Washington State Institute for Public Policy

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The Effectiveness of Washington's State Need Grant Program: Final Evaluation Report

The 2012 Washington State Legislature directed the Washington State Institute for Public Policy (WSIPP) to conduct a comprehensive study of the State Need Grant (SNG) program. The SNG provides tuition assistance to resident undergraduate students in Washington State. Students from low-income families—under 50% of state median family income (MFI)—receive a full grant. Partial grants are awarded to students with family incomes at or below 70% MFI.

The legislation calls for WSIPP to:

> "determine to what extent this program has increased access and degree attainment for low-income students and . . . whether the funding for the state need grant has been utilized in the most efficient way possible."[1]

A previous report completed by WSIPP details SNG program rules, expenditures, and characteristics of eligible students.[2] This report covers the impact of the program on a range of outcomes and includes the following sections:

Summary

Washington's State Need Grant (SNG) program provides tuition assistance to low-income undergraduate students attending higher education institutions in the state. In the past ten years, state SNG expenditures more than doubled from $136 million in 2003 to $303 million in 2012. Last year (2012-13), about 74,000 students received an SNG (among 106,000 eligible students).

This report assesses the effectiveness of the SNG program in improving enrollment and degree completion outcomes. We find that for students with the lowest family incomes, receipt of State Need Grants is associated with higher re-enrollment and completion rates. Specifically, a 25% change in the SNG award amount would result in a 2 to 4 percentage point change in student re-enrollment and a 4 to 8 percentage point change in completion rates for the lowest income students.

The State Need Grant represents just one of several sources of financial aid that undergraduate students may receive. We examine the interactions between the SNG and other sources of aid and the relationship between overall aid and the student's cost of attendance. SNG award amounts are based on a student's family size and family income level. This report looks at how alternative awarding strategies may impact the number of students receiving a grant and the average value of those awards.

Suggested citation: Bania, N., Burley, M., & Pennucci, A. (2013). *The effectiveness of the state need grant program: Final evaluation.* (Doc. No. 14-01-2301). Olympia: Washington State Institute for Public Policy.

[1] Third Engrossed Substitute House Bill 2127, Laws of 2012.

[2] Burley, M. & Lemon, M. (2012). *State need grant: Student profiles and outcomes* (Doc. No. 12-12-2201). Olympia: Washington State Institute for Public Policy.

I. Program Background

Washington's State Need Grant (SNG) program was established in 1969. The grant provides need-based financial aid to eligible students attending public and private institutions of higher learning in the state. Resident undergraduate students with low family incomes (under 70% MFI and below) are eligible for full or partial tuition assistance under this program. The highest need students at public colleges and universities may receive a grant nearly equal to the full cost of tuition and fees. SNG students at private institutions currently receive a grant for up to $8,500 towards tuition expenses (Exhibit 1).

The SNG program serves students at career schools, community and technical colleges, and four-year degree granting (baccalaureate) institutions. Students enrolled part- and full-time in these institutions may be eligible for an SNG award. In 2011, the average amount of the State Need Grant was the highest per-student grant in the nation.[3]

In 2012, the legislature asked WSIPP to conduct an evaluation on the effectiveness of the SNG (see sidebar) for the following outcomes:

- Enrollment rates
- Academic performance
- Degree or certificate completion

In addition, the evaluation was intended to examine the efficient targeting of SNG funds and the success of different student groups. This report outlines important trends in program enrollment and expenditures, summarizes student enrollment and completion rates, and assesses the role of State Need Grant dollars on those outcomes.

State Need Grant Evaluation—Legislative Direction

The purpose of this study is to determine to what extent this program has increased access and degree attainment for low-income students and to determine whether the funding for the state need grant has been utilized in the most efficient way possible to maximize the enrollment and degree attainment of low-income students. This study shall include, but not be limited to, a review of the following:

- *the demographics of recipients of the state need grant program, including, but not limited to, gender, race, and income;*
- *the effect of the state need grant on enrollment rates of low-income students at the different institutions of higher education and whether these students attend full-time or part-time;*
- *the effect of the state need grant on recipients' persistence, performance, degree or certificate completion, and time to degree or certificate completion at the different institutions of higher education;*
- *an inventory of the types of degrees and certifications at the different institutions of higher education, by field of study, obtained by recipients; and*
- *the interplay of the state need grant program with other forms of financial aid and the effect of this interplay on access and degree attainment of low-income students.*

The reports shall include recommendations for using more efficiently the funds provided to the state need grant program to increase access and degree attainment of low-income students. To the maximum extent possible, this report shall disaggregate the demographic and institution specific data in a manner that will inform policymakers of the enrollment patterns and success of specific subsets of recipients within the different institutions of higher education.

Third Engrossed Substitute House Bill 2127, Laws of 2012.

[3] Averaged across all undergraduate full-time equivalent (FTE) students (including non-recipients), the average SNG was $1,077 in 2011. National Association of State Student Grant and Aid Programs. (2013). *43rd Annual Survey Report on State-Sponsored Student Financial Aid 2011-2012 Academic Year.* p 21. Retrieved from http://www.nassgap.org/

Exhibit 1

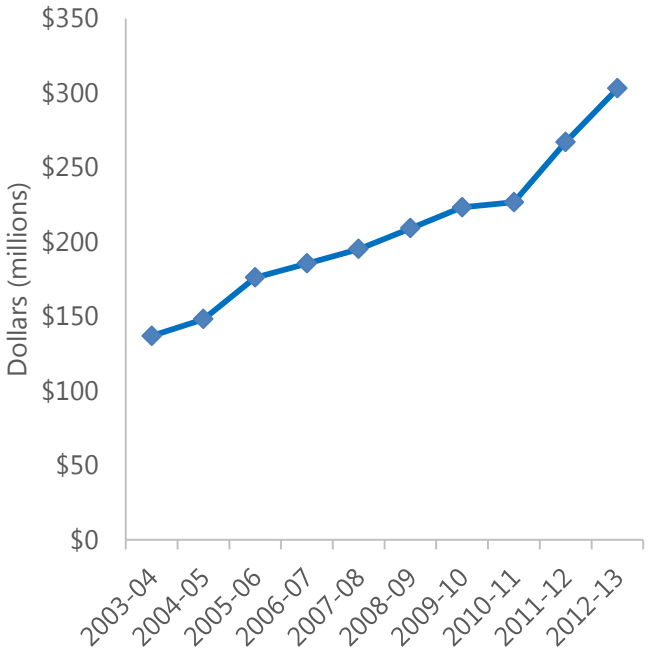
Maximum SNG Awards by Sector (2013-14)

Sector	Maximum award
Public research University of Washington Washington State University	 $10,868 $10,868
Public regional Western Washington University Central Washington University The Evergreen State College Eastern Washington University	 $7,882 $7,631 $7,611 $7,196
Public community and technical colleges	$3,696
Private four-year	$8,517
Two-year proprietary (career) colleges*	$1,412-$2,118

*Awards vary at proprietary colleges by accreditation

Exhibit 2

State Need Grant—Total Expenditures (2003-2012)



*inflation adjusted (2012) dollars

Last year (2012-13), nearly 74,000 students in Washington State received an SNG award. Total state expenditures for the SNG program exceeded $303 million in 2012, more than double the amount spent on the program in 2003 (Exhibit 2). This increase was attributable to an increased number of students attending college in Washington and to the rising cost of tuition during this period.[4]

Prior to 2009, state appropriations for the SNG program were generally sufficient to provide grant funding to most eligible students who applied for financial aid. In recent years, however, the number of students eligible for the SNG has exceeded available funding. As Exhibit 3 shows, during the last four years, between 20,000 and 30,000 students were eligible to receive a State Need Grant but did not receive an award due to funding limitations.

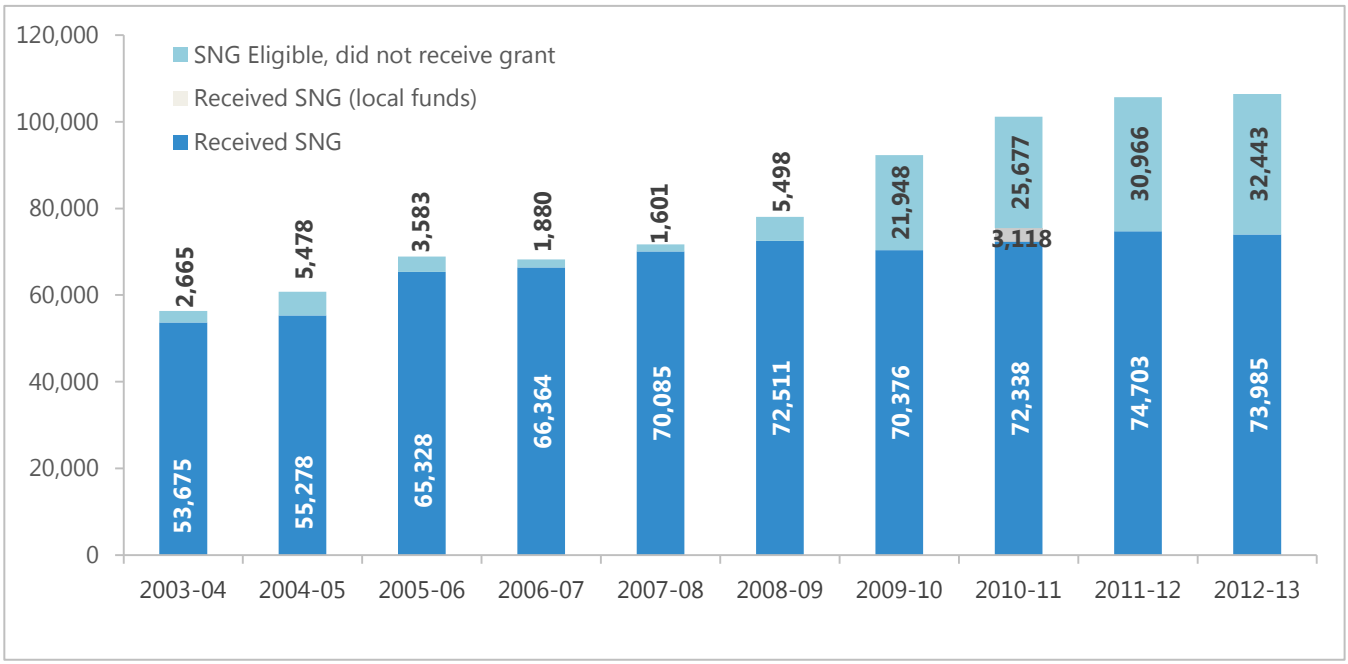
For this evaluation, we decided we could not compare outcomes for these "unserved" students for three reasons:

1) Our analysis includes outcomes in which we follow students for up to six years. Since there were only a sizable number of unserved students in recent years, we could not assess certain outcomes (such as degree completion) for this group.
2) About 40% of unserved students in a given year receive an SNG award in the following academic year. This subsequent grant receipt makes it difficult to distinguish these students as a true comparison group (without any state assistance).
3) Results may be biased since unserved students had a different profile—with higher average incomes and a greater likelihood of enrolling part-time at entry.

[4] See Burley & Lemon, (2012).

Exhibit 3

Washington State Need Grant Eligible Students Who Did/Did Not Receive a Grant



*Note: the "received SNG (local funds)" was a legislative directive to the public institutions only and not all participating SNG institutions.

The State Need Grant represents one of several sources of college financial aid that a student may receive. The main types of financial aid include:

- Federal grants—provided primarily through the Pell program (need-based);
- Institutional grants and loans—from institutional foundations, endowments, and other sources—may be awarded by need, merit, or other criteria; and
- Federally backed education loans—may include subsidized or unsubsidized loans administered by the U.S. Department of Education.

The primary challenge of this evaluation involves determining the unique effect of state grants given that a student receives financial assistance from many different sources.

Our evaluation approach—a "regression discontinuity" analysis—relies on changes in SNG eligibility rules to isolate the impact of these grant dollars. We also examine the interplay between the State Need Grant program and other sources of aid.

Section II of this report provides a summary of data sources and enrollment and completion rates. The evaluation results are presented in Section III; the methodology is detailed in the Technical Appendix. Section IV examines the various sources of financial aid received by SNG students in more detail.

II. Enrollment and Completion Rates

In this section, we provide an overview of several higher education student outcomes, including:

- enrollment persistence,
- academic progress, and
- degree/certificate completion.

Study Data and Participating Institutions

The data used for our summary of enrollment and completion rates (Section II) and study of program impacts (Section III) come from participating SNG colleges and universities. We received permission from all 40 public higher education institutions and 17 of the 28 private colleges and universities to utilize student records for this report.

Total student counts and average awards for participating institutions are listed in Exhibit 4 (2011-12). SNG recipients in this study are distributed by the following institutional sectors:

- 66%—public community and technical colleges (CTC)
- 28%—public baccalaureate colleges and universities
- 5%—private baccalaureate colleges and universities[5]
- 1%—private career colleges[6]

The Washington Student Achievement Council (WSAC) oversees the State Need Grant program, distributes allocated funds to eligible institutions, and maintains data on need-based financial aid.

To track student outcomes, financial aid information was matched to enrollment records for SNG eligible students in both public and private institutions. Staff at the Washington State Education Research and Data Center (ERDC) matched the records and provided WSIPP researchers with a de-identified research dataset to complete this analysis.[7] We analyzed enrollment and financial aid activity of SNG students over eight years (2004-05 to 2011-12).

Acknowledgments

This evaluation is based on the most comprehensive integration of higher education data ever conducted in the state of Washington. The following organizations and agencies were instrumental in this evaluation effort.

We received all need-based financial aid records (loans and grants) for the study cohort from the Unit Record Report (URR). The URR and other financial aid files are maintained by the Washington Student Achievement Council (WSAC).

Available financial aid files do not include complete information on student enrollment, academic progress (credits), and degree completion in higher education necessary to assess program outcomes. Records for Washington public higher education students are accessible through the Education Research and Data Center (ERDC) warehouse, but the private college and career school data had to be requested separately.

The Council of Presidents (representing the public baccalaureate institutions) and the State Board for Community and Technical Colleges (SBCTC) (representing the CTCs) both agreed to share data through ERDC for this study.

Information from Washington's private colleges and universities is not available through ERDC. Therefore, we worked with two associations representing many of these private colleges and universities in this state, the Independent Colleges of Washington (ICW) and The Northwest Career College Federation, to develop necessary agreements for the purpose of sharing data solely for the purpose of this study.

