.

We identify primary community college institutions attended using information on credit hours attempted in THECB data. For consistency, community colleges are considered at the system rather than campus level.

The Financial Aid Database offers detailed information on types of financial aid awarded to a student by each institution. We categorize specific grants scholarships and loans as either need-based aid, merit aid, loans, and work-study aid (See Appendix). Though there are additional work-study funding programs offered through the state of Texas, we include only federal work-study in our model analysis. The FADs also includes some additional family information, including family income, to be included as controls.[3]

The final major dataset employed in this study is from the TWC. These files contain quarterly information on wages for a job, industry code for a job, county of employment, and local unemployment rates for each job worked by an employee. We use this database to determine whether

[3]Because it is technically possible to be awarded aid from more than one institution in a given semester, we only consider financial aid awarded by the primary community college institution as identified from the THECB files.

a student worked in their first term and year of school, and their wages recorded in the TWC system.

The analysis sample is restricted to individuals who enroll in community college as their first primary post-secondary institution and receive a Pell grant in their first year of study. The restriction to students who receive a Pell grant means that all students in our sample receive federal need-based aid and are therefore eligible to receive federal work-study funding. This sample choice makes it possible to avoid comparing students that receive need-based aid and those that do not, as these are likely to be very different populations.

Summary statistics of the data used in this study are included in Tables (1) and (2) for all community college students, Pell grant aid recipients, and federal work-study participants. Pell grant recipients make-up 29.4% of total community college attendees, and federal work-study participants comprise 2.6% of the Pell grant sample. These summary statistics confirm the methodological choice to focus on Pell grant recipients (or students that qualify for need-based aid) rather than the full sample of students that may not receive any financial aid, as there are large differences between students that receive need-based aid and those that do not in SAT scores[4], family income and loans.

Differences between the Pell grant recipient group (our analysis sample) and participants in federal work-study offer the first test of selection into the treatment. From the summary statistics, we can see that federal work-study participants are more likely to be male, more likely to be African American, and are less likely to be Hispanic. Federal work-study participants have lower TAKS Math and TAKS Reading scores, though these differences are not large in magnitude relative to the mean scores on these tests. Participants had slightly fewer math credits and more advanced credits in high school. With respect to financial aid, work-study participants have similar family income to non-participants with Pell grants, but participants receive larger Pell grants, more need-based grants outside of the Pell grant program and more merit-based aid. This suggests that the students who participate in federal work-study are more desired by their institutions because they are also receiving more financial aid from other sources, though their family income is not significantly less than non-participants. Of particular note is the fact that federal work-study participants receive more merit-based aid than non-participants. If merit aid is awarded to students who are identified as being highly qualified and positioned for success, this means that participants are

[4]SAT scores are not included in our estimation because they are not required of student to attend community college and therefore there is incomplete coverage of this variable in our sample

likely positively selected.

5. Results

Given the attention paid to the possibility of selection bias in the allocation of work-study funding and work-study participation decisions, we first explore this possibility empirically. Table (3) tests these selection patterns directly by regressing federal work-study participation on other elements of the financial aid package. In the first column only the regressors shown and the set of institution and enrollment semester fixed effects are included, while the second column includes family income variables, demographics and TAKS scores. Students with larger Pell grants, or lower income levels, are more likely to participate in the federal work-study program. Additionally, across both specifications, the coefficient on merit aid is positive and highly significant. In the second specification, when we condition on the broader set of demographic covariates, the coefficient on TAKS reading score is also positive and significant. Students with stronger reading skills are more likely to participate in the work-study program. If we think of merit aid and TAKS scores as indicators of ability that may be correlated with unobserved ability, this test provides evidence that federal work-study participants may be positively selected.

We investigate the selection pattern more closely by separating this test by school and examining the distribution of selection across schools. Figure (1) decomposes the correlation between merit aid levels and federal work-study participation by school. Each bar represents the merit aid level coefficient in the selection test of Table (3) (specification from column 2) from a regression within a single community college institution. The graph shows that the correlation between merit aid and federal work-study participation is not always positive, but is more likely to be positive and is only significant when positive. Figures (2) and (3) show the same school level coefficients of TAKS reading and math scores of students in a regression of work-study participation on the set of covariates used in this study. There is significant variation in the value of these coefficients by school, but the coefficients are only significant when positive and only show significance for TAKS reading scores and merit aid levels. In other words, there is substantial variation in the association of work-study participation with indicators of student ability across schools and likewise there may be variation in the selection of students into this program across schools, but the overall relationship between these indicators and work-study participation is likely positive.

Before examining student outcomes, it is important to first verify that federal work-study

participation does in fact make a student more likely to work while in school. This is important to check given that our sample of community college students receiving need-based financial aid may face credit constraints and already be likely to work while in school in order to afford tuition. If students receiving federal work-study funding are not more likely to work than other students with traditional financial aid, then it is difficult to attribute any estimated effects to the work-study program. In Table (4) we show regressions of this intermediate outcome, whether a student worked in their first semester of school. If participating in the federal work-study program does not encourage a student to work, conditional on covariates in the model, then studying this financial aid program is not meaningful because we are interested in how the program affects student outcomes by encouraging them to work. From the first two columns of Table (4), it is clear that the work-study program is associated with working in the first semester of school. Adding covariates to the model in Column 2 does not have much of a qualitative impact on the results. While this is reassuring from an empirical standpoint, the inclusion of covariates does not deal with possible positive selection like the IV strategy. It is also clear from this table that Pell grants and merit aid grants appear to be substitutes for working, or students that have larger aid packages are less likely to work while in school. Additionally, ability as proxied by TAKS scores is not a major predictor of the probability of working while in school. This suggests that for community college students, working while taking classes is related to financial constraints and necessity.

