CHANGING DIRECTION:

Integrating Higher Education
Financial Aid and Financing Policies

Informing Public Policy: Financial Aid and Student Persistence

August 2003

WICHE

Supported by a grant from Lumina Foundation for Education

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Donald E. Heller

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Western Interstate Commission for Higher Education

The Western Interstate Commission for Higher Education (WICHE) is a public, interstate agency established to promote and facilitate resource sharing, collaboration, and cooperative planning among the Western states and their colleges and universities. Member states are:

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California	Nevada	Utah
Colorado	New Mexico	Washington
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WICHE's broad objectives are to:

- Strengthen educational opportunities for students through expanded access to programs,
- Assist policymakers in dealing with higher education and human resource issues through research and analysis, and
- Foster cooperative planning, especially that which targets the sharing of resources.

This publication was prepared by the Policy Analysis and Research Unit, which is involved in the research, analysis, and reporting of information on public policy issues of concern in the WICHE states.

This report is available free of charge online at http://wiche.edu/Policy/Changing_Direction/Pubs.htm.

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Foreword

Financial aid issues have emerged in public policy in recent years as states and their higher education institutions struggle to determine how to best allocate limited resources across a wide range of financial aid programs. Not only must states and institutions consider the needs of their citizens and the state, they must also look at the distribution of funds among programs that serve needy students and those that serve meritorious students or those with special skills.

However a state or institution decides to award its financial aid, there is the hope that by granting aid the student will persist in college and graduate. The actual granting of money is done with the expectation that the additional money will either make it possible for the student to stay enrolled until graduation or it will entice the student to stay at that particular institution or in that state. The major objective from the state and institutional perspective is to retain the student by providing financial assistance.

The relationship between financial aid and persistence is a tenuous one. And measuring or studying that relationship is made even more fragile by the push and tug of a myriad of other factors in a student's life. In addition to looking at financial aid in terms of influencing student behavior, states must make choices through public policy about the most effective mechanism for delivering the aid—through state-based programs or through institution-based programs.

This study by Dr. Donald Heller, Pennsylvania State University, was commissioned through *Changing Direction: Integrating Higher Education Financial Aid and Financing Policies*, a national initiative designed to help states and key constituents examine how to structure financial aid and financing policies and practices to maximize participation, access, and success for all students and to promote more informed decision making on issues surrounding financial aid and financing in higher education. *Changing Direction* serves policymakers in the legislative and executive branches of state government and their staffs, higher education researchers, state executive agencies, governing and coordinating boards, educators, college and university leaders, and business and corporate leaders.

This report is one of a series of documents produced to foster greater understanding of key issues related to establishing stronger alignment of financial aid and financing policies. Four complementary reports are:

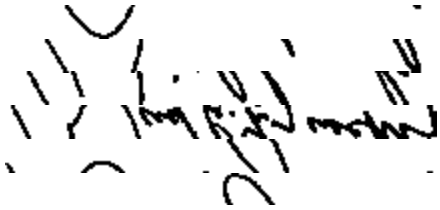
- ***Policies in Sync: Appropriations, Tuition, and Financial Aid for Higher Education —*** A set of four commissioned papers that look into a system comprised of integrated financial aid and financing policies.
- ***Linking Tuition and Financial Aid Policy: The State Legislative Perspective***— Summary of survey responses from legislative leaders in the US on the degree of alignment between tuition and financial aid policymaking, their role in the policymaking

process, and their degree of satisfaction with the process.

- ***Tuition and Fees Policies in the Nation's Public Community Colleges*** – An analysis of tuition and fees policies among public community colleges in the U.S. with implications for public policy.
- ***Integrating Financial Aid and Financing Policies: Case Studies from Five States*** - A collection of case study reports from Arizona, Connecticut, Florida, Missouri, and Oregon as they have tried to align state higher education policies related to financial aid and financing

The *Changing Direction* project has been successful in large part because of WICHE's collaboration with the American Council on Education (ACE) and the State Higher Education Executive Officers (SHEEO). ACE's Center for Policy Analysis and SHEEO have long-standing reputations for high-quality work on a wide range of issues, with a history of specializing in financial aid and financing issues. WICHE and its partners also collaborate closely with the national Conference of State Legislatures (NCSL), a national, bipartisan organization that brings even more visibility to the project and provides additional expertise concerning the state legislative role in creating integrated higher education policy. The cooperation among the organizations has been especially valuable to this project.

WICHE is most grateful to Lumina Foundation for Education, a private, independent foundation that strives to help people reach their potential by expanding access and success in education beyond high school, for its generous support of this project. Without the Foundation's assistance and encouragement, this project would not be possible.



David Longanecker
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Executive Summary

Changing Direction: Integrating Higher Education Financial Aid and Financing Policies, a project of the Western Interstate Commission for Higher Education (WICHE), examines how to structure financial aid and financing policies and practices to maximize college participation, access, and success for all students. This study, *Informing Public Policy: Financial Aid and Student Persistence,* was commissioned by WICHE to help support one of the *Changing Direction* project goals: that of helping to inform decision-making on issues related to financial aid and student success.

The primary objective of this report is to shed light on the topic of institutionally and state-funded grants to students attending public higher education institutions. This study uses data from a nationally representative survey of the U.S. Department of Education to analyze the characteristics of students receiving these grants and whether the use of the grants has changed in recent years. It also examines whether the institutional and state grant awards are related to student persistence and degree attainment. Bivariate and multivariate statistical methods are used to perform these analyses.

Data presented in this report indicate that while the number of institutional grant awards and average award size increased between the 1995-1996 and 1999-2000 academic years, the size of the awards did not keep pace with the increase in tuition costs at four-year institutions, though it did at community colleges. In addition, institutional aid in the latter year was much more likely to be awarded without consideration of financial need: while in 1995-1996, 42 percent of institutional grant dollars provided to undergraduates in public institutions was awarded without means testing, four years later almost two-thirds of all dollars were awarded in this fashion. This trend echoes that of the growth of state-sponsored merit scholarship programs. Combining state and institutional awards, 28 percent of the total dollars were awarded without consideration of financial need in 1995-1996, a proportion that grew to 46 percent in 1999-2000.

The analyses of the distribution of institutional grant awards by student characteristics indicate some distinct patterns. Full-time, dependent, and traditional college-age students (under 24) were more likely to receive awards, and the awards received were larger than those to part-time, independent, and older students. While lower-income students were more likely to receive an institutional grant, the overall size of the average grant received was larger for middle- and higher-income students.

In examining institutional grant awards in states with relatively greater spending on state-funded aid, compared to their lower-spending peers, different patterns were found. Students in the low-aid states were more likely to receive an institutional grant, and institutions in these states made much greater use of non-need grants than did those in the high-aid states. The average non-need grant tended to be larger than need-based awards.

The multivariate analysis examines how a variety of variables were related to the persistence and degree attainment of students who began their college careers in public institutions in the 1995-1996 academic year (many of those variables were also found in earlier research to be related to persistence). The analyses confirmed the prior research: academic factors are the strongest predictors of whether a student successfully navigates his or her way through college to the ultimate attainment of a degree or certificate.

Institutional grants, however, were still found to be related to persistence and attainment even after controlling for the demographic, academic, institutional, and college cost factors included in the models. Students who received an institutional need-based grant of $1,200 in their first year of college (the average grant award) were 6 percentage points more likely to persist into their second year than were students who did not receive an institutional need-based award.

Awarding of institutional aid early in a student's career was an important predictor of much later persistence or attainment of a credential (certificate, associate's degree, or bachelor's degree). Students who received a $1,200 need-based grant in their first year in college were 6 percentage points more likely to persist than nonrecipients; those who received the average non-need award ($2,000) were also 6 percentage points more likely to persist until or attain some type of credential by the 2000-2001 year. Institutional non-need grants had the same relationship with attainment of a bachelor's degree by that year. The finding that work-study awards were also related to persistence and attainment by the sixth year also echoes that of other researchers. State aid was also found to be related to persistence into the second year (non-need grants) and bachelor's degree attainment (need-based grants).

The analyses in this report demonstrate the important role that both institutional and state aid can play in promoting persistence and degree attainment. Even controlling for other factors influential on these outcomes, grants from institutions and the state – aid awards that are under the direct control of state and/or institutional policymakers – are predictors of postsecondary success.

Institutional grants have become an important part of the fabric of a financial aid system in this country that has been described by one recent observer as "a hodgepodge of programs involving a number of participants with diverse interests."[1] In the 1999-2000 year, public higher education institutions in this country awarded $2.5 billion in institutional grants to undergraduate students, while the states, through their grant programs, awarded another $2.1 billion to undergraduates in public institutions. These two sources combined provided more than the $4.5 billion awarded in Pell Grants, the primary federal financial aid program.

The states and their higher education institutions have a large amount of resources available to help offset the costs of attending college for their students (and supplement the assistance available from the federal government and private sources). How these two sources of aid are coordinated – or more appropriately, *whether* they are coordinated – is going to vary from state to state, depending

largely upon the higher education governance structure in each. States with more centralized control over public higher education institutions or systems have more opportunities to ensure that state and institutional financial aid programs work in tandem to accomplish the state's goals regarding higher education access, persistence, and degree attainment.

Whether their state has a strong, centralized higher education governance structure or a more decentralized configuration, there are a number of steps decision makers should go through to determine how best to use the limited resources available to promote the persistence and degree attainment of public college and university students. These discussions should be engaged in by a broad array of constituents who have responsibility for establishing the goals of public higher education in the state, as well as for carrying out the implementation of those goals. Legislators, executive branch education advisors, higher education governing or coordinating boards, system heads, campus leaders, leaders of the business sector, and community organizations – all can play an important role in helping establish objectives and devising programs and strategies for accomplishing them.

Introduction

About the *Changing Direction* Project

Changing Direction: Integrating Higher Education Financial Aid and Financing Policies examines how to structure financial aid and financing policies and practices to maximize participation, access, and success for all students. With funding support from Lumina Foundation for Education, the Western Interstate Commission for Higher Education (WICHE) embarked on a multiyear project with the goal of better, more informed decision-making on issues surrounding financial aid and financing in higher education.

Changing Direction provides a venue for policymakers and educators from all regions of the country to critically examine strengths and weaknesses of public policies and develop new models by looking at emerging trends, their potential impact on higher education, and the policy implications related to issues of financial aid, finance, cost of education, and access. While this necessarily involves all sources of assistance and financing – federal, state, local, and institutional – the project focuses on state policies and practices. It addresses current practices and policies, with emphasis on exploring innovative, creative, perhaps untested approaches to national- and state-level challenges. *Changing Direction* serves policymakers in the legislative and executive branches of state government and their staffs, higher education researchers, state executive agencies, governing and coordinating boards, educators, college and university leaders, and business and corporate leaders.