Creating this research dataset involved substantial time and effort. For the sake of future research efforts, we outlined some of the difficulties encountered in this process in Technical Appendix D.

[5] Based on private baccalaureate institutions participating in this study (Exhibit 4).

[6] Students at private career colleges represent about 3% of all SNG recipients, but we were unable to obtain enrollment information for all participating career colleges.

[7] The ERDC was established in 2007 to "facilitate analyses, provide meaningful reports, collaborate on education research, and share data." (www.erdc.wa.gov).

Exhibit 4

State Need Grant Students and Average Awards by Sector and Institution (2011-12)

Sector	Institution name	SNG recipients	Average grant award	Most common grant award
Research	University of Washington	7,080	$7,883	$9,280
	Washington State University	4,707	$7,075	$9,280
	Total	**11,787**		
Regional	Central Washington University	2,642	$5,043	$6,629
	Eastern Washington University	2,513	$5,553	$6,444
	The Evergreen State College	1,403	$5,620	$6,629
	Western Washington University	1,918	$6,008	$6,751
	Total	**8,476**		
Independent/private four-year	Antioch University	79	$4,845	$5,476
	Bastyr University			
	Cornish Institute	96	$7,606	$8,214
	DigiPen Institute of Technology			
	Gonzaga University	383	$6,921	$8,214
	Heritage University	545	$6,404	$8,214
	Northwest University - Kirkland			
	Northwest College of Art - Poulsbo			
	Pacific Lutheran University	633	$5,993	$8,214
	Saint Martin's University	290	$6,827	$8,214
	Seattle Pacific University	426	$7,457	$8,214
	Seattle University	540	$6,677	$8,214
	University of Puget Sound	101	$7,827	$8,214
	Walla Walla University	110	$7,169	$8,214
	Whitman College	63	$7,834	$8,214
	Whitworth University	420	$6,430	$8,214
	Total	**3,686**		
Community college	Bellevue College	1,466	$1,891	$1,085
	Big Bend Community College	1,020	$1,937	$3,256
	Cascadia Community College	443	$1,912	$3,255
	Centralia College	1,025	$1,957	$3,256
	Clark College	3,861	$1,963	$3,255
	Columbia Basin College	1,273	$2,261	$3,256
	Edmonds Community College	2,105	$2,085	$3,256
	Everett Community College	1,146	$2,234	$3,256
	Grays Harbor College	965	$1,990	$3,255
	Green River Community College	1,944	$1,709	$817
	Highline Community College	2,043	$1,914	$3,256
	Lower Columbia College	1,425	$2,195	$3,256
	North Seattle Community College	816	$1,971	$3,256
	Olympic College	1,444	$2,174	$1,085

Sector	Institution name	SNG recipients	Average grant award	Most common grant award
Community college (cont.)	Peninsula College	708	$2,152	$3,256
	Pierce College	1,918	$2,073	$3,256
	Seattle Central Community College	1,610	$2,057	$3,256
	Shoreline Community College	1,108	$2,039	$3,256
	Skagit Valley College	1,400	$1,799	$3,256
	South Puget Sound Community College	1,687	$1,593	$1,085
	South Seattle Community College	691	$2,389	$3,256
	Spokane Community College	2,783	$2,413	$3,256
	Spokane Falls Community College	2,198	$2,321	$3,256
	Tacoma Community College	2,076	$2,268	$3,256
	Walla Walla Community College	839	$2,390	$3,256
	Wenatchee Valley College	1,118	$2,384	$3,256
	Whatcom Community College	1,533	$1,752	$3,256
	Yakima Valley College	1,893	$2,170	$3,256
Technical colleges	Bates Technical College	425	$2,211	$3,256
	Bellingham Technical College	1,166	$2,076	$3,256
	Clover Park Technical College	1,765	$2,045	$3,256
	Lake Washington Technical College	951	$2,236	$3,256
	Renton Technical College	729	$2,001	$3,256
	Seattle Vocational Institute	180	$2,191	$3,256
Total (Community and Technical)		**47,754**		
Private career and private college	Art Institute of Seattle	563	$1,519	$1,356
	Divers Institute of Technology	32	$863	$905
	Everest College			
	Gene Juarez Academy	322	$1,522	$905
	Glen Dow Academy			
	Interface College	113	$1,166	$678
	International Air & Hospitality Academy	136	$893	$1,044
	ITT Technical Institute			
	Lucas Marc Academy			
	Northwest Indian College	93	$2,094	$3,255
	Perry Technical Institute			
	Total	**1,259**		
Total		**72,962**		

*__Note__: Students may be included in multiple colleges, so total awards exceed unduplicated student count (72,456).
Italicized institutions did not provide student records for this evaluation.

Persistence and Completion Rates by Higher Education Sector

The student populations and academic programs within each of Washington's higher education sectors vary considerably. Thus, we track outcomes separately for CTC students and students enrolled in baccalaureate institutions. A summary of enrollment, progress, and completion rates follows; a more detailed exposition of these outcomes is provided in Technical Appendix A.

Public Community & Technical College Students

The CTC sector differs in many ways from the public and private baccalaureate institutions.[8] In particular, the educational goals of CTC students vary widely and are often quite distinct from baccalaureate students. For example, 55% of entering students from the CTC sector enrolled in academic degree programs while others enrolled in workforce programs (including training for the trades, health professions, business, and other occupations).

Also, unlike most college freshmen at baccalaureate institutions, many CTC students do not enroll immediately following high school graduation. In the cohort of CTC students analyzed here, more than half (52%) of the students entered college two years or more after graduating from high school. Generally, CTC students are older (36% are age 24 or older) and more likely to be financially independent (47%) than baccalaureate students.[9] Among CTC students who begin college on a full-time basis, over half enroll on a part-time basis for at least one term.

CTC Outcome Measures. Our evaluation findings that account for these observed differences are outlined in Section III. Prior to conducting the statistical analysis on the impact of the SNG program, we completed a descriptive summary on the educational outcomes of SNG recipients:

- Enrollment persistence was quite similar for both workforce and academic CTC students. Among first-time students entering college in fall term 2010, 82% re-enrolled during spring term 2011 and just over 60% re-enrolled in fall 2011.[10]
- Workforce and academic CTC students made similar academic progress during their first academic year: about 60% of both groups entering in fall 2010 completed a full-time course load during academic year 2010-11; another 25% completed at least half of a full-course load.[11]
- Some of the coursework during the first year was remedial—approximately three-fifths of CTC students in the academic track and two-fifths in workforce training enrolled in one or more remedial courses during their first year.
- Approximately one-third of CTC workforce students completed awards within a four-year period. In the same time period, nearly 30% of academic-track CTC students completed a two-year degree and half of those students transferred to a four-year institution. Although they did not earn a two-year degree, another 10% either transferred or had sufficient academic preparation to transfer to a four-year college.

[8] This analysis excludes students enrolled in a variety of programs at private career schools and two-year colleges. These programs range from short-term certification programs lasting a few weeks to a more traditional two-year associate degree programs. More detail about the colleges is provided in Technical Appendix A.

[9] Financial independence is indicated by tax filing status as reported on students Free Application for Federal Student Aid (FAFSA) form.

[10] Once enrolled, we track all student outcomes across all Washington State higher education institutions. For example, if a student initially enrolled at the University of Washington in fall 2010, we track that student's enrollment in spring and fall 2011 regardless of whether they continue to be enrolled at the University of Washington. Because of data limitations, however, we are unable to track students if they enroll out of state.

[11] We define a full-time course load as at least 36 credit hours on the quarter system and 24 credit hours on the semester system.

- The most common degrees earned for CTC students included an Associate in Arts for academic-track students and trade-related or health care certificates for workforce students.

Public and Private Baccalaureate Students

Students entering four-year degree-granting institutions are usually recent high school graduates. Among those who received an SNG award and enrolled full-time at a baccalaureate institution in fall 2006, 91% were age 19 or younger and 90% were financially dependent on their families. Nearly all (96%) of those entering four-year institutions initially enrolled as full-time students; however, a substantial portion (41%) of these students enrolled part-time in at least one term during their course of study.

Baccalaureate Outcome Measures. Below, we summarize relevant outcome measures separately for public research universities, public regional colleges and universities, and private baccalaureate institutions. As mentioned previously, this summary provides descriptive information about the progress of SNG recipients—an assessment of the program impact is outlined in Section III.

- Among first-time students entering four-year institutions in fall term 2010, most (94 to 98%) re-enrolled in the following spring term and again in the 2011 fall term (84 to 92%).
- The proportion of full-time students completing a full year of coursework in their first academic year varied by sector among the baccalaureates: about 90% in the public research sector, 80% in the private non-profit sector, and 67% among public regional colleges and universities.[12]
- Between 60% and 65% of students who enrolled in private institutions or public research universities in fall 2006 successfully completed a four-year degree within six academic years. The rate for public regional colleges and institutions was 47%.
- Among those who earned degrees, the average time to completion across all three baccalaureate sectors was 4.5 years. About two-thirds (64%) of graduates who started at private colleges and universities, 42% of graduates who started at public regional universities, and half of graduates who started at research universities finished a degree within four years.

[12] Full-time undergraduate students would need to complete 15 credits per quarter (excluding summer) in order to graduate within four years of starting college.

III. Evaluation Results

As noted, the 2012 Legislature asked WSIPP to conduct an evaluation on the effectiveness of the SNG (see sidebar) for the following outcomes:

- Enrollment rates
- Academic performance
- Degree or certificate completion

A number of factors may influence the academic performance of students assisted by the SNG. These factors include a student's age, financial circumstances, other financial aid received (in addition to the SNG), family composition, and educational background.[13]

Our analysis examines how SNG funding influences outcomes after considering all of these known variables. These results, estimated with a statistical modeling technique known as regression discontinuity (see sidebar), constitute the core findings from this evaluation regarding how SNG funding impacts student outcomes. Technical Appendix B includes a more detailed explanation of the methodology and results.

During the study period (2005-2012), there were slight changes in the formula used for determining SNG award amounts. For purposes of illustrating our analytical approach, we show the formula that includes three income cut-offs (Exhibit 5). In all cases, students with family incomes at or below 50% of the state's median family income (MFI) receive a full SNG award (see page 3). In 2012, this income cutoff for a family of four in Washington State was $41,000. As income increases, students receive a percentage of the full award. At 70% MFI and below, students receive half of the maximum SNG award. Above this income level ($57,500 for a family of four), students are ineligible and would not receive a grant.[14]

Evaluating Impacts Using a "Regression Discontinuity" Design

For this evaluation, we estimate the effectiveness of the SNG program using an approach called "regression discontinuity."[#] The regression discontinuity (RD) method includes two features:

- First, *regression* permits an analysis of the relative importance of several variables (such as student characteristics and other financial aid) on the outcome of interest (i.e. college persistence and completion).
- Second, the *discontinuity* provides a way to reliably isolate the impact of grant funding separate from any other aid in a student's financial aid package. This feature is particularly important given the array of different loans, grants and scholarships that a student may receive from various sources.

RD studies identify "treatment" and "control" groups based on eligibility cutoffs. If there are no systematic differences between students just below and above the cutoff, this research approach can closely approximate an experimental design and provide reliable estimates of program effects.

The SNG program is particularly suited to this type of analysis. SNG students with family incomes under 50% MFI receive the maximum grant amount—the "treatment." Above this income level, the grant amount is pro-rated—for example, students with incomes between 65 and 70% MFI qualify for half of the maximum grant, and students with incomes above 70% MFI are ineligible for any grant. Thus, we can compare outcomes for students just above and below each of these thresholds, knowing that they are likely to be otherwise quite similar to one another.

[#] *Econometric Analysis of Cross Section and Panel Data*. (2008). Cambridge, Mass: MIT Press Ltd. P. 954-959.

[13] Our previous December 2012 report shows student profiles by these (and other) characteristics.

[14] Third Engrossed Substitute House Bill 2127, Laws of 2012; The 70% MFI limit was set in 2007, in prior years, this limit ranged between 55% (2001) and 65% (2005).

Exhibit 5

Historic State Need Grant Income Cutoffs
(2007-2009 Academic Years)

MFI range	Upper income limits (family of 4)	Percent of SNG award
0-50%	$41,000	100%
51-65%	$53,000	75%
66-70%	$57,500	50%
71%+		ineligible

Note: The above income categories for the prorated SNG award were changed in 2009. A similar phase out schedule was maintained, but the number of income categories increased from three to five (see Technical Appendix, Exhibit B2 for historical schedule).

This regression discontinuity analysis examines outcomes for students at two critical thresholds—the first threshold represents a "full to partial" grant adjustment where the maximum SNG award is cut by 25% when student income exceeds 50% MFI. The second threshold is associated with a complete phase-out of the SNG award (above 70% MFI).[15]

The *treatment* in this case is the reduction of the SNG at each of these thresholds. We compare students just above and below MFI cut-offs to see whether SNG dollar reductions impact student academic progress.

Public Baccalaureate Results[16]

Our findings for public four-year degree granting institutions suggest that a partial (25%) reduction in the maximum SNG award (approximately $2,000 for baccalaureate students) is associated with decreases in student persistence and graduation rates. Among those entering public four-year institutions for the first time, a 25% grant reduction is associated with a 2.2 percentage point decrease in re-enrollment the following fall and a 8.3 percentage point reduction in six-year graduation rates (see Exhibit 6).

The magnitude of this impact can be illustrated with a hypothetical example. In 2011, 17,171 freshman, sophomores, and juniors enrolled in public four-year universities and colleges and received SNG awards. If each of these students had experienced a 25% reduction in their SNG award amount in that year, we would expect that approximately ***378 fewer*** of these students would have reenrolled in college in fall 2012. In 2006, 5,289 students with an SNG award began attending public baccalaureate schools for the first time. Based on our estimates, if their SNG grant award was reduced by 25%, we would expect ***439 fewer*** graduates in this cohort (within six years).

CTC Results

Again, examining students whose family incomes place them just above and below the 50% MFI threshold, we find similar results for students admitted to community and technical colleges during fall term. The 25% reduction in the SNG is associated with a decline in re-enrollment rates of 3.8 percentage points the following fall, and a 4.6 percentage point reduction in these students' three-year graduation rate.

