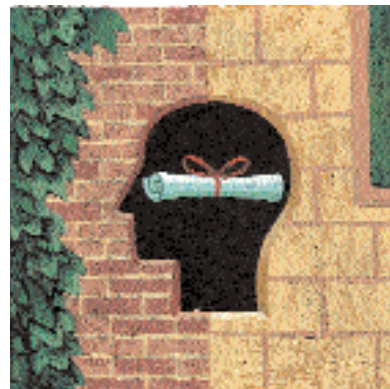


# THE SHAPING OF **H**IGHER EDUCATION IN THE UNITED STATES AND NEW ENGLAND

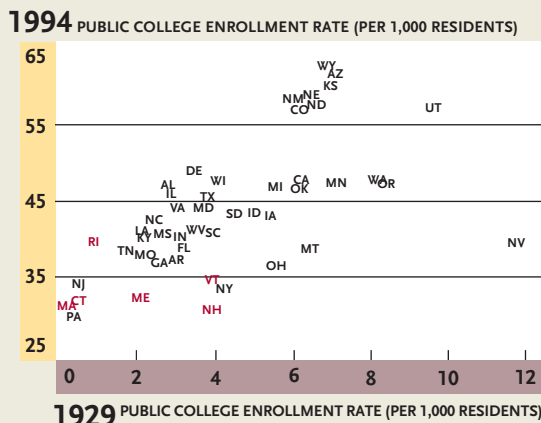
BY CLAUDIA GOLDIN AND LAWRENCE F. KATZ  
ILLUSTRATