USAGroup Foundation
New Agenda Series™

VOLUME 3 • NUMBER 1 • NOVEMBER 2000

College Affordability: Overlooked Long-Term Trends and Recent 50-State Patterns

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Acknowledgments

During my work on this monograph, I discussed its concepts and constructs with several persons and groups. I want to acknowledge their contributions to my work here. I presented the findings and conclusions of the research to members of the Financial Aid Research Network at its annual conference in St. Louis in June and to members of the National Association of State Student Grant and Aid Programs (NASSGAP) in Providence in September. The questions and comments of participants in both meetings helped me clarify parts of the final monograph.

Several persons read drafts and made editorial and substantive suggestions that greatly improved the final document. They include Kingston Johns, Kenneth E. Redd, Robert C. Dickeson, Richard J. Ramsden, Samuel L. Kipp, William J. Sheldrake, John M. Mutz, and Morris Mills. I thank them very much for their insights and advice. I am also grateful to Jean Rose for her editorial assistance, and to Natasha Swingley for her graphic art and work in producing this printed document. Any errors of omission or commission, or weaknesses in the monograph, are the sole responsibility of the author.

Jerry Sheehan Davis
November, 2000

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USAGroup Foundation **New Agenda Series™**

November 2000

College Affordability: Overlooked Long-Term Trends and Recent 50-State Patterns

by Jerry Sheehan Davis

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Executive Summary

This monograph offers new ways of looking at long-term trends in four-year college charges to undergraduates, the ability of students and families to pay them, and trends in college prices in relation to the earnings outcomes of college attendance.

It describes significant state-by-state differences in four-year college affordability and "graduation productivity" ratios. Then it concludes with a discussion of the implications these trends and differences in patterns have for federal student aid policy-making. The primary purpose of this monograph is to help inform discussions on the dimensions and nature of the college affordability crisis so that solutions to it can be more readily crafted and implemented.

Examination of the long-term trends in prices at four-year colleges and the family incomes of students who must pay them revealed that:

- Prices at four-year public and private colleges grew rapidly in the 1990s, but at a slower annual rate than during the 1980s.
- In spite of the slower growth rates in college prices, concerns about college affordability increased during the 1990s, probably because college prices absorbed greater dollar shares of family earnings at most income levels.
- It has become much more difficult for students from lowest-income families to afford to attend four-year colleges without access to student financial aid.
- In 1997 it took from two to four more days of earnings per year for families with median and third quartile incomes to cover "net" college

prices than it had in 1990. It took from five to ten more days of annual earnings for families with lowest incomes.

- The national "affordability crisis" for students from families with above median and third quartile incomes has likely been exaggerated. The "affordability crisis" may for many relatively affluent families be a crisis of *willingness to pay* rather than a crisis of *ability to pay* for rising college charges.

Comparisons of trends in relationships between college prices and graduates' earnings led to the conclusions that:

- Since the beginning of the 1980s, mean annual earnings have grown much faster for young persons with college degrees than for those with just high school diplomas, thereby increasing the financial benefits of completing an undergraduate degree program.
- During the 1990s, it would have taken four-year public college graduates fewer months to recover their net college expenses (after institutional aid) with their additional earnings from their education than at any time since the early 1970s.
- The value of a baccalaureate degree, in terms of graduates' increased mean earnings, has kept pace with and sometimes exceeded the growth in college prices.

The value of a baccalaureate degree, in terms of graduates' increased mean earnings, has kept pace with and sometimes exceeded the growth in college prices.

Comparisons of trends in relationships between college prices and the earnings for undergraduates who enrolled at four-year colleges but did not complete their degrees demonstrated that:

- During the 1980s, it would have taken students who left four-year colleges *without degrees* decreasing numbers of months to recover their college expenses with their additional earnings. But, by the 1990s, it would have taken such students longer to recover their expenses, especially if they had borrowed to pay college charges.
- In terms of increased mean earnings, the value of attending college without earning a degree did *not* keep pace with the growth in college charges.
- The financial penalties for attending four-year colleges without completing and earning degrees rose significantly for undergraduates during the 1990s.

Because the financial value of a baccalaureate degree increased so much during the 1990s, growing numbers and proportions of high school graduates and traditional age cohort groups began to attend college. However, the retention and graduation rates of students at four-year colleges may have increased only slightly, if at all, during this time period. More students were leaving college without degrees — and with more student loan debt for their efforts.

Analysis of state-by-state differences in affordability of four-year public colleges led to the conclusion that:

- There are significant state-by-state differences in the numbers of earnings days it takes families to cover annual expenses at four-year public colleges in their states.

- After including institutional and state funding for student aid, families would have needed, on average, about 28 days of median income-level earnings to cover "net charges" in 1997. But in fourteen states it would have taken 24 or fewer days, and in another twelve states, 31 or more days to cover "net charges." So considerable differences in affordability exist among states even after their student financial aid efforts are taken into account.
- The evidence strongly suggests that the differences in college affordability are more closely related to differences in charges to students and families than to differences in family incomes or student financial aid from programs funded by the states or the institutions.
- If parents and policymakers are concerned about the growth in shares of family incomes needed to cover college expenses during the 1990s, one would expect them also to be concerned about frequently greater state-by-state differences in the shares needed to cover expenses. But few have expressed concerns, primarily because of limited public knowledge about college prices and infrequent comparisons of public college prices across state lines.
- Because colleges in the less affordable states generally charge higher tuitions, they effectively shift more of the expense of paying for college to students and families — and to the federal government, which provides students with most of their aid.

Dfferences in college affordability are more closely related to differences in charges to students and families than to differences in family incomes or student financial aid.

Analysis of state-by-state differences in the "graduation productivity" ratios of their four-year colleges showed that:

- There are substantial differences among states in the rates at which four-year college students start and complete their undergraduate degrees.
- The states whose public and private colleges have the best "graduation productivity" ratios include California, Florida, Illinois, Iowa, Oregon, and Washington. The states whose colleges have the poorest ratios include Alaska, Kentucky, Louisiana, Nevada, South Dakota, and West Virginia.
- These state-by-state differences in graduation ratios are important because students who do not finish will not receive as many benefits from attendance and generally will take longer to recover their costs of attendance from earnings, especially if they have borrowed to pay those costs. Thus these differences have important implications for federal financial aid policies.

The relationships between four-year public college affordability rankings and "graduation productivity" ratios were cross-tabulated and examined on a state-by-state basis, leading to discovery of another area of great diversity among the states. It was concluded that:

- Students in some states are at relatively great advantage, and students in some states are at significant disadvantage.
- Students who are at most advantage are enrolled in states with high affordability and high "graduation productivity" rankings. Their colleges are less costly and

students who attend them are more likely to graduate. These states include Illinois, Iowa, and Washington.

- Students who are relatively disadvantaged are enrolled in states with the lowest affordability and "graduation productivity" rankings. Their colleges cost more and students who attend them are less likely to graduate. These states include Indiana, Maine, and West Virginia.
- The relative risk to students in borrowing to pay to attend four-year public colleges increases as their colleges' combined rankings on affordability and productivity decrease. The need to borrow more increases while the probability of graduating and being able to repay their loans diminishes.

Making federal grant aid available to students for only the first two years of attendance at four-year colleges would significantly reduce the financial barrier to attendance.

Because college prices have increased and federal, state and institutional grant aid generally has not kept pace, many more students are using loans to pay for their college expenses. Because college expenses and borrowing have increased while graduation rates have not increased for many students, it takes those who leave without degrees longer to recover their expenses from additional earnings generated by their few years of college attendance. Thus the penalty for failure to complete a degree program has risen.

These trends led to the conclusion that making federal grant aid available to students for only the first two years of attendance at four-year colleges would significantly reduce the financial barrier to attendance because students would not have to risk accepting loans for programs or colleges where they are uncertain of success. "Front-loading" federal grants would also make it possible to come closer to achieving the federal student aid goal of equalizing financial access to college. Using only loans for financial aid for the latter years of college is justified by the fact that students who reach their junior years are very likely to graduate and, therefore, should be better able to afford to repay their loans from earnings enhanced by their college degrees. Using only loans for the latter years also helps offset the costs to the federal government of "front-loading" grants.

The substantial state-by-state differences in affordability and "graduation productivity" lead to significant inequities in paying for college. Where students live and attend college influences the degree to which they and their families have to sacrifice to meet college expenses. It will not be easy for federal policy-makers to ameliorate the negative effects of these differences, but it is likely that successful responses will involve simultaneously addressing affordability and "graduation productivity" issues. When more students are more likely to graduate, then college becomes more affordable, because the expenses are more easily recovered from the students' additional earnings, even when loans are used to meet expenses. Ignoring these state-by-state differences perpetuates significant inequities in college affordability and the ways in which students pay for college.

Introduction

The 1990s saw growing numbers of students, parents, policy-makers, and educators discussing, studying, and worrying about rising college tuitions. More students than ever before, and greater proportions of all student populations than ever before, are enrolling in colleges. However, there are great concerns that many students are, or soon will be, unable to afford to attend. These concerns reached a high enough level nationwide that Congress created the National Commission on the Cost of Higher Education in 1997 and charged it with presenting "a clear understanding of what is truly happening with respect to the cost of a college education and what steps can or should be taken to ensure a quality postsecondary education remains affordable" (National Commission on the Cost of Higher Education, 1998, p. ix).

The Commission arrived at several "key convictions" about the college cost and price crisis. It concluded that:

- The concerns about rising college prices are real.
- There is great confusion about college costs and prices and that the distinction between the two must be recognized.
- The rising college costs are as troubling a policy issue as the rising prices charged to students.
- The public and its leaders are concerned about where higher education places its priorities and how these priorities lead to price increases.
- The United States has a world class system of higher education.

The Commission made a series of recommendations to achieve five basic policy goals: (1) strengthening institutional cost control, (2) improving market information and public accountability, (3) deregulating higher education, (4) rethinking accreditation, and (5) enhancing and simplifying Federal student aid. Because less than two years have passed since the Commission made its report, there is scarcely enough time to assess the effects of its recommendations. It is unlikely that a new examination of the same issues today would lead to different conclusions and convictions even if new recommendations were offered.

Between the 1997-98 academic year in which the Commission conducted its work and 1999-2000, average annual tuition and fee charges rose by 5.0 percent at four-year public colleges and by 8.6 percent at four-year private colleges (Washington Office of the College Board, 1999b). These percentage increases were greater than the increases in the Consumer Price Index, the "yardstick" that is frequently used to assess growth in college prices. Many colleges' tuition and fee charges continue to grow faster than the personal and family incomes and student financial aid resources used to pay them. [As this monograph was being written, the United States Senate Committee on Governmental Affairs held hearings on the "college affordability crisis."] These factors, as well as others, suggest that public and policy-maker concerns about rising college prices and the factors that drive them upward have not diminished since the Commission issued its findings and recommendations.

There are great concerns that many students are, or soon will be, unable to afford to attend.

If college costs continue to rise faster than student ability to pay them from family or financial aid resources, the crisis will become pervasive.

In 1997, the author of this monograph wrote a short book for the Sallie Mae Education Institute called *College Affordability: A Closer Look At The Crisis* (Davis, 1997). That report examined several different aspects of rising college costs, as well as the responses of many different parties to those increases. It concluded that:

> With the student financial aid available today, the vast majority of students in the vast majority of places across the nation can and do find the financial means to attend a four-year college. Although the college affordability crisis is neither uniform nor universal, if college costs continue to rise faster than student ability to pay them from family or financial aid resources, the crisis will become pervasive (Davis, 1997, p.2).

That college affordability is an important public issue and will likely remain so for many years makes it worthy of continued examination and discussion. This monograph offers new ways of looking at long-term trends in four-year college charges to undergraduates, the ability of students and families to pay them, and trends in college prices in relation to the earnings outcomes of college attendance. It describes significant state-by-state differences in four-year college affordability and "graduation productivity" ratios. Then it concludes with a discussion of the implications these trends and differences in patterns have for federal student aid policy-making. The primary purposes of this monograph and the earlier book are virtually the same: to help inform discussions on the dimensions and nature of the college affordability crisis so that solutions to it can be more readily crafted and implemented.

Trends in College Prices and Family Incomes

The analysis here focuses on paying for undergraduate education at four-year colleges. This monograph is intended to help inform discussions on affordability of baccalaureate education at four-year colleges and universities. It does not address trends in prices at community colleges, because those prices generally are lower and little public concern has been expressed about their affordability. It does not discuss trends in student financing of post-baccalaureate education, because financial aid policy-makers' efforts are primarily focused on undergraduates. Exclusion of graduate and professional education does not imply that there are no affordability or financial problems in those areas. For a greater understanding of those problems and issues, readers are invited to see *Student Financing of Graduate and Professional Education, 1995-96,* by Susan P. Choy and Ron Moskovitz (1998) and *Student Borrowing, Debt Burden, and Default: The Special Case of First Professional Students in the 1990s* by Samuel M. Kipp, III (1998).

The first data examined are for growth patterns in average annual tuition, fees, room, and board charges for undergraduates at four-year colleges. Table One shows these average annual rates and the average rates for four years cumulative from 1970 through 1997. These "basic charges" do not include all expenses students incur when attending college, such as expenses for books and supplies, transportation to and from campus, or personal and miscellaneous expenses. In 1998-99, it was estimated that those expenses would represent about 25 percent of average "basic charges" for four-year public college students and about 10 percent of those charges for students at the private colleges (Washington

Table One

Annual and Cumulative Average Undergraduate Tuition and Fees and Room and Board Rates for Full-Time Students at Four-Year Public and Private Colleges Selected Years, 1970-71 to 1997-98

	PUBLIC COLLEGES				PRIVATE COLLEGES			
	Average Annual	Percent Change	Four Years Cumulative	Percent Change	Average Annual	Percent Change	Four Years Cumulative	Percent Change
1970	$1,333	—	$ 5,900	—	$ 2,714	—	$11,800	—
1975	$1,785	33.9	$ 7,900	33.9	$ 3,705	36.5	$16,500	39.8
1980	$2,550	42.9	$12,100	53.2	$ 5,594	51.0	$26,800	62.4
1985	$3,859	51.3	$17,100	41.3	$ 9,228	65.0	$41,400	54.5
1990	$5,243	35.9	$23,300	36.3	$13,237	43.4	$58,400	41.1
1995	$7,014	33.8	$29,900	28.3	$17,612	33.1	$75,100	28.6
1997	$7,628	13.0	$32,400	8.4	$19,143	8.7	$81,100	8.0

Source: Digest of Education Statistics. 1998, Table 311.

Office of the College Board, 1999a). The "non-basic" expenses were not included in these analyses because comprehensive data were not available for all years under examination. More important, the characteristics of undergraduate students, where they live and get back and forth to classes, and the courses they take have changed. All those changes affect their average "non-basic" expenses. Thus comparisons of trends in average "non-basic" expenses could be misleading in assessing trends in affordability for the average student. So none were made.

Comparisons of the "four years cumulative" data are meaningful because students generally do not plan to purchase just one year of education. Moreover, these data will be used in another context below. The annual data show that the largest percentage rate increases in college charges occurred between 1980 and 1985, not in recent years, as the current widespread expressions of concern about college affordability might suggest. Between 1980 and 1985, annual charges rose by 51 percent at public colleges and by 65 percent at private colleges. In each five-year period since 1985, the annual charges grew more slowly than during the 1980 to 1985 time period. Therefore, although college charges to students continue to grow, the rate of growth has slowed. Prior to 1990, charges grew at a faster rate at private colleges than at public colleges. Since 1990 charges grew faster at public colleges.

The average annual 1997 four-year college charges were nearly six to more than seven times as great as the 1970 charges.

It is worth noting that although the *percentage increases* in charges were smaller during the 1990s than during the 1980s, the average annual *dollar increases* were larger. For example, the public colleges' average annual charges rose by $1,384 between 1985 and 1990 but by $1,771 between 1990 and 1995. The respective increases for the private colleges' annual charges were $4,009 and $4,375. Students and families pay in increased dollars, not percentage increases. The dollar increases may have caused rising concerns about college prices in the 1990s.

What happened to family incomes as college charges grew? They were increasing, but not nearly as fast as college charges. Table Two displays the lowest quartile, median, and third quartile income values for families with householders between ages 45 to 54, from 1970 to 1997. The incomes of families with householders in this age group are the most relevant to assessing changes in college affordability because beginning college students are most likely to come from such families. It is inappropriate to include the family incomes of householders between ages 21 and 30 because almost none would have children old enough to be in college. Families headed by householders in the 65 and older age range should not be included in this analysis because so few would have children young enough to be "traditional age" college students. So the incomes of this 45 to 54 years of age group represent the best choice.

The 1997 annual family incomes in the "target cohorts" were four to five times greater than the 1970 incomes. *But the average annual 1997 four-year college charges were nearly six to more than seven times as great as the 1970 charges.* College prices grew much more than did family incomes. Looking at the growth data in terms of "marginal" prices and incomes may help explain why concerns about college prices grew in the 1990s. Between 1980 and 1990, the average annual price at public colleges grew by $2,693, from $2,550 to $5,243. The median family income grew by $19,907, from $27,257 to $47,164. These figures indicate that the rise in college prices absorbed about 13.8 percent of the increase in median income. Between 1990 and 1997, the average annual price at public colleges grew by $2,385 and the median family income grew by $12,795. *Therefore, the rise in*

college prices in the 1990s absorbed 18.6 percent of the increased dollars in median income. The *dollar* increases in college prices represented larger shares of the increases in median incomes in the 1990s than in the 1980s. This greater increase in the rate at which marginal increases in earnings were "taxed" by increases in college prices may have contributed to increased concern about rising college tuitions.

Table Two

First Quartile, Median, and Third Quartile Income Values for Families with Householders Between Ages 45 to 54, 1970 to 1997

	First Quartile	Percent Change	Median	Percent Change	Third Quartile	Percent Change
1970	$ 8,033	—	$12,121	—	$18,596	—
1975	$11,344	41.2	$17,569	44.9	$24,858	33.7
1980	$16,862	48.6	$27,257	55.1	$39,798	60.1
1985	$22,224	31.8	$36,653	34.5	$54,494	36.9
1990	$29,022	30.6	$47,164	28.7	$70,897	30.1
1995	$33,387	15.0	$57,571	22.1	$84,541	19.2
1997	$35,728	7.0	$59,959	4.1	$91,137	7.8
			Change 1970 to 1997			
	4.45		4.95		4.90	

Source: U.S. Bureau of the Census, P-60, No. 80; P-60, No. 105; P-60, No. 132;P-60, No. 156; P-60, No. 174; P-60, No. 193; P-60, No. 200

Many studies of college affordability compare changes in college prices with median family incomes. However, since the median is only a measure of central tendency in an income distribution, it is an imperfect depiction of the data, and its use in making comparisons with college charges has been criticized (Reynolds, 1998). Analysts are much less likely to miss important information by looking at changes in three measures of the family income distribution: the lowest quartile (the 25th percentile), the median (the 50th percentile), and the third quartile (the 75th percentile). So the three measures were used here. Furthermore, by using the three measures, it is possible to see if college charges grew at different rates in comparison with changes in incomes of lower-income and the more affluent families. It is possible, for example, that higher-income families' incomes grew faster than college prices while prices grew faster than incomes for lower-income families. Using only the median income for comparisons would overlook these important phenomena.

Table Two shows that median and third quartile incomes grew at slightly faster rates than lowest quartile incomes. In 1970, the third quartile income value was 2.31 times greater than the lowest quartile income value, $18,596 versus $8,033. By 1997, the third quartile income value was 2.55 times greater, $91,137 versus $35,728. *Thus the gap in incomes between richer and poorer families increased during the period under study.* Here are the differences for the seven years of data points:

1970	2.31 times greater
1975	2.19 times greater
1980	2.36 times greater
1985	2.45 times greater
1990	2.44 times greater
1995	2.53 times greater
1997	2.55 times greater

For the "gap" between lowest quartile and third quartile incomes to have remained at its 1970 level, the lowest quartile family income in 1997 should have been 10.4 percent greater than it was, $39,453 versus $35,728. Given these disparities and if college prices are becoming less affordable for higher-income families, then prices must certainly be growing more burdensome for lower-income families.

Figure One displays the average annual undergraduate charges for public and private colleges as percentages of lowest quartile, median, and third quartile family incomes. (Please note that "family incomes" *here and throughout this report* refers only to incomes of families whose household heads are between ages 45 and 54, not to incomes of all families.)

