

Discussion Paper No. 41r

Williams Project on the Economics of Higher Education
Denison Gatehouse
Williams College
Williamstown, MA 01267

**Subsidies, Costs, Tuition, and Aid in
US Higher Education:
1986-87 to 1993-94**

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DP-41r
April 1997

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ABSTRACT

**SUBSIDIES, COSTS, TUITION, AND AID IN US HIGHER EDUCATION:
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Data from a panel of 2,269 colleges and universities track the major changes in educational costs, prices, subsidies, and financial aid over the seven eventful years from 1986-87 to 1993-94. The ability to give student subsidies is recognized as a central determinant of an institution's economic circumstances and strategy. Subsidy resources allow a school to sell its educational services at a net price below the costs of their production. So prices are always less than costs -- how much less depends on a school's resources.

Using a global accounting frame, the paper emphasizes the inter-relatedness of institutional decisions on enrollments, subsidy resources, sticker prices, financial aid, and general subsidies. Public and private sectors faced very different circumstances and behaved very differently. Within each sector, Carnegie school types lived in different worlds. Public Research Universities faced sharply reduced public support but countered it with restricted enrollments and higher tuitions that allowed them to maintain and even expand educational quality. Public Two-year Colleges, in contrast, were well protected by public policy so that even as they absorbed a twenty-five percent increase in enrollments, they maintained educational expenditures with only very modest increases in net tuition (\$62 over seven years). The prices that students paid for a dollar's worth of education changed between public and private institutions, between Research Universities and Two-year Colleges within the public sector, and between high- and low-subsidy schools in both sectors -- and these changes appear to have influenced students' enrollment choices.

Increases in sticker prices either reallocate subsidies or raise net tuitions.

April, 1997

**Changing Subsidies and the Economy of US Higher Education:
1986-87 to 1993-94**

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I. Introduction

It has long been recognized that most college students in the US are heavily subsidized simply by being sold an education at prices that don't nearly cover its costs of production. And the distribution of those subsidies among students has long been studied as an important dimension of public policy -- of equity and educational access. But a recent paper by Winston and Yen [1995] has attempted to shift the focus. Rather than look at subsidies from the perspective of the students -- "Which students get how much subsidy on the basis of what characteristics?" -- that paper views student subsidies as an important element in the institutional circumstances and strategies of schools. So the question becomes, "Which colleges with what characteristics grant how much subsidy to their students and how?" Subsidies, then, are an unavoidable part of the cost, price, quality, and aid strategies of colleges and universities.

Winston and Yen reported on the student subsidies granted by 2,687 colleges and universities in the US in 1991. What they discovered about the student subsidies granted by colleges and universities can be summarized:

- Student subsidies are big, both in dollar terms and as a share of the typical student's total educational costs. 1991 data from the Department of Education showed that the average college in the US provided an education that cost \$10,653 a year to produce and charged its average student a net price of \$3,101. So the typical student got a \$7,551 subsidy that covered 71% of his educational costs --- the net price he paid covered the remaining 29%. Put a bit differently, he paid 29 cents for a dollar's worth of education.
- Private colleges and universities, on average, give subsidies that are virtually the same size as those of public colleges and universities -- they measure \$7,839 at public and \$7,244 at private institutions. We are used to the idea that subsidies are given by a society through government in order to encourage socially desirable behavior. We are less used to the idea that, massively, subsidies are often given by private donors for similar purposes¹. Yet the data show that they are. But an important difference should be noted. Public sector subsidies typically pay for a large part of a relatively inexpensive education --- the average public institutions sold a \$8,760 education for a price of \$921. Private sector subsidies, on the other hand, typically pay much smaller part of a much more expensive education -- they sold a \$12,669 education for a price of \$5,424.
- Subsidies are very skewed in their distribution among institutions -- rich schools give very large ones, poor schools give little. In the ten percent of private institutions that grant the smallest student subsidies, the average student got \$488 a year. At the other end, the richest ten percent of private institutions² give an average subsidy of \$21,135 on an education that

¹ The authors would like to thank the Andrew W. Mellon foundation for support of this work through the Williams Project on the Economics of Higher Education.

¹ Though attention to this kind of institution may be increasing. See Susan Rose-Ackerman's excellent article in the Journal of Economic Literature [1996] in which she reports that fully 6.5% of national income and 10.6% of employment in the US is due to the private nonprofit sector where such motives prevail.

² Within the public sector, subsidies aren't quite as dispersed.

costs \$28,061 to produce. At the most expensive schools, student subsidies of \$40,000 a year and more are common. Subsidies, of course, are the difference between educational expenditures -- the true costs of the education -- and a student's net price. Subsidies have to be paid for with real resources. So it may not be surprising that schools differ so markedly: their subsidies directly reflect their very different access to "donative resources" -- to present and past charitable contributions from government and private donors.

- Student subsidies affect the economic structure of higher education at two levels. Any individual college or university is firmly constrained in its decisions about its quality, price, size, and financial aid by its access to subsidy resources. A poor school cannot offer the bargain that a rich one can -- giving a high quality education at a low price -- and all of its strategic decisions about mission and its market have to be conditioned by limits on its subsidy resources. But at different level, taking the whole of higher education together, it is made up of a population of "firms" that play on distinctly different fields with very different (sustainable, equilibrium) relationships between price and cost. It is not clear how well either our intuition or our tools of analytical microeconomics accommodate so basic a violation of the rules of the for-profit business game.

Winston and Yen examined institutions' student subsidies and the structure of higher education only for 1991. But if subsidies play so central a role in colleges' economic strategies and the nature of the industry, it should be of particular interest to see how those subsidies and their determinants have changed with changing circumstances. Luckily, the full stretch of IPEDS data -- from 1986-7 to 1993-94 -- allows us to cover a period of particular change, anxiety, and accommodation in higher education so examination of that period should nicely test the insights to be got from attention to subsidies. And while other excellent summaries of those changes have been published (see, especially, McPherson and Schapiro [1997]), attention to

subsidies brings into focus the *relationships* between subsidies, costs, tuition, and aid in a useful way.³

In this paper, then, we will look at the largest panel of schools, 2,269, that can be generated from IPEDS⁴ data to estimate student subsidies in 1986-87, 1990-91, and 1993-94.⁵ Subsidies, educational costs, net tuition, student aid, and general subsidies are calculated as in Winston-Yen [1995].³

Dramatic changes were occurring in higher education over the seven years between 1986-87 and 1993-94. Deep cuts were made in federal and state support, there was a movement toward “high tuition, high aid” policies in the public sector, merit aid grew, and small colleges encountered increasing difficulties in attracting students. Much attention has focused on rising “college costs” for the customer, usually described in the popular press by the growth in sticker prices. We will look at these price changes in the data that follow, emphasizing the relationships between sticker price, net tuition, aid, and general subsidies.⁷

3 The foundation of the analysis rests on a “global” accounting of a college’s economic fortunes within which these pieces fit. The first few pages of Winston-Yen [1995] may provide a useful introduction.

4 The Integrated Postsecondary Educational Data System, published by the National Center for Educational Statistics of the US Department of Education. In this paper we have used National Science Foundation, CASPAR Database System, Ver. 4.4.

5 In order to be in the panel, institutions had to meet several reporting and size criteria for all of the three years. These are described in Winston-Yen [1995]. In addition, in this paper we have removed the 14 medical schools from the population. Because we can’t sort out costs per student and net tuition by enrollment level (graduate, undergraduate, professional), these schools, with their disproportionately expensive medical students, produce estimates of subsidy that were so large as to not be credible for undergraduates. In addition, any measurement error in such large numbers has a big effect on changes in population averages across time.

6 With one small change in the capital cost estimation in order to use a single interest rate to compute the opportunity cost component of capital services in all three years. In addition, the same regression coefficients were used to fill in missing capital stock values over those three years. Along with the change in the population of schools needed to form a panel, this means that the 1991 averages included here differ slightly from those in Winston-Yen [1995].

7 A usefully precise algebraic description of these relationships is given in Appendix A.

The essential relationships are these: A school's average subsidy is simply its instructional spending per student,* less the net price the student pays. That subsidy takes two forms. Part of it is granted to all of its students equally, as the sticker price is set below instructional spending -- a "general subsidy" -- while part of it is granted to students individually as financial aid so that they pay less than the sticker price. So a college might produce a \$12,000 education for which it charged a \$5,000 sticker price. The full-price student with no financial aid would be getting a \$7,000 general subsidy because her sticker price was that far below her educational costs. But if the average student at that school also got an additional \$2,000 of financial aid, her net price would be \$3,000. Her total subsidy, then, would be the sum of the \$7,000 general subsidy and \$2,000 in financial aid or \$9,000.

Note that, other things remaining constant, the sticker price serves only to divide up a given amount of student subsidy. A higher sticker price means that more of the subsidy is distributed as individual financial aid and less as general aid, dollar for dollar. A lower sticker price shifts the division the other way, dollar for dollar. If educational costs and *net* tuition don't change, the total subsidy can't, so sticker price changes can only affect the distribution of the subsidy, not its size. If the \$12,000 college above were to raise its sticker price from \$5,000 to \$6,000 without changing instructional costs or net price, all it would do is redistribute \$1,000 per student from general subsidy to individual financial aid.