Next we estimate the first stage regressions for our model that uses the instrument of average work-study earnings of students at an institution in the prior year. Table (5) presents the first stage regressions for our IV specifications. The instrument, $AvgWorkStudyEarned_{j,t-1}$, is positive and significant with and without the set of additional covariates beyond the financial aid package variables. The F-statistics of the coefficient of the instrument is 4.563 and 4.652, with p-values less than 5% in both regressions. The instrument just satisfies the practitioner's rule of instrument strength, or an F-test statistic greater than 4. In a setting with additional cohorts of data, this relationship might be stronger, but in this study using only two cohorts of data the marginal strength of our instrument may decrease the precision of our IV estimation. Columns 3 and 4 of Table (4) report estimates from the IV strategy, but do not estimate the federal work-study coefficient with precision, so unfortunately it is difficult to draw conclusions from the IV model.

The main outcomes of interest in this study are student persistence to the second year of study at their primary institution and student transfers to four-year institutions after one year of

study. We are interested in how participating in the work-study program may affect these student outcomes. From Table (6), we can see that working while in school in any type of job (which includes federal work-study jobs and jobs held by non-participants) has a positive correlation with continuing to a second year of study as reported in the first row. Federal work-study participation also has a positive association with persistence of about 13%. Generally, students with larger aid packages and student loan levels are more likely to persist to a second year of study as Pell grants, other need-based aid, merit aid and loan levels are all positively correlated with persistence. TAKS scores in reading and math are also strongly positively associated with student persistence in the specifications that include demographic and ability controls. Considering the array of control variables does not have a qualitative impact on the estimated effect of federal work-study. Even though it appears omitting some observable characteristic is not driving our estimated effects, due to the possibility of positive selection is it still important to consider an IV strategy. Again, the IV estimation does not appear to precisely measure the federal work-study coefficient and is not easy to interpret.

In Table (8) we examine the outcome of student transfers to four-year universities. As in the persistence regressions, students with larger financial aid packages and higher TAKS scores are more likely to transfer to a four-year institution. However, the transfer regressions in Table (8) show a negative correlation of generally working while in school and transferring to a four-year institution, but a positive correlation of participating in the federal work-study program. The positive association between work-study participation and transferring to a four-year school may mean that work experience acquired through the work-study program provides skills to students that enable them to pursue higher degrees. However, this pattern also suggests that individuals in the federal work-study program may be positively selected and more likely to succeed in school and transfer. It is unclear what the actual effect of the federal work-study grant is because here again, the instrument does not produce precisely estimated coefficients.

One might be concerned that the population of students in community colleges includes students who attain one year certificates, and the outcomes of persistence to a second year and transferring to a four-year institution are not relevant for this subgroup of students. We do not want to exclude students who obtain one year certificate degrees because these students may have initially intended to pursue longer degree programs and their decision to graduate after one year may be related to other inputs of the model. Instead, we utilize a variable coded in THECB of

student degree intent and exclude students that initially intend to pursue a one year certificate degree. This variable is imperfect in that the response rate of students to this question was not complete, and we are missing the degree intent for many students in the sample. In Tables (7) and (8) we replicate the persistence and transfer tables respectively while excluding students with the intention of only completing a one year certificate program. These tables are robust to the initial specifications and the results are similar.

Despite the fact that our instrumental variable regressions are not precisely estimated in this study, our findings are consistent with the earlier work by Scott-Clayton (2011). Employing her instrument of federal work-study institution grant funds per eligible student, Scott-Clayton finds that participation in the federal work-study program is a strong predictor of intermediate employment outcomes such as the probability working while in school, but does not find uniform effects of participation in the federal work-study program on her academic outcomes of GPA, number of credits earned or graduation rates. She does find differences in academic outcomes by gender, and learns that men experience academic benefits from participation in the program while women do not.

Following this finding, we estimate our main tables splitting our analysis by gender in Appendix A. As in Scott-Clayton's work, our estimates of the intermediate outcome of working while in school do not differ by gender. Predictably, men and women both are more likely to work while in school if they are participating in the federal work-study program (Table A.1). In Tables A.2 and A.3 we find that though participation in work-study is positively associated with persistence for both men and women, the effect of working while in school is positively correlated with persistence for men but not women. Similarly, in the transfer regressions in Tables A.4 and A.5, students who participate in the work-study program are more likely to transfer to four-year institutions. However, in this context, working while in school has no relationship with the likelihood of transferring to a four-year institution for men, while the effect of working is negatively associated with transfers for women. The reasons for these gender differences in academic outcomes are unclear, but they may be related to differences in the types of occupations men and women have while in school. Overall we find a significant, positive effect of participating in federal work-study on students' educational outcomes. We find effects of between a 12% and 15% increase in the probability of persistence to a second year of study, depending on the specification. This confidence interval does not include zero. Work-study has a more modest but still important estimated effect

of increasing the probability of transferring to a four-year university by 3%-4%.

Through her instrumental variable strategy, Scott-Clayton (2011) is attempting to determine the effect of working in a job through the federal work-study program in a way that is not tainted by selection into this program. To the extent that working in a job through the work-study program is similar to working in any job while in school, our positive estimates for men and negative estimates for women of working while in school are consistent with the gender differences that Scott-Clayton finds for work-study participation using her IV strategy. Of course, our regressions that include whether or not a student works while in school (in any job) do not identify the causal effect of working, so this pattern is indicative. In future work, we plan to augment our sample with additional cohorts of data that will allow us to estimate our instrumental variables model more precisely.