The graph shows that college charges as a percent of all three family income levels declined modestly between 1970 and 1980 but have risen ever since. The growth in charges as a percent of *lowest quartile* incomes grew faster than charges as a percent of other income levels, and it shot upward faster in the 1990s than in the earlier decades.

Figure One

Public and Private Four-Year College Charges as a Percent of First, Second and Third Quartile Family Income Levels, 1970 to 1997

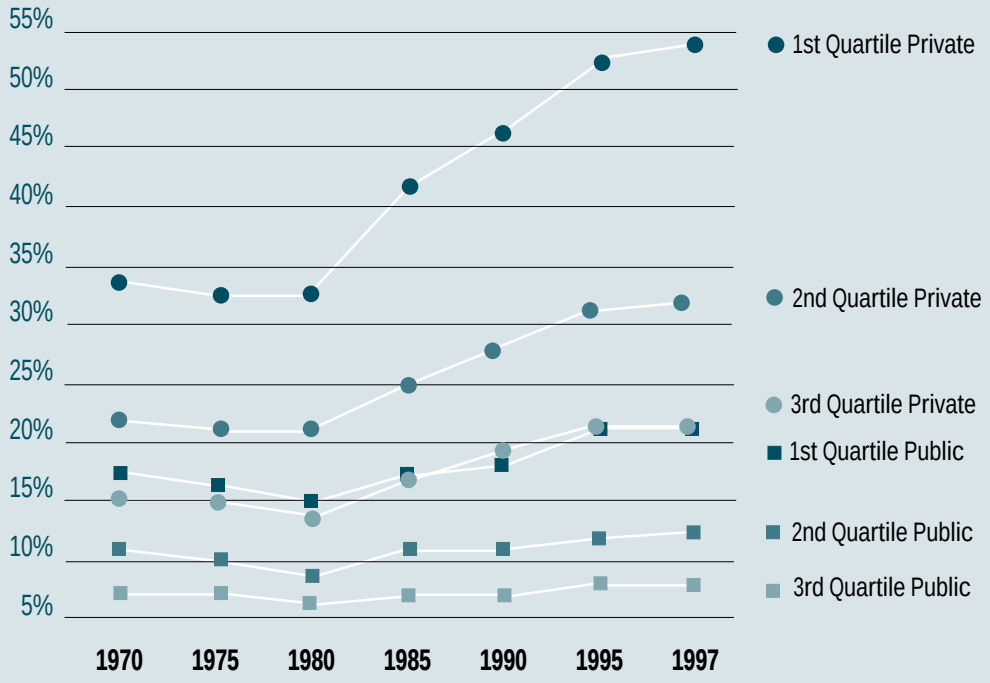

Table Three

Mean Days of Earnings Required to Cover Annual Average Undergraduate Tuition and Fees and Room and Board Rates at Four-Year Public and Private Colleges, at First Quartile, Median, and Third Quartile Family Incomes, 1970 to 1997

	PUBLIC			PRIVATE		
	First Quartile	Median	Third Quartile	First Quartile	Median	Third Quartile
1970	41	27	18	84	56	36
1975	39	25	18	82	53	37
1980	38	23	16	83	51	35
1985	43	26	18	104	63	42
1990	45	28	18	114	70	47
1995	53	30	21	132	76	52
1997	53	32	21	134	80	53
			Difference 1980 to 1997			
	+15	+9	+5	+52	+29	+18
			Difference 1990 to 1997			
	+8	+4	+3	+20	+10	+6

Note: Family means are for families with householders between ages 45 to 54. It is assumed that there are 250 days of earnings in each year.

Therefore, financial assistance has to have grown substantially in importance to students from lower-income families.

Knowing that it took 1.6 additional percentage points of median income in 1997 than in 1990 to pay the average charges at four-year public colleges is useful; however, this knowledge is not especially helpful to understanding widespread and growing concerns about rising tuitions. Consequently, another measurement was sought — the days of earnings required to cover annual average charges. The lowest quartile, median, and third quartile income values displayed in Table Two for each year were divided by 250, the assumed number of earnings days in a year. Those resulting amounts then were divided into the average annual charges for the corresponding years to determine approximately how many days of earnings (gross earnings before taxes) were needed to pay the annual charges for tuition, fees, room, and board. The results of the computations are displayed in Table Three.

Assessing the charges in terms of days of earnings represents an attempt to better understand the viewpoints of parents as consumers of education for their children. If college charges rise but the number of days of earnings needed to pay them do not rise because family earnings keep pace with the growth in charges, then it is reasonable to assume that concerns about college affordability would not increase.

Readers should note that the charges being used at this point in the analyses are "gross" charges or the "sticker prices" before available student financial aid is considered. It is appropriate when addressing college affordability issues from the family viewpoint to use these "sticker prices," because they are the ones families initially confront and the

media discuss. Because they receive student financial aid, many students pay less than the "sticker price." But when students and parents initially assess whether college is affordable, the "sticker prices" are very important because they are known facts. Whether students will receive financial aid (and in what amounts) is uncertain and unknown until late in the college planning process.

At the median income level, the number of earnings days needed to cover average charges at four-year public colleges decreased from 27 to 23 between 1970 and 1980. Between 1980 and 1997, however, the number rose by nine, or 39 percent. Between 1970 and 1980, the number of days needed to cover average *private* college charges shrank from 56 to 51. But between 1980 and 1997, the number of earnings days median income families would have used to pay for private college charges rose by almost 57 percent, from 51 to 80 days.

During the 1990s (through 1997), the days of earnings a median income family had to spend to meet public and private college charges rose by about 14 percent. That was a much smaller rate of increase than during the 1980 to 1990 period, when the days to cover public college charges rose by almost 22 percent and the days needed for private college charges rose by 37 percent.

Here are the percentage increases in days needed to cover *public* college charges at the lowest quartile, median, and third quartile income levels:

	1980 to 1990	**1990 to 1997**
Lowest quartile	18%	18%
Median	22%	14%
Third Quartile	12%	17%

When students and parents initially assess whether college is affordable, the "sticker prices" are very important because they are known facts.

Here are the percentage increases in days needed to cover *private* college charges at the lowest quartile, median, and third quartile income levels:

	1980 to 1990	**1990 to 1997**
Lowest quartile	37%	17%
Median	37%	14%
Third Quartile	34%	13%

Again, these charges are the "gross" or "sticker prices" for the colleges and do not represent what students actually paid after their financial aid awards were considered. They do, however, represent a very useful way of assessing the changes in prices from the viewpoint of the parents who help pay the bills for college.

For a more accurate assessment of trends in college affordability from the family viewpoint, it is necessary to consider college charges after financial aid — not an easy task. It is difficult to estimate the average annual "net price" paid by undergraduates over three decades, especially in the years before 1986 when the National Center for Education Statistics began conducting the National Postsecondary Student Aid Study (NPSAS) every three years. The problem is that financial aid is awarded to students from many federal, state, institutional, and private programs. The annual *Trends in Student Aid* report by the Washington Office of the College Board provides an accurate account of the aggregate amounts of aid available to all students in all types of postsecondary education. But those

who prepare that report are unable to determine how all the dollars from every program are distributed among full-time and part-time undergraduate, graduate, and professional school students at the different types of two-year, four-year, and other institutions. The shares of aid from the different programs are distributed differently among these student categories, and the shares to each student category vary over time as funding levels, aid amounts, and aid policies change.

Given the difficulties in obtaining the data for all three decades under study, and recognizing that obtaining precise data is not critical to understanding the long-term trends being analyzed in this monograph, it was decided to consider "net charges" or "net prices" equivalent to the "gross charges" or "sticker prices" *after* subtracting *only* institutional aid. Institutional aid includes financial aid amounts available through the students' institutions from endowments, gifts, reallocations of funds, and other revenue sources. Institutional aid does not include funds from state and federal governments. To give the reader some perspective, four-year public colleges spent an estimated $4.3 billion and four-year private colleges spent an estimated $7.8 billion on institutional financial aid in 1996 (Barbett and Korb, 1999).

There was another important reason for focusing on institutional aid — *to represent trends in college affordability from the viewpoints of the colleges themselves, whose leaders continually try to respond to public criticism for rising tuitions.* When these leaders are criticized for tuition increases, they frequently respond by noting that they have increased their

Table Four

Mean Days of Earnings Required to Cover Annual Net Average Undergraduate Tuition and Fees and Room and Board Rates at Four-Year Public and Private Colleges, at First Quartile, Median, and Third Quartile Family Income Levels, 1970 to 1997

	PUBLIC			PRIVATE		
	First Quartile	Median	Third Quartile	First Quartile	Median	Third Quartile
1970	40	26	17	77	51	33
1975	37	24	17	72	47	33
1980	36	22	15	73	45	31
1985	41	25	17	90	55	37
1990	42	26	17	96	59	39
1995	47	29	19	107	65	42
1997	47	28	19	106	63	42
			Difference 1980 to 1997			
	+11	+6	+4	+33	+18	+11
			Difference 1990 to 1997			
	+5	+2	+2	+10	+4	+3

Note: Family means are for families with householders between ages 45 to 54. It is assumed that there are 250 days of earnings in each year.

institutional aid or "tuition discounts" to help offset the higher "sticker prices" for students who cannot afford the charges.

Comparison of trends in "net charges" to the days of earnings required to pay them over time yields slightly different results than comparisons using "gross charges." It also helps to understand the trends from the viewpoints of the colleges students hope to attend. Table Four (on the previous page) displays the data.

The Table Three data showed that the "gross charges" at public colleges absorbed four more days of median income families' earnings in 1997 than in 1990. At private colleges, the difference was ten days. The Table Four data show that, after institutional aid is considered, the "net charges" at public colleges absorbed only *two* more days of median income families' earnings in 1997 than in 1990. To cover "net charges" at public and private colleges took only 7 to 8 percent more days of median earnings in 1997 than in 1990. Put another way, after the colleges increased their institutional financial aid to help offset the rising tuitions, they were asking families to spend 7 to 8 percent more of their median earnings to enroll (or to secure some other student aid resources to cover the additional expenses).

The marginal increase in "net charges" at private colleges was three times as great as the marginal increase at public colleges.

Looking at the increased charges in terms of the 250 annual work days, "net charges" at public colleges took 0.8 percent more (two days) of median total earnings in 1997 than in 1990. The average annual "net charges" at private colleges absorbed 1.6 percent more (four days) of median total earnings in 1997 than in 1990.

Here are the increases in "earnings days" needed to cover *public* college "net charges" at the lowest quartile, median, and third quartile income levels:

	1980 to 1990	**1990 to 1997**
Lowest quartile	6	5
Median	4	2
Third Quartile	2	2

Here are the increases in days needed to cover *private* college "net charges" at the lowest quartile, median, and third quartile income levels:

	1980 to 1990	**1990 to 1997**
Lowest quartile	23	10
Median	14	4
Third Quartile	8	3

These data show that increases in days required to cover "net charges" at *private* colleges were greater in the 1980s than in the 1990s, *even when considering that the data for the 1990s end at 1997*. However, it appears that increases in days required to cover "net charges" at the *public* colleges could eventually be slightly greater in the 1990s than in the 1980s. Because nearly seven out of ten undergraduates who are enrolled at four-year colleges attend public institutions, the rising public concern over college affordability during the 1990s is — at least in part — understandable.

The Table Four data also show that in the 17-year period after 1980, rising "net charges" at private colleges generally absorbed three times as many *additional* days of earnings as they did at public colleges. *Put another way, the marginal increase in "net charges"*

at private colleges was three times as great as the marginal increase at public colleges. This trend undoubtedly contributed to the difficulties private colleges face in maintaining their shares of four-year college undergraduate enrollments. It should be noted, however, that the differences in marginal increases for public and private colleges were not as great during the 1990s as they were during the previous decade.

At the median and third quartile income levels, it took from two to four days more in 1997 than in 1990 to cover "net charges" at four-year public and private colleges. At the lowest quartile income level, it took from five to ten additional days, depending on whether the colleges were public or private. Thus the *increase* in "net charges" between 1990 and 1997 captured twice as large a share of lower-income families' incomes as did the increase for more affluent families' incomes. *Net college prices became slightly less affordable for median and third quartile income families, but net prices became a great deal less affordable for families with lowest quartile incomes.*

It was noted above that the "net charges" used here are for college prices "net" of *institutional* grant aid, because data for college prices "net" of all grant aid *from all sources* for the three decades under study are not available. Data are available, however, for the four test years of NPSAS studies during the 1980s and 1990s. It will be helpful to look at these data and compare them with the "net charges" used for Table Four to see if they lead to different conclusions about trends in college affordability. The data for grant aid from all sources in 1986, 1989, 1992, and 1995 were obtained from NPSAS studies as reported in *Straight Talk About College Costs and Prices* (National Commission on the Cost of Higher Education, 1998). Table Five shows the numbers of days of earnings required at the median family income level to cover the two different kinds of "net charges" in selected years. For example, for 1985, the "net charges" used are for college prices "net" of only institutionally funded aid. For 1986, the "net charges" used are for college prices "net" of all grant aid from all sources. In 1985, it would have taken 25 days to cover "net charges"

Table Five

Mean Days of Earnings Required to Cover Annual Net Average Undergraduate Charges at Four-Year Public and Private Colleges, at Median Family Incomes, Selected Years

		PUBLIC	PRIVATE
1985	(Institutional Grants only)	25	55
1986	(All Grant Aid)	21	46
1989	(All Grant Aid)	23	50
1990	(Institutional Grants only)	26	59
1992	(All Grant Aid)	25	56
1995	(Institutional Grant only)	29	65
1995	(All Grant Aid)	26	58
1997	(Institutional Grants only)	28	63

at the public colleges and 55 days to cover them at the private colleges. A year later, in 1986, *when all grant aid was considered*, it would have taken only 21 days to cover charges at the public colleges and 46 days to cover charges at the private colleges. So grant aid from other than institutional sources cut from four to nine days off the time needed to cover college charges with median incomes.

Data on both types of "net charges" were available for 1995. They show that including grant aid from all sources cut three days off the time required to cover "net charges" at the public colleges and seven days off the time required at the private colleges.

College affordability changed at about the same rates in the recent past.

Between 1985 and 1995, the days needed to cover "net charges" after considering *only* institutional aid rose by four at the public colleges, from 25 to 29. Between 1986 and 1995, the days needed to cover "net charges" after *all* grant aid rose by five at public colleges, from 21 to 26. Between 1985 and 1995, the days needed to cover "net charges" after considering *only* institutional aid rose by ten at private colleges, from 55 to 65. Between 1986 and 1995, the days needed to cover "net charges" after *all* grant aid rose by 12, from 46 to 58. Therefore, *regardless of which definition of "net charges" is employed*, it appears that college affordability changed at about the same rates in the recent past.

The trends in college charges and family incomes can be summarized as follows:

- Prices at four-year public and private colleges grew rapidly in the 1990s, but at a slower annual rate than during the 1980s.
- In spite of the slower growth rates in college prices, concerns about college affordability increased during the 1990s.
- Concerns about affordability likely grew because college prices grew faster than family incomes in the 1990s and they absorbed greater shares of earnings at all income levels.
- The "gap" between earnings of lower-income and more affluent families has grown significantly since 1985, increasing the relative disadvantages lower-income students face in trying to pay for college from their own resources.
- By 1997, it took from two to four more days of earnings for families with median and third quartile incomes to cover "net" college prices than it had in 1990. It took from five to ten more days of earnings for families with lowest quartile incomes.

When taken as a percentage of the 250 total working days in a year, the price increases are relatively modest, from 0.8 percent to 1.2 percent. Such increases would hardly represent an affordability crisis. A comparison of days it took to earn enough to cover college charges in 1997 with days needed in 1990 shows increases ranging from 7 percent to 12 percent. These percentage increases are significant, but do not seem of crisis proportions. However, given the emotions present in discussions of tuition increases, it can be assumed that many are focusing on the latter figure. Families are not looking at the relatively small increased share of family incomes absorbed by current college charges *but are instead comparing current college charges with lower ones of previous years.*

Some readers of early drafts of this report suggested that the author should have used "after tax" family earnings in the comparisons, since taxes took a growing share of family incomes during the study period. Tax charges vary by such things as taxpayers' incomes,

types of earnings, numbers of dependents, whether they own or rent homes, and where they live. During the 27 years under examination, the averages for these factors for the families changed. So it is difficult to determine a mean or median "after tax" income for all families for each year under study.

To assess the probability of reaching different conclusions about college affordability if "after tax" incomes were used, the author assumed a family size of four to determine numbers of exemptions and then assumed that all families would use the standard deduction applicable to married taxpayers filing joint returns. The federal income tax paid under these assumptions was calculated for each income value and year displayed in Table Two, using the appropriate tax tables for each year. That amount was subtracted from the income value. Then appropriate Social Security (FICA) payments were subtracted from the income values to leave estimated "after tax" (federal taxes, that is) earnings. Those amounts were divided by 250 to obtain the "after tax" earnings per day for the families. Then the result was divided into the annual net basic charges to determine how many days of "after tax" or "net earnings" would be needed to cover annual net average

Table Six

Mean Days of *After Federal Tax* Earnings Required to Cover Annual Net Average Undergraduate Tuition and Fees and Room and Board Charges at Four-Year Public and Private Colleges, at First Quartile, Median, and Third Quartile Family Income Levels, 1970 to 1997

	PUBLIC			PRIVATE		
	First Quartile	Median	Third Quartile	First Quartile	Median	Third Quartile
1970	47	33	22	91	64	44
1975	44	30	22	86	59	44
1980	41	27	20	84	56	42
1985	50	33	23	110	72	53
1990	51	32	23	117	75	52
1995	56	37	28	131	83	59
1997	56	35	26	130	81	58
			Difference 1980 to 1997			
	+15	+8	+6	+46	+25	+16
			Difference 1990 to 1997			
	+5	+3	+3	+13	+6	+6

Note: Family means are for families with householders between ages 45 to 54. It is assumed that there are 250 days of earnings in each year.

undergraduate tuition and fees and room and board charges at four-year public and private colleges. The results are displayed in Table Six.

The data show that it would have taken fewer days of "net earnings" to pay for college charges in 1980 than in any years before or after that time. In 1980, it would have taken median income families about 27 days of "net earnings" to cover average four-year public

college charges and 56 days to cover average charges at private colleges. By 1997, the numbers had risen to, respectively, 35 days and 81 days. But the bulk of those increases occurred between 1980 and 1990. Between 1990 and 1995, the number of days of "net earnings" needed at the median family income level to cover four-year public college charges rose from 32 to 37, or an additional work week of earnings. The number of days needed to cover four-year private college charges rose from 75 to 83, representing more than a week and a half of earnings after taxes and FICA payments. It is noteworthy that the numbers of days of "net earnings" at all three family income levels that were needed to cover charges at both types of college either remained constant (in the case of first quartile incomes at four-year public colleges) or decreased slightly between 1995 and 1997.

It appears that using "net earnings" after federal taxes does not lead to different conclusions about the general trends in college affordability for the period under examination. Basic college charges absorbed increasing shares of "net earnings" during the 1980s but the pace of growth slowed during the 1990s. *And it appears that the trend of college charges growing faster than family incomes may have reversed itself during the middle years of the 1990s.*

Trends in College Graduates' Earnings

The preceding section showed how college charges and "net prices" generally increased faster than the ability of families to pay for them during the past three decades. To compare college charges with family earnings is meaningful because families continue to pay a large share of the college charges levied on students. According to Anna and Robert Leider (1999), students and families will pay about 42 percent of the *immediate* costs of tuition and fees, room and board, books and supplies, transportation, and maintenance expenses to attend college in 2000-01. Because some students and parents use loans to pay the immediate costs and loans must be repaid, the amount that students and families pay ultimately rises to over 70 percent.

The trend of college charges growing faster than family incomes may have reversed itself during the middle years of the 1990s.

However, comparing college charges with family earnings or with student and family financial resources treats college expenses as consumption of goods and services rather than as an investment. Attending college can more properly be considered an investment in human capital. Therefore, expenditures on tuition and other charges can be considered investing rather than consuming. Funds spent on college can be considered as similar to funds spent on investing in a business or some other financial opportunity. In the case of college, students are investing in themselves.

Obtaining a baccalaureate degree is a good investment for many reasons, not the least of which is the potential for greater annual and lifetime earnings. College graduates' average annual earnings are considerably greater than the average earnings of persons without college degrees, and those earnings are likely to remain so.