More generally, and usefully, any increase in sticker price -- of the sort that has attracted so much publicity -- can readily be 'decomposed' into two parts. One part of the increase *raises* the students' net price while the other part *reallocates* the subsidy from general subsidy to

* Including, importantly, capital service costs.

financial aid. A higher *net* price makes more educational resources available; a reallocation of the subsidy from general subsidy to individual financial aid, serves to increase access (need-based aid) or to discount prices for marketing and enrollment management. So it proves quite useful to separate those two effects of the sticker price changes that took place during this period -- the part that raised what students paid and the part that shifted the subsidy to poorer students,

II. The Data

The tables reporting our results are at the back of the paper. After describing the aggregates for all of US higher education (as represented by our panel), the data are disaggregated in two ways. The first is the familiar “type and control” that separates schools by their public or private control and then by Carnegie type -- Research, Doctoral or Comprehensive Universities, Liberal Arts or Two-year Colleges, and a catchall category, Specialized schools. Data are reported for the beginning and end-points of our study -- 1986-87 and 1993-94 -- and frequently for the appropriate panel subset of the 1990-91 data from Winston and Yen. The second is also from Winston-Yen where the data for public and private sectors are disaggregated by wealth -- the size of a school’s student subsidies, hence their use of donative wealth in the form of appropriations, gifts, facilities, and endowments. The narrative will first give an overview based on the broad, aggregated results, then report by type, control, and size. All money values are reported in 1994 dollars for comparability.

A. The Overview: Aggregate Changes, 1986-87 to 1993-94

These seven years witnessed an overall enrollment growth of 14%: the average school added 462 FTE students. Non-tuition income did not keep pace with this enrollment growth,⁹ so the amount the average student was subsidized fell by \$306 in real terms, from \$8,308 to \$8,002. Despite the decline in student subsidies, though, schools increased the amount they spent on each student's education by 2.7% (\$3 IO), funded by a 20% increase (\$615) in net price. So more students were educated with higher average expenditures paid for by a higher net price.

Public attention, as noted, has focused on schools' gross tuition charges, their "sticker prices." As also noted, those sticker price changes can usefully be decomposed into the fraction that affects the net price that students pay and the fraction that reallocates student subsidies between general subsidies and financial aid. So the average sticker price rose by \$1,316 (30%) over these seven years, but less than half of that increase (47%) raised students' net price -- what they actually paid. Most of it (53%) served to redistribute the subsidy from general to individual aid. Unfortunately, our data can't answer the next important question -- "How much of this redistribution served greater equity or access and how much went to marketing or enrollment management through price discounts and merit aid?" -- because IPEDS data don't distinguish between need and non-need aid.

The use of sticker price increases to shift dollars from general subsidy to financial aid is also directly evident: the average school paid out 50% more student financial aid in 1994 than in 1987, or \$700 per student. McPherson and Schapiro [1997] have taken note of this rapid growth in student aid. What hasn't been reported, however, is that because overall subsidies were falling, that growth in individual student aid came entirely at the expense of a general subsidy that fell by 15%. Reflecting the decline in general subsidy, the full-price student in US higher

⁹ To be precise, the amount of donative income *allocated* to instruction did not keep pace with enrollment growth -- it could be the case that schools shifted donative resources to non-instructional spending or to

education paid, on average, 39% of her educational costs in 1987 and almost 50% in 1994. The average student, on the other hand -- including those getting financial aid -- paid 27% of her educational costs in 1987 and 31% in 1994. So the period has seen a significant move in the direction of a high-tuition/high-aid policy.

B. Differences between the Public and Private Sectors

Enrollment grew more rapidly at public than at private institutions: FTE enrollments at the average public school grew by 15%, adding 717 students, while the average private school grew by 10%, adding 178 students. So both sectors were growing, but public institutions continued to enroll an increasing fraction of all the students in higher education. In 1987, 75% of the (FTE) students in our population were in the public sector; by 1994, the fraction had risen a percentage point to 76%.

The \$306 decline in per-student subsidy in the aggregate is the result of a relatively modest subsidy decline in the private sector, by 0.7% or \$61, and a larger decline in the public sector, by 6.4% or \$525. So public subsidies fell from near equality with private subsidies in 1987 (\$8,143 at public and \$8,492 at private) to being fully 10% or \$800 below the private sector in 1994 (\$7,618 public and \$8,432 at private). Figure 1 shows that a considerable portion of the decline in the relative size of public subsidies occurred in the last two years of the period when public subsidies declined by 1.0% annually while private subsidies rose 0.7% per year.

In the public sector, the average school accommodated the decline in subsidy resources with a 3% cutback in the amount spent on each student and a 32% increase in net tuition (though that came to only \$279 on the small dollar base). In the private sector, the increase in net tuition

savings but available data don't reveal this. See Appendix A for the algebra behind this.

Figure 1
Public and Private Subsidy/Student

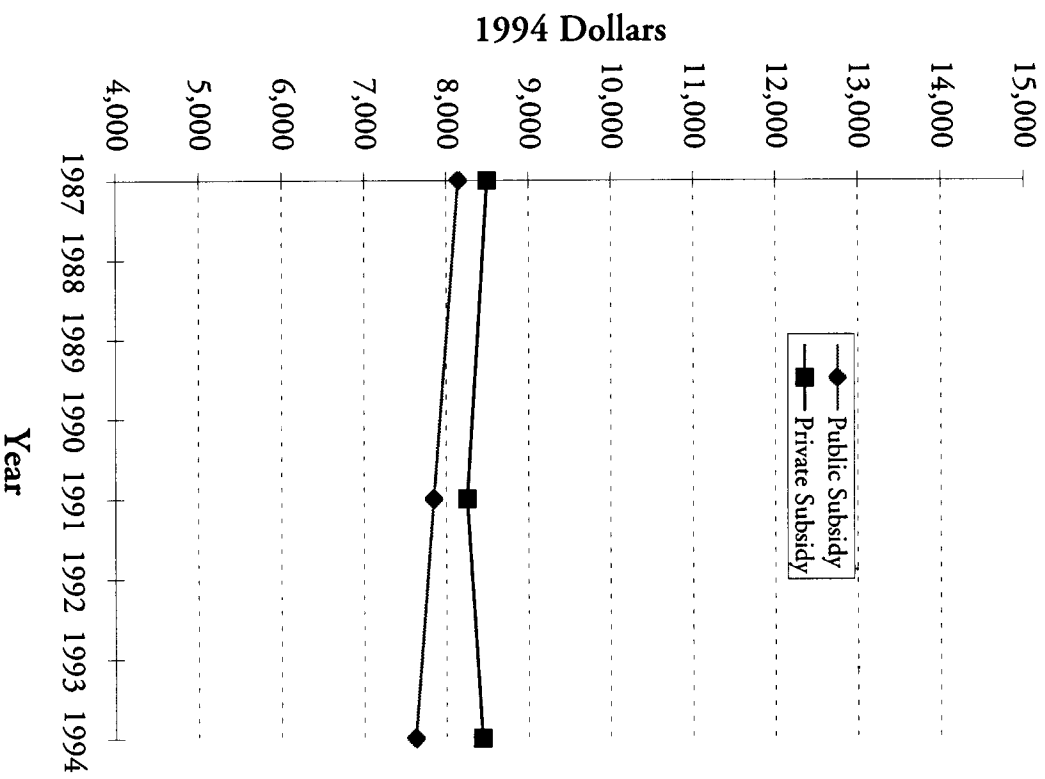
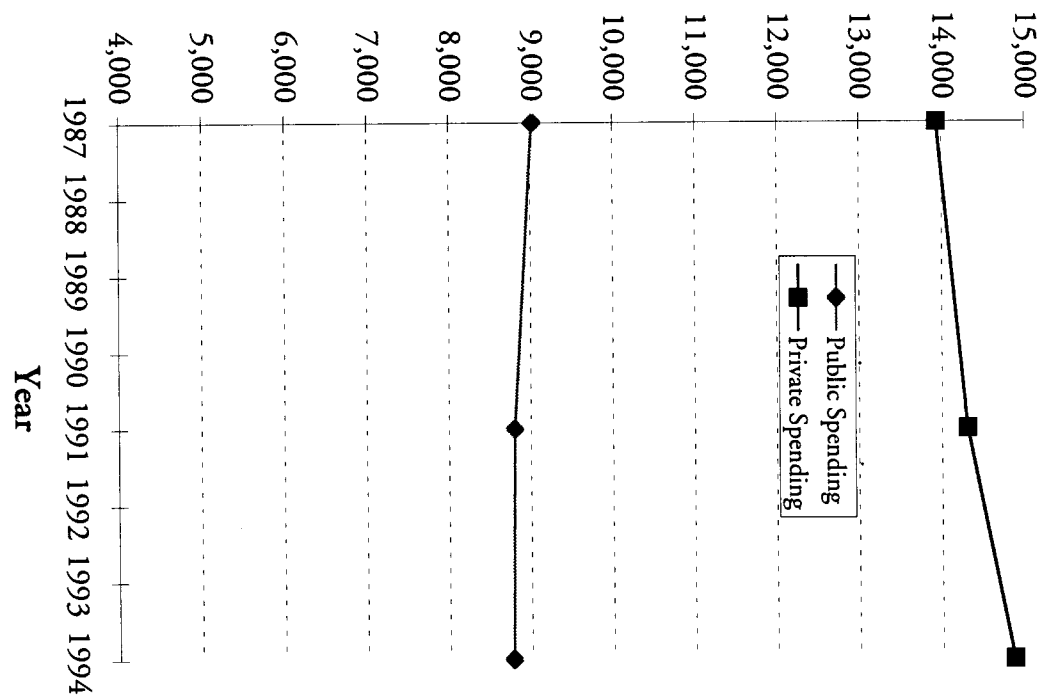


Figure 2
Public and Private Educational Expenditures



was smaller in percentage terms (18%) but larger in dollars at almost \$1,000. Private institutions, in contrast, used this higher net tuition to **increase** the amount they spent on each student's education -- by \$930 or 7%.