6. Discussion and Future Work

In this paper, we investigate the federal work-study aid program and its potential effects on student persistence and performance in community colleges in Texas. We explore the selection process of student participation in the federal work-study program and find evidence that participants are positively selected. To mitigate this problem, we attempt to use an instrument of average work-study earnings of students at an institution in the prior year. The instrument has some predictive power, but fails to estimate the coefficient of interest precisely in the second stage.

Despite estimation issues related to the instrumental variable strategy, we find interesting relationships using OLS regressions. Both working in school and participating in the federal work-study program are associated with a 12-15% increase in the probability of persisting to a second year of college. Working in school is associated with a lower probability of transferring to a four-year college by 3-5%, while working in a position through the federal work-study program is associated with a higher probability of transferring to a four-year college by 3-4%.

We hope to continue to explore this policy question by requesting additional data through the Texas (ERC). Adding older high school graduation cohorts will allow us to expand the set of outcomes we explore to graduation completion and long-term labor market outcomes, as well as expand the analysis to students in four-year colleges as well. Additionally, in a broader setting, the instrumental variable strategy may have more power. We also hope to build upon the instrumental variable strategy in future work by soliciting information from the U.S. Department of Education

on the size of federal work-study transfers to individual institutions in Texas over time. This institution grant size information may be more meaningful when used as a lagged instrument than the lagged average student earnings through the work-study program, as it reflects institutional constraints in disbursement of the grant.

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Table 1: Student Summary Statistics

	All	Pell Grant	Federal work-study	Difference (Pell-WS)
Demographics				
Age	17.09	17.08	17.06	0.0280
	(0.47)	(0.48)	(0.45)	(1.77)
Female	0.49	0.45	0.41	0.0431**
	(0.50)	(0.50)	(0.49)	(2.89)
LEP	0.01	0.02	0.01	0.00774
	(0.12)	(0.13)	(0.11)	(1.57)
Asian	0.03	0.02	0.02	-0.00248
	(0.16)	(0.14)	(0.14)	(-0.62)
African American	0.13	0.19	0.21	-0.0298*
	(0.34)	(0.39)	(0.41)	(-2.49)
Hispanic	0.37	0.54	0.51	0.0352*
	(0.48)	(0.50)	(0.50)	(2.36)
White	0.47	0.25	0.26	-0.00486
	(0.50)	(0.43)	(0.44)	(-0.37)
High School Academics				
TAKS Math	2251.17	2245.34	2239.77	5.343***
	(35.10)	(35.41)	(34.82)	(5.07)
TAKS Reading	2293.58	2290.50	2287.55	2.826***
	(18.57)	(18.73)	(18.41)	(5.07)
SAT	1000.40	860.27	862.39	8.641
	(186.14)	(157.54)	(152.82)	(0.75)
Math Credits	6.75	6.99	6.89	0.137*
	(2.03)	(1.85)	(1.75)	(2.04)
English Language Credits	9.34	9.69	9.55	0.136
	(2.38)	(2.18)	(2.00)	(1.78)
Advanced Credits	3.51	2.34	2.83	-0.434***
	(4.61)	(3.34)	(3.60)	(-4.47)
N	122384	36031	940	

Table 2: Student Summary Statistics

	All	Pell Grant	Federal work-study	Difference (Pell-WS)
Financial				
Family Inc.	56935.83	20924.36	22006.19	1670.1
	(162065.41)	(21133.92)	(16391.92)	(1.02)
Work-Study	38.22	46.69	1639.88	-1568.1***
	(312.83)	(347.52)	(1244.40)	(-235.66)
Federal Work-Study	32.41	39.24	1504.13	-1450.2***
	(277.88)	(305.40)	(1171.78)	(-257.18)
Loans	910.03	606.86	594.41	-55.20
	(1900.76)	(1522.07)	(1467.32)	(-1.15)
Pell Grants	2489.91	3215.23	4095.60	-937.3***
	(1999.75)	(1714.64)	(1796.06)	(-17.37)
Non Pell Grants	146.71	120.74	183.53	-94.61***
	(428.11)	(382.63)	(624.06)	(-6.92)
Merit Aid	550.08	558.53	974.06	-419.4***
	(1125.94)	(1062.65)	(1375.85)	(-13.88)
Zero EFC	0.00	0.00	0.00	0.0000672
	(0.02)	(0.03)	(0.03)	(0.07)
Outcomes				
Persistence	0.38	0.26	0.46	-0.165***
	(0.49)	(0.44)	(0.50)	(-12.83)
Transfer to 4-yr	0.17	0.15	0.20	-0.0419***
	(0.37)	(0.36)	(0.40)	(-3.95)
Working in School	0.92	0.96	1.00	-0.0481***
	(0.27)	(0.21)	(0.00)	(-7.64)
Wage in School	556.86	564.41	403.09	139.2*
	(1930.28)	(1856.41)	(1396.52)	(2.55)
N	122384	36031	940	

Table 3: Selection, Federal Work-Study Participation

Fed. Work-Study Participation	OLS	OLS with Controls
Pell Level	0.0065***	0.0071***
	(0.00070)	(0.00077)
Non-Pell Level	0.0069	0.0068
	(0.0046)	(0.0046)
Merit Aid Level	0.0064***	0.0058***
	(0.0013)	(0.0013)
Loans Level	-0.00094	-0.0014*
	(0.00077)	(0.00079)
TAKS Read		0.00094*
		(0.00052)
TAKS Math		0.00011
		(0.00058)
N	36031	36031

