

The Economics of Higher Education

By Michael L. Whalen

Division of Planning & Budget

Reprinted from

Cornell University
2004-05 Financial Plan

May 2004

The logo consists of a solid red square with the word "CORNELL" written in white, uppercase, serif font, centered within the square.

CORNELL

THE ECONOMICS OF HIGHER EDUCATION

INTRODUCTION

The twentieth century witnessed the evolution of the college degree from a luxury to a necessity—the capstone of a series of academic experiences that ready an individual for a fulfilling life in a complex and demanding society. That preparation leads not only to a better economic future but also provides the individual with a richer understanding and appreciation of the world and human society. The process of completing a higher education—highly dependent on personal initiative—can lead to a pattern of life-long learning.

From an economic point of view, higher education has become an *in demand* commodity. It is also an expensive undertaking, paid for in a complex array of transactions that are replete with direct and indirect subsidies. This seeming opaqueness of higher education's finances coupled with rapid rises in tuition have contributed to a general misunderstanding of the economics of higher education, leading some to charge that colleges and universities are out of control. A few government representatives have even suggested the imposition of tuition price controls.

Higher education's finances *are* complex, and for reasons that spring from the very heart of the enterprise the cost of providing a manually intensive, highly customized education for a student *is* expensive. This article will explore the economics of higher education in the United States (and at Cornell University in particular), focusing primarily on undergraduate education and touching on these interrelated topics:

- the concept and evolution of the modern university, including its relationship to the state and its approach to shared governance (page 2);
- the economic constructs of *cost* (university expenditures), *price* (student charges for tuition, fees, room, board, and related services), and *subsidy*, including financial aid (page 5);
- the cost structure of higher education (page 10);
- the combination of competitive and self-imposed pressures that affect that cost structure (page 12);
- the approaches used to manage the enterprise, control costs, and guide development (page 15); and
- the issues of access and affordability, which include concerns over rising student debt and the economic return on the investment in higher education for both the individual and society (page 18).

CONCEPT OF A UNIVERSITY

The word university derives from the Latin *universum*, which in turn comes from two ancient Indo-European roots: *oino* (meaning one, unique) and *wer* (meaning to turn, bend). Thus a university, like a universe, is a singularity made from many, who turn or bend to form it—a coalescence that reshapes its constituent parts through the very act of coming together. According to the Encyclopædia Britannica:

The modern university evolved from the medieval schools known as *studia generalia*...they were generally recognized places of study open to students from all parts of Europe. ...These early universities were corporations of students and masters, and they received their charters from popes, emperors, and kings. [Universities] were free to govern themselves, provided they taught neither atheism nor heresy. Students and masters together elected their own rectors (presidents). As the price of independence, however, universities had to finance themselves. So teachers charged fees, and, to assure themselves of a livelihood, they had to please their students. [Universities] had no permanent buildings and little corporate property, and they were subject to the loss of dissatisfied students who could migrate to another city and establish a place of study there.

In medieval Bologna the body of instructors was called the *collegium* and the student body the *universitas*. ...In most universities of the later Middle Ages, *collegium* meant an endowed residence hall for students.... The colleges grew strongest at the University of Paris and at the universities of Oxford and Cambridge. Each had colleges in the 13th century, notably Paris' Sorbonne, Oxford's Merton, and Cambridge's Peterhouse. By 1500 few students lived outside colleges. The colleges kept libraries and scientific instruments and offered regular salaries—occasionally chairs—to doctors and tutors who could prepare students to be examined for degrees.

Thus was born the university* as it is known today—a universe of students from varied backgrounds and locations who form a society in order to benefit from

* The word *university* first appears in the English language in this context around the year 1300, in a reference to Oxford that was contained in a description of the life of St. Edmund the Confessor, who went to Oxford to learn arithmetic but switched majors (as undergraduates are wont to do) to divinity: *So at he bigan at Oxenford of diuinite, So noble alosed er nas non in al e vniuersite. ...He bigan so deope desputi of e trinite, at gret wonder me hadde urf al e vniuersite.* In modern English: *So [well] did he undertake theological study at Oxford that no one in the whole university was praised as much as he was. ...He undertook to inquire and debate so deeply about the Trinity that people marvelled throughout the entire university.* (Translated by Andrew Scott Galloway, Cornell University.)

the teaching of scholars who in turn are affiliated with particular colleges. What distinguishes the university from all other forms of education—as true in the twenty-first century as it was in the Middle Ages—is that it must become a universe of both students and ideas, embracing the “all is part of the whole” nature that is at its etymological root. Interestingly, this was the very concept encapsulated in Ezra Cornell’s famous “any student, any study” motto. All intellectual endeavors are fair game for scholarship and study at a university. And while no one institution can cover every topic in depth, being a university means that most topics will be explored. A true university is global in its academic perspective.

The Evolution of Higher Education

While there were similarities among the first European universities, the paths of higher education funding and management have diverged over the ensuing millennium. The Encyclopædia Britannica notes that:

In modern times the nature of higher education around the world has been largely determined by models established in influential countries such as France, Germany, Great Britain, and the United States. ... The Germans were the first to stress the importance of universities as research facilities, and they also created a sense of them as emblems of a national mind. The doctoral degree, or Ph.D., invented in Germany, has gained popularity in systems around the world.

Currently, most of Europe’s higher education institutions are strongly affiliated with government organizations, either through ministerial direction or de facto control exercised via government funding. A recent article in *The Economist* described the cracks that have developed in Europe’s educational façade:

The present picture in Britain may be dismal, but misery is relative. Strolling happily through... British universities, are 12,000 undergraduates from other European Union (EU) countries. Their home universities are in a still worse state: not only more overcrowded, but with barely a vestige of direct teaching. ... In Germany... where professors enjoy the status of tenured civil servants, conditions are frequently dreadful. ... Similar stories come from Spain and Italy, where universities are plagued by rigidity and corruption. ... In effect, universities in these countries have become government-owned degree mills. Their aim is to get the greatest number of young people in and out for the least money and trouble. It is not all gloom and doom. Most countries have islands of excellence: German postgraduate engineering faculties, for example, or the French *grandes écoles*, fiercely competitive and independent. Finland and Holland have largely managed to keep quality up and bureaucracy down. But for the most part, universities in

the larger countries of continental Europe are a dreadful warning of the consequences of nationalisation.

What Differentiates American Universities

The Economist goes on to describe the international view of higher education in the United States:

No wonder, then, that British and European academics cast envious and wondering eyes at the American university system. It manages both quantity and quality: more than 60% of American high school graduates at least start some form of tertiary education. And it keeps standards high, too. The European Commission recently published a painstaking ranking of the world’s best universities... Of the top 50, all but 15 were American. From Europe, only Oxford and Cambridge made it into the top 10; from other EU countries, no university ranks higher than 40.

Why does America succeed where Europe fails? The most important factor is diversity. American higher education is not just more varied, but has less of the crippling snobbery and resentment that accompanies variety in, say, Britain. American universities are also fiercely competitive: for talented staff and students, for donations, for results.... A crucial part of competition is flexibility in setting fee income. Most European countries charge little or nothing. But fees have two beneficial effects. The first is that the university is beholden to nobody in its planning. ... Fees also mean that students are much more motivated. Underpriced goods and services are usually wasted, and university education is no exception. ... But fees will also make students more powerful customers. Teaching at American universities is much better presented than in most European ones. Visiting American students are often startled to attend lectures with no visual aids, out-of-date hand-outs and droning, inaudible speakers. Such complacency will not long survive when customers have a choice.

While this take on U.S. colleges and universities may be overly ebullient, the United States *has* developed a very successful model of higher education. A number of fundamentals differentiate the U.S. approach from that of most of the world.

- *The United States enjoys a heterogeneous mix of public and private, for-profit and not-for-profit entities delivering educational services for highly targeted segments of society.* Almost 6,500 institutions are engaged in higher education in the United States. Of the 4,200 institutions that grant degrees, 41 percent are public, 40 percent are private not-for-profit, and 19 percent are private for-profit entities. Over 300 for-profit entities grant a bachelor’s or higher degree, enrolling over 5 percent of all first-time, full-time freshmen. A recent phenomenon in the U.S. has been the rapid expansion of for-profit

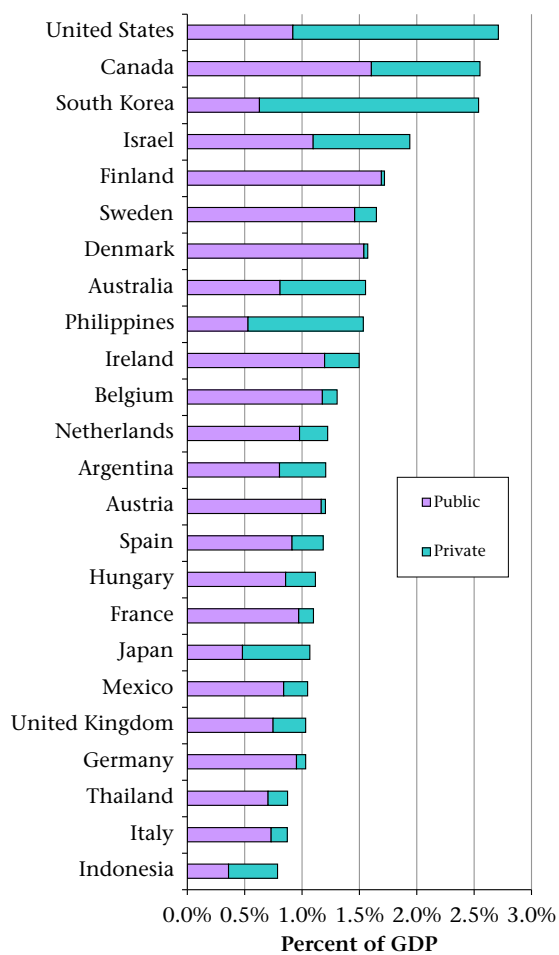
distance learning entities. Led by the University of Phoenix, the largest publicly traded on-line education company, revenues of the top ten of these corporations grew 30 percent in 2003, and total income for all accredited proprietary institutions reached \$15 billion.

- *There is relatively minimal government interference in the academic program of these organizations.* While the federal government is involved in providing student-based financial aid for higher education and funds a significant portion of the cost of university-based research, government control of higher education is largely a state issue. Even at the state level, most academic review occurs in the accreditation process, which is conducted by one of six regional accreditation agencies—private organizations that examine colleges and universities broadly, evaluating each in terms of its own institutional purposes and goals.
- *The U.S. has been liberal in its approach to higher education, allowing each institution to chart its own financial course.* Private institutions enjoy broad freedom and authority in this respect, establishing fee structures, determining compensation approaches, and controlling programs. Even in the case of public institutions, administrators and control boards are authorized to develop programs, allocate resources, hire faculty and staff, and carry out the myriad actions required to run large and complex organizations.
- *Historically, American society has been willing to allocate sufficient funding from a variety of sources to maintain and enhance academic quality in higher education.* As the graph at right demonstrates, the U.S. spends a higher percentage of its gross domestic product on higher (tertiary) education than any other country. And, in marked contrast to many other industrialized nations, about two-thirds of that total comes from private, nongovernmental sources. Spending at this level allows colleges and universities to hire and retain excellent faculty, compete for promising students, remain abreast of technological innovation, and maintain and improve their facilities.
- *An entrepreneurial spirit pervades the educational enterprise, supporting a constructive competition for resources and talent.* Students enjoy immense choice in selecting an institution and are free to move among institutions. Absent are the tracks found

in the higher education systems of some countries that limit a student's course of study (and ultimate career choice). Faculty members are likewise free agents who can move among institutions to advance their careers. Competition is evident and sometimes fierce for the best students, faculty, and staff. Universities vie with one another and other entities for government research funding, foundation support, and in some cases private donations.

These factors result in a system that is organic rather than planned, adapting, albeit gradually, to change and market conditions and allowing program development and curriculum transformation based on faculty design and student demand.

