Aid After Enrollment:
Impacts of a Statewide Grant Program at Public Two-year Colleges

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Acknowledgments

Abstract

Most students who begin at community colleges do not finish with a degree. The net price of college commonly shifts after enrollment, and there is little evidence on how these shifts affect two-year degree completion. This study provides evidence on the impacts of a private program that offers supplemental grant aid to students with demonstrated financial need, who are already enrolled at public two-year colleges in Wisconsin. An evaluation using a randomized control group and data from over 5,000 students in multiple cohorts, fails to confirm substantial increases in persistence or degree completion caused by the grant program.

Introduction

Community colleges are best known for training adult learners for the workforce, through two-year degrees and shorter certificates that can be pursued part-time (Kane & Rouse, 1999; Bailey, Jaggars, & Jenkins, 2015). However, community college is also a pathway for students graduating high school and entering college full-time in pursuit of bachelor's degrees. Full-time community college students in 2014 represented 38% of all community college students and 25% of all full-time undergraduates (Ma & Baum, 2016). Younger, full-time students are more likely than the average student to complete degrees at community colleges, yet the majority of them still leave without credentials (NSC, 2014).

Understanding the causes of non-completion is important, because students who stay enrolled earn degrees that are more valuable than ever before (Belfield & Bailey, 2011). Even without a degree, accumulating additional college credits or upgrading from a certificate to an associate degree can lead to substantial increases in subsequent earnings (Carruthers & Sanford, 2015; Bahr et al. 2015). Students who leave college are also more likely than ever before to have debt, and without degrees they face poor prospects of repaying even small loans (Brown et al., 2014; Campbell & Hillman 2015).

Difficulty paying for college may contribute to the problem of non-completion among community college students, especially those entering college during and following the recession. Increased enrollment coupled with shrinking state appropriations during the Great Recession led to increases in tuition and decreases in instructional spending (Barr & Turner, 2013). At the same time median family income fell, leaving families less equipped to pay for college (Bricker et al., 2014). Compared to

four-year universities, there is far less state and institutional financial aid available at community colleges to offset these trends (College Board, 2015). The federal Pell Grant, which is distributed based on financial need, is the main source of grant aid received by community college students (College Board, 2015). From school year 2008–09 to 2010–11 following the Great Recession, Pell Grant spending per recipient increased 29%, and overall spending increased 95%, (CBO, 2013). Still, the net price (tuition and fees, plus books and supplies, plus living and transportation costs, minus other grant aid) faced by community college students from lower-income families increased as a percent of their income (IPEDS, 2016).

Within broader trends in tuition and spending on aid programs, individual students are also subject to changing net prices during their college careers. Students may gain or lose financial aid after a program shifts its criteria, as with the Pell Grant expansions and some more recent Pell Grant contractions (Mabel, 2015). Students may also lose financial aid because they fail to meet static criteria. For example, many community college students are at risk of losing Pell Grant aid because they do not make Satisfactory Academic Progress as defined by their colleges (Schudde & Scott-Clayton, 2014). Other students may become ineligible for need-based aid when family income rises from new employment, and still others may face unexpected tuition increases.

Given the importance of degree completion, there is relatively little evidence about how *changes* in the price of college affect the performance of community college students *after* they enroll. Evidence on the effects of prices typically comes from exploiting exogenous variation in financial aid, often with a focus on enrollment at four-

year colleges and universities. Focusing on persistence and degree completion among students enrolled at community colleges, there appears to be little to no effect of programs that use the federal needs analysis system to target grant aid (Bettinger, 2004; Castleman & Long, 2013; Marx & Turner, 2015; Denning, 2016). In contrast, somewhat larger effects have been identified for grants that fully meet direct costs throughout the college career, provide a clear pathway for students, and include support mechanisms (Barrow et al., 2014; Scrivener et al., 2015; Carruthers & Fox, 2016). However the bulk of financial aid does not include these features.

This study contributes new, rigorous evidence on the impact of a large, ongoing, privately funded, statewide program that uses random assignment to provide a modest grant aid to students with financial need. The program simulates an exogenous change in Pell Grant aid, delivered after enrollment, more closely than other programs that have been evaluated using randomized designs. It also served an important and growing population of college students at a critical time: recent high school graduates from low-income families, starting full-time at public two-year colleges, during a five-year period spanning the Great Recession. The program offered $1,800 in grant support per year to students at public technical colleges and two-year branch campuses of the public university system in Wisconsin. These students also received Pell Grants, but had enrolled with an average of $7,000 in additional costs unmet by financial aid.

We examine data from more than 5,000 students across five cohorts entering college between fall 2008 and fall 2012, measuring their persistence in college by observing retention, transfer, credit accumulation, and degree attainment. We estimate small positive impacts, that appear to accrue to students with greatest financial need,

but generally these differences are not statistically significant. Students appear to remain enrolled full-time at their initial institutions slightly longer, which accords with the grant's requirements, but their overall attainment of college credits and degrees is not increased. Using a 95% confidence interval, we can rule out impacts larger than a 1.8 percentage-point increase in the likelihood of persistence to the second year of college, per $1,000 of aid offered.

The program provided no additional support in the form of counseling or setting academic benchmarks for students. This appears to have mattered, as the modest additional administrative requirements that the program imposed seem to have prevented many eligible students from receiving the grant. We find that a group of students to whom the grant offer was extended despite their ineligibility appear to have been adversely impacted, and were substantially less likely to persist to a second year of college.

The following section describes the intended effect of financial aid programs and research on their effects. We focus on aid after enrollment, and how it is delivered to students with financial need at community colleges. The intervention is then described, along with the evaluation design. Finally, impact estimates are presented and discussed.

Effects of Financial Aid on Persistence: Theory and Evidence

A simple theoretical model of schooling decisions, for high school graduates already enrolled in college, centers on the decision of whether to stay enrolled. Added grant aid lowers the price of college, increases the expected net benefit of staying

enrolled, and should in turn induce some students on the margin to enroll who otherwise would not. The size of the population at this margin depends on the distribution of preferences and financial constraints across students, as formalized in Bettinger (2004). Many state and federal programs follow the logic of identifying students at this margin and reducing their prices through additional grant aid.

