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Introduction

Higher education profoundly affects the economy, society, and culture of this country. Whether viewed as engines of economic growth, keepers of the keys to culture, or tools of credentialism, colleges and universities are powerful, important, and pervasive forces, a fact attested to by the attention that scholars have paid to them over the years. American higher education is often held up as a model for the world—in marked contrast to popular contemporary views of American elementary and secondary schooling. Higher education is seen as vital to the country's continued growth and ability to compete in an increasingly international market.[1] The technological gap between the United States and other countries is narrowing, spawning a demand for increased creativity and flexibility in the American economy. Although the main responsibility of higher education historically has not been to prepare students for specific jobs, the percentage of students who major in the liberal arts has plummeted in the 1970s and 1980s as the percentage majoring in professionally oriented areas has soared.[2]

The last two decades have been a turbulent period for American higher education, marked by profound demographic shifts, episodes of high inflation, gyrating salaries, and significant changes in the nation's economy. Enrollments have risen markedly, increasing by 49 percent from 1970 to 1988 (U.S. Department of Education 1989, table 163, p. 181), and new federal programs to provide aid to college students have been initiated. During the 1970s, tuition increases in both public and private colleges lagged behind inflation, only to accelerate in the 1980s as the rate of inflation slowed. Between the academic years 1970–71 and 1987–88, the average annual rate of increase in tuition and fees at public colleges and universities exceeded the rate of

1. For a concise statement of this point, see Newman (1985).
2. See Bowen and Sosa (1989), and also Table 7.1 and Chapter 11, n. 2, below.

inflation by 0.8 percent, and for private institutions the difference was 2.1 percent.[3] Critics have bitterly denounced these price increases, citing them as evidence not only of inefficiency but also of institutional greed and irresponsibility.[4]

This period has also witnessed dramatic changes in the academic labor market, marked by substantial reductions in hiring of new Ph.D.s in many fields. But as we enter the 1990s there is evidence that surpluses will again give way to shortages in a number of academic fields (Bowen and Sosa 1989). As a result of developments in the 1970s and 1980s, however, the numbers of American graduate students in several disciplines, particularly technical fields, have declined dramatically just when demand promises to rebound, generating concern about our capacity to serve all capable college students in the future.

Among the prominent issues in current discussions about higher education, three are especially noteworthy and amenable to economic analysis. These issues constitute the themes for the three parts of this book. The first is the demand for undergraduate places in colleges and universities. Among the notable features of this market are the relatively large size of the expenditure on a college education compared to other items in the family budget, the participation of both students and their parents in decisions about college, limited knowledge about alternative suppliers, and an elaborate application and selection process. In recent years, the prices faced by households in this market have risen markedly. At the same time, governments, by means of student aid programs and state subsidies, are able to influence these prices. What are the economic forces affecting demand in this market? In particular, what is likely to be the effect of rising tuitions and government policy on the level and composition of this demand? Are minorities and the poor participating to a greater or lesser extent over time?

The second issue addressed is supply in the academic labor market. Projections of supply and demand for faculty sometimes rely on simple assumptions about supply, owing to our ignorance of the factors that determine whether a person engages in graduate work, how long he or she spends completing that training, and the probability that a nonacademic career will ultimately be chosen. Is the supply of Ph.D.s likely to increase? If so, in what fields will it increase, and what will be its quality? Can Ph.D.s currently employed in the nonacademic sector be induced to move to the academic sector? More generally, will academe experience a shortage of Ph.D.s?

3. The average inflation rate over the period was 6.5 percent. The average rate of increase in tuition and fees was 7.3 percent in public institutions and 8.6 percent in private ones. These calculations are based on U.S. Department of Education (1989, table 258) and Council of Economic Advisers (1991, 351). The average consumer price index (CPI) for each pair of years was used.

4. See, e.g., William Bennett, "Our Greedy Colleges," *New York Times,* 18 February 1987, p. A31; "Colleges: A Machine with No Brakes," *Washington Post Weekly,* 21–27 August 1989; Chester Finn, "Trying Higher Education: An Eight Count Indictment," *Change* 16 (May/June, 1984): 29–33, 47–51.

The third issue is the rising cost of a college education. When costs rise faster than inflation, both the efficiency and the objectives of colleges and universities come under scrutiny. Why have these increases occurred? Have they been accompanied by lower student/faculty ratios? Are they due to deliberate actions on the part of institutions or to forces beyond the control of administrators? Questions such as these provide the motivation for this book.