WICHE's primary partners in this initiative are the State Higher Education Executive Officers and the American Council on Education. WICHE is also collaborating closely on the project with the National Conference of State Legislatures. [2]

A Brief History of State and Institutional Financial Aid

State support of higher education in the United States began with public allocations to private, largely church-chartered institutions.[3] This support was often in the form of the granting of public lands and authorization for the running of lotteries to benefit the institution. Many state governments in the late 18th and early 19th centuries began to provide direct financial assistance from general tax revenues to support a number of private colleges and universities. Spurred in part by the Morrill Act of 1862, state support for higher education expanded through the 19th and 20th centuries, with most states focusing their direct appropriations primarily on public institutions.

As early as the first half of the 20th century, some states began to develop state-sponsored financial aid programs. The Truman Commission on Higher Education, in its review of the financing of higher education, singled out the New York state scholarship program (the nation's first large-scale state program),

which awarded grants based on performance in the regents examinations.[4] While the Commission did encourage states to develop their own scholarship programs to help meet the goal of equal opportunity in higher education, its primary recommendation was the creation of a federally funded program because of its belief that the states would not or could not step up to their obligation:

> Irrespective of, and in addition to whatever program of grants-in-aid the Federal Government may decide to adopt, this Commission urges generous extension of State scholarship provisions. Nevertheless, it is realistic to concede that in the immediate future many States will not feel that they can afford to embark upon such a program. . . . In other words, however intrinsically desirable it is to extend such a program within the States, this Commission believes that such scholarships would not represent a sufficiently comprehensive or adequate attack upon the problem; and especially would this be true in the less prosperous states.[5]

Notwithstanding the pessimism of the Truman Commission, a number of states did join New York in developing their own scholarship programs. By the end of the 1960s, the Carnegie Commission on Higher Education reported that there were 19 state-run scholarship programs, and in the 1969-1970 academic year they awarded a total of almost $200 million in grants to 488,000 students.[6] The programs ranged in size from Maine's, which appropriated $61,000 and served 150 students, to the oldest program in New York, where $59 million was divided among 263,000 students.

It took the federal government almost two decades to respond with legislation to help accomplish the goal of equality in educational access established by the Truman Commission. The Higher Education Act of 1965 established the federal government's first broad-based student assistance programs. An important feature of the first reauthorization of the Higher Education Act in 1972 was the creation of the State Student Incentive Grant (SSIG) program, which provided federal matching funds for state-run, need-based grant programs. This proved to be a critical catalyst to the development and expansion of the state programs. While in 1969, 19 states appropriated just under $200 million for these programs, by 1974, this had expanded to 36 states and $423 million.[7] By 1979, every state (and the District of Columbia) reported at least one grant program, and the total appropriated funds had increased to over $800 million.[8] A 1975 survey conducted by the National Association of State Scholarship Programs commented that "growth represented in '74-75 and '75-76 in the historical summary table above, to a large degree, is a response to the new SSIG Program which permits up to a $1,500 annual student award (equal shares of $750 Federal/State) in this new form of State/Federal partnership."[9] State grant programs continued to expand in the 1980s and 1990s. As of the 2001-2002 fiscal year, 48 states (all but Alaska and South Dakota) had programs awarding a total of over $5 billion in grants to undergraduate students.[10]

The advent of institutional grants in public colleges and universities is a relatively new phenomenon. There has been little research conducted on the topic (more research exists on the use of institutional aid by private

colleges and universities), but there are some data available from the National Center for Education Statistics (NCES). Through its Integrated Postsecondary Education Data System (IPEDS) surveys, which by law are to be completed by every Title IV eligible institution in the country annually, NCES has tracked institutional spending on financial aid since 1987.[11] In FY 1987, public institutions awarded $486 million in institutional grants and scholarships. By 1996, this total increased 294 percent, to over $1.9 billion.[12] In contrast, institutional spending in private institutions increased 227 percent during this same period, and the Consumer Price Index increased 39 percent.

State and institutional grants to undergraduates in public institutions in the 1999-2000 academic year totaled $4.7 billion, or over 41 percent of the total grants received by students in these colleges and universities. In contrast, federal Pell Grants represented 40 percent of the total grants (the remaining 19 percent were from private sources). State and institutional grants have become an important part of the complex mechanism the nation uses for funding higher education. Understanding how these sources of aid are used – and in particular, how they are used to promote the persistence and degree attainment of students – is an important policy issue for states and higher education institutions alike.

Objectives of this Study

This study was commissioned by WICHE in order to help support one of the *Changing Direction* project goals of "more informed decision-making on issues surrounding financial aid and financing in higher education."[13] As the public as well as policymakers at both the federal and state levels scrutinize higher education to ensure its accountability for use of public resources, higher education and state leaders need information and analyses to ensure that those resources are being used effectively and efficiently. Concerns have been raised that while the country has made great progress in improving overall access to higher education, we have been less successful in ensuring that students are successful once they are in college. And "success" has generally been defined as attaining some form of degree or credential before leaving postsecondary education.

The primary objective of this report is to shed light on the topic of institutionally and state-funded grants to students attending public higher education institutions. While there has been a fair amount of research conducted on state financial aid, much less is known about how institutional grants are used in public colleges and universities. This study uses data from a nationally representative survey of the U.S. Department of Education to analyze the characteristics of students receiving these grants and whether the awarding of these grants is related to persistence and degree attainment. A secondary objective is to familiarize state and institutional policymakers with the type of data available from the federal government that could be used for conducting their own analyses of student persistence.

Following this introduction, the report provides a brief summary of the research on college retention and degree attainment, with a focus on the role of financial aid. The subsequent section summarizes the use of institutionally

funded grants by public colleges and universities in 1999-2000, the most recent year for which data are available. Section 4 then provides a multivariate analysis of the relationship between a number of factors – including characteristics of the students themselves and of the institutions they attend – to examine how financial aid is related to persistence in the context of other determinants. The final section of the report summarizes the key findings of the study and presents some questions for policymakers at the state and institutional level. These questions are designed to help stimulate discussion of the relationships between state and institutional financial aid policy by the participants in the *Changing Direction* project.

Brief Review of the Research on Financial Aid and Persistence

The last three decades have seen a large amount of research on the factors that affect persistence in college. These studies utilize a variety of methods and techniques; qualitative, quantitative, case studies, descriptive, multivariate. Entire books have been written on the topic.[14] Scholarly journal articles and monographs, too numerous to list, have also addressed the topic. These studies have found a number of factors that help determine whether a student persists through a college program. Socioeconomic factors, academic aptitude and preparation (both in high school and college), and institutional factors have all been found to help promote or hinder retention.[15]

In recent years, the relationship between financial aid and persistence has received more attention. As the price of college has increased (as measured against the ability of students and their parents to pay), the role of financial aid both in promoting access to college and in helping to ensure students stay enrolled once there has received much more attention. The diversification of the student body to include groups who historically had rarely participated in higher education – including the poor, minority and handicapped students, and students older than the traditional college-going ages of 18 to 24 – has also helped to raise the visibility of the importance of financial aid in promoting student success.

There are a number of difficulties in conducting research on this relationship. First, the term "financial aid" encompasses a wide variety of programs from a number of different sources. Financial aid generally is provided in one of three forms, each of which can have a number of varieties: grants, scholarships, or tuition waivers, which are subsidies toward tuition that are considered gifts and do not have to be repaid by the recipient; loans, whose repayment may or may not be subsidized by the federal or a state government; and work-study assistance, which requires that the student perform some form of work, usually on campus, for which they are paid a wage that is largely subsidized by the federal government (and in some cases, by state governments).

A second difficulty is the longitudinal nature of the act of persisting in college and attaining a degree. Unlike cross-sectional studies, which generally only require an interaction between researcher and subjects at a single point in time, research on persistence requires that students be followed for some period of time. Longitudinal research tends to be expensive to conduct because of the logistical difficulties of staying in contact with a group of subjects and revisiting them on a periodic basis to obtain more information.

A third complexity with conducting research on financial aid and student persistence is the changing nature of financial aid programs. Most aid programs, whether operated by the federal or state governments, private groups, or higher education institutions, often change their eligibility rules and award levels on an annual basis. This makes it difficult to assess the

impact of a particular form of aid because it becomes a moving target; just as student behavior (that is, whether they persist or dropout) changes, so are the sources and types of financial aid.

Even given these problems, however, a good body of research has developed to help us better understand this relationship. Quantitative research conducted by such scholars as Edward St. John, Michael Paulsen, and Larry Leslie and Paul Brinkman have used multiple datasets and statistical techniques to try to tease out the effects of financial aid, separate from those of the other factors, on persistence and degree attainment.[16] A number of government agencies and nongovernmental policy organizations have also sponsored research in this area.[17]

In general, the research on the relationship between financial aid and college persistence has found positive effects: that is, the receipt of a financial aid award is positively related to higher rates of persistence. These findings hold true even in those multivariate analyses that control for many of the other factors related to persistence and degree attainment. In a review of much of this literature, Pascarella and Terenzini concluded that "while the findings were somewhat mixed, students who receive financial aid are as likely to persist in college as those who do not, even when academic abilities are taken into account."[18] They ascribe this effect to aid's ability to "level the financial playing field" for students from different income backgrounds. The implication is that without the financial aid, these students would be *less* likely to persist than their peers who did not receive aid.

These positive effects of financial aid on persistence have been reported for all three forms of aid: grants, loans, and work-study. In some studies the effects are more pronounced on within-year persistence (staying enrolled from the first semester to the second) than on year-to-year persistence. As with reviews of the research on the relationship between financial aid and initial college entry, grants have often been found to be the best type of aid for promoting persistence.[19] While work-study has also been found to be positively related to persistence, there is still some question whether the effect is primarily because of the financial assistance work-study provides or because of its value in helping students become more integrated into their college campuses.

There are a number of areas of need in the body of research on the relationship between financial aid and persistence. Most of the work on student loans was conducted using cohorts of students that attended college before the large expansion in loan limits (and consequential increase in student indebtedness) that occurred in the 1992 reauthorization of the Higher Education Act. In the nine years since the increase in loan limits in that reauthorization (the most recent for which data are available), borrowing in the federal student loan programs increased 168 percent. In the prior nine years leading up to the 1992 reauthorization, student indebtedness increased only 91 percent.[20] Research using more recent cohorts of students is needed to assess whether student loans are still positively related to persistence, given these increased debt burden levels. Congress is set to examine whether loan limits need to be raised again in the current reauthorization, yet some

organizations have questioned whether student loan burdens are already too high.[21]

A second area is an examination of the effects on persistence of different forms of grants. Historically, the great majority of grants provided by states and public institutions were awarded using financial need as the primary criterion. Yet in both state and institutional grant programs, the recent trend has been in the use of merit aid, or aid awarded without consideration of financial need (see Section 4 of this report for more on this issue). Few studies have examined directly the differing effects of need-based versus merit grants on persistence, though some recent research on related topics may help shed light on this question.[22] This report does begin to address this issue, however.