Research tends to show that programs delivering grant aid using the federal needs analysis system appear to have little impact keeping community college students enrolled. Bettinger (2004) found that an additional $1,000 of Pell Grant eligibility may have increased the probability of persistence to the second year of college by at least nine percentage points at two-year colleges in Ohio. But using alternative identification strategies, this estimate becomes smaller and possibly zero. Castleman and Long (2013), studying the Florida Student Access Grant of $1,300, found essentially no impact on enrollment, persistence, or completion at two-year colleges. Marx & Turner (2015) did not find a significant impact of Pell Grant eligibility on credits earned at community colleges in the City University of New York system. Denning (2016) found no measurable impact of small increases in Pell Grant aid on re-enrollment in Texas community colleges.

These findings could signal a lack of binding financial constraints at community colleges. But Lochner & Monge-Naranjo (2012) find that credit constraints are generally becoming more important barriers to college enrollment. The lack of strong effects of need-based financial aid might instead be evidence of several frictions inherent in measuring financial constraints and their effects, and the difficulty of shifting those constraints in favor of continued enrollment.

First, identifying potentially financially constrained students is a complicated process. To qualify for most forms of aid, students must complete the Free Application for Federal Student Aid (FAFSA) to calculate their Expected Family Contribution (EFC). Filing the FAFSA can be more involved than filing taxes (Dynarski & Scott-Clayton, 2006). Applicants receive an award package that includes offers of grants, loans, and work-study, which they must act to accept. Students supplement their aid package with funds from savings or earnings in order to cover the EFC and what remains of the full cost of attendance, which includes tuition, fees, books, supplies, and living costs. Additional financial aid can reduce the net price (total cost minus grant aid) or can leave the net price unchanged while changing the composition of the aid package (grants supplanting loans). Embedded in this process are the choices of whether and how much to work during school, and where to live, which affect both current and future financial aid packages.

Second, within this structure, students who could benefit from aid may not actually receive it. Grants can be primarily merit- or performance-based, but in many cases primarily need-based grants have hidden non-financial requirements attached. These include maintaining a GPA above a certain threshold to keep the Pell Grant, or filing the FAFSA early enough to receive first-come first-served state grant programs (Schudde & Scott-Clayton, 2014; Anderson & Goldrick-Rab, 2016; Bird, 2015; Cannon & Goldrick-Rab, 2016). Students face this process repeatedly, with changing and often unclear requirements for maintaining eligibility.

Third, the aid students receive may be insufficient to make an impact. The full cost of college includes direct and indirect costs. Direct costs, which officially cap the

amount of aid available, may be mismeasured, and are often understated relative to an objective measure of local living costs (Kelchen, Hosch, & Goldrick-Rab, 2014a). This leaves students with significant remaining direct costs to meet through savings, work, or borrowing. Indirect costs, including foregone wages, must be financed outside the official aid system.

Finally, students may not be aware of the aid they qualify for. Within a national sample of second-year students at community colleges, who had previously received a Pell Grant, 10% failed to refile the FAFSA for their second year, potentially forgoing grant aid (Bird & Castleman, 2016). Castleman & Page (2016) reminded community college students from Massachusetts to refile the FAFSA, increasing their filing rates by 12% and rates of persistence to the second year of college by 14%. Bettinger et al. (2012) assisted families with filing for financial aid at tax time, inducing a five percentage point increase in initial enrollment at two-year colleges. These large impacts imply that in the absence of these interventions, students lacked information and attention that would motivate them to participate in grant programs.

These issues are particularly important at community colleges. Relative to students at four-year colleges, students at community colleges come from lower-income families and are more likely to be the first in their family to attend college (Ma & Baum, 2016). Community college students choose a wide variety of degree pathways and living arrangements, and are more likely to work while enrolled (Goldrick-Rab, 2010; Schudde & Goldrick-Rab, 2015). Scott-Clayton (2015) discusses the lack of structure many students experience, and reviews empirical evidence that community college students can benefit from programs helping them follow a defined path through school.

Indeed, the evidence for need-based aid programs that also provide structured support seems to be the strongest. The Performance Based Scholarship (PBS) evaluated by Barrow et al. (2014) provided incentive payments to young parents at New Orleans community colleges, using periodic rewards to focus attention on academic performance. PBS induced a 45% increase in credits earned over the first year, and a 12 percentage-point increase in re-enrollment for a second year of college. The Accelerated Study in Associate Programs (ASAP) package of academic advising, a clear course schedule, a tuition waiver, transportation, and books, yielded an 18 percentage point increase in three-year graduation rates from the City University of New York (Scrivener et al., 2015). Knox Achieves is a program that couples counseling with complete coverage of tuition and fees at Tennessee community colleges, and is directed at students making a direct transition from high school to community college. Carruthers & Fox (2016) find Knox Achieves induced a large increase in enrollment, with an indication of greater persistence among impacted students.

Existing research says little about where aid dollars should be directed for the greatest impact. Some studies cited above have identified the effect of need-based aid by comparing across a maximum threshold of financial need in a regression discontinuity design (Castleman & Long, 2013; Marx & Turner, 2015). To better inform the allocation of need-based aid, it is also useful to estimate the impact of aid for students at different levels of financial need. When identification comes from comparisons across dates of birth as in Denning (2016), or across cohorts and geography as in Carruthers & Fox (2016) it is possible to estimate heterogeneity by measures of family income. In both cases lower-income students received less

additional aid, but saw larger impacts on enrollment decisions. Randomized trials also create exogenous variation across all levels of financial need, but in many cases researchers do not report differences in effects on this margin.

In summary, financial aid is unlikely to be effective if it does not adequately cover the real prices students face, and need-based financial aid is hindered from doing so by several types of frictions. Below we describe an instance of financial aid that potentially covers a sizable fraction of costs, but is also subject to the frictions discussed here. Randomized assignment of the program allows for estimation of average impacts, as well as heterogeneity in impacts by financial need. We use the body of work discussed in this section to generate research questions and hypotheses, and later to interpret the answers.

The Wisconsin Scholars Grant (WSG)

The Wisconsin Scholars Grant (WSG) is a privately funded grant program seeking to offset college costs for low-income Wisconsin families. The present study complements an evaluation of the WSG's impacts on students attending Wisconsin's public universities, which demonstrated reductions in students' work hours and improvements in bachelor's degree completion rates over four years (Broton, Goldrick-Rab, & Benson, forthcoming; Goldrick-Rab et al., 2016).