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Figure 1: Coefficient Values of Merit Aid Levels in Selection Regressions (Federal Work-Study Participation), By Community College Institution

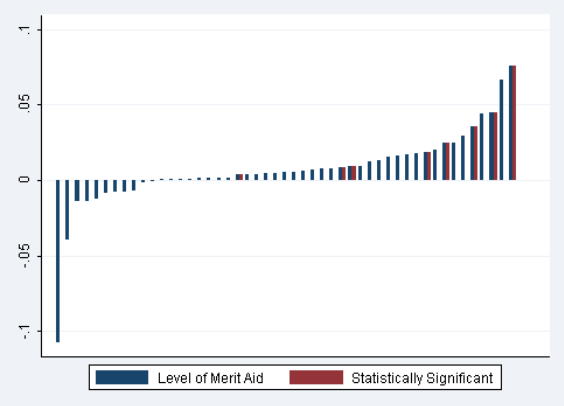


Figure 2: Coefficient Values of TAKS Reading Scores in Selection Regressions (Federal Work-Study Participation), By Community College Institution

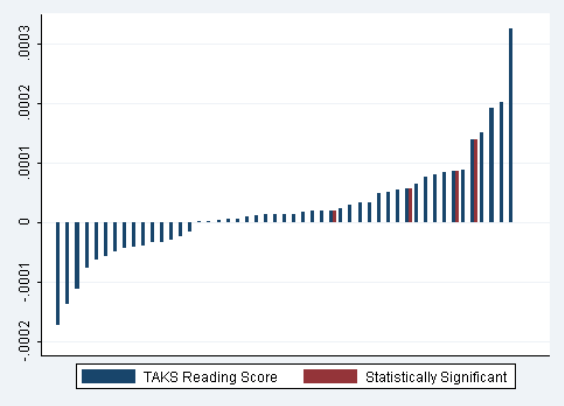
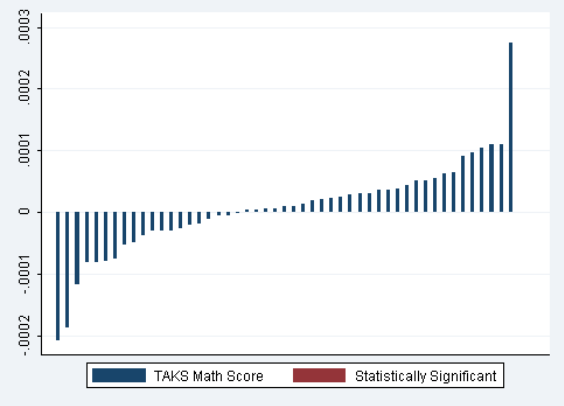


Figure 3: Coefficient Values of TAKS Math Scores in Selection Regressions (Federal Work-Study Participation), By Community College Institution



The graphed coefficients are taken from regressions for each community college institution. The school level regressions have the same specification as column (2) in Table (3).

Table 4: Working in School

Working in School	OLS	OLS with Controls	IV	IV with Controls
Fed. Work-Study	0.039***	0.038***	-0.128	-0.143
	(0.010)	(0.010)	(0.362)	(0.335)
Pell Level	-0.0002**	-0.0002***	0.0009	0.0011
	(0.00008)	(0.00007)	(0.0023)	(0.0024)
Non-Pell Level	-0.00007	-0.00010	0.00109	0.00113
	(0.00033)	(0.0003)	(0.0027)	(0.0025)
Merit Aid Level	-0.0003***	-0.0003***	0.0007	0.0007
	(0.0001)	(0.0001)	(0.0023)	(0.0020)
Loans Level	0.0001	0.0001	-0.00005	-0.0002
	(0.0001)	(0.0001)	(0.0004)	(0.0005)
TAKS Read		0.0001*		0.0003
		(0.00007)		(0.0003)
TAKS Math		-0.00002		-0.000002
		(0.00008)		(0.00013)
N	36031	36031	36031	36031

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table 5: First Stage, Federal Work-Study Participation

Fed. Work-Study Participation	IV First Stage	IV First Stage with Controls
Avg. Work Study Lag	0.0095**	0.0095**
	(0.0044)	(0.0044)
Pell Level	0.0065***	0.0071***
	(0.0007)	(0.0007)
Non-Pell Level	0.0070	0.0068
	(0.0046)	(0.0046)
Merit Aid Level	0.0064***	0.0060***
	(0.0013)	(0.0013)
Loans Level	-0.0010	-0.0014*
	(0.00077)	(0.00079)
TAKS Read		0.00094*
		(0.00052)
TAKS Math		0.00011
		(0.00058)
F_diff	4.563	4.652
p_diff	0.0332	0.0315
N	36031	36031
F_diff	4.563	4.652
p_diff	0.0332	0.0315
N	36031	36031

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table 6: Persistence to 2nd Year

Persistence	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Working	0.152**	0.124**				
	(0.0614)	(0.0581)				
Fed. Work-Study			0.137***	0.128***	4.375	1.475
			(0.0173)	(0.0168)	(8.345)	(6.103)
Pell Level	0.026***	0.033***	0.025***	0.032***	-0.002	0.022
	(0.0028)	(0.0035)	(0.0028)	(0.0035)	(0.054)	(0.044)
Non-Pell Level	0.030***	0.026***	0.029***	0.025***	-0.001	0.016
	(0.009)	(0.008)	(0.009)	(0.0082)	(0.063)	(0.044)
Merit Aid Level	0.061***	0.047***	0.060***	0.047***	0.033	0.039
	(0.004)	(0.004)	(0.0037)	(0.0039)	(0.053)	(0.035)
Loans Level	0.010***	0.011***	0.010***	0.012***	0.015	0.014
	(0.0027)	(0.0025)	(0.0027)	(0.0025)	(0.0093)	(0.0091)
TAKS Read		0.017***		0.017***		0.016***
		(0.0016)		(0.0015)		(0.006)
TAKS Math		0.027***		0.027***		0.027***
		(0.0018)		(0.0018)		(0.0021)
N	36031	36031	36031	36031	36031	36031