Analysis of Institutional Grant Awards in the 1999-2000 Academic Year

Introduction

Since 1986, the National Center for Education Statistics (NCES) of the U.S. Department of Education has conducted a series of studies examining the use of financial aid in American colleges and universities. The National Postsecondary Student Aid Studies (NPSAS), conducted every three years through 1995, and then every four years, is a cross-sectional, nationally representative survey of over 50,000 college students across the country. The surveys include information about the students' socioeconomic backgrounds, academic performance in high school and college, financing of college, and reasons for attending college, as well as information about the colleges the students attend.[23]

In addition to the cross-sectional data, NPSAS includes in alternating surveys longitudinal data about students who were beginning their postsecondary careers or completing a baccalaureate degree. These longitudinal surveys, which include varying numbers of follow-up questionnaires, can be used to answer questions about the persistence of students in college, as well as about the post-baccalaureate experiences of graduating students.

Data from the NPSAS:2000 survey, the most recent available, were used to analyze the use of institutional grant awards to undergraduates by public institutions in the 1999-2000 year.[24] In that year, these institutions enrolled over 12 million undergraduate students in academic or vocational programs. Analyses for all institutions nationally are first presented, followed by an analysis of states that have large state-run grant programs compared to states with much smaller programs.

National Data

Aid awards by institutional sector

Table 3.1 presents data on institutional grant awards for all public institutions and by sector. As described earlier, over 12 million undergraduates were enrolled in public institutions in 1999-2000. Approximately 12 percent of all students received some form of institutional grants, with 7 percent receiving a need-based award and 6 percent receiving a non-need award.[25] The average grant (for students who received a grant) totaled approximately $1,800, with the need awards averaging $1,200 and the non-need awards averaging $2,300 each.[26]

Table 3.1 Institutional Grant Awards by Sector, 1999-2000

Category	% of students receiving grant	Mean grant amount
All public		
All grants	11.7%	$1,791
Need grants	6.5	1,213
Non-need grants	5.7	2,296
Community colleges		
All grants	8.0	757
Need grants	5.3	422
Non-need grants	2.3	879
4-year non-doctoral granting		
All grants	13.9	1,783
Need grants	5.8	1,064
Non-need grants	8.4	2,137
4-year doctoral granting		
All grants	19.2	2,820
Need grants	9.4	2,185
Non-need grants	10.6	3,023

Not surprisingly, doctoral-granting institutions were most likely to give institutional grants to students and gave the largest grants, on average. These institutions generally charge the highest tuition in the public sector, and in those states where the institutions have the discretion to utilize tuition revenue as they see fit (often within some broad constraints imposed by state regulations), these revenues can be used to fund institutional aid programs through "tuition recycling." These doctoral institutions are also the most likely to be engaged in fund raising and development programs which can be used to create endowed or annually funded scholarship programs.[27]

While the average grant at community colleges totaled approximately $750, the mean grant at doctoral-granting institutions was almost four times as large. Only 8 percent of community college students received institutional grants, while almost one in five students attending doctoral institutions received assistance. In all three sectors, non-need grants were larger than need-based grants.

Aid awards by student characteristics

Four characteristics of the students were used to analyze differences in aid awards among these groups: attendance status, income, dependency status, and age. These characteristics have been found in the prior research to be influential in whether students receive financial aid. For example, students who attend college less than half time are not eligible for federal Pell Grants and for many of the state-funded financial aid programs. Many publicly funded aid programs, including Pell Grants and approximately 75 percent of state grant awards, impose financial needs-testing

on recipients. And many aid programs restrict their awards to financially dependent students and/or students in traditional age groups.

The NPSAS surveys record three characteristics of student attendance status: whether they attended college for the entire academic year; whether they attended full time or less than full time; and whether they attended one institution or more than one institution during the year. They also record each student's attendance status separately in the fall semester. I have divided students into three categories: those who attended a single institution full time for the entire academic year; those who began college in the fall semester and attended a single institution during the year, but less than full time for the full year; and all other students, who are excluded from the analysis.

The rationale for the first group is that full-time students attending college for the entire year are most likely to be recipients of financial aid. The rationale for excluding the third group is that the NPSAS data are less reliable for students who either attended more than one institution during the year or were not enrolled in college in the fall semester. This third group includes approximately 20 percent of the 12 million undergraduates enrolled in public institutions in 1999-2000.

Table 3.2 presents grant data for the approximately 80 percent of all students in public institutions who fell into the first two categories described above. Students who attended college full time for the entire academic year were more likely to receive both need-based and non-need grants than were students who attended less than full time, full year. Grants for the full-time students were also larger on average, which is what one would expect given the enrollment intensity of and costs faced by these students.

Table 3.2 Institutional Grant Awards by Attendance Status, 1999-2000

Category	# of grants	% of students	Mean grant
All students (9,631,379)			
All grants	1,296,148	13%	$1,889
Need grants	720,059	7	1,283
Non-need grants	632,572	7	2,409
Full-time, full-year (4,153,750)			
All grants	867,735	21	2,298
Need grants	440,376	11	1,650
Non-need grants	470,408	11	2,694
Less than Full-time/full-year (5,477,629)			
All grants	428,413	8	1,060
Need grants	279,683	5	704
Non-need grants	162,164	3	1,583

To examine the pattern of grant awards by income, I divided all students (public and private institutions combined) in the NPSAS sample into income quartiles, based on their parents' income (in 1998) for dependent students, and their own income (and that of their spouse, if married) for independent students. The analyses include students in the lowest quartile, the two middle quartiles combined, and the highest quartile, based on these income levels.[28]

Approximately 21 percent of students in public institutions were in the lowest income quartile, 52 percent were in the middle two quartiles, and 27 percent were from the highest income group.

	Dependent Students	Independent Students
Lowest quartile	Below $31,646	Below $9,000
Middle two quartiles	$31,646 to $85,583	$9,000 to $41,999
Highest quartile	Above $85,583	Above $41,999

Table 3.3 presents the number of grants and average grant award for students in each income group. Students in the lowest quartile were approximately two and three times more likely to receive any type of institutional grant than were students in the middle and upper income groups, respectively. The average size of the total grant received increased, however, as you go up the income ladder.

Table 3.3 Institutional Grant Awards by Income Quartile, 1999-2000

Category	# of grants	% of students	Mean grant
All students (12,144,763)			
All grants	1,414,630	12%	$1,791
Need grants	789,500	7	1,213
Non-need grants	686,238	6	2,296
Lowest quartile (2,516,995)			
All grants	497,614	20	1,526
Need grants	353,286	14	1,156
Non-need grants	164,168	7	2,139
Middle two quartiles (6,304,261)			
All grants	700,895	11	1,828
Need grants	378,318	6	1,156
Non-need grants	356,302	6	2,367
Highest quartile (3,323,507)			
All grants	216,121	7	2,282
Need grants	57,896	2	1,936
Non-need grants	165,768	5	2,300

For need-based grants, students in the lowest income group were more than twice as likely as those in the middle groups, and seven times more likely than upper quartile students, to receive an award. However, while students in the first two groups received average awards of the same size, higher income students received awards approximately 67 percent larger. This result is likely driven by the fact that higher income students generally attend more expensive schools, and thus their financial need is increased by a higher cost of attendance.

Non-need grants were awarded to students in each of the three groups at approximately equal rates – from 5 to 7 percent of each group received a non-need award. The average size of the awards was also approximately the same for each group.

For an analysis of aid awards by age, a cut point of age 24 (as of December 31, 1995) was used. This is the age below which students are generally considered dependent by federal financial aid rules.[29] Table 3.4 reflects the fact that younger students, who are most likely dependent students, are more likely to receive institutional grants and receive larger grants on average. While those under age 24 represented 55 percent of all undergraduates in public institutions, they received 72 percent of all grants shown in Table 3.4.

Table 3.4 Institutional Grant Awards by Age, 1999-2000

Category	# of grants	% of students	Mean grant
All public (12,144,763)			
All grants	1,414,630	12%	$1,791
Need grants	789,500	7	1,213
Non-need grants	686,238	6	2,296
Under 24 (6,738,850)			
All grants	1,016,081	15	2,107
Need grants	519,472	8	1,419
Non-need grants	544,277	8	2,578
24 and above (5,405,913)			
All grants	398,549	7	987
Need grants	270,028	5	817
Non-need grants	141,961	3	1,217

The pattern for dependency status is similar (Table 3.5). As noted above, students below the age of 24 can be considered independent. Thus, when one includes those students under the age of 24 who are independent with those 24 and above (who must, by federal rules, be independent), the balance shifts to 53 percent of students falling into the independent category. These students received only 37 percent of the institutional grant awards, however, and the awards they received were smaller, on average, than those of their dependent peers.

Table 3.5 Institutional Grant Awards by Dependency Status, 1999-2000

Category	# of grants	% of students	Mean grant
All public (12,144,763)			
All grants	1,414,630	12%	$1,791
Need grants	789,500	7	1,213
Non-need grants	686,238	6	2,296
Dependent (5,761,830)			
All grants	896,150	16	2,189
Need grants	447,834	8	1,515
Non-need grants	490,086	9	2,618
Independent (6,382,933)			
All grants	518,480	8	1,104
Need grants	341,666	5	818
Non-need grants	196,152	3	1,492

The analysis in this section has shown that there are differences in the proportion of students receiving an institutional grant, and the average size of those grants, depending upon the student's characteristics. However, it is important to note that a number of factors influence the awarding of institutional grants. Besides those examined here – which can work in tandem or in conflict in influencing grant awards – other factors include the cost of the institution attended and the availability and awarding of other financial aid. As noted above, higher-income students tend to attend more expensive institutions; thus, all other things being equal, one would expect this factor to lead them to qualify for more need-based aid than if the cost of attendance was more closely equivalent for students from all income groups. Similarly, full-time students will generally qualify for more aid than part-time students.