In this part of the monograph, trends in college charges are compared with trends in the earnings of college graduates to determine whether growth in *marginal earnings* kept pace with the growth in prices. In this "investment model" for thinking about college charges, greater average annual earnings are compared with the costs of attending. If the

marginal earnings increased faster than the charges, it is reasonable to conclude that the returns on the investment, *relative to the costs of investing*, improved.

Even if earnings grew faster, it does not mean that investing money in a college education is a better choice than investing in the stock market or some other venture. No attempt is made here to assess the relative returns from money invested in college tuitions versus money invested in something else. The intent here is on determining whether marginal earnings are growing faster than the charges or costs of investing, whether college charges have grown so much that "investors" (the students) are worse off now than in earlier years.

So how fast are college graduates' annual earnings growing? Table Seven shows that, in 1970, among full-time year round workers ages 25 to 34, the mean earnings for males with baccalaureate degrees were 33 percent more than the mean earnings for males with only high school diplomas. By 1997, males with baccalaureate degrees earned 57 percent more. The differences are even more striking for females. In 1970, female college graduates earned 41 percent more than female high school graduates. By 1997, the female college graduates earned 66 percent more.

The mean earnings for young workers, rather than for all workers, were used here because young workers were more likely to have completed college in closer proximity to the individual years of college charges reported here. If mean earnings for all workers had been used, that data would have been biased by the fact that many of the older workers graduated long before the young ones. Thus their tuition charges and other college expenses were much less (and their earnings correspondingly higher) than those of younger workers, who would have graduated only a few years ago.

Table Seven

Mean Earnings for Full-Time Year-Round Workers, High School Graduates and Bachelor's Degree Recipients, by Gender, Ages 25 to 34, 1970 to 1997

	MALES			FEMALES		
	High School Diploma	Bachelor's Degree	Difference	High School Diploma	Bachelor's Degree	Difference
1970	$ 8,999	$11,999	$ 2,980	$ 5,629	$ 7,938	$ 2,309
1975	$12,348	$15,100	$ 2,752	$ 7,820	$ 9,931	$ 2,111
1980	$17,629	$21,554	$ 3,925	$11,721	$15,134	$ 3,413
1985	$21,273	$29,647	$ 8,374	$15,605	$21,585	$ 5,980
1990	$24,038	$35,534	$11,496	$17,076	$27,210	$10,134
1995	$27,440	$42,734	$15,294	$20,091	$31,066	$10,975
1997	$28,772	$45,292	$16,520	$21,289	$35,348	$14,059

Source: U.S. Bureau of the Census, P-60, No. 80; P-60, No. 105; P-60, No. 132: P-60, No. 156; P-60, No. 174; P-60, No. 193; P-60, No. 200

The differences in earnings between high school and college graduates did not grow at the same rate for the entire period under study. During the 1970s, earnings for young males and females with college degrees did not rise as rapidly as earnings for young persons with just high school diplomas. Mean earnings for male high school graduates rose by 96

percent; mean earnings for male college graduates, by 80 percent. Mean earnings for female high school graduates rose by 108 percent; mean earnings for female college graduates, by 91 percent. During this period, the slower growth in college graduates' earnings led some observers to question the economic efficacy of investing in college (Bird, 1975).

During the 1980s, the earnings growth patterns were reversed, with female college graduates' mean earnings growing by 80 percent and male college graduates' mean earnings growing by 65 percent while the respective growth rates for high school graduates' mean earnings were only 46 percent and 36 percent. During the 1990s, the mean earnings of college graduates continued to grow at a faster rate, but the earnings differences were not as great. Between 1990 and 1997, the mean for male college graduates rose by 27 percent; the mean for high school graduates, by 20 percent. The mean for female college graduates rose by 30 percent; the mean for high school graduates, by 25 percent. In order for their earnings to have kept pace with the college graduates' earnings during the 1990s, the 1997 male high school graduates would had to have earned 6.5 percent, and females 4.2 percent, more than they actually earned.

Paying for College Charges With Increased Earnings

If the differences in earnings diminish substantially or if college prices begin to soar upward, many more students (and parents) will begin to make careful assessments about the long-term benefits of investing in college.

There is another reason for using the earnings for young workers rather than earnings for workers of all ages in this monograph. The author was seeking approximate estimates of changes in the amount of time it might have taken college graduates to recover their investments in college. This analysis represents an attempt to model situations in which potential students looked at the price of four years of college, looked at the additional earnings they could expect as college graduates, and then considered how long it might take to recover the investment expenditures with those higher earnings. In short-hand terms, the hypothetical question being posed by the students was, "Is the value of a college degree increasing or decreasing faster than what it costs to attend?" Put even more briefly, "Is the payoff worth the investment?" It is recognized that few students actually conduct this particular kind of "cost-benefit analysis." However, it is well-known that students and parents, even though to widely varying degrees, do weigh the charges of institutions of higher education against a host of presumed benefits to be obtained, among them higher earnings (C.f., Hossler, Schmit, and Vesper, 1999).

Both now and historically, college graduates have higher annual and lifetime earnings than non-graduates. These facts are widely known. Most students and parents expect a college education to pay off in the form of better and better-paying careers. Therefore, it is unlikely that many students *carefully* weigh the amounts colleges charge against incremental amounts they expect to earn after graduation. More are likely to weigh college charges against the financial resources currently available to them to determine whether they can afford to enroll, than whether they can pay the prices. Most students and families have to make financial sacrifices to pay for college. But as long as the long-term financial benefits of college remain substantial, the sacrifices appear worth making. However, if the differences in earnings diminish substantially or if college prices begin to soar upward, many more students (and parents) will begin to make careful assessments about the long-term benefits of investing in college. Some may decide that the long-term benefits are not

worth the relatively short-term sacrifices. Therefore, it is important to know more about trends in the relationships between college prices and earnings differentials. As college prices continue to rise at above inflationary rates, are the earnings benefits diminishing? Are college prices growing fast enough to affect students' and parents' "cost-benefit" analyses?

The data in Table Eight provide some potential for answering these questions. The table was constructed by using the four years of cumulative charges from Table One and the differences in mean earnings from Table Seven. For example, Table One shows that male students who entered four-year public colleges in 1970 would have paid, on average, about $5,900 for their cumulative charges for four years of tuition, fees, room, and board. In 1970, young male college graduates earned, on average, about $2,900 more per year than did young males with only high school diplomas. Dividing the cumulative charges of $5,900 by the $2,900 increased annual earnings yields an estimate of 2.03 years in which to recoup the cumulative expenses. Table Eight rounds off the resulting computations to the nearest number of months, in this case, 24 months.

The first column in Table Eight shows that males attending four-year public colleges in 1970 would have needed 24 months to recover the average cumulative charges with the average additional earnings. That number rose to 34 months in 1975 and then to 37 months in 1980. By 1985, the number of months had fallen to 25. It remained below that level through 1997.

Since the mid-1980s, the relationships between average cumulative *public* college charges and average additional earnings for males with college degrees have remained relatively stable. Even though the average cumulative college charges nearly doubled (rising by 89 percent) between 1985 and 1997, the average *additional* earnings of young male college graduates generally kept pace with those charges.

Table Eight

Mean Number of Months Needed to Recover the Cumulative Costs of College with Average Additional Annual Earnings, Workers Ages 25 to 34, by Gender and Types of Colleges, 1970 to 1997

	Four-Year Public Colleges		Four-Year Private Colleges	
	Males	Females	Males	Females
1970	24	31	48	61
1975	34	45	72	94
1980	37	43	82	94
1985	25	34	59	83
1990	24	28	61	69
1995	23	33	59	82
1997	24	28	59	69

The relationships between average cumulative *private* college charges and average additional earnings for males with baccalaureate degrees also remained stable after the mid-1980s. In 1970, it would have taken males 48 months to recover the average charges

at four-year private colleges. The number rose rapidly, to 72 months in 1975 and then 82 months in 1980, before dropping to 59 months in 1985. It stayed between 59 and 61 months after that.

The patterns for females were less stable than those for males, in part because there was less stability *in the differences* in earnings of female college graduates and high school graduates. The number of months it would have taken females to recover four years of charges at public and private colleges rose rapidly between 1970 and 1980. Between 1980 and 1985, the number of months dropped. The number went down again by 1990, as the difference between mean earnings of female college and female high school graduates rose by over 69 percent. The "gap" in mean earnings increased by only 8 percent between 1990 and 1995. Therefore, the number of months it would have taken females to recover their college expenses with their higher earnings rose. The number of months returned to its 1990 level by 1997.

It is very important to note that, even though cumulative charges for four years at public and private colleges rose by 39 percent, it would have taken about the same number of months in both 1990 and 1997 to recover college charges. Therefore, during this decade, the value of a college degree, in its relative ability to increase graduates' mean earnings, kept pace with the growth in college prices. College charges may have absorbed greater shares of *family* incomes in 1997 than in 1990, but college charges did *not* grow faster than the payoff to *graduates* in the form of greater average earnings. These two very important points will be mentioned again in another context below.

The value of a college degree, in its relative ability to increase graduates' mean earnings, kept pace with the growth in college prices.

Some readers may consider that one of the major costs of education has been overlooked in these analyses: the loss of earnings while one is employed as a student. These forgone earnings represent amounts that can be much larger than the direct charges. For example, according to data in Table Seven, young, male high school graduates earned, on average, $28,772 per year in 1997. The estimated cumulative basic charges for four years at a public college in 1997 were $32,400 (see Table One). So if male students were forced to give up the average earnings for four years of study, they would be sacrificing over three times as much in forgone earnings as they would pay in cumulative charges, $115,088 versus $32,400. But most students do not quit working entirely. Virtually all of them earn some money during their four years of college, even if only during summer and vacation periods. They don't lose the average earnings amounts listed in Table Seven. The amounts students earn vary by their types and duration of employment, by geographic locale, by gender, and by years under consideration. (They earned more in 1997 than in 1970.) Trying to accurately assess the trends in how much forgone earnings students might have lost between 1970 and 1997 would have been extremely difficult, if not impossible. The important point here is that counting forgone earnings would not lead to different conclusions *about the trends* in relationships between "costs of investing" (cumulative basic charges *plus* forgone earnings) and the relative time it would have taken to recover the costs with additional earnings gained from having a degree. The *numbers* of months to recover would be different; the *trends* generally would not be different.

For example, if it is assumed that male high-school graduates gave up four years of average earnings in 1997, they would, in theory, have lost more than $115,000 ($28,772 times 4 equals $115,088). Adding that amount to the estimated cumulative basic charges of $32,400 yields the sum of $147,488. If that amount, *rather than just the basic charges*, were considered the total cost of investing in college, it would have taken 107 months to

recover those investment expenditures with the $16,520 average annual additional earnings from having a degree. Using the same computational process for all years under study yields these results for males who attended four-year public colleges:

	Months Needed to Recover Expenses Plus Lost Earnings	Months Needed to Recover Just Basic Expenses
1970	169	24
1975	250	34
1980	253	37
1985	146	25
1990	125	24
1995	110	23
1997	107	24

These numbers lead to basically the same conclusion about the average amount of time it would have taken males to recover their costs of education with additional earnings. The lengths of time grew in 1975 and 1980, dropped substantially in 1985 and then again in 1990 and 1995, and then remained about the same in 1997. Using forgone earnings in computations did not produce significantly different conclusions about the trends for males or females, regardless of whether they attended public or private colleges. Assuming that students lose *all* their average earnings does not lead to different conclusions about the trends in relative time needed to recover the costs of investment, and it is very difficult to estimate the average earnings that might actually have been forgone. Consequently, it made sense to disregard forgone earnings here.

Some persons who looked at drafts of this monograph suggested that by assuming that students graduate in four years the author underestimated cumulative charges for earning a degree. It is widely known that many four-year public college graduates began to take more than four years to earn their degrees during the 1990s and they continue to do so today. (The phenomenon is not nearly as prevalent at four-year private colleges.) If the students had to spend more than four years in attendance, then their cumulative expenses would have been greater than those estimated and reflected in Table One, which were used to compute the months needed to recover cumulative expenses.

To test for the effects of taking longer to complete a degree on the number of months needed to recover cumulative expenses, it was assumed that students who entered four-year *public* colleges in 1990, 1995, and 1997 had to take five years instead of four years to earn their degrees. Then the numbers of months needed to recover the cumulative expenses for five years were computed. Here is how they compare with the original estimates that appear in Table Eight:

	Males Months to Recovery Original*	Males Months to Recovery New	Females Months to Recovery Original*	Females Months to Recovery New
1970	24	24*	31	31*
1975	34	24*	45	45*
1980	37	37*	43	43*
1985	25	25*	34	34*
1990	24	30	28	34
1995	23	29	33	40
1997	24	29	28	34

*Students for these years were assumed to have gotten degrees in four years.

The number of months it would have taken to recover cumulative "net charges" with additional earnings rose between 1970 and 1980 and then dropped by 1985.

Even if the four-year public college students who entered in 1990, 1995, and 1997 took five years to earn their degrees, it would have taken them fewer months to recover their costs than it would have taken students entering in 1980 and taking only four years to get degrees. If males entering in 1997 took five years to get their degrees, it would have taken them just five more months than it would have taken males who entered in 1990 and got their degrees in four years to recover their expenses, 29 months versus 24 months. It would have taken females six additional months, 34 months versus 28 months. Therefore, it appears that even if all the four-year public college students of the 1990s took longer than those of the 1980s to complete their degrees, they would not have extended their expense recovery times by large amounts. Taking longer to earn a degree would not have substantially diminished the relative value of the investment.[1]

Because both gross and "net" college charges after institutional aid were compared with family incomes, it is appropriate to compare the months that graduates would have needed to recover their cumulative "net charges" for four years of college during the 1970 to 1997 time period. Table Nine displays the data.

The patterns in Table Nine are similar to the patterns in Table Eight. The number of months it would have taken to recover cumulative "net charges" with additional earnings rose between 1970 and 1980 and then dropped by 1985. After 1985, the number of months for males to recover "net charges" at both types of colleges decreased. For females, the numbers went down between 1985 and 1990, went back up in 1995, and then back down in 1997.

[1] The author notes here that today's students generally are not forced to take more than four years to complete their degrees. The vast majority of baccalaureate degree programs can be completed in four academic years. But some students take longer because many work more hours at "part-time" jobs. They take 12 credit hours per term rather than 15 credit hours because this makes them "full-time" students and eligible for aid but allows them to devote more time and effort toward getting better grades in fewer courses. Some students transfer between colleges, lose credits and/or have to repeat courses before graduating. Others change majors and must take new required courses for graduation. In some instances, students are forced to take more than four years because a required course is not available when they need it. In other instances, students become ill or must handle family problems, so they have to leave school for awhile. But for the most part, students who take more than four years to earn a bachelor's degree choose to do so. For this reason, and because reliable data are unavailable for all years under study, the author chose not to compute the times needed to recover college expenses on the basis of the average number of years it took students entering in different years to earn their degrees. Using averages is unlikely to have produced different conclusions about the trends in cumulative expense recovery times.

Table Nine

Mean Number of Months Needed to Recover the Net Cumulative Costs of College with Average Additional Annual Earnings, Workers Ages 25 to 34, by Gender and Types of Colleges, 1970 to 1997

	Four-Year Public Colleges		Four-Year Private Colleges	
	Males	Females	Males	Females
1970	23	30	44	56
1975	33	43	64	83
1980	35	41	72	83
1985	24	33	52	72
1990	22	26	51	58
1995	20	30	48	67
1997	21	25	46	54

In 1997, it would have taken males 21 months to recover their average cumulative "net charges" for four years of education at public colleges with their average additional earnings. That is fewer months than in 1970, 1985, and 1990. It is only one month more than in 1995. In 1997, it would have taken females 25 months to recover their average cumulative "net charges" at public colleges. *That is fewer months than in any previous year under investigation.* In 1997 it would have taken females 54 months to recover their average cumulative "net charges" at private colleges. Although that was more than twice as long as it would have taken to recover "net charges" at public colleges, it is also fewer months than in any previous year under study. The 46 months it would have taken males to recover their average cumulative "net charges" at private colleges in 1997 was fewer months than in any previous year since 1970.

The Table Nine data show that, between 1980 and 1997, the value of a college degree, in terms of both male and female graduates' increased mean earnings, grew faster than did average cumulative "net charges." The relative value increased during both the 1980s and the 1990s. Although "net charges" at colleges absorbed somewhat greater shares of family incomes in 1997 than in 1990, those expenses did not grow faster than the payoff to graduates in the form of greater average annual earnings.

The findings here can be summarized as follows:

- Since the beginning of the 1980s, mean annual earnings have grown faster for young persons with college degrees than for those with just high school diplomas. By 1997, female college graduates earned 66 percent more than high school graduates and male college graduates earned 57 percent more.
- During the 1990s, it would have taken college graduates fewer months to recover their net college expenses with their additional earnings from their education than at any time since the early 1970s.
- During the 1990s, the value of a bachelor's degree in terms of graduates' increased mean earnings kept pace with and sometimes exceeded the growth in college prices.

In 1997, it would have taken females 25 months to recover their average cumulative "net charges" at public colleges. That is fewer months than in any previous year under investigation.

The Cost Versus Benefits Analysis For Students Who Leave College Without Degrees

The preceding section of this monograph described how the earnings benefits of employment as a college graduate grew in relationship to college expenses. But because not all students complete their education, it is important to examine the trends in relationships between additional earnings and college charges for such students. The first step is to examine differences in annual earnings. Table Ten compares the mean annual earnings of young high-school graduates with those of persons with one to three years of undergraduate education, by gender, from 1970 through 1997.

Table Ten shows that in 1970, among full-time year round workers ages 25 to 34, the mean earnings for males with some college (one to three years) were 15 percent greater than the mean earnings for males with only high school diplomas. By 1997, males with some college still earned about 15 percent more than male high school graduates. In 1970, females with some college earned 14 percent more than female high school graduates. By 1997, the female college graduates earned 15 percent more.

Table Ten

Mean Earnings for Full-Time Year-Round Workers, High School Graduates and One to Three Years of College, by Gender, Ages 25 to 34, 1970 to 1997

	MALES			FEMALES		
	High School Diploma	Some College	Difference	High School Diploma	Some College	Difference
1970	$ 8,999	$10,398	$1,399	$ 5,629	$ 6,402	$ 773
1975	$12,348	$13,736	$1,388	$ 7,820	$ 8,784	$ 964
1980	$17,629	$18,755	$1,126	$11,721	$13,486	$1,765
1985	$21,273	$24,528	$3,255	$15,605	$18,353	$2,748
1990	$24,038	$28,298	$4,260	$17,076	$20,872	$3,796
1995	$27,440	$29,971	$2,531	$20,091	$22,938	$2,847
1997	$28,772	$33,072	$4,300	$21,289	$24,581	$3,292

Source: U.S. Bureau of the Census, P-60, No. 80; P-60, No. 105; P-60, No. 132; P-60, No. 156; P-60, No. 174; P-60, No. 193; P-60, No. 200

The differences in mean annual earnings for females were remarkably stable during the 27 years under investigation. With the exception of 1985 and 1990, the females with some college consistently earned between 12 percent and 15 percent more than females with high school diplomas. In 1985 and 1990, they earned 18 percent and 22 percent more, respectively, than did high school graduates. During the 1980s, mean earnings for females with some college rose by 55 percent; mean earnings for female high school graduates, by 46 percent.

There was somewhat less stability in the earnings differences for males. In 1970, males with some college earned, on average, 15 percent more than males with no college training. That difference shrank to 11 percent in 1975 and then diminished further to 6

percent in 1980. Between 1980 and 1990, the mean earnings of males with some college rose by 51 percent; mean earnings for male high school graduates, by only 36 percent.

The 1980s saw the *differences* in mean annual earnings for those with some college and those with none grow tremendously, by 278 percent among males and by 115 percent among females. However, during the 1990s (at least through 1997), the gaps returned to their 1970 percentage levels for both males and females. Between 1990 and 1997, mean annual earnings for young males with some college rose by 17 percent; mean earnings for young male high school graduates, by 20 percent. During the same time period, mean annual earnings for young females with some college rose by 18 percent; mean earnings for young female high school graduates, by 25 percent. *So the relative benefits of having some college education, at least in terms of increased earnings, diminished during the 1990s.*

The relative benefits of having some college education, at least in terms of increased earnings, diminished during the 1990s.

Given this circumstance and the knowledge that college expenses increased substantially during the decade, it is reasonable to expect the relationships between college charges and earnings to have become less favorable to students in the 1990s. The data in Table Eleven show this is the case. The data show how many months young persons with some college (one to three years) would have had to work at their moderately higher average annual earnings levels to recover the average cumulative "net charges" for two years at a four-year public or four-year private college. Again, "net charges" refers to basic charges for tuition, fees, room, and board minus institutional aid.