Students at Wisconsin's public two-year colleges (which include both technical colleges and branch campuses of the University of Wisconsin) were subjected to the same initial and continuing eligibility requirements for the WSG that were imposed on the university students. Recent graduates of Wisconsin's public high schools (under 21

at time of college enrollment) had to complete the FAFSA and qualify for a Pell Grant (e.g. for the 2008–09 school year this required an EFC below $4,041, which corresponds roughly to a family income of $50,000 in 2007), and enroll full-time (at least 12 credit hours). Those who were first time college students, and had demonstrated financial need beyond the aid they already received (i.e. total cost minus grant aid is above zero) were then entered into a pool for random selection.

Placement into the randomization pool was done by administrators without students' knowledge, after enrollment in September of their first year. Once selected, students received a letter in October, and had to sign and return a form to verify their eligibility and receive the grant. Roughly 1,500 students entered the randomization pool each year. Of these, roughly 600 were selected to receive grant offers. However only 80% of these ever received the grant, indicating a substantial portion did not receive the notification, did not return it, or were deemed ineligible. We therefore consider both the intent-to-treat impacts of selection to receive a grant offer, and the treatment-on-the-treated impacts of receiving additional grant aid.

The grant provided $1,800 per year (delivered as $900 per semester). The grant was intended to offset unmet financial need, and we examine whether this occurred by reducing borrowing or by reducing out-of-pocket costs to students.

Students can receive the WSG for up to ten semesters if they continue to re-enroll in college full-time, file the FAFSA, and maintain Pell Grant eligibility. Pell Grant eligibility includes includes both a means test defined by the FAFSA, and Satisfactory Academic Progress as defined by their college (i.e. specific performance in terms of both courses completed and grades). If students transferred to a public university in the

state, the grant increased to $3,500 per year. Many students did not meet these requirements for continuing eligibility, with just 42% of those initially receiving the grant continuing to receive it beyond the first year.

Both economic reasoning and empirical evidence imply that the WSG funds could impact academic performance, in several ways. As students make decisions about whether to stay enrolled, the WSG should induce longer full-time enrollment at Wisconsin two-year colleges, by reducing the price of this specific pathway. In fact, university students who were offered the WSG appeared to shift enrollment behavior to maintain eligibility for the aid (Kinsley & Goldrick-Rab, 2015). The mechanism is not to induce drastic behavioral change, since these students already enrolled full-time in pursuit of a degree, but to buffer against financial shocks that could lead to dropout. These unexpected shocks are important: in a survey of some WSG-eligible students in their first semester at two-year colleges, 34% said they were having more trouble affording college than they had expected. Financial aid is an important buffer, since 59% said they received no help from parents in paying for their education. Whether or not additional financial aid induces longer enrollment, it could change students' choices while enrolled. If students choose to work less in favor of more study time, this could manifest itself in a higher rate of credit accumulation or better grades. There is room for reduction in work hours: in the same survey, 76% earned income from jobs.

However, as discussed above, effects of the WSG may be hindered because it lacks structure and salience. When the WSG recipient group was surveyed about which programs were part of their aid package, just 25% correctly included WSG in their choices.

The WSG may have operated differently by the school and student context. We investigate whether impacts differ by family financial background, as measured by the EFC from the FAFSA. The Pell Grant offsets the EFC roughly dollar-for-dollar for these students. Therefore students with a higher EFC will have lower amounts of Pell Grant aid, but may not have sufficient resources to cover the additional out-of-pocket expense. At the same time, students with a zero EFC cannot receive any more Pell Grant aid, though they might benefit from it.[1] Impacts of aid may also vary by gender, type of institution, or parental education (first-generation college status).

Our research questions are therefore:

1. What is the impact of the WSG offer on the financial aid package?

2. What is the impact of the WSG offer on short-term persistence? Outcomes: credits attempted and completed, grades, enrollment in second year.

3. What is the impact of the WSG offer on long-term persistence, degree completion, and transfer? Outcomes: continued enrollment, accumulation of credits, cumulative GPA, degree completion, and transfer to different sectors.

4. Is the WSG offer more effective for students with greater poverty as measured by EFC? Do impacts vary by gender, type of institution, or parental education?

5. How do impacts of the WSG offer differ from impacts of WSG receipt?

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1. Effects of the university arm of the WSG on bachelor's degree attainment were generally no larger among students with lower out-of-pocket costs, which are associated with a lower EFC (Goldrick-Rab et al., 2016).

The following section lays out a plan to answer these questions, making use of the random assignment feature of WSG implementation.

Research Design

We estimate regressions of the form:

$$Y_i = \rho WSG_i + X'_i\beta + C'_i\gamma + \varepsilon_i \quad (1)$$

where Y_i is some outcome for student i. Selection to receive a WSG offer, indicated by WSG_i, varies randomly within the sample, making the residual ε_i uncorrelated with WSG_i and providing unbiased estimates of the intent-to-treat effect ρ.[2] Randomization was effectively blocked by cohort, and we add a vector of cohort fixed effects C_i to all analyses. To add precision, we condition on a vector of baseline characteristics X_i, including gender, age, dependency status for financial aid purposes, parents' education, EFC, and the initial system enrolled. Throughout this study we use linear probability models for binary outcomes.

We test for differences in impacts by estimating regressions of the form:

$$Y_i = \delta X_i + \pi_0 WSG_i + \pi_1 WSG_i * X_i + C'_i\kappa + \epsilon_i \quad (2)$$

where X_i represents some moderating baseline characteristic of student i. δ is the direct effect of a unit increase in the baseline characteristic X_i on the outcome Y_i. π_0 is the treatment effect experienced by students with $X_i = 0$. π_1 is the differential treatment effect experienced by students with $X_i = 1$ for binary X's and for a unit increase in X_i for continuous X's.

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2. Since eligible students are scattered all over the state among larger classes of college students, we do not expect there to be first-order spillover effects of the WSG treatment across students in the sample. Therefore only the student's own assignment to the WSG is included, not the assignment of his or her peers.