Tertiary-Education Spending as a Percent of Gross Domestic Product (GDP)



Shared Governance

In addition to being a universe of students and ideas, the concept of shared governance also remains from higher education's medieval birth. The level of faculty and student participation in this respect is more pronounced than that found in primary and secondary education and is noticeably different from the decision-making structures of governments and the corporate world. In this regard, the faculty is responsible for most of the academic program (both the curriculum and areas of scholarship), and with few exceptions is the primary force in determining academic cost. (Those exceptions include decisions to embark on new programs that require massive infusions of capital or present unusual liabilities—cases where the administration and the trustees play a much larger role.) Ronald Ehrenberg has suggested three reasons for student involvement in governance:

One objective...is to prepare students for future leadership positions. Participating in campus governance allows them to gain needed experience. Another objective...is to strengthen the ties between the institution and its students so that after they graduate they will become active alumni and contribute to the well-being of the institution and its future students. Finally, given the activism of many students, the failure to provide an official outlet for students to express their views on issues the university faces may lead them to express these views in other ways.

One of the implications of shared governance is its effect on the time element of decision-making. As Ehrenberg has observed:

Academic administrators usually realize the importance of consulting with the faculty. This consultation process often leads to what appears to be an endless series of meetings and discussions. The university is a deliberative organization where rational debate is highly valued, and decisions are typically not reached quickly on major, or even minor, issues.

Higher education's governance, often seen as chaotic, is remarkably adapted to institutional idiosyncrasies, allowing faculty, student, alumni, and other views to be considered as decisions are made (although not always to the full satisfaction of each constituency).

Cornell – The “American University”

In some ways Cornell is the quintessential American university—the archetype that defines the species—combining the heterogeneous mix of elements that characterize U.S. higher education:

- It is a private institution with a public purpose.
- It is fueled somewhat equally from the main revenue sources (students, donors, and governments).
- It values traditions but is impatient for change.
- It relies on shared governance to ensure optimal institutional choices that have broad support.

Frederick Rudolph observed as much in describing the university's founding:

Cornell brought together in creative combination a number of dynamic ideas under circumstances that turned out to be incredibly productive. ...Andrew D. White, its first president, and Ezra Cornell, who gave it his name, turned out to be the developers of the first American university and therefore the agents of revolutionary curricular reform. But, if they had not, others would have. Indeed, the United States has been so costal in its definition of what has happened that even now in Cambridge and Baltimore, New York and Philadelphia, the suggestion that Ithaca, New York, is where the American university was first successfully defined still comes as news.

ECONOMIC CONSTRUCTS

Discussions of the economics of higher education are frequently clouded by the interchangeable use of the terms *cost* and *price* and the hidden nature of the many *subsidies* inherent in education, including *financial aid*. To understand the interaction of these elements it is useful to define them more fully.

Cost of Education

The cost of education encompasses not only expenditures for academic instruction but also a host of academic and nonacademic services, including a rich cultural environment for resident students. There are several factors that make it difficult to isolate the cost of education from other institutional activities.

- First, there is a general commingling of instruction, research, and public service activities at all levels of the institution. Personnel, equipment, facilities, systems—all are often involved simultaneously in more than one mission. Thus the costs are not always recorded separately.
- Second, students derive benefit from being taught by faculty who not only are experts but are engaged through their own scholarship in developing the very knowledge that forms the basis of the curriculum. Students, even undergraduates, par-

ticipate in that development activity. Students also engage in public and community service, often as part of leadership and career development activities. The research and public service activities of the faculty benefit, in turn, from student contact and involvement, especially at the graduate level. Thus, even if the costs were always recorded separately, the cross subsidization of benefits is not.

- Third, there is no accepted method for segregating undergraduate from graduate education, and the question of “who benefits from whom?” is difficult to resolve. Graduate students who intend to remain in academe as a career clearly benefit from the opportunity to hone teaching skills before undergraduate audiences. Undergraduates, in turn, benefit by participating in classes and research where graduate students are present.

A number of attempts have been made to establish the per student cost of providing higher education. In 1995, the economist Gordon C. Winston and his collaborators (herein referred to as “Winston”) described a conceptual framework for computing a fully loaded cost of instruction. Their approach:

- started with all educational and general operating costs (which exclude enterprise activities like housing and dining) for 2,687 institutions;
- removed financial-aid expenditures (as basically price discounts rather than true costs) and mandatory transfers (which largely fund debt service on new and renovated facilities);
- isolated and removed funded research and public service activities (including an appropriate share of overhead costs); and
- added in an approximation of full capital costs.

In adjusting for capital costs, which they estimate add over 40 percent to overall operating costs, Winston proposed that what was needed was:

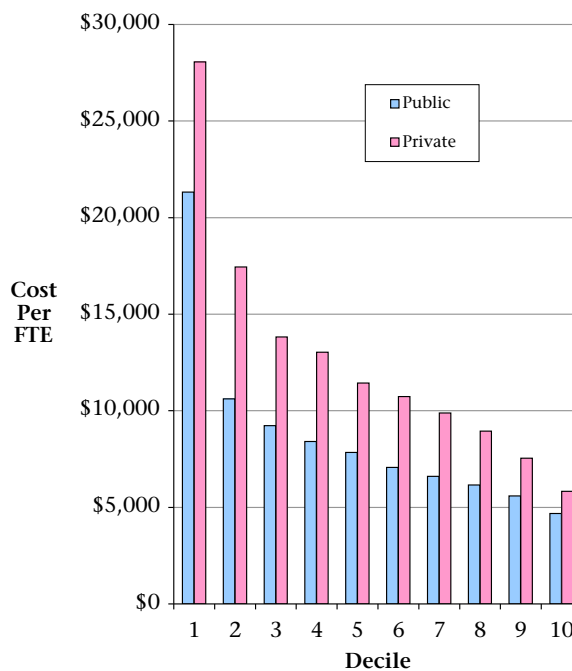
...simply “the rental rate” for the physical capital used in producing education at a given institution—in effect, what it would cost that institution to rent its instructional buildings, equipment, and land for the year from a profit-making entrepreneur in a competitive market. That yearly rent, in turn, will depend on the replacement value of its capital, on its actual yearly depreciation, and on an opportunity cost—the income sacrificed by its owner in having his wealth tied up in physical, rather than financial, capital.

As a surrogate for rental rates Winston:

- estimated depreciation on buildings and equipment at 2.5 percent per year;

1991 Cost of Instruction Per Full-Time Equivalent Student By Decile

(1,386 public and 1,301 private U.S. institutions)



- estimated opportunity costs on buildings, equipment, and land at 8.55 percent per year; and
- multiplied the sum of those two rates times the replacement value of school’s capital stock.

Using data from the U.S. Department of Education, Winston concluded that the average cost of instruction per full-time equivalent student in 1991 was \$10,653, with a range of \$6,508 to \$25,561 from lowest to highest decile. (See graph above.)

Other studies have ignored opportunity costs, and not all authors agree that student financial-aid is always a price discount. Financial aid functions as a discount when it ensures that a school’s enrollment target is met. Less obvious is how to treat financial aid when it is used to shape rather than fill the class, using criteria of merit (to recognize, for example, academic achievement or athletic prowess) or financial need (to expand access based on socioeconomic factors). Some analysts have argued that financial aid used in this sense is not a price discount at all but rather a true, discretionary cost, to be included in the cost of education.

Prices: Sticker and Discounted

Tuition is the price that colleges and universities charge for providing educational services. Economists divide tuition into two types:

- Full tuition, or “sticker price,” is the published rate of tuition. Students who do not receive financial aid in the form of grants pay full tuition.
- Discounted tuition is the effective price paid by students who receive financial aid in the form of grants. (See pages 9 and 10.)

Tuition is by no means the only outlay made in obtaining an education. Students must also pay for room and board, textbooks and other educational materials, travel, and miscellaneous expenses. Taken together these elements are termed the *cost of attendance*.

At each institution some students receive grant aid and some do not. The financial impact of awarding grant aid is to lower gross tuition receipts for the overall student population to a *net tuition*. This net is often expressed on an average, per student basis.

Subsidies: General and Specific

Winston offered a key observation about higher education’s finances vis-à-vis undergraduates:

...[O]ne of the most fundamental anomalies in the economics of higher education is the fact that US colleges and universities sell their primary product—education—at a price that is less than the average cost of its production. The subsidy that gives to nearly every college student in the country is neither temporary nor small nor granted only by government institutions; student subsidies are a permanent feature of the economics of higher education; for the average student they represent a large part of the total costs; and they are only slightly smaller in private than in public institutions.

Winston separated student subsidies into:

- *general subsidies*, which benefit all students, even those who are paying full tuition and receiving no financial aid, and
- *specific or individual subsidies*, which occur when selected students receive financial aid that further lowers the amount that they and their families pay to attend a college or university.

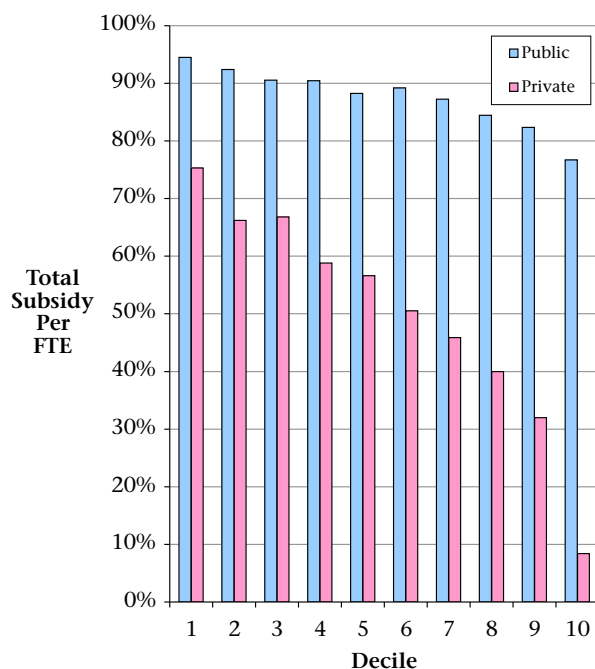
Winston calculated that the average sticker price charged in 1991 was \$4,589. Given a fully loaded cost of instruction that averaged \$10,653, Winston estimated that students received a general subsidy of

\$6,064. Specific subsidies in the form of financial aid averaged \$1,488, and lowered the average sticker price from \$4,589 to a \$3,101 net price. By this calculus, the ratio of sticker price to cost was 43 percent while the ratio of net price to cost was 29 percent. The combination of general and specific subsidies, which averaged 71 percent (90 percent for public institutions and 57 percent for private), was greatest for the highest cost institutions and declined with the decrease in instructional cost. (See graph below.)

Colleges and universities are able to provide both kinds of subsidies (accomplishing the feat of “selling their primary product...at a cost that is less than the average cost of its production”) without disappearing in a financial black hole because of the existence of charitable donations (defined broadly to include government appropriations), which augment the “commercial” revenue of tuition. Winston argued that the “sustainable separation of cost and price—the continuing ability of a college to subsidize all of its customers—is surely a defining economic characteristic of higher education, both public and private.” Winston proposed further that the magnitude of these subsidies

Total Subsidies Per Full-Time Equivalent Student By Decile of Instruction Cost

(1991 data for 2,687 U.S. institutions)



is the factor that allows institutions of higher education to differentiate themselves among their peers:

A hierarchy of institutions results from their 'donative-commercial' revenue sources and from the radical differences among them in their successes—past and present—in raising and accumulating donative resources. These differences in donative wealth, in turn, strongly influence their current commercial circumstances. Schools that get a lot of donated money from endowments and legislatures and gifts can and do sell, in their commercial role, at a lower price or higher quality. So Williams sells its \$65,000 education for a net price of about \$20,000. "The market" for higher education is very different, then, from commercial markets and competitive market forces play out in a much different environment. They may still work, perhaps, but they do so on a strikingly tilted playing field.