High Aid Versus Low Aid States

In order to examine whether there were differences in the use of institutional grants in states that had large state aid programs, as compared to states with smaller state-funded programs, 10 states were selected for each category. The selection was made based on a

ranking of the states on how much they spent on need-based grants to undergraduates for every 18- to 24-year-old resident in the state in the 1999-2000 academic year.[30] The 10 highest-spending and 10 lowest-spending states are included in the two categories. The purpose of this analysis is to help answer the question of whether institutions in states that did not have large state-funded aid programs substitute their own grants to make up for the absence of state support, in comparison to states with larger state grant programs.

Each category contains the following ten states:

	Need-based Aid		All Aid	
	Spending per 18-24 pop.	National ranking	Spending per 18-24 pop.	National ranking
High aid states				
New York	$375	1	$386	1
Illinois	301	2	321	2
Pennsylvania	274	3	274	5
Vermont	264	4	269	6
Minnesota	259	5	259	7
New Jersey	253	6	282	4
Massachusetts	202	7	205	9
Iowa	185	8	187	13
Indiana	183	9	186	14
Connecticut	143	10	145	19
Low aid states				
South Dakota	$0	51*	0	51
Georgia	0	50	318	3
Alaska	0	49	22	42
Louisiana	3	48	144	20
Wyoming	3	47	3	50
Hawaii	4	46	4	49
Alabama	4	45	17	44
Mississippi	5	44	67	32
Idaho	6	43	8	47
Arizona	6	42	6	48

* The NASSGAP ranking includes the District of Columbia along with the 50 states.

Together, these 20 states represented 37 percent of all undergraduates enrolled in public institutions in the 1999-2000 academic year: the high-aid states enrolled 26 percent of all students nationally, and the low-aid states enrolled 11 percent.

When comparing financial aid awarded by states and institutions, it is helpful to have an understanding of the relative prices of higher education institutions in the states. The NPSAS data include information about each student's cost of attendance, adjusted for their attendance intensity. Table 3.6 presents this information for each sector in the two groups of states. While the average price of community colleges in each group were statistically no different from one another, the high-aid states had higher prices in the two four-year sectors.[31]
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Table 3.7 shows the comparison of institutional grant awards between the two groups of states. When examining the public sector as a whole, institutions in the low-aid states were more likely to award institutional grants to students than were colleges and universities in the high-aid states. The difference was driven by much larger proportions of non-need grant awards in the low-aid states. Institutions in the high-aid states, however, awarded larger grants on average than institutions in the low-aid states.

Table 3.6 Average Student Cost of Attendance in High Aid and Low Aid States, 1999-2000

Sector	High aid states	Low aid states
All public	$7,716	$7,190
Community colleges	5,331	5,035
4-year non-doctoral granting*	9,377	8,160
4-year doctoral granting*	11,929	10,226

* Estimates between the two groups of states are statistically different.

Table 3.7 Institutional Grant Awards by Sector in High Aid and Low Aid States, 1999-2000

	Top 10 high aid states		Bottom 10 low aid states	
Category	% receiving grants	Mean grant	% receiving grants	Mean grant
All public				
All grants*	7%	$2,443	11%	$1,884
Need grants*	3	1,847†	3	1,071†
Non-need grants*	4	2,719†	9	2,070†
Community colleges				
All grants	3	773	8	1,008
Need grants	1	463	3	621†
Non-need grants	2	915	6	1,118†
4-year non-doctoral granting				
All grants	9	1,983	10	1,877
Need grants	4	964†	NA	NA
Non-need grants*	5	2,718†	9	2,031
4-year doctoral granting				
All grants	17	3,376	16	2,625
Need grants*	9	2,633	4	1,639†
Non-need grants	9	3,600	12	2,827†

* Estimates of the two groups of states for this category of grant in this sector are statistically different.
† Estimates of the need and non-need grants for this group of states in this sector are statistically different.
NA Too few observations to produce a reliable estimate.

In community colleges, students in the low-aid states were more likely to receive institutional grants, while in both four-year sectors, the proportion of students receiving grants in the two groups of states were approximately equal. In all three sectors, students in the low-aid states were more likely to receive non-need grants than their counterparts in the high-aid states. In the four-year doctoral-granting sector, a higher proportion of students received need-based grants in the high-aid states than in the low-aid states.

Table 3.7 also compares the mean need-based and non-need grant in each sector for each group of states to see if the two types of grants are statistically different from one another. In both groups of states across all three sectors, the two types of grants were different from one another, as they were in four-year nondoctoral institutions in the high-aid states and four-year doctoral institutions in the low-aid states (the average non-need awards are larger in each comparison).

The Relationship between Institutional and State Grants, Student Persistence, and Degree Attainment

Description of the Models

In order to untangle the effects of the many variables that affect student persistence and degree attainment (described in Section 2), this section of the report performs a multivariate analysis of this relationship with a special focus on the role of institutional and state grants. The data used for this analysis are from the *Beginning Postsecondary Students Longitudinal Study* (BPS), a survey conducted by the National Center for Education Statistics (2003).[32] Students attending public two-year and four-year institutions were included in the models.

The BPS survey is based on the *National Postsecondary Student Aid Study* of 1995-1996 and extracted approximately 12,000 students who were beginning their postsecondary careers. The students were surveyed in 1998 and again in 2001 regarding their continuing educational progress and other factors. While the BPS surveys provide a wealth of financial aid information about students in their freshman year of college, only limited information about their receipt of financial aid (and college costs) is available for subsequent years. Nevertheless, the survey is a valuable tool for examining the relationship between financial aid and student persistence.

The models used in this analysis group the variables used as predictors into categories, including: student demographic factors; student academics; institutional sector; tuition cost; and student aid. Table 4.1 provides the variables used in the models. For each outcome, the variables are added in blocks by category, in order to show the sequential effects of each group of predictors in each model.

While the BPS survey is rich in information, it has a number of limitations. Because data were collected both from students as well as their institutions attended in the 1995-1996 academic year, there is a great deal of information available, including about financial aid awards, for that year. In the two follow-up surveys, however, data were collected only from student interviews as well as from some federal databases. Thus, there is only limited information available about receipt of financial aid and college costs in students' subsequent years in college. However, because students' experiences in their first postsecondary years are so critical to whether they ultimately attain a degree or not (most students who drop out do so in there first year or between the first or second year), the BPS survey is a useful resource for measuring the effects of a number of variables.

Table 4.1 Variables used in Multivariate Models

Category	Variables
Outcome	Attainment or persistence through 96-97 Attainment or persistence through 00-01 Attainment of a bachelor's degree by 00-01
Demographic	Age as of 12/31/95 Parental education level of highest parent (less than HS, HS grad, college or beyond) Income quartile (1994) Race (white, black, Hispanic, Asian American/Pacific Islander, Native American)
Academic	Attendance intensity (full-time, part-time, mixed full-time/part-time) High school merit index (ACT/SATscore, curricular rigor, GPA) Expected highest degree (95-96) College GPA Number of stopouts
Institutional sector	Institution as beginning student (community college or 4-year)
Tuition cost[9]	Net cost of attendance after aid 95-96
Financial aid	Years of work-study received Years receiving any aid Years receiving Pell Grant Inst. need-based grant amount (95-96) Inst. non-need grant amount (95-96) State need-based grant amount (95-96) State non-need grant amount (95-96)

Note: Varying measures (depending upon what variables are available in the BPS dataset) are used for different outcomes.

The BPS surveys utilized a complex, multistage sampling design, with the sample stratified by institutional sector, and students sampled within institutions. Appropriate statistical methods have been utilized to account for this complex design, including the use of proper weights and Huber/White standard errors to generate estimates that are nationally-representative.[34]

Three different outcomes are modeled: whether the student persisted from the first postsecondary year (1995-1996) to the second (1996-1997); persisted into the sixth year (2000-2001) or ever attained a certificate or degree (associate's or bachelor's); or attained a bachelor's degree by 2001. For the first two outcomes, attainment of a degree or certificate is counted as a positive outcome. The models in this section use logistic regression, an

appropriate multivariate technique when the outcome is dichotomous in nature.

The effect of each predictor on persistence is expressed as a *delta-p* statistic, recommended by Cabrera and Petersen as a method for expressing the relationship between a unit change in a predictor and the estimated percentage point change in the outcome.[35] For example, a *delta-p* value of 0.025 indicates that a one unit change in the predictor is related to a 2.5 percentage point increase in the likelihood that a student would persist (or attain a credential). For categorical variables the effect of the predictor is estimated as compared a baseline, or referent, group within the category. In measuring the relationship between race and persistence, for example, the referent group is white students.

Models of Persistence and Degree Attainment

Attainment or Persistence into Second Year (1996-1997)

Table 4.2 presents the results of the models of persistence into the 1996-1997 academic year. Students were counted as a positive outcome if they enrolled at any time during this year, or attained some type of credential by the end of this year. Model 1 includes only the student's demographic variables; models 2 through 5 add academic variables, the institutional sector, net cost of attendance, and the financial aid information, respectively.[36] Included at the bottom of the table for each model are: the percentage of students in the model with a positive outcome; the number of observations; the number of observations weighted up to national levels; a pseudo-R^2 statistic, which is a measure of the proportion of total variance in the outcome explained by the model; and the percentage of cases that the model properly classifies as a positive or negative outcome (i.e., properly predicts a student as a persister or nonpersister using a cutoff of 0.5).