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table 7: Persistence to 2nd Year - Without 1 Year Certificate Intention

Persistence	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Working	0.159**	0.130*				
	(0.0693)	(0.0695)				
Fed. Work-Study			0.133***	0.124***	9.097	4.984
			(0.018)	(0.018)	(11.81)	(6.86)
Pell Level	0.027***	0.034***	0.027***	0.033***	-0.031	-0.001
	(0.0028)	(0.0037)	(0.0029)	(0.0036)	(0.0763)	(0.0490)
Non-Pell Level	0.032***	0.028***	0.031***	0.027***	-0.016	0.003
	(0.010)	(0.009)	(0.0097)	(0.009)	(0.079)	(0.045)
Merit Aid Level	0.060***	0.047***	0.059***	0.046***	0.002	0.018
	(0.004)	(0.004)	(0.004)	(0.004)	(0.085)	(0.040)
Loans Level	0.011***	0.012***	0.011***	0.012***	0.017	0.018*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.012)	(0.0095)
TAKS Read		0.018***		0.018***		0.013**
		(0.002)		(0.002)		(0.0068)
TAKS Math		0.027***		0.027***		0.026***
		(0.002)		(0.002)		(0.004)
N	32939	32939	32939	32939	32939	32939

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table 8: Transfer to 4-Year Institution

Transfer	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Working	-0.028	-0.041**				
	(0.018)	(0.019)				
Fed. Work-Study			0.0374***	0.0331***	3.441	3.546
			(0.0120)	(0.0120)	(7.064)	(6.537)
Pell Level	0.013***	0.014***	0.013***	0.014***	-0.009	-0.011
	(0.0024)	(0.003)	(0.002)	(0.003)	(0.046)	(0.048)
Non-Pell Level	0.003	0.002	0.003	0.001	-0.021	-0.022
	(0.007)	(0.007)	(0.007)	(0.007)	(0.052)	(0.048)
Merit Aid Level	0.020***	0.017***	0.020***	0.017***	-0.001	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.045)	(0.04)
Loans Level	0.014***	0.013***	0.014***	0.013***	0.017**	0.018*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.008)	(0.010)
TAKS Read		0.0058***		0.0057***		0.0024
		(0.0012)		(0.0012)		(0.0066)
TAKS Math		0.007***		0.007***		0.007***
		(0.0014)		(0.0014)		(0.003)
N	36031	36031	36031	36031	36031	36031

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table 9: Transfer to 4-Year Institution - Without 1 Year Certificate Intention

Transfer	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Working	-0.035*	-0.046**				
	(0.021)	(0.022)				
Fed. Work-Study			0.040***	0.036***	6.95	6.17
			(0.013)	(0.013)	(9.74)	(8.19)
Pell Level	0.014***	0.016***	0.014***	0.016***	-0.031	-0.028
	(0.002)	(0.003)	(0.003)	(0.003)	(0.064)	(0.060)
Non-Pell Level	0.005	0.004	0.005	0.003	-0.031	-0.027
	(0.007)	(0.007)	(0.007)	(0.007)	(0.062)	(0.051)
Merit Aid Level	0.0198***	0.0165***	0.0195***	0.0163***	-0.024	-0.019
	(0.0035)	(0.0036)	(0.0035)	(0.0035)	(0.062)	(0.048)
Loans Level	0.014***	0.013***	0.014***	0.013***	0.019**	0.020*
	(0.0024)	(0.0023)	(0.0024)	(0.0023)	(0.0094)	(0.011)
TAKS Read		0.0059***		0.0059***		0.0006
		(0.001)		(0.001)		(0.008)
TAKS Math		0.007***		0.007***		0.006
		(0.001)		(0.001)		(0.004)
N	32939	32939	32939	32939	32939	32939

Standard errors in parentheses

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

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Appendix A: Results by Gender

Table A.1: Working in School: By Gender

Working in School	OLS	OLS with Controls	IV	IV with Controls
Men				
Fed. Work-Study	0.034***	0.034***	-0.046	-0.057
	(0.00956)	(0.0095)	(0.46)	(0.41)
Pell Level	-0.00016*	-0.00018**	0.00039	0.00052
	(0.00008)	(0.00008)	(0.0032)	(0.0032)
Non-Pell Level	0.0003	0.0003	0.0012	0.0013
	(0.0005)	(0.0005)	(0.0050)	(0.0045)
Merit Aid Level	-0.00035***	-0.00033**	0.00028	0.00033
	(0.00014)	(0.00013)	(0.0036)	(0.0030)
Loans Level	0.0001	0.0001	-0.00003	-0.0001
	(0.0001)	(0.0001)	(0.0009)	(0.0010)
TAKS Read		-0.000006		0.00004
		(0.00007)		(0.0002)
TAKS Math		-0.00004		-0.000004
		(0.0001)		(0.0002)
N	19793	19793	19793	19793
Women				
Fed. Work-Study	0.0453***	0.0452***	-0.304	-0.322
	(0.013)	(0.013)	(0.399)	(0.381)
Pell Level	-0.0002**	-0.0002**	0.0018	0.0021
	(0.0001)	(0.0001)	(0.0024)	(0.0025)
Non-Pell Level	-0.0005	-0.0005	0.0006	0.0006
	(0.0005)	(0.0005)	(0.0023)	(0.0024)
Merit Aid Level	-0.0002*	-0.0003*	0.0011	0.001
	(0.00014)	(0.00014)	(0.0016)	(0.0014)
Loans Level	0.00009	0.00009	0.0002	0.00005
	(0.00014)	(0.00013)	(0.0004)	(0.0004)
TAKS Read		0.00032**		0.0008
		(0.00018)		(0.00058)
TAKS Math		-0.000009		0.00003
		(0.0001)		(0.0003)
N	16238	16238	16238	16238