It is the presence of sufficient donative resources that allows an institution to be highly selective in admitting students and to provide them with a remarkably rich and textured education. As Winston noted,

Student peer quality is, in terms of educational services, seen to be a genuinely productive input to education. Students who go to school with good students will, *cet. par*, get more/better education than those who go to school with weak students. ...If there is a single implication of the role of peer quality in production, it is that [universities] care about who they sell to because a sale of educational services is, simultaneously, the purchase of an important input to production.

A feedback loop is at work here because student quality is both an output and an input in an economic sense. Students are attracted to an institution in part because of the quality (measured along a number of axes) of their fellow students in residence. As Winston has observed, this is "an input that cannot be bought from anyone other than the school's customers." As a result, "...institutions have strong incentives to care about—to control or influence—who they sell to. The familiar indifferent/anonymous market models of microeconomic theory aren't appropriate." The occurrence of substantial donative resources and the high degree of student selectivity are two of the hallmarks that differentiate premier universities in the U.S. (including Cornell) from those in other countries.

Estimating Costs and Subsidies at Cornell

In order to evaluate the interplay of cost, price, and subsidy at Cornell, a somewhat simplified analysis of the university's 2002-03 expenditures was undertaken. This study limited its focus to the Ithaca campus, setting aside the Medical College and Cornell's subsidiary

components, such as eCornell. The methodology, which is a variation on Winston's approach:

- started with the university's operating costs as reported in the audited financial statements;
- removed certain balance sheet transactions and added the imputed value of employee benefits paid directly by New York State on behalf of some of Cornell's employees;
- removed all capital expenditures and substituted depreciation and interest costs for all physical capital, including facilities used by Cornell that are owned by New York State;
- segregated costs by mission (e.g., instruction, research, etc.) and apportioned administrative and support costs to these direct-cost categories;
- removed the portions of research, public service, and auxiliary service (e.g., residence, dining, campus store, etc.) costs that are recovered via grants, contracts, targeted government appropriations, and user fees;
- added the value of financial aid that is shown as a revenue offset rather than an expense in the financial statements; and
- divided the adjusted sum by the full-time equivalent student enrollment for that year.

This calculation resulted in an average cost of education for all students—undergraduate, graduate, and professional—of about \$43,000 for 2002-03. It is important to keep in mind that this value ignores opportunity costs, includes financial aid as a bona fide expense, and offsets costs for research, public service, and enterprise-like student services only to the extent that there are external payers for such activities. It can be argued that the residual amount of research and other costs that remain embedded in this calculation are legitimate costs of education because they represent the investment of the institution's own resources in these activities (as opposed to the investment by a sponsor or a customer). Cornell spends its own funds in this way, for example on research, because doing so allows the institution to attract a superior caliber of faculty members who involve students directly in those research activities, providing students with a direct benefit from this support.

Including financial aid as part of the cost of education (based on the argument that in Cornell's case, financial aid is used primarily to shape the socioeconomic makeup of the student body rather than to achieve

its overall enrollment target for undergraduates) permits a comparison with tuition as the university's sticker price. Cornell had three primary undergraduate tuition rates in 2002-03, and the average tuition charged, weighted by enrollments in various tuition categories, was \$23,464. The ratio of average undergraduate sticker price to average cost of education was 55 percent in 2002-03. Removing financial aid expenditures from the cost of education lowers the average cost from \$43,000 to \$36,800. Adjusting the average tuition charged to undergraduates for the amount of grant aid those students received produces an average net tuition actually paid of \$17,440. The ratio of average net tuition to adjusted cost of education was 47 percent in that same year. **Viewed either way, students and their families paid about half of the overall cost of a Cornell education in 2002-03.**

Financial Aid – The Special Subsidy

Cornell has a long history of providing financial aid to undergraduates. The first gift-funded student aid came in the form of merit-based prizes. Andrew D. White initiated the concept at Cornell in February 1868 when he offered the university \$1,000 “to be applied to the support and encouragement of meritorious students.” As early as 1879, the university established free scholarships that were to be awarded based on an assessment of financial need and meritorious academic conduct. Amos Padgham created the first endowed scholarship fund in 1892, initiating a trend to create financial-aid endowments that would remain productive and available far into the future.

Currently, Cornell operates under a policy (in box above at right) whereby U.S. citizens and permanent residents are admitted regardless of their ability to pay for the cost of attendance and then are assisted in meeting that cost upon enrollment. Cornell's current practice is to include residents of Canada and Mexico under the umbrella of “U.S. citizens and permanent residents.” Financial aid for international students (other than those from Canada and Mexico) is handled differently, based on a predetermined allocation of resources.

Financial aid awards are based on an assessment of financial need using the College Scholarship Service need analysis. Recently, Cornell adopted the “consensus approach,” which changed the treatment of stu-

Cornell Admissions/Financial-Aid Policy

Cornell University makes admissions decisions without regard to the ability of students or parents to pay educational costs. Students who are U.S. citizens or permanent residents and who demonstrate financial need will be assisted in meeting that need through one or more of the following: federal and state grants, employment opportunities, loans, The Cornell Commitment programs, scholarships from endowments and restricted funds, and Cornell grants. Annual adjustments will be made in self-help and family contribution levels.

Cornell will continue its commitment to excellence and diversity in the student population. Self-help levels for individual students may reflect the University's recognition of outstanding merit, unique talent, commitment to work and community service, and its commitment to diversity in the class.

– Adopted by the Cornell University Board of Trustees
March 1998

dent and family assets (such as a family residence) in a way that is more favorable to middle-income families. The needs analysis follows five steps:

- First, the university determines the typical *cost of attendance* for a student during the academic year. This cost varies by tuition rate between endowed Ithaca and contract colleges and between New York State residents and nonresidents in the contract colleges. Tuition also varies for students enrolled in special programs, such as Cornell Abroad. Room and board rates are based on typical on-campus residency and use of Cornell dining services, even when students live off campus. The differential cost of living when studying abroad is also taken into consideration in the calculation. The cost of attendance includes provision for the purchase of books, travel to and from Cornell, and other miscellaneous expenses.
- Second, the *family contribution* is determined. The family contribution is composed of the *parental contribution*—the amount that the student's parents should be able to afford to pay based on an assessment of income and family assets—and a *student contribution* that is based on student assets and how much the student should be able to earn from summer employment. The difference between the cost of attendance and the family contribution becomes the student's *financial need*.
- Third, financial need is adjusted for certain external sources of support, such as federal Pell grants

and New York State TAP awards, that can be applied to pay that cost.

- Fourth, financial need is then adjusted for student *self-help*. Self-help represents the amount of the cost of attendance that a student should cover by a combination of student loans and academic-year work. The federal government subsidizes both components of loan and work/study.
- Finally, the cost of attendance not met by family contribution, external sources, and student self-help is covered by university *grant aid*, which comes from endowments and gifts as well as the institution's general unrestricted operating budget.

About 48 percent of all undergraduates demonstrate some financial need, and about 39 percent are awarded subsidized loans, work/study opportunities, and grant aid (the other 9 percent receive loans and work/study but no grant aid). Cornell will spend over \$102 million on undergraduate financial aid from its own resources in 2004-05, 93 percent of which will provide grant aid to about 5,500 students.

COST STRUCTURE

Most U.S. colleges and universities engage in three primary missions: instruction, research, and public service. As the graph at right shows, general operating expenditures for the nation's colleges and universities generally increased on an inflation-adjusted, per student basis for most of the twentieth century. *[This analysis included a more comprehensive set of institutions (about 4,000) than the 2,687 in the Winston study cited earlier. Also, this analysis focused on operating costs and ignored capital and opportunity costs, which Winston estimated added more than 40 percent to total costs.]*

- The cost of education was defined to include instructional activity and support, such as libraries, as well as a proportionate share of administrative and physical plant operating costs. By this measure educational costs have increased almost three-fold in inflation-adjusted terms since 1930.
- The volume of organized research and public service activities each increased seven-fold on this per-student basis. For the most part, organized research, which is funded through sponsored grants and contracts, saw dramatic growth in the post-World War II era, with a decrease in that growth rate since the 1960s. The corresponding growth in

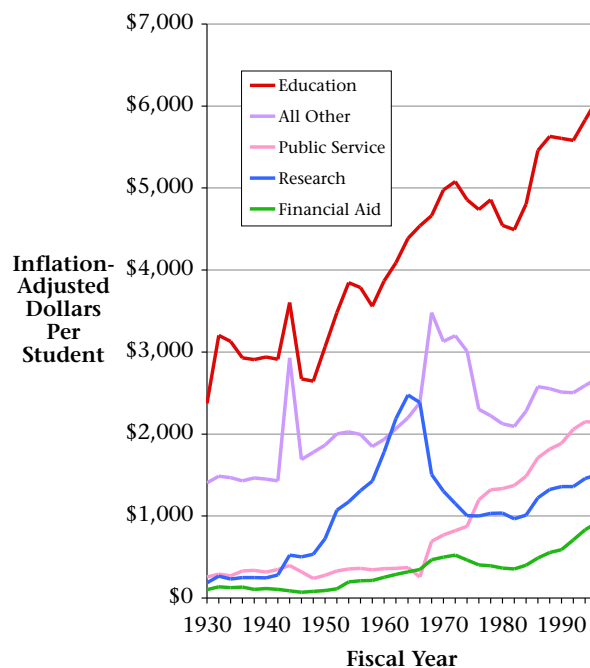
public service activities since the 1960s represents increased expenditures in university-administered hospitals and health-care activities.

- Institutional outlays for student financial aid have experienced the greatest growth rate, increasing eight-fold per student since 1930, with almost all of that expansion occurring since the 1960s.

From 1930 through 1996, the U.S. saw a twelve-fold increase in college enrollment, from 1.1 million to 14.3 million students. While there was an absolute drop in enrollment during World War II and a slight dip during the Vietnam War, this influx of students posed a challenge for higher education in the U.S., which responded in several ways:

- The number of degree-granting institutions grew from about 1,400 in 1930 to about 4,200 currently.
- The number of students per institution, and hence the size of those organizations, also increased.
- The ratio of students to faculty increased, although it has decreased since the 1970s. (See graph at the top of page 11.) While increasing the student/faculty ratio might be viewed as a positive productivity measure, it is often judged as

**General Operating Expenditures Per Student
U.S. Degree-Granting Institutions**
(in inflation-adjusted, 1995-96 dollars)



detrimental to the academic endeavor by students, faculty, and the assessors of quality, such as accrediting agencies and rankings magazines and guides.

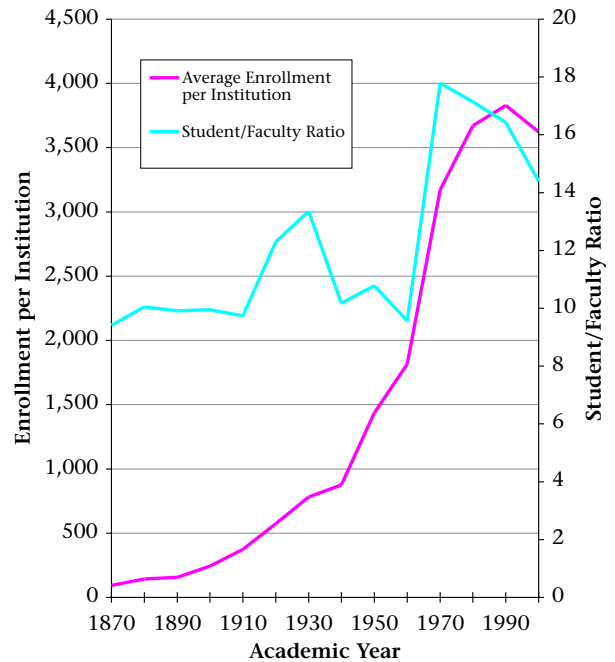
These changes transformed higher education from a “cottage industry” to a significant economic endeavor. Attending college and earning at least a bachelors degree became a more universal aspiration, albeit a more expensive undertaking.