For example, Model 1 indicates that for every year older a student was, his or her probability of being enrolled in 1996-1997 declined by 1.2 percentage points, controlling for the other demographic variables in the model.[37] Students in the highest income quartile had a probability of persisting that was 8.1 percentage points greater than students in the lowest quartile, again, controlling for the other demographic factors. Eighty-seven percent of the 3,234 students (in public institutions) in the survey persisted into their second year, representing 845,802 students nationally. This first model explains only 4.3 percent of the variance in the outcome (pseudo-R^2 statistic), but properly classifies over 90 percent of the cases[38]

Model 2 adds students' academic characteristics to the demographic variables included in Model 1. With the addition of the academic measures, age and income remain as significant predictors of persistence among the demographic variables. Students who when interviewed during their first year in college reported that they expected to ultimately attain at least a bachelor's degree were 7.6 percentage points more likely to persist than students who did not expect to attain that level of education. Higher ability students were also more likely to persist; every one point of GPA was related to a 6.0 percentage point increase in the probability of persistence, and students with higher merit measures in high school also were more likely to persist. Stopping out of college, however,

Table 4.2 Models of Persistence/Attainment in 1996-1997

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic					
Age as of 12/31/95	-0.012	-0.011	-0.012	-0.011	-0.010
Income – highest quartile (compared to lowest quartile)	0.081	0.072	0.073	0.069	0.087
Race – Asian/Pacific Islander (compared to white)	0.099				
Academic					
Expected degree – BA or greater (compared to less than a BA)		0.076	0.076	0.076	0.076
GPA in 1995-96 (0 - 4 scale)		0.060	0.059	0.059	0.049
HS merit index – middle to high merit (compared to low merit)		0.084	0.080	0.081	
Number of stopouts through 96-97 – 1 or more (compared to none)		-0.123	-0.118	-0.116	-0.099
Tuition cost					
Net cost of attendance 95-96 after aid ($00s)					0.001
Financial aid					
Number of years receiving any aid – 1 or more (compared to none)					0.089
Institutional need-based grants in 95-96 ($00s)					0.005
State non-need grants in 95-96 ($00s)					0.010
Percentage persisting or attaining	87.0%	87.0%	87.0%	87.0%	87.0%
Number of observations in model	3,234	3,234	3,234	3,234	3,234
Weighted observations (nationally)	845,802	845,802	845,802	845,802	845,802
Pseudo-R^2	0.043	0.194	0.196	0.196	0.239
Percentage of cases properly classified	91.0%	90.7%	90.8%	90.7%	91.4%

was strongly related to a failure to make it into the second year. Students who stopped out at least once were 12.2 percentage points less likely to persist into 1996-1997 than were students who had no stopout spells.[39] The addition of the academic factors greatly improved the ability of the model to predict persistence; the demographic and academic factors jointly explained 19 percent of the variance in students' persistence.[40]

The addition of neither the institutional sector nor net cost of attendance were significant predictors in Models 3 and 4. Model 5, which added information about financial aid, did present some new predictors of persistence and improved the overall fit of the model slightly. If a student received any type of aid in either or both of her first two years of college, she was 8.9 percentage points more likely to persist (compared to students receiving no aid in both years). Students receiving institutional need-based grants were one-half percentage point more likely to persist for every $100 in grant aid (that is, a student receiving a $1,000 grant would be 5 percentage points more likely to persist than one receiving no institutional need grant). Students receiving state-sponsored non-need grants were 1 percentage point more likely to persist (for every $100 in grant aid).

While the addition of the financial aid information helped improve the models, some of the academic and demographic factors still remained as important predictors of persistence into the second year. Degree expectations and academic performance in college still remained strong predictors of persistence, even after controlling for financial aid awards. However, when financial aid was controlled for, grade point average in the first year was not quite as strong a predictor of persistence, and stopping out did not have as deleterious an effect on persistence.

Attainment or Persistence into Sixth Year (2000-2001)

The next set of models (Table 4.3) predict persistence into the 2000-2001 academic year, or attainment of a credential (certificate, associate's degree, or bachelor's degree) by the spring of 2001. The models used to predict this outcome include some measures of students' academic and other experiences from the base year (1995-1996) through 2000-2001. This additional information adds to the explanatory power of the models; the fully-specified model (number 5) explains 37 percent of the variation in persistence patterns, compared to only 24 percent of the variation in the models of persistence into the second year.

As with the models of persistence into the second year, academic factors jointly considered were the most important predictors of persistence into 2000-2001, even academic factors earlier in a student's college career. In the fully-specified model, students who attended college exclusively part-time through 1998 were 19.6 percentage points less likely to persist into 2000-2001 than were students who were full-time through 1998. Similarly, students whose attendance intensity was a mix of both part-time and full-time were 10.2 percentage points less likely to persist. Grades were also important predictors of persistence; students who achieved grades higher than C's (average through 2000-2001) were at least 20 percentage points more likely to persist. The only demographic factor that was found to be related to persistence through the fully-specified model was race; black students were 26 percentage points less likely to persist into 2000-2001 than whites, even controlling for the other factors in the model.

Table 4.3 Models of Persistence/Attainment in 2000-2001

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic					
Race – black (compared to white)	-0.169	-0.190	-0.201	-0.192	-0.260
Race – Asian/Pacific Islander (compared to white)	0.151	0.131			
Academic					
Attendance intensity through 97-98 – always part-time (compared to always full-time)		-0.354	-0.327	-0.309	-0.196
Attendance intensity through 97-98 – mixed PT/FT (compared to always full-time)		-0.132	-0.113	-0.114	-0.103
Cum. GPA through 00-01 – mostly B's or B's and C's (compared to mostly C's and below)		0.215	0.215	0.215	0.206
Cum. GPA through 00-01 – mostly A's or A's and B's (compared to mostly C's and below)		0.229	0.229	0.229	0.225
Tuition cost					
Net cost of attendance 95-96 after aid ($00s)					0.002
Financial aid					
Number of years receiving work-study – 1 or 2 (compared to none)					0.125
Number of years receiving work-study – 3 or more (compared to none)					0.160
Number of years receiving any aid – 3 or more (compared to none)					0.179
Institutional need-based grants in 95-96 ($00s)					0.005
Institutional non-need grants in 95-96 ($00s)					0.003
Percentage persisting or attaining	76.3%	76.3%	76.3%	76.3%	76.3%
Number of observations in model	3,382	3,382	3,382	3,382	3,382
Weighted observations (nationally)	1,129,929	1,129,929	1,129,929	1,129,929	1,129,929
Pseudo-R^2	0.026	0.317	0.319	0.319	0.370
Percentage of cases properly classified	80.8%	87.6%	87.5%	87.5%	87.9%

Table 4.4 Models of Bachelor's Degree Attainment through 2000-2001

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic					
Age as of 12/31/95	-.033				
Income – highest quartile (compared to lowest quartile)	0.160				
Race – black (compared to white)	-0.129		-0.109	-0.108	-0.135
Race – Hispanic (compared to white)	-0.115				
Race – Asian/Pacific Islander (compared to white)	0.209	0.192			
Academic					
Attendance intensity through 97-98 – other than full-time (compared to always full-time)		-0.238	-0.179	-0.179	-0.167
Number of stopouts through 00-01 – 1 or more (compared to none)		-0.370	-0.370	-0.369	-0.365
Cum. GPA through 00-01 – mostly B's or B's and C's (compared to mostly C's and below)		0.548	0.544	0.544	0.529
Cum. GPA through 00-01 – mostly A's or A's and B's (compared to mostly C's and below)		0.561	0.562	0.561	0.551
HS merit index – middle merit (compared to low merit)		0.184	0.141	0.140	0.121
HS merit index – middle to high merit (compared to low merit)		0.283	0.209	0.209	0.168
HS merit index – high merit (compared to low merit)		0.297	0.215	0.215	0.189
Institutional sector					
Started in public 4-year (compared to community college)			0.297	0.295	0.251
Tuition cost					
Net cost of attendance 95-96 after aid ($00s)					0.001
Financial aid					
Number of years receiving work-study – 1 or 2 (compared to none)					0.139
Number of years receiving work-study – 3 or more (compared to none)				0.224	
Number of years receiving any aid – 3 or more (compared to none)					0.204
Number of years receiving Pell Grants – 1 or 2 (compared to none)					"0.104
Institutional non-need grants in 95-96 ($00s)					0.003
State need-based grants in 95-96 ($00s)					0.006
Percentage attaining bachelor's degree	41.5%	41.5%	41.5%	41.5%	41.5%
Number of observations in model	3,382	3,382	3,382	3,382	3,382
Weighted observations (nationally)	1,129,929	1,129,929	1,129,929	1,129,929	1,129,929
Pseudo-R^2	0.049	0.416	0.444	0.444	0.464
Percentage of cases properly classified	54.3%	81.3%	81.9%	82.0%	82.1%

Financial aid plays an important role in predicting persistence into later years, also. Students who received one or two years of college work-study support were 12.5 percentage points more likely to persist (controlling for all other factors in the model) than students who received no work-study. Similarly, students who received even more work-study were 16 percentage points more likely to persist than non-work-study recipients.[41] Students who received any form of aid (from any source) in three or more years were 17.9 percentage points more likely to persist than students receiving no aid in their college careers. Students receiving institutional grants in their first year in college were more likely to persist through to 2000-2001. Recipients saw a 0.5 percentage point increase in their likelihood of persisting for every $100 in need-based grants and a 0.3 percentage point increase for every $100 in non-need grants.

Attainment of a Bachelor's Degree by 2000-2001

The third outcome examined is the attainment of a bachelor's degree by June 2001 (Table 4.4). Consistent with the other outcomes modeled, academic factors as a group are the most important determinants of whether a student who started his postsecondary career in a public institution ultimately attains a bachelor's degree. The fully specified model, containing all five categories of predictors, explains 46 percent of the variation in degree attainment.

Overall, almost 42 percent of all beginning students in 1995-1996 ultimately attained a bachelor's degree by 2001. In the fully-specified model (Model 5), the only demographic factor related to degree attainment was race; black students, controlling for all other factors, were 13.5 percentage points less likely to receive a degree. The academic factors are very strongly related to degree attainment. Students who attended college their first three years other than full-time were 16.7 percentage points less likely to attain a degree within six years. Stopouts were also an important predictor of whether a student received a bachelor's degree; students who had at least one stopout were 36.6 percentage points less likely to attain a degree than students who did not stopout.