Finally, since not all selected students actually receive grant aid, we estimate a treatment-on-the-treated parameter μ by using WSG_i as an instrument for additional aid received. This requires estimating WSG effects on aid in a first stage, then regressing outcomes on predicted aid.

$$WSGReceived_i = \tau WSG_i + X_i'\boldsymbol{\theta} + C_i'\boldsymbol{\omega} + \zeta_i \quad (3)$$

$$Y_i = \mu WSG\widetilde{Receiv}ed_i + X_i'\boldsymbol{\phi} + C_i'\boldsymbol{\nu} + \xi_i \quad (4)$$

This approach is subject to the exclusion restriction that the WSG offer only impacts outcomes through the channel of increased financial aid (Imbens & Angrist, 1994). We have a unique ability to test this assumption. We observe at baseline some of the WSG eligibility criteria: Wisconsin residency, age, full-time status, whether EFC is within the Pell range, and first-time enrollment status as reported on the FAFSA. We use these criteria to identify students, in both the WSG and control groups, who appear to be ineligible to take up the grant if offered, even though the students appear in the randomization pool and our sample. We then estimate equation (1) among the predicted ineligible group, to test for impacts of a grant offer that is unlikely to result in additional grant aid. This informs a treatment-on-the-treated analysis in the predicted eligible group.

Data and Sample

Wisconsin Setting

The importance of two-year colleges and two-year degrees varies widely across states. Wisconsin ranks 27th (36th) out of 50 states in the percent of undergraduates (full-time undergraduates) enrolled in two-year public colleges (Ma & Baum, 2016). The fraction of the Wisconsin workforce with vocational associate degrees is over twice the national average (11.4% versus 4.7%), and Wisconsin workers in this category earn higher hourly wages than the national average ($18.29 versus $17.02) (COWS, 2014). However Wisconsin lags national averages in these same measures for academic associate degrees (4.8% of the workforce versus 6.3%, $15.41 per hour versus $16.65).

Wisconsin two-year colleges belong to two distinct systems with campuses across the state. The state public university system provides liberal arts degrees and preparation to transfer to universities, at the two-year University of Wisconsin Colleges (UW Colleges). UW Colleges is one institution consisting of 13 branch campuses and an online program. The Wisconsin Technical College System (WTCS) consists of 16 colleges with 49 total branch campuses. WTCS focuses on preparing students for careers, though five of the colleges also include liberal arts and university transfer in their missions.

The two systems differ from each other and from national averages in a few key ways. Table 1 compares the two systems to each other and to the roughly 1,000 other two-year public colleges in the nation, in terms of student population, prices, and outcomes over the period of this study. UW Colleges students are more commonly young, first-time students pursuing degrees full-time. The group of students beginning

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degree programs full-time is a small fraction of total enrollment at both systems and nationally. Nearly half of the students at both systems take out federal student loans, which is well above the national average of 20%. The rate of receiving Pell Grants is lower at both systems (25% and 32%) than the national average of 45%.

Comparing the two systems provides an instructive example of the difference between cost of attendance and net price. In 2008–09 WTCS charged $3,265 in tuition and required fees, for two semesters of full-time enrollment, while UW Colleges charged a higher price of $4,584.[3] On top of that, UW Colleges has higher living costs in its official cost of attendance, and fewer UW Colleges students qualify for Pell Grants. Focusing in on the Pell Grant population though, WTCS students actually faced higher net prices. This is partly explained by more UW Colleges students living with family for lower costs, and partly explained by larger need-based grants available from the state to UW Colleges students. Students with family incomes under $30,000, paid $4,566 at UW Colleges, far less than the WTCS net price of $7,068. Relative to the size of the WSG, these are meaningful differences. Considering tuition and required fees, the WSG covered 55% at WTCS versus 39% at UW Colleges. Considering net price for the lowest income group, WSG covered 26% at WTCS versus 39% at UW Colleges.[4] Clearly, students in this sector still have costs to meet after aid is applied.[5]

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3. Over the five cohorts of students included in this study, initial cost of attendance rose by 20% while the WSG amount stayed the same (in current dollars).

5. The four-year version of the WSG, at $3,500 per year, covers 53.6% of average tuition and required fees at the average four-year University of Wisconsin. It covers 40.3% of average net price for the lowest income group.

5. In some cases two-year students pay a comparable net price to students at four-year colleges and universities. The maximum state need-based grant available is $1,875 larger at four-year institutions than at WTCS, enough to nearly erase the difference in tuition in some cases. Prices to live on-campus at universities can also be lower than the official price of living off-campus to attend two-year colleges. Kelchen, Hosch, & Goldrick-Rab (2014b) show that official prices are consistently underestimated at Wisconsin two-year colleges, at some campuses by over 25%.

Turning to outcomes, retention to the third semester is similar across both systems and the national sample, near 60%. Graduation rates differ widely between the two systems. At UW Colleges, 36% of students earn a degree within 150% of a normal time frame (three years for associate degrees). At WTCS just 21% of students graduate in 150% of normal time (which could be shorter than three years for technical certificates). The national average is in between at 27%. UW Colleges students transfer out at a rate of 38%, far more often than WTCS students beginning at transfer-focused colleges (22%) or the national average (20%).

Table 1. Characteristics of Public Two-year Colleges, 2008-09 School Year

	UW Colleges (all campuses)	WTCS (avg. across colleges)	Student-weighted Wisc. avg	Public two-year colleges
Students				
Undergraduates				
Under age 25 (%)	91.2	70.6	76.4	73.1
First-time, full-time, degree/certificate-seeking (% of undergraduat	28.0	10.3	15.2	15.2
First-time, full-time, degree/certificate-seeking (count)	3,663	587	1,450	662
Receiving Pell Grants (%)	25.0	32.1	30.1	44.6
Receiving federal loans (%)	41.0	46.8	45.2	19.7
Of those receiving federal financial aid (%)				
Living off-campus with family	60.0	41.3	46.5	48.2
Living off-campus not with family	33.3	56.5	50.0	43.3
Prices				
Cost of attendance for full-time undergrad, off-campus, in-state (current $)				
Tuition and required fees	4,584	3,265	3,635	2,799
Percent covered by WSG of $1,800 (%)	39.3	55.1	49.5	-
Books and supplies	860	1,154	1,071	1,152
Total cost with family	9,464	7,326	7,926	7,502
Total cost not with family	16,174	13,448	14,213	14,378
Average net price faced by federal aid recipients, selected ranges of family income (current $)				
Family income $0-30k	4,566	7,068	6,366	5,798
Percent covered by WSG of $1,800 (%)	39.4	25.5	28.3	-
Family income $30k-48k	6,586	8,355	7,858	6,891
Percent covered by WSG of $1,800 (%)	27.3	21.5	22.9	-
Outcomes				
First-time, full-time, degree/certificate-seeking undergraduates receiving financial aid (%)				
Retention to fall 2009	58.0	62.1	61.0	59.1
Completed a degree in 150% of normal time at initial institution	20.9	35.5	31.4	26.8
Transferred out by end of 2010-11^	37.9	21.8		19.7

^ For WTCS, transfer rates are only reported by colleges with university transfer in their mission.