Table Eleven

Mean Number of Months Needed to Recover the Cumulative Net Charges of Two Years of College with Average Additional Annual Earnings, Workers Ages 25 to 34, by Gender and Types of Colleges, 1970 to 1997

	Four-Year Public Colleges		Four-Year Private Colleges	
	Males	Females	Males	Females
1970	23	41	44	79
1975	31	44	59	85
1980	55	35	112	71
1985	28	34	62	73
1990	22	26	65	73
1995	61	54	140	124
1997	38	50	86	112

Between 1970 and 1980, the number of months males would have had to work at higher earnings levels to recover the "net charges" for two years of study at four-year public colleges rose by 139 percent, from 23 to 55 months. The number of months for males who had attended four-year private colleges rose by 155 percent. For females, the number of months to recover "net charges" first rose in the 1970s, then dropped by the end of that decade, and then remained rather stable throughout the 1980s. During the 1980s, the number of months to recovery for males dropped by about 49 percent for

those who had attended public colleges and by about 45 percent for those who had attended private colleges.

However, between 1990 and 1995, *regardless of gender or whether colleges attended were public or private,* there was a dramatic increase in the number of months needed to recover the average charges for two years of college. Two factors contributed to this increase. The most important was that the difference between mean annual earnings of young workers with some college and those with none *decreased* by 41 percent among males and by 25 percent among females. *The payoff in increased earnings from attending college diminished.* The other factor was that "net charges" for two years of college grew by about 30 percent.

Between 1995 and 1997, the number of months again declined for males and females at both types of institutions. This was largely because the differences in mean earnings rose by 16 percent among females, *and by 70 percent among males.* Another factor contributing to the decline was a slower growth in "net charges" at private colleges.

The students who spent only two years in college during the 1990s would have taken longer than students in earlier years to recover their college expenses, even the "net charges" after institutional financial aid. *The value of some college, in terms of its relative ability to increase either male or female students' mean earnings, did not keep pace with the growth in average cumulative "net charges." The cost versus benefits ratios, at least in terms of additional mean earnings, diminished for both males and females.*

Here is how the months to recovery of average cumulative "net charges" would have compared in 1997 for college graduates and for students with only some college, by gender and types of colleges:

	Public Colleges		**Private Colleges**	
	Males	**Females**	**Males**	**Females**
Graduates	21	25	46	54
Some College	38	50	86	112

These data show that students who did not complete their degrees would have taken much longer than college graduates to recover their expenses; this is especially true for female students. Females with just some college would have had to work twice as long as female graduates to recover their "net charges" — for half as much time spent in college. The relative value of college training and education, at least as measured by increased mean earnings, was severely diminished when students did not complete their degree programs. The financial penalty for failure to complete a baccalaureate degree program was very high, because it would have taken so much longer to recover the amounts of money spent on college expenses, even "net charges."

The relative value of college training and education, at least as measured by increased mean earnings, was severely diminished when students did not complete their degree programs.

The penalty for failure would have been even greater if students had accepted loans to help meet their college expenses. For example, if the 1997 students borrowed $5,000 in Federal Family Education Loan Program (FFELP) loans for two years of study, they would have had to repay about $7,200 in principal and interest. Males would have required another six months and females eight months to recover their expenses from their modest additional earnings. In 1997, the typical four-year public college *graduate* who had borrowed to pay for expenses left college owing $12,000 in student loans; the typical four-year private college graduate borrower owed about $14,000. It would have cost about $17,400 and $20,300, respectively, in principal and interest to repay those debts under the standard

ten-year amortization schedule. Therefore, the number of months until recovery of expenses would have compared as follows:

	Public Colleges		Private Colleges	
	Males	**Females**	**Males**	**Females**
Graduates	25	30	51	59
Some College	52	68	100	130

In this illustration, the graduates who borrowed would have borrowed more than twice as much as the student borrowers who spent only two years in college. The graduates would have spent twice as long in college. But it would have taken the graduates only half as long to recover their education expenses. If male students had borrowed $5,000 before leaving at the end of two years, it would have taken them from four to eight years to recover their expenses, depending on whether they had attended a public or a private college. It would have taken female students from five and a half to almost eleven years to recover their expenses. That it would have taken so long to recover the college (and loan repayment) expenses from attending college for only two years should suggest to most readers that the penalty for failure to complete college is very great, since it takes many years before students begin to realize net ("net" after college expenses) earnings benefits from their incomplete college experiences.

The penalty for failure to complete college is very great.

The findings for trends in college expenses and earnings for students who did not complete their degree programs can be summarized as follows:

- During the 1980s, it would have taken students who left four-year colleges after just two years decreasing numbers of months to recover their college expenses with their additional earnings.
- During the 1990s, it would have taken such students longer to recover their expenses, especially if they had borrowed to pay college charges.
- In terms of increased mean earnings, the value of attending college without earning a degree did not keep pace with the growth in college charges.
- The financial penalties for attending four-year colleges without completing and earning degrees rose significantly.

Changes in College Participation and Graduation Ratios

Earlier sections of this monograph showed that college prices rose faster than had family incomes. However, during the 1990s, the value of a college degree, in terms of graduates' increased mean earnings, kept pace with and sometimes exceeded the growth in college prices. Therefore, in spite of the growing short-term difficulty in paying for college, more students could have been expected to enroll because the payoff for earning a degree was so good. The long-term benefits outweighed the short-term expenses.

Table Twelve shows the college enrollment rates of two groups: high school graduates of a given year and persons between 18 and 24 years of age, regardless of when (or if) they graduated from high school.

Table Twelve

College Enrollment Rates of High School Graduates and Traditional Student Age Cohorts, 1970 to 1997

	High School Graduates	18 to 24 Years Old
1970	51.8%	25.7%
1975	50.7%	26.3%
1980	49.3%	25.7%
1985	57.7%	27.8%
1990	59.9%	32.1%
1995	61.9%	34.3%
1997	67.0%	36.2%

Source: Digest of Education Statistics, 1998, Tables 183 & 186

During the 1970s, about half of all high school graduates went on to college (either four-year or two-year) within a year after graduation. About one-fourth of the 18 to 24-year-old cohort were enrolled in college. That the increased earnings payoff for having a degree was modest in that decade likely contributed to these patterns. The 1980s saw a significant increase in the percentages of high school graduates and percentages of the "college age" cohort enrolling in college. By the end of that decade, almost six out of ten high-school graduates went on to college within a year of graduation, and nearly one-third of the "college age" population was enrolled. During the 1990s, the proportion of high school graduates who went directly on to college continued to rise significantly. A growing share of the "college age" population enrolled in college, but the increase was not as great as during the 1980s. There is no evidence to suggest that these two proportions have decreased since 1997. *More persons go to college because the payoff in terms of greater earnings continues to be good.*

Careful readers may have noted that the percentages of persons going to college reported in Table Twelve refer to all types of colleges. It is possible to estimate the percentages of high school graduates who continued their education at just the four-year colleges for the years under study. Here are those percentages:

1970	31.0%
1975	24.5%
1980	23.7%
1985	29.2%
1990	31.7%
1995	35.2%
1997	39.4%

These data show that the percentage of high school graduates going directly on to just four-year colleges increased almost as much in the first seven years of the 1990s as it did during the decade of the 1980s, 7.7 percent versus 8.0 percent. Rising proportions of high school graduates are going directly on to four-year colleges as well as all types of colleges. Data on the percentages of all college-age students who enrolled only at four-year colleges were unavailable.

Because the payoff for graduating is good, one would expect the numbers of baccalaureate degree recipients to have grown over time. They did, along with the numbers of students attempting to earn degrees. Here are the percentage increases for the different time periods:

	Students	**Graduates**
1970 to 1975	12.9%	10.2%
1975 to 1980	4.2%	1.1%
1980 to 1985	1.9%	5.7%
1985 to 1990	11.8%	7.3%
1990 to 1995	0.7%	6.5%

Between 1970 and 1975, undergraduate enrollments in four-year colleges grew by 12.9 percent, which accounts in large part for the 10.2 percent increase in bachelor's degree recipients. During the latter half of the 1970s, when the earnings returns for college degrees were relatively slight, the annual number of college graduates barely rose at all, by 1.1 percent, while enrollments were growing by 4.2 percent. Between 1980 and 1990, when the earnings returns for college degrees were growing, undergraduate enrollments at four-year colleges grew by 13.9 percent, while bachelor's degree recipients grew by 17 percent. Between 1990 and 1995, enrollments grew by about 0.7 percent, but the number of graduates rose by 6.5 percent.

The ratio between numbers of undergraduate students and degree recipients can be considered as a kind of proxy for student retention and for college productivity. If all students enrolled, stayed at their institutions, and completed their degrees in four years, then the ratio would be 4.00, because one-fourth of the undergraduate student body should be graduating each year. That the actual ratios are greater than 4.00 indicates that some students drop out and some take longer than four years to complete their degrees.

The percentage of high school graduates going directly on to just four-year colleges increased almost as much in the first seven years of the 1990s as it did during the decade of the 1980s, 7.7 percent versus 8.0 percent.

The ratio is, however, only an approximate proxy for student retention and college productivity, because it can also be affected by changes in freshmen (and transfer) student enrollment patterns, even when students do not drop out. The following model illustration will demonstrate this point. Here are some "sample" freshmen, sophomore, junior, and senior enrollments for successive years, along with each year's enrollment-to-graduates ratio.

Years:	One	Two	Three	Four	Five
Freshmen	250	275	225	300	250
Sophomores	250	250	275	225	300
Juniors	250	250	250	275	225
Seniors/Grads	250	250	250	250	275
Enrollment	1,000	1,025	1,000	1,050	1,050
Ratio	4.00	4.10	4.00	4.20	3.82

In the first year, there were 250 students in each of the four classes, assuming that everyone who entered had remained in school for four consecutive academic years and would then graduate. In the second year in this example, there were 275 freshmen rather than 250. This increased total enrollment to 1,025 and, consequently, raised the total enrollment-to-graduate ratio in the second year to 4.10 (1,025 divided by 250). In the third year, there were only 225 freshmen, the 275 freshmen of the second year became sophomores, and total enrollment dropped back to 1,000. Thus the ratio returned to 4.00 at the end of the third year, *still with no one dropping out or leaving school except through graduation (*and no one transferring in as an upperclassman). In the fourth year, freshmen enrollment reached 300, raising the total number of students to 1,050. Because only 250 students who had been freshmen in the first year were graduating, the enrollment-to-graduate ratio rose to 4.20. By the fifth year, freshmen enrollment had returned to the first year's level of 250. By that time, the second year's 275 freshmen had become seniors and were graduating, so the ratio slipped to 3.82 as it took only 3.82 students to "produce" a single graduate (1,050 divided by 275). It should be apparent that year-to-year changes in freshmen enrollments can make significant difference in the ratios.

Now it is appropriate to look at the effects of student attrition on these data. Here is how the numbers would look if approximately 10 percent of the students left from each succeeding freshmen, sophomore, and junior class:

Years:	One	Two	Three	Four	Five
Freshmen	250	275	225	300	250
Sophomores	250	225	248	203	270
Juniors	250	225	203	223	183
Seniors/Grads	250	225	203	183	201
Enrollment	1,000	950	879	909	904
Left School	0	75	71	67	72
Ratio	4.00	4.22	4.33	4.97	4.50

In this second illustration, 25 of the "Year One" freshmen, sophomores, and juniors failed to make it to their next years, representing a loss of 75 students. But during the second year the freshmen enrollment rose from 250 to 275, so the total enrollment became 950. Thus the enrollment-to-graduate ratio rose to 4.22. The enrollment-to-graduate ratio for the five combined years for the first set of data is 4.02 (it took 5,125 students to produce 1,275 graduates during the five-year period). The ratio for the second set of data is 4.37 (it took 4,642 students to produce 1,062 graduates). Even though both "colleges" in this illustration enrolled the same number of beginning students each year, the first had a better overall ratio because no students dropped out.

It should be apparent that changes in attrition, as well as numbers of graduates, affect the ratios. It should also be apparent that, because beginning student enrollments and the numbers of students who leave or drop out change from one year to the next, relatively small year-to-year changes in the ratios are insignificant. Put another way, two annual ratios would likely have to differ by more than 0.20 or 0.30 points to be considered as representing a significant difference in attrition/retention rates or "graduation productivity." "Graduation productivity" is defined here as the simple ratio between undergraduate enrollments and bachelor's degree recipients. "Graduation productivity" basically represents the number of students it takes to "produce" a graduate.

Table Thirteen, on the next page, shows the ratios between numbers of undergraduate students and bachelor's degree recipients at public and private four-year colleges for the years under study. In the first part of the 1970s, it took about 5.7 undergraduates to produce a graduate at a four-year public college. In the latter part of the 1970s, it took about 6.2 students to produce a graduate. From 1980 to 1990, it took about 6.6 undergraduates to produce a degree recipient. In 1991 through 1995, it took about 6.0 undergraduates. These data suggest that public four-year colleges were worse at student retention and graduation during the 1980s than in the 1970s but they likely improved a little during the 1990s.

The ratios for the private colleges indicate that they were slightly more successful than public colleges at producing graduates. Also, the year-to-year patterns for the private colleges were not quite as distinct as those for the public colleges. Like the public colleges, the private colleges seem to have declined in productivity between the first and second halves of the 1970s, when the number of students needed to produce a graduate rose from 5.6 to 5.9 students. But then the ratio remained at 5.9 for two years and then averaged 5.7 between 1982 and 1989. During the 1990s, the ratio averaged 5.4 students per graduate. Thus it appears that both the private and public four-year colleges improved their ability to produce baccalaureate degree recipients during the first part of the 1990s. Their retention rates very likely improved, if only slightly.

This method of looking at attrition rates and productivity over time is imperfect. It would be better to have been able to look at annual year-to-year changes in the graduation rates of each new cohort of students. The National Collegiate Athletic Association (NCAA) collects and publishes graduation rate figures in terms of the numbers of freshmen students who receive degrees within six years of matriculation. But those data have only been available for this decade (NCAA, 1996). Moreover, those data cannot be used in the aggregate, because they are institution-specific. That is to say, the cohort students enter one institution and are counted as graduating if they receive a diploma *from the same institution* within six years. Many students transfer between colleges and graduate within

The ratios for the private colleges indicate that they were slightly more successful than public colleges at producing graduates.

Table Thirteen

Numbers of Undergraduate Students Enrolled per Bachelor's Degree Recipients, Four-Year Public and Private Colleges, 1970 to 1995 (Enrollments and Recipients in 1,000s)

	PUBLIC COLLEGES			PRIVATE COLLEGES		
	Enrollment	Bachelor's Degrees	Students per Recipient	Enrollment	Bachelor's Degrees	Students per Recipient
1970	3,433	558	6.15	1,625	282	5.76
1971	3,459	600	5.77	1,615	288	5.61
1972	3,485	631	5.52	1,605	291	5.52
1973	3,489	652	5.35	1,616	294	5.50
1974	3,656	635	5.75	1,649	288	5.73
1975	3,989	635	6.28	1,720	291	5.91
1976	3,847	630	6.11	1,682	289	5.82
1977	3,921	628	6.24	1,734	293	5.92
1978	3,854	622	6.20	1,750	300	5.83
1979	3,943	624	6.32	1,792	305	5.88
1980	4,114	626	6.57	1,837	309	5.94
1981	4,229	636	6.65	1,871	317	5.90
1982	4,278	646	6.62	1,860	323	5.76
1983	4,288	646	6.64	1,885	328	5.75
1984	4,205	652	6.45	1,873	327	5.73
1985	4,207	659	6.38	1,858	329	5.65
1986	4,287	6.59	6.50	1,872	332	5.64
1987	4,405	658	6.69	1,893	336	5.63
1988	4,479	676	6.63	1,954	343	5.70
1989	4,649	700	6.64	1,954	351	5.57
1990	4,773	724	6.59	2,006	370	5.42
1991	4,742	759	6.25	2,004	377	5.42
1992	4,731	785	6.03	2,084	380	5.48
1993	4,675	789	5.93	2,083	380	5.48
1994	4,636	777	5.97	2,096	383	5.47
1995	4,625	774	5.98	2,114	391	5.41

six years, but they do not get counted as graduates by the NCAA, *because their degrees are not from the institutions where they first matriculated.* To analyze the year-to-year *collective* productivity of all institutions, cohort graduation rate data that are not institution-specific are needed. There were none for every year under investigation.

The American College Testing Program (ACT, Inc.) has for several years produced an annual report on trends in freshman-to-sophomore dropout rates and five-year graduation

rates from colleges. Like the NCAA reports, these reports do not track students from one college to another. The data from the ACT reports do, however, indicate a considerable degree of stability in attrition rates. A recent press release (ACT Newsroom, 2000), showed that these percentages of four-year public college freshmen did not return for their second years:

1988	29.6%	**1994**	28.3%
1989	29.3%	**1995**	28.6%
1990	28.6%	**1996**	29.0%
1991	28.3%	**1997**	28.6%
1992	28.4%	**1998**	28.8%
1993	28.1%	**1999**	28.1%

The same ACT press release showed that the proportions of students who earned bachelor's degrees from four-year public colleges within five years is decreasing. Again, these data are for students who graduated from the institutions they initially entered:

1988	48.0%	**1994**	45.6%
1989	48.2%	**1995**	46.1%
1990	47.9%	**1996**	44.6%
1991	46.6%	**1997**	44.2%
1992	46.7%	**1998**	42.9%
1993	46.3%	**1999**	42.2%

It is reasonable to conclude from these data (and the data on "graduation productivity" ratios) that there is a considerable degree of stability in attrition and graduation ratios over time for four-year public colleges.

There is a considerable degree of stability in attrition and graduation ratios over time for four-year public colleges.

State-by-State Differences in College Affordability

Up to now, the analyses have focused on national statistics, trends, and patterns of change over time. In *College Affordability: A Closer Look At The Crisis* (1997), the author discussed the significant differences in college affordability between and among states. Those differences still persist. This section describes the wide variations among the states in terms of the numbers of days' median family income earnings that were needed to cover average charges at four-year public colleges in 1997. "Between state" differences in the mean days needed are a function of differences in median family incomes, in basic student charges, and in available financial aid. It will be shown that the "between state" differences in days needed by families in the 50 states and District of Columbia are greater than the national differences in days needed in 1997 and most earlier years. It will be shown that the differences in days needed to cover average charges vary more by geography than by time.

The differences in days needed to cover average charges vary more by geography than by time.

The estimated median incomes of families with household heads between the ages of 45 and 54 differ considerably among the states (see Table A-1 in Appendix A for the details). For example, the median incomes in seven states (Arkansas, Mississippi, Montana, New Mexico, Oklahoma, South Dakota, and West Virginia) were under $50,000 in 1997. But at the other end of the scale, median incomes exceeded $65,000 in fifteen states (Alaska, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Utah, Virginia, Washington, and Wisconsin). Here is a frequency distribution of the median incomes by states:

Under $45,000	2 states	AR, WV
$45,000 to $49,999	5 states	MS, MT, NM, OK, SD
$50,000 to $54,999	10 states	AL, AZ, DC, FL, IA, KY, LA, ND, TN, WY
$55,000 to $59,999	15 states	GA, ID, KS, ME, MO, NE, NY, NC, OH, OR, PA, RI, SC, TX, VT
$60,000 to $64,999	4 states	CA, IN, MI, NV
$65,000 to $69,999	11 states	CO, DE, HI, IL, MA, MN, NH, UT, VA, WA, WI
$70,000 or More	4 states	AK, CT, MD, NJ

The medians for half the states (25) fell between $50,000 and $59,999. But the medians for nearly one-fourth of the states (12) were over $66,000 and the medians for another approximately one-fourth of the states (13) were under $52,000. There were substantial state-by-state differences in the medians and substantial differences in the amounts of money (before taxes) families earned in each day of the 250 earnings days in the year, ranging from $208 or less for families with median earnings $52,000 or less, to $264 or more for families with median earnings of $66,000 or more. It is reasonable to expect this 27 percent difference to have direct effects on the numbers of earnings days needed to cover college charges in the different states.