Grades clearly play a strong role in predicting attainment, with students earning grades above C (again, average through 2000-2001) being over 50 percentage points more likely to persist.[42] Another interesting finding is that the student's high school merit index (constructed for the BPS survey) – which was not a predictor of persistence into the second or sixth years – was a predictor of ultimate degree attainment. The higher was this index (which is in a range of 1 to 4), the greater was the probability the student received a bachelor's degree. In addition, students who began their college careers in a four-year institution were 25 percentage points more likely to ultimately attain a bachelor's degree than were students who began in a community college.[43]

Financial aid did play a role in predicting students' bachelor's degree attainment. Students who received one or two years of work-study were 13.9 percentage points more likely to attain a degree than students who received no work-study, while students with three or more years of work-study were 22.4

percentage points more likely to receive a bachelor's degree. Students who received any type of aid from any source for three or more years were 20.4 percentage points more likely to attain a degree.[44] Students who received one or two years of Pell Grants were 10.4 percentage points less likely to receive a degree than students who received no Pell Grants. This result, which at first glance appears contradictory to much of the research reviewed in Section 2, may be due to the fact that many students who received a Pell Grant for only one

Table 4.5 Institutional and State Grant Awards by Sector, 1995-1996 to 1999-2000

	1995-1996		1999-2000		% Change	
	% receiving	Mean	% receiving	Mean	% receiving	Mean
All public						
All inst. grants	9.8%	$1,496	11.7%	$1,791	19.2%	19.7%
Inst. need grants	7.0	1,201	6.5	1,213	(7.7)	1.0
Inst. non-need grants	3.1	2,020	5.7	2,296	85.2	13.7
All state grants	8.8	1,310	12.6	1,390	43.6	6.1
State need grants	8.2	1,262	9.5	1,346	15.9	6.7
State non-need grants	0.8	1,571	3.4	1,413	346.7	(10.1)
Community colleges						
All inst. grants	7.2	581	8.0	757	11.2	30.3
Inst. need grants	5.6	526	5.3	422	(4.7)	(19.8)
Inst. non-need grants	1.6	777	2.3	879	48.4	13.1
All state grants	5.5	779	9.7	958	75.6	23.0
State need grants	5.4	762	6.8	931	25.4	22.2
State non-need grants	*	*	3.1	970	"	"
4-year non-doctoral granting						
All inst. grants	11.3	1,608	13.9	1,783	23.3	10.9
Inst. need grants	7.4	1,259	5.8	1,064	(22.2)	(15.5)
Inst. non-need grants	4.3	2,039	8.4	2,137	95.6	4.8
All state grants	14.7	1,384	17.7	1,538	20.4	11.1
State need grants	14.0	1,375	14.8	1,472	5.8	7.1
State non-need grants	0.9	1,250	3.2	1,716	250.5	37.3
4-year doctoral granting						
All inst. grants	15.1	2,481	19.2	2,820	27.3	13.7
Inst. need grants	10.3	2,054	9.4	2,185	(8.2)	6.4
Inst. non-need grants	5.8	2,823	10.6	3,023	84.0	7.1
All state grants	12.4	1,819	15.4	1,936	23.6	6.4
State need grants	10.8	1,759	11.0	1,785	1.5	1.5
State non-need grants	2.0	1,807	4.8	2,093	145.9	15.8

* Too few observations to estimate.

or two years may have been enrolled in sub-baccalaureate programs.

Students receiving institutional non-need grants in their first year were also more likely to attain a degree, with an increase in their predicted rate of 0.3 percentage points for every $100 in grants. Students receiving need-based state aid saw a similar boost in their predicted degree attainment rate, with an increased probability of 0.6 percentage points for every $100 in state grants.[45]

Summary of Changes in the Awarding of Institutional and State Grants, 1995-1996 to 1999-2000

One limitation of the multivariate analyses in this section is that they use data from a cohort of students who began college almost eight years ago.[46] Much has changed in the financing of higher education in the ensuing period. For example, tuition prices at public institutions rose substantially from 1995-1996 to 2002-2003; the average cost of attendance at a public four-year increased 39 percent and at community colleges it increased 37 percent.[47] In addition, the provision of state grant aid to undergraduates has increased at even a faster rate, 76 percent from 1995-1996 to 2001-2002.[48]

While the most recent NPSAS data are still approximately four years old, they are still more recent than the 1995-1996 data, and thus, can help shed light on how the use of financial aid has changed since the BPS cohort examined in this section. Table 4.5 shows the percentage of students receiving both institutional and state grants, and the average grant amount (for students receiving grants) from the NPSAS:1996 and NPSAS:2000 surveys.[49] Also shown is the change over the two periods in the proportion of students receiving grants and the average grant amount. Among the notable changes was the increase in the proportion of students receiving both institutional and state non-need grants. Across all public institutions, and within each sector, these categories of grants saw the fastest growth in their use.

Overall, institutional grant spending for undergraduate students in the public sector increased 41 percent, from almost $1.8 billion in 1995-1996 to $2.5 billion in 1999-2000.[50] State grant spending in public institutions increased 51 percent to $2.1 billion during this same period.[51] In the earlier year, 42 percent of institutional grant dollars and 10 percent of state grant dollars were awarded without consideration of financial need. By 1999-2000, these proportions increased to 62 percent and 27 percent, respectively.

During this period, tuition prices increased 20 percent at four-year public institutions and 15 percent in community colleges.[52] The increase in both institutional and state average grant amount (need and non-need combined) did not keep pace with the tuition increase in four-year institutions, but did in community colleges. Tuition prices have again begun to rise more rapidly under the current recession. In the three years from 1999-2000 to 2002-2003, tuition prices in both public college sectors increased another 19 percent.

Conclusion

Summary of Findings

Institutional grant aid in the public sector used to be a little-known phenomenon, restricted largely to use in funding graduate stipends and fellowships. In recent years, however public colleges and universities have begun to make more use of institutional grant awards to undergraduate students.

Data presented in Sections 3 and 4 of this report indicate that while the number of institutional grant awards and average award size increased between the 1995-1996 and 1999-2000 academic years, the size of the awards did not keep pace with the increase in tuition costs at four-year institutions but did at community colleges. In addition, institutional aid in the latter year was much more likely to be awarded without consideration of financial need; while in 1995-1996 42 percent of institutional grant dollars provided to undergraduates in public institutions was awarded without means-testing, four years later almost two-thirds of all dollars were awarded in this fashion. This trend echoes that of the growth of state-sponsored merit scholarship programs. Combining state and institutional awards, 28 percent of the total dollars were awarded without consideration of financial need in 1995-1996, a proportion growing to 46 percent in 1999-2000.

The analyses of the distribution of institutional grant awards in Section 3 indicate some distinct patterns. Full-time, dependent, and traditional college-age students (under 24) were more likely to receive awards, and the awards received were larger than part-time, independent, and older students. While lower-income students were more likely to receive an institutional grant, the overall size of the grant received was larger for middle- and higher-income students.

In examining institutional grant awards in states with relatively larger spending on state-funded aid compared to their lower-spending peers, different patterns were found. Students in the low-aid states were more likely to receive an institutional grant, and institutions in these states made much greater use of non-need grants than did those in the high-aid states. The average non-need grant tended to be larger than need-based awards.

The multivariate models in Section 4 utilized the *Beginning Postsecondary Students Survey* to examine how a variety of variables – including many of those found in earlier research to be related to persistence – were related to the persistence and degree attainment of students who began their college careers in public institutions in the 1995-1996 academic year. The analyses confirmed the prior research that academic factors are the strongest predictors of whether a student successfully navigates her way through college to the ultimate attainment of a degree or certificate.

Institutional grants, however, were still found to be related to persistence and attainment even

after controlling for the demographic, academic, institutional, and college cost factors included in the models. Students who received an institutional need-based grant of $1,200 in their first year of college (the average grant awarded, as indicated in Table 4.5) were 6 percentage points more likely to persist into their second year than were students who did not receive an institutional need-based award.

Awarding of institutional aid early in a student's career was an important predictor of much later persistence or attainment of a credential (certificate, associate's degree, or bachelor's degree). Students who received a $1,200 need-based grant in their first year in college were 6 percentage points more likely to persist than nonrecipients; those who received the average non-need award ($2,000) were also 6 percentage points more likely to persist until or attain some type of credential by the 2000-2001 year.[53] Institutional non-need grants had the same relationship with attainment of a bachelor's degree by that year. The finding that work-study awards were also related to persistence into and attainment by the sixth year also echoes that of other researchers. State aid was also found to be related to persistence into the second year (non-need grants) and bachelor's degree attainment (need-based grants).

The findings of this study provide valuable evidence to inform the policy debate regarding whether financial issues or academics are what limits college access and persistence, particularly for certain groups of students.[54] This study demonstrates that both are related to persistence.

Policy Implications for States and Public Higher Education Institutions

The analyses in this report demonstrate the important role that both institutional and state aid can play in promoting persistence and degree attainment. Even controlling for other factors influential on these outcomes, grants from institutions and the state – aid awards that are under the direct control of state and/or institutional policymakers – are predictors of postsecondary success.

There are also important limitations to the use of the BPS survey for modeling student persistence. For example, there is very little information in BPS to gauge the degree to which students are engaged in their campus and curricular studies, a characteristic that has been found to be important in promoting student retention.[55] Similarly, there is no information in BPS regarding students' participation in federally funded pre-college preparation programs, such as Talent Search and Upward Bound, or in-college assistance programs, such as Student Support Services or McNair Scholars. Also, as mentioned earlier, detailed financial aid information is available only for students' first year in college.

While the evidence here indicates that institutional and state grants in general help to promote persistence, it is difficult to ascribe precise meaning to the differing effects of need-based versus non-need grants. These models are relatively parsimonious, and further investigation would have to be conducted to determine if in fact either type of grant is truly a "better" vehicle for helping students pay for college, or whether the findings in this study are at least in part due to these grants acting as

proxies for some unmeasured characteristics of students or their institutions that are also related to persistence. It is important for policymakers to note that the research on the impact of financial aid on college participation (summarized in section 2) has found that grants are most effective when targeted at students who need the financial assistance in order to attend and persist in college. Further studies could utilize both national data, as from the BPS survey, as well as data obtained from individual state or institutional databases. Models of persistence and attainment are best used when they contain detailed financial aid information for students in every year in college.[56]

As described earlier, institutional grants have become an important part of the fabric of a financial aid system in this country that has been described by one recent observer as "a hodgepodge of programs involving a number of participants with diverse interests."[57] In the 1999-2000 year, public higher education institutions in this country awarded $2.5 billion in institutional grants to undergraduate students. The states, through their grant programs, awarded another $2.1 billion to undergraduates in public institutions. These two sources combined provided more than the $4.5 billion awarded in Pell Grants, the primary federal financial aid program.

The states and their higher education institutions have a large amount of resources available to help offset the costs of attending college for their students (and supplement the assistance available from the federal government and private sources). How these two sources of aid are coordinated – or more appropriately, *whether* they are coordinated – is going to vary from state to state, depending largely upon the higher education governance structure in each. States with more centralized control over public higher education institutions or systems have more opportunities to ensure that state and institutional financial aid programs work in tandem to accomplish the state's goals regarding higher education access, persistence, and degree attainment.

Based on the research conducted on the relationship between college costs and financial aid, and college access and persistence (summarized in Section 2), the analysis of the changes in institutional grant awards from 1995-1996 to 1999-2000 and the patterns of awards in the latter year may pose a troubling trend for disadvantaged students. These students are more likely to be enrolled part time, attend community colleges, and have higher financial need.[58] They are also less likely to qualify for merit grants than their higher-income peers.[59]

Questions and Discussion Items for State and Institutional Leaders

Whether in a state with a strong, centralized higher education governance structure or a state with a more decentralized configuration, there are a number of steps states should go through to determine how best to use the limited resources available that can be focused on promoting the persistence and degree attainment of public college and university students. These discussions should be engaged in by a broad array of constituents who have responsibility for establishing the goals of public higher education in the state, as well as for carrying out the implementation of those goals. Legislators, executive branch education

advisors, higher education governing or coordinating boards, system heads, campus leaders, leaders of the business sector, and community organizations – all can play an important role in helping establish objectives and devising programs and strategies for accomplishing them.