Cornell’s Cost Structure

The graphs below summarize both the costs of operating Cornell’s Ithaca campus and the revenue streams that support those costs. Not reflected in these graphs are the roughly \$150 million to \$200 million of capital expenditures that are made annually on the Ithaca campus, which are borne directly by gifts, sponsored programs, and special state appropriations or are amortized with debt.

- The colleges, research centers, and other academic programs and services (including the library system) constitute two-thirds of all operating costs. The remaining third is devoted to undergraduate and graduate student financial aid (11.8 percent), administrative and support services (7.5 percent), student services (7.1 percent), and operation and maintenance of the physical plant (7.5 percent).
- As the graph at the top of page 12 shows, employee costs (salaries, wages, and employee benefits) dominate, constituting 58 percent of the total in 2002-03. Employee benefits paid directly by

Average Enrollments and Student/Faculty Ratios – U.S. Degree-Granting Institutions

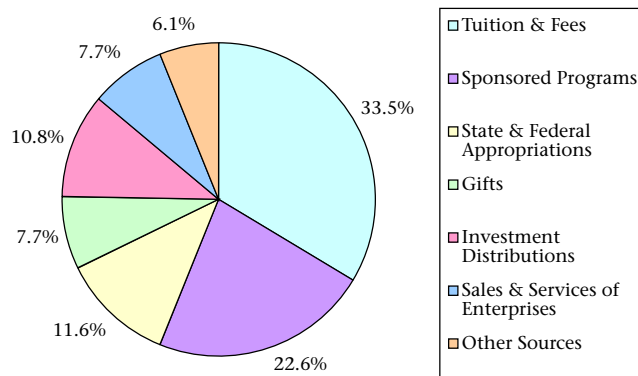


New York State on behalf of certain contract college employees are not reflected in these graphs because they are not recorded on Cornell’s books. If added, employee costs would account for 60 percent of the revised total operating costs, a ratio that equals the higher education industry average for this relationship.

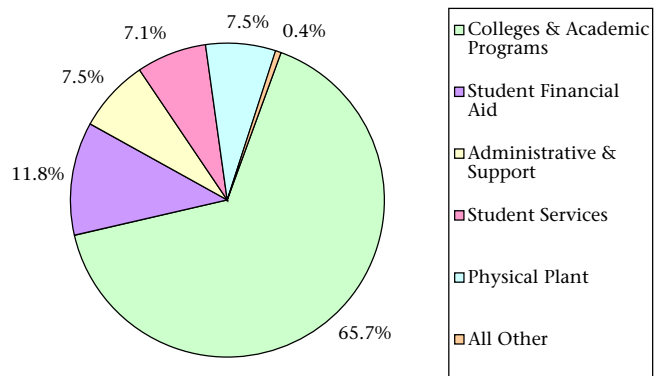
- Over the period of 1970-71 through 2002-03,

Ithaca Campus – 2002-03 Operating Revenues and Expenditures

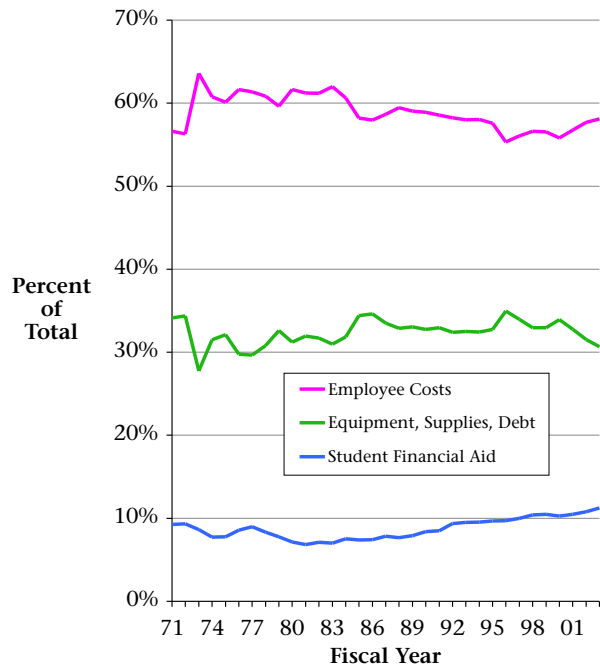
Revenues – \$1.419 Billion



Expenditures – \$1.331 Billion



Ithaca Campus – Ratios of Major Operating Expenditure Categories



employee costs have decreased as a percent of total operating costs while expenditures for equipment, supplies, materials, and debt service on capital construction have remained somewhat constant, at about one-third of total costs. Financial-aid costs as a percentage of the total operating expense pattern have grown over this period, reflecting the institution’s commitment to offset higher attendance costs for needy students as well as enhanced support for graduate students.

Relationships to Revenue Streams

The cost structure of Cornell University’s Ithaca campus is related directly to the pattern of revenues.

- Educational costs are paid largely by tuition and fee revenues (shown in the pie charts on page 11 as gross, without adjustment for financial-aid costs), substantial portions of gifts and investment distributions, a small fraction of sponsored programs funding, a portion of state appropriations, and other sources.
- Organized research and public service are supported primarily by sponsored programs (grant and contract) funding, government appropriations,

gifts, and investment distributions.

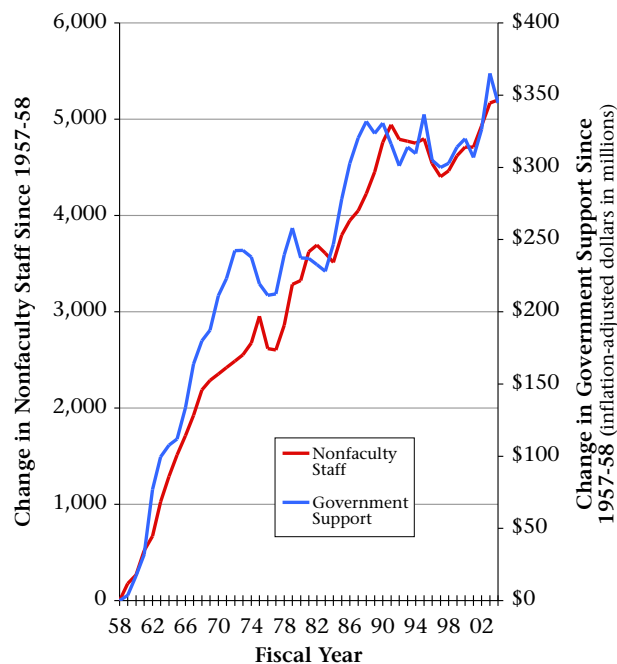
- Over half of all financial-aid costs come from tuition revenues; the remainder come from gifts, investment distributions, and sponsored programs (primarily for graduate students).

Given these dependent relationships it is not surprising that expenditure patterns react directly to changes in specific revenue streams. A clear example of this phenomenon is the change in overall non-faculty staff employment on the Ithaca campus in relation to the periodic growth and decline in operating revenues that come from government agencies (either as appropriations or in the form of grants and contracts), where there is strong correlative pattern subject to a two to three-year reaction delay. (See graph below.)

COST PRESSURES

The pattern of higher education expenditure changes over time in response to three primary cost drivers: inflation, competition, and innovation.

Ithaca Campus – Change in Nonfaculty Staffing Levels and Government Support



Inflation

While the concept that the purchasing power of money can change over time is generally familiar, measuring that dynamic is not simple. Some of the most common inflation-measuring indexes are:

- the *Consumer Price Index* (CPI), which measures inflation in day-to-day living expenses;
- the *Producer Price Index* (PPI), which measures inflation at the wholesale price level;
- the *Employment Cost Index* (ECI), which measures inflation in the labor market; and
- the *Gross National Product Implicit Price Deflator* (GDP-Deflator), which measures the inflationary experience of the nation at large.

Besides these general indexes there are many specialized measures, such as the Higher Education Price Index (HEPI), that focus on particular activities. The difficulty in relating general inflationary indexes to specific activities is the potential mismatch between the elements being measured. For example, the CPI tracks the following goods and services:

Food	15.4%
Housing	42.1%
Apparel	4.0%
Transportation	16.9%
Medical Care	6.1%
Recreation	5.9%
Education	5.9%
Other	3.7%
Total	100.0%

HEPI's categories differ significantly:

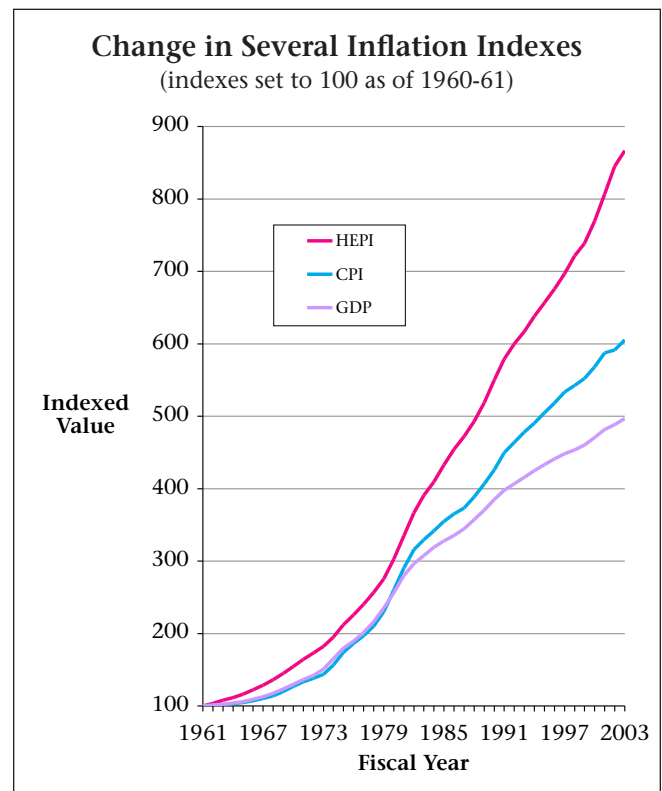
Staff Salaries & Wages	62.3%
Employee Benefits	12.5%
Contracted Services	7.7%
Supplies & Materials	4.4%
Equipment	2.8%
Library Acquisitions	2.5%
Utilities	7.8%
Total	100.0%

The relative change in three of these indexes—HEPI, CPI, and GDP-Deflator—is shown in the graph at right. Since 1960-61, the inflationary pressure on higher education has been 43 percent greater than that felt by consumers and 74 percent greater than that experienced in the production of all U.S. goods and services. It is hardly surprising that colleges and universities experience inflation differently from consumers at large.

Competition

The competition among U.S. colleges and universities for students, faculty members, and resources is fierce, especially in Cornell's peer group. The competition for students expresses itself financially in many ways.

- Graduate students, especially doctoral candidates, are often funded for the full cost of their tuition and fees and receive stipends to help offset living expenses while enrolled. In some science and engineering fields these stipends approach \$30,000 for the academic year, as Cornell vies with other research universities to attract the very best students. The university has enhanced minimum stipend levels for all graduate students, including a 10 percent increase scheduled for 2004-05, and has added health insurance coverage (at an annual cost of over \$2 million) to its portfolio of benefits provided to fellowship and assistantship holders.
- While Cornell administers need-based financial aid for undergraduates, the institution has discretion to set family contribution expectations, student self-help levels, and to apply a mix of loans, work/study, and grant resources to meet institutional obligations. Other universities have altered their financial-aid policies to reduce or eliminate



loan, work/study, and/or parental contributions, substituting additional grant funding. The financial magnitude of such changes can be significant at Cornell, given its relatively large undergraduate population. For example, Cornell would have to increase its undergraduate grant-aid budget by \$5 million to match Harvard's recent announcement that it was eliminating parental contributions for families where family income falls below \$40,000. (Harvard, with an endowment that is seven times larger than Cornell's on a per student basis, estimated the impact on its budget at \$2 million.)