Source: Integrated Postsecondary Education Data System (IPEDS).

Current dollars. Sample size for all public two-year colleges is roughly 1,000, but varies by row due to missing data, particularly in transfer rate because not all colleges report.

Study Sample

This study uses administrative data for multiple cohorts of students who entered the WSG randomization pool. Data from WTCS include all students in the WSG group as well as a representative sample of the control group, for the cohort entering in fall 2008, the first year the program operated.[6] Data from UW Colleges include all WSG students and all control students from cohorts entering in fall 2008 through 2012. In all there are 5,171 students, 1,265 of whom were offered the WSG. There is very little attrition.[7]

For all students in the sample, we observe baseline characteristics from the FAFSA, and for three semesters we observe enrollment, credits, and grades within their system (either UW Colleges or WTCS), as well as when students transfer to other institutions. We also report longer-term outcomes such as college degrees, for earlier cohorts of students whom we observe for six or more semesters. This smaller sample includes 3,153 students, 844 of whom were offered the WSG.

To describe the sample, we report baseline characteristics in Table 2. WSG's targeting to young adult students from low-income families is evident. The average student is 19 years old, and 86% of the sample is considered financially dependent on their parents for financial aid purposes (meaning they have not married, had children, or served in the military). Seven percent of dependent students have parents with zero income, and 41% of students themselves have zero income in the year before they start

6. The WTCS sample uses a stratified random sample by college with different sampling rates across colleges. We use post-stratification weights so that the analysis sample is representative of the randomization pool (Lohr, 2009). Standard errors are calculated by Taylor series linearization. Results do not differ substantially when estimated without weights, or when estimated with Huber-White robust standard errors.
7. Missing data either at baseline or for outcomes causes a 0.7% rate of attrition in the control group and 1.4% rate in the WSG group. In the longer-term outcome sample, the rates are 2.8% and 4.0%.

college. With generally low levels of income when positive ($32,500 among parents), this translates into 47% with the lowest possible EFC of $0, and an average EFC of $2,320 when positive. The vast majority (82%) of UW Colleges students are white, with 9% Asian, 4% Hispanic, 3% African American, and 1% Native American (race/ethnicity available in UW Colleges sample only, not shown in table).

Table 2 reports the results of estimating equation (1) above, conditioning only on the cohort, with each baseline characteristic as the outcome, as an assessment of whether randomization established equivalent groups on average. The WSG group appears to be slightly older, with a difference of 0.3 years, significant at the 10% level. This is difference is small in magnitude, and there are no other meaningful differences between the two groups. In the following section, we estimate equation (1) with these characteristics as covariates, to assess impacts on financial and educational choices.

Table 2. Baseline Equivalence of Student Characteristics Across WSG and Control Groups

Parameter	Control mean	WSG diff.		(SE)
Female (%)	58.4	-0.2		(1.7)
Age	19.2	0.3	*	(0.2)
Parent completed college (%)	39.5	-0.6		(1.7)
No parent with HS degree (%)	11.1	-0.1		(1.1)
Dependent for FAFSA (%)	85.8	-1.2		(1.4)
Among dependent students				
Parent AGI is zero (%)	7.0	0.3		(1.1)
Parent AGI if positive (current $)	32,479	1,013		(1070)
Student AGI is zero (%)	40.8	2.0		(1.6)
Student AGI if positive (current $)	7,479	-342		(474)
EFC is zero (%)	46.8	1.6		(1.7)
EFC if positive (current $)	2,320	283		(203)

* p<0.1 ** p<0.05 *** p<0.01
Source: UW Colleges and WTCS administrative records. N=5,171.
Estimates of differences include adjustment for cohorts, which served as randomization blocks.

Impacts of the Wisconsin Scholars Grant

Impacts on Financial Aid

Changing a student's financial aid package is the initial, proximal effect of the WSG. Table 3 documents these changes at UW Colleges (financial aid data were not available for the full WTCS sample). The full cost of attendance for a semester, as stated above, is roughly $7,000. Prior to administration of the WSG, students received an average of $3,326 in grants, leaving them with a net price of $3,835. To cover this, 47% of students borrowed, with an unconditional average of $939 in federal loans. Just nine percent of students receive work-study, and unconditional earnings are $37.

The average student offered the WSG received $643 in WSG aid during the first semester. This is an average of $900 per recipient and zero among the 19% of the group who are non-recipients. There was little displacement of existing aid, including loans, and so the average reduction in net price was $636, leaving the net price for the WSG group at $3,199.

Rates of receipt fell as time went on. Not all of the decrease can be explained by dropout or loss of Pell Grant eligibility, because the rate of receipt among full-time enrolled Pell recipients was still well below 100%. Over six semesters, the average UW Colleges student offered the WSG received $2,063 from the program out of a potential $5,400.[8] We return to the issue of non-receipt below.

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8. This measure may understate WSG receipt, because it does not capture cases of continued receipt of the grant after transferring to other public Wisconsin colleges and universities.