Differences in the average charges for tuition, fees, room, and board at the four-year public colleges have direct effects on the earnings days required to cover college expenses. Just as median family incomes vary, so do public four-year college charges vary among the states (see Table A-1). Here is a frequency distribution of those charges:

Under $5,600	3 states	MS, NM, OK
$5,600 to $5,999	7 states	AR, KY, LA, NC, SD, TN, UT
$6,000 to $6,499	10 states	AL, DC, ID, IA, KS, NE, ND, TX, WI, WY
$6,500 to $6,999	5 states	AZ, FL, GA, MT, WV
$7,000 to $7,999	8 states	AK, CO, HI, MN, MO, NV, SC, WA
$8,000 to $8,999	8 states	CA, IL, IN, ME, MA, MI, OR, VA
$9,000 to $9,999	8 states	CT, DE, MD, NH, NY, OH, PA, RI
$10,000 or More	2 states	NJ, VT

The average charges in twelve states were below $6,100, but the average charges in another twelve states were above $8,800. The differences in charges were substantial.

Table Fourteen displays the frequency distribution of the number of earnings days needed by families *at the median income levels in their states* to cover the average charges at four-year public colleges *in their states* in 1997. The median number was 31 days; the average, 31.9 days. In slightly more than one-fourth of the states (14) it took 28 or fewer

Table Fourteen

Estimated Numbers of Days of Median Earnings Required to Cover Average Four-Year Public College Tuition, Fees, Room, and Board Charges, by States, 1997

Days	Number	States
52	1	VT
42	1	RI
41	2	NY, PA
39	2	ME, OH
38	1	WV
37	1	NH
36	1	MT
35	3	IN, MI, OR
34	3	AR, CT, DE
33	6	CA, FL, MD, MA, MO, NJ
32	4	AZ, IL, SC, VA
31	6	AL, DC, GA, MS, SD, WY
30	2	NM, ND
29	4	IA, NV, TN, WA
28	4	LA, MN, OK, TX
27	5	CO, HI, ID, KS, NE
26	1	KY
25	2	NC, WI
23	1	UT
22	1	AK

Median: 31 days
Mean: 31.9 days

days. In slightly fewer than one-fourth of the states (12) it took 35 or more days to cover the average charges. In the simplest of terms, in 1997 it would have cost families in the more expensive states at least 25 percent more than families in the least expensive states to pay for average four-year public college charges. This "geographic" difference of seven days is greater than the "temporal" difference of six days between 1985 and 1997 (see Table Three on page 11).

It could take more days of earnings to pay for college if the median family incomes in a state were lower than usual, the average college charges were higher than usual, or some combination of the two. College charges in ten of the fourteen states where it took 28 or fewer days to cover expenses were *below average.* In the other four states (Minnesota, Colorado, Hawaii, and Alaska), the median family incomes were higher. College charges were *above average* in nine of the twelve states where it took 35 or more days to cover expenses. Median family incomes were lower in the other three states (Montana, New Hampshire, and West Virginia). *These findings strongly suggest that state differences in college charges have greater effects on differences in college affordability than do differences in median family incomes.*

Another way of looking at the data suggests the same conclusion. Here are the means of incomes and means of college charges for the states where it took 35 or more days and 28 or fewer days to cover college charges:

The state differences in college charges have greater effects on differences in college affordability than do differences in median family incomes.

	28 Days	**35 Days**
Mean of Charges	$ 6,370	$ 8,950
Mean of Incomes	$60,970	$56,070

The mean of college charges in the states where it took 35 or more days to cover expenses was *40 percent greater* than the mean in the states where it took 28 or fewer days to cover expenses, $8,950 versus $6,370. The mean of median incomes in those "less affordable" states was only 8 percent less than the mean of incomes in the "more affordable" states. Therefore, at least at the extremes of the data, policies regarding college charges apparently have a much greater effect on affordability than do the median income characteristics of families in the different states.

A look at the states whose families are in the middle of the income distributions will be helpful here. It was noted above that the median family incomes in 15 states fell between $55,000 and $59,999. Here are the numbers of earnings days required in those 15 states where the median family income levels were fairly similar:

25 to 28 days	Idaho, Kansas, Nebraska, North Carolina, and Texas
31 to 35 days	Georgia, Missouri, Oregon, and South Carolina
39 to 42 days	Maine, New York, Ohio, Pennsylvania, and Rhode Island
52 days	Vermont

Even though their income levels were similar, families in Maine, New York, Ohio, Pennsylvania, and Rhode Island would have had to spend about 23 percent more days of earnings than families in Georgia, Missouri, Oregon, and South Carolina to cover college charges. They would have had to spend about *53 percent* more days of earnings than

families in Idaho, Kansas, Nebraska, North Carolina, and Texas. They would, however, have had to spend about 22 percent fewer days than families in Vermont.

Perhaps readers from the states with larger state-funded grant programs will question the validity of this analysis because it includes only gross charges or "sticker prices." Some may argue that generous institutional financial aid programs *and extensive state grant programs* offset the higher gross charges or "sticker prices." To assess the validity of such arguments, data on estimated "net charges" were compared with median family incomes. The results are displayed in Table A-2 in Appendix A.[2]

The data on "net charges" are best estimates based on information reported by the National Center for Education Statistics on current funds revenues and expenditures of degree-granting institutions in 1996-97 (Barbett and Korb, 1999) and on information on state-funded grant programs as collected by the National Association of State Student Grant and Aid Programs for 1996-97 (NASSGAP, 1998).

Table Fifteen, on the next page, displays the frequency distribution of the number of earnings days needed by families at the median income levels *in their states* to cover the average "net charges" (net after considering institutional and state aid) at four-year public colleges *in their states* in 1997. The median number was 27 days, which is four days fewer than the median 31 days needed to cover gross charges or the "sticker prices." The average was 27.7 days, which is 4.2 fewer days than the average needed to cover gross charges. In slightly more than one-fourth (14) of the states, it took 24 or fewer days. In slightly fewer than one-fourth (12) of the states, it took 31 or more days to cover the average charges. This "geographic" difference of seven days is greater than the "temporal" difference of six days between 1985 and 1997 (see Table Three on page 11). In 1997, families in the more expensive states paid at least 29 percent more than families in the least expensive states for average "net charges."

Regardless of whether "gross" or "net" charges are used, the data show there are substantial differences among the states in the affordability of their public four-year colleges. There are substantial differences, at least 29 percent, in the amounts of effort required to pay for college expenses. The seven additional days required in the more expensive states could be considered as a kind of "public college tax" of about 2.8 percent of family earnings (seven days is 2.8 percent of the 250 earnings days in the year).

If parents and policy-makers are concerned about the growth in shares of family incomes needed to cover college expenses, then one would expect them also to be concerned about similar (and sometimes greater) state-by-state differences in the shares needed to cover expenses. It appears that students and families in such states as Minnesota, Nebraska, North Carolina, and Wisconsin are getting relative bargains in four-year public college charges, while students and families in states such as Maine, Ohio, Pennsylvania, Rhode Island, and Vermont are not.

Few students and families in the more expensive states have complained about the greater amounts they must pay, or protested that they are not getting the "bargains"

There are substantial differences among the states in the affordability of their public four-year colleges.

[2] When the author discussed these findings with representatives of NASSGAP, he was told that some states appropriate funds that are ear-marked for financial aid purposes and directly allocate them to public colleges. These funds are not reported in the annual NASSGAP surveys. However, the NCES reports on institutional expenditures do collect and report data on scholarship and fellowship funds *provided by state and local governments*. So combining both data sources produced the best available estimate of how much state and institutional grant aid was awarded to four-year public college undergraduates in 1997.

Table Fifeen

Estimated Numbers of Days of Median Earnings Required to Cover Net Average Four-Year Public College Tuition, Fees, Room, and Board Charges, by States, 1997

Days	Number	States
45	1	VT
38	1	RI
35	1	PA
34	3	ME, OH, WV
33	2	MT, NH
32	2	NY, OR
31	2	DE, IN
30	3	CT, DC, MI
29	7	AL, AZ, CA, MD, MA, SC, SD
28	2	MO, ND
27	2	AR, VA
26	7	FL, HI, MS, NV, NJ, TN, WY
25	4	ID, KS, LA, TX
24	5	CO, IA, NE, OK, WA
23	1	IL
22	4	GA, KY, MN, NM
21	4	AK, NC, UT, WI

Median: 27 days
Mean: 27.7 days

citizens of other states receive. The absence of widespread complaints is likely a function of limited public knowledge about college prices and costs. Many studies have documented how little parents of college-bound students know about college charges (C.f., Ikenberry and Hartle, 1998; Miller, 1997). Another reason for the absence of widespread complaints is that few students and families likely ever compare four-year public college charges across state lines. Only 16 percent of all four-year public college first-time freshmen students who were enrolled in 1996 were not enrolled in colleges in their home states (Barbett, 1998). Thus relatively few public four-year college students are likely to make comparisons of tuitions in different states. That public colleges typically charge non-residents higher tuitions than residents would also likely confound many inter-state price comparisons by students and families of charges in their home states versus charges in another state.

The inter-state differences in affordability have implications for federal student aid policies. The vast majority of federal student aid is awarded on the basis of financial need. "Financial need" is the difference between total charges and the "expected family contribution," the amount that students and families are expected to pay from their own financial resources. "Expected family contributions" (EFCs) are based largely on current income, family financial assets, and family size. Families with similar incomes, assets, and sizes would have similar EFCs. But if one of these families lived in one of the more expensive

states with higher tuition charges and another lived in one of the least expensive states with lower charges, the former family would have higher financial need. The family with higher need would qualify for more federal financial aid to offset that need generated by the higher charges. Therefore, even though two families might have very similar incomes, assets, and sizes, the family living in a more expensive state (such as Maine, Ohio, Pennsylvania, Rhode Island, and Vermont) would be eligible for more federal aid than the family living in a less expensive state (such as Minnesota, Nebraska, North Carolina, and Wisconsin). *So a family's eligibility for federal student aid is affected by where they live, because their college charges are affected by where they live.*

Because the federal student aid funds are used by students to pay tuitions, funds from these programs represent an indirect but sizable source of revenue for colleges. Therefore, four-year public colleges in the more expensive (and less affordable) states generally will receive a greater share of total tuition revenue from federal student aid sources than will four-year public colleges in the less expensive states. Because colleges in the states with lower affordability generally charge higher tuitions, they effectively shift more of the burden of paying for college to students and families — and to the federal government.

There are many reasons why college prices are higher in some states than in others. Differences in prices that colleges must pay for salaries, goods, and services needed to operate can contribute to differences in college expenditures. Differences in types of programs offered can affect the costs colleges must incur; for example, it costs more to offer courses in science and technology than in humanities and the social studies. If disproportionate numbers of students take courses in the more costly programs, that might contribute to above average charges to students. Colleges that offer large numbers of graduate and professional school programs may incur above average costs because these programs are more labor-intensive and salaries represent the largest single cost for most colleges. Some of these colleges may seek to offset their higher costs by charging undergraduates higher tuitions, thereby "subsidizing" the graduate and professional school students by allowing them to pay lower tuition rates. The list of reasons for differences in college prices is lengthy. William Massy (1998) and Gordon Winston (1998) listed the major factors in their separate testimony for the National Commission on the Cost of Higher Education. Paul Brinkman (1992) and Charles Lenth (1993) offered readers additional, earlier explanations for why prices vary, and grow.

Regardless of the many valid reasons why four-year public colleges in some states charge students more than similar colleges in other states charge, the fact remains that policy decisions about charges directly contribute to state-by-state differences in college affordability. The analyses above strongly suggest that the state-by-state differences in affordability are influenced more by differences in college charges than by differences in family financial resources and differences in state and institutional financial aid to students.

The findings on state-by-state differences in affordability can be summarized as follows:

- The median incomes of families with college-age children vary considerably among the states, falling below $52,000 in one-fourth of the states and rising above $66,000 in another one-fourth of them.
- The average total charges for tuition, fees, room, and board at four-year public colleges also vary considerably among the states, falling below $6,100 in twelve states but rising above $8,800 in another twelve.

A family's eligibility for federal student aid is affected by where they live, because their college charges are affected by where they live.

Colleges in the less affordable states ... shift more of the burden of paying for college to students and families and to the federal government.

- In 1997, it would have taken, on average, about 32 days of earnings for families at median income levels to cover annual expenses at four-year public colleges in their states. However, in fourteen states it would have taken 28 or fewer days and in twelve states 35 or more days to cover expenses.
- After institutionally funded and state-funded student financial aid resources are considered, it would have taken, on average, about 28 days of earnings at the median income levels to cover "net charges" in 1997. But in fourteen states it would have taken 24 or fewer days, and in another twelve states 31 or more days, to cover "net charges." Therefore, considerable differences in college affordability exist among states even after their student financial aid efforts are taken into account.
- The evidence strongly suggests that the differences in college affordability are more closely related to differences in charges to students and families than to differences in family incomes or student financial aid from state- and institutionally funded programs.
- If parents and policymakers are concerned about the growth in shares of family incomes needed to cover college expenses during the 1990s, one would expect them to also be concerned about frequently greater state-by-state differences in the shares needed to cover expenses. But few have expressed concerns, primarily because of limited public knowledge about college prices and costs and infrequent comparisons of public college costs across state lines.
- Because colleges in the less affordable states generally charge higher tuitions, they effectively shift more of the burden of paying for college to students and families and to the federal government.

State-by-State Differences in Graduation Productivity Ratios

It was noted earlier in this monograph that the four-year public and private colleges' "graduation productivity" (as measured by the numbers of undergraduate students needed to "produce" a baccalaureate degree recipient) changed over time, diminishing between the 1970s and the 1980s, but then improving slightly during the 1990s. Improvements in "graduation productivity" are important because they indicate when greater percentages of students are completing their degrees. It was noted that students who do not complete their degrees must, on average, take much longer than graduates to recover their education expenses. Therefore, in the face of rising college prices, it is important that growing percentages of students complete their degrees. It is important that the "graduation productivity" ratios improve by getting smaller and closer to the theoretical "4.00" level expected if all students who entered went four consecutive years and then graduated on time.

Since many college characteristics and student characteristics differ among states, it was hypothesized that there are differences in four-year college "graduation productivity" ratios between and among the states. The data in Table Sixteen, on the next page, demonstrate that there are, in fact, substantial differences in the "graduation productivity" ratios for four-year public colleges.

The "graduation productivity" ratios for 1993 to 1997 were 5.0 or less for the public colleges in five states: Washington, Michigan, California, Illinois, and Florida. At the other end of the scale, the ratios were more than 8.0 for institutions in six states: Alaska, the District of Columbia, Utah, Idaho, Louisiana, and Maine. *Collectively, the four-year public colleges in the first five states have, on average, graduation productivity ratios that are almost 60 percent better than those of four-year public colleges in the latter six states.* In the former states, it took only 4.6 four-year public college undergraduates to produce a baccalaureate degree recipient. In the latter states, it took 11.4 undergraduates.

To compensate for the potential effects of dramatic year-to-year changes in new enrollments on the annual "graduation productivity" ratios, the indexes displayed in Table Sixteen were computed over a four year period. That is to say, the sum of numbers of graduates for four consecutive years (1993-94, 1994-95, 1995-96, and 1996-97) were divided into the sum of numbers of enrolled undergraduates for the same four years to get an average ratio for the period. Analysis of the complete data in Appendix Tables A-3 and A-4 shows that the annual ratio for each of the four years under study for most of the states was very similar. Therefore, it is reasonable to conclude that the state-by-state differences represented here are not the results of some unusual enrollment or attrition circumstances for a single year. They are a function of what appears to be a fairly stable pattern of differences in "graduation productivity."

There are many factors that could contribute to the state-by-state differences. Students in some states might take longer to graduate because proportionately more transfer between colleges, take fewer hours of credit per term or year, or attend on a part-time rather than full-time basis. Proportionately more students in some states might not be as well prepared for college by their secondary schools, thus leading to higher attrition or drop-out rates, which are reflected in poorer "graduation productivity" ratios. Proportionately more students in some states might have greater financial difficulties in paying for college,

There are many factors that could contribute to the state-by-state differences.

Table Sixteen

Graduation Productivity Ratios for Undergraduates at Four-Year Public Colleges, By States, 1993 to 1997

States	Ratio	Percent Above/Below National Average
WA	4.2	+29
MI	4.4	+25
CA	4.6	+22
IL	4.8	+19
FL	5.0	+15
HI, MD, VA, WY	5.2	+12
AZ, IA, OR	5.3	+10
NC	5.5	+ 7
MS, RI, SC	5.6	+ 5
KS	5.8	+ 2
AL, CT, NJ, TX, WI	5.9	0
Average For The Nation	**5.9**	**0**
NH, PA, OK, VT	6.0	- 2
DE	6.1	- 3
CO	6.2	- 5
MO	6.3	- 7
MN, ND	6.4	- 8
GA, MA, NY, OH	6.5	-10
NE, NM	6.7	- 13
MT, TN	6.9	- 17
NV	7.2	- 22
IN, KY, SD	7.4	- 25
AR	7.6	- 29
WV	7.7	- 30
ME	8.1	- 37
LA	8.4	- 42
ID	8.6	- 46
UT	8.7	- 47
DC	15.6	- 62
AK	19.1	- 69

causing them to leave school. More students in some states might attend college without intending to receive degrees, so graduation is not a goal. (This explanation is likely the case in the District of Columbia, where many employees attend classes part-time for work-related purposes.) More students in some states might come from families of minority/poverty statuses, which generally leads to higher probabilities of leaving college without a degree (Horn, 1999). Still other states might have lower admissions requirements, thus enrolling more students who are less likely to succeed in college. Regardless of which factors contribute to differences in "graduation productivity" ratios, the differences in the

ratios among states indicate that the probability of students graduating from four-year public colleges differs significantly.

These differences in probabilities have important implications for student financial aid policies. If students have a higher probability of graduating, they will have a higher probability of earning higher mean salaries as employees. Thus attending college will be a good investment for them, regardless of the fact that the charges they pay might be growing faster than their family's ability to pay them without financial assistance. That college is a good investment will likely encourage more students to attempt to enroll.

Students with a higher probability of graduating can incur student loan debts, because they will be much more likely to be able to repay loans from future earnings. States with students in those situations might be able to devote more resources to loan program aid rather than to grant program aid for their citizens, thereby stretching their financial aid dollars and assisting more students.

Alternatively, in states where students have lower probabilities of graduating, attending college represents a more risky investment because the lower additional earnings from a few years of study mean it will take longer to recover the costs of attendance. In such states, charges that rise faster than family ability to pay them can represent a much greater threat to attendance than do rising charges in states where the probability of successful graduation is better. Where students are less likely to graduate, states may have to invest more in grant aid to counteract or offset the risks that certain students will fail to complete their degrees, because that risk acts as a disincentive to enroll.

In states where students have lower probabilities of graduating, the federal government risks greater likelihood of borrowers defaulting on their federal student loans. (In the 1990s, the author was able to accurately estimate that fewer than 5 percent of all students who got FFELP loans and received degrees from four-year colleges default on those loans.) When the federal government awards aid to four-year public college students in states where the probabilities of their graduating are lower, the government and taxpayers are less likely to get as good a return on the investment. Therefore, fewer will become as productive citizens, workers, and taxpayers as was expected or desired.

"Graduation productivity" ratios for four-year *public* colleges have been emphasized here because differences among states in the ratios for four-year *private* colleges will not be as important to public policy-makers. These differences are not as important because public policy-makers do not invest as many public dollars in private colleges as they do in public colleges. Nor can public policy-makers at the federal or state levels exert as much influence on private colleges as on public colleges. "Graduation productivity" ratios for the public colleges are more important to public policy-makers because public colleges in almost all states enroll larger numbers of the states' citizens. For example, in 1996, 68 percent of all undergraduates enrolled in four-year colleges nationwide were enrolled at public colleges (Digest of Education Statistics 1998, Table 180).

The diversity among private colleges and their missions in the different states undoubtedly contributes to differences in "graduation productivity" ratios in ways that do not affect the public college ratios. For example, more private colleges in New England and the Northeastern states than in the Southern states are selective in admissions requirements and serve students whose elementary and secondary school education and socioeconomic statuses enhance their probabilities of graduating.

These differences in probabilities have important implications for student financial aid policies.

The vast majority of public four-year college undergraduates (more than eight out of ten) are enrolled in their home states. Therefore, differences in "graduation productivity" ratios at public colleges are likely to reflect differences in characteristics of students and families, differences in elementary and secondary school instruction and preparation for college, and differences in public college policies and practices among different states. Many private college students (more than four out of ten) are *not* residents of the states where they are enrolled. Therefore, state-by-state differences in "graduation productivity" ratios for private colleges may be unrelated to differences among state populations, educational systems, and state policies regarding education.