- Students come to Cornell with expectations for a quality academic environment, a comprehensive library system, well-maintained facilities and grounds, access to a variety of cultural and entertainment events, and a set of services and support (including health-care and athletic programs, high-speed Internet access and computer support, and career placement services). While any one of these elements is often not a deciding factor influencing a student's decision to enroll, taken together they define how Cornell is known and viewed by prospective students. To remain competitive the university must dedicate sufficient resources to maintain them all and to make incremental advancements in some. For example, it costs about \$58 million annually to operate the Ithaca campus library system, \$123 million to operate and maintain facilities and grounds, \$83 million to provide residential and dining services, and \$10 million to underwrite health-care services that are not covered by health insurance.

The competition for faculty takes several forms.

- *Faculty salaries* – Salaries become competitive: (a) at the point of hire, when an applicant may be considering competing offers; (b) at a point of retention, where an incumbent is being wooed by another institution; and (c) during the annual salary increase for all faculty, where the university's average faculty salary vis-à-vis its peers' affects the institution's ability to attract and retain faculty. Faculty salaries increase in all three situations, the first two having small incremental impacts and the third having a more significant effect.
- *Support for spouses and partners* – An important issue in the hiring of new faculty and, increasingly, in the retention of existing faculty, is the provision of support for spouses and partners. This

becomes more significant for rural campuses, like Cornell's, where there are limited opportunities for professional employment in the immediate region. Colleges and universities respond by creating jobs on campus or through partnerships with local companies and organizations, subsidizing or paying in total the cost of such employment.

- *Faculty start-up packages* – A major component in faculty hiring is the provision of a start-up package that may include a signing bonus, graduate student support, renovation of space, purchase of equipment, funding for travel and publication, and housing subsidies (in major urban areas). Start-up packages in the sciences and engineering frequently exceed \$1 million.
- *Increasing diversity* – Cornell is committed to increasing the diversity of its faculty. In doing so, the institution faces a three-fold challenge:
 - the limited number of Ph.D.'s being awarded to women and minority students in some disciplines (a pipeline issue);
 - the practice by institutions of overcoming the first limitation by raiding each other's existing faculty (a local optimization solution); and
 - the elimination of mandatory faculty retirement combined with the age distribution of Cornell's faculty where 20 percent are over the age of 60 and 93 percent of these are white.

The *Journal of Blacks in Higher Education* reports that the percentage of doctoral degrees awarded to blacks in 2002 reached an all-time high (6.3 percent of all doctorates awarded to U.S. citizens). Yet there continue to be great differences between blacks and whites in terms of the disciplines where degrees are earned. For example, about 40 percent of all doctorates awarded to blacks are in the field of education, with relatively fewer degrees being earned in the sciences and engineering. Cornell is addressing the pipeline issue by encouraging women and minorities to apply to college and follow a career path that leads to an advanced degree. The university has spent \$6 million over the past five years to prefill faculty positions with women and minorities. A postdoctoral fellows program brings three promising minority scholars on campus, providing them with the opportunity to move into faculty positions. And Cornell's network of services for women and minorities helps increase faculty retention.

Innovation

Perhaps the most significant competitive challenge that Cornell and its peers face is the sheer cost of innovation. Research is one of the university's core missions. Unlike the research and development divisions of commercial enterprises, universities devote time and resources to discoveries that often do not have immediate application and payback. And with the exception of certain patentable concepts and products, universities give their findings away for free, benefiting U.S. society and the world at large. The cost impact of innovation appears in many ways.

- The subject matter in all fields of academic inquiry is evolving and expanding constantly. The cost of merely keeping abreast is noticeable, and when an institution wants to help lead the way it must commit substantial resources to the endeavor. For example, as part of an effort to enhance progress in enabling research areas, Cornell created the Life Sciences Initiative, which will support current and future advances in biology, chemistry, and physics as they may be applied in understanding, conserving, and utilizing biological diversity. Included in this undertaking will be over \$400 million in capital improvements and a plan to hire 20 new faculty members in biomedical engineering, computer and information sciences, and genomics.
- In an ever-expanding universe of knowledge and ideas, libraries must increase the span of their collections. Cornell's library system purchased or was given 248,949 printed volumes in 2002-03. It also sold or disposed of 89,732, leaving a net addition of 159,217 volumes, or 2.2 percent. In the same year, the library system added 4,310 non-book materials (such as maps, movies, and tape recordings), 42,946 microforms, and 1,181 cubic feet of manuscript materials. Acquisition costs for these materials totaled \$14.8 million in 2002-03, and they occupied an additional 3 miles of the library's total inventory of 185 miles of shelving space.
- University buildings, which are often multipurpose facilities, are expensive to construct and maintain. Duffield Hall, which is typical of a high-technology research and teaching building, will cost \$588 per gross square foot to construct and fit out with necessary equipment, appurtenances, and services. The proposed life sciences facility mentioned above will exceed \$500 per

gross square foot while a new building to support the College of Architecture, Art and Planning is projected to cost about \$425 per gross square foot.

- Innovation in the application of computer systems and technology to research and education is another costly area. Research-related technology is expensive in the sciences and engineering because of the experimental nature of most activities, which limits the use of off-the-shelf components. The hardware and software used in such research is often constructed or highly modified on-site. Technology-rich classrooms and lecture halls are quickly becoming the norm in newly constructed or renovated facilities such as the Statler Hall Beck Center where \$16.3 million is being spent to create superior learning environments. Finally, the infrastructure that constitutes Cornell's campus network and connects it to the Internet costs \$8.6 million annually to operate and maintain. The gradual upgrade of that wiring plant to increase speed and bandwidth is projected to cost \$68 million.

Universities commit to these undertakings because the development of new knowledge is a primary mission. Sharing the process and the outcome of discovery with students is of paramount importance—as an element of pedagogy and a prelude to developing the next generation of faculty. For that reason, universities commingle education and research activities in the same facilities, often paying a premium over what single-use structures would cost. The result at a research university, however, is an educational experience that is comprehensive, demanding, and highly customized to fit the student's career choice.

MANAGEMENT AND COST CONTROL

Managing a research university is a challenge, given its large size, semi-decentralized governance, hundreds of revenue streams, and various outputs and products. The long-established tradition of faculty participation in decision-making coupled with a general expectation that consensus should precede the implementation of major changes conspires to cast such universities as ungoverned, ungovernable, or both. Much of the national debate over college tuition and higher education costs reflects an underlying lack of confidence by some in the administration of higher education.

Controlling Costs – Up and Down

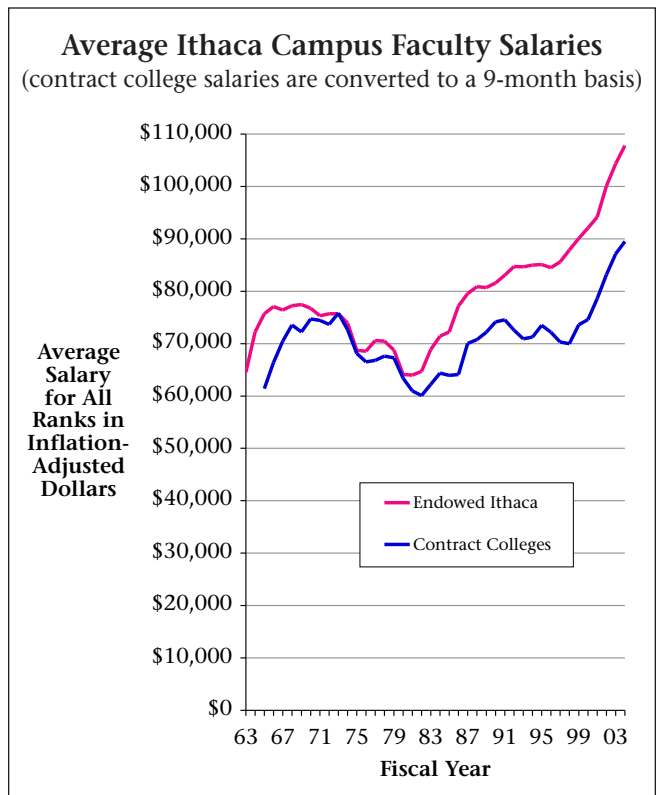
In evaluating the adequacy of institutional management, it is important to remember that cost control does not always result in the lowering of costs. For example, Cornell is currently increasing selected expenditure categories:

- *Faculty Salaries* – As the graph below at right shows, the cost of faculty salaries has grown substantially, in inflation-adjusted terms, over the past few years. Several years ago, the Faculty Senate, the academic deans, and the university administration identified two sets of peer research universities—one for the endowed Ithaca colleges and one for the contract colleges—to serve as faculty salary reference points. A goal was set to increase Cornell’s faculty salaries over a five to six-year time frame so that, on average, they equal the means of these peer groups. As of 2003-04, Cornell has moved within 1 percentage point of these peer-group means (not shown in this graph).
- *Financial Aid* – As described earlier, the university commits a significant amount of resources annually to meet the financial-aid costs of its students. Whether viewed as bona fide costs or tuition discounts, these investments have real fiscal impacts. Financial-aid budgets are often increased at or above the growth in tuition rates. For example, Cornell-funded undergraduate grant aid grew 10 percent from 2001-02 to 2002-03 while Cornell’s three primary undergraduate tuition rates increased a weighted average of 6.4 percent.
- *Academic Initiatives* – Cornell recognizes that an academic program flourishes only when there is a process of constant renewal. Accordingly, the university has allocated incremental funding for program enhancements generated by its colleges and their faculties. These projects—which include the creation of a social sciences institute, support for spouses and partners of new faculty, and the installation and upgrade of the audiovisual and computer services in classrooms—will be funded at almost \$10 million in 2004-05.
- *Improved Facilities* – The university is committed to providing its faculty, students, and staff with world-class education, research, and living/learning facilities. Again, the buildings and infrastructure needed to support them are expensive to construct, operate and maintain, and enhance.

Workforce Planning

From an economic point of view, increasing educational expenditures by these and other means while holding enrollment steady will drive up the unit cost of production. Because, as Winston has observed, non-profit universities are striving to maximize excellence or prestige rather than profits, a higher unit cost of production can be desirable as long as it is sustainable. Recently, the university instituted a broad review—entitled “Workforce Planning”—to help balance Cornell’s investments in the academic program. In some sense Workforce Planning is a misnomer as the project has expanded beyond a review of the size and distribution of the nonacademic workforce that was its genesis.

- Launched in November 2001, the effort was triggered by financial pressures on the university’s budget. The project aspects of the initiative will conclude in 2004, however the institutional commitment and focus on improving efficiency and effectiveness in support functions will continue.
- The Workforce Planning team, composed of deans and vice presidents, identified six major areas of nonacademic support that would receive in-depth reviews: human resources, financial transactional processing, alumni affairs and development, facili-

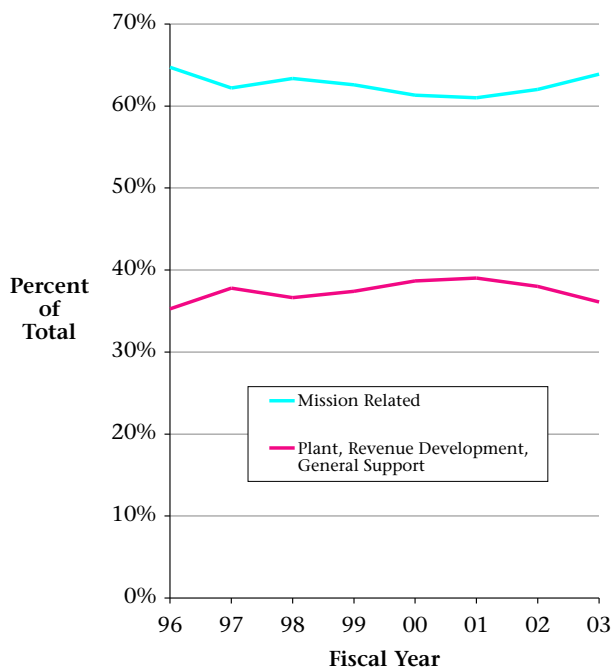


ties, information technology, and student services.