Sticker prices rose all around. At public institutions, they went up 38% between 1987 and 1994, adding \$584, and the annual growth rate for sticker prices went from 3.0% between 1987 and 1991 to 6.9% between 1991 and 1994. At private schools, sticker prices rose by 28% over the period or \$2,134, and the increase accelerated more modestly from 3.3% to 4.0% per year. So in the earlier part of the period, public and private institutions raised their sticker prices at about the same rate, but in the later part, public institutions sharply accelerated those increases while private schools stepped up their rate only a bit.

As for the division of those sticker price increases between higher net tuition income and redistribution of subsidies, the sectors were, in the aggregate and over the whole period, remarkably similar as both devoted about 53% of the sticker price increases to increased aid, leaving 47% as an increase in net prices. Within the period, however, the trend at publics was to increase the fraction retained as higher net prices (from 43% in 1987-91, to 50% in 1991-94), while the trend at privates was to increase the fraction used to redistribute subsidy (from 42% in 1987-91, to 65% in 1991-94), a fact consistent with increased competitive pressure and increased price discounting in the private sector.

III. Type of School

This section looks at the changes between 1987 and 1994 that appear when the population is separated into the six types of institutions reflected in Carnegie classifications: Research, Doctoral, and Comprehensive Universities, Liberal Arts, and Two-year Colleges, and

Specialized institutions. The data described in the preceding section revealed such different experiences in the public and private sectors that all further analysis will continue to separate the population in that way. We start with the behavior of the public sector and the Carnegie types within it.

A. Public Institutions by Type

Enrollments were growing throughout the public sector, though that growth was far from uniform. Student FTEs at public research universities increased by a small percent, 3.6%, over the whole of these seven years, while at public two-year and liberal arts colleges they grew quite significantly -- 24.6% and 25.9%, respectively. These translate into average yearly rates of 0.5%, 3.2%, and 3.3%. What growth there was in the public Research Universities was concentrated in the early part of the period: from an annual rate of 1.3% between 1987 and 1991, enrollment growth went slightly negative (-0.5%) in the last two years. Public Doctoral Universities showed the same kind of decline in growth rates within the period -- from a 2.9% annual rate in the first part to 0.1% in the last -- and so did both the public Liberal Arts Colleges (from 4.2% to 2.2%) and Comprehensive Universities (from 2.8% to 1.1%). At Public Two-year Colleges, in contrast, enrollment growth remained high over the whole of the period, falling only slightly from 3.4% to 3.0% per year. Given that they make up more than half of the student population of public schools, the growth of the Two-year Colleges explains much of the aggregate enrollment increase in the public sector.

The Research and Doctoral Universities are so large to begin with that even small growth rates imply large numbers. Over the seven years, Research Universities added about 730 students, on average (growing to 2,107), while Doctoral Universities added about 1,250 (to

11,338). On the other hand, despite their 25% cumulative growth, the much smaller public Two-year Colleges increased average enrollment by only 650 (to 3,305).

Public Sector Subsidies: Expenditures and Net Prices

Students' subsidies in the public sector fell not only in the aggregate, but in each type of school considered alone. Public liberal arts colleges were the hardest hit with a cumulative 13.2% subsidy decline over the whole period; in contrast, subsidies at the public research universities fell only 5.1%. Indeed, the research universities escaped nearly all subsidy decline early on, from 1987 to 1991, showing only an 0.4% annual fall, but they got hit harder between 1991 and 1994 when students' subsidies dropped by 1.2% per year. The dollar value of average subsidies at public liberal arts colleges, because those subsidies were so large to begin with, dropped the most among major types -- by \$1,189 per student -- while those for public two-year schools dropped the least -- by \$286. The Research Universities' 5.1% decline amounted to \$548 per student.

Most types of schools in the public sector responded to declining subsidy resources by cutting educational spending and raising net tuition. This was most dramatic at the public Liberal Arts Colleges where spending was cut by 6% and net tuition was raised by over 60%. Given the accounting relationships that link subsidies, net prices, and spending, this response might seem tautological. It is also possible, however, to respond to declining subsidy resources -- as did the Research Universities -- by raising net price enough to increase spending. Public Research Universities increased net price by 46% -- \$916 -- both to cover the \$548 decline in subsidy resources and to increase spending by 3% (\$368). Furthermore, in the last three years, from 1991 to 1994 when their subsidies were declining most rapidly, the response of the Research Universities was not, in general, deeper cuts in spending, but more rapid increases in

net tuition: real annual increases in net tuition climbed to over 8% and became the source of much public outcry.¹⁰

Students at the public Two-year Colleges, in contrast, seem to have been shielded from much of this. Spending and tuition barely changed early on, from 1987 to 1991. The Two-year Colleges adjusted to a tiny loss of \$18.1 in non-tuition income over these four years by cutting spending 0.5% per year and raising net tuition but by less than \$20. From 1991 to 1994, these two-year schools saw a continued but slow decline in subsidy support, and in consequence cut educational spending by an additional 0.3% per year. Tuition increases at Two-year Colleges remained by far the smallest among public institutions. While other types in the public sector raised net tuition by 7% and more per year, two-year schools raised their net tuition by less than 3% per year – adding up to a cumulative increase of less than \$50 over those three years. These numbers suggest that states placed a priority on maintaining both the quality and accessibility of public Two-year Colleges -- a policy we will return to below.

Public Sector Sticker Prices

Sticker prices rose rapidly in all parts of the public sector, by over 30%. Despite their small base, these numbers also translate into large increases in dollar terms. Research universities raised sticker prices the most, by 45% or \$1,300, while doctoral universities added almost \$950, and comprehensive universities and liberal arts colleges each added about \$800 to their sticker prices.

Large differences show up, however, between the four-year and two-year colleges when we shift attention to how those sticker price increases were used. In the public four-year schools,

¹⁰ McPherson and Schapiro [1997] observe an acceleration of public tuition increases. They observe that public tuition increases have been making up for the decline in state appropriations per student.

well over half went into higher net prices for students. The largest fraction was at the Comprehensive Universities, which retained 72% of the sticker price increase in the form of higher net prices and used only 28% to change the distribution of the subsidy. Public Two-year schools took the opposite tack: 84% of their sticker price increases went to reallocate subsidies to financial aid, leaving only 16% in higher net prices. This sharp difference suggests that Two-year colleges were more protective of their accessibility to low-income students than other public institutions.

The shift from general subsidy to individual student aid revealed in the aggregate public sector data was ubiquitous. All types of schools reduced their general subsidies and increased individual financial aid and both of these changes accelerated during the period -- the sticker-price student in the public sector received a smaller share of the subsidy in 1994 while the financial aid student got a larger share. General subsidies declined by as much as 18% over the period (at public liberal arts colleges) and individual aid increased by as much as 58% (at two-year schools). Here, starting levels matter a lot: the portion of the subsidies in the public sector given in the form of financial aid has typically been so small that large percentage increases can describe pretty modest absolute amounts. The 22% increase in student aid at public Research Universities between 1991 and 1994, for instance, amounted to about \$233 per student while the 3.1% increase at public two-year colleges came to \$2.15 -- spread over three years.

B. Private Institutions by Type

Schools in the private sector had both lower rates of enrollment growth and a smaller range of growth rates than did the public institutions, but all types of private schools saw larger enrollments -- with the exception the average private Two-year College that shrank by 20 students. The lowest (positive) growth was found at private Doctoral Universities and

Specialized schools, that had less than 5% cumulative growth between 1987 and 1994, while the highest growth took place in private Comprehensive Universities -- 16% in total. The private Liberal Arts Colleges were close behind with 15% enrollment growth while Research Universities increased size by a modest 6%. Once again, however, student numbers tell a rather different story. With only 5% growth, an average of 255 more students chose a private Doctoral University in 1994 while the 6% increase in private Research Universities meant nearly 654 more. On the other hand, the 16% increase in private liberal arts colleges netted only 160 students.

Private Sector Subsidies

In contrast to the public sector, average student subsidies at many schools in the private sector **rose** from 1987 to 1994. In some types of schools they increased modestly -- \$137 per student at the average Liberal Arts College over seven years -- while in others subsidies increased a lot -- \$2,817 per student in private Research Universities and \$939 in private Doctoral Universities. Thus the \$107 decline in private schools' student subsidies overall comes largely from the \$911 decline at Comprehensive Universities.

This increase in private sector subsidies meant that spending on students' education in the private sector increased on balance by more than did the net prices those students paid. In a classic example of finding the glass half-empty or half-full, the \$1,625 increase in net tuition in the private Research Universities was accompanied by \$4,442 more spending per student in those schools, increasing the average student's subsidy by the \$2,817. In the private Two-year Colleges, a net price increase of \$852 was accompanied by a spending increase of nearly \$1,100.

Private Sector Sticker Prices

Tuition increases have been dramatized in public discussion by focusing on sticker prices, rather than on the net prices that students actually pay. Sticker prices have indeed increased and at an accelerating rate in almost all types of private institutions during this period - the annual rate of growth increased from 1.7% to 3.8% per year at private Doctoral Universities; from 3.5% to 4.0% at Comprehensive schools; from 3.3 to 4.0% at Liberal Arts Colleges and from 2.6% to 5.8% at Two-year schools. Only in private Research Universities did the yearly rate of increase slow down and there only from an annual rate of 3.2% to one of 3.0%. Putting these sub-periods together to take the period as a whole, the smallest total rise in sticker price is the 19.5% at private Doctoral Universities and the largest is the 31% at the private Two-year schools. And, of course, the relatively large initial levels of tuition in the private sector turn these percentages into significant dollar values that range from a \$1,683 average increase at private Two-year Colleges to a whopping \$3,111 increase at the private Research Universities. In dollars of constant 1994 value.