The "Market" for Higher Education: A Brief Description

Economists are accustomed to viewing the provision of any good or service in terms of the concepts of demand (describing the behavior of households and individuals), supply (describing the conduct of firms), and market (describing the interactions of supply and demand). While it is obvious that the provision of higher education is far too complex to fit into the neat categories of textbook economics, these constructs can nevertheless be useful when peculiarities characterizing a specific market are taken into account. It is natural therefore to begin our treatment of these three issues with a thumbnail sketch of the "market," noting especially its unusual features. We first provide some summary measures of the size and growth of the market for higher education; we then discuss diversity, decentralization, firm organization, and finance.

Size and Growth

In 1987, there were about 3,400 institutions of higher education enrolling some 12.3 million students.[5] Adding up all expenditures on higher education yields a total $130 billion in 1988–89. As shown in Table 1, this amount is about two-thirds of the total spent on elementary and secondary schooling, an impressive amount considering that the full-time equivalent enrollment of colleges and universities is only one-fifth of that at lower levels.[6] Furthermore, the growth in expenditures for colleges and universities has been considerably more rapid than that for elementary and secondary schools, reflecting in large part an explosion in enrollments. Between 1929–30 and 1988–89, total enrollments in colleges and universities increased more than tenfold. Over that period, expenditures on higher education also grew rapidly, from 0.6 to 2.7 percent of GNP, but not in proportion to enrollments. Expenditures for elementary and secondary schools rose from 2.4 to 4.1 percent of GNP over this period, during which time precollege enrollments increased by 60 percent.[7]

Diversity

What do career counseling, computerized reference services, planetarium shows, seminars on literary criticism, televised football games, high-energy

5. For the data, see Table 2 below.

6. U.S. Department of Education (1989, 9, 180). Enrollment figures are based on 1987.

7. Enrollments in 1929–30 and 1988–89 were, respectively, 28.3 and 45.4 million for grades K-12 and 1.1 and 12.8 million for colleges and universities (U.S. Department of Education 1989, 10).

Table 1 **Expenditures of Educational Institutions (dollar amounts in billions)**

	Elementary and Secondary Schools		Colleges and Universities			
	Amount($)	% of GNP	Public($)	Private($)	Total($)	% of GNP
1929–30	2.49[a]	2.4	.29	.34	.63	.6
1939–40	2.52[a]	2.8	.39	.37	.76	.8
1949–50	6.25	2.4	1.43	1.23	2.66	1.0
1959–60	16.71	3.4	3.90	3.24	7.15	1.4
1969–70	43.18	4.5	16.23	9.04	25.28	2.6
1979–80	103.16	4.1	41.43	21.03	62.47	2.5
1988–89	199.10	4.1	85.50	45.80	131.40	2.7

Sources: U.S. Department of Education (1989, table 26, p. 30); U.S. Council of Economic Advisers (1990, table C-1, p. 264).

Note: GNP is for beginning year.

[a]Estimated from information on public expenditures, using ratio of public to total expenditures in 1949–50 and 1959–60.

physics experiments, fast-food operations, lectures on introductory psychology, advice on agricultural pest control, weight lifting, teacher training, and orchestra rehearsals have in common? The answer, of course, is that they are all among the many activities of colleges and universities. As suggested by the variety of these activities, the service called "higher education" is in reality an amalgam of qualitatively different outputs, produced in a wide assortment of settings.[8]

The diversity of American higher education is manifested in the aims of its institutions, the activities in which they engage, and the accomplishments of their students and faculty. Founded for reasons as different as training clergy, producing teachers, and serving the general population of individual states, colleges and universities in this country have evolved into several distinct types of institutions. A relatively small number of well-known universities embrace research as their essential, if not primary, responsibility. They account for a disproportionate share of the country's Ph.D.s, federal grants, and articles published in academic journals. Other universities place comparatively less emphasis on research while still maintaining some doctoral programs. Many of the state universities have active public service programs, including agricultural extension services, the provision of consumer information, medical services, and industrial extension services that assist employers. In contrast to these larger institutions, the mostly private liberal arts colleges specialize in basic undergraduate education in the arts and sciences, emphasizing the process of student-faculty interaction. One other group of four-year colleges is the so-called comprehensive institutions. By and large, they serve

8. Where services are necessarily produced in conjunction, they are called "joint products." Nerlove (1972) has argued, e.g., that teaching and research are joint products of universities.

students within a limited geographic area and tend to offer a higher percentage of professional programs than the research universities or the liberal arts colleges. Rounding out the array of higher education institutions are the two-year colleges, which are used by some as a stepping-stone to a four-year college and by others as a means of obtaining basic training in job-related skills.