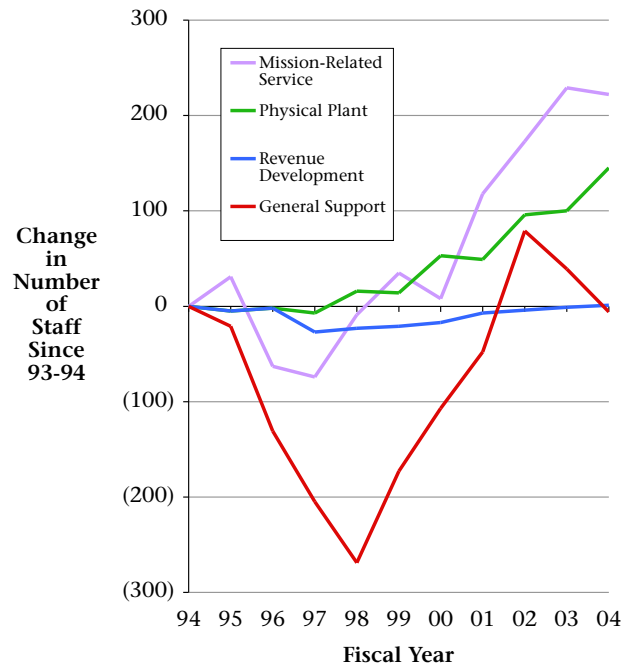
- The team also identified three primary objectives for the initiative on the Ithaca campus:
 - to clearly define roles, responsibilities, standards of performance, and accountabilities within each major administrative function;
 - to realize substantial and ongoing financial savings as well as increased effectiveness and efficiency in support services; and
 - to improve the competitive market-pay position of nonacademic staff.
- Based on a review of staffing data, the university established the goal of identifying \$20 million that could be reallocated for strategic priorities.

To date, the initial review phases of the six original areas have been completed, and because of the positive progress achieved in these functions, two others—the library and related information services and the purchasing function—were added in 2002-03. The university has entered into the implementation phase for human resources, financial transactions, and alumni affairs and development functions, where a revised staffing and organization plan will eliminate redundant effort and provide a more responsive and effective system of support. Departments are being

Relative Proportions of Expenditures by Category – Ithaca Campus



Change in Ithaca Campus Nonacademic Headcounts Since 1993-94



relieved of the burden of transaction-intensive processes, which are being shifted to regional or central processing centers.

The purchasing review has focused on a process called “strategic sourcing,” an effort intended to create savings by improving unit pricing in the purchase of over \$200 million in goods and materials made by the Ithaca campus annually.

Cornell has identified savings in the range of \$6 million to \$7.3 million from Workforce Planning efforts to date and has seen some evidence of a shift in overall expenditures towards the mission-related categories of instruction, research, and public service. (See graph at left.) The makeup of the nonacademic workforce has also changed, with growth in workers who directly support mission-related activities and a recent drop in the number of staff engaged in general support (See graph above.) The growth in the number of staff involved in constructing and maintaining the physical plant has increased in response to additions to the number of buildings and the complexity of their operating systems. And the number of staff involved in revenue development, especially fundraising will increase as Cornell launches its next campaign.

ACCESS AND AFFORDABILITY

The National Commission on the Cost of Higher Education, established by Congress in 1997 to review higher education costs and tuition, recommended:

- that academic institutions intensify their efforts to control costs and increase institutional productivity;
- that the academic community provide...leadership to develop better consumer information about costs and prices and to improve accountability to the general public;
- that governments develop new approaches to academic regulation, ...that emphasize performance instead of compliance, and differentiation in place of standardization;
- that the academic community develop well-coordinated, efficient accrediting processes that relate institutional productivity to effectiveness in improving student learning; and
- that Congress continue ...existing student aid programs and simplify and improve the financial aid delivery system.

In 2003, Representatives Howard P. “Buck” McKeon and John A. Boehner issued a report on what they termed a “college cost crisis.” This review was followed by Representative McKeon’s introduction (later withdrawn) of a bill to institute tuition price controls. The President of the American Council on Education (ACE), David Ward, responded in April 2003, noting that this proposal was problematic for four reasons:

- First, federal price controls...are an inefficient and ineffective tool that has never worked as intended.
- Second, the “sanctions” envisioned...would have the most severe impact on low- and middle-income students...[making] it impossible for them to finance a college education.
- Third, [the proposal would result in] larger classes, fewer seminars, more part-time faculty, and less qualified and less experienced instructors.
- Fourth, [the proposal] ignores the serious revenue pressures facing all public and private colleges and universities. ...in 1980 states provided 46 percent of the operating support for public colleges and universities. By 2000, that amount had fallen to 34 percent...

While Representative McKeon’s proposed solutions may have been misguided, he identified issues that remain of national concern. When Congress amended the Higher Education Act in 1998, it mandated that the National Center for Education Statistics (NCES) undertake three special studies of higher education. The first of these concerned the relationship between tuition increases and the decline in other revenues.

[There was] no close relationship between increases in

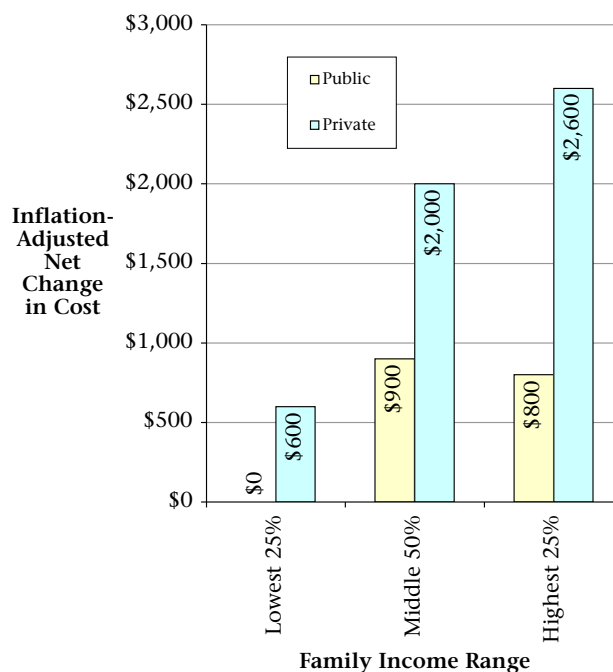
prices and costs during the 1990s... Tuition increased faster than most expenditure categories, including instruction, which is the largest expenditure category at post-secondary institutions. Over the same period the proportion of revenue coming from tuition increased, while other sources of revenue experienced relative decreases (government appropriations for public institutions, endowment income and private gifts for private not-for-profit institutions).

At private non-for-profit 4-year institutions, prices were related to “internal” budget constraints—the increasing cost of institutional aid and average faculty compensation and decreasing revenues from non-tuition resources, such as endowment income. Additionally, private colleges compete for students with comparable private institutions and operate within the context of “external” conditions, such as the availability of state aid, per capita income in the state..., and the price of attending a public institution in the same state. Unlike the public sector, there is no single overriding factor consistently related to tuition or price increases in the private not-for-profit sector.

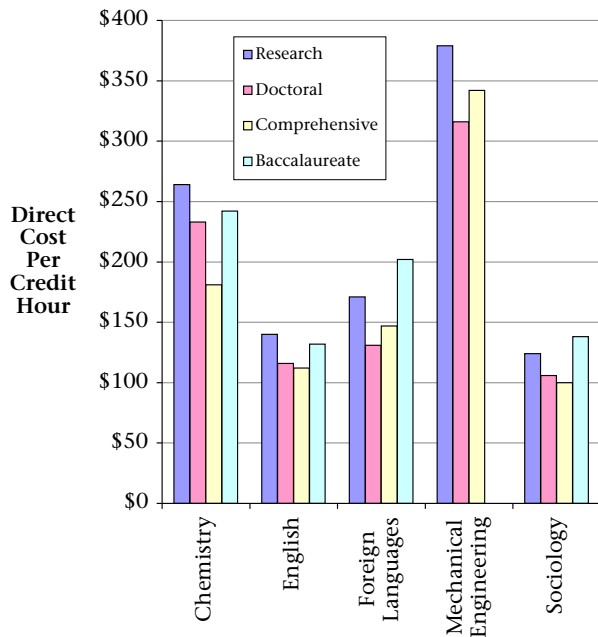
The second NCES finding concerned the financial impact of these tuition increases on students and their families when financial aid is taken into account.

Combined grant aid—state, federal, and institutional—was sufficient to offset increases in price of attendance for low-income undergraduates, those students who had the highest need and were least able to afford to pay for an increase in total price. [See graph below.]

Change Between 1992-93 and 1999-2000 in the Price of Attendance Minus All Grant Aid
(U.S. not-for-profit higher education institutions)



Direct Cost Per Credit Hour by Type of Institution (+300 4-year colleges and universities)



The third NCES report observed that there is “...no strong relationship between cost and price. Price is largely associated with factors external to the institution, while cost is driven by internal... programs and priorities.” Two key findings were that:

...(1) instructional costs of an institution are determined by the disciplinary mix of that institution, and (2) costs vary across disciplines within that institution more than they do within a given discipline... across institutions.

This phenomenon can be seen in the graph above, which displays the average direct costs of instruction per credit hour in 2000-01 for five disciplines taught by over 300 4-year colleges and universities that participated in the study. This report also noted that:

Price (sticker price or tuition) is a constant for all undergraduates at an institution. Chemistry and engineering majors pay the same tuition as English and sociology majors. However, the cost of delivering instruction in those disciplines varies widely.

Economies of scale have the greatest impact on instructional costs. The more student credit hours taught per faculty member, the lower the unit cost. ...Increasing the proportion of tenured faculty—that cadre of faculty that is better compensated and that has reduced teaching loads—will also increase instructional expense. Finally, the study found that introducing or increasing the level of graduate instruction and programs raised instruction costs.

Access and Affordability at Cornell

Cornell charges tuition and provides financial aid in a fashion that balances the institution’s revenue needs—to maintain its status as one of the world’s premier research universities—with the student’s ability to pay. For the period 1966-67 through 2004-05, Cornell’s three main undergraduate tuitions will have grown annually at the following inflation-adjusted rates:

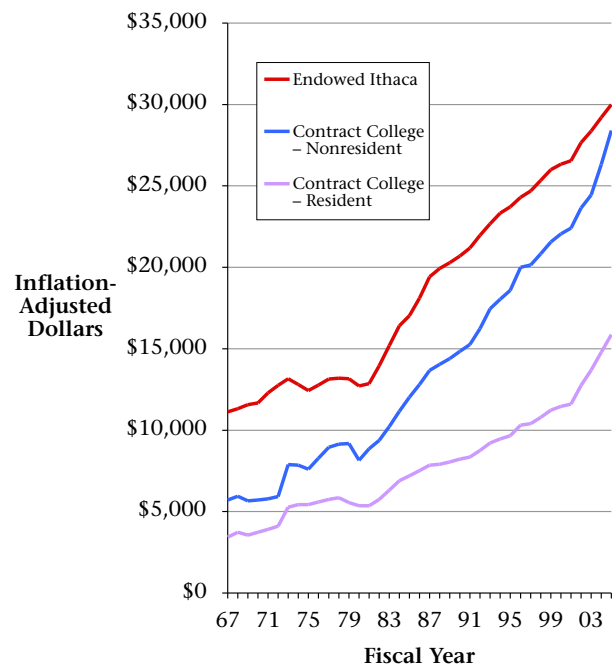
Endowed Ithaca	2.6%
Contract College Resident	4.1%
Contract College Nonresident	4.3%

The graph below shows the compounded effects of these growth rates on tuitions charged. This growth was fairly steady except for three periods:

- During the high-inflation years of the 1970s, tuitions remained flat or declined.
- Through the 1980s, tuitions were increased to recover the purchasing power lost in the 1970s.
- Over the past five years, contract college tuitions experienced step increases to offset the loss of New York State appropriations to those colleges.