Over the seven years and for the private sector as a whole, these sticker price increases split evenly between raising students' net price and reallocating subsidy from general to individual student aid. In Research, Comprehensive, and Two-year schools, about half of the increase went to each; at Doctoral Universities, more went to raising net tuition (55%); at Liberal Arts Colleges, more went to reallocating subsidy (61%). However, by the latter half of the period, all but the Doctoral Universities used sticker price increases primarily as a means of changing how the subsidy was granted. At Research and Comprehensive Universities, only 42% of the increase in sticker price ended up in higher net prices from 1991 to 1994, and at Liberal Arts and Two-year Colleges, less than 30% did.

So rising sticker prices in the private sector redistributed subsidies from general subsidy to individual student aid. Aid grew by over 40% in all of the major Carnegie sectors. The

decision (or necessity) to increase the portion of subsidy going to student aid forced deep cuts in the part being given as a general subsidy at Comprehensive Universities (41%) and at Liberal Arts (17%) and Two-year Colleges (15%). At Research Universities, in contrast, student subsidies were growing enough, overall, to allow these schools simultaneously to increase **both** the level of student aid and the general subsidy.

Put in more conventional terms that simply measure the growth of student aid, this redistribution of subsidy in the private sector happened at accelerating rates during the period. For every Carnegie type, aid grew more rapidly from 1991 to 1994 than from 1987 to 1991. The change is most extreme at Two-year colleges, where the rate of growth of student aid jumped from -0.6% to 15% per year. And this continues the trend of accelerating growth in student aid in all types of private institutions that McPherson and Schapiro [1994] documented within our first subperiod (87-91). The faster aid growth from 1991 to 1994 caused deeper cuts to be made in general subsidies at private Liberal Arts Colleges (2% per year) and Comprehensive Universities (8% per year), and forced cuts in general subsidy to be made for the first time at Doctoral Universities (0.2% per year).

In light of these striking figures, it is well to rehearse again the significance of these two broad forms of subsidy distribution. The general subsidy is given to all students at a school, regardless of their individual characteristics, simply by virtue of a sticker price that doesn't cover the full cost of producing a year's education. It is the subsidy the "full-pay student" gets.

The subsidy that's given as "individual student aid" is less easy to categorize. It is a discount from the sticker price consequent on the student's individual characteristics. But such subsidies can be motivated by very different objectives. They clearly include the need-based financial aid that expands college choice by the student who is "willing but unable" to pay the

sticker price. So financial aid serve the familiar but important social objective of educational access.

But the same price discounts in the form of financial aid are used for marketing and enrollment management. A larger share of the subsidy is often given a high quality student to induce her to go to a particular school -- whether she needs the financial aid or not (a student who is "able but unwilling" to pay the sticker price). Or that price discount may serve, simply, to fill chairs in the classroom. Or to exploit an individual's apparent price elasticity. So the temptation to see the redistribution of student subsidies over this period from general subsidy to individual financial aid as serving to increase educational access should probably be resisted without more information about what, exactly, is going on. It may simply describe increased price discounting in the face of declining demand. It does seem likely, though, that this "high-tuition/high-aid" policy is more often in the service of access and equity in the public than in the private sector. ¹¹

IV. The Distribution of Subsidies

In looking at student subsidies as a key part of institutional cost, price, and aid strategies, a chief finding of the Winston-Yen study was the striking differences among colleges and universities in their access to the donative -- non-tuition -- resources that support student subsidies. So institutions are highly skewed in the distribution of their ability to subsidize their students -- the average school in the top ten percent of private institutions gave each student \$2 1,135 subsidy in 1991 while the average school in the bottom ten percent gave \$488. These differences, predictably, had a great influence on their patterns of cost, price, and aid. To

¹¹ McPherson and Schapiro [1997] also describe large increases in sticker prices and simultaneous rapid aid growth in the private sector. In their view, market forces have eroded schools' ability to make real increases in net price: "...large increases in gross tuition have been resulting in substantially smaller increases in actual revenues." (p. 3-9).

examine the significance of skewed distribution, then, this section disaggregates schools in the public and private sectors (separately) by the size of the subsidies they grant their students.

A. Subsidy Distribution in Public Institutions

Enrollments expanded more quickly from 1987 to 1994 among the poorer public schools than among those with more donative wealth. The average increase was 22% in the bottom half of the subsidy size distribution and 10% in the top half: average enrollment went up by 885 FTE students in the bottom half and 548 in the top.

Changes in subsidies were pronounced over these seven years reflecting the withdrawal of support for public higher education that's been commented on. But a dramatic pattern appears when we look at the changes in subsidies per student over the hierarchy of public schools, ranked by the size of their student subsidies: subsidies fell everywhere, but steeply in the upper deciles and little in the lower deciles. The average subsidy decline in the top half the distribution was 8.9% or \$891 per student; in the bottom half it was 5.0% or \$281. So whatever combination of forces was bringing down public subsidies, they struck harder at the high subsidy schools.¹² Within the period, there seems not to be much of a pattern to the timing of the subsidy reductions -- in some deciles it declined more over 1987-91, in others, more during 1991-94. It does appear significant, however, that student subsidies at the wealthiest public institutions have dropped considerably more rapidly in the final three years -- by over 2% per year in real terms.

Not surprisingly, those schools that faced the largest reductions in subsidy per student generally made the sharpest cuts in educational spending per student. Spending per student fell an average of 4% or \$421 in the top half. In the two lowest subsidy public deciles, spending per

¹² State appropriations certainly appear to play the central role, but for a variety of reasons, the IPEDS data do not fully describe a school's income sources.

student actually increased. This pattern appears to explain, at least partially, the enrollment pattern: students chose the lower subsidy public schools because of the sharp cuts in educational spending at the high subsidy schools, cuts which amount to fewer student services, larger classes, overenrolled course requirements, etc. Those that were low-subsidy schools in 1987 became relatively more attractive by 1994 both through their own growth in student spending and through the reductions in educational spending at the wealthier schools.

The enrollment shift toward lower cost schools may also have been reinforced by relative price changes. Net tuition rose most rapidly in the top deciles where spending declined the most. So students in those high-subsidy schools paid more and got less. Increases in net prices exceeded 30% in four of the top five deciles while expenditures declined by an average of 4%. In the bottom half of the distribution, net prices rose less and spending declined less -- as noted, spending increased in the bottom two deciles.

This is nicely summarized by the price/cost ratio that describes what a student pays per dollar of educational quality. Over the period, that price rose by an average of 39% in the top five deciles, but only by 24% in the bottom five. So it could be anticipated that more new students would chose schools further down in the subsidy rankings where net prices were rising less and spending on their education was falling less, or even rising. Those poorer schools became, quite simply, a better deal.

So these results provide an alternative -- or augmented -- explanation for the enrollment shift of low income students from high-subsidy public Research Universities to the lower priced Two-year Colleges that was documented by McPherson and Schapiro [1996]. That shift is, these figures suggest, more generally a movement from high-cost/high-subsidy to low-cost/low-subsidy colleges. McPherson and Schapiro argued that low income students increasingly went to

the cheaper schools because they were shut out of the high-end Research Universities by rising net prices there. They saw an income-effect in those higher net tuitions. But at the same time, Two-year Colleges at the low-end have become relatively a better bargain in terms of what a student has to pay for a dollar's worth of education. Research Universities raised price a lot and quality a little; Two-year Colleges managed to keep both pretty much the same. So there's also a substitution effect at work in students' response to lower *relative* prices. The push of higher prices and lower quality at the upper end was complemented by the pull at the lower end of prices that rose less and spending that fell less.

Given these strong differences in net tuition growth, it is interesting that growth of sticker prices was roughly the same across the deciles. The mean increase in sticker prices for the public sector was 37.5% between 1987 and 1994 while the range for individual deciles was 32.4% to 41.3% with no apparent patterns.

But if sticker prices don't tell much, their uses do. When increases in public sector sticker prices are decomposed into the part that adds to the students' net price and the part that redistributes the student subsidy from general to individual aid, it is apparent that the wealthiest public institutions used sticker prices mainly to increase what the students had to pay -- to protect educational quality -- while the poorer ones used their similar percentage increases mainly to redistribute the subsidy from general to individual aid. So for schools in the top decile, 61% of the sticker price increase went for higher net prices and educational expenditures while in the ninth decile, only 32% was used that way.

But no matter how we slice public higher education, it is apparent that subsidy resources were shifted massively from general subsidies to individualized financial aid -- a clear movement toward a "high-tuition/high-aid" strategy. Aid grew and general subsidies were cut in all deciles.

But lower subsidy public schools increased student aid more rapidly than those granting higher subsidies: aid grew by a third in the first decile and over two-thirds in the ninth and tenth deciles. In dollar terms these increases are about the same size -- around \$300 per student -- so the change in general subsidies follows pretty much the same pattern as the decline in subsidies overall.

Since state and local appropriations make up more than half of the non-tuition income of public institutions, it is reasonable to look there to explain why subsidies fell more at the high subsidy schools than at others. And the IPEDS data do show that governments withdrew support most rapidly from the highest subsidy public schools. State and local appropriations declined by \$1,500 per student at first decile schools while they declined by around \$300 in the eighth, ninth and tenth deciles. States facing tight budgets chose to preserve access and educational spending at low-subsidy schools over higher subsidy ones.

The main finding, then, is that the reduction in funding at high quality public institutions induced a substitution effect so that enrollments shifted from high- to low-cost schools. Protection of student subsidies at the lower-cost public schools -- at the expense of those at high-cost schools -- let them increase educational expenditures while raising net prices modestly, using their sticker price increases mainly to redistribute subsidies to individual aid. If we can assume that, these being public institutions, student aid is being used primarily to increase access and not for marketing, the picture would seem to be a generally encouraging one of expanded public enrollments that have been redirected from the high-cost/high-subsidy schools to less costly schools by their relatively lower prices and higher expenditures.