Table 3. Effect of the WSG Offer on First Semester Aid at UW Colleges

Parameter	Control mean	WSG diff.		(SE)
Aid disbursed first semester (current $)				
WSG	2	641	***	(14)
Other grants	3,326	-43		(49)
Net price (cost of attendance minus grants)	3,835	-636	***	(63)
Subsidized federal loan	734	-54	*	(31)
Unsubsidized federal loan	205	2		(18)
Federal work study	37	0		(6)
Total federal debt (among borrowers, longer-term sample)	5,611	-388		(287)

Longer-term receipt of WSG	All	Enrolled full-time with Pell
Receiving WSG at UW Colleges (%)		
Semester 1	80.6	81.2
Semester 2	72.3	85.1
Semester 3	42.2	78.2
Semester 4	37.3	80.7
Semester 5	11.4	66.0
Semester 6	6.4	64.1
Total WSG $ received	2,063	-

* p<0.1 ** p<0.05 *** p<0.01
Source: UW Colleges administrative records. N=3,949 for first semester aid, 397 for longer-term receipt among WSG group.
Estimates of differences include adjustment for cohorts, which served as randomization blocks.

Short-term Impacts

Retention rates for community college students are often low, and this sample was no exception: just 58% of students returned for a second year of college. The WSG aimed to change that, and Table 4 reports the results.

Table 4. Short-term Effects of the WSG Offer

Parameter	Control mean	Cohort effects only		Covariate-adjusted		
		WSG diff.	(SE)	WSG diff.		(SE)
Semester 1						
Credits attempted	13.80	-0.50	(0.09)	-0.02		(0.08)
Credits earned	10.70	0.09	(0.17)	0.09		(0.17)
GPA	2.30	0.04	(0.04)	0.02		(0.04)
Semester 2						
Enrolled (%)	85.9	1.4	(1.2)	1.4		(1.2)
Enrolled full-time (%)	75.8	1.9	(1.5)	3.1	**	(1.5)
Credits attempted	11.60	0.14	(0.18)	0.20		(0.19)
Credits earned	8.94	-0.08	(0.21)	-0.06		(0.21)
GPA (if enrolled)	2.27	-0.03	(0.04)	-0.06		(0.04)
Cumulative after first year						
Cumulative GPA above 2.0 (%)	64.9	0.02	(1.6)	-1.0		(1.6)
Semester 3						
Enrolled (%)	57.8	-0.2	(1.7)	-0.2		(1.7)
Enrolled full-time (%)	48.7	0.8	(1.7)	2.0		(1.7)

* p<0.1 ** p<0.05 *** p<0.01

Source: UW Colleges and WTCS administrative records. N=5,171.

All outcomes are measured within the system where initially enrolled (UW Colleges or WTCS).

Covariates include system, gender, mother's level of education, father's level of education, FAFSA independence, age at entry, and EFC.

A GPA of 2.0 is often used as a benchmark for Satisfactory Academic Progress, and 65% of students met that requirement. Eighteen percent of students who enrolled for a third semester had lower than a 2.0 GPA for the first year, meaning they may have had to appeal to keep their eligibility for federal and other grant aid (Schudde & Scott-Clayton, 2014).

The WSG effect on third semester enrollment is nearly zero, with a relatively tight confidence interval. Studies of financial aid often report the effect per $1,000 offered (Deming & Dynarski, 2010). Scaling the effect of the grant for comparability across

studies, a 95% confidence interval rules out impacts larger than 1.8 percentage points in likelihood of persistence per $1,000 in aid offered.

Longer-term impacts

Early stop-outs or switches to part-time enrollment are common at two-year colleges, and do not necessarily mean that a student will not earn a degree. However, the lack of robust impacts of the WSG on short-term outcomes suggests that downstream impacts are unlikely. Table 5 shows longer-term outcomes, using the smaller sample.

There is a marginally statistically significant increase in the number of full-time semesters enrolled. The control group enrolls for 2.85 out of a possible 6, while the WSG group enrolls for 0.13 more, an increase of 5%.

Two years after beginning college, just 20% of students had completed a degree, and 28% continued to enroll for a third year. The remainder had stopped out or dropped out. Students accumulated an average of 36 credits over nearly 3 full-time semesters, meaning the average student completed a full-time course load of 12 credits when enrolled.[9] With 95% confidence we can rule out impacts larger than 1.5 credits over three years, per $1,000 offered.

Thirty percent had obtained degrees within three years. There is no evidence of a positive impact of the WSG on degree completion. For the 1,688 students in the initial cohort we estimate impacts on five-year degree completion (not shown). Forty-one percent of students in the control group earned degrees during this time. The WSG

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9. Our measure of full-time semesters considers only fall and spring semesters. The measure of credit accumulation additionally includes summer terms at WTCS, where summer credits account for 10% of all credits. Summer credits are not observed at UW Colleges, but constitute less than 5% of overall credits earned there.

group had an estimated four percentage points higher rate of degree completion, but this diminished to one percentage point with covariates, and was not statistically significant.

Table 5. Longer-term Effects of the WSG Offer

Parameter	Control mean	Cohort effects only			Covariate-adjusted		
		WSG diff.		(SE)	WSG diff.		(SE)
Continued enrollment (%)							
Semester 2	86.7	1.4		(1.5)	1.3		(1.5)
Semester 3	59.0	-0.1		(2.1)	0.01		(2.2)
Semester 4	50.9	0.7		(2.2)	0.8		(2.2)
Semester 5	27.9	2.2		(2.0)	0.8		(2.0)
Semester 6	23.1	0.8		(1.9)	-0.8		(1.9)
Degree through 4 sem. (%)	19.6	1.2		(1.9)	-0.40		(1.9)
Through 6 semesters							
Semesters enrolled	3.47	0.05		(0.07)	0.02		(0.07)
Full-time semesters enrolled	2.85	0.07		(0.07)	0.13	*	(0.07)
Credits earned	36.31	0.62		(1.04)	0.62		(1.04)
Cumulative GPA	2.23	0.03		(0.05)	-0.004		(0.05)
Degree earned (%)	30.0	0.8		(2.1)	-1.0		(2.1)
Any transfer (%)	42.3	-6.5	***	(1.9)	-3.9	**	(2.0)
Transfer to University of Wisc. (%)	22.6	-3.6	***	(1.4)	-1.4		(1.4)
Transfer to two-year public (%)	6.5	-1.5		(1.2)	-2.5	**	(1.2)
Transfer to for-profit (%)	2.8	0.2		(0.8)	0.2		(0.8)

* p<0.1 ** p<0.05 *** p<0.01
Source: UW Colleges and WTCS administrative records. N=3,153.
All outcomes are measured within the system where initially enrolled (UW Colleges or WTCS).
Covariates include system, gender, mother's level of education, father's level of education, FAFSA independence, age at entry, and EFC.