Standard errors in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table A.2: Persistence to 2nd Year: By Gender

Persistence to 2nd Year	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Men						
Working	0.310***	0.296***				
	(0.104)	(0.100)				
Fed. Work-Study			0.144***	0.135***	-5.056	-4.824
			(0.0222)	(0.0218)	(18.00)	(14.31)
Pell Level	0.025***	0.033***	0.024***	0.032***	0.060	0.070
	(0.003)	(0.0037)	(0.0030)	(0.0037)	(0.126)	(0.111)
Non-Pell Level	0.0453***	0.0379***	0.0440***	0.0366***	0.100	0.0890
	(0.0124)	(0.0114)	(0.0125)	(0.0114)	(0.198)	(0.154)
Merit Aid Level	0.0681***	0.0528***	0.0669***	0.0518***	0.108	0.0877
	(0.0044)	(0.0045)	(0.0044)	(0.0045)	(0.142)	(0.104)
Loans Level	0.0076**	0.0091***	0.0079**	0.0094***	-0.0025	-0.0026
	(0.0034)	(0.0031)	(0.0034)	(0.0031)	(0.037)	(0.036)
TAKS Read		0.0168***		0.0168***		0.0195**
		(0.002)		(0.0019)		(0.0089)
TAKS Math		0.029***		0.029***		0.031***
		(0.002)		(0.002)		(0.006)
N	19793	19793	19793	19793	19793	19793
Women						
Working	-0.013	-0.053				
	(0.083)	(0.075)				
Fed. Work-Study			0.120***	0.110***	7.010	4.305
			(0.0248)	(0.0238)	(7.034)	(4.621)
Pell Level	0.0264***	0.0325***	0.0257***	0.0318***	-0.0141	0.00509
	(0.0033)	(0.0041)	(0.0033)	(0.0041)	(0.0431)	(0.0312)
Non-Pell Level	0.011	0.010	0.010	0.010	-0.011	-0.0021
	(0.0090)	(0.0086)	(0.0090)	(0.0085)	(0.046)	(0.028)
Merit Aid Level	0.0487***	0.0373***	0.0482***	0.0369***	0.0210	0.0224
	(0.0049)	(0.0051)	(0.0048)	(0.0050)	(0.0279)	(0.0161)
Loans Level	0.0143***	0.0146***	0.0142***	0.0146***	0.0111	0.0151***
	(0.0034)	(0.0032)	(0.0034)	(0.0032)	(0.0084)	(0.0058)
TAKS Read		0.015***		0.015***		0.0096
		(0.0023)		(0.0023)		(0.0074)
TAKS Math		0.027***		0.027***		0.027***
		(0.0021)		(0.0021)		(0.0037)
N	16238	16238	16238	16238	16238	16238

Standard errors in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table A.3: Persistence to 2nd Year - Without 1 Year Certificate Intention: By Gender

Persistence to 2nd Year	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Men						
Working	0.336***	0.329***				
	(0.125)	(0.122)				
Fed. Work-Study			0.139***	0.131***	-4.855	-5.652
			(0.0227)	(0.0224)	(15.15)	(14.14)
Pell Level	0.0257***	0.0337***	0.0248***	0.0327***	0.0585	0.0762
	(0.0031)	(0.0039)	(0.0031)	(0.0039)	(0.103)	(0.108)
Non-Pell Level	0.0481***	0.0405***	0.0472***	0.0398***	0.0888	0.0863
	(0.0132)	(0.0121)	(0.0132)	(0.0122)	(0.126)	(0.113)
Merit Aid Level	0.0675***	0.0529***	0.0664***	0.0519***	0.104	0.0924
	(0.0045)	(0.0047)	(0.0045)	(0.0046)	(0.116)	(0.0996)
Loans Level	0.0085**	0.00995***	0.0087**	0.0102***	0.00225	0.0000347
	(0.0035)	(0.0032)	(0.0035)	(0.0032)	(0.0205)	(0.0258)
TAKS Read		0.0171***		0.0171***		0.0201**
		(0.0021)		(0.0021)		(0.0089)
TAKS Math		0.0289***		0.0289***		0.0304***
		(0.0026)		(0.0026)		(0.0063)
N	18151	18151	18151	18151	18151	18151
Women						
Working	-0.034	-0.086				
	(0.108)	(0.098)				
Fed. Work-Study			0.120***	0.110***	6.044	3.392
			(0.027)	(0.026)	(6.403)	(4.275)
Pell Level	0.0287***	0.0347***	0.0280***	0.0340***	-0.0077	0.0126
	(0.0034)	(0.0042)	(0.0034)	(0.0042)	(0.041)	(0.029)
Non-Pell Level	0.0109	0.0098	0.0106	0.0096	-0.0019	0.0033
	(0.0099)	(0.0095)	(0.0099)	(0.0094)	(0.041)	(0.023)
Merit Aid Level	0.048***	0.036***	0.047***	0.036***	0.021	0.023
	(0.0053)	(0.0055)	(0.0053)	(0.0054)	(0.028)	(0.017)
Loans Level	0.014***	0.015***	0.014***	0.015***	0.013*	0.016***
	(0.0035)	(0.0034)	(0.0035)	(0.0034)	(0.0076)	(0.0056)
TAKS Read		0.015***		0.015***		0.012*
		(0.0024)		(0.0024)		(0.0064)
TAKS Math		0.0273***		0.0273***		0.0264***
		(0.0022)		(0.0022)		(0.0034)
N	14788	14788	14788	14788	14788	14788