B. Subsidy Distribution in Private Institutions

Enrollment in the private sector increased at all levels of subsidy, though by less overall than at public institutions. Again, enrollment growth was generally smaller in the upper deciles. Over these seven years, enrollments expanded by more than 11% in the sixth through ninth deciles, and by less than 10% in each of the first five. So new enrollment in the private sector, too, went disproportionately to low-subsidy schools.

Subsidies were rising only in the top decile of private schools -- in each of the other deciles, subsidies fell. This reverses the pattern seen in the public sector. In deciles two through ten, subsidies declined by varying amounts that appear unpatterned across deciles: from as much as an 8% decline decile 7 to as little as an 0.1% decile in decile 8. It's interesting, then, that spending increased in all deciles, and most rapidly at the lowest subsidy schools -- by 9.2% (\$923) in the eighth decile and 17.4% (\$1,265) in the tenth. With subsidies declining, these increases in spending had to be paid for by raising the average net tuition that students paid -- by over \$1000 in most of the second through tenth deciles, including a \$1,400 increase in the tenth.¹³

The experience of the wealthiest private schools stands in stark contrast to the rest of the population, public and private. In that elite segment, average subsidies were rising and these schools took advantage of that fact both by increasing educational spending per student, by

¹³ This statement neglects a lot. On the one hand, these 107 high-subsidy institutions in decile one may have been trying to maintain or improve student quality through competitive price discounting in the form of financial aid. That strategy would be reflected in numbers like these -- in large allocations of sticker price increases toward financial aid rather than to net price increases -- and in familiar institutional complaints about "the rising costs of the financial aid budget." But in an earlier paper, McPherson and Schapiro [1994] presented evidence of truly massive increases in physical capital investment by these same high-subsidy schools during this same period and that had to be financed out of what we've described as "donative resources." Since the measure of "subsidy resources" available to us from the IPEDS data doesn't let us include resources diverted to saving, it's quite possible, too, that these figures are dominated by those elite private institutions that have had sufficient increases in wealth to increase aid, build buildings and subsidize students, all the while maintaining student quality. Finally, it should be noted that our calculation of educational costs includes -- as it must -- the rental rate on the capital services used. So both educational expenditures and subsidies will have risen for this group of schools as a consequence of their building boom. Their students are now served with 50 meter pools and new museums and science buildings but they may, nonetheless, have to give merit aid to get a class of the quality they want.

almost \$1,500, and by holding down net tuition increases. Top decile private schools raised net tuition by 8.0% or \$574 over the seven years, less than one-half of the rate of increase at the average private institution; they actually let their net tuition fall by \$350 (by allowing aid per student to outpace growth in the sticker price) from 1991 to 1994.

Sticker price increases follow a similar pattern across subsidy deciles as do net tuition increases -- they are considerably smaller in the first decile (16%) than in the rest (over 25% in each). In addition, poorer schools use larger fractions of the sticker price increase to raise net tuition. So in the top decile, one-third of the higher sticker prices ends up in higher net prices while two-thirds serves to redistribute the subsidy (give more aid); in the tenth decile, these are reversed.

V. Conclusion

Some of what is reported here is not news. Sticker prices are rising, states have been cutting support to public higher education, there has been a huge growth in financial aid. But these have typically been reported as disconnected changes. This paper examines those trends in an arithmetic of global-accounting that makes explicit the fact that they depend on each other. The identity that locks together educational costs, prices, and subsidies, for instance, takes the mystery out of why public tuitions have risen so rapidly over this period -- the rise in enrollments and decline in public appropriations **required** either that public tuitions go up or that educational expenditures and quality go down. And since tuition revenues are so small a part of public school funding -- and state appropriations such a large part -- the tuition increases had to be big, and especially big and alarming when described as the much-reported form of percentage increases.

And, in all this, it is important to see the very different responses of the very different kinds of schools that make up US higher education -- by type, control, and wealth.

Laying out these relationships reveals apparent priorities. Public Research Universities faced sharply reduced public support but countered it with restricted enrollments and higher tuitions that allowed them to maintain and even expand educational quality. Two-year Colleges, in contrast, were well protected by public policy so that even as they absorbed a twenty-five percent increase in enrollments, they maintained educational expenditures with only a very modest increase in net tuition (\$62 over seven years). All parts of the private sector used higher net tuitions to improve educational quality, but the Research and Doctoral Universities got an additional boost in large subsidy increases while falling subsidies at Comprehensive Universities nearly wiped out all the improved tuition income, leaving educational spending about the same.

Putting these changes in context addresses some misconceptions about tuition increases. Price increases have often been treated as an erosion of value for students. But “value” has to encompass both the price they pay and the quality of education they get for that price. Overall, students paid more for what they got -- a dollars worth of education that cost 27 cents in 1986 sold for 31 cents in 1993. So higher education was being “privatized,” not by a shift of enrollments to the private sector, but by a shift of the cost burden from society to the student in the public sector. And the prices that students paid for a dollar’s worth of education changed between public and private institutions, between Research Universities and Two-year Colleges within the public sector, and between high- and low-subsidy schools in both sectors -- and these changes appear to have influenced students’ enrollment choices.

Finally, out of context reports of sticker price increases obscure the fact that sticker prices aren't what people pay and that the dollars gained from higher sticker prices have, overall and in both public and private sectors, been used more to shift the distribution of subsidies to financial aid students than to raise the net tuition that students actually pay.

Appendix A -- Global Accounts

The purpose of this appendix is to relate student subsidies, costs prices and aid to the rest of a college's global accounts. A college's global accounts are a complete description of all of its financial transactions, thus the identities below account for every dollar that is earned and every dollar that is spent by a college. See Winston [1992] for a more complete discussion of global accounts.

Student Subsidy Tautologies

Before getting into global accounts, it is useful to review the tautologies that relate student subsidies, costs, prices and aid. Subsidy is defined to be instructional spending per student (X_i) minus the net tuition (P_n):

$$\text{Subsidy} = X_i - P_n \quad (1)$$

...where the net price is the sticker price (P_s) net of the average aid award per student (A):

$$P_n = P_s - A \quad (2)$$

Substituting into (1) shows the division of subsidy between a "general subsidy" (S_g) going to all students -- even those paying the full sticker price -- and aid:

$$\begin{aligned} \text{Subsidy} &= (X_i - P_s) + A \\ \text{Subsidy} &= S_g + A \end{aligned} \quad (3)$$

And aid is further divided into need-based aid (A_n) and merit aid (A_m):

$$A = A_n + A_m \quad (4)$$

$$\text{Subsidy} = S_g + (A_n + A_m) \quad (5)$$

For a given level of instructional expenditures and net price, a higher sticker price means only that a smaller fraction of the subsidy will be given as general subsidy, S_g and a larger fraction will be given as financial aid, A . In practice, both sticker price and net price will change. So, rearranging (2) and looking at changes in all variables,

$$\Delta P_s = \Delta P_n + \Delta A \quad (6)$$

...and dividing by ΔP_s ...

$$1 = \Delta P_n / \Delta P_s + \Delta A / \Delta P_s \quad (7)$$

...shows how changes in sticker price decompose into the fraction of that change that raises the net price ($\Delta P_n / \Delta P_s$) and the fraction that redistributes subsidy resources from general subsidy to student aid ($\Delta A / \Delta P_s$).

Student Subsidies in a Global Accounting Context

Global accounts begin by adding up all income to the college: income from student net tuition, from earnings on endowment (total return, NOT endowment availed), from gifts, from state appropriations, from auxilliary enterprise fees and from all other sources (and from the imputed rent on its own capital). This global income, Y, is used exhaustively on all the things on which a college spends its money (student education, research, auxilliary enterprises, etc.) or it is saved. There's nothing "left over." So in it's simplest form, we write:

$$Y \equiv X + S \quad (8)$$

Where X is global expenditures per student and S is savings per student. We complicate this by breaking spending and income into broad groups. Income comes from auxilliary enterprises (Ya), student net price (Pn) and "donative" sources (Yg) Spending goes to support auxilliary enterprises (Xa), student instruction (Xi) and research and public service (Xr). So

$$Y = Y_a + P_n + Y_g \quad (9a)$$

$$X = X_a + X_i + X_r \quad (9b)$$

Substituting these into (8):

$$Y_a + P_n + Y_g = X_a + X_i + X_r + S \quad (10)$$

Rearranging to bring all student-related variables to one side:

$$(X_i - P_n) = Y_g - X_r - S + (Y_a - X_a) \quad (11)$$

The left-hand side is the student subsidy. Assuming that auxiliary enterprises break even so $Y_a - X_a = 0$, (11) can be simplified:

$$\text{Subsidy} = Y_g - X_r - S \quad (12)$$

Student subsidy is donative income not saved or spent on non-instructional activities. So,

$$\Delta \text{Subsidy} = \Delta Y_g - \Delta X_r - \Delta S \quad (12)$$

We have frequently identified changes in subsidy with changes in donative income per student. (12) shows that this is not the only possibility: a change in student subsidy could result, alternatively, from an opposite change in non-instructional spending or savings. So when we suggest that changes in subsidy are due to changes in donative resources, we implicitly assume that X_r and S are constants.