Many students (42%) transferred at some point in their first three years after starting college. Most went to public universities in Wisconsin (23%), but 7% transferred

to another two-year public college and 3% transferred to a for-profit institution. Here the WSG has large and statistically significant effects. Unpacking the impacts, and focusing on the specifications with covariates included, the WSG group was 2.5 percentage points *less* likely to transfer laterally to another two-year public college. Most of this effect is localized in the first year, where the rate of transfer in the WSG group is less than half that in the control group. Bahr (2009) documents that lateral transfer of this variety is quite common. Since transfers can delay degree completion, reducing transfer is potentially a positive impact of the WSG.

Heterogeneous Impacts

Given generally null estimates for average treatment effects, statistically significant heterogeneity in impacts would have to come from offsetting positive and negative impacts. Negative impacts seem unlikely, if the aid program functioned as intended. Nonetheless we explore whether there are detectable differences in effects within the WSG-eligible population.

As noted earlier, EFC is the measure of financial need used by many financial aid programs. Since aid is targeted based on EFC, the effects of aid are often confounded with EFC. We take advantage of random assignment to estimate the impacts of the WSG at varying levels of EFC. Table 6 shows that an EFC of zero is highly predictive of outcomes, generally reducing rates of persistence and completion. The WSG appears to have offsetting effects on credit attainment for the two EFC groups, with a small decrease in credits estimated for positive-EFC students and a differential positive impact of 1.2 credits for zero-EFC students, significant at the 10% level. Similar results are obtained with a continuous measure of EFC. The generally

positive point estimates on the interaction term suggest that the WSG worked best for

students with higher levels of financial need as measured by the EFC.

We also explore differences in impacts across other baseline characteristics that

are associated with significant differences in college outcomes. The type of institution

(transfer/liberal arts or career/technical), gender, and first-generation college student

status. We generally do not find heterogeneous treatment effects on these

characteristics (results available by request).

Table 6. Heterogeneous Effects of the WSG Offer by EFC

Parameter	Effect of EFC zero		(SE)	Effect of WSG for EFC pos.	(SE)	Differential effect for EFC zero	(SE)
Short-term effects							
Enrolled in sem. 3 (%)	-4.9	***	(1.8)	-0.6	(2.3)	1.2	(3.4)
Credits earned in first year	-2.30	***	(0.38)	-0.56	(0.50)	1.19 *	(0.71)
Longer-term effects							
Semesters enrolled	-0.15	*	(0.08)	0.02	(0.09)	-0.01	(0.14)
Full-time semesters enrolled	-0.12	*	(0.07)	0.12	(0.09)	0.03	(0.13)
Credits earned	-4.24	***	(1.11)	0.21	(1.45)	0.97	(2.02)
Degree earned (%)	-9.0	***	(2.2)	-0.7	(2.8)	3.4	(4.0)
Cumulative GPA	-0.25	***	(0.05)	-0.05	(0.06)	0.10	(0.09)
Any transfer (%)	-1.9		(2.2)	-4.9 *	(2.6)	2.0	(3.7)

* p<0.1 ** p<0.05 *** p<0.01

Source: UW Colleges and WTCS administrative records. N=5,171 for short-term, 3,153 for longer-term.

All outcomes are measured within the system where initially enrolled (UW Colleges or WTCS).

All regressions include cohort effects and covariates. Covariates include system, gender, mother's level of education, father's level of education, FAFSA independence, and age at entry.

Implementation and Take-up

As discussed above, many students did not comply with the initial eligibility requirement and therefore didn't receive the grant offered to them. One reason is that the initial criteria to enter the randomization pool were mismeasured. This was only a problem for the initial cohort at WTCS. We created an index predicting eligibility (based on the sample criteria described above), and found that 37% of students initially placed in the WSG group and offered the grant did not meet the eligibility criteria. Just 32% of those students received the grant, while 78% of the other selected students received the grant. We do not observe the actual process of eligibility verification, but our predicted eligibility measure is strongly predictive of receipt among the WSG group, and is also observable within the control group.[10]

We estimate equation (2), defining X_i as predicted eligibility, to assess the differential effects of a WSG offer that went unfulfilled. Table 7 reports the results of this analysis.

Offering the WSG to apparently ineligible students (most of whom never received it) appears to have had a statistically significant and large negative impact on their odds of returning for a second year of college, reducing it by ten percentage points. The estimated impact is robust to the inclusion of covariates in the model. This reduction in persistence shows up in negative point estimates for longer-term effects, but the magnitudes are smaller and standard errors are larger.

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10. An example of the inaccuracy in this process is that the EFC or personal information can change during the federal verification process, or through updating of information submitted via the FAFSA. Full-time status can also shift. The administrative data contain the final value, while WSG initial eligibility and verification could have been based on earlier values.

Table 7. Heterogeneous Effects of the WSG Offer by Predicted Eligibility, WTCS Fall 2008 Cohort

Parameter	Effect of predicted elig.	(SE)	Effect of WSG for inelig.		(SE)	Differential effect for elig.		(SE)
Short-term effects								
Enrolled in sem. 3 (%)	-7.3	(4.9)	-10.3	**	(4.7)	14.7	**	(6.2)
Credits earned in first year	2.92 ***	(1.08)	0.22		(1.03)	-0.24		(1.35)
Longer-term effects								
Semesters enrolled	-0.25	(0.17)	-0.29	*	(0.16)	0.44	**	(0.22)
Full-time semesters enrolled	0.35 **	(0.16)	0.04		(0.15)	0.22		(0.20)
Credits earned	3.59	(2.27)	-2.18		(2.05)	4.28		(2.92)
Degree earned (%)	-2.8	(4.9)	-1.2		(4.6)	2.9		(6.1)
Cumulative GPA	0.17	(0.11)	-0.05		(0.11)	0.04		(0.14)
Any transfer (%)	-1.3	(4.7)	-1.4		(4.2)	-9.6	*	(5.4)

* p<0.1 ** p<0.05 *** p<0.01

Source: WTCS administrative records. N=1,222 for short-term, 1,163 for longer-term.

All outcomes are measured within WTCS.

All regressions include cohort effects and covariates. Covariates include gender, mother's level of education, father's level of education, FAFSA independence, age at entry, and EFC.