Historically, the university was able to keep the tuitions for the contract colleges lower than endowed

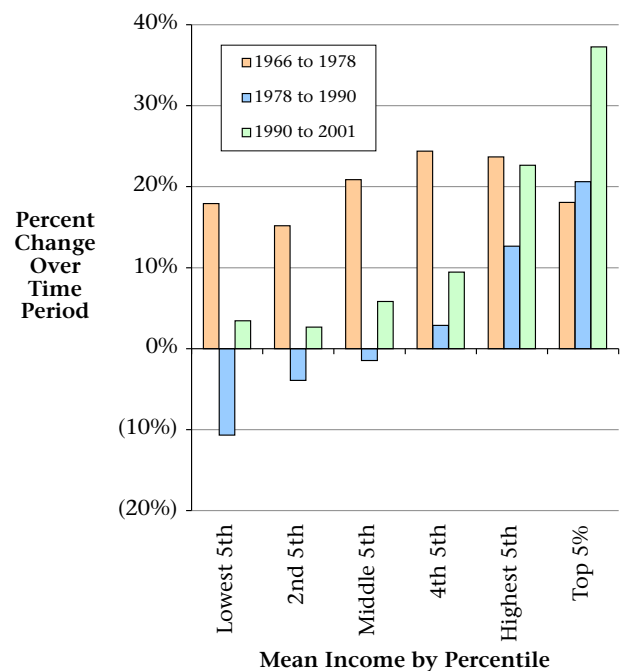
Undergraduate Tuitions (in inflation-adjusted, 2004-05 dollars; assuming inflation remains at 2 percent per year for 2003-04 and 2004-05)



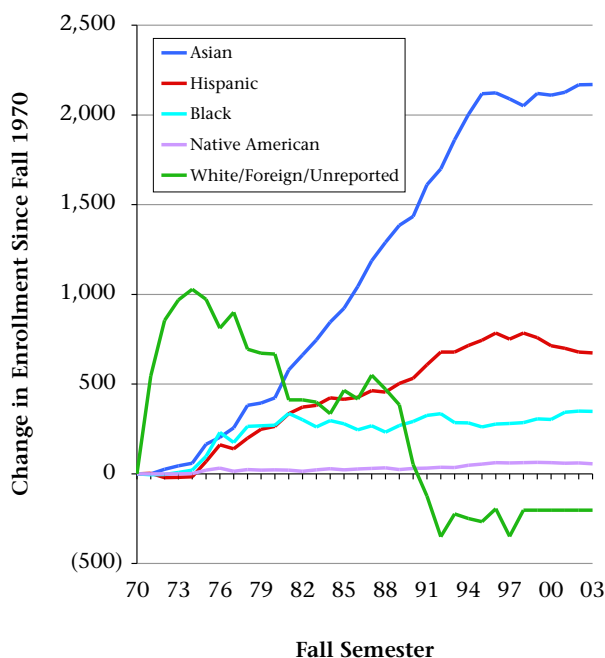
Ithaca tuition because of New York State appropriations, which paid for some (but not all) of the cost of education in those colleges. Since 1970-71, state appropriations have declined from 56 percent to 30 percent of the overall contract college operating budget. These reductions, including recent significant cuts, have forced the university to increase contract college tuitions more steeply than the endowed Ithaca rate.

During the period from the mid-1960s to the mid-1970s, Cornell gradually adopted its current undergraduate admissions and financial-aid policy (as displayed on page 9) in order to diversify the student body, rendering it more representative of the nation's socioeconomic makeup. Cornell intensified its efforts to attract minority applicants, an undertaking that continues today. (See graph below.) Cornell launched this effort during a time of profound changes in the distribution of wealth in the U.S. All segments of society experienced real growth in income in the period 1966 through 1978. Since then, there has been a shift of wealth from the lowest income families to the highest income groups, with the 95th percentile experiencing a 37 percent inflation-adjusted growth in family

Change in Average U.S. Family Income
(in inflation-adjusted terms)



Change in Undergraduate Enrollment at Cornell University (as of the third week of the fall semester; data prior to 1980 interpolated from several sources)



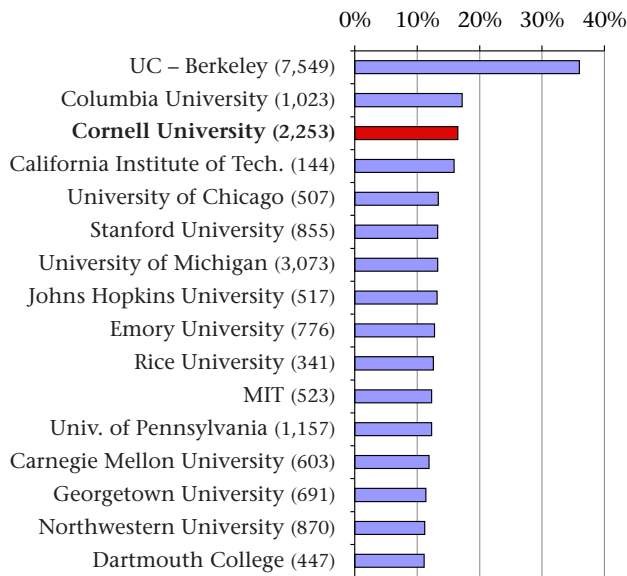
income during the 1990s. (See graph above.)

Cornell's has been successful in increasing the economic diversity of its student body. The graph at the top of page 21, which displays the number and percentage of undergraduates who receive federal Pell grant awards that are distributed to low-income students, shows that the university ranks high among peer research universities in attracting low-income students. Also, the distribution of Pell-grant recipients across Cornell's seven undergraduate colleges is fairly uniform. The graph at the bottom of page 21 uses family income to compare the distribution of Cornell's grant recipient population and the population of U.S. families where the head of the household is between 45 and 54 years old (the age range of the typical undergraduate's parents.) The university's grant-aid population has a higher percentage of low-income students than this segment of the U.S. population. In addition, Cornell awards grant aid to students whose families have a wide variety of incomes (measured by adjusted gross income—AGI—as reported on federal tax returns). Such distributions occur because Cornell's determination of a student's financial need takes into account circumstances such as a family having more

Number and Percentage of Undergraduates Per Institution Who Receive Federal Pell Grant Awards for Low-Income Students

(fall 2001; ranked in descending order of percent)

Percentage of Undergraduate Enrollment



than one dependent in college simultaneously or a significant loss suffered by a family-owned business.

In effect, Cornell's tuition and financial-aid policies ensure that students whose circumstances permit pay full tuition while those who cannot afford the full price pay a proration based on income and other factors. Tuitions are adjusted annually to keep pace with the shift in wealth that has been occurring nationally and financial-aid budgets are increased to ensure that needy students continue to have access to Cornell.

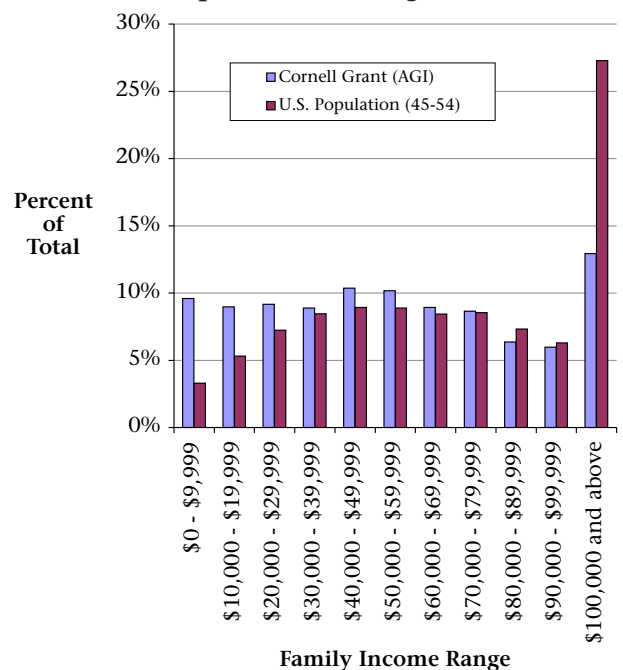
While these admissions and financial-aid policies are designed to encourage racial, ethnic, geographic, and economic diversity, Cornell, like all of its private research university peers, draws a disproportionate share of its undergraduate enrollment from upper income families. (An estimated 72 percent come from families with incomes in excess of \$80,000.) Wealth in the U.S. has a profound influence on all of the factors that predispose a student to be a viable candidate for an institution like Cornell—the quality of the primary and secondary education; parental involvement, encouragement, and advocacy in preparing for higher education; access to tutoring and coaching experiences; and the support needed to participate in sports

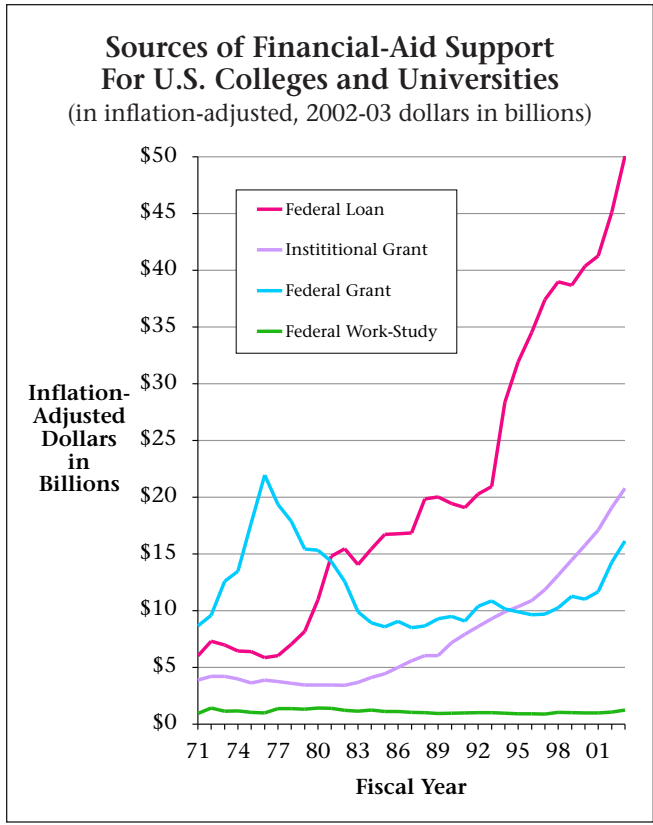
and extracurricular activities. Affluent families expect their children to have a college education and work actively to achieve that goal. Other economic strata of U. S. society do not match their driving success, and the resulting imbalance within of higher education remains a challenge for colleges and universities.

Student Debt

One important factor influencing the finances of many students has been the federal government's substitution of loans for grants. This change came in reaction to burgeoning college enrollments (which more than doubled nationally during the 1960s) compounded by changes in the rate structures of Pell and other federal financial-aid programs, leading to dramatic increases in federal grant-aid appropriations. To stem the appropriation flow and extend financial assistance to students from middle-income families the government introduced subsidized loans in 1966, de-emphasizing grant-aid. As federal grant sources diminished in inflation-adjusted terms, colleges and universities increased grant aid from their own resources. (See graph on page 22.)

Distribution by Family Income Range of The Cornell Grant-Aid Population and The U.S. Population at Large (age 45 to 54)





The emphasis on student loans has increased the debt burden of most of Cornell's undergraduates. Of the 3,565 undergraduates who graduated in 2002, 1,903 (or 53 percent) had some amount of student debt. As the following table shows, the debt level at graduation averaged \$16,651, which was a decrease from the average of \$17,032 in 2001. Debt levels varied widely for graduates in 2002, ranging from \$502 to \$61,915.