One widely recognized scheme for describing the variety of institutions in higher education is a classification system developed by the Carnegie Foundation for the Advancement of Teaching. The purpose of the system is to group institutions according to their primary mission, and it uses such criteria as enrollment, number and type of degrees awarded, and amount of federal research support to make distinctions. Ten categories defined in this system are listed in Table 2, along with short descriptions of each.[9] The usefulness of this classification scheme lies in its grouping together of institutions that are similar in mission and, to some extent, size. But the consideration of this or any other classification of institutions of higher education should begin with the realization that these groupings are far from distinct. Just as institutions in different classes share many of the same characteristics, there is also much diversity among institutions that are grouped together.

The individual institutions differ enormously. In size, they range from the gargantuan state universities with enrollments over 40,000 to intimate colleges with only a few hundred students. Over the last decade, some have grown at rates of more than 15 percent per year (e.g., Hawaii Pacific College, the University of Alaska at Juneau), while others have suffered enrollment declines in excess of 10 percent annually (e.g., Gratz College).[10] In purpose, they range from such clearly delineated objectives as religious education and the great books approach to the almost all-encompassing aims of the large state universities. Of the latter, the University of North Carolina is illustrative. According to its official mission statement, "The mission of the University is to serve all the people of the State, and indeed the nation, as a center for scholarship and creative endeavor. The University exists to expand the body of knowledge; to teach students at all levels . . . ; to improve the condition of human life through service and publication; and to enrich our culture."[11]

9. In addition to the first nine categories listed in Table 2, the Carnegie classification system also contains categories for free-standing professional schools and specialized institutions (e.g., independent medical and law schools, seminaries, and institutions with exclusively graduate-level programs). This is an extremely heterogeneous group and includes relatively few institutions that offer undergraduate degrees. We generally group them together as specialized institutions or ignore them in what follows.

10. Calculations cover the period 1978–79 to 1987–88. For a description of the data, see Part III.

11. "Mission Statement of the University of North Carolina at Chapel Hill" (*Record of the University of North Carolina at Chapel Hill*, April 1989). Reflecting on the multiplicity of purposes and traditions that influence the modern "multiversity," Kerr (1982, 18) gives this not entirely tongue-in-cheek assessment: "A university anywhere can aim no higher than to be as British as possible for the sake of the undergraduates, as German as possible for the sake of the graduates and the research personnel, as American as possible for the sake of the public at large—and as confused as possible for the sake of the preservation of the whole uneasy balance."

Table 2 **Enrollment in Institutions of Higher Education in the United States, 1976 and 1987**

Type of Institution	Enrollment (000s)		% Change in Enrollment, 1976–87	No. of Institutions		% Change in Number, 1976–87	Share of Enrollment in 1987	% of Students Enrolled in the Category in Public Institutions in 1987
	1976	1987		1976	1987			
Total	**11,165**	**12,301**	**10.2**	**3,072**	**3,389**	**10.3**	**100.0**	**76.9**
Doctorate-Granting	**3,056**	**3,429**	**12.2**	**184**	**213**	**15.8**	**27.9**	**77.4**
Research University I	1,144	1,579	38.0	51	70	37.3	12.8	79.7
Research University II	803	630	−21.5	47	34	−29.8	5.1	85.9
Doctorate-Granting I	805	680	−15.5	56	51	−8.9	5.5	72.8
Doctorate-Granting II	304	540	77.6	30	58	96.7	4.4	66.9
Comprehensive Universities and Colleges	**3,170**	**3,303**	**4.2**	**594**	**595**	**1.2**	**26.9**	**72.0**
Comprehensive I	2,628	2,971	13.1	381	424	12.1	24.2	76.7
Comprehensive II	542	332	−38.7	213	171	−18.3	2.7	29.2

Liberal Arts Colleges	**531**	**584**	**10.0**	**583**	**572**	**−3.3**	**4.7**	**7.5**
Liberal Arts I	154	214	39.0	123	142	1.6	1.7	2.3
Liberal Arts II	377	370	−1.9	460	430	−4.6	3.0	10.5
Two-Year Institutions	**3,978**	**4,518**	**13.6**	**1,146**	**1,367**	**19.4**	**36.7**	**94.1**
Specialized Institutions	**416**	**467**	**12.3**	**559**	**642**	**15.0**	**3.8**	**28.1**

Sources: Carnegie Foundation for the Advancement of Teaching (1987, tables 1, 2, 4); Carnegie Foundation for the Advancement of Teaching (1989).