However, if "graduation productivity" ratios for both types of colleges in a given state were similarly high or low, it is reasonable to hypothesize that the ratios are influenced at least in part by characteristics of the students, families, and elementary and secondary education systems of the states. Table Seventeen shows the "graduation productivity" ratios for both types of colleges in each state for the academic years 1993-94 through 1996-97.

The vast majority of public four-year college undergraduates (more than eight out of ten) are enrolled in their home states.

The states are ranked by "graduation productivity" ratios for their four-year public colleges. Only four of the twelve states with the best ratios for four-year public colleges also ranked in the top twelve for their four-year private college ratios: Washington, California, Iowa, and Oregon. Only six of the twelve states with the *poorest* ratios for public colleges also ranked among the poorest twelve for their private college ratios: Nevada, Kentucky, South Dakota, West Virginia, Louisiana, and Alaska. Overall, the correlation between percentile rankings for the two ratios was just +0.252.

Therefore, the state-by-state relationship between ratios for the two types of colleges is very slight. One should not expect states with better four-year public college "graduation productivity" ratios to have private colleges with better ratios, or vice versa. Collectively, the "graduation productivity" ratios for all public colleges were not as good as the ratios for all private colleges. However, in twelve of the thirteen states with the best public college "graduation productivity" ratios, the public college ratios exceeded those of private colleges.

The findings on state-by-state differences in "graduation productivity" ratios can be summarized as follows:

- There are substantial differences among states in the "graduation productivity" ratios for their public and private colleges, indicating that there are equally substantial differences in rates at which four-year college students complete their undergraduate degrees.
- The states whose public and private colleges have the best "graduation productivity" ratios include California, Florida, Illinois, Iowa, Oregon, and Washington. The states whose colleges have the poorest ratios include Alaska, Kentucky, Louisiana, Nevada, South Dakota, and West Virginia.
- Because students who do not finish will not receive as many benefits from attendance and generally will take longer to recover their costs of attendance from additional earnings (especially if they have borrowed to pay those costs) differences in ratios have important implications for financial aid policies.

Although some states' public and private colleges have similarly better, and worse, "graduation productivity" ratios, the relationship between rate rankings for the two types of four-year colleges within most states is not very strong.

Table Seventeen

Graduation Productivity Ratios for Undergraduates at Four-Year and Private Colleges, by States, 1993 to 1997

States	Ratio		Percent Above/Below National Average		States	Ratio		Percent Above/Below National Average	
	Public	Private	Public	Private		Public	Private	Public	Private
WA	4.2	5.1	+29	+ 7	DE	6.1	6.5	- 3	-18
MI	4.4	6.9	+25	-25	CO	6.2	5.7	- 5	- 4
CA	4.6	4.9	+22	+11	MO	6.3	5.7	- 7	- 4
IL	4.8	5.3	+19	+ 4	MN	6.4	4.8	- 8	+13
FL	5.0	5.4	+15	+ 2	ND	6.4	5.4	- 8	+ 2
HI	5.2	8.5	+12	-55	GA	6.5	6.4	-10	-16
MD	5.2	5.5	+12	0	MA	6.5	5.4	-10	+ 2
VA	5.2	5.9	+12	- 7	NY	6.5	5.6	-10	- 2
WY	5.2	N.A.	+12	N.A.	OH	6.5	5.8	-10	- 5
AZ	5.3	7.9	+10	-44	NE	6.7	5.3	-13	+ 4
IA	5.3	5.2	+10	+ 5	NM	6.7	5.5	-13	0
OR	5.3	4.5	+10	+18	MT	6.9	7.0	-17	-27
NC	5.5	5.5	+ 7	0	TN	6.9	5.6	-17	- 2
MS	5.6	5.2	+ 5	+ 5	NV	7.2	12.5	-22	-56
RI	5.6	5.2	+ 5	+ 5	IN	7.4	5.6	-25	- 2
SC	5.6	6.0	+ 5	- 9	KY	7.4	7.4	-25	-35
KS	5.8	4.6	+ 2	+16	SD	7.4	8.0	-25	-45
AL	5.9	5.8	0	- 5	AR	7.6	6.2	-29	-13
CT	5.9	5.6	0	- 2	WV	7.7	7.6	-30	-38
NJ	5.9	6.0	0	- 9	ME	8.1	5.6	-37	- 2
TX	5.9	5.2	0	+ 5	LA	8.4	6.4	-42	-16
WI	5.9	5.7	0	- 4	ID	8.6	5.1	-46	+ 7
NH	6.0	4.9	- 2	+11	UT	8.7	4.7	-47	+15
PA	6.0	5.3	- 2	+ 4	DC	15.6	5.4	-62	+ 2
OK	6.0	5.9	- 2	- 7	AK	19.1	8.6	-69	-56
VT	6.0	5.6	- 2	- 2					

State-by-State Differences in Affordability and Graduation Productivity

It was shown above that there were substantial differences in the extent to which students and families could afford the charges at four-year public colleges in their different states. It was also shown that colleges differed considerably among states in their "graduation productivity" ratios, which were used to represent probable differences in student attrition rates and probabilities of graduating. These differences in affordability and productivity are very likely to have continued past 1997, the most recent year under examination, and into the 21st century and current academic year. Moreover, they are likely to persist for some while — unless policy-makers intervene.

Therefore, it is important to look at these differences in tandem, because doing so leads to new ways of thinking about student financial aid policies and how federal student aid programs might affect students in different states. The states were grouped roughly into four "quartiles" on affordability and then four "quartiles" for "graduation productivity"

Figure Two

Affordability and Graduation Productivity Rankings of Four-Year Public Colleges by States, 1997

Highest Affordability ↕ Lowest Affordability	Highest Productivity ↔ Lowest Productivity			
	IL IA WA	NC OK WI	GA CO MN NE NM	AK KY UT
	FL HI VA WY	KS MS NJ TX	TN	AR ID LA NV
	AZ CA MD MI	AL CT SC	MA MO ND	DC SD
	OR	NH PA RI VT	DE MT NY OH	IN ME WV

ratios. These groupings made it possible to categorize states, *in relative terms*, as "highest affordability — highest productivity," "second highest affordability — second highest productivity," "third highest affordability — third highest productivity," and so on. *The rankings are relative, not absolute.* There is no intent to imply that any given state's levels of

affordability or productivity are as they should be, better than they should be, or not as good as they should be. The rankings show only how states compared to each other in 1997. Figure Two shows the results of these groupings. Undergraduates at the four-year public colleges in the fourteen states in the *upper left-hand* quadrant probably are better off than students in the twelve states in the *lower right-hand* quadrant. Students in the states in the former quadrant are enrolled where net college charges are the most affordable (at least to median income families) *and* where the "graduation productivity" ratios suggest they have a higher probability of graduating. The three states with the best combinations of affordability and "graduation productivity" are Illinois, Iowa, and Washington.

The students in the dozen states in the *lower right-hand* quadrant are among the least favored in the nation. Their four-year public colleges rank "third highest" and "lowest" in affordability and "third highest" and "lowest" on "graduation productivity." Students in these states are likely to pay larger shares of their family earnings, and sacrifice more, to attend four-year public colleges. They also are relatively less likely to earn baccalaureate degrees in a timely fashion. The three states with the poorest combination of affordability and "graduation productivity" are Indiana, Maine, and West Virginia.

Students enrolled in the public colleges in the dozen states in the *lower left-hand* quadrant face difficult affordability issues. However, their colleges rank among the highest on "graduation productivity." If these students can overcome the problems of affordability, they have a good probability of graduating and achieving significant returns on their investments. Oregon ranked very low on affordability but ranked among the best on "graduation productivity."

Students in the thirteen states in the *upper right-hand* quadrant are enrolled in relatively affordable four-year public colleges. But their probabilities of graduating generally are less than those of students elsewhere. While their institutions are among the most affordable, the "graduation productivity" ratios for the public colleges in Alaska, Kentucky, and Utah were among the poorest in the nation.

It was hypothesized that states whose four-year public colleges were less affordable may also have had higher "graduation productivity" ratios, because such colleges generally charged higher tuitions and, therefore, might have had more revenue to apply to the production of degree recipients. As Figure Two shows, twelve out of the 26 states whose colleges were considered more "productive" were among the least affordable. Five out of twelve states listed in the first column of Figure Two with the highest "graduation productivity" ratings ranked either "third highest" or "lowest" on affordability. Thirteen of the 25 states whose colleges ranked lower on productivity ranked higher on affordability. Seven out of twelve states listed in the fourth column as having colleges that were the least "productive" ranked either highest or second highest in affordability.

Thus it appears that lower affordability (charging higher tuition and fees) is only *sometimes* related to greater productivity. Perhaps some states whose colleges try to be more affordable (by charging lower tuition and fees) may do so at the risk of cutting their revenues and possible consequent ability to produce college graduates. However, when the chi-square test of statistical significance was applied to the Figure Two data, it showed that the relationship was significant at less than the 50th percentile level. Therefore, for now, there is no statistical evidence that charging students higher tuitions to yield more institutional revenue results in an increase in "graduation productivity."

There is no statistical evidence that charging students higher tuitions to yield more institutional revenue results in an increase in "graduation productivity."

Impact on loans

In 1998-99, about 80 percent of all federal aid to postsecondary students was offered in the form of loans. The trend for rising shares of federal aid to be offered in the form of loans is likely to continue into the near future. It was shown above that students who graduate from college have relatively good incomes; therefore, their ability to repay student loans is, *on average*, satisfactory.

It is worth mentioning here that since the early 1980s there have been on-going and widespread discussions among policy-makers, policy analysts, higher education administrators and others about the difficulties that some borrowers encounter in repaying their student loans. There are concerns that too many students may encounter excess debt burdens that negatively affect the benefits they derive from having gone to college. Many researchers have discovered that the vast majority who default or are continually delinquent on their loan payments did not complete their degree programs. Research also indicates that most bachelor's degree recipients do not have difficulties in repaying their loans. For example, Susan Choy and Sandra Geis (1997) found in a national longitudinal study of 1992-93 college graduates that the average monthly loan payment of $136 represented about 9 percent of the borrower's earnings a year after graduation. In a follow-up to the original study, Susan Choy (2000) learned that the borrowers' monthly debt burdens had shrunk to below 4.8 percent of earnings by four years after graduation. After reviewing the results of the 1997 National Student Loan Survey by Nellie Mae, Sandra Baum and Diane Saunders (1997) concluded that there was no overwhelming evidence that groups considered most vulnerable to debt burden problems had encountered them. The concerns and the research continue, as borrowing to pay for college increases.

Using student loans to help pay for four-year public college undergraduate charges involves more risk in some states than others.

Using student loans to help pay for four-year public college undergraduate charges involves more risk in some states than others. Using loans is most risky in the twelve states with the poorest "graduation productivity" ratios. These twelve states are displayed in Figure Two and include Alaska, Arkansas, the District of Columbia, Idaho, Indiana, Kentucky, Louisiana, Maine, Nevada, South Dakota, Utah, and West Virginia. Four-year public colleges in three of these states (Indiana, Maine, and West Virginia) are among the least affordable. That they are least affordable means that their students' financial need for loans will very likely be greater than the need for loans in the other states. Since their students' financial need will be higher, their average loan balances should be higher. If their probabilities of graduating are relatively poor, they are more likely to encounter loan debt burdens and subsequent delinquencies and defaults.

Following this logic, it is better to offer loans to students in states with good affordability rankings (their college charges are lower so their loan debts generally will be smaller) and higher "graduation productivity" rankings (the borrowers will be more likely to graduate and earn more money to repay loans) than it is to offer loans to students in states with the less affordable colleges and poorer productivity rankings. Therefore, according to Figure Two, it would be much better to offer loans to four-year public college students in Illinois, Iowa, and Washington than to similar students in Indiana, Maine, and West Virginia.

Four-year public colleges in Arizona, California, Maryland, Michigan, and Oregon are among those with the lowest affordability rankings. Thus their students generally have to accept relatively higher debt levels in order to pay for college charges. However, these colleges rank among the best on the "graduation productivity" ratios. Therefore, although they may have to borrow more, their students are more likely to graduate and, consequently,

are less likely to have difficulties repaying their loans. Offering loans to students in these states is better than offering loans to students in other states with similarly lower affordability rankings but lower "graduation productivity" rankings, such as New Hampshire, Pennsylvania, Rhode Island, and Vermont.

States with lower affordability but better productivity rankings are likely to represent more attractive markets to providers of loan capital, whether those providers are the federal government (through the Federal Direct Student Loan Program) or the nation's private lenders (through the Federal Family Education Loan Program). Such states include Arizona, California, Maryland, Michigan, and Oregon. These markets should be more attractive because more students are likely to need higher balance loans and their probabilities of graduating and repaying their loans should be above average. The four-year public college markets in Alaska, Kentucky, and Utah are likely to be least attractive, because colleges in those states have the highest affordability ratings, which means fewer students are likely to borrow, and they have the lowest "graduation productivity" rankings, which means they are less likely to graduate. Thus the students in these markets are more likely than students in most other states to have small balance loans *and* experience difficulty repaying them.

The findings on state-by-state differences in affordability and "graduation productivity" ratios can be summarized as follows:

- There is a great deal of inter-state diversity in four-year public college affordability and "graduation productivity" ratios which in combination puts students in some states at relatively great advantage and students in other states at relatively significant disadvantage.
- Students who are at most advantage are those enrolled in states with high affordability and high "graduation productivity" rankings, because their institutions are less costly and students who attend them are more likely to graduate. These states include Illinois, Iowa, and Washington.
- Students who are relatively disadvantaged are enrolled in states with the lowest affordability and "graduation productivity" rankings, because their institutions cost more and students who attend them are less likely to graduate. These states include Indiana, Maine, and West Virginia.
- Borrowing student loans to attend four-year public colleges in states with better "graduation productivity" rankings is less risky than borrowing to attend in states with low rankings, because borrowers in the former states are more likely to graduate and, consequently, earn enough money to repay their loans.
- The relative risk to borrowers in using student loans to pay for college increases as the four-year public colleges' combined rankings on affordability and productivity decrease, because the need to borrow more increases while the probability of graduating decreases.

Students who are at most advantage are those enrolled in states with high affordability and high "graduation productivity" rankings.

Some Policy Implications of the Long-Term National Trends

The trends and patterns examined in this monograph have several implications for financial aid policy and education policy at both the federal and state levels. The most important ones will be examined here. The focus is first on the implications of national trends. The trends on four-year public and private college affordability for the nation as a whole generally are more positive than they have been portrayed in the national media. It is true that the net basic charges (tuition, fees, room and board, minus institutional financial aid) at four-year public colleges have, over time, absorbed growing shares of median family incomes. But the average increases in percentages of income were not huge at public colleges, and their growth rate diminished in the 1990s at the private colleges. It was shown above that public college net charges absorbed only two more days of earnings in 1997 than in 1990 for families with incomes at the median and third quartile income levels.

From 1980 to 1997, the *net* charges (after subtracting institutionally-funded student aid) as a percent of *median* family incomes were as follows:

	At Public Colleges	At Private Colleges
1980	8.8%	18.0%
1985	10.0%	22.0%
1990	10.4%	23.6%
1995	11.6%	26.0%
1997	11.2%	25.2%

The trends on four-year public and private college affordability for the nation as a whole generally are more positive than they have been portrayed in the national media.

The trends for *net* charges as a percent of *third quartile* (75th percentile) family incomes were even more favorable. They were as follows:

	At Public Colleges	At Private Colleges
1980	6.0%	12.4%
1985	6.8%	14.8%
1990	6.8%	15.6%
1995	7.6%	16.8%
1997	7.6%	16.8%

The trends for net charges as a percent of *lowest quartile* (25th percentile) family incomes were much less favorable at both types of colleges. They were as follows:

	At Public Colleges	At Private Colleges
1980	14.4%	29.2%
1985	16.4%	36.0%
1990	16.8%	38.4%
1995	18.8%	42.8%
1997	18.8%	42.4%

These trends (and the fact that average college tuitions have grown at slower rates in the years after 1997) suggest that the current national "affordability crisis" *for students from families with above median and third quartile incomes* has likely been exaggerated. National average net basic charges after institutional grant aid are not soaring relative to these families' ability to pay them. Students from such families are paying more for college now than in earlier years, but the increased amounts are not huge relative to their rising family incomes. With the rise in availability of federal student loans during the 1990s, students from families in the median and third quartile income ranges generally should be able to afford the rising charges. The data examined above suggest the possibility that the "affordability crisis" may for many relatively affluent families be a crisis of *willingness to pay* rather than a crisis of *ability to pay* for rising college charges.

For students from families with incomes at the lowest quartile level and below, growing net basic college charges represent a significant barrier to access to four-year colleges, especially to the nation's private colleges and universities. Increased net basic charges between 1990 and 1997 absorbed twice as many additional days of earnings for these families as they absorbed for more affluent families. Fortunately, federal grant aid to lower-income students grew at a significant pace during the 1990s and helped offset some of the growing charges. For example, the annual dollars awarded through the Federal Pell Grant Program, which is targeted on lowest income students, grew by 60 percent, from $4.5 billion in 1988 to $7.2 billion in 1998 (Washington Office of the College Board, 1999b). Grant dollars awarded through the Federal Supplemental Educational Opportunity Grant Program (FSEOG), which is targeted on the neediest undergraduates, grew by 50 percent, from $408 million in 1988 to $614 million in 1998 (Washington Office of the College Board, 1999b). (Even after inflation is taken into account, the growth rates for these two programs were, respectively, 19 percent and 10 percent.)

Given that growth in net basic charges has *not greatly* exceeded growth in median and third quartile family incomes, current federal financial aid policy to provide increased access to loans (most of which are non-subsidized loans) to students from such families seems appropriate. Non-subsidized loans cost the government (and taxpayers) much less than subsidized loans; and they do so at relatively modest increase in the cost of borrowing to students (Student Aid Guide, 1999).

Since growth in net basic charges *has* significantly exceeded growth in lowest quartile family incomes, the federal government's attempts to provide students from such families with more federally funded grant aid also seem to be appropriate policy. Low-income students likely need even more federal grant aid to offset their ever-rising charges. An excellent description of how low-income students pay for college is offered in *Low Income Students — Who They Are and How They Pay For Their Education* (Choy, 2000).

It was noted above that a growing proportion of all the federal student aid dollars (up to eight out of ten in 1998) is provided in the form of loans rather than grants. Federal student financial aid policy has for some while focused on expanding access to loan dollars for increasing numbers of students. Some observers of this trend have expressed grave concerns about the emphasis on loans and what has been described as the growing "grant-loan imbalance" in federal financial aid policy (Gladieux and Hauptman, 1995). The primary arguments for wanting to emphasize loan programs are fairly simple. First, loan programs cost the federal government less money than grant programs because the vast majority of the loan dollars are repaid with interest. Because grants do not have to be

The "affordability crisis" may for many relatively affluent families be a crisis of willingness to pay rather than a crisis of ability to pay.

repaid, they represent what is called "gift aid." Grant dollars are "gifts" to students from the federal government (and the taxpayers whose taxes fund the programs) and are, therefore, more costly than loans.

Second, because students will derive many personal and financial benefits from their college education, it is considered appropriate that they use loans to pay for college charges when they cannot otherwise afford to pay them. The reasoning here is that the benefits students will achieve from attending college will exceed the benefits that society derives from their education and, therefore, it is appropriate for students to pay a substantial share of the college charges through government substitution of loan aid for grant aid. Superb discussions of this reasoning and the public policy issues it raises are found in *Higher Education: Who Pays? Who Benefits? Who Should Pay?* (Carnegie Commission on Higher Education, 1973) and the more recent *Cost, Price and Public Policy: Peering into the Higher Education Black Box* (Stringer, et al., 1999).

The primary arguments for wanting to emphasize grant programs rather than loan programs also are fairly simple. First, grants represent a very effective way of achieving one of the major goals of federal student aid — to help students overcome the financial barrier to college attendance. Grants are considered effective because they produce an immediate and permanent reduction in the charges students must pay from their personal and family resources. Grant aid, unlike loan aid, does not defer paying for college charges to some later date from future income. Students who receive grants instead of loans are not forced to make calculations about their probabilities of succeeding in college and consequent ability to repay their loans from future employment earnings. *Grant aid reduces student uncertainty and personal financial risk in paying for college*. Grant recipients who do not have to borrow know that if they enroll but do not succeed, they will not be worse off financially than had they not tried college at all. They will not have failed and have mostly student loan debt to show for their efforts. Presumably when students have strong academic records, high academic aptitude, and above-average motivation to succeed, loan aid and grant aid will produce similar enrollment effects, because such students will be more confident of success and the ability to repay their loans. Unfortunately, many financially needy students from lower-income families do not enjoy this confidence. For them, grant aid is more effective than loan aid at removing the financial disincentives to attend college.