<u>Years Borrowed</u>	<u>Count</u>	<u>Average Debt</u>
1	220	\$5,081
2	254	\$10,900
3	460	\$15,031
4	894	\$21,118
5	73	\$26,250
6	2	\$45,671
All	1,903	\$16,651

The increase in the use of debt to finance higher education is part of a national landscape where, as reported by Edmund Andrews in the *New York Times*, "Adjusted for inflation, the average family's debt, including a mortgage, has climbed from \$54,000 in 1990 to \$79,000..." by 2002. The nation's household debt now exceeds \$9 trillion, of which \$7 trillion is home mortgage debt. Educational loans remain a small

fraction of that total, as students and their families borrow about \$40 billion annually through federally subsidized and unsubsidized loan programs. (The use of commercial debt to finance educational costs adds only marginally to this total.) Nationally, undergraduate debt at graduation averaged \$19,785 in 2000.

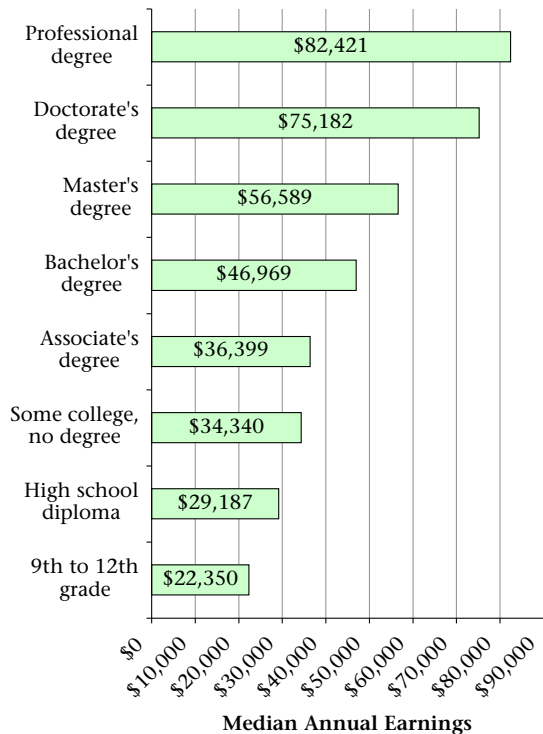
While a debt of \$16,651 for Cornell's recent graduates is not insignificant, it remains less than a new car loan, which averaged \$26,296 as of February 2004. The university's graduates appear capable of handling such debt. Cornell's default rate on federally subsidized loans is low (1.9 percent for Perkins Loans in 2000 compared with a national average of 10.6 percent; 1.1 percent for Federal Direct Loans versus a national average of 5.9 percent). As of 2000, the median income of Cornell graduates from the Classes of 1994 and 1989 were \$52,500 and \$67,500 respectively. By comparison, the median U.S. family income for the age group of these classes (25 to 34) was \$45,373.

Return on Investment

Whether students and their families save in advance for college or borrow while in attendance, they make a substantial investment in securing higher education's benefits. The Organisation for Economic Co-operation and Development (OECD) has measured the impact that tertiary (postsecondary) education has on future earnings of students, finding an enhancement in all countries, with the United States enjoying a significant effect. The OECD has calculated that the internal rate of return in the U.S. of postsecondary education relative to a high school degree to be 14.8 percent (taking into account length of studies, higher earnings, higher taxes, lower unemployment, tuition, and the value of public support). A recent analysis on student aid issued jointly by the Institute for Higher Education Policy and Scholarship America® reports that "a bachelor's degree has become worth more than \$1,000,000 in total lifetime earnings." The report notes that "no one can argue that the personal economic benefits of a college education are illusory...median annual salaries are strongly related to educational credentials." (See graph on page 23.)

A recent national survey sponsored by the Nellie Mae Corporation and focused on how student borrowers perceive their education debt revealed that over 70 percent believed that student loans were very impor-

Median Annual Earnings of Year-Round, Full-Time Workers Age 25 and Over By Educational Attainment (U.S. Census 2002)



tant in allowing them access to education after high school, that 58 percent said that these loans allowed them to attend the college of their choice, and that only 17 percent reported that student loans had a significant effect on career plans.

Studies of Cornell's students and alumni show that students rank other factors ahead of cost of attendance in making the decision to enroll; that about half of recent graduates report that they took out no educational loans, relying heavily on parental resources instead; and that most believe that Cornell should maintain need-based financial aid (even if they did not benefit personally from such aid while enrolled).

Finally, it is important to put the cost of a higher education in the context of other investments that a family makes. The American Council on Education notes that the average annual total cost of attendance at a private four-year college (\$26,900) was slightly less than the comparable cost of the average private boarding school (\$28,700) and much less than the annual cost of nursing home care (\$57,700).

IN SUMMARY – LOOKING BEYOND

Cornell's founding in 1865 as New York State's land-grant university was predicated on three revolutionary ideas: (a) that higher education should be made widely available to rich and poor without regard to race or sex, (b) that scholarship and curriculum should not be preordained by religious or sectarian viewpoint, and (c) that the curriculum should be responsive to the needs of the students.

Cornell provides students with a high quality education that is expensive. The university is concerned about and controls its costs. *Control*, however, means the active management of costs, which may lead to increased or decreased expense. While Cornell's tuitions are high, they remain less than the average cost of the education provided. Financial aid permits all students, regardless of financial circumstance, to obtain an education that has a substantial economic return on the investment made. Cornell employs financial aid—**rewarding merit within need**—to shape the undergraduate student body, ensuring a class that is diverse and excels in many ways.

The economics of higher education, governmental policies, and competition among high-quality universities have caused tuition to grow faster than the change in consumer prices—factors that are likely to continue in the near term. The university monitors these conditions, measuring the capacity of students and their families to assume part of the cost of education and establishing the proportion of that cost that Cornell can pay from other resources.

In assessing a Cornell education it is important to look beyond economics and take into account the value of a well-educated and engaged citizenry—something that is difficult to assess and impossible to measure in purely quantitative terms. The university appears well endowed in this sense, if the accomplishments and successes of its alumni are factored into the equation. This perhaps is one of Cornell's greatest legacies: that in the act of discovering, preserving, and conveying knowledge, the university continues to contribute talented and inspired individuals to society at large.

BIBLIOGRAPHY

- American Council on Education, *Putting College Costs into Context*. American Council on Education, March 2, 2004. [Online source] <http://www.acenet.edu/bookstore/pubInfo.cfm?pubID=313>.
- American Heritage Dictionary of the English Language. "University." New York, NY: Houghton Mifflin, 2000.
- Andrews, Edmund L., March 16, 2004, *Greenspan Shifts View on Deficits*. The New York Times Company.
- Baum, Sandy and Marie O'Malley, *College on Credit: How Borrowers Perceive their Education Debt*. Nellie Mae Corporation. [Online source] http://www.nelliemae.com/library/research_10.html.
- Boehner, John A. and Howard P. "Buck" McKeon, *The College Cost Crisis, A Congressional Analysis of College Costs and Implications for America's Higher Education System*. Washington, DC: U.S. Congress, 2003.
- Chronicle of Higher Education, February 13, 2004, *Deeper Pockets, Different Tactics*. The Chronicle of Higher Education. [Online source] <http://chronicle.com/weekly/v50/i23/23a02601.htm>.
- Cornell University, *2001 ASQ Plus*. Ithaca, NY: Cornell University, 2002.
- Cornell University, *COFHE Alumni Survey*. Ithaca, NY: Cornell University, 2000.
- Economist Newspaper Limited, February 17, 2004, *Who Pays to Study?* [Online source] http://www.economist.com/world/na/displayStory.cfm?story_id=2367332.
- Ehrenberg, Ronald G., *Tuition Rising, Why College Costs So Much*. Cambridge, MA: Harvard University Press, 2000.
- Encyclopædia Britannica, "College," "Higher Education," and "University." Encyclopædia Britannica Premium Service. [Online source] <http://www.britannica.com/eb/article?eu=25168,41282,76310>.
- Hill, Catharine, Gordon Winston, and Stephanie Boyd, *Affordability: Family Incomes and Net Prices At Highly Selective Private Colleges and Universities*. Williamstown, MA: Williams College, 2003.
- Horstmann, Carl, editor, *Edmund the Confessor*, [In] *Early South-English Legendary, or, Lives of Saints*. London, England: Trübner & Co., 1887.
- Institute for Higher Education and Scholarship America®, *Investing in America's Future, Why Student Aid Pays Off for Society and Individuals*. May 2004. [Online source] <http://www.ihep.org/Pubs/PDF/InvestinginAmericasFuture.pdf>.
- Journal of Blacks in Higher Education, *Percentage of Doctoral Degrees Awarded to Blacks Has Reached the Highest Level Ever Recorded*. The Journal of Blacks in Higher Education, March 2004. [Online source] http://www.jbhe.com/news_views/42_PhDs_and_blacks.html.
- National Commission on the Cost of Higher Education, *Straight Talk About College Costs and Prices*. January 1998. [Online source] http://www.acenet.deu/washington/college_costs/1998/07july/straight_talk.html.
- Organisation for Economic Co-operation and Development, *Education at a Glance, OECD Indicators, 2003*, New York, NY: Oxford University Press, 1971.
- Oxford English Dictionary, Compact Edition, Vol. II, "University." New York, NY: Oxford University Press, 1971.
- Research Associates of Washington, *College and University Higher Education Price Index, 2003 Update*. Arlington, VA: Research Associates of Washington, June 2003.
- Rudolph, Frederick. *Curriculum, A History of the American Undergraduate Course of Study Since 1636*. San Francisco, CA: Jossey-Bass Publishers, 1978.
- U.S. Department of Education, NCES, *The Condition of Education 2003*. NCES 2003-067. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003067>.
- U.S. Department of Education, NCES, *Congressionally Mandated Studies of College Costs and Prices*. NCES 2003-171. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003171>.
- U.S. Department of Education, NCES, *Digest of Education Statistics 2002*. NCES 2003-060. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003060>.
- U.S. Department of Education, NCES, *Postsecondary Institutions in the United States: Fall 2001 and Degrees and Other Awards Conferred: 2000-01*. NCES 2003-158. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003158>.
- U.S. Department of Education, NCES, *Postsecondary Student Aid Study*. NEDRC Table 149. [Online source] http://nces.ed.gov/das/library/tables_listings/nedrc_table.asp?sbj=student%20aid.
- U.S. Department of Education, NCES, *Study of College Costs and Prices, 1988-89 to 1997-98, Volumes I and II*. NCES 2002-157. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002157>.
- U.S. Department of Education, NCES, *A Study of Higher Education Instructional Expenditures: The Delaware Study of Instructional Costs and Productivity*. NCES 2003-161. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003161>.
- U.S. Department of Education, NCES, *What Students Pay for College, Changes in Net Price of College Attendance Between 1992-93 and 1999-2000*. NCES 2002-174. [Online source] <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002174>.
- U.S. Department of Labor, Bureau of Labor Statistics, *Archived Consumer Price Index Detailed Report Tables*. [Online source] http://www.bls.gov/cpi/cpi_dr.htm#2004.
- U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Price Indexes*. [Online source] http://www.bls.gov/cpi/cpifaq.htm#Question_6.
- Ward, David, *Letter to Representative Howard P. "Buck" McKeon, April 11, 2003*, American Council on Education. Washington, DC. [Online source] <http://www.acenet.edu/washington/letters/2003/04april/McKeon.cfm>.
- Winston, Gordon C. and Ivan C. Yen, *Costs, Prices, Subsidies, and Aid in U.S. Higher Education*. Williamstown, MA: Williams College, 1995.
- Winston, Gordon C., *The Economic Structure of Higher Education: Subsidies, Customer-Inputs, and Hierarchy*. Williamstown, MA: Williams College, 1996.
- Winston, Gordon C., *Toward a Theory of Tuition: Prices, Peer Wages, and Competition in Higher Education*. Williamstown, MA: Williams College, 2003.