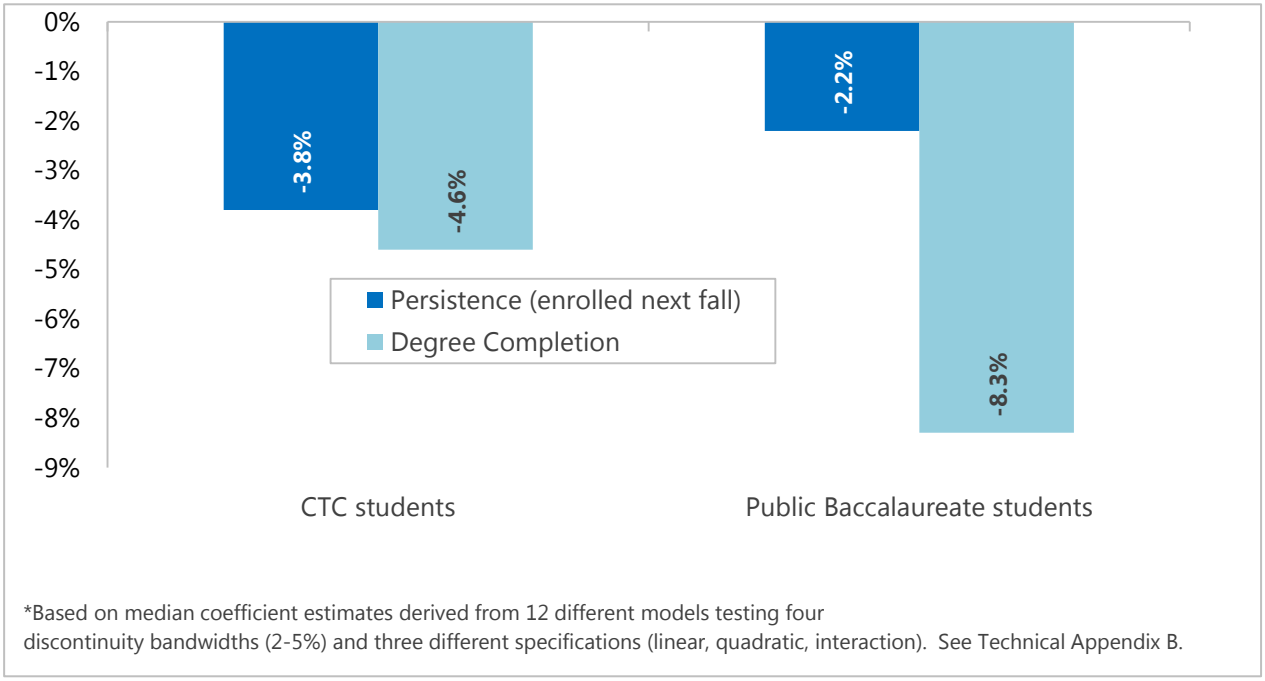
The magnitude of this impact can be illustrated with another hypothetical example. If a 25% reduction in the SNG (approximately $600) had been applied to all 47,134 CTC students receiving SNG awards in the 2011-12 academic year, we would have expected ***1,791 fewer*** students to have reenrolled in a CTC in fall 2012. In 2006, there were 10,895 students with an SNG award that enrolled for the first time at a CTC. We estimate that a 25% reduction in the SNG award for these students would result in ***436 fewer*** college completers (within three years).

[15] Results for this second threshold are included in Technical Appendix B. Nearly three-quarters (74%) of SNG students have incomes under 55% MFI.

[16] We completed a comprehensive analysis of students in both private and public baccalaureate colleges and universities. Unfortunately, for private institutions, we are unable to report statistically reliable estimates on the effect of SNG award. Our statistical models included students with family incomes in the ranges discussed above. Within this range, the sample size for private students was smaller and characteristics of private students around the income threshold differed noticeably (see Exhibit B3).

Exhibit 6

Median Effects* of a 25% Reduction in the State Need Grant on Student Outcomes



*Based on median coefficient estimates derived from 12 different models testing four discontinuity bandwidths (2-5%) and three different specifications (linear, quadratic, interaction). See Technical Appendix B.

Our analysis also investigated differences related to enrollment status (part-time/full-time), year in school (freshmen, sophomore) and financial circumstances. While we found overall effects from the SNG program, we cannot make conclusions about the relative effectiveness of the program for these subgroups of students.

Generally, the findings are not statistically significant at conventional levels. This is likely a result of the relatively small sample sizes available for this analysis. However, the effects estimated here are comparable in size to statistically significant estimates from studies (employing larger sample sizes) of similar need-based financial aid programs in Ohio, Wisconsin, and Florida.[17]

To test the similarity of our findings with related research, we conducted a "meta-analysis" of these three studies and our findings for the State Need Grant.[18] In meta-analysis, we pool the results of all credible evaluations that measure how policies (such as financial aid) affect outcomes (such as student persistence). We computed an "elasticity" for each study to assess results on comparable basis and then estimate the average impact. An elasticity measures how a percentage change in one variable leads to a percentage change in a second variable.

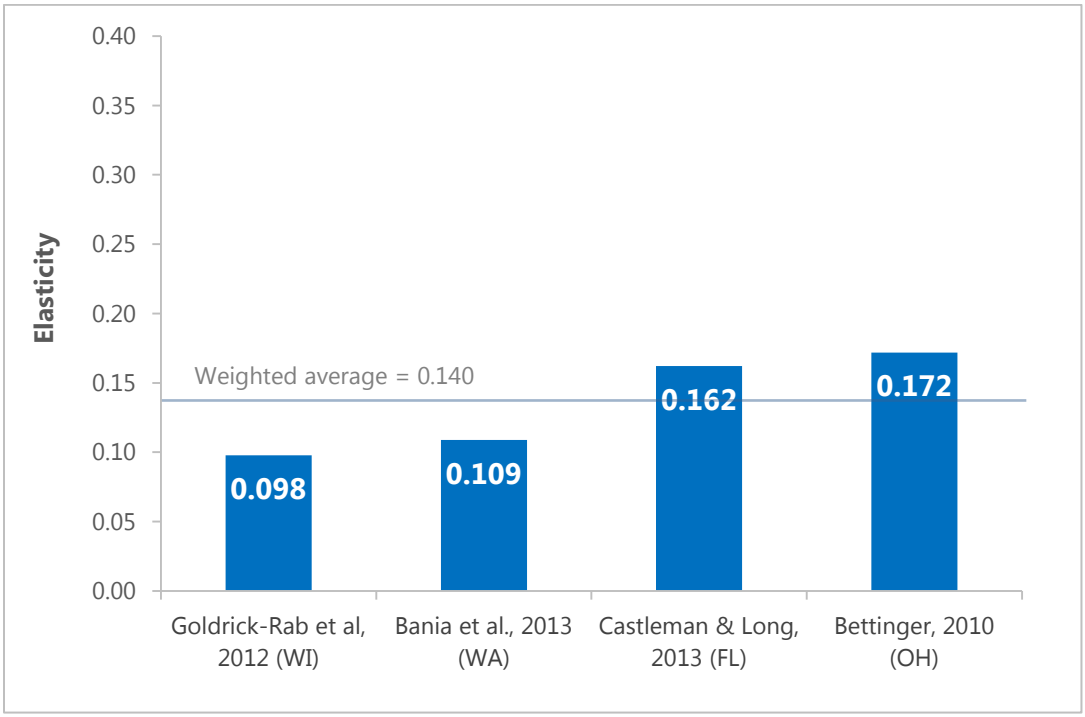
For the meta-analysis, we focus on four-year college fall-reenrollment rates (the outcome most commonly measured across the four studies). Our findings on the impacts of Washington's SNG program are similar to findings from research on programs in three other states (see Exhibit 7). The average elasticity across the four studies is 0.14, which can be interpreted as follows: a 10% change in need-based grant amounts leads to a 1.4% change in fall re-enrollment.

[17] See Appendix Exhibit B6 for information about these studies.

[18] In general, we follow the procedures in Lipsey, M.W., & Wilson, D. (2001). *Practical meta-analysis*. Thousand Oaks: Sage Publications.

Exhibit 7

Elasticities: Effect of Need-Based Grants on Subsequent Fall Enrollment



Bania, N., Burley, M., & Pennucci, A. (2013). *The effectiveness of the state need grant program: Final evaluation* (Doc. No. 13-12-2301). Olympia: Washington State Institute for Public Policy.

Bettinger, E. (2010). *Need-based aid and student outcomes: The effects of the Ohio college opportunity grant*. Stanford University School of Education. <http://www.sesp.northwestern.edu/docs/need-based-aid-why.pdf>

Castleman, B. L., & Long, B. T. (2013). *Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation*. National Bureau of Economic Research. <http://www.nber.org/papers/w19306>;

Goldrick-Rab, S., & University of Wisconsin—Madison. (2012). *Need-based financial aid and college persistence: Experimental evidence from Wisconsin*. Madison, Wisconsin: Institute for Research on Poverty, University of Wisconsin-Madison

IV. Financial Aid Interplay

The 2012 Washington State Legislature directed WSIPP to examine "the interplay of the state need grant program with other forms of financial aid."

Among SNG recipients, between 40 and 80% of the total costs of attending college are covered by four sources: the State Need Grant, institutional aid, a federal Pell Grant, and student loans.[19] This section discusses the variation in aid sources at different income levels and types of colleges.

Aid amounts are expressed as a percentage of a student's total cost of attendance (see sidebar for definitions and calculations). The median cost of attendance for full-time SNG students in 2011-12 was as follows:

- $16,900 for community and technical college students
- $20,790 for students at public regional colleges and universities
- $24,938 for students at public research universities
- $43,751 for private baccalaureate students

Grant assistance covers a substantial portion of the cost of attendance for State Need Grant students. However, as the family income of SNG students increases, the role of grant aid declines. Exhibit 8 shows average aid amounts as a percentage of the total cost of attendance for full-time students receiving a State Need Grant. The breakout of a student's total aid package is listed by family income range (MFI eligibility) and institutional sector.

Financial Aid: Important Terms

Students do not apply directly for a State Need Grant. When a student completes the Free Application for Federal Student Aid (FAFSA), eligibility for the SNG and other need-based awards is determined based on the following factors:

- Every college calculates a student budget based on the average cost for a student to attend the institution for a full academic year. This **cost of attendance (COA)** usually includes tuition and fees, books and supplies, transportation, and personal expenses. Room and board costs are included based on student living arrangements (on-campus, off-campus, and at home).
- The **Expected Family Contribution (EFC)** for the student and family is based on taxable and untaxable income, assets, and benefits as reported on the FAFSA. Family size and number of children in college are also factors used to adjust the EFC.[#]
- The expected family contribution is subtracted from the cost of attendance to calculate **financial need.** Financial aid officers take a student's calculated financial need into consideration when allocating grants, loans, and other awards.

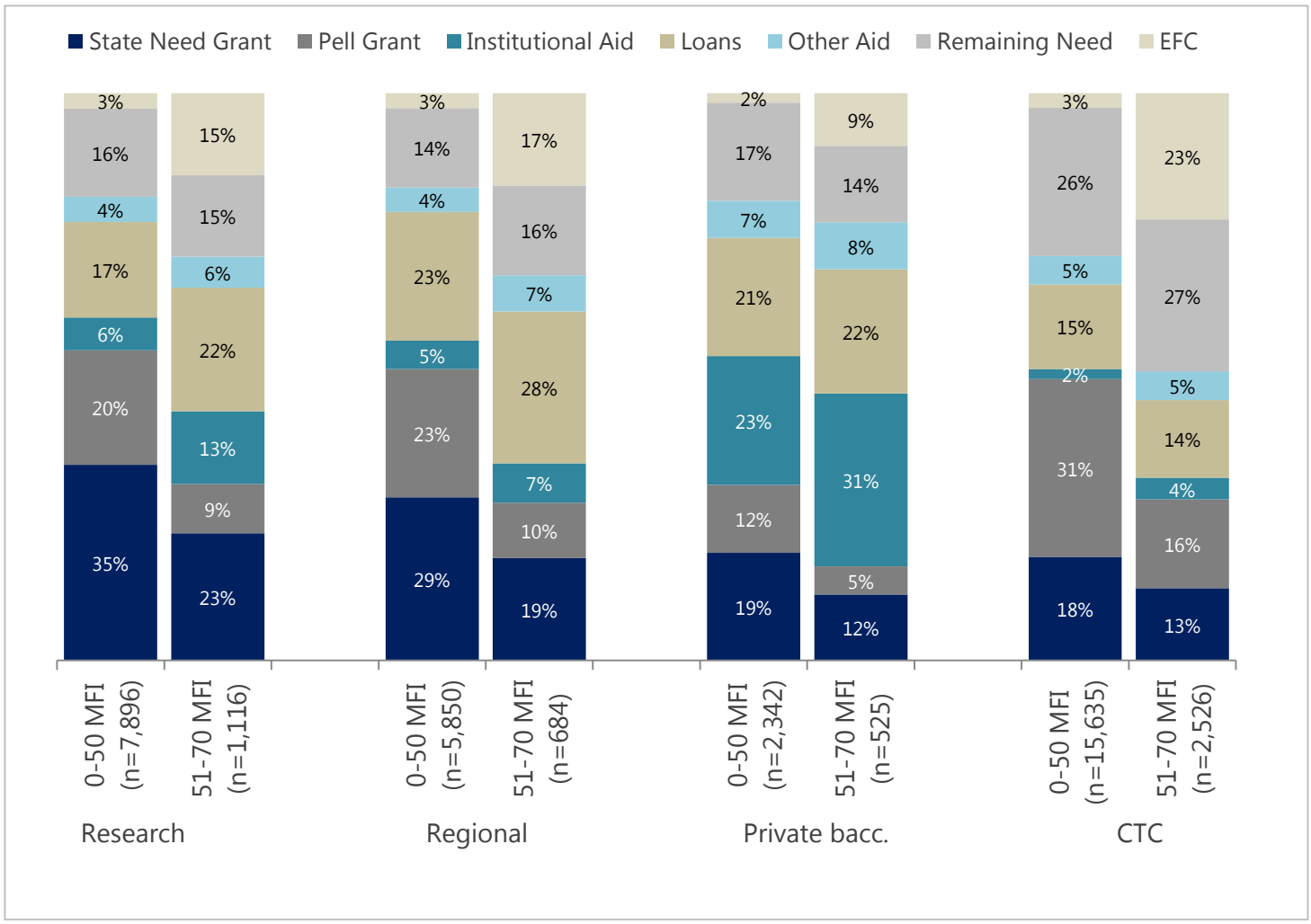
Students must demonstrate financial need in order to be eligible for an SNG award. For students with need, the SNG award amount is determined by family size and income level (Median Family Income).