Grant aid reduces student uncertainty and personal financial risk in paying for college.

Second, need-based grant aid (such as aid from the Federal Pell Grant Program) helps equalize the ability to pay for college between poor and affluent students. This approach helps to equalize financial access to college, which is another historic goal for federal student aid programs. Grant aid substitutes for the money that students from poor families do not have but affluent students do have. Therefore, at least in theory, students from poor and affluent families pay net college charges in accordance with their financial ability to do so. Their financial access will be "equalized" because the net charges for students from richer and poorer families will be "equal to" their ability to pay them.

Unfortunately, there is not enough grant aid available to all financially needy students to equalize all students' net charges. Many undergraduates from low-income families must accept loans to help pay for expenses at four-year colleges. In his National Postsecondary Student Aid Study (NPSAS) for academic year 1995-96, Berkner (2000) found that 49 percent of dependent full-time undergraduates with family incomes at the lowest quartile ranges got federal loans at four-year public colleges and 62 percent got them at four-year private colleges.

Here are the percentages of full-time dependent students, by income ranges, who got federal loans at both types of colleges in 1989-90 and 1995-96:

	Public Colleges		Private Colleges	
	1989-90	**1995-96**	**1989-90**	**1995-96**
Lowest Quartile	35.7%	48.8%	57.4%	62.0%
Second Quartile	26.1%	51.5%	55.3%	67.0%
Third Quartile	13.1%	38.3%	41.8%	59.6%
Highest Quartile	5.1%	22.9%	14.1%	35.6%

In addition to demonstrating that more than half of all lowest-income dependent full-time undergraduates at four-year colleges have to borrow to meet their educational expenses, these data show that, between 1989 and 1995, increasing proportions of dependent students from all income levels borrowed. The greatest percentage point increases were for students from second and third quartile income levels at public colleges, 25 points each, and for students from the highest quartile income levels at private colleges, 21 points. Students from the lowest income quartile registered the smallest percentage point increases, 13 points at the public colleges and 5 points at the private colleges. Increases in grant assistance likely kept the percentage point increase among lowest-income students as small as it was. (It may help some readers to attach income values to these quartile income ranges. They were: lowest quartile, less than $25,000; second quartile, $25,000 to $46,499; third quartile, $46,500 to $70,000; and highest quartile, more than $70,000.)

There is another noteworthy change in the percentages of students who borrowed in 1989 and 1995. In 1989, the difference in proportions of all full-time undergraduates borrowing at public colleges and private colleges was 17 percentage points, 21.9 percent versus 38.9 percent. By 1995-96, the difference had narrowed to only 11.7 percentage points, 43.4 percent versus 55.1 percent. The proportion of undergraduates who borrowed to attend four-year public colleges nearly doubled in the six-year time span. Therefore, decreasing proportions (and numbers) of students are unable to avoid accepting student loans by going to a public rather than a private college.

To reiterate, the trend is for college charges to have grown faster relative to growth in incomes for the lowest income families, which makes the federal policy to focus increased grant aid on students from such families seem appropriate. The trend is for growth in median and third quartile family incomes to have nearly kept pace with the growth in college charges. Because it costs the federal government less to provide students with loans than with grants, and because students receive considerable personal and financial benefits from their college education, the federal policy to focus increased loan aid on students from median and third quartile income families also seems appropriate.

There are, however, significant problems with implementation of these two apparently appropriate student aid policy strategies. More lowest-income students have had to increase their borrowing because the growth in their grant aid and their very modest family financial resources has not kept pace with growth in college charges. As their borrowing increases, so does their risk and the penalty for failure to complete their programs of study. As the risk and penalty for failure increases, it will become more difficult for low-income students to surmount the financial barrier to attendance at four-year colleges.

The proportion of undergraduates who borrowed to attend four-year public colleges nearly doubled in the six-year time span.

Even though college charges have increased only slightly faster than their family incomes, students from families at the third and highest quartile income ranges have substantially increased their borrowing. Berkner (2000) found the following changes in average amounts borrowed by dependent undergraduates at four-year public and private colleges in 1989-90 and 1995-96:

	Public Colleges		Private Colleges	
	1989-90	**1995-96**	**1989-90**	**1995-96**
Lowest Quartile	$2,081	$3,458	$2,594	$3,851
Second Quartile	$2,117	$3,792	$2,606	$3,817
Third Quartile	$2,102	$3,642	$2,555	$3,809
Highest Quartile	$2,149	$3,774	$2,632	$3,697

These data show that average amounts borrowed by students from families with incomes in the third and highest quartiles grew by over 74 percent at the public colleges and by almost 45 percent at the private colleges. The average amounts borrowed by lowest income quartile students grew by 66 percent at the public colleges and by 48 percent at the private colleges.

Since the average additional earnings of college graduates over high school graduates have grown as fast as college expenses, the increases in borrowing might not seem troubling. *But not all students nor all borrowers graduate.* Studies conducted by the National Center for Education Statistics during the 1990s showed that only about 57 percent of students who enrolled full-time in four-year colleges earned baccalaureate degrees by six to ten years after beginning as freshmen (Digest of Education Statistics 1998, tables 306 and 309). The earlier discussion of changes in "graduation productivity" ratios at the national level showed that there were only modest increases in the rates at which students graduated from four-year colleges during the 1990s. It is safe to estimate that four out of ten first-year students who are currently enrolled full-time at four-year colleges will *not* receive their baccalaureate degrees. (The state-by-state differences in "graduation productivity" ratios described above make it safe to estimate that in many states much fewer than half the freshmen will ever finish college.)

The average additional earnings gained from attending college but not earning a degree have not grown as fast as the costs of attendance.

It was demonstrated above that the average additional earnings gained from attending college but not earning a degree have not grown as fast as the costs of attendance. The time it takes students to recover the costs of attendance with additional earnings from completing only two or three years of college apparently is growing. Adding the cost of borrowing to the costs of attendance adds even more months to the time needed to recover college expenses. It increases the penalty for failure.

That only six out of ten students will graduate and receive the full benefits of attending four-year colleges and that increasing numbers and proportions of such students are accepting more loan debt makes the current federal policy to emphasize loan programs in student financial aid seem much less appropriate than it might otherwise appear. This is true even for students from the more affluent families, since about one-third of them will not earn baccalaureate degrees (Digest of Education Statistics 1998, Table 309).

If all students who begin study at four-year colleges were well-prepared for the experience and confident in their ability to succeed, then using loans to help achieve the

federal goal of overcoming the financial barrier to college attendance would be effective federal policy. If all students who begin study actually completed their degree programs, using loan programs would be efficient and effective because they cost the federal government less than grant programs and most students would not have difficulty repaying their loans. There would also be some economic or social justice in using loan programs because the graduates would be so much better off financially than the persons who did not attend college but whose taxes helped pay for federal student grant programs. *But not all students are well-prepared, or confident in their ability to succeed, or graduate.*

Colleges and universities are enrolling greater percentages of all high school graduates than they did twenty, or even ten, years ago, suggesting that first-year students in general are unlikely to become better prepared in the near future; or to become more confident in their ability to succeed. There has been a great deal of stability in the "graduation productivity" ratios for all colleges combined for more than two decades, suggesting that substantial increases in graduation or success rates are unlikely. Therefore, to increasingly rely on loan programs as the primary vehicle to deliver federal student financial aid is very risky —- to students, the government, and the nation.

Not all students are well-prepared, or confident in their ability to succeed, or graduate.

One alternative strategy to cut the risk and continue to effectively use loan programs is to make loans available only to four-year college undergraduates after they have successfully completed their first two years of study, substituting grant aid for loan aid. Students could receive more Pell Grant aid or perhaps more grant aid from another new program geared toward students who are not from the poorest families, thereby alleviating the need to borrow. To help reduce the federal government's costs for substituting grant aid for loan aid, students could be considered ineligible for federal grant aid after they reached their third year of undergraduate study. The only federal aid for the upperclassmen years would be in the form of loans (or employment awards from the Federal Work-Study Program).

Using grants for the first two years of college would significantly reduce the financial barrier to attendance because students would not have to risk accepting loans for programs or colleges where they are uncertain of success. "Front-loading" grants would also make it possible to come closer to achieving the federal student aid goal of equalizing financial access to college, because more grant aid would be available to help make net charges for students from richer and poorer families more "equal to" their ability to pay them. Using only loans for financial aid for the latter years of college is justified by the fact that students who reach their junior years are very likely to graduate and, therefore, should be able to afford to repay their loans from earnings that are significantly enhanced by their college degrees.

There is likely to be resistance to this "front-loading" proposal. The first reason for resistance is philosophical. Under this proposal, students who are successful and reach their latter years of college will not be rewarded for their achievement by receipt of federal grant aid to help cut their net college charges. In fact their success in college will lead to a kind of "negative reward" by their having to accept what will, in some cases, amount to substantial student loan indebtedness. So the more successful students are, and the longer they remain in college, the greater their annual net charges will be, because they won't be eligible for federal grants to help offset those expenses. Students could, of course, continue to receive state grants, institutional grants, and private grants and scholarships for as long as states, institutions, and private donors chose to provide them.

Offering students only federal loans for their last years of undergraduate study might be considered a disincentive to continue education to graduation. However, those who adopt this viewpoint are mistakenly looking at financial aid as an incentive to students to continue their education. *The real incentive to students to continue their education is provided by the personal and financial benefits to be derived from the education experience itself, not the financial aid that might be available to help pay for it.* Student aid reduces the financial disincentives, the financial barrier, to enroll and continue. It does not provide the incentives to do so. Students do not go to college so they can get federal financial aid. They go to get education and training.

By the end of their second year of college, students should have enough experience to evaluate the worth of their programs and the payoffs they will receive from their degrees. Having to borrow more to help cover the expenses for the remaining years should not represent an enrollment barrier to them. That having to borrow to pay for educational expenses does not represent a barrier to enrollment *when students are confident of success and payoffs* is demonstrated in student willingness to incur substantial indebtedness to attend prestigious but expensive undergraduate colleges, law schools, medical colleges, and MBA programs.

Another reason for resisting the "front-loading" proposal comes from the fact that most students who leave college do so during their first and second years of study. So substituting federal grant aid for federal loan aid to students in their first two years will mean that more grant dollars will go to students who do not complete their degrees. The federal government will have increased its grant expenditures on students who fail. Thus the grant programs *might* be a little less *efficient* in that the government (and taxpayers) will get a reduction in the ratio of dollars spent to graduates produced. If the federal costs of providing grants to students who drop out are less than the savings to the government of substituting all loans for some grant aid to students in their latter years of undergraduate study, then the grant programs might not become less efficient. The programs will produce the same numbers of graduates for the same amounts of expenditures.

It is quite likely that "front-loading" the grants will make grant programs more effective.

It is quite likely that "front-loading" the grants will make grant programs *more effective* by reducing the financial aid barrier to beginning students and helping equalize the costs of education among poorer and more affluent students. The potential sacrifices in efficiency are more than offset by the potential gains in effectiveness.

Another reason some persons and organizations may resist "front-loading" is that it could affect the distribution of total federal grant aid dollars among students at the different types of two-year and four-year postsecondary institutions. If federal grant aid went only to first-and second-year students, a greater share of the total federal grant dollars would be awarded to students at two-year colleges and proprietary business, trade, and technical schools rather than to students at four-year colleges. This issue could be addressed by applying "front-loading" exclusively to students at four-year colleges and continuing to award grants and loans to first and second year students at other types of institutions.

Asking first and second year students to continue to accept federal loans to attend two-year colleges and business, trade, and technical schools could be considered an unfair hardship that four-year college students would not have to bear. However, Berkner (1998) reported that only 6 percent of the two-year public college students got federal loans in 1995-96, and they borrowed, on average, only $2,840. Under those conditions, having to receive loans in their first years of study would not represent a major hardship to many

students at these colleges. For the same year, Berkner (1998) reported that about 54 percent of all students at proprietary business, trade, and technical schools borrowed, on average, $4,082. Consequently, being forced to continue to borrow when four-year college students receive grants could be considered unfair in general and a hardship in particular to some of these students.

The primary reasons for "front-loading" federal grants to four-year college students *and not others* are that:

- Four-year college students will of necessity incur larger loan debts to complete their education (annual costs typically are higher and the students will have to accept loans to replace grants for their third and fourth years).

- Their total educational expenses will be much greater than those of students at other kinds of institutions and, therefore, it is likely to take them longer to recover their total expenses from increased earnings.

- The length of time they must remain in school to complete their programs contributes to more uncertainty about their ability to succeed, recover educational expenses, and repay larger loans.

"Front-loading" grants to students at four-year colleges addresses the increasing penalty for failure to complete a degree at a four-year college. It also addresses the rising affordability issues faced by students from lowest-income families: more of their expenses would be covered by grant aid in their initial years when they are uncertain of their ability to succeed. If new federal grant aid programs were provided to aid first- and second-year students who are not from the poorest families, "front-loading" could also provide relief to middle-income families who are experiencing difficulty keeping up with rising college tuitions.

"Front-loading" grants to students at four-year colleges addresses the increasing penalty for failure to complete a degree at a four-year college.

Some Policy Implications of the State-by-State Patterns

The focus will now turn from the policy implications of national trends to the policy implications of the state-by-state patterns examined above. It was demonstrated earlier that there are substantial inter-state differences in affordability of public four-year colleges. As the data in Table Fourteen indicate, the average net basic charges (after institutional and state grant aid are considered) as a proportion of median family incomes are at least 11 percent above the national average in six states. In six other states they are more than 21 percent above the national average. In fourteen states the net basic charges as a proportion of median family incomes are at least 14 percent less than the national average. In eight of these fourteen states they are at least 21 percent less than the national average. *Where students live and attend college has a great deal of influence on the degree to which they and their families have to sacrifice to meet college expenses.*

Because most federal aid is need-based, federal financial aid policy helps compensate for these differences. Students from less affordable states will have higher financial needs because their colleges' basic charges are generally higher. Therefore, many students will receive more federal financial aid than they would receive if they lived in states with more affordable colleges. Federal grants help equalize the net charges that students from lower- and lower-middle-income families pay for higher education, but most students from families with incomes at the median and higher levels are not eligible for Federal Pell Grant awards nor for awards from the FSEOG Program. Therefore, many students have to accept federal loans to meet their education expenses. They have to borrow more because they attend colleges in states whose education policy-makers have decided that students and families should pay more of the costs of higher education through higher tuition, fees, and other basic charges. The students who are forced to borrow to pay the higher shares of costs must also pay more for their education because they must pay interest on their loans.

Where students live and attend college has a great deal of influence on the degree to which they and their families have to sacrifice to meet college expenses.

Inter-state inequities in student and family sacrifices needed to cover college expenses are accompanied by another kind of inequity. The tax dollars that support federal student aid programs are shifted from the taxpayers of states with more affordable colleges to those with less affordable colleges. Taxpayers in states with more affordable colleges in effect support the taxpayers in states with less affordable ones.

Public four-year colleges in a dozen states with lower affordability rankings also have lower "graduation productivity" ratings. As a result, their students sacrifice more for their education, must borrow more to pay for it, and are less likely to graduate on a timely basis, if at all. And it costs the federal government more (on a per student basis) to subsidize programs in these states. Students, the federal government, and the taxpayers are getting relatively less for their efforts in these states than other states. Figure Two shows that these states include Delaware, the District of Columbia, Indiana, Maine, Massachusetts, Missouri, Montana, New York, North Dakota, Ohio, South Dakota, and West Virginia. Collectively, these states' four-year public colleges enrolled, in 1995, over 1 million undergraduates, representing 22 percent of all undergraduates in the nation's four-year public colleges (Digest of Education Statistics, 1999). Two of the states, New York and Ohio, rank third and fourth, respectively, in numbers of undergraduates enrolled in four-year public colleges.

The policy-making remedies for this situation are not readily apparent and are certainly less obvious than "front-loading" the federal grants to enhance financial access and to help reduce the penalty for students who leave colleges without degrees. Because public colleges are under the direct or indirect control of state governments, the federal government's ability to change their tuition policies and retention practices is limited. The federal government could try to improve the colleges' "graduation productivity" ratios by setting attrition/retention standards for the colleges as criteria for eligibility to participate in federal aid programs. Such standards would be resisted by colleges that enroll significant numbers of "at risk" students who are more likely to be financially needy and less likely to be successful and to graduate. Regardless of whether they enroll many "at risk" students, colleges in general are likely to resist retention or graduation standards on the grounds that such criteria can be viewed as unnecessary intrusions into their academic standards and internal practices. Colleges want the freedom to admit whomever they choose and provide the curricula and services the administration and faculty believe are best for their students and institutions.

To reduce the incentive to colleges to raise tuitions, the federal government could place a cap on the amount of financial aid awarded to any given student. Individual federal aid programs currently have annual and cumulative award limits on the amount of aid students can receive, but students may receive aid from multiple programs up to their annual education expenses (tuition and fees, room and board, books and supplies, transportation and personal expenses). Placing an annual "cap" on the total amount of federal aid individual students from the various family financial circumstances can receive would help equalize federal financial aid awards across state lines.

But a "cap" would not equalize "net" charges after financial aid, nor would it help equalize financial access. Colleges would be free to charge more than the cap amount, forcing students and families to look elsewhere for the additional resources to cover their remaining "after aid" expenses. As a matter of fact, many students already are forced to do so because their aid programs are not funded at levels high enough to cover all eligible applicants' needs. Thus it appears that capping federal financial aid does not represent an effective strategy for providing states with incentives to either increase or equalize affordability.

Capping the amounts that colleges can charge students for tuition and other expenses is also problematic. The amounts colleges must pay for goods and services vary among states. They vary among campuses within states, depending on the combinations of programs and services colleges choose to provide. These differences make it extremely difficult to determine objectively how much colleges should charge for a given type of instruction or service. Student charges are determined in part by the colleges' costs of providing instruction and services. The charges are also determined by demand for different kinds of instruction and services, and by whether the demand produces economies of scale. Further, charges are also determined by state political processes that assess what proportions of expenses are reasonable to charge students and families. Applying caps or "price controls" to amounts colleges can charge represents a questionable solution to equalizing affordability across (or within) state boundaries.

The federal "campus-based" aid programs (the Federal Supplemental Educational Opportunity Grant, the Federal Work Study, and Federal Perkins Loan programs), whose allocations go directly to colleges for disbursement to needy students who colleges pick

Capping the amounts that colleges can charge students for tuition and other expenses is also problematic.

(within federal guidelines), represent a potential avenue for providing colleges with financial incentives to keep tuition increases at a minimum. The federal government could increase institutional allocations when colleges keep tuition increases below some "acceptable" rate, based on average increases or some other standard. Another option might allow the federal government to cut institutional allocations when colleges exceed some tuition rate increase.

Institutional allocations for the campus-based programs are small relative to amounts of student aid received from other federal programs. For example, in FFY 1998, the federal government allocated about $700 million to four-year public colleges for the campus-based programs and the campuses awarded about $1.1 billion in aid to students from their combined allocations and institutional matches. Students at four-year public colleges got over twice as many dollars from the Federal Pell Grant Program, $2.6 billion, and they got almost $15 billion in FFEL Program and Federal Direct Student Loan Program loan dollars (Washington Office of the College Board, 1999b).

There is, at best, only modest potential for providing incentives to colleges to suppress tuition increases.

The campus-based program allocations also are small relative to tuition revenues colleges receive. For example, in 1996, four-year public colleges nationwide received over $18.5 billion in tuition revenue (Barbett and Korb, 1999). The federal government could cut allocations to colleges that have above-average tuition increases, but the amounts they could cut would likely be much less than the additional revenues colleges would receive by charging students an above-average increase. For example, in dollar terms, a cut of 30 percent in institutional allocations to the campus-based programs at the four-year public colleges would amount to just over one percentage point of tuition revenue. Alternatively, the government could increase institutional allocations by 30 percent to campuses that hold tuition increases to some minimum. But the increased allocations would only represent the amount of revenue that colleges could gain with just a 1 percent increase in tuition. These data indicate that there is, at best, only modest potential for providing incentives to colleges to suppress tuition increases by manipulating the institutional allocation formulas for federal campus-based aid.