The following is a list of questions and issues to help state and institutional policymakers begin a dialogue on how state resources can best be used to promote the persistence and degree attainment of postsecondary students.

- What are the state's overall educational attainment goals? Does the state need more people with shorter-duration credentials, such as certificates or vocational training? Or does the state need more people with bachelor's degrees? In what fields are these skills needed?

  The answers to these questions may help policymakers decide whether to emphasize access and persistence in community colleges or four-year institutions. Different financial aid and other retention strategies may be best used to promote one goal over the other. For example, the evidence here indicates that students who begin their postsecondary careers in a four-year institution (and stay there) are more likely to earn a bachelor's degree.

- How will the state ensure degree and certificate holders will ultimately stay in the state and contribute to the economy?

  The issue of state "brain drain" of the most academically talented students has risen in visibility on the economic and postsecondary agendas in many states in recent years.[60] Many states have responded to this concern in their financial aid policies by implementing merit scholarships, designed to encourage the most able students to attend college in the state. Yet there is scant evidence that these students stay in the state and contribute to the economy after college graduation. State policymakers should examine whether other state policies – such as loan forgiveness programs or state income tax credits – may be more effective at encouraging holders of valued job skills to stay in the state.

- To what degree does the state have a history of providing a significant level of centralized (state-run) grants to undergraduate students? If there is little or no history, is there political will to fund a new program or expand existing ones?

  State-funded grants are distinct from institutional grants in that they are generally awarded in the form of a voucher; that is, they are portable and students can use them at any institution in the state.[61] Institutional grants, on the other hand, are not portable; they can generally be used only at the institution making the award, or within the system offering the grant if it is a multi-campus system.

- To what degree are campus leaders willing to use institutionally funded grants (either from restricted funds or from recycled tuition revenue) to help accomplish broader state goals? Or are institutional grants used exclusively for more narrow, enrollment-management objectives?

Many public institutions, particularly in the four-year sector, operate in a competitive admissions environment. Thus, without intervention from outside sources, they are likely to use their own aid to promote institutional objectives. This is an entirely rational approach for campus leaders, particularly in those states where campus heads report to their own board of trustees or regents, rather than to a broader, statewide governing or coordinating board. In the public four-year sector (combining doctoral and nondoctoral granting institutions), overall spending on need-based grants increased 2 percent from 1995-1996 to 1999-2000, while spending on non-need grants increased 121 percent in the same period (calculated from NPSAS data used to construct Table 4.5). This rise in the use of institutional merit aid, relative to need-based grants, is likely an indicator of the increased competitiveness in which most of these institutions find themselves. Research by others has shown that institutional merit aid is increasingly being awarded to higher-income students. [62]

- How should resources available to help promote persistence and attainment be distributed among the already-proven strategies?

As described earlier in this section, states and institutions combined awarded $4.7 billion in grants to undergraduates in the 1999-2000 academic year, an amount exceeding that available in the federal Pell Grant program. Countless other amounts are spent on other strategies to promote persistence and attainment. State and institutional leaders should examine all of these policies as a group in decided how to allocate funding among them. Some strategies may be best used for certain types of students or in certain institutions; others will work better for different groups. Too often funding decisions for groups of programs with similar purposes are made in isolation, leading to difficulty in maximizing the ability of these programs to work in consort with one another.

Donald E. Heller came to Penn State in 2002 from the University of Michigan, where he earned a national reputation for his studies of higher education finance, tuition pricing, financial aid, and student access. Dr. Heller earned an Ed.D. in Higher Education from the Harvard Graduate School of Education, and holds an Ed.M. in Administration, Planning, and Social Policy from Harvard and a B.A. in Economics and Political Science from Tufts University. Before his academic career, he spent a decade as an information technology manager at the Massachusetts Institute of Technology. Dr. Heller teaches and conducts research on issues relating to higher education economics, public policy, and finance, as well as academic and administrative uses of technology in higher education. The primary focus of his work is on issues of access and choice in postsecondary education, examining the factors and policies that help to determine whether or not individuals attend college, and what type of institution they attend. He has consulted on higher education policy issues with university systems and policymaking organizations in California, Colorado, Massachusetts, Michigan, New Hampshire, and Tennessee.

Dr. Heller's research has been published in scholarly journals including *The Journal of Higher Education*, *The Review of Higher Education*, *Change,* and *The Journal of Student Financial Aid*, and his work has been reported on by national media including *The New York Times, The Wall Street Journal, The Los Angeles Times, The Washington Post, Newsweek, U.S. News & World Report, Business Week, The Chronicle of Higher Education*, CNN Headline News, and Marketplace Radio. He is the editor of the books *The States and Public Higher Education Policy: Affordability, Access, and Accountability* (Johns Hopkins University Press, 2001), and *Condition of Access: Higher Education for Lower Income Students* (ACE/Praeger, 2002).

Dr. Heller received the 2002 Promising Scholar/Early Career Achievement Award from the Association for the Study of Higher Education, a scholarly society with 1,400 members dedicated to higher education as a field of study. He was also the recipient in 2001 of the Robert P. Huff Golden Quill Award from the National Association of Student Financial Aid Administrators, for his contributions to the literature on student financial aid.

Appendix A

NPSAS Sample Definition

In defining institutional eligibility for inclusion in the NPSAS:2000 sample, NCES established the following criteria:

> To be eligible for NPSAS:2000, an institution was required, during the 1999–2000 academic year, to:
>
> - Offer an educational program designed for persons who had completed secondary education.
> - Offer more than just correspondence courses.
> - Offer at least one academic, occupational, or vocational program of study lasting at least three months or 300 clock hours.
> - Offer courses that were open to more than the employees or members of the company or group (for example, a union) that administered the institution.
> - Be located in the 50 states, the District of Columbia, or Puerto Rico.
> - Be other than a U.S. Service Academy.
> - Have a signed Title IV participation agreement with the U.S. Department of Education.[63]

These criteria made 6,422 postsecondary institutions eligible for inclusion in the survey. From this universe of institutions, 1,082, or 16.8 percent of the institutions were selected for participation in NPSAS:2000. Usable data were obtained from 999 institutions.

The institutional sample was stratified into 22 groups, based on institutional control, highest degree level, and the proportion of students earning bachelor's degrees in education (the top 20 percent of institutions based on this ranking were designated "high education" institutions, and the remaining were designated "low education"). Table A.1 presents the 22 institutional strata.

Student eligibility for inclusion in the NPSAS:2000 sample was defined as:

> Those who attended a NPSAS-eligible institution during the 1999–2000 academic year and who were:
>
> - Enrolled in *either*: an academic program; at least one course for credit that could be applied toward fulfilling the requirements for an academic degree; *or* an occupational or vocational program that required at least three months or 300 clock hours of instruction to receive a degree, certificate, or other formal award.
> - Not concurrently enrolled in high school.
> - Not enrolled *solely* in a GED or other high school completion program.[64]

Within institutions, students were grouped into seven strata based on their degree level, whether they were completing a baccalaureate degree, and major: undergraduate business majors receiving a bachelor's degree in 1999-2000; other majors receiving a bachelor's degree; other (nongraduating) undergraduates; master's; doctorate; other graduate degree; and first professional.[65]

Approximately 63,000 students from the 999 institutions were included in the NPSAS:2000 sample. Of this total, 49,930 were undergraduate students.

Table A.1 NPSAS:2000 Institutional Sample Strata

Stratum #	Control	Level (highest degree)	Education
1	Public	Less than 2-year	
2	Public	2-year	
3	Public	Baccalaureate	High
4	Public	Baccalaureate	Low
5	Public	Master's	High
6	Public	Master's	Low
7	Public	Doctorate	High
8	Public	Doctorate	Low
9	Public	First professional	High
10	Public	First professional	Low
11	Private, non-profit	Less than 2-year	
12	Private, non-profit	2-year	
13	Private, non-profit	Baccalaureate	High
14	Private, non-profit	Baccalaureate	Low
15	Private, non-profit	Master's	High
16	Private, non-profit	Master's	Low
17	Private, non-profit	Doctorate	High
18	Private, non-profit	Doctorate	Low
19	Private, non-profit	First professional	High
20	Private, non-profit	First professional	Low
21	Private, for-profit	Less than 2-year	
22	Private, for-profit	2-year or more	
22	Private, for-profit	2-year or more	

Endnotes

1. R. B. Archibald, "Redesigning the Financial Aid System: Why Colleges and Universities Should Switch Role with the Federal Government" (Baltimore, MD: The Johns Hopkins University Press, 2002), 1.

2. This section has been copied from the Western Interstate Commission for Higher Education (2003).

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4 . President's Commission on Higher Education, *Higher Education for American Democracy* (New York: Harper and Brothers: 1947).

5. President's Commission, vol. II, 47.

6. Carnegie Commission on Higher Education, *The Capitol and the Campus: State Responsibility for Postsecondary Education – A Report and Recommendations* (New York: McGraw-Hill, 1971).

7. R. H. Fenske and J. D. Boyd, "State Need-Based College Scholarship and Grant Programs: A Study of their Development, 1969-1980" (New York: College Entrance Examination Board, 1981).

8. National Association of State Scholarship and Grant Programs (various years), *NASSGP/NASSGAP Annual Survey Report* (Deerfield, IL; Harrisburg, PA; and Albany, NY: Illinois State Scholarship Commission; Pennsylvania Higher Education Assistance Agency; and New York State Higher Education Services Corp.).

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11. Unfortunately, NCES has been slow in releasing the data, so the most recent time-series data available end in 1996.

12. Quantum Research Corp., CASPAR database system, online data file (Bethesda, MD: Author, 2003). Note: the IPEDS data covers both undergraduate and graduate students. Data from the National Postsecondary Student Aid Study for that same academic year (1995-1996, described in more detail in Section 4) show a total of $1.8 billion awarded by public institutions to undergraduates, so the IPEDS data are likely a fairly accurate measure of institutional spending.

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14. See, for example:

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- E. T. Pascarella and P. T. Terenzini, *How College Affects Students: Findings and Insights from Twenty Years of Research* (San Francisco, CA: Jossey-Bass Publishers, 1991).
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15. A review of the research on the relationship among these other factors and persistence is beyond the scope of this study.

16. See, for example:

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- E. P. St. John, S. Hu, M. Clements, and E. H. Asker, "Keeping Indiana's Public Colleges Affordable: The Effects of State Grants on Persistence by Full-time Students," paper presented at the NASSGAP/NCHELP Research Network Conference, Savannah, GA (May 1999).
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18. Pascarella and Terenzini, 420.