[#] See http://studentaid.ed.gov/sites/default/files/2012-13-efc-forumula.pdf for more information.

[19] Workforce students in the CTC sector can also receive state-funded Opportunity Grants. These need-based grants provide funding for up to 45 credits which must be taken within three years. In 2012-13, over 5,000 workforce students received an Opportunity Grant.

Exhibit 8

Financial Aid as a Percentage of Full-Time Cost of Attendance by MFI Eligibility Range and Sector: 2011-12



Types of Financial Aid Received by SNG Students

Among the lowest income SNG students (0-50% MFI), approximately half of the cost of attendance is covered by the State Need Grant, Pell Grant, and institutional aid. The federal Pell program provides need-based grants to undergraduates and is discussed later in this section.

Institutional aid includes scholarships and grants awarded from the institution's foundation or endowment. Institutional aid covered between 23 and 31% of the cost of attendance for students attending private baccalaureate colleges. At public colleges and universities, this category also includes funds set aside from tuition. In 2011, the legislature provided greater tuition-setting authority to public institutions. If tuition increases exceed a certain level, the institution is responsible for redirecting a portion of tuition revenue for need-based aid. At the research institutions (Washington State University and University of Washington), institutional programs (Cougar Commitment and Husky Promise) cover any tuition for low-income students that is not already not covered by the Pell and State Need Grants.

At public regional universities and community colleges, institutional aid covers a relatively small percent of the total cost of attendance. As family income increases, students at these institutions are likely to cover costs with loans or a higher expected family contribution (EFC).

The remaining need, shown in Exhibit 8, includes the percentage of college costs not covered by financial aid or the calculated expected family contribution. Typically, remaining need would be covered by student employment, reducing living expenses, family assistance beyond EFC, or private debt.

In the public baccalaureate institutions, unmet (remaining) need for SNG students ranges from 14 to 16%. The amount of unmet need community and technical college students is higher than in other sectors, representing over 25% of the total cost of attendance.

Unfortunately, limitations in the data available in this study precluded our ability to examine the extent to which students may offset the cost of college through sources such as personal loans or employment. We were, however, able to examine the relationship between the State Need Grant and the two largest sources of aid—federal loans and Pell Grants.

During the 2011-12 academic year, students with a State Need Grant received over $858 million dollars in total (known) financial aid. Most of this aid (89%) fell into three categories:

- Loans (federally backed)—$235 million (27%)
- State Need Grants—$254 million (30%)
- Federal Pell Grant program—$273 million (32%)

We analyze all aid for need-based recipients, including unsubsidized loans, work study, scholarships, and grants.

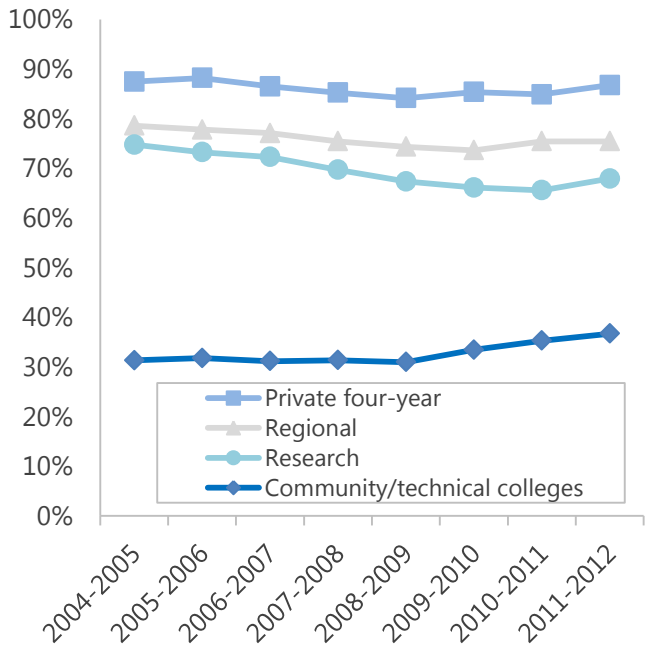
SNG and Federal Loans

In 2011, half of students receiving an SNG award also took out a loan from the US Department of Education's Direct Loan Program to help pay for college.[20] The percentage of borrowers in the SNG program has stayed relatively consistent since 2004 for private and public regional baccalaureate institutions. As Exhibit 9 shows, about 90% of SNG students at private colleges and 80% of students at public regional colleges borrow to pay for college.

The rate of borrowing has changed over time in two sectors. About 30% of SNG students at public community and technical colleges took out a federal direct loan in 2004. In 2008, the borrowing rate among this population began to increase to 36% in 2011-12. In contrast, borrowing among SNG students at public research universities declined slightly—from 75% in 2004 to 68% by 2011.

Exhibit 9

Percent of SNG Students with Loans by Sector



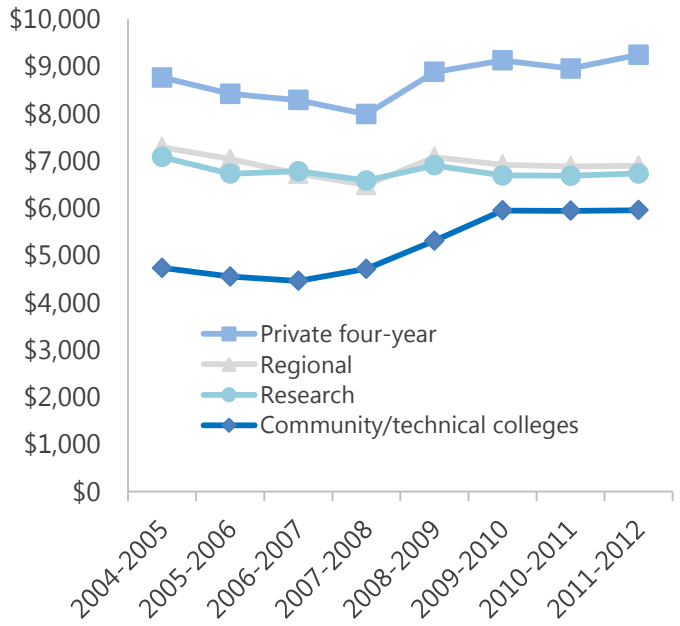
[20] Includes federal Perkins, Stafford, and Plus loans (subsidized and unsubsidized). See http://www.direct.ed.gov/ for more information.

Loan amounts for SNG students vary by type of institution attended. Exhibit 10 presents the average inflation-adjusted loan amounts for SNG students between 2004 and 2011. In the public four-year (regional and research) institutions, the average annual loan among SNG students was approximately $7,000.

During this period, the average (annual) loan for students at two-year community and technical colleges increased by about $1,200—from $4,732 in 2004 to $5,954 by 2011. Average loan amounts for SNG students at private baccalaureate institutions also increased during this time—from $8,769 (2004) to $9,244 (2011).[21]

Exhibit 10

Average Loan Amount for SNG Students by Sector
2004-2011



Results in constant (2012) dollars (CPI-U).

SNG and Federal Pell Grants

The federal Pell Grant program was established in 1978. In terms of overall expenditures, Pell Grants represent the largest source of financial aid provided to low-income undergraduate students.[22] Pell Grant awards are based on a student's financial need as determined by the Expected Family Contribution (see page 14). Students with the highest levels of need can receive the full Pell Grant award ($5,500 in 2012). The Pell Grant decreases by $100 for every $100 in calculated EFC.[23]

The Pell Grant and State Need Grant programs have important differences in how award amounts are calculated:

- The **Pell Grant formula** (EFC) considers a family's available income, which equals adjusted gross income (AGI) minus certain allowances (such as income protection). The formula also includes a contribution from available assets (investments, savings, and business). For dependent students, the Pell Grant is based on income of both parents and students.[24]
- **SNG** awards are also provided to students with calculated need, but the SNG formula is based solely on the parent's taxed and untaxed income and student's family size. For independent students, awards are based on the income of the student and married spouse. Students with an AGI at or below 50% of the state's median family income (MFI) receive the full grant award (see Exhibit 1). Partial awards are available to students with incomes at or below 70% MFI.

[21] The Ensuring Continued Access to Student Loans Act of 2008 resulted in increased unsubsidized Stafford loan limits ($2,000 higher) for undergraduate students, starting in the 2008-09 academic year.

[22] https://studentaid.ed.gov/types/grants-scholarships/pell

[23] Pell Grants are considered entitlements and all eligible students receive the full value of the calculated award. Grants are adjusted for enrollment status and cannot exceed the cost of attendance.

[24] http://ifap.ed.gov/efcformulaguide/attachments/082511EFCFormulaGuide1213.pdf

Based on the different methodologies for determining need, some students may qualify for a State Need Grant but be ineligible for federal Pell funding. This may occur in cases where a family has lower income but significant assets. A dependent student with low-income parents but higher levels of individual earned income may also be ineligible for a Pell Grant.

Exhibit 11 shows SNG recipients for the 2011-12 year by family income level (MFI) and receipt of Pell Grants. Of the 71,530 SNG students in this cohort, 95% received a Pell Grant. Nearly all (99%) of the lowest income SNG students received Pell funding. At higher incomes, between 23 and 35% of SNG students did not qualify for a Pell Grant.

Exhibit 11

Pell Grant Receipt Among SNG Students by Income Level (2011-12)

MFI range	Received Pell	Pell ineligible	Total students with SNG
0-50%	61,255 (99%)	692 (1%)	61,947
51-60%	4,440 (77%)	1,339 (23%)	5,779
61-70%	2,459 (65%)	1,345 (35%)	3,804
Total	68,154 (95%)	3,376 (5%)	71,530

In total, 3,376 SNG students did not qualify for federal (need-based) grant assistance in 2011-12 (5% of all recipients). In many states, if a student does not meet financial qualifications for federal grants, they would be ineligible to receive state-funded need grants. The final part to this section examines how other states distribute need-based grants for college.

What Can Washington Learn from Other States' Grant Programs?

As noted, the 2013 Legislature directed WSIPP to identify more efficient ways to distribute SNG. This report does not include a specific recommendation about allocating and awarding State Need Grant funds. Instead, we examine grant formulas in other states and assess the tradeoff between serving more students and reducing grant levels. In the 2011-12 academic year, about 31,000 undergraduate students in Washington were eligible for an SNG award but unable to receive assistance due to program funding limitations. This section outlines alternative awarding approaches to determine if additional students could receive assistance without substantially cutting individual award amounts.

Exhibit 12 displays information about the higher education student grant programs among ten states with the largest expenditures on need-based grants (and no merit requirement). Only Washington and New York define need and calculate award amounts according to income cut-offs. Other states rely on the federal expected family contribution (EFC) methodology described earlier. Formulas based on the EFC generally use state dollars to meet calculated need after adjusting for other sources of financial aid.

We examined the awarding formulas of four different states and applied these rules to the population of eligible SNG students in Washington State for the 2011-12 academic year. The state formulas selected include Minnesota, North Carolina, Oregon, and Pennsylvania. We selected states with formulas that could be easily understood and applied given available data in Washington State. A full description of each formula is included in Technical Appendix C.

Two of these formulas involve a "shared responsibility" calculation—where contributions from the student and family are established and state grant amounts are determined after considering the level of federal grants received.[25] Exhibit 13 shows hypothetical results obtained when applying these awarding formulas to all *eligible* SNG students in the 2011-12 academic year. We estimate the number of students potentially served with each approach based on the actual $256 million SNG expenditure for institutions that provided data for this study.[26]

Using the formulas employed by two states (Oregon and Pennsylvania), approximately 97,000 students would receive a grant, but average grant amounts would be cut in half. Based on our results presented in Section III, this level of grant reduction would likely result in lower student enrollment levels and fewer college graduates.

The approach used in North Carolina would result in only slightly more students receiving a grant (73,474), but average grants would also fall by about $1,000. Using Minnesota's "shared responsibility" model, we estimate that average grant awards would only fall slightly (from $3,460 to $3,143). In addition, this approach could provide grant assistance to more students within available funding limits. Our estimates show 81,319 students that may be served using a formula similar to the Minnesota model (compared to 72,060 recipients under current SNG awarding criteria).

[25] Requirements for Washington's State Need Grant program also specify a "self-help" contribution from the student equal to 25% of the cost of attendance or a reasonable level of earnings (whichever is less). Self help includes parent contributions, work study, scholarships, loans, unmet need, and other sources of financial support.

[26] The actual 2011-12 SNG expenditure was $266 million. Since we do not have the entire population of SNG recipients in our study cohort, total expenditures are slightly lower than actual amounts.

Exhibit 12

Definitions of Financial Need for Largest Undergraduate State Need Grant Programs
(by state expenditures): 2009-10

State	Program name	Total dollars (millions)	Program dollars as % of total State grant dollars	Recipients	Definition of need
New York	Tuition Assistance Program	$901.4	89%	330,110	Max income/income based
Pennsylvania	Pennsylvania State Grant Program	$413.3	100%	171,702	Need (cost-EFC)
Illinois	Monetary Award Program	$390.5	99%	141,380	Need (cost-EFC)
New Jersey	Tuition Aid Grant	$311.2	84%	72,609	Need (cost-EFC)
Texas	TEXAS Grant with S/LEAP	$277.8	42%	71,919	EFC
Washington	Washington State Need Grant Program	$211.0	88%	70,376	Max income/income based
Minnesota	MN State Grant	$168.5	95%	103,544	Need (cost-EFC)
North Carolina	UNC Need Based Grant	$133.4	36%	61,952	Need (cost-EFC)
Missouri	Access Missouri Financial Assistance Program	$82.8	69%	49,146	EFC
Oregon	Oregon Opportunity Grant	$76.7	58%	43,111	Need (cost-EFC)

Source: Jacobs, C.E., Whitfield, S.E., & Brown Center on Education Policy. (2012). *Beyond need and merit: Strengthening state grant programs.* Brookings Institution. Supplementary material from http://www.brookings.edu/research/reports/2012/05/08-grants-chingos-whitehurst.
Note: States programs with merit (class rank, test score, GPA) requirements for eligibility or renewal not included.