Note: Carnegie classes are defined as follows: *Research Universities I:* Institutions that offer a full range of baccalaureate programs, award at least 50 Ph.D. degrees annually, and receive at least $33.5 million of federal research support annually; *Research Universities II:* Same criteria as Research Universities I, except these institutions receive between $12.5 and $33.5 million annually in federal research support; *Doctorate-Granting Universities I:* Institutions that offer a full range of baccalaureate programs and award at least 40 Ph.D. degrees annually in five or more disciplines; *Doctorate-Granting Universities II:* Institutions that offer a full range of baccalaureate programs and award at least 20 Ph.D. degrees annually in one discipline or at least 10 Ph.D. degrees in three or more disciplines; *Comprehensive Universities and Colleges I:* Institutions that enroll at least 2,500 students, award at least half their baccalaureate degrees in two or more professional disciplines, such as engineering or business administration, and also offer graduate education through the master's degree; *Comprehensive Universities and Colleges II:* Institutions that enroll between 1,500 and 2,500 students, award at least half their degrees in two or more professional disciplines, and, in many cases, offer graduate education through the master's degree; *Liberal Arts Colleges I:* Primarily highly selective undergraduate colleges that award more than half their baccalaureate degrees in the arts and sciences; while not a criterion, almost all these institutions enroll fewer than 3,000 students annually and have limited, if any, graduate programs; *Liberal Arts Colleges II:* Less selective liberal arts colleges and smaller comprehensive type universities and colleges with annual enrollment of less than 1,500; because of the mixture of liberal arts colleges and comprehensive institutions, we sometimes label this category "Other-Four-Year Colleges" in the chapters that follow; *Two-Year Institutions:* Institutions that offer certificate or degree programs through the associate of arts level and (with few exceptions) offer no baccalaureate degrees; this category includes "freshman and sophomore" branch campuses of some large state universities (e.g., Penn State), specialist technical and vocational colleges, and free-standing institutions offering associate of arts degrees; *Specialized Institutions:* Institutions that offer at least half their degrees in a single specialized field; this category includes free-standing theological seminaries, medical schools, teachers colleges, and institutions offering other professional degrees.

The diversity of our colleges and universities ranges into the production process as well. Large doctorate granting universities tend to employ graduate teaching assistants to help with undergraduate instruction. Many comprehensive institutions and less selective liberal arts colleges frequently use part-time faculty to teach courses, while the highly selective liberal arts institutions rely almost exclusively on full-time faculty for instructional purposes. The teaching load and responsibilities of the faculty vary too. At institutions where the faculty are expected to engage in extensive research and scholarship, faculty rarely teach more than four courses annually. At the elite private liberal arts colleges, teaching loads range from four to six courses per year, while faculty at comprehensive institutions and less selective liberal arts colleges often teach eight or more courses per year.

What occurs inside classrooms also varies across institutions. The student/faculty ratio, which affects the pedagogical strategies available to an instructor, is quite different at different institutions, ranging from above 50 to 1 at several dozen four-year colleges and universities to under 10 to 1 at some private institutions. Certainly, the amount of individual attention, dialogue, and feedback on written assignments, all elements of the learning process, must differ when the student load varies by a factor of five to one.

Institutions also differ, obviously, in geographic location. A college education in the traditional American sense is a product that one purchases at the point it is provided. Mail-order and telecommunicated higher education has never been an important part of the college experience in America. And seldom do colleges move, although some do offer classes in various locations.

The diversity of experiences available from American colleges and universities means that comparisons are, at best, hazardous. Prices can be expected to vary significantly when the product mix differs so much. During a period of a shrinking college-age population, as America has been experiencing, it is natural to see institutions reaching out to less traditional students and competing on the basis of their differences. The effect of this enormous product differentiation on market behavior and performance is ambiguous. A market in which many services are purchased together (e.g., cognitive development, sorting, screening, social development, entertainment, and job placement) and not sold directly makes it difficult to assess value. Information about quality is difficult to assemble and evaluate, which in turn may affect the average level and variation of quality offered.