19. See Leslie and Brinkman, 1987; also see, for example:

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21. S. Burd, "Congress Should Freeze Federal Loan Limits, Report Says," *The Chronicle of Higher Education* (2 May 2003), A30.

22. See for example the studies of state merit programs in D. E. Heller and P. Marin (eds.), *Who Should We Help? The Negative Social Consequences of Merit Scholarships* (Cambridge, MA: Harvard Civil Rights Project, 2002).

23. J. A. Riccobono, M. B. Cominole, P. H. Siegel, T. J. Gabel, M. W. Link, and L. K. Berkner, *1999-2000 National Postsecondary Student Aid Study (NPSAS:2000) Methodology Report*, NCES 2002-152 (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2002).

24. Institutions included in the analyses here include community colleges and four-year institutions, and excludes less than two-year public institutions (which enrolled fewer than 1 percent of undergraduates enrolled in public institutions that year). See Appendix A for more information about institutions and students eligible to be included in the NPSAS surveys.

25. Some students receive both types of awards. "Grants" includes grants, scholarships, fellowships, and tuition waivers. In the NPSAS survey, "need" awards are provided using solely financial need criteria or criteria that utilize a combination of financial need and other measures. "Non-need" awards include aid that was provided without consideration of financial need. See National Center for Education Statistics. *National Postsecondary Student Aid Study of 1999-2000 Electronic Codebook for Windows*, computer data file (Washington, DC: U.S. Department of Education, 2000).

26. It is important to note that the data presented here includes *all* students enrolled in these institutions, including both full-time and part-time enrollees. Thus, the average awards and percentage of students receiving awards will be less than in a recent report released by NCES. See L. Horn, and K. Peter, *What Colleges Contribute: Institutional Aid to Full-Time Undergraduates Attending 4-year Colleges and Universities*, NCES 2003-157 (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2003). That report analyzed data on full-time students at four-year institutions only and because these students are more likely to receive institutional aid, the figures in that report are higher.

27. The NPSAS data do not distinguish between unrestricted institutional grants (those funded from tuition revenues) versus restricted grants (those funded from endowed scholarships or designated gifts).

28. Dependent college students in public institutions are, on average, from higher-income families than all

Americans. While the median family income of these students in the NPSAS sample was $53,276, the median income of all families in the U.S. was $46,737 in 1998. See United States Bureau of the Census, "Regions—Families (All Races) by Median and Mean Income: 1953 to 2001," online data file, (http://www.census.gov/hhes/income/histinc/f06.html) (Washington, DC: Author, 2003).

29. In general the only cases in which those under age 24 can be considered independent are: orphans or wards of the court; military veteran; married; or had at least one legal dependent other than a spouse. All students over the age of 24 are considered independent students.

30. National Association of State Student Grant and Aid Programs, *NASSGAP 31st Annual Survey Report 1999-2000 Academic Year* (Albany: New York State Higher Education Services Corp., 2001). The ranking of spending on need-based aid (as compared to all aid spending for undergraduates) was used because the majority of state aid is awarded based on need.

31. The reason why the high-aid states have an overall cost of attendance so close to that of the low-aid states – even though the four-year institutions are so much more expensive in the former group – is that there are proportionally more community college students in the high-aid states. Since their cost of attendance is lower than students attending four-year institutions, this helps drive down the average cost. Tests comparing the mean amounts in Tables 3.6 and 3.7 were conducted using a Wald test and probability cutoff of pd" .05. For more information about prices paid by students in different college sectors, see College Board, *Trends in College Pricing, 2002* (Washington, DC: Author, 2002-a); and L. Horn, C. C. Wei, and A. Berker, *What Students Pay for College: Changes in Net Price of College Attendance between 1992-93 and 1999-2000*, NCES 2002-174 (Washington, DC: U.S.

Department of Education, National Center for Education Statistics, 2002).

32. National Center for Education Statistics, "Beginning Postsecondary Students Longitudinal Study Restricted Use Files, computer data file (Washington, DC: U.S. Department of Education, 2003).

33. The BPS dataset contains a number of variables related to cost in the base year (1995-1996), including the total cost of attendance, net price (after financial aid), and level of unmet need (cost of attendance less family contribution and all aid). The literature on the relationship of college costs and persistence points to the importance of looking not just at the sticker price of college, but at the net price and/or unmet need. The latter two measures are strongly correlated, and thus, cannot be included in the models due to problems with collinearity. Because more complete information was available on net cost, this variable was used in the models to represent costs faced by students. See Paulsen and St. John; St. John; and St. John, Paulsen, and Starkey.

34. Stata Corp., *Stata Survey Data Reference Manual, Release 8* (College Station, TX: Stata Press 35, 2003).

35. A. F. Cabrera, "Logistic Regression Analysis in Higher Education: An Applied Perspective," in J. C. Smart (ed.), *Higher Education: Handbook of Theory and Research*, vol. X (New York: Agathon Press, 1994), 225-256). Also see T. Petersen, "A comment on presenting results from logit and probit models," *American Sociological Review* 50, no. 1 (1985), 130-131.

36. The delta-p statistics only for those variables that were statistically significant at a level of p ≤ .05 are shown in the tables (that is, the coefficient was significantly different from zero).

37. For clarity, the outcome discussed in this section refers to "persistence," but this includes attainment of a credential (degree or certificate through the year indicated).

38. When the mean of a dichotomous outcome is highly skewed toward either the successful or unsuccessful outcome, it is common for logistic regression models to correctly classify a high percentage of cases.

39. The BPS survey defines a stopout as "a break in enrollment of five or more consecutive months." See National Center for Education Statistics, 2003.

40. The order in which the blocks of variables are added into the models does not matter; the large gain in predictive ability added by the academic factors would occur no matter to which model they were added.

41. This finding should be interpreted with some caution, however. In order to receive work-study (or any aid) for three or more years, a student has to be enrolled for at least three years. A student enrolled for at least three years has, by definition, cleared the important hurdle of persisting into the second year. A student who received no work-study (or no aid) may have dropped out after one year, and thus, could not receive a bachelor's degree.

42. It is interesting to note that the biggest boost comes not from making stellar grades, but from making "good" grades. Compared to students with mostly C's and below, those with mostly B's or B's and C's have a predicted persistence rate 52.9 percentage points higher. Students with mostly A's or A's and B's have only a slightly higher increase in persistence.

43. Note that the models included the students' degree expectations when they first enrolled in college. So this finding is important as it indicates that even controlling for degree expectations (i.e., for all students who expected to ultimately attain a bachelor's degree) and other factors, students who began in community colleges were at a disadvantage.

44. See note 41 for a caution in interpreting this finding.

45. In order to examine whether there were any major changes in the results if the sample was restricted only to those students who said they aspired to a bachelor's degree or greater in their first year in college, Model 5 in Tables 4.3 and 4.4 was tested with this restricted sample. The restricted sample produced results substantively the same as those shown in Tables 4.3 and 4.4.

46. The next wave of the NPSAS survey in the 2003-2004 academic year will include a new BPS cohort.

47. College Board, 2002-a.

48. National Association of State Scholarship and Grant Programs.

49. The institutional grant figures for 1999-2000 are the same as those found in Table 3.1.

50. These totals are not shown in the table, but were calculated by multiplying the average grant award by the number of students nationally who received awards.

51. Overall, state grant awards to undergraduates increased 40 percent, indicating that students in public colleges received a larger share of state grants (compared to their peers in private institutions) in 1999-2000 than four years earlier (see National Association of State Scholarship and Grant Programs). As a point of reference, the Consumer Price Index increased 9.6 percent over these four years. See National Center for Education Statistics, *Digest of Education Statistics, 2001* (Washington, DC: U.S. Department of Education, 2002).

52. College Board, 2002-a.

53. While the BPS dataset does not have data on institutional aid in students' second and subsequent years in college, it is reasonable to assume that a student receiving either a need-based award or a non-need grant would have a high probability of receiving such an award in later years. Thus, the effect described here is likely not just that of the award made in the first year of college, but is also likely a proxy, or marker, of later receipt of institutional aid.

54. S. Burd, "Rift Grows over What Keeps Low-income Students out of College," *The Chronicle of Higher Education* (25 January 2002), A18.

55. Pascarella and Terenzini.

56. Ideally, a database used to model persistence and degree attainment should contain information about the financial aid offers received and college costs faced by those students who do *not* persist. This information would provide even better measures of the effectiveness of financial aid in promoting persistence.

57. Archibald, 1.

58. See the following:

- Advisory Committee on Student Financial Assistance, *Access Denied: Restoring the Nation's Commitment to Equal Educational Opportunity* (Washington, DC: U.S. Department of Education. Advisory Committee on Student Financial Assistance, 2001).
- Advisory Committee on Student Financial Assistance, *Empty Promises: The Myth of College Access in America* (Washington, DC: U.S. Department of Education, 2002).
- P. T. Terenzini, A. F. Cabrera, and E. M. Bernal, *Swimming against the Tide: The Poor in American Higher Education* (New York: College Board, 2001).

59. Heller and Marin.

60. See the following:

- J. D. Creech, *State-Funded Merit-based Scholarship Programs* (http://www.sreb.org/Main/LatestReports/accountbench/scholarship/scholarship.html) (Atlanta, GA: Southern Regional Education Board, 1999).
- D. E. Heller, "The Policy Shift in State Financial Aid Programs," in J. C. Smart (ed.), *Higher Education: Handbook of Theory and Research*, vol. 17 (New York: Agathon Press, 2002-a), 221-261.
- D. E. Heller, "State Merit Scholarship Programs: An Introduction," in D. E. Heller and P. Marin (eds.), *Who Should We Help? The Negative Social Consequences of Merit Scholarships* (Cambridge, MA: Harvard Civil Rights Project, 2002-b), 15-23).
- L. G. Tornatzky, D. O. Gray, S. A. Tarant, and C. Zimmer, *Who Will Stay and Who Will Leave?* (Research Triangle Park, NC: Southern Technology Council, 2001).

61. Many state programs provide some restrictions on how students can use the grants. Some require the students to use them only at in-state institutions; others distinguish between public and private institutions within the state (or offer differing award levels for attending each sector). But in all, there is some degree of portability to the grants.

62. M. S. McPherson and M. O. Schapiro, *The Student Aid Game: Meeting Need and Rewarding Talent in American Higher Education* (Princeton, NJ: Princeton University Press, 1997).

63. Riccobono et al., 12.

64. Riccobono et al., 13.

65. Not all student strata existed within each institutional stratum; for example, the public two-year sector would contain individuals only in student stratum 3.

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