Exhibit 13

Alternative Need Grant Formulas
Estimates Based on 2011-12 Eligible SNG Students in Washington

State formula	Estimated students served	Estimated students unserved	Estimated average grant
Washington	72,060*	28,450*	$3,460
Minnesota	81,319	15,549	$3,143
North Carolina	73,474	-	$2,514
Oregon	96,653	-	$1,382
Pennsylvania	98,257	-	$1,883

* Washington students served and unserved include student records available from study file.

V. Conclusion

Nearly 74,000 undergraduate students received financial assistance with college costs from Washington's State Need Grant program in 2012. Assessing the effectiveness of state-based financial aid, such as the SNG program, presents several challenges. First, the effect of state financial support must be separated from other sources of financial aid received by the student. Second, an evaluation must account for other factors associated with student success (such as family and educational background).

The evaluation approach presented in this report addressed these challenges and found some evidence that the SNG award is associated with increased enrollment persistence and degree completion for undergraduate students in public colleges and universities.

For students with the lowest family incomes, we looked at the impact of a 25% change in the SNG award amount (about $600 for CTC students and $2,000 for public baccalaureate students). We estimate that this level of SNG assistance is associated with a 2 to 4 percentage point change in student re-enrollment. Similarly, adjusting the grant award by this amount is also associated with a 4 to 8 percentage point change in completion rates for the lowest income students.

Among eligible students at higher income levels (70% MFI), we found that partial grants are associated with similar enrollment and completion effects for students at public baccalaureate institutions. We were unable to draw conclusions regarding the effectiveness of SNG dollars for students at private four-year degree granting institutions, which may be a result of the small sample size available for this sector.

Overall, our results indicate that State Need Grant assistance is related to gains in enrollment and completion among undergraduate students with high levels of financial need. Not all eligible students can receive a grant given current funding levels, however. Alternative approaches to determining eligibility and award levels may improve access to the SNG program (by serving more students within current funding levels without substantial reductions in grant amounts for the lowest-income students).

Technical Appendix

The Effectiveness of Washington's State Need Grant Program: Final Evaluation Report

Appendix

A. Enrollment, Academic Progress, and Completion Rates of SNG Students

The legislation for this study calls for an examination of, "the effect of the state need grant on recipients' persistence, performance, degree or certificate completion, and time to degree or certificate completion."[27] To estimate the effect of these grant dollars, we must account for the range of factors that may also influence the expected performance of students assisted by the SNG. These factors include a student's age, financial circumstances, family composition, and educational background. Details about the models and results used to estimate the adjusted effect of the SNG are presented in Section III and Technical Appendix B.

This section includes the "unadjusted" results for SNG students—simply the rate of students meeting the following academic outcomes:

- Enrollment persistence (same year): Enrollment in any institution between fall and spring term in the same academic year.
- Enrollment persistence (next year): Enrollment in any institution from fall term of the entering academic year to fall term of the subsequent academic year.
- Academic progress: Full-time enrolled students that complete full-time credit load by the end of the first academic year (36 quarter credits).
- Degree completion: Enrollment status (including degree completion) at the end of four years. Transfers to four-year institutions (with or without degree) are included as well as a measure of 'academic preparedness' for students without a degree.

The educational goals of SNG students in Washington may vary widely across the different sectors of the higher education system. Therefore, we report separate results for students enrolled in baccalaureate colleges and universities. We also break out results for Community and Technical College (CTC) students seeking an Associate's degree (academic) and those working toward a workforce or professional certificate. The results presented here include those first time students (freshmen) who enrolled full-time during the fall term as degree/certificate seeking student and received an SNG award during this term. (Results for part time CTC students are included in the final part to this section.)

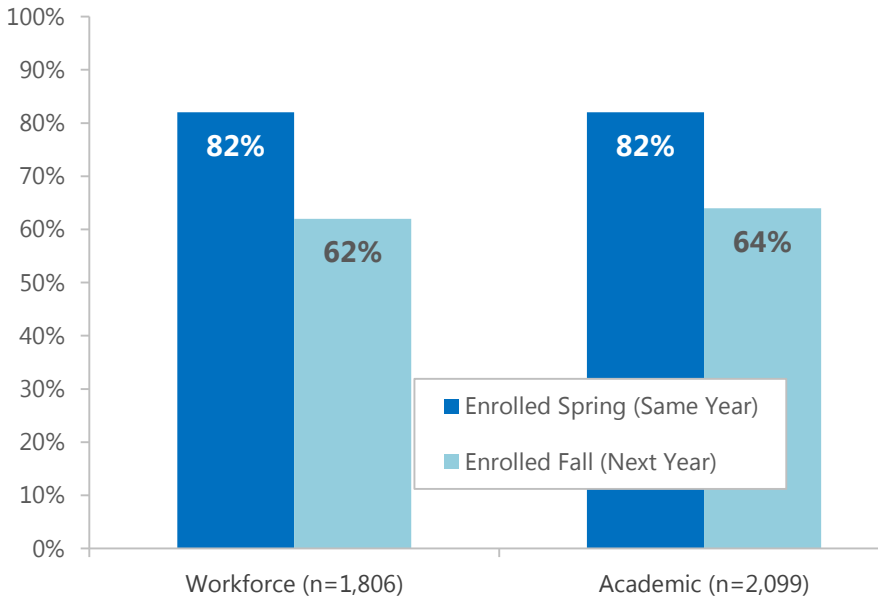
[27] Third Engrossed Substitute House Bill 2127, Laws of 2012.

A1. Re-enrollment Rates

Community and Technical Colleges. We tracked two measures of student enrollment progress among first-time SNG students entering college—fall-to-spring enrollment (same year) and fall-to-fall enrollment (next year). These measures of enrollment persistence include re-enrollment at *any* institution of higher education in Washington. For example, enrollment persistence outcomes for CTC students may include re-enrollment at either a community college or a baccalaureate institution.[28]

Exhibit A1 shows enrollment outcomes for freshmen students with an SNG award for were enrolled full time at a CTC. For both academic and workforce students enrolled in the fall of 2010, 82% re-enrolled during the spring term. Within one year, 62% of workforce students and 64% of academic students re-enrolled in college the next fall term (2011).[29]

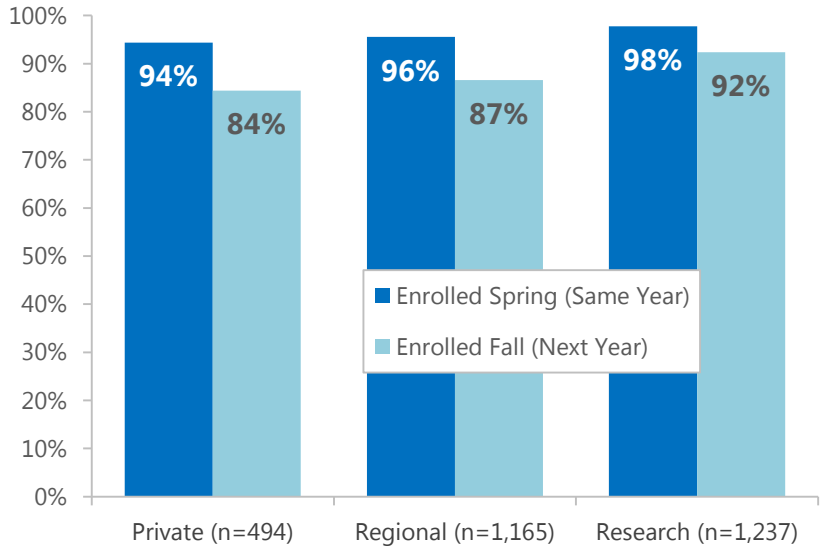
Exhibit A1
CTC Freshmen SNG Recipients (Fall 2010)
Subsequent Enrollment Outcomes



[28] We include information about college transfers to different institutions in the section on degree completion.
[29] This rate is comparable to fall-to-fall enrollment for all public CTC students (West region), see Dunbar, A., National Student Clearinghouse, & Indiana University. (2011). *National postsecondary enrollment trends: Before, during, and after the great recession*. It is worth noting that some workforce students participate in certificates that are one-year or less in duration.

Baccalaureate Colleges and Universities. SNG Students at four-year degree-granting (baccalaureate) institutions had high rates of re-enrollment. Exhibit A2 displays the enrollment persistence of entering freshmen with an SNG award at private colleges and universities as well as public regional and research institutions.[30] Among students starting in the fall of 2010, between 94% (private baccalaureate institutions) and 98% (research universities) enrolled in the spring term. Fall-to-fall (next year) enrollment persistence for this cohort of SNG students ranged between 84% (private) and 92% (research). The re-enrollment rates presented include students that change schools or transfer (within Washington State).

Exhibit A2
Baccalaureate Freshmen SNG Recipients (Fall 2010)
Subsequent Enrollment Outcomes



IPEDS Reporting and Comparisons

All higher education institutions that participate in federal financial assistance programs (1965 Higher Education Act—Title IV) must comply with reporting requirements established by the National Center for Education Statistics (NCES). Student information provided for federal reporting purposes is submitted through the Integrated Postsecondary Education Data System (IPEDS).

The measures published by NCES (using IPEDS) are frequently referenced gauges of student outcomes. The outcome measures used for this evaluation, however, cannot be directly compared to IPEDS reports for several reasons. First, IPEDS reports do not account for enrollment or completion outcomes if the student attends a different institution. This analysis tracks student outcomes in all (participating) colleges and universities in Washington. Second, the IPEDS reports utilize a self-reported measure of first-time enrollment to define entering students. First time college entrants in this study are identified from this self-reported variable (when available) and by examining enrollment history (from the past two to seven years).

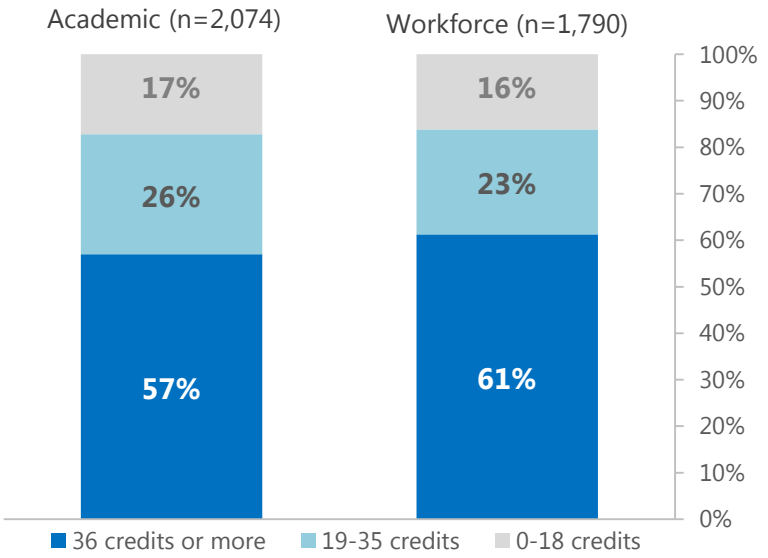
[30] These results are presented for full-time students only. Among freshmen baccalaureate students in this cohort, 98% were enrolled full-time. Re-enrollment rates for private sector institutions do not include Antioch University, Seattle Pacific University, or University of Puget Sound.

A2. Academic Progress

Community and Technical Colleges. In the CTC sector, students are considered to be enrolled full-time (for financial aid purposes) if they register for 12 or more credits in a given quarter.[31] Our measure of academic progress tracks credit accumulation for SNG students in the first year following fall enrollment. The outcome includes the percentage of first time freshmen students with an SNG award who earn 36 credits or more credits by the end of spring term.[32] Students may earn more than this credit level, but we want to first track how many earn sufficient credits to be considered on track for completion by the end of the first year.

Exhibit A3 shows that for both academic and workforce students, approximately 60% of those enrolled full-time completed a full credit course load during their first academic year (36 credits/year).[33] About one-fourth (23-26%) earned more than half of planned full-time credits while 16-17% achieved only minimal credit accumulation by spring (0-18 credits). Over the course of this year, some students may have shifted from full-time to part-time enrollment or they may have withdrawn from college. By the end of the year, however, academic students earned an average of 33 credits while workforce students earned 36 credits.

Exhibit A3
CTC Full Time Freshmen SNG Recipients (Fall 2010)
Credit Accumulation After One Year



It should also be noted that the level of remedial coursework was fairly high for these first time CTC students with an SNG award. For workforce students, 38% enrolled for one or more remedial credits during this initial year. Among academic students, 61% took a remedial course. These courses provide students with necessary preparation to succeed in college-level math and reading and to earn a degree. The final outcome reported here looks at the preparation and achievement of CTC students.

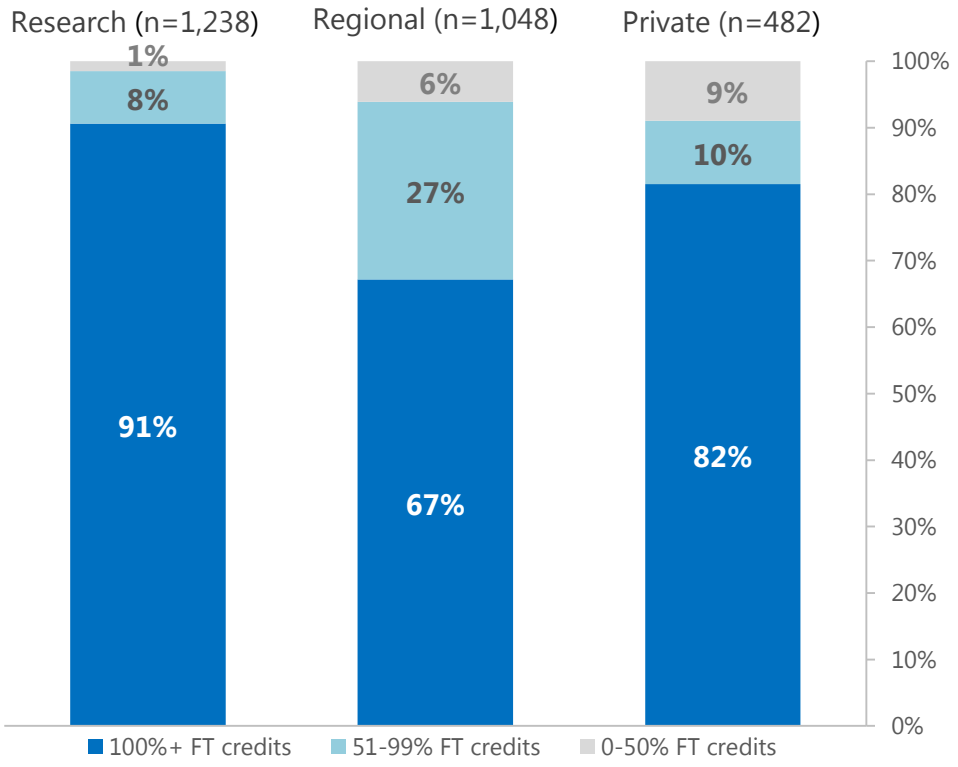
[31] Full-time undergraduate students would need to complete 15 credits per quarter (excluding summer) in order to graduate within four years of starting college.
[32] Results for part-time students who earn 20 or more credits by spring term are included at the end of this section.
[33] A handful of students had incomplete credit records, so totals in the credit accumulation measure are slightly lower than the enrollment persistence measure.