Product differentiation also spawns non-price competition among colleges and universities, competition that has increased noticeably in the last decade. Cardboard boxes full of slick brochures touting the advantages of various colleges and universities are no longer limited to the closets of outstanding high school athletes. It is now commonplace for high school seniors (and many juniors) who score well on college entrance examinations to be courted aggressively by colleges.

The enormous diversity of goals, quality, and teaching methods found in

various institutions makes it difficult to assess changes in the American higher education sector. For example, shifts in enrollment from one type of institution to another can easily be mistaken for systematic changes in all institutions. To ease the interpretation of data, in this volume we frequently subdivide the higher education sector into smaller groups of institutions; while each still offers unique characteristics, we believe that these groups are more homogenous. We have elected, for the most part, to use three significant differences among the institutions: mission, control, and size. The Carnegie classification system (see Table 2) is one widely recognized way of dividing institutions. Most recently revised in 1987, this scheme is useful for distinguishing among colleges and universities with quite distinct goals, and we use it as the basis for organizing several presentations of data on institutions.

The market for higher education is strongly shaped by government action at a variety of levels. Over three-fourths of college students are in institutions directly operated by some level of government, from ubiquitous community colleges to pinnacle land-grant campuses. Students at both public and private institutions receive direct financial support in the form of federal and state grants, institutional scholarships, loans, subsidized work-study jobs, Reserve Officer Training Corps programs, and several state grant programs. Federal grants provide significant support for research in agriculture, health, science, and other fields. The prominent role played by the states reflects the decentralized federal character of government in the United States. Many states operate more than one system of higher education, with separate finance and governance structures for community colleges, comprehensive universities, and doctoral level campuses. To a significant degree, then, higher education is a function of government, and federalism promotes diversity within the public sector.

Yet the private sector persists and, in many cases, thrives. Any list of the country's oldest and most prestigious institutions will contain many that are private. The most selective liberal arts colleges are almost all private. Many private institutions have strong religious or ethnic heritages that make them distinctive. The private institutions retain an important place in higher education in America. There are even a few institutions like Cornell and Temple that combine public and private control.

Finally, there are obvious differences between institutions that enroll 40,000 or more students and the many (at least 600) that enroll fewer than 1,000. Table 2 summarizes the distribution of enrollments according to the Carnegie classification scheme. In 1987, about 77 percent of students enrolled in higher education were in public institutions, with this percentage ranging from 7.5 in liberal arts colleges to 94.1 in two-year institutions. Over one-quarter of all students were enrolled in research and doctorate-granting institutions and a similar number in comprehensive institutions, while over one-third (many of these part-time students) were enrolled in two-year institu-

tions. Liberal arts colleges, which in 1987 represented almost 17 percent of institutions or higher education, enrolled less than 5 percent of students that year.

Table 2 also highlights changes in the share of enrollments of the various categories. Between 1976 and 1987, enrollments in institutions of higher education grew by about 10 percent in the United States. However, enrollments in some categories grew substantially faster, while enrollments in other categories actually declined significantly. These enrollment changes are due to changes in enrollment within existing institutions, the birth and death of institutions, and shifts in institutions between Carnegie categories. Many institutions used the loose academic labor markets of the late 1970s and early 1980s as an opportunity to upgrade their faculty and start or expand graduate programs. This shift in function is reflected in the 16 percent increase in the number of research and doctorate-granting institutions, compared to the 1 percent increase in comprehensive institutions and the 3 percent decline in liberal arts colleges.

Characteristics of institutions vary widely across institutional categories. Table 3 illustrates the variability on five dimensions—average full-time enrollment, percentage of students enrolled part-time, percentage of students who already have four-year degrees, average full-time-equivalent student to full-time faculty ratio, and average educational and general expenditures per full-time-equivalent student. The ten Carnegie categories have been condensed into six for the purpose of this table (specialized institutions are excluded).

There is great variation in all five criteria reported in Table 3. Research universities average almost 20,000 students per campus, while the typical college in the Other-Four-Year category is smaller than many urban high schools. The selective liberal arts colleges (Liberal Arts I) enroll primarily full-time students. The other institutions all have a large number of part-time students, but for different reasons. The Research and Doctoral institutions' part-time students include graduate and postbaccalaurate professional students, while the part-timers at Comprehensive and Two-Year colleges are more commonly undergraduates. Graduate education is concentrated at the Research and Doctoral universities, but expenditures per student are highest at the Research and Liberal Arts I institutions. Not only are selective liberal arts colleges very expensive, but their costs are growing the fastest of any classification of institutions. Table 3 also shows that the ratio of full-time-equivalent students to full-time faculty varies considerably across categories of institutions, from a low of 14 at the selective liberal arts colleges to 27 at two-year colleges. At the institutional level, there is even more variation in student/faculty ratios, which range from a low of about 10 to several dozen institutions above 50. There are obviously different approaches to teaching implied by the variation in this central relationship in higher education—that between student and instructor.