Standard errors in parentheses
$*p < 0.10, **p < 0.05, ***p < 0.01$

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table A.4: Transfer to 4-Year Institution: By Gender

Transfer to 4-Year Institution	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Men						
Working	-0.0011	-0.0095				
	(0.019)	(0.019)				
Fed. Work-Study			0.0301*	0.0269*	-6.484	-4.146
			(0.0156)	(0.0157)	(18.02)	(11.72)
Pell Level	0.0141***	0.0155***	0.0139***	0.0153***	0.0592	0.0474
	(0.0025)	(0.0028)	(0.0025)	(0.0028)	(0.126)	(0.0903)
Non-Pell Level	0.0055	0.0033	0.0052	0.0031	0.0756	0.0472
	(0.0095)	(0.0094)	(0.0095)	(0.0094)	(0.200)	(0.128)
Merit Aid Level	0.0192***	0.0160***	0.0190***	0.0158***	0.0705	0.0461
	(0.0039)	(0.0040)	(0.0039)	(0.0039)	(0.143)	(0.0857)
Loans Level	0.0127***	0.0120***	0.0127***	0.0121***	-0.00024	0.0019
	(0.0028)	(0.0027)	(0.0028)	(0.0027)	(0.037)	(0.029)
TAKS Read		0.0067***		0.0067***		0.00895
		(0.0016)		(0.0016)		(0.0075)
TAKS Math		0.0058***		0.0058***		0.0074
		(0.0018)		(0.0018)		(0.0052)
N	19793	19793	19793	19793	19793	19793
Women						
Working	-0.0518**	-0.0674**				
	(0.0238)	(0.0262)				
Fed. Work-Study			0.0475***	0.0419**	7.585	7.026
			(0.0178)	(0.0175)	(8.540)	(7.511)
Pell Level	0.0110***	0.0131***	0.0107***	0.0128***	-0.0328	-0.0317
	(0.0030)	(0.0032)	(0.0030)	(0.0032)	(0.0518)	(0.0500)
Non-Pell Level	-0.000339	-0.0006	-0.0005	-0.0007	-0.0232	-0.0208
	(0.0075)	(0.0076)	(0.0074)	(0.0075)	(0.0521)	(0.0471)
Merit Aid Level	0.0225***	0.0186***	0.0223***	0.0185***	-0.00754	-0.00573
	(0.0040)	(0.0041)	(0.0040)	(0.0040)	(0.0343)	(0.0270)
Loans Level	0.0159***	0.0145***	0.0159***	0.0144***	0.0125	0.0152*
	(0.0030)	(0.0029)	(0.0030)	(0.0028)	(0.0091)	(0.0085)
TAKS Read		0.0048***		0.0048***		-0.0037
		(0.0018)		(0.0018)		(0.0112)
TAKS Math		0.0091***		0.0091***		0.0085
		(0.0019)		(0.0018)		(0.0053)
N	16238	16238	16238	16238	16238	16238

Standard errors in parentheses
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Table A.5: Transfer to 4-Year Institution - Without 1 Year Certificate Intention: By Gender

Transfer to 4-Year Institution	OLS	OLS with Controls	OLS	OLS with Controls	IV	IV with Controls
Men						
Working	-0.0048	-0.0081				
	(0.0257)	(0.0272)				
Fed. Work-Study			0.0336**	0.0309*	-6.779	-5.343
			(0.0167)	(0.0168)	(17.80)	(13.53)
Pell Level	0.0149***	0.0162***	0.0147***	0.0160***	0.0606	0.0564
	(0.0027)	(0.0029)	(0.0027)	(0.0029)	(0.120)	(0.102)
Non-Pell Level	0.0062	0.0041	0.0059	0.0039	0.0625	0.0471
	(0.0098)	(0.0098)	(0.0098)	(0.0097)	(0.149)	(0.110)
Merit Aid Level	0.0188***	0.0159***	0.0185***	0.0157***	0.0704	0.0532
	(0.0041)	(0.0042)	(0.0041)	(0.0042)	(0.136)	(0.0953)
Loans Level	0.0130***	0.0124***	0.0131***	0.0125***	0.0043	0.0030
	(0.0029)	(0.0028)	(0.0029)	(0.0028)	(0.0240)	(0.0245)
TAKS Read		0.0062***		0.0062***		0.0090
		(0.0017)		(0.0017)		(0.0084)
TAKS Math		0.0057***		0.0057***		0.0072
		(0.0020)		(0.0020)		(0.0055)
N	18151	18151	18151	18151	18151	18151
Women						
Working	-0.0659**	-0.0850***				
	(0.0293)	(0.0326)				
Fed. Work-Study			0.0504***	0.0446**	8.981	8.137
			(0.0193)	(0.0190)	(9.602)	(8.196)
Pell Level	0.0133***	0.0152***	0.0130***	0.0149***	-0.0408	-0.0378
	(0.0031)	(0.0033)	(0.0031)	(0.0033)	(0.0605)	(0.0557)
Non-Pell Level	0.0027	0.0020	0.0026	0.0019	-0.0162	-0.0137
	(0.0084)	(0.0084)	(0.0083)	(0.0084)	(0.0608)	(0.0541)
Merit Aid Level	0.0219***	0.0181***	0.0217***	0.0179***	-0.0173	-0.0137
	(0.0043)	(0.0043)	(0.0042)	(0.0043)	(0.0429)	(0.0335)
Loans Level	0.0156***	0.0144***	0.0156***	0.0144***	0.0148	0.0176
	(0.0030)	(0.0029)	(0.0030)	(0.0029)	(0.0106)	(0.0107)
TAKS Read		0.0060***		0.0059***		-0.0029
		(0.0018)		(0.0018)		(0.0115)
TAKS Math		0.0087***		0.0087***		0.0065
		(0.0019)		(0.0019)		(0.0065)
N	14788	14788	14788	14788	14788	14788