Table 8. Instrumental Variables Treatment-on-the-treated Effects of WSG Receipt at UW Colleges

Parameter	WSG receipt (IV second stage)	(SE)
Short-term effects		
Enrolled in sem. 3 (%)	0.7	(2.7)
Credits earned in first year	-0.20	(0.52)
Longer-term effects		
Semesters enrolled	0.09	(0.10)
Full-time semesters enrolled	0.08	(0.10)
Credits earned	0.96	(1.60)
Degree earned (%)	-4.3	(2.8)
Cumulative GPA	0.01	(0.07)
Any transfer (%)	1.6	(3.4)

* $p<0.1$ ** $p<0.05$ *** $p<0.01$
Source: UW Colleges administrative records. N=3,949 for short-term, 1,990 for longer-term.
All outcomes are measured within UW Colleges.
WSG selection is used as an instrument for an indicator of initial WSG receipt.
All regressions include cohort effects and covariates. Covariates include gender, mother's level of education, father's level of education, FAFSA independence, age at entry, and EFC.

In the UW Colleges sample, measured ineligibility is far less common, only occurring in less than 2% of cases. However there is still some initial non-receipt of WSG, as shown in Table 3. For this sample we estimate an instrumental variables analysis as described above in equations (3) and (4), with selection into the WSG group as an instrument for receipt of WSG (a binary indicator of initial receipt). Table 8 reports the results.

This analysis is too imprecise to allow us to draw the conclusion that the WSG had a positive impact, even when focusing on students who received funds. Here we

cannot directly identify at baseline which control group students would be likely to receive WSG if offered. Still, the estimates here represent the local average treatment effect for that group, under the assumption that the WSG offer increases receipt of grant aid, and only affects outcomes through the receipt of grant aid. Because the analysis in WTCS calls this assumption into question, these results may not represent the local average treatment effect.

Conclusion

This study evaluated the impacts of a private grant that was offered by random assignment to students with financial need, who were already enrolled at community colleges. The grant's requirements and implementation meant that many of its intended recipients did not receive it or retain it over time. Still, students offered the grant received an average of just over $2,000 in additional support during the next three years. This does not appear to have improved their odds of persisting in college or completing degrees. There is some suggestive evidence that students in the WSG group were more likely to stay enrolled full time at their initial institution, and among students with the greatest financial need at baseline, the WSG group may have earned additional credits.

The study is not without its limitations. The sample is specific to students following a traditional pathway from high school to full-time enrollment in college, and thus may not generalize to older or part-time students. The sample came from Wisconsin, during the aftermath of the Great Recession, which again may not generalize to America's students today. We do not observe all aspects of student life,

and hence do not estimate effects on consumption, leisure, health, and well-being while enrolled in college. We also cannot follow students beyond initial transfers out of their starting institution, or in some cases beyond a few semesters after beginning college. The effects of the WSG are unlikely to manifest in later years and at other institutions, since they appear to be so weak in earlier years at the colleges where the WSG operates. But our approach still underestimates overall educational attainment in this population where transfers and stop-outs are common.

Still, this study of aid after enrollment adds to our knowledge about the effects of college prices on persistence, as distinct from effects on enrollment. Unexpected changes in net prices, like the one provided by WSG, commonly occur when federal, state, and private sources shift their budgets and policies.

Our findings are generally consistent with prior work. Small impacts on already enrolled students are consistent with smaller intensive margin effects of other social programs, such as the impact of the Earned Income Tax Credit on labor supply (Meyer, 2002). This study also adds to the growing body of evidence showing that aid delivered through the FAFSA system adds complexity that may offset some of its benefit. Finally, the small impacts of this grant are consistent with recent theory and evidence supporting community college students' need for more than just additional grant aid.

One unanswered research question highlighted by our findings is the relative importance of price reduction and student support within the same environment. This study and studies of state and federal aid suggest that money alone may have little to no impact. Meanwhile studies of comprehensive programs that both lower the price of college and provide support services show substantial impacts. To our knowledge, no

existing study unpacks the effects of aid, supports, and their interaction. One possible experiment would be a factorial design that randomly assigns financial aid and student supports separately. Fixing the scope and budget of the program, the factorial design would lose statistical power relative to pairing aid and supports for all treated students. However it could be appealing to provide at least one of the treatments to more members of the eligible population.

One low-cost form of support that can be paired with financial aid, is simply to deliver information about the aid. In the case of the WSG, students did not appear to know that they received it. Goldrick-Rab (2012) argues that making financial aid salient could increase its impact. This could be tested by randomly assigning a clear, behaviorally informed letter or other message, among students served by an existing aid program such as the Pell Grant.

Another unanswered research question with respect to changes in college prices after enrollment is whether the effects of gains and losses are parallel. Enrolled students may view their first-year expenses as a reference point, and be more adversely impacted by an increase in prices than helped by a decrease in prices (Kahneman, Knetsch, & Thaler, 1991). Carruthers & Özek (2016) estimate that losing $2,000 of merit aid decreased persistence rates by 9 percentage points at community colleges in Tennessee. Losing need-based aid may be less salient however, and could be offset by increased financial resources that caused the loss of aid.

Testing the impacts of WSG is especially informative for policymaking by states and private foundations that do not have the ability to change pricing directly, have secondhand access to eligibility criteria and financial aid packaging, and can only

provide small price adjustments relative to overall student costs. The experience of the WSG has makes clear that it can be surprisingly hard to give away money and have it make an impact.

Whenever possible, designers of aid programs should weigh the desire to target a specific population against the difficulty of identifying that population, and its stability over time. Of course, helping a coherent target population requires setting initial criteria. But if these eligibility criteria are mismeasured, program designers can choose to still offer grants to chosen students who are later found to be ineligible. Program designers can also choose to impose few to no requirements for continuing receipt. The Wisconsin HOPE Lab is evaluating a new grant program which is randomly assigned among lower-income students with demonstrated interest in STEM (Science, Technology, Engineering, and Mathematics), but does not require students to maintain either the financial or academic qualities that make them initially eligible (Goldrick-Rab & Roksa, 2013).

Creativity in delivering aid, and in researching its impacts, are vital to informing the most efficient use of the billions of public and private dollars devoted to lowering the price of college.

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