Table 3 **Characteristics of Colleges and Universities by Carnegie Classification, 1987–88**

Type of Institution	Sample Size	Average FTE[a] Enrollment	% of Students Who Are Part-Time	% of Students Who Are Post Baccalaureate	Average 1987-88 E&G[b] Expenditures per FTE Student	Sample Size for Student/Faculty Ratio Calculation	Average FTE Students per FT Faculty[a]
Research	90	18,948	23.5	20.7	13,093	87	19.0
Doctoral	96	9,576	32.8	17.4	8,561	88	20.5
Comprehensive	522	4,307	36.2	11.3	6,815	485	20.7
Liberal Arts I	131	1,451	12.2	4.0	12,858	122	13.9
Other Four-Year[c]	353	784	27.7	4.5	8,095	306	16.7
Two-Year	853	2,373	64.9	.0	4,747	716	27.0
All	2,045	3,601	42.5	9.6	8,123	1,804	20.9

Source: Computation by authors based on the sample of 2,045 institutions used in Part III of this volume.

[a]Full-time-equivalent (FTE) students = full-time students + ⅓ part-time students; full-time (FT) faculty does not include any part-time faculty.

[b]Educational and general (E&G) expenditures include expenditures for instruction, public service, libraries, computers, deans, student services (admissions, registrars, health, and recreation), institutional support (presidents and provosts, accounting and finance, fund-raising and security), plant operations, unrestricted scholarships, and interest on accumulated debt and exclude restricted scholarships (e.g., Pell grants) and externally sponsored research (in 1987–88 dollars).

[c]Liberal Arts II.

Non-Price Rationing

Unlike the competitive market visualized in textbooks, the market for higher education does not reach equilibrium through the adjustment of market prices. In the language of economics, the market does not "clear."[12] There are important capacity constraints, some of which the governing bodies of institutions place on themselves. Where the number of applicants desiring places exceeds the number of places the institution is willing to offer, the places are rationed through an admissions and selection process. Fewer than half the institutions in American higher education are "selective" in the sense of turning away more than one-third of their applicants. But, within the group of most selective institutions, this process takes on great importance, not only for the institutions and the applicants, but also for society in general.

Decentralization

In comparison to those in other developed countries, the system of colleges and universities in the United States is relatively decentralized, with 50 separate state regimes and hundreds of private institutions run by self-perpetuating boards of trustees. Bok (1986) argues that this decentralization is a central characteristic of American higher education and that it encourages competition, innovation, and diversity. As Rosovsky (1990) points out, one manifestation of this decentralization is a national admissions process in which several thousand offices are making admission decisions independently. Similarly, decisions regarding the allocation of research funds are also decentralized, although to a lesser extent, owing to the smaller number of funding sources. Decentralization also means that we have a less monolithic higher education establishment than do most other developed countries. One illustration of this, noted by Fallows (1990, 17–18), is the fact that only two of the seven American presidents since 1960, Kennedy and Bush, graduated from an elite private institution, while all Japanese leaders graduated from a single college, the University of Tokyo.

The internal organization of colleges and universities is also characterized by decentralization. Instead of the hierarchical structure typical of corporations, universities are staffed by semiautonomous faculty members with few specific duties. In the words of Coleman (1973), the university is an "institutional anachronism" whose governing structure is based on the concept of community and whose administrators face a constant challenge of management without having much control over their faculty members' time.[13]

Financing

The higher education industry shares an important institutional characteristic with the health sector—the people who receive the service usually pay

12. For a formal discussion of market clearing in higher education, see Abowd (1977).

13. There are also more than the usual number of principal-agent problems since it is not altogether clear who the principal is or what the objective function of the institution is. For a discussion, see James (1990).

little, if anything, out of their own pockets. In the health industry, medical insurance provides third-party payments covering most expenditures. Few people purchase higher education insurance (although some prepaid college education plans have an insurance element to them). But students, who usually have a lot to say about whether and where they will attend college, only rarely pay the full bill. The difference is made up by contributions from state and federal governments, taxes forgone by local governments, payments from parents (which may have some cost to students if they reduce other gifts and bequests from parents to students), income from gifts and endowments, and subsidies from other (e.g., charitable) organizations.