Standard errors in parentheses
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Specifications with controls include family income, an indicator variable for zero expected family contribution, TAKS Math and Reading Scores, Age, Race, Gender, high school Limited English Proficiency (LEP) status and high school Special Education status. TAKS scores are measured in hundreds of points. All specifications include fixed effects for high school graduation cohort, enrollment semester and first primary institution attended. Standard errors are clustered at the (enrollment semester - institution) level.

Appendix B: Components of Financial Aid Variables

Need-Based Aid Categories:

1. Pell Grants:
   Pell grants are need-based grants to low-income undergraduate and certain post-baccalaureate students.

2. FSEOG Grants:
   Federal Supplemental Educational Opportunity Grants (FSEOG) are federal need-based grants provided for students with exceptional financial need.

3. Texas Public Educational Grant (TPEG):
   TPEG grants are need-based grants provided to students within Texas as supplemental grants to federal funding.

4. Texas Tuition Equalization Grant (TEG):
   TEG grants are applicable for Texas residents enrolled in Texas higher education institutions with demonstrated financial need.

5. HB3015 Grants/Scholarships:
   Texas supplemental funding for students with financial need.

6. Leveraging Educational Assistance Partnership (LEAP) Program & Special Leveraging Educational Assistance Partnership (SLEAP) Program:
   These supplemental Texas grants are available to Texas residents enrolled in public Texas higher education institutions.

7. State Nursing Scholarship:
   Texas funded need-based scholarships for students attending school for nursing.

8. Tuition Exemptions/Waivers & Other Need-based awards:
   This category of exemptions/waivers is provided directly by the institution attended.

Merit Aid Categories:

1. Top 10% Scholarship:
   Financial need-based scholarship available to students that are Texas residents and that rank in the top 10

2. Merit Aid Funded by Private Donations to Institutions & Institutionally funded Merit-based Gift Aid:
   These scholarships are provided directly through specific higher education institutions to enrolling students.

3. Categorical Aid (Brought from Outside Sources) and Other Scholarships and Grants:
   This is a broad category of merit scholarships that a student brings to their aid package from an outside application process.

4. Byrd Scholarship:
   The Byrd Scholarship is a federally funded and state administered program that offers scholarship grants to exceptional students.

5. Student Deposit Scholarship:
   The Student Deposit Scholarship provides Texas funding for needy and deserving students at Texas higher education institutions.

6. Texas Grant Program:
   This Texas scholarship is available to students in Texas higher education institutions with demonstrated financial need that graduated from public high school in Texas. These students must have completed the Recommended High School Program or the Distinguished Achievement Program in high school to be considered.

7. AmeriCorps:
   AmeriCorps scholarship and tuition grants are given to students that complete a successful term of service with the AmeriCorps nonprofit volunteer service. This grant is included in the merit category because applications to participate in AmeriCorps service are competitive.

8. Teach Grant:
   Teach Grants are given to qualified students interested in becoming teachers after graduating.

9. HB3015 Other:
   These are additional grant funds distributed through the HB3015 tuition set-asides. They are included in the merit category because the manner of their distribution is not clear from the FADs documentation.

Work-Study Aid:

1. Federal Work-Study:
   This program is the subject of this paper and is described in detail above.

2. Texas Work-Study, HB3015 Work-Study & Texas Work-Study Mentorship Program:
   These programs are similar to the federal work-study program but uses funds from Texas rather than the federal government.

3. Need-based Institutional Work-Study:
   These are work-study programs subsidized and funded by institutions that choose to sponsor their own work-study programs.

Loans:

1. Federal Unsubsidized Loans:
   Unsubsidized loans are offered through the federal government to assist students in paying for tuition. They include Stafford Loans, PLUS Loans, PLUS Federal Direct Loans, Unsubsidized Federal Direct Loans and HELP Loans.

2. Federal Subsidized Loans:
   These loans are federal low-interest loans offered to students with demonstrated financial need. They include Perkins Loans, Subsidized Federal Direct Loans

3. Texas Unsubsidized Loans:
   These loans are administered through the state of Texas and include College Access Loans (CAL).

4. : Texas Subsidized Loans:
   These loans are administered through the state of Texas at a low or zero rate of interest. They include the Be On Time Loan Program (BOT) and HB3015 Loans.

5. Primary Care Student Loans:
   These are long-term low-interest rate loans available to students interested in pursuing certain specialties of medicine.

6. Other Long-Term Loans:
   This category includes any other uncategorized loans that a student may have received to help finance the cost of tuition.