One very important factor that determines how much public colleges will charge for tuition is the amount of direct appropriations they will receive from state legislatures. Decisions about appropriations to campuses are made by state legislatures upon recommendations of members of the state executive branches. Therefore, it is perhaps more appropriate to look for incentives that the federal government could use to apply to all public four-year colleges within a given state rather than to just individual institutions.

Because Federal Pell Grants represent the largest single source of federal grant aid, that program might serve as a vehicle for encouraging states to make their public colleges more affordable. The Federal Pell Grant payment schedules could be adjusted upward or downward for all needy students at four-year public colleges in a state, depending on whether the institutions increased their tuitions at below-average or above-average rates in comparison to tuition increases in other states. (Rather than using all colleges' tuition increases to get an "average rate increase" for a criterion, the Consumer Price Index or some other index could be used as the "standard" for above-average or below-average tuition inflation.) When colleges raised tuitions at below-standard rates, the payment schedules could be modified to increase individual awards, thereby rewarding the states for trying to keep their four-year public colleges affordable. Federal Pell Grant payment schedules could be modified to cut individual awards or hold them constant when a state's

four-year public colleges had above-standard tuition increases. This modification would provide a disincentive to states to raise public college tuitions.

However, it should be noted here that the Federal Pell Grant dollars annually awarded to students at four-year public colleges represent only about 14 percent of the institutions' total annual revenue. Suppose that the federal government decided to cut Federal Pell Grant dollars to students by 10 percent for every one percentage point increase in tuition above the Consumer Price Index. A 10 percent cut in the $2.6 billion in Federal Pell Grant dollars estimated as available to students at four-year public colleges would come to $260 million. But a one percent increase in their tuition revenue would yield $185 million, making the net loss in revenue to the public colleges only $75 million. That $75 million would have represented only about seven hundredths of one percent of the $101 billion in total revenue received by four-year public colleges in 1996 (Barbett and Korb, 1999). Therefore, at least in this illustration, the financial disincentives to states for increasing tuitions would be minuscule. The government would have to threaten to cut Federal Pell Grant payments by much more than 10 percent to produce a strong enough financial disincentive to raise tuitions. (It is impossible to estimate how much of a cut in federal grant dollars would be needed to create a strong *political* disincentive to states and colleges to raise tuitions.)

The Federal Pell Grant program could be modified to require states to "match" dollar awards at some percentage level, say 25 percent, so that grant aid awards to individual students would be increased by that amount. Assuming that states would be willing and able to "match" the awards, this policy would make more grant aid available to lowest-income students, a measure that should improve financial access and make colleges more affordable to some students.

Requiring states to "match" the Federal Pell Grant awards to their students would not, however, make colleges more affordable for students from families whose resources make them ineligible for the awards. Moreover, requiring states to "match" Federal Pell Grant awards might lead to the unintended consequence of declines in enrollments by students from lowest-income families. Some colleges in some states might not try as hard as they do now to recruit and enroll lower-income grant recipients because the "match" would require their spending more state money for grants to each one.

It is worth noting here that any plan to increase Federal Pell Grant awards *and then "front-load" the grants* would mean that students at four-year public colleges in the dozen states with lower affordability rankings *and* lower "graduation productivity" rankings would receive disproportionately *more* of the additional federal *grant* aid than they now receive, based on the ratios of upperclassmen and first-and second-year undergraduates. Proportionately fewer first-and second-year students make it to their third and fourth years of undergraduate study in these states. Therefore, increasing federal grant aid to students in states where the public four-year colleges have poorer "graduation productivity" ratios would result in losses of efficiency to the federal grant programs because grant recipients in those states are less likely than recipients in other states to graduate. The government would spend more grant money on students who would be less likely to graduate. However, *not* increasing grant aid to students in such states lets those students' collective penalty for failure continue to grow because they have to borrow to pay their college expenses and they are less likely to complete their degrees and earn enough to repay their loans.

The Federal Pell Grant program could be modified to require states to "match" dollar awards at some percentage level.

Policy-makers must factor in all the variations and state-by-state differences in affordability and "graduation productivity" ratios.

It is likely that successful federal responses to the state-by-state differences will have to involve simultaneously addressing both affordability and "graduation productivity" issues. When more students are more likely to graduate, their college expenses become more affordable because the expenses can be met by loans and are more easily recovered from the students' additional earnings gained from completed degrees. When more students are more likely to graduate there is considerably greater justification for the current trend toward asking them to pay increasing shares of the total costs of their education.

Addressing affordability issues probably will have to involve modifying eligibility and award criteria for all federal aid, not just Federal Pell Grants or campus-based aid. Federal grant aid by itself is not large enough for adjustments to have compelling financial effects on colleges within a given state. Addressing "graduation productivity" issues probably will have to involve modifying the eligibility criteria that determine when and how colleges may participate in federal student aid programs, even though colleges are likely to resist establishment of eligibility criteria that involve retention or graduation standards. Colleges are likely to perceive such as being unnecessary intrusions into their internal affairs. One alternative to setting graduation or retention standards for colleges as a whole is for the federal government to partially base financial aid allocations to institutions on the numbers or proportions of federal aid recipients who graduate within a given time frame.

Finding equitable methods for financing student aid will not be easy. Federal student aid policy-makers must factor in all the variations and state-by-state differences in affordability and "graduation productivity" ratios. Federal policy-makers must find methods for ameliorating the negative effects of these differences on students and their families. But continuing to ignore these state-by-state differences perpetuates a significant degree of inequity among states in college affordability and the ways in which students pay for college.

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Appendix Tables

Appendix Table A-1

Estimated Median Incomes of Families with Household Heads Ages 45 to 54, Average Four-Year Public College Basic Charges, and Days of Earnings Needed to Defray Those Charges, By States, 1997

	Incomes	Charges	Days		Incomes	Charges	Days
AL	$50,800	$6,354	31	MO	$57,800	$ 7,520	33
AK	$82,400	$7,131	22	MT	$47,300	$ 6,855	36
AZ	$52,600	$6,669	32	NE	$56,100	$ 6,100	27
AR	$43,500	$5,890	34	NV	$63,200	$ 7,295	29
CA	$64,100	$8,491	33	NH	$65,700	$ 9,846	37
CO	$68,700	$7,552	27	NJ	$78,000	$10,235	33
CT	$70,300	$9,652	34	NM	$45,000	$ 5,459	30
DE	$67,200	$9,165	34	NY	$58,200	$ 9,460	41
DC	$51,100	$6,428	31	NC	$58,300	$ 5,919	25
FL	$51,500	$6,890	33	ND	$51,600	$ 6,264	30
GA	$56,500	$6,924	31	OH	$57,300	$ 9,022	39
HI	$67,600	$7,308	27	OK	$48,000	$ 5,301	28
ID	$55,600	$6,074	27	OR	$59,400	$ 8,394	35
IL	$66,000	$8,537	32	PA	$59,100	$ 9,769	41
IN	$60,400	$8,494	35	RI	$58,700	$ 9,962	42
IA	$54,700	$6,426	29	SC	$56,300	$ 7,160	32
KS	$56,400	$6,098	27	SD	$48,400	$ 5,993	31
KY	$54,800	$5,662	26	TN	$50,200	$ 5,778	29
LA	$51,800	$5,710	28	TX	$55,600	$ 6,313	28
ME	$55,100	$8,576	39	UT	$65,100	$ 5,953	23
MD	$74,000	$9,717	33	VT	$55,000	$11,469	52
MA	$66,600	$8,894	33	VA	$67,100	$ 8,627	32
MI	$63,700	$8,974	35	WA	$66,300	$ 7,704	29
MN	$68,200	$7,617	28	WV	$43,000	$ 6,558	38
MS	$45,100	$5,534	31	WI	$65,000	$ 6,409	25
				WY	$52,600	$ 6,450	31

Sources: Basic charges are from Digest of Education Statistics 1998, Table 312. Median family incomes are estimates from Bureau of the Census Website data.

Appendix Table A-2

Estimated Median Incomes of Families with Household Heads Ages 45 to 54, Net Average Four-Year Public College Basic Charges, and Days of Earnings Needed to Defray Those Charges, By States, 1997

	Incomes	Net Charges	Days		Incomes	Net Charges	Days
AL	$50,800	$5,839	29	MO	$57,800	$6,571	28
AK	$82,400	$6,772	21	MT	$47,300	$6,234	33
AZ	$52,600	$6,167	29	NE	$56,100	$5,481	24
AR	$43,500	$4,715	27	NV	$63,200	$6,589	26
CA	$64,100	$7,312	29	NH	$65,700	$8,676	33
CO	$68,700	$6,620	24	NJ	$78,000	$8,016	26
CT	$70,300	$8,437	30	NM	$45,000	$3,893	22
DE	$67,200	$8,354	31	NY	$58,200	$7,356	32
DC	$51,100	$6,111	30	NC	$58,300	$4,788	21
FL	$51,500	$5,305	26	ND	$51,600	$5,770	28
GA	$56,500	$4,918	22	OH	$57,300	$7,808	34
HI	$67,600	$7,021	26	OK	$48,000	$4,514	24
ID	$55,600	$5,630	25	OR	$59,400	$7,686	32
IL	$66,000	$6,167	23	PA	$59,100	$8,320	35
IN	$60,400	$7,463	31	RI	$58,700	$8,911	38
IA	$54,700	$5,259	24	SC	$56,300	$6,495	29
KS	$56,400	$5,549	25	SD	$48,400	$5,639	29
KY	$54,800	$4,871	22	TN	$50,200	$5,213	26
LA	$51,800	$5,186	25	TX	$55,600	$5,588	25
ME	$55,100	$7,496	34	UT	$65,100	$5,542	21
MD	$74,000	$8,595	29	VT	$55,000	$9,900	45
MA	$66,600	$7,794	29	VA	$67,100	$7,201	27
MI	$63,700	$7,583	30	WA	$66,300	$6,338	24
MN	$68,200	$5,933	22	WV	$43,000	$5,895	34
MS	$45,100	$4,725	26	WI	$65,000	$5,341	21
				WY	$52,600	$5,696	26

Sources: Basic charges are from Digest of Education Statistics 1998, Table 312. Median family incomes are estimates from Bureau of the Census Website data Institutional grant aid from Barbett and Korb (1996) State grant aid from 29th Annual NASSGAP report.

Appendix Table A-3

Numbers of Undergraduates, Numbers of Bachelor's Degree Recipients, and Graduation Productivity Ratios, Four-Year Public Colleges, By States, 1993 to 1996 (Numbers in 1,000s)

	Undergraduates					Degree Recipients					
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total	Ratio
AL	106	100	102	102	410	18	17	17	17	69	5.9
AK	27	26	26	26	105	1.2	1.4	1.4	1.3	5.5	19.1
AZ	71	76	75	75	297	14	14	14	14	56	5.3
AR	57	53	53	56	219	7	7	7	7	28.9	7.6
CA	385	399	388	381	1,553	86	83	83	82	334	4.6
CO	103	103	102	103	411	17	16	16	17	66.1	6.2
CT	44	41	42	42	169	8	7	7	7	28.5	5.9
DE	22	21	21	21	85	3	4	4	3	14	6.1
DC	10	7	9	10	36	0.6	0.5	0.5	0.5	2.3	15.6
FL	150	166	163	158	637	30	31	32	33	126.3	5.0
GA	126	128	130	127	511	19	19	20	20	78.4	6.5
HI	17	16	17	17	67	3	3	3	3	12.8	5.2
ID	34	34	34	34	136	4	4	4	4	15.9	8.6
IL	147	142	142	144	575	30	30	29	29	118.7	4.8
IN	160	152	153	155	620	22	21	21	20	83.7	7.4
IA	50	51	50	50	201	10	9	9	9	37.9	5.3
KS	69	65	67	66	267	12	12	12	11	45.8	5.8
KY	89	84	85	87	345	12	12	12	12	46.6	7.4
LA	123	124	124	124	495	15	15	15	15	59.1	8.4
ME	28	27	27	28	110	4	4	3	3	13.5	8.1
MD	85	86	85	85	341	17	16	16	17	66.1	5.2
MA	85	82	83	83	330	14	13	12	12	51.1	6.5
MI	197	194	194	193	600	35	34	34	34	136.8	4.4
MN	102	98	98	100	398	16	16	15	14	62	6.4
MS	47	49	47	47	190	9	9	8	8	33.9	5.6

	Undergraduates					Degree Recipients					
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total	Ratio
MO	99	98	97	97	390	16	16	15	15	62.4	6.3
MT	27	27	28	28	110	4	4	4	4	15.9	6.9
NE	48	46	46	45	185	7	7	7	7	27.4	6.7
NV	24	25	24	24	97	3	3	3	4	13.5	7.2
NH	23	23	23	23	92	4	4	4	4	15.4	6.0
NJ	108	106	107	107	428	18	18	18	18	72.6	5.9
NM	39	38	37	36	150	6	6	6	6	22.4	6.7
NY	276	279	271	265	1,091	42	41	42	44	168.9	6.5
NC	127	126	127	126	506	23	23	23	23	91.8	5.5
ND	26	25	25	25	101	4	4	4	4	15.7	6.4
OH	221	214	208	206	849	34	33	32	32	130.9	6.5
OK	75	76	75	74	300	13	12	12	13	50.1	6.0
OR	49	49	50	50	198	10	9	9	9	37.6	5.3
PA	192	189	191	191	763	33	32	30	31	126.2	6.0
RI	19	18	18	17	72	3	3	3	3	12.9	5.6
SC	65	65	65	65	260	12	12	12	12	46.5	5.6
SD	27	27	25	24	103	3	3	4	3	13.9	7.4
TN	94	92	93	93	372	13	13	13	14	53.6	6.9
TX	330	330	325	322	1,307	55	55	55	56	220.6	5.9
UT	66	70	71	72	279	7	8	8	9	32.2	8.7
VT	14	14	14	14	56	2.5	2.3	2.4	2.2	9.4	6.0
VA	120	120	121	123	484	24	23	24	23	93.1	5.2
WA	70	71	71	73	285	16	17	17	18	68.4	4.2
WV	57	56	56	56	225	8	7	7	7	29.1	7.7
WS	120	119	117	118	474	21	20	20	20	79.8	5.9
WY	9	9	9	9	36	1.8	1.8	1.6	1.6	6.9	5.2

Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System.

Appendix Table A-4

Numbers of Undergraduates, Numbers of Bachelor's Degree Recipients, and Graduation Productivity Ratios, Four-Year Private Colleges, by States, 1993 to 1996 (Numbers in 1000s)

	Undergraduates					Degree Recipients					
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total	Ratio
AL	18.7	18.5	18.5	18.5	74.2	3.1	3.1	3.3	3.2	12.7	5.8
AK	1.4	0.6	0.6	0.5	3.14	0.1	0.1	0.1	0.08	0.364	8.6
AZ	16.5	14.4	13.1	14.9	58.9	1.0	2.3	2.9	1.2	7.4	7.9
AR	10.1	10.1	10.4	10.6	41.2	1.6	1.5	1.7	1.8	6.6	6.2
CA	114.6	130.7	130.2	133.5	509.0	24.2	26.4	27.7	25.6	103.9	4.9
CO	16.0	17.6	17.4	20.8	71.8	2.6	3.9	3.3	2.8	12.6	5.7
CT	36.6	37.3	37.7	38.3	149.9	6.6	6.6	6.6	6.9	26.7	5.6
DE	5.5	5.4	5.5	5.6	22.0	0.8	0.9	0.9	0.8	3.4	6.5
DC	37.6	33.6	34.2	33.9	139.3	6.5	6.5	6.5	6.5	26.0	5.4
FL	73.1	73.6	72.6	74.2	293.5	13.1	14.0	14.1	13.4	54.6	5.4
GA	43.0	43.9	45.6	47.3	179.8	6.4	7.0	7.6	7.3	28.3	6.4
HI	10.8	11.2	11.2	12.0	45.2	1.3	1.3	1.3	1.4	5.3	8.5
ID	2.0	1.9	1.9	1.9	7.7	0.4	0.4	0.3	0.4	1.5	5.1
IL	115.4	116.2	117.7	118.2	467.5	21.1	22.1	22.5	21.9	87.6	5.3
IN	52.0	52.3	53.0	53.1	210.4	8.9	9.3	9.9	9.7	37.8	5.6
IA	41.0	41.7	43.1	42.6	168.4	8.0	8.0	8.5	8.4	32.9	5.2
KS	14.0	14.8	14.6	14.2	57.6	3.0	3.1	3.1	3.2	12.4	4.6
KY	21.5	21.7	22.5	22.9	88.6	2.9	3.0	3.1	2.9	11.9	7.4
LA	19.3	19.0	19.4	19.3	77.0	3.0	3.0	3.1	3.0	12.1	6.4
ME	12.8	13.3	13.8	13.4	53.3	2.4	2.4	2.4	2.4	9.6	5.6
MD	22.9	23.1	22.7	22.9	91.6	4.2	4.0	4.3	4.3	16.8	5.5
MA	150.2	148.5	153.7	154.8	607.2	28.5	27.8	28.4	28.0	112.7	5.4
MI	70.8	70.1	70.3	71.9	283.1	9.6	10.5	10.4	10.5	41.0	6.9
MN	38.5	39.5	39.8	40.3	158.1	8.3	8.1	8.2	8.1	32.7	4.8
MS	9.6	9.4	9.1	8.5	36.6	1.7	1.7	1.9	1.8	7.1	5.2

	Undergraduates					Degree Recipients					
	1993	1994	1995	1996	Total	1993	1994	1995	1996	Total	Ratio
MO	67.8	69.6	68.8	67.2	273.4	10.9	12.3	12.2	12.5	47.9	5.7
MT	4.2	4.3	4.2	4.2	16.9	0.5	0.5	0.8	0.6	2.4	7.0
NE	16.4	16.6	16.2	16.1	65.3	3.0	3.1	3.2	3.1	12.4	5.3
NV	0.6	0.6	0.8	1.0	3.0	0.05	0.08	0.06	0.05	0.24	12.5
NH	18.6	17.8	18.0	18.0	72.4	3.6	3.6	3.8	3.7	14.7	4.9
NJ	41.1	40.2	39.6	40.0	160.9	6.9	6.5	6.5	6.7	26.6	6.0
NM	2.4	3.4	3.3	3.6	12.7	0.4	0.8	0.6	0.5	2.3	5.5
NY	295.2	289.9	289.8	296.0	1,170.7	52.1	52.1	53.3	52.1	209.6	5.6
NC	54.7	52.2	56.0	56.9	219.8	9.8	9.7	9.9	10.7	40.1	5.5
ND	3.3	3.1	3.2	3.4	13.0	0.7	0.6	0.6	0.5	2.4	5.4
OH	92.6	92.9	92.5	93.2	371.2	13.4	16.6	16.6	16.9	63.5	5.8
OK	15.3	16.0	15.3	15.8	62.4	3.0	2.8	2.2	2.5	10.5	5.9
OR	16.8	17.3	17.2	17.3	68.6	3.7	3.7	3.9	3.8	15.1	4.5
PA	167.4	164.8	165.3	165.0	662.5	31.0	31.1	31.3	31.8	125.2	5.3
RI	30.1	28.5	28.0	29.8	116.4	5.8	5.6	5.5	15.3	22.2	5.2
SC	21.4	20.9	21.7	22.1	86.1	3.5	3.6	3.6	3.7	14.4	6.0
SD	6.2	6.2	6.3	6.1	24.8	0.7	0.8	0.9	0.7	3.1	8.0
TN	38.9	39.6	40.8	41.1	160.4	6.8	7.3	7.1	7.4	28.6	5.6
TX	75.1	76.4	79.9	80.6	312.0	14.3	15.3	15.3	15.3	60.2	5.2
UT	32.4	31.8	31.5	32.1	127.8	6.5	6.8	7.2	6.9	27.4	4.7
VT	12.1	11.7	11.7	11.8	47.3	2.1	2.3	2.1	2.0	8.5	5.6
VA	40.8	45.8	46.9	46.2	179.7	7.1	7.8	8.0	7.5	30.4	5.9
WA	25.1	25.5	25.8	26.1	102.5	4.9	5.0	5.1	5.0	20.0	5.1
WV	10.0	10.4	10.0	9.7	40.1	1.3	1.3	1.4	1.3	5.3	7.6
WS	40.5	41.8	42.3	42.0	166.6	6.9	7.1	7.2	7.8	29.0	5.7
WY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System.

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USA Group Foundation, Inc.
P.O. Box 7039
Indianapolis, Indiana 46207-7039

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POSTMASTER: Send all address changes to USA Group Foundation, Inc., P.O. Box 7039, Indianapolis, Indiana 46207-7039.