If auxiliary accounts do not break even, then any surplus or deficit affects student subsidy (or saving or non-instructional spending).

$$\Delta \text{Subsidy} = \Delta Y_g - \Delta X_r - \Delta S + A(Y_a - X_a) \quad (13)$$

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Table 1.1
Costs, Prices, Subsidies, Aid and Enrollment
by Control and Subsidy Decile
1987 and 1994 Academic Years

	Number of Institutions	Enrollment		Subsidy		Educational Spending		Net Tuition and Fees		Sticker Price		General Subsidy		Individual Student Aid	
		1987	1994	1987	1994	1987	1994	1987	1994	1987	1994	1987	1994	1987	1994
	<i>N</i>	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
All Institutions	2,269	3,274	3,736	8,308	8,002	11,338	11,647	3,030	3,645	4,433	5,749	6,905	5,898	1,403	2,104
Public Institutions	1,197	4,649	5,365	8,143	7,618	9,013	8,768	870	1,149	1,555	2,139	7,458	6,629	685	989
Private Institutions	1,072	1,740	1,917	8,492	8,432	13,933	14,863	5,441	6,431	7,646	9,780	6,287	5,083	2,205	3,348
Public Institutions															
Research	72	20,343	21,074	10,710	10,162	12,719	13,087	2,009	2,925	2,922	4,228	9,797	8,859	913	1,303
Doctoral	54	10,086	11,338	9,386	8,478	11,190	10,913	1,804	2,435	2,553	3,496	8,636	7,417	749	1,061
Comprehensive	254	5,724	6,606	8,776	7,839	9,966	9,581	1,190	1,741	2,003	2,768	7,963	6,812	813	1,027
Liberal Arts	75	1,992	2,507	9,039	7,850	9,926	9,287	887	1,438	1,898	2,688	8,028	6,599	1,011	1,251
Two-Year	722	2,652	3,305	7,222	6,936	7,779	7,555	557	618	1,132	1,524	6,647	6,030	575	906
Specialized	20	1,868	2,040	17,375	17,072	18,818	18,934	1,444	1,862	2,240	3,081	16,579	15,853	796	1,219
Private Institutions															
Research	38	11,068	11,722	17,372	20,190	26,804	31,246	9,431	11,056	12,936	16,047	13,868	15,199	3,505	4,991
Doctoral	40	5,390	5,645	7,152	8,091	16,177	18,308	9,024	10,217	11,100	13,265	5,076	5,043	2,076	3,048
Comprehensive	235	2,096	2,424	6,645	5,734	12,474	12,657	5,829	6,923	7,592	9,788	4,881	2,869	1,763	2,865
Liberal Arts	505	1,060	1,216	9,449	9,586	14,639	15,635	5,190	6,049	7,758	9,944	6,881	5,692	2,568	3,894
Two-Year	131	652	633	5,966	6,178	9,667	10,731	3,701	4,553	5,425	7,108	4,242	3,623	1,724	2,555
Specialized	123	939	957	8,478	7,723	13,663	14,123	5,185	6,400	6,895	8,865	6,767	5,258	1,711	2,466

Table 1.2
Real Changes in Costs, Prices, Subsidy, Aid and Enrollment

By Control and Carnegie Type
1987 to 1994

in 1994 \$	Enrollment	Subsidy	Educational Spending	Net Tuition	Sticker Price	General Subsidy	Individual Student Aid	% of Increase in St'r. Pr. that Raises Net Pr.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All Institutions	462	-306	310	615	1,316	-1,006	701	46.7%
Public	717	-525	-245	279	584	-829	305	47.8%
Private	178	-61	930	991	2,134	-1,204	1,144	46.4%
Public Institutions								
Research	731	-548	368	916	1,306	-938	390	70.1%
Doctoral	1,252	-908	-277	631	943	-1,220	312	66.9%
Comprehensive	882	-937	-386	551	765	-1,151	214	72.1%
Liberal Arts	515	-1,189	-638	551	790	-1,429	240	69.7%
Two-Year	653	-286	-224	62	392	-617	331	15.7%
Specialized	172	-302	116	418	841	-725	423	49.7%
Private Institutions								
Research	654	2,817	4,442	1,625	3,111	1,331	1,486	52.2%
Doctoral	255	939	2,131	1,192	2,165	-33	972	55.1%
Comprehensive	328	-911	184	1,094	2,196	-2,012	1,102	49.8%
Liberal Arts	156	137	997	860	2,186	-1,189	1,326	39.3%
Two-Year	-20	212	1,064	852	1,683	-619	831	50.6%
Specialized	18	-755	460	1,215	1,970	-1,510	755	61.7%

Table 3
Real Growth in Costs, Prices, Subsidies, Aid and Enrollment

By Control and *Carnegie Type*
 1987 to 1994

	Enrollment	Subsidy	Educational Spending	Net Tuition	Sticker Price	General Subsidy	Individual Student Aid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
All Institutions	14.1%	-3.7%	2.7%	20.3%	29.7%	-14.6%	50.0%
Public	15.4%	-6.4%	-2.7%	32.1%	37.5%	-11.1%	44.5%
Private	10.2%	-0.7%	6.7%	18.2%	27.9%	-19.2%	51.9%
<u>Public Institutions</u>							
Research	3.6%	-5.1%	2.9%	45.6%	44.7%	-9.6%	42.8%
Doctoral	12.4%	-9.7%	-2.5%	35.0%	36.9%	-14.1%	41.6%
Comprehensive	15.4%	-10.7%	-3.9%	46.3%	38.2%	-14.5%	26.3%
Liberal Arts	25.9%	-13.2%	-6.4%	62.1%	41.6%	-17.8%	23.7%
Two-Year	24.6%	-4.0%	-2.9%	11.1%	34.7%	-9.3%	57.5%
Specialized	9.2%	-1.7%	0.6%	29.0%	37.5%	-4.4%	53.1%
<u>Private Institutions</u>							
Research	5.9%	16.2%	16.6%	17.2%	24.0%	9.6%	42.4%
Doctoral	4.7%	13.1%	13.2%	13.2%	19.5%	-0.7%	46.8%
Comprehensive	15.6%	-13.7%	1.5%	18.8%	28.9%	-41.2%	62.5%
Liberal Arts	14.7%	1.4%	6.8%	16.6%	28.2%	-17.3%	51.7%
Two-Year	-3.0%	3.6%	11.0%	23.0%	31.0%	-14.6%	48.2%
Specialized	1.9%	-8.9%	3.4%	23.4%	28.6%	-22.3%	44.1%

Table 1.4
Real Changes in Costs, Prices, Subsidies, Aid and Enrollment
By Control and Carnegie Type
1987-91, 1991-94

in 1994 Dollars	Enrollment		Subsidy		Educational Expenditures		Net Tuition And Fees		Sticker Price		General Subsidy		Individual Student Aid		Fraction of Increase in Sticker Price that Raises Net Price	
	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994
	(1)	(2)	(3)		(4)		(5)		(6)		(7)		(8)			
All Institutions	328	134	-274	-31	61	249	335	281	601	715	-540	-466	266	435	55.7%	39.2%
Public	513	203	-301	-224	-216	-29	84	195	194	390	-411	-419	110	195	43.4%	50.0%
Private	121	57	-244	184	370	560	614	376	1,055	1,079	-685	-520	440	703	58.2%	34.9%
Public Institutions																
Research	1,073	-342	-177	-371	131	237	308	608	465	841	-334	-604	157	233	66.3%	72.3%
Doctoral	1,225	27	-688	-219	-520	243	169	463	286	657	-806	-414	118	194	58.9%	70.4%
Comprehensive	675	207	-632	-305	-464	78	169	382	236	529	-699	-452	67	147	71.6%	72.2%
Liberal Arts	355	161	-613	-575	-419	-219	194	356	345	445	-764	-664	151	89	56.3%	80.0%
Two-Year	376	278	-181	-105	-167	-57	14	48	129	263	-296	-320	115	215	10.8%	18.1%
Specialized	82	90	1,362	-1,664	1,472	-1,357	110	308	220	621	1,252	-1,978	109	313	50.2%	49.5%
Private Institutions																
Research	348	307	2,032	786	3,075	1,367	1,043	582	1,736	1,375	1,339	-8	693	793	60.1%	42.3%
Doctoral	199	57	569	370	914	1,217	346	847	754	1,411	160	-194	408	564	45.8%	60.0%
Comprehensive	217	111	-680	-230	-41	225	639	455	1,109	1,087	-1,150	-862	470	632	57.7%	41.9%
Liberal Arts	99	57	-251	388	289	708	540	319	1,093	1,094	-804	-386	552	774	49.5%	29.2%
Two-Year	11	-30	-687	899	-72	1,137	615	237	576	1,107	-649	30	-38	869	106.6%	21.4%
Specialized	52	-34	121	-876	945	-485	824	391	1,193	777	-247	-1,262	369	386	69.1%	50.3%

Table 1.5
Real Annualized Growth in Costs, Prices, Subsidies, Aid and Enrollment
By Control and Carnegie Type
1987-91, 1991-94

	Enrollment		Subsidy		Educational Expenditures		Net Tuition And Fees		Sticker Price		General Subsidy		Individual Student Aid	
	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
All Institutions	2.4%	1.2%	-0.8%	-0.1%	0.1%	0.7%	2.7%	2.7%	3.2%	4.5%	-2.0%	-2.5%	4.4%	8.0%
Public	2.7%	1.3%	-0.9%	-1.0%	-0.6%	-0.1%	2.3%	6.4%	3.0%	6.9%	-1.4%	-2.0%	3.8%	7.6%
Private	1.7%	1.0%	-0.7%	0.7%	0.7%	1.3%	2.7%	2.0%	3.3%	4.0%	-2.8%	-3.2%	4.7%	8.2%
Public Institutions														
Research	1.3%	-0.5%	-0.4%	-1.2%	0.3%	0.6%	3.6%	8.1%	3.8%	7.7%	-0.9%	-2.2%	4.0%	6.8%
Doctoral	2.9%	0.1%	-1.9%	-0.8%	-1.2%	0.8%	2.3%	7.3%	2.7%	7.2%	-2.4%	-1.8%	3.7%	7.0%
Comprehensive	2.8%	1.1%	-1.9%	-1.3%	-1.2%	0.3%	3.4%	8.6%	2.8%	7.3%	-2.3%	-2.1%	2.0%	5.3%
Liberal Arts	4.2%	2.2%	-1.7%	-2.3%	-1.1%	-0.8%	5.1%	10.0%	4.3%	6.2%	-2.5%	-3.1%	3.5%	2.5%
Two-Year	3.4%	3.0%	-0.6%	-0.5%	-0.5%	-0.3%	0.6%	2.7%	2.7%	6.5%	-1.1%	-1.7%	4.7%	9.5%
Specialized	1.1%	1.5%	1.9%	-3.1%	1.9%	-2.3%	1.9%	6.2%	2.4%	7.8%	1.8%	-3.8%	3.3%	10.4%
Private Institutions														
Research	0.8%	0.9%	2.8%	1.3%	2.8%	1.5%	2.7%	1.8%	3.2%	3.0%	2.3%	0.0%	4.6%	5.9%
Doctoral	0.9%	0.3%	1.9%	1.6%	1.4%	2.3%	0.9%	2.9%	1.7%	3.8%	0.8%	-1.2%	4.6%	7.1%
Comprehensive	2.5%	1.6%	-2.7%	-1.3%	-0.1%	0.6%	2.6%	2.3%	3.5%	4.0%	-6.5%	-8.4%	6.1%	8.7%
Liberal Arts	2.3%	1.6%	-0.7%	1.4%	0.5%	1.6%	2.5%	1.8%	3.3%	4.0%	-3.1%	-2.2%	5.0%	7.7%
Two-Year	0.4%	-1.6%	-3.0%	5.4%	-0.2%	3.8%	3.9%	1.8%	2.6%	5.8%	-4.1%	0.3%	-0.6%	14.9%
Specialized	1.4%	-1.2%	0.4%	-3.5%	1.7%	-1.1%	3.8%	2.1%	4.1%	3.1%	-0.9%	-6.9%	5.0%	5.8%

Table 2.1
Costs, Prices, Subsidies, Aid and Enrollment
by Control and Subsidy Decile
1987 and 1994 Academic Years

in 1994 Dollars	Enrollments		Subsidy		Educational Expenditures		Net Tuition and Fees		Sticker Price		General Subsidy		Individual Student Aid	
	1987	1994	1987	1994	1987	1994	1987	1994	1987	1994	1987	1994	1987	1994
All Institutions	3,274	3,736	8,308	8,002	11,338	11,647	3,030	3,645	4,433	5,749	6,905	5,898	1,403	2,104
All Public	4,649	5,365	8,143	7,618	9,013	8,768	870	1,149	1,555	2,139	7,458	6,629	685	989
All Private	1,740	1,917	8,492	8,432	13,933	14,863	5,441	6,431	7,646	9,780	6,287	5,083	2,205	3,348
Public Institutions														
Decile 1	6,506	6,984	15,210	13,956	16,344	15,669	1,133	1,713	2,159	3,114	14,185	12,555	1,026	1,402
Decile 2	4,677	5,327	10,972	9,748	11,833	10,937	861	1,190	1,783	2,429	10,050	8,508	922	1,239
Decile 3	5,629	6,086	9,524	8,676	10,334	9,849	810	1,172	1,596	2,207	8,738	7,642	785	1,034
Decile 4	5,227	5,770	8,369	8,111	9,266	9,309	897	1,198	1,636	2,233	7,630	7,076	739	1,035
Decile 5	4,539	5,152	7,784	7,492	8,602	8,511	818	1,019	1,486	2,047	7,116	6,464	668	1,028
Decile 6	3,611	4,318	7,290	6,685	8,002	7,658	712	973	1,379	1,899	6,623	5,759	667	926
Decile 7	4,391	5,278	6,562	6,221	7,424	7,286	862	1,065	1,469	1,970	5,955	5,316	608	904
Decile 8	4,332	5,192	5,935	5,698	6,864	6,839	929	1,142	1,454	1,942	5,410	4,897	525	800
Decile 9	3,653	4,582	5,352	5,285	6,144	6,239	792	954	1,306	1,803	4,838	4,435	514	850
Decile 10	3,918	4,962	4,386	4,274	5,274	5,341	888	1,067	1,281	1,740	3,994	3,601	392	673
Private Institutions														
Decile 1	2,661	2,821	21,481	22,959	28,701	30,732	7,221	7,774	10,938	12,682	17,764	18,050	3,717	4,909
Decile 2	1,158	1,234	12,681	12,504	18,132	19,039	5,450	6,535	8,376	11,024	9,756	8,016	2,926	4,489
Decile 3	1,086	1,151	10,433	10,339	15,523	16,507	5,090	6,168	7,607	10,121	7,916	6,386	2,517	3,953
Decile 4	1,579	1,749	9,266	8,625	14,321	14,706	5,055	6,081	7,774	9,867	6,547	4,839	2,719	3,785
Decile 5	1,841	1,977	7,730	7,663	13,359	14,492	5,629	6,828	7,770	10,368	5,589	4,124	2,141	3,540
Decile 6	1,540	1,773	6,948	6,468	11,684	12,196	4,735	5,727	6,807	8,949	4,877	3,246	2,072	3,222
Decile 7	1,928	2,233	5,890	5,444	11,313	11,884	5,423	6,439	7,296	9,426	4,017	2,458	1,873	2,987
Decile 8	1,759	2,014	4,739	4,736	10,048	10,971	5,310	6,235	6,979	8,838	3,070	2,133	1,669	2,603
Decile 9	1,886	2,128	3,708	3,608	8,879	9,459	5,171	5,850	6,491	8,260	2,388	1,199	1,320	2,410
Decile 10	1,953	2,088	1,941	1,852	7,255	8,520	5,314	6,669	6,396	8,243	859	277	1,082	1,575

Note: The panel contains 2,269 institutions, 1,197 public and 1,072 private. Each public decile contains 119 or 120 institutions, and each private decile contains 107 or 108 institutions.

Table 2.2
Real Changes in Costs, Prices, Subsidies, Aid and Enrollment

By Control and Subsidy Decide

1986-87 to 1993-94

in 1994 Dollars	Enrollments	Subsidy	Educational Expenditures	Net Tuition & Fees	Sticker Price	General Subsidy	Individual Student Aid	% of Increase in St'r. Pr. that Raises Net Pr.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All Institutions	462	-306	310	615	1,316	-1,006	701	46.7%
All Public	717	-525	-245	279	584	-829	305	47.8%
All Private	178	-61	930	991	2,134	-1,204	1,144	46.4%
<u>Public Institutions</u>								
Decile 1	477	-1,254	-675	580	955	-1,630	376	60.7%
Decile 2	651	-1,225	-896	329	646	-1,542	317	50.9%
Decile 3	457	-848	-486	362	611	-1,097	249	59.3%
Decile 4	543	-258	43	301	597	-554	296	50.5%
Decile 5	613	-292	-91	201	561	-652	360	35.9%
Decile 6	707	-605	-344	261	520	-864	259	50.2%
Decile 7	887	-342	-138	204	501	-638	297	40.7%
Decile 8	860	-237	-25	212	488	-513	276	43.5%
Decile 9	930	-67	95	162	497	-402	336	32.5%
Decile 10	1,043	-112	67	178	459	-392	281	38.9%
<u>Private Institutions</u>								
Decile 1	161	1,478	2,031	553	1,745	286	1,192	31.7%
Decile 2	76	-177	908	1,085	2,648	-1,740	1,563	41.0%
Decile 3	64	-94	984	1,078	2,514	-1,530	1,436	42.9%
Decile 4	170	-641	385	1,026	2,092	-1,708	1,066	49.0%
Decile 5	137	-67	1,133	1,199	2,598	-1,465	1,398	46.2%
Decile 6	233	-480	512	992	2,143	-1,631	1,151	46.3%
Decile 7	304	-446	571	1,017	2,130	-1,559	1,113	47.7%
Decile 8	255	-3	923	926	1,859	-936	934	49.8%
Decile 9	241	-99	580	679	1,768	-1,189	1,090	38.4%
Decile 10	135	-89	1,265	1,355	1,847	-582	493	73.3%