Baccalaureate Colleges and Universities. Exhibit A4 shows the same credit accumulation outcomes for students at public and private four-year degree granting institutions.[34] These baccalaureate institutions include schools on a quarter based academic calendar (three terms, excluding summer) and a semester-based calendar (two terms) system. Students at quarter schools are expected to enroll for a minimum of 36 credits to be eligible for (full time) financial aid, while students at semester schools need 24 credits for full time enrollment.

Freshmen students with a State Need Grant award at public research universities had the highest level of credit accumulation among all baccalaureate students. Between fall 2010 and spring 2011, 91% of these students met the threshold for full time credit accumulation. Of the students at private four-year institutions, 82% earned at least the expected number of credits during this first year as well.

Exhibit A4

Baccalaureate Freshmen SNG Recipients (Fall 2010)
Percent Earning Full-Time Credit Load



About two-thirds of freshmen SNG students at public regional (comprehensive) colleges and universities earned 36 credits or more during this first year. Among remaining students, 27% earned at least half (18-35) of the full-time credits.

The academic progress that takes place over this first year provides an early indication if the student will be able to complete a degree in the expected timeframe. The final outcome presented in this section looks at degree completion, college transfers and types of degrees earned by students with a State Need Grant.

[34] Regional does not include The Evergreen State College. Private does not include the University of Puget Sound.

A3. Degree/Certificate Completion

Community and Technical Colleges The 34 community and technical colleges in Washington State provide academic preparation for transfer to a baccalaureate institutions, technical skills to aid in workplace advancement, and career training for students entering a profession or trade for the first time. CTC students include a broad spectrum of individuals from different age groups, family circumstances, and educational backgrounds. In the cohort of CTC students analyzed here, almost half (48%) graduated from high school two years or more before entering college. Among the SNG students in our CTC study cohort:

- 36% were age 24 or older;
- 47% were financially independent; and
- 58% of these independent students had a family size of two persons or more.

When examining the rate of degree and certificate completion among these students, it is important to recognize that the educational goals and of CTC students may vary widely. The planned timeline for degree completion may also change for these students according to workplace or family demands. For the 4,071 students in this analysis that started full-time, over half (54%) attended school part-time for at least one term.

To capture these differences effectively, we list several possible outcomes for CTC Students: completing an award (degree or certificate), transferring to a four-year institution, achieving sufficient academic preparation and maintaining enrollment. Exhibit A5 shows outcomes for CTC students who enrolled full time in the fall quarter of 2007 and received an SNG award during this initial term.

We followed students for a four year period and found the following outcomes for students enrolled in an academic program:

- **29%** completed a degree (Associates); about half of these students earned a degree and transferred to a four-year institution (15% total)
- **7%** did not complete a degree but did transfer to a four year institution, an additional **3%** had sufficient academic preparation for a future transfer
- **17%** were still enrolled, and **44%** had no ongoing enrollment or completion information

Student entering workforce programs had the following outcomes:

- **29%** completed a certificate and did not have additional enrollment activity
- **4%** completed a certificate and then transferred to a four-year institution
- **22%** reached a level of preparation (45 vocational credits or 30 vocational credits and 15 academic credits)
- **7%** were still enrolled in the final term, leaving **36%** who were not enrolled by the end of the study period

Exhibit A6 also shows the types of degrees and certificates earned by students in this cohort. We include the highest degree attained for each student (certificate, Associates, Bachelors) along with the field of study (major). About two-thirds of academic students earned an Associate in Arts. For students that started in a workforce program, 30% earned an award related to health care and 22% completed a trade-related certification.

Exhibit A5

SNG Students Entering CTC in Fall 2007
Enrollment/Degree Outcomes After Four Years

Type of student	Earned award		No award				Total
	Transfer to four-year	No transfer	Transfer to four-year	Prepared transfer ready	Still enrolled	Not enrolled	
Academic	329 (15%)	313 (14%)	166 (7%)	64 (3%)	374 (17%)	998 (44%)	2,250
Workforce	71 (4%)	524 (29%)	46 (3%)	408 (22%)	127 (7%)	651 (36%)	1,826

Exhibit A6

Degree/Certificate Inventory for 2007 CTC Cohort
(SNG Students Entering in Fall 2007)

	Academic student		Workforce student	
Field of study	Awards earned	Percentage	Awards earned	Percentage
Arts and Letters	427	67%	92	15%
Business	59	9%	73	12%
Computer Science	10	2%	35	6%
Education	13	2%	12	2%
Engineering and Related Technologies	10	2%	29	5%
Health	64	10%	181	30%
Law	0	0%	19	3%
Trades	13	2%	129	22%
Other*	46	6%	25	5%
Total	**642**	**100%**	**595**	**100%**

*Includes sciences, social sciences, agriculture/natural resources, and architecture.

Baccalaureate Colleges and Universities. Students entering four-year degree granting institutions are generally recent high school graduates. For the analysis, we looked at students who received an SNG award and enrolled full-time at a baccalaureate institution in the fall of 2006. Among this cohort, 91% were age 19 or younger and 90% were financially dependent. Nearly all (96%) of those entering four-year institutions initially enroll as full-time students. However 37% of these students enrolled part-time in at least one term during the study period. To assess outcomes for this cohort, we determined if the student completed a degree by the end of six years after initial enrollment. Exhibit A7 shows the completion results for SNG students entering college in 2006.

For the most part, students completed a degree at the same institution where they initially enrolled. At public regional colleges and universities:

- **43%** completed a degree from the same college and an additional **9%** completed a degree after transferring; and
- **8%** were still enrolled at the end of the study period.

For students at private four-year colleges and universities:

- **56%** graduated from the institution where they started college and **6%** completed a degree at a different institution; and
- **5%** had an active enrollment record at the end of six years.

SNG students at public research universities had the highest graduation rates:

- **64%** completed a degree from the same institution, with an additional **3%** completing a degree after transferring; and
- **5%** remained enrolled leaving **24%** not enrolled after six years.

These figures on enrollment persistence are meant to provide a baseline indication of academic progress for students receiving a State Need Grant. The student populations and academic programs within these institutions vary considerably. Therefore, these rates cannot be used to illustrate the effectiveness of the SNG program or the relative performance across sectors. Our findings regarding program effectiveness are outlined in the first section and detailed in the technical appendices.

Exhibit A7

SNG Students Entering Baccalaureate Institutions in Fall 2006
Enrollment/Degree Outcomes After Six Years

Sector	Completion at starting institution	Complete at different institution		Still enrolled	Not enrolled	Total
		Four-year college	Two-year college			
Public research	765 (64%)	23 (1%)	33 (2%)	69 (5%)	289 (24%)	1,179
Public regional	445 (43%)	48 (4%)	53 (5%)	92 (8%)	394 (38%)	1,032
Private four year	239 (56%)	20 (4%)	11 (2%)	23 (5%)	127 (30%)	420

Exhibit A8

Undergraduate Degree/Certificate Inventory for 2006 Baccalaureate Cohort
(SNG Students Entering in Fall 2006)

Field of study	Awards earned	Percentage
Agriculture and Natural Resources	83	5%
Arts and Letters	455	28%
Business	235	14%
Computer Science	29	2%
Education	73	4%
Engineering and Related Technologies	66	4%
Health	79	5%
Other*	17	1%
Sciences	159	10%
Social Sciences	433	26%
Trades	8	1%
Total	**1,637**	**100%**

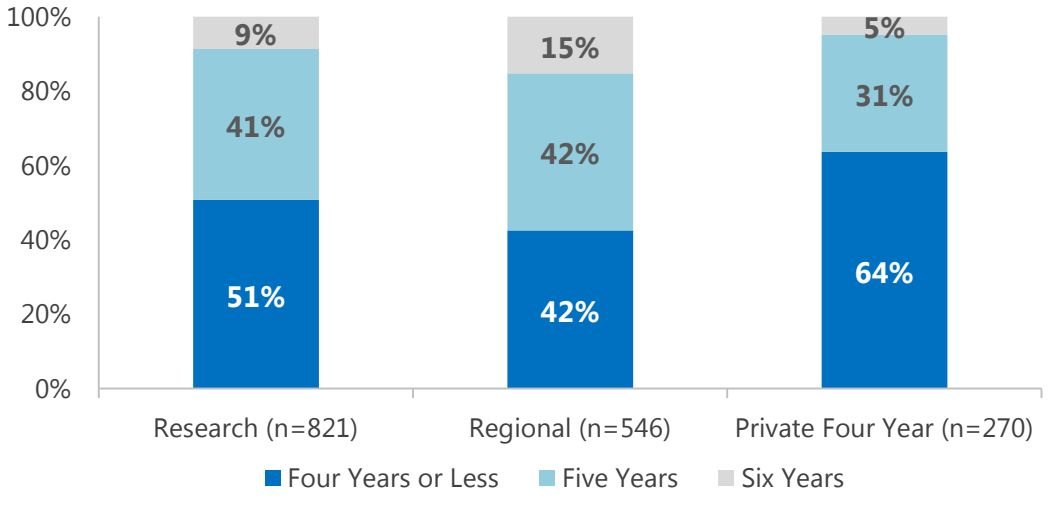
*Includes architecture and law.

Exhibit A8 provides an inventory of the degrees earned by field of study. In total, 1,637 students in this cohort earned a degree. Bachelor of Arts (BA) degrees were awarded to 1,187 students (72%), 353 students received a Bachelor of Science (BS) degree (21%) and 97 students earned a two year degree or certificate (6%).

More than half of this degrees granted to this cohort of SNG students were in general studies (arts and letters) or social sciences. Science, technology, and engineering accounted for 21% of all degrees. On average, students finished a degree within 4.5 years. About two-thirds of students entering private colleges and universities and half of students in research universities finished a degree within four years (Exhibit A9). Between 30 and 40% earned a degree in the fifth year after entry. Another 5 to 15% completed their degrees within six years of initial enrollment.

Exhibit A9

Time to Degree for Baccalaureate SNG Students
Entering Fall 2006



A4. Part-Time CTC Students—Enrollment, Academic Progress, and Completion Rates

The enrollment and completion rates presented in Sections A1-A3 of this appendix are based on SNG students entering college with full-time enrollment. As mentioned, only 4% of students entering baccalaureate institutions are enrolled part-time. About 16% of SNG recipients entering community and technical colleges started as part-time students. Exhibits A10-A12 include enrollment, academic progress, and degree completion rates for these part-time SNG students.

Exhibit A10
CTC Freshmen SNG Recipients Entering Part-Time (Fall 2010)
Subsequent Enrollment Outcomes

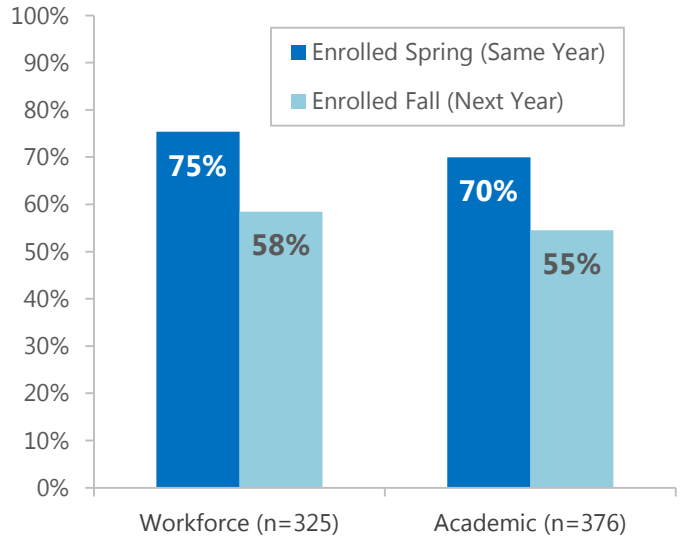


Exhibit A11
CTC Part Time Freshmen SNG Recipients (Fall 2010)
Credit Accumulation After One Year

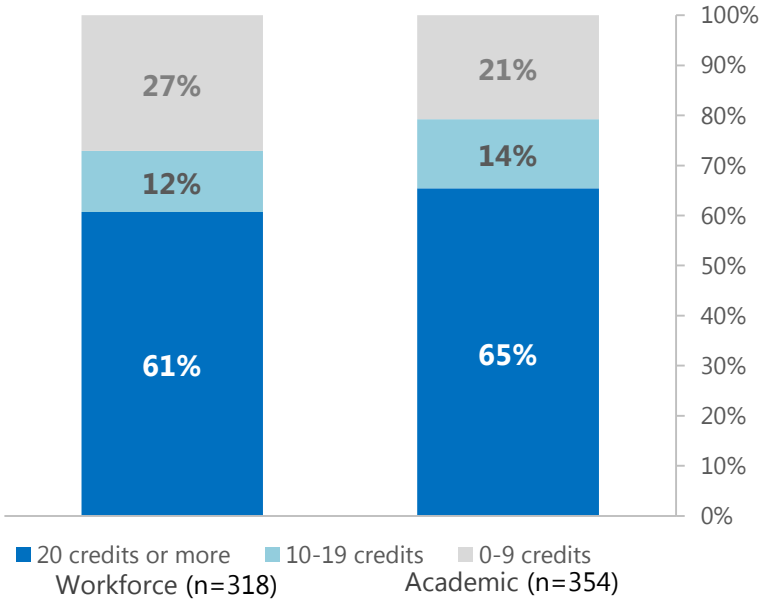


Exhibit A12
SNG Students Entering CTC Part-Time in Fall 2007
Enrollment/Degree Outcomes After Four Years

Type of student	Earned award		No award				Total
	Transfer to four-year	No transfer	Transfer to four-year	Prepared transfer ready	Still enrolled	Not enrolled	
Academic	31 (7%)	51 (12%)	17 (4%)	6 (1%)	88 (20%)	237 (55%)	430
Workforce	15 (4%)	80 (23%)	12 (3%)	57 (17%)	36 (10%)	144 (42%)	344

A5. Career College Students—Completion Rates

Students at the approved private career colleges enroll in a wide range of career-specific training and professional programs that may lead to a certificate or Associates degree. The programs vary in length, from six-months to two years. Currently, 11 private career and two-year colleges participate in the State Need Grant program. All participating institutions must be accredited and approved by the Washington Student Achievement Council. Given the variability in program objectives, length of study, and types of awards conferred at private career colleges, it would be somewhat misleading to report student enrollment and progress for the entire private career college sector. Instead, we report on the number of SNG students at private career colleges who enrolled in and completed a degree or certificate program. A total of six private career colleges provided data on student outcomes for this evaluation.