As outlined in the first part of this volume, federal and state governments subsidize the costs of students' attendance in a number of ways. Direct appropriations from state governments to public institutions permit relatively low tuitions to be charged to all students attending public institutions. Some states also provide grants to residents who attend in-state institutions, subsidized loans for students, and payments to private institutions for each degree that they grant. At the federal level, undergraduate aid is provided in the form of need-based grants, subsidized loans, and subsidized employment. Aid is also provided under various entitlement programs, such as veterans benefits and through direct support of the five service academies.

Thus, the primary consumers of the education experience—the students—rarely pay the entire bill. Although distortions can arise whenever the decision makers do not confront all costs directly, these so-called third-party payment problems are not likely to be as serious in the market for higher education as they are in the health industries because students shoulder a good share of the cost of attending college, in the form of earnings that are forgone in order to matriculate.

Purpose and Outline of This Volume

The three major concerns of this volume—undergraduate enrollments, the supply of academics, and costs—lend themselves to economic analysis and in fact have generated significant scholarly attention. Much of the resulting research is not, however, easily accessible to noneconomists. It is therefore one objective of this volume to present findings from the economics literature in a form that can be understood by noneconomists. Another objective is to present and discuss data that are relevant both to these findings and to public policies affecting higher education. Most of these data are presented in the form of tables or figures; technical references to econometric estimates are relegated to notes or appendices. Finally, each part of the book attempts to highlight the implications of the data and other findings discussed, both for the higher education industry and for public policies affecting it.

Part I of the volume focuses on the demand for undergraduate places, with special attention to the effects of changes in tuition and financial aid on that demand. Demand is measured in terms of both the overall size of enrollments

and their composition. Chapter 1 introduces the topic by comparing American college enrollments to those in other countries. It then examines the components of recent enrollment changes in this country over a period during which the size of the 18-year-old population began to decline. Chapter 2 presents a statistical portrait of undergraduate enrollment, beginning with aggregate measure of enrollment growth. It notes the rising proportion of women and part-time students among undergraduates. It then considers in some detail who goes to college, what kinds of colleges they attend, their progress toward completion, and the implications of these patterns for the racial and economic composition of undergraduate student bodies.

Chapter 3 turns to economic models of education to explain recent trends in enrollment. It presents evidence on three trends occurring during the 1980s that affected demand for higher education: the dramatic turnaround in the financial returns from college training, the rapid rise in college costs, and the bulging of the income distribution at the top. In considering demand for undergraduate places, it is important to keep in mind the difference between selective colleges, which experience excess demand for their places, and nonselective institutions, which do not. Chapter 4 examines the role of financial aid, beginning with a brief description of the programs and their methods of awarding aid. The chapter then traces the changes that have taken place over the last decade in these programs and discusses their likely effect on both the numbers and the composition of undergraduate enrollments. Chapter 5 first presents a summary of the major changes over the period 1979–87 that affected aggregate demand. It then turns to the question of whether the economic disparity between those who do and those who do not attend college has been growing over time. It concludes with a review of some of the important unanswered questions related to the demand for undergraduate places.

Part II of the volume focuses on academic labor supply. Projections of forthcoming shortages of Ph.D.s abound. For example, one major book recently concluded that by the late 1990s there will be large shortages of faculty in the arts and sciences and that these shortages will be especially large in the humanities and social sciences, where there may be as few as seven candidates for every ten faculty positions (Bowen and Sosa 1989).

Economists typically define shortages as arising when, at the prevailing salaries in an occupation, demand exceeds supply (Ehrenberg and Smith 1991, chap. 2). As long as salaries are free to rise, shortages will eventually be eliminated. Still, there is concern over potential shortages of doctorates in academe, for two reasons. First, many observers believe that academic institutions may not possess the resources to increase faculty salaries enough to eliminate these shortages. Second, the time it takes graduate students to complete doctoral degrees is sufficiently long that, even if new graduate enrollments were to increase in response to an increase in salaries, the supply of new doctorates would not begin to rise until a number of years later. Thus, if shortages do materialize in the future, they may persist for a number of years.

Among the policies proposed to avert these projected shortages are in-

creased financial support for graduate students and the shortening of the time it takes graduate students to complete their degrees. Yet evidence on the magnitudes of likely supply responses to such proposed changes is actually quite scanty. Part II of this volume reviews the academic literature and available data, from a wide range of sources, to summarize what we know about academic labor supply and what we need to know to make informed policy decisions.