Table 3
Real Growth in Costs, Prices, Subsidies, Aid and Enrollment

By Control and Subsidy Decile

1386-87 to 1333-34

	Enrollments	Subsidy	Educational Expenditures	Net Tuition & Fees	Sticker Price	General Subsidy	Individual Student Aid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
All Institutions	14.1%	-3.7%	2.7%	20.3%	29.7%	-14.6%	50.0%
All Public	15.4%	-6.4%	-2.7%	32.1%	37.5%	-11.1%	44.5%
All Private	10.2%	-0.7%	6.7%	18.2%	27.9%	-19.2%	51.9%
<u>Public Institutions</u>							
Decile 1	7.3%	-8.2%	-4.1%	51.1%	44.3%	-11.5%	36.6%
Decile 2	13.9%	-11.2%	-7.6%	38.2%	36.2%	-15.3%	34.4%
Decile 3	8.1%	-8.9%	-4.7%	44.7%	38.3%	-12.5%	31.7%
Decile 4	10.4%	-3.1%	0.5%	33.6%	36.5%	-7.3%	40.0%
Decile 5	13.5%	-3.8%	-1.1%	24.6%	37.8%	-9.2%	53.8%
Decile 6	19.6%	-8.3%	-4.3%	36.7%	37.7%	-13.0%	38.9%
Decile 7	20.2%	-5.2%	-1.9%	23.6%	34.1%	-10.7%	48.9%
Decile 8	19.9%	-4.0%	-0.4%	22.8%	33.6%	-9.5%	52.6%
Decile 9	25.5%	-1.2%	1.5%	20.4%	38.1%	-8.3%	65.3%
Decile 10	26.6%	-2.5%	1.3%	20.1%	35.9%	-9.8%	71.6%
<u>Private Institutions</u>							
Decile 1	6.0%	6.9%	7.1%	7.7%	16.0%	1.6%	32.1%
Decile 2	6.5%	-1.4%	5.0%	19.9%	31.6%	-17.8%	53.4%
Decile 3	5.9%	-0.9%	6.3%	21.2%	33.0%	-19.3%	57.0%
Decile 4	10.8%	-6.9%	2.7%	20.3%	26.9%	-26.1%	39.2%
Decile 5	7.4%	-0.9%	8.5%	21.3%	33.4%	-26.2%	65.3%
Decile 6	15.2%	-6.9%	4.4%	21.0%	31.5%	-33.4%	55.5%
Decile 7	15.8%	-7.6%	5.0%	18.7%	29.2%	-38.8%	59.4%
Decile 8	14.5%	-0.1%	9.2%	17.4%	26.6%	-30.5%	55.9%
Decile 9	12.8%	-2.7%	6.5%	13.1%	27.2%	-49.8%	82.5%
Decile 10	6.9%	-4.6%	17.4%	25.5%	28.9%	-67.8%	45.5%

Table 2.4
Real Changes in Costs, Prices, Subsidies, Aid and Enrollment

By Control and Subsidy Decile
 1987-1991, 1991-1994

in 1994 Dollars	Enrollments		Subsidy		Educational Expenditures		Net Tuition and Fees		Sticker Price		General Subsidy		Individual Student Aid		Fraction of Increase in Sticker Price that Raises Net Price	
	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
All Institutions	328	134	-274	-31	61	249	335	281	601	715	-540	-466	266	435	55.7%	39.2%
All Public	513	203	-301	-224	-216	-29	84	195	194	390	-411	-419	110	195	43.4%	50.0%
All Private	121	57	-244	184	370	560	614	376	1,055	1,079	-685	-520	440	703	58.2%	34.9%
Public Institutions																
Decile 1	408	69	-589	-665	-391	-284	198	382	290	665	-681	-949	92	284	68.2%	57.4%
Decile 2	389	262	-720	-505	-658	-238	62	267	141	505	-799	-743	79	238	44.0%	52.8%
Decile 3	377	80	-478	-370	-325	-161	153	209	220	391	-545	-552	67	181	69.4%	53.6%
Decile 4	531	12	-322	64	-251	294	71	230	187	410	-438	-115	116	179	37.9%	56.2%
Decile 5	438	175	-21	-272	4	-95	25	177	163	398	-159	-493	139	221	15.1%	44.4%
Decile 6	474	233	-492	-113	-441	97	52	210	151	369	-592	-272	100	159	34.1%	56.8%
Decile 7	595	292	-172	-170	-124	-13	47	156	181	319	-306	-333	134	163	26.2%	48.9%
Decile 8	617	243	-207	-30	-117	91	91	121	203	285	-320	-194	112	164	44.8%	42.5%
Decile 9	596	334	5	-72	34	61	30	132	155	343	-120	-282	125	211	19.2%	38.5%
Decile 10	707	336	-8	-104	108	-41	116	63	251	209	-143	-250	135	146	46.2%	30.1%
Private Institutions																
Decile 1	103	58	-71	1,549	835	1,196	906	-353	1,195	550	-360	646	289	903	75.8%	-64.2%
Decile 2	104	-28	-743	566	-323	1,231	420	664	862	1,786	-1,185	-555	442	1,121	48.8%	37.2%
Decile 3	43	22	-308	214	356	628	664	414	1,200	1,314	-844	-686	536	899	55.3%	31.5%
Decile 4	125	45	-614	-28	-4	389	610	416	1,033	1,060	-1,037	-671	423	643	59.0%	39.3%
Decile 5	84	52	-14	-53	670	462	684	516	1,356	1,242	-686	-780	672	726	50.4%	41.5%
Decile 6	159	74	-375	-105	165	347	539	453	1,002	1,141	-837	-794	463	688	53.8%	39.7%
Decile 7	180	124	-340	-105	316	255	656	360	1,118	1,012	-802	-757	462	651	58.7%	35.6%
Decile 8	198	57	96	-99	637	286	541	384	1,031	828	-393	-543	490	444	52.5%	46.4%
Decile 9	163	78	-270	171	137	443	407	271	797	971	-660	-529	390	700	51.1%	27.9%
Decile 10	52	84	195	-284	908	357	713	642	954	893	-46	-536	241	252	74.8%	71.8%

Table 2.5
Real Annualized Growth in Costs, Prices, Subsidies, Aid and Enrollment
By Control and Subsidy Decile
1987-1991, 1991-1994

	Enrollments		Subsidy		Educational Expenditures		Net Tuition and Fees		Sticker Price		General Subsidy		Individual Student Aid	
	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994	1987-1991	1991-1994
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
All Institutions	2.4%	1.2%	-0.8%	-0.1%	0.1%	0.7%	2.7%	2.7%	3.2%	4.5%	-2.0%	-2.5%	4.4%	8.0%
All Public	2.7%	1.3%	-0.9%	-1.0%	-0.6%	-0.1%	2.3%	6.4%	3.0%	6.9%	-1.4%	-2.0%	3.8%	7.6%
All Private	1.7%	1.0%	-0.7%	0.7%	0.7%	1.3%	2.7%	2.0%	3.3%	4.0%	-2.8%	-3.2%	4.7%	8.2%
Public Institutions														
Decile 1	1.5%	0.3%	-1.0%	-1.5%	-0.6%	-0.6%	4.1%	8.8%	3.2%	8.3%	-1.2%	-2.4%	2.2%	7.8%
Decile 2	2.0%	1.7%	-1.7%	-1.7%	-1.4%	-0.7%	1.8%	8.8%	1.9%	8.1%	-2.0%	-2.8%	2.1%	7.4%
Decile 3	1.6%	0.4%	-1.3%	-1.4%	-0.8%	-0.5%	4.4%	6.8%	3.3%	6.7%	-1.6%	-2.3%	2.1%	6.6%
Decile 4	2.4%	0.1%	-1.0%	0.3%	-0.7%	1.1%	1.9%	7.4%	2.7%	7.0%	-1.5%	-0.5%	3.7%	6.6%
Decile 5	2.3%	1.2%	-0.1%	-1.2%	0.0%	-0.4%	0.7%	6.6%	2.6%	7.5%	-0.6%	-2.4%	4.8%	8.4%
Decile 6	3.1%	1.9%	-1.7%	-0.6%	-1.4%	0.4%	1.8%	8.4%	2.6%	7.5%	-2.3%	-1.5%	3.5%	6.5%
Decile 7	3.2%	1.9%	-0.7%	-0.9%	-0.4%	-0.1%	1.3%	5.4%	3.0%	6.1%	-1.3%	-2.0%	5.1%	6.8%
Decile 8	3.4%	1.6%	-0.9%	-0.2%	-0.4%	0.4%	2.4%	3.8%	3.3%	5.4%	-1.5%	-1.3%	5.0%	7.9%
Decile 9	3.9%	2.6%	0.0%	-0.4%	0.1%	0.3%	0.9%	5.1%	2.8%	7.3%	-0.6%	-2.0%	5.6%	10.0%
Decile 10	4.2%	2.4%	0.0%	-0.8%	0.5%	-0.3%	3.1%	2.0%	4.6%	4.4%	-0.9%	-2.2%	7.7%	8.5%
Private Institutions														
Decile 1	1.0%	0.7%	-0.1%	2.4%	0.7%	1.3%	3.0%	-1.5%	2.6%	1.5%	-0.5%	1.2%	1.9%	7.0%
Decile 2	2.2%	-0.7%	-1.5%	1.6%	-0.4%	2.3%	1.9%	3.6%	2.5%	6.1%	-3.2%	-2.2%	3.6%	10.1%
Decile 3	1.0%	0.6%	-0.7%	0.7%	0.6%	1.3%	3.1%	2.3%	3.7%	4.7%	-2.8%	-3.3%	4.9%	9.0%
Decile 4	1.9%	0.9%	-1.7%	-0.1%	0.0%	0.9%	2.9%	2.4%	3.2%	3.9%	-4.2%	-4.2%	3.7%	6.4%
Decile 5	1.1%	0.9%	0.0%	-0.2%	1.2%	1.1%	2.9%	2.7%	4.1%	4.3%	-3.2%	-5.6%	7.1%	8.0%
Decile 6	2.5%	1.4%	-1.4%	-0.5%	0.4%	1.0%	2.7%	2.8%	3.5%	4.7%	-4.6%	-7.0%	5.2%	8.3%
Decile 7	2.3%	1.9%	-1.5%	-0.6%	0.7%	0.7%	2.9%	1.9%	3.6%	3.9%	-5.4%	-8.6%	5.7%	8.5%
Decile 8	2.7%	1.0%	0.5%	-0.7%	1.5%	0.9%	2.5%	2.1%	3.5%	3.3%	-3.4%	-7.3%	6.6%	6.4%
Decile 9	2.1%	1.3%	-1.9%	1.6%	0.4%	1.6%	1.9%	1.6%	2.9%	4.3%	-7.8%	-11.5%	6.7%	12.1%
Decile 10	0.7%	1.4%	2.4%	-4.6%	3.0%	1.4%	3.2%	3.4%	3.5%	3.9%	-1.4%	-30.2%	5.1%	6.0%