To determine completion rates of SNG students at private career colleges, we selected a cohort of students entering programs in 2009. We included all students entering with an SNG award during any month/term of this initial year. Program types varied among the schools providing data for this study, so we looked at the number of students that completed a certificate or degree within three years. The completion rate varied between 79 and 100% for SNG students in these programs (Exhibit A13). Most students completed a program at these colleges within nine months (certificate) or six quarters (Associates degree). Students completed awards in the following fields:

- Airline Travel Specialist/Reservations
- Commercial Diving
- Computer and Information Sciences and Support Services
- Computer/Information Technology Administration and Management
- Computer Software and Media Applications
- Cosmetology and Related Personal Grooming Services
- Health and Medical Administrative Services.
- Hospitality Administration/Management

Exhibit A13

SNG Students Entering Private Career Colleges (2009)
Enrollment/Degree Outcomes After Three Years

Institution	SNG students completing	Completion rate	Total enrolled SNG students
Diver's Institute of Technology	31	100%	31
Gene Juarez Academy	88	79%	111
Interface College	35	87%	40
International Air & Hospitality Academy	42	97%	43

Note: Art Institute of Seattle provided enrollment figures for this study but completion data were unavailable. Northwest Indian College provided enrollment and degree completion information, but results are omitted based on low student counts and the requirement to protect student confidentiality.

B. Program Impact Analysis—Methods and Results

B1. Sample and Data

The analysis sample for this study was drawn from the Unit Record Report (URR) data collected by the Washington Student Achievement Council (WSAC). The URR data contains comprehensive information on financial aid awarded and distributed to students in Washington State. The data covers financial aid funds from federal, state, private, and institutional sources. All institutions of higher education that distribute SNG awards to their students must report data to WSAC for inclusion in the URR.

The sample included all students whose family income was below 75% of the state's median family income (MFI) in any academic years between 2004-05 and 2011-12. If a student was included in the file based on their income in any one year, records were included for this student every year from 2004-05 through 2011-12. This selection criterion includes all students who were eligible to receive an SNG award as well as some students with incomes just above the threshold for SNG eligibility (70% of MFI). The maximum SNG award amounts by year and institution type for these students are presented in Exhibit B1. The URR data has detailed information for each student including their family income and composition, demographics (race, gender, and age), marital status, financial aid dependency status, and the composition of the financial aid package by academic year. Enrollment and degree completion records were matched to this financial aid data by the Education Research and Data Center (see page 5 and Technical Appendix D).

Results are estimated for all students attending four-year public institutions and two-year community and technical colleges between 2004 and 2012. The CTC student sample is restricted to students indicating their intent to pursue a degree or certificate. We estimate statistical models for each sector separately for several reasons. First, the source for some of the data provided for our analysis was sector specific. Estimating separate models reduces heterogeneity by allowing for potentially unknown differences that might exist in each of the underlying specific-specific data sets. Second, the composition of students across a number of characteristics, both measured and unmeasured, varies considerably across the three sectors. In particular, students in the community college sector are subject to different academic standards in the admission process. Third, tuition levels vary substantially across these sectors. Finally, some outcome measures (graduation rates) are sector specific. We do not report analysis of the private colleges and universities due to the extremely small sample size.

Exhibit B1

Maximum SNG Award Amounts by Year and Type of Institution

Year	Public research	Public regional	Private	CTC
2005-06	$4,774	$3,724	$5,008	$2,328
2006-07	$5,156	$3,970	$5,390	$2,450
2007-08	$5,564	$4,188	$5,798	$2,502
2008-09	$6,000	$4,416	$6,234	$2,554
2009-10	$6,876	$5,030	$6,876	$2,690
2010-11	$7,717	$5,575	$7,717	$2,682
2011-12	$9,280	$6,629	$8,214	$3,256

Source: Washington Student Achievement Council (WSAC)

B2. Methods

We model outcomes (e.g. fall-to-fall retention, six-year graduation rate, etc.) as a function of whether or not each student receives an SNG and other observable covariates as statistical controls (demographics, etc.):

$$Y = \beta_0 + \beta_1 G + \beta_2 X + \varepsilon$$

Y = outcomes (e.g. fall-to-fall retention, six-year graduation rate)
G = indicator that students received the State Need Grant
X = observable covariates
ε = random error (but also includes unobserved variables which might affect Y)

If we estimate this model using OLS regression analysis, then the coefficient β_1 measures the effect of G on Y (conditional on enrollment). Receipt of a grant G, however, is in part a function of family income (as well as policy and implementation variables). This, in turn, is likely to result in a statistical correlation between G and unobservable variables, causing an OLS estimate of β_1 to be biased downward. In the case of need based financial aid, G is allocated to students whose families have the greatest financial need and these families may also lack other attributes (correlated with income and assets) that are related to success in college.

The policy changes in the SNG phase-out schedule (Exhibit B2) offer an opportunity to get an unbiased estimate of G via a regression discontinuity (RD) research design. RD is an estimation approach designed to mimic the data characteristics of a randomized experiment. The design is appropriate in contexts where there is a cut-off in *treatment* according to a characteristic that is generally unrelated to the outcome of interest. The focus of the RD approach is to restrict model estimation to those subjects falling narrowly above and below the critical cut-off threshold. This design limits the heterogeneity of individuals in the estimation sample, while preserving the effect of the treatment (or lack thereof).

The SNG phase out schedule involves abrupt changes in the award amount when students' family incomes cross certain distinct thresholds. Because the phase-out schedule contains sharp changes rather than a gradual phase-out, we can compare outcomes for students just above and just below each of these thresholds. By focusing on this narrow bandwidth, we can plausibly argue that students' unobservable variables will not differ much in these two groups. In essence, the threshold effectively randomly assigns students to a higher SNG and lower SNG and we can get an unbiased estimate of the effect of this particular change in the SNG.

In the case of the SNG, we examine two critical thresholds—the first threshold is associated with a 25% decrease in the maximum SNG award amount and the second threshold is associated with a complete phase out of the SNG award. The treatment in this case is the *reduction* of the SNG at each of these thresholds—we compare students just above and below these MFI thresholds to see whether SNG reduction deters their academic progress. The first threshold is reached when a student's family income approaches 50% of the MFI. For incomes just below this threshold, students receive the *maximum* SNG, while those just above this threshold receive an award that is reduced by 25% relative to the maximum award. Similarly, those with family incomes below the second threshold (70% MFI) receive a reduced grant (relative to the maximum award amount), while those just above this threshold receive no grant at all. The data available for our analysis may be less complete for those just above this second threshold—since this group includes students who are not SNG eligible, the selection criteria may be less reliable. Therefore our primary focus will be on the more reliable data clustered around the first threshold (50% of MFI).

Exhibit B2

SNG Phase-out Schedule: Award Amount as a Percent of Maximum SNG Grant

Year	0% to 50% of MFI	50% to 55% of MFI	55% to 60% of MFI	60% to 65% of MFI	65% to 70% of MFI	Over 70% of MFI
2005-06	100%	75%			0%	
2006-07	100%	75%			0%	
2007-08	100%	75%			50%	0%
2008-09	100%	75%			50%	0%
2009-10	100%	70%	65%	60%	50%	0%
2010-11	100%	70%	65%	60%	50%	0%
2011-12	100%	70%	65%	60%	50%	0%

While RD analysis is restricted to only individuals falling narrowly above and below the critical threshold, the exact bandwidth around the threshold to be examined is not prescribed. Instead, there are trade-offs associated with wider or narrower bandwidths. The smaller the bandwidth, the more potentially limited the heterogeneity of individuals included in the analysis—thereby limiting selection bias and otherwise confounding factors. Thus, the ideal analysis is based on the smallest possible bandwidth. However, smaller bandwidths also imply smaller sample sizes (and correspondingly less precise coefficient estimates). The reverse is true for larger bandwidths. Thus, common practice in RD analysis is to estimate models for a range of bandwidths. We base the analysis here on the smallest possible bandwidth of +/- 2 MFI percentage points, but we also present analyses up to bandwidths of +/- 5.

An additional question in RD analysis is the matter of model specification. In an equation explaining student outcomes, a variable for "reduced grant" (RG) is entered as a binary indicator variable along with family income (MFI; the assignment or forcing variable) and relevant control variables. The relationship of a given outcome measure might be expected to manifest as a single shift in the intercept at the point of discontinuity or might be more complex—with the regression line taking on a different slope or form on either side of the discontinuity. Thus, linear, interactive, and quadratic regression functions of the assignment variable are estimated here. In our results, we report the median effect size across these three specifications and the four bandwidths described above—12 different models in all.

An additional concern about obtaining unbiased estimates is the possibility of strategic behavior on the part of students (and/or their families) in manipulating family income (or reported family income) in order to qualify for the maximum SNG. This behavior would appear in the data as an unusually high (low) number of students reporting family income just below (above) a critical threshold (e.g. 50% or 70% of MFI). This kind of manipulation is fairly implausible, as it would require that students and their families know the median income benchmark for their family size. Nevertheless, the data were examined for evidence of such strategic behavior, but none was found. Similarly, we examined the distribution of key covariates to see if any of these variables exhibited unusual discontinuities around the threshold.

B3. Outcome Measures and Control Variables

Two outcome measures pertinent to academic progress are included in this study: student re-enrollment in the subsequent fall following their first fall term and graduation within a specified time period. For students at four-year baccalaureate institutions, graduation rates are measured as the earning of a bachelor's degree within four or six years of initial enrollment. For CTC students, graduation is defined as earning "degree transfer" status (or a bachelor's degree) within three years of initial enrollment.

While the RD design should limit sample heterogeneity, we experiment with a number of pertinent control variables to additionally limit any confounding relationship between family income, socio-demographic status, and academic progress. Available control variables include measures of other financial aid received (work-study, loans, or other grants), student age, gender, race, marital status, financial independence status, and full-/part-time student status. In addition, controls are included for the academic year of first enrollment, academic institution, and student's county of origin (as a proxy for high school attended). Since the RD design simulates a random assignment, we generally expect the groups above and beyond thresholds to be very similar along the measured covariates and we expect that statistical models will not generally be sensitive to the inclusion or exclusion of specific control variables.

B4. Results

Mean student outcomes, financial aid levels and control variables for students whose family income places them near the 50% MFI threshold are shown in Exhibit B3. Means are calculated separately by institution type and for students within a bandwidth of +/- 5 percentage points, above and below the 50% MFI threshold. The +/- 5 bandwidth represents the largest possible sample included in the 50% MFI threshold equations—equations restricted to bandwidths of 2 thru 4 are estimated on a subsample of this group.

Exhibit B4 displays full sets of coefficient estimates for some sample equations (50% MFI threshold and bandwidth of +/- 2 MFI percentage points) for students at public baccalaureate institutions and those at community and technical colleges. In this specification, the effect of a reduction in the SNG is represented by the coefficient on the binary variable "RG." For example, for public baccalaureate institutions, the reduced grant is associated with a 2.6 percentage point reduction in one-year re-enrollment rates. Estimated coefficients on a number of the control variables are consistently statistically significant and their signs and magnitudes are as one might expect. Class standing, full-time student status, and financial aid received all influence re-enrollment next fall.

In addition to the results discussed here, we explored a number of other specification issues. We establish that inclusion or exclusion of control variables and equation form (linear, interactive, or quadratic) has little effect on the results for public colleges and universities. Furthermore, coefficient estimates for a given type of institution are quite stable across different specifications. Interaction effects between grant reduction and either full-time student status or student class-standing (freshman, sophomore, etc.) revealed no important patterns. Finally, samples for the community and technical colleges and the four-year public institutions were combined in an effort to increase sample size and improve statistical significance. Even with the combined sample, however, results were not statistically significant.

Our analysis here focuses on results for equations estimated for 4 possible bandwidths (bandwidths of +/- 2 thru +/- 5), three specification types (linear, interactive, and quadratic) and a full set of control variables, for a total of 12 different specifications. The median of the effects estimated from these models are reported in Exhibit B5 separately by institution type—public baccalaureate institutions and community and technical colleges—and for the 50 and 70% MFI thresholds. Individual marginal effects for each of the 12 models are displayed in accompanying charts. In addition, models were estimated with a more restricted set of control variables. The results (not shown here, but available from the authors upon request) were substantially similar to the findings reported. This consistency is not surprising given the fact that the regression discontinuity approach is a quasi-experimental design.

Results for public baccalaureate institutions (Exhibit B5) suggest that the 25% reduction in the maximum SNG award that occurs at the 50% MFI threshold is associated with drops in student persistence and graduation rates. Among those entering public baccalaureate institutions for the first time, this grant reduction is typically associated with a 2.2 percentage point decrease in re-enrollment the following fall and with 2.1 and 8.3 percentage point reductions in four- and six-year graduation rates, respectively. Results at the 70% MFI threshold are similar.

Similar results are found for students admitted to community and technical colleges, particularly with regard to the 50% MFI threshold. At this threshold, SNG reduction is associated with a decline in re-enrollment rates of 3.8 percentage points the following fall, and a 4.6 percentage point reduction in the three-year graduation rate. The results at the MFI=70 threshold are relatively inconclusive.

Generally, the marginal effects estimated here are not statistically significant at conventional levels. This is not surprising, given the relatively small sample sizes available for this analysis. However, the estimated effects are comparable in size to estimates in studies of Ohio, Wisconsin, and Florida programs. For instance, Castleman and Long (2013) find that a $1,000 reduction in Florida's need-based aid resulted in a 3.5 percentage point drop in six-year graduation rates; the equivalent effect in Washington is a 4.1 percentage point drop. Similarly, Goldrick-Rab et al. (2012) and Bettinger (2011) estimate 2 to 4 percentage point drops in the one-year persistence rate; our corresponding estimate is a 1.1 percentage point decline.

Exhibit B6 presents results from a meta-analysis we conducted of rigorous evaluations of the impacts of grant aid on one-year persistence rates (the outcome most commonly measured across the studies we located). The analysis includes the Ohio, Wisconsin, and Florida studies described in the above paragraph, as well as WSIPP's finding for public baccalaureate institutions in Washington State. The relationship is calculated as an "elasticity." An elasticity measures how a percentage change in one variable leads to a percentage change in another variable. Using a consistent measure such as an elasticity permits a valid comparison of program effect across different study designs and also allows us to take local contexts into account (given variation in average aid amounts and persistence rates).

For re-enrollment outcomes, we found that the results from our State Need Grant analysis are consistent with findings from other states. The average elasticity across the four studies is 0.140; our finding for Washington is 0.109.

Exhibit B3

Characteristics of Students in Public Two- and Four-Year Institutions, Washington State
Academic Years 2005-06 to 2010-11, Enrolled Students Eligible for State Need Grants in at Least One Year

	Public four-year		Private four-year		Community and technical colleges	
	48 <= MFI < 50	50 <= MFI < 52	48 <= MFI < 50	50 <= MFI < 52	48 <= MFI < 50	50 <= MFI < 52
Educational outcomes						
Enrolled next fall	0.900	0.893	0.862	0.936	0.634	0.629
Degree completed in four years*	0.392	0.389	0.377	0.356	0.087	0.105
Degree completed in six years*	0.480	0.475	0.485	0.441	0.192	0.205
Financial aid status						
Proportion receiving aid						
State Need Grant	1.000	1.000	1.000	1.000	1.000	1.000
Other grants	0.894	0.904	0.987	0.982	0.875	0.881
Work study	0.108	0.099	0.336	0.357	0.080	0.064
Loans	0.670	0.683	0.763	0.813	0.224	0.245
Amount received (relative to maximum SNG award)						
Total	2.712	2.562	4.202	4.209	2.449	2.237
State Need Grant	0.890	0.687	0.843	0.670	0.818	0.629
Other grants	0.930	0.997	2.186	2.302	1.120	1.066
Work study	0.039	0.039	0.108	0.103	0.061	0.052
Loans	0.852	0.840	1.065	1.135	0.450	0.489
Student characteristics						
Average age	21.758	21.867	n/a	n/a	22.958	22.571
Proportion female	0.580	0.567	0.651	0.661	0.589	0.600
Race						
Proportion white	0.607	0.625	0.441	0.567	0.642	0.647
Proportion Asian	0.134	0.128	0.092	0.064	0.053	0.060
Proportion black	0.052	0.054	0.026	0.035	0.079	0.083
Proportion other race	0.169	0.165	0.349	0.310	0.109	0.100
Proportion financially independent	0.272	0.267	0.276	0.269	0.391	0.350
Proportion married	0.101	0.115	0.145	0.117	0.144	0.122
Sample size by academic year						
All years	1038	1058	152	171	838	797
2005-06	161	165	36	39	162	153
2006-07	161	176	29	31	156	126
2007-08	188	190	29	16	148	149
2008-09	186	201	27	23	156	161
2009-10	185	170	15	34	94	115
2010-11	157	156	16	28	122	93

*For Community and Technical Colleges, these variables are measured for two and three years, respectively.
Financial aid status and student characteristics measured in year of admission

Exhibit B4

Regression Discontinuity Estimates—Alternate Specifications, (2005-06 to 2010-11)
50% MFI Threshold, Dependent Variable: Enrolled Next Year, Bandwidth=2%

Sample:	Public four-year institution			Community and technical colleges		
Independent variables	**Coefficient**	**SE**		**Coefficient**	**SE**	
Intercept	0.686	0.046	***	0.331	0.111	***
Reduced Grant (25% reduction)	-0.028	0.028		-0.094	0.052	*
Median Family Income	0.009	0.013		0.042	0.022	*
Sophomore	-0.003	0.021		0.148	0.059	**
Upper class standing	0.038	0.017	**			
Independent Status	-0.007	0.025		-0.006	0.040	
Married	-0.02	0.025		-0.082	0.039	**
Age	-0.001	0.002		0.000	0.003	
Full-time	0.256	0.020	***	0.294	0.025	***
Female	-0.015	0.013		0.031	0.023	
White	0.023	0.017		-0.006	0.029	
Asian	0.057	0.023	**	0.068	0.054	
Black	-0.012	0.031		0.063	0.047	
Financial Aid (relative to maximum SNG award)						
Other Grants	0.027	0.010	***	0.087	0.015	***
Work Study	0.072	0.048		-0.023	0.044	
Loans	0.019	0.009	**	0.028	0.012	**
Year Controls	Yes			Yes		
County of Origin Controls	Yes			Yes		
Institutional Specific Controls	Yes			Yes		
R Squared	0.155			0.197		
N	2096			1635		

*Statistically significant at the 0.10 level

**Statistically significant at the 0.05 level

***Statistically significant at the 0.01 level

Exhibit B5

Summary of Regression Discontinuity Results

Median Marginal Effects of SNG Reduction across 12 Models

	Persistence: re-enrolled next fall	Degree completion within four years (two years for CTC)	Degree completion within six years (three years for CTC)
Cohorts	2005-06 through 2010-11	2005-06 through 2007-08	2005-06 through 2006-07
MFI threshold 50%			
Public four-year	-2.2%	-2.1%	-8.3%
CTC	-3.8%	1.6%	-4.0%
MFI threshold 70%			
Public four-year	-2.4%	-9.0%	-7.5%
CTC	0.4%	-4.6%	2.4%

*Twelve models include linear, interactive and quadratic models estimated for bandwidths 2 thru 5. All models are estimated including a full set of control variables.

Exhibit B6

Elasticities: Effect of Need Grants on Subsequent Fall Enrollment

Study	Treatment group N	Comparison group N	Inverse variance weight	Random effects inverse variance weight	% change in grant amount	% change in one-year persistence	Elasticity
Goldrick-Rab et al, 2012 (WI)	2,125	12,722	6,569	844	42.0%	4.1%	0.098
Bania et al., 2013 (WA)	1,038	1,058	1,882	639	22.6%	2.5%	0.109
Castleman & Long, 2013 (FL)	3,777	3,777	1,820	632	32.8%	5.3%	0.162
Bettinger, 2010 (OH)	4,026	57,708	922	472	19.7%	3.4%	0.172

Note: Results based on public four-year baccalaureate colleges and universities. Elasticity equals percentage change in persistence (fall-to-fall) divided by percentage change in grant amount.

Meta-analytic result
Weighted mean elasticity: 0.140
Standard error: 0.02
p-value: 0.00

Citations to studies in the meta-analysis

Bania, N., Burley, M., & Pennucci, A. (2013). *The effectiveness of the state need grant program: Final evaluation* (Doc. No. 13-12-2301). Olympia: Washington State Institute for Public Policy.

Bettinger, E. (2010). *Need-based aid and student outcomes: The effects of the Ohio college opportunity grant*. Stanford University School of Education. <http://www.sesp.northwestern.edu/docs/need-based-aid-why.pdf>

Castleman, B. L., & Long, B. T. (2013). *Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation*. National Bureau of Economic Research. <http://www.nber.org/papers/w19306>;

Goldrick-Rab, S., & University of Wisconsin—Madison. (2012). *Need-based financial aid and college persistence: Experimental evidence from Wisconsin*. Madison, Wis: Institute for Research on Poverty, University of Wisconsin-Madison

C. Alternate State Grant Awarding Formulas

Minnesota: Formula is based on a "shared responsibility" model where the cost of attendance is divided among:

1. Students—pay 46% of the cost of attendance
2. Family—responsible for 96% of the expected parent contribution (for dependents) or 86% of the expected student contribution (for independents) if no children in family, or 50% of the expected student contribution if the student is independent and has children
3. Government—the Minnesota State Need Grant is equal to the cost of attendance minus the student and family responsibility (above) and total amount of the Federal Pell Grant.

For the current academic year, the maximum award (Pell plus MN State Grant) ranges from $6,650 at public two-year colleges to $10,450 at private four-year colleges.

Source: http://www.ohe.state.mn.us/mPg.cfm?pageID=138

North Carolina: Need-based aid in North Carolina is delivered using two different formulas for students in the baccalaureate and community college sectors. The University of North Carolina (UNC) Need-Based Grant Program is available to resident undergraduate students attending one of the 16 campuses in the UNC system. The grants range from $200 to $3800 and are set at the level of remaining need after the following amounts are subtracted from the cost of attendance (COA):

- Federal Pell Grant
- Self Help Expectation of $4,500
- Average educational tax credit of $950
- Modified Expected Family Contribution (EFC)

The UNC methodology for calculating the EFC is more generous than the federal formula. The exact calculation does not include income of dependent students, but does include a higher income protection, employment, and asset allowance. Since data elements from the FAFSA were not available for our analysis, we estimated the modified EFC as 80% of the expected parent contribution.

The North Carolina Community College Grant Program provides a "floor" of $4,350 (in 2011-12) for eligible students with and EFC at or below $5,000. That is, if the Pell Grant is less than $4,350, the NC Carolina Community College Grant will make up the difference for Pell eligible students.

Source: Pathways, College Foundation Inc. and State Education Assistance Authority. (2007). *State Programs for Students Attending UNC System Universities*. Retrieved from http://www.cfnc.org/static/pdf/home/sc/pdf/G635b.pdf
http://www.cfnc.org/Gateway?command=GetBasedProgramDetail&note=no&type=7&vocType=-1&vocational=no&id=116
North Carolina State Board of Community Colleges. (2012). *State Board of Community Colleges 2012-2013 NC Community College Grant Program Payment Schedule.* Retrieved from
https://www.nccommunitycolleges.edu/state_board/SBCC%20Agendas%20&%20Attachments/2012/MAR%202012/FC%205.pdf

Oregon: The Oregon Opportunity Grant is also based on a shared model with the following determination of responsibility:

1. Student—$5,700 which is approximately 90% of minimum wage work at 15 hours/week at 48 weeks annually. Students at four-year institutions are expected to take out a $3,000 loan for education purposes, so the student responsibility increases by $3,000 (to $8,700)
2. Family—equals the expected family contribution (student and parent)
3. Government—the government responsibility includes the Pell Grant and an estimated tax credit (American Opportunity Tax credit).

Calculated need is determined after the student, family, and government responsibility has been subtracted from the cost of attendance (tuition and fees plus $12,300). Students with calculated need at or above $1,950 receive an Oregon Opportunity Grant. The grant is equal to $1,950 (full-time, full year students only, and all sectors).

Source: http://oregonstudentaid.gov/oregon-opportunity-grant.aspx

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Pennsylvania: The Pennsylvania State Grant is based on a cost of college formula which is set at tuition plus a $1,000 allowance for books and supplies and a $4,000 "educational expense allowance" (replaces room and board allowance). The formula sets student need at the cost of college less the expected family contribution and Pell Grant.

The Pennsylvania State Grant is calculated as a percentage of the students need. A need adjustment is applied in the following manner:

- 47% of need covered for students with EFC between $0 and $4000
- 37% of need covered for students with EFC between $4000 and $6000
- 32% of need covered for students with EFC between $6000 and $8000
- 27% of need covered for students with EFC between $8000 and $10000
- 10% of need covered for students with EFC between $10000 and $12000
- 3% of need covered for students with EFC above $12,000

The minimum PA State Need Grant award is $500 for eligible students, with a maximum of $2,313 for students with educational costs below $11,000 ($3,700 for students with costs above $11,000).

Source: Pennsylvania Higher Education Assistance Agency. (2012). *Pennsylvania State Grant Program Manual 2012-13 Program Year.* Retrieved from http://www.pheaa.org/funding-opportunities/state-grant-program/pdf/2012-2013/Program-Manual.pdf

D. Creating a Research Dataset

Identifiable student records for this evaluation were provided under data sharing agreements designed to protect student privacy and confidentiality. Each participating institution (or association) provided student-level data to the Washington State Education Research Data Center (ERDC). After establishing the link between a student found in the financial aid (State Need Grant) file and those found in institutional enrollment files, each record was assigned a random student identifier. All information that could potentially identify a student was then removed before a combined research dataset was sent to WSIPP.

This process permitted tracking of student outcomes and financial aid status over time and across different colleges. The creation of this research dataset involved substantial coordination and effort. Future projects that combine data in this manner should consider the following:

- Timing—many institutions do not officially "close" or finalize academic records for 9-12 months after the completion of an academic year. Different sectors have different reporting timelines and due dates for data submission. Anomalies or inconsistencies in records from even one institution can result in substantial re-work and delay statewide or sector-specific results.
- Linking student records—the federal Family Education Rights and Privacy Act (FERPA) protects confidential student data from unauthorized disclosure. By working with the Educational Research and Data Center (ERDC), we were able to create a process to link records while protecting student confidentiality. This linkage involved deterministic matching of social security numbers, names and dates of birth, and some additional probabilistic matching strategies and manual review of linkages when key fields used for matching, such as SSN, were not available.

  While every effort was made to create the best possible match, linking student records across different data collection systems and time inevitably results in an uncertain number of unmatched or mismatched records. Improving the data quality and completeness of key linking fields, such as middle name and SSN, would improve this process.
- Standardized File Formats—we worked extensively with research staff at private universities to develop common definitions and categories for the submission of enrollment and degree completion information. While we believe the data are consistent and reliable, it would be valuable to create a set of common data requirements for institutions participating in the SNG so this research could be replicated in the future.

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