Chapter 6 begins with a description of how estimates of projected shortages arise and summarizes the issues one must address before deciding if policy interventions are required. The remainder of this chapter presents some background data on the academic labor market and new Ph.D. production in the United States. Chapter 7 describes a schematic model of academic labor supply and indicates the underlying trends since 1970 in a number of variables that contribute to projections of shortages of faculty. In Chapter 8, a general model of occupational choice and the decision to undertake and complete graduate study is sketched. This framework, available data, and the prior academic literature are then used to address students' choices of college majors, decisions to undertake and complete graduate study, decisions on the time it takes to complete Ph.D. programs, and decisions on choices of sectors of employment for new and experienced Ph.D.s. Chapter 9 addresses issues relating to the age structure of the faculty and retirement policies and minority and female representation in academe. Chapter 10 considers whether a shortage of American Ph.D.s would really matter or could be eased by increased reliance on foreign students trained in the United States, faculty currently employed in foreign institutions, and faculty without doctorates. It also briefly summarizes the implications for both future research needs and public policy.

Part III of the volume considers costs. Because there are no accurate measures of "output" from colleges and universities, conclusions about productivity can only be inferred from indirect evidence. This section of the volume thus focuses primarily on costs. Chapter 11 outlines six possible explanations for the rapidly rising costs in higher education: better-quality service, more expensive inputs, inherently low productivity growth, faculty and administrators' self-interest maximization, poor management, and increased government regulation. The possibilities are examined with financial data from 2,045 colleges and universities covering the period 1978–79 to 1987–88. The institutions are distinguished on the basis of their mission, control, size, and enrollment growth.

Chapter 12 examines the various categories of expenditures made by colleges and universities during the 1980s. Instruction accounts for about half of all current expenditures. Expenditures per student have increased at a rate of 2.8 percent per year over and above the general rise in prices. They rose fastest in the period 1983–84 to 1985–86. The most rapidly increasing categories of expenditures are scholarships funded internally, student services (e.g., recruiting, record keeping, health, and recreation), and institutional support (president, provost, finance, accounting, public relations, fund-raising, and

campus security). Expenditures per student increased much faster at selective private liberal arts colleges than at any other type of institution. Overall costs per student are rising much faster at private than at public institutions. Cost inflation is even worse if expenditures are compared to the number of degrees awarded.

Chapter 13 examines cost trends on the basis of institutional size and the rate of change of enrollment. Institutions whose enrollments declined during the 1980s experienced a much larger surge in costs than those institutions with stable or growing enrollments. Four-year institutions with stable enrollments are used to evaluate scale economies in private colleges and universities. There is evidence of overall size advantages only for private research universities and for less selective private liberal arts colleges.

Instructional costs are decomposed in Chapter 14. Different types of institutions have quite different ratios of instructional expenditures to total expenditures, full-time faculty salaries to instructional expenditures, average salary levels per full-time faculty member, and students per faculty member. Over the period 1978–79 to 1987–88, noninstructional costs have increased faster than instructional costs. Within instructional costs, the faster growth has been in categories other than full-time faculty salaries (e.g., fringe benefits, part-time faculty, support staff, equipment, and supplies). Faculty salaries have gained on inflation over the period, and the number of students per faculty member has increased modestly. The most dramatic differences across institutions occur in the ratio of full-time faculty to instructional expenditures, suggesting that colleges and universities differ markedly in the way they combine resources to produce "education." Chapter 14 concludes by evaluating the possible explanations for rising costs presented in Chapter 11.

The three parts of this volume yield three perspectives on the challenges facing higher education in the United States in the 1990s. First, the growth of aggregate enrollments, which defied adverse demographic trends during the 1980s, is likely to cease during the first half of the decade and then resume in the second, owing in both instances to changing demographics. Second, as enrollments rebound in the second half of the decade, increased demand for faculty may induce higher salaries and a variety of adjustments in the supply of faculty. Third, cost per student may increase rapidly when the demand for higher education is damped and may slow when demand recovers and enrollments increase. Even given these broad generalizations, however, one must consider the great diversity of mission, scale, control, location, and heritage of the colleges and universities. Some institutions will be growing even as others are declining, some will experience decreases in student-faculty ratios while others see them increase, and costs per student in dollars of constant purchasing power will decline for some even as they are rising for others. All three parts consider how higher education, in all its diversity, adapts to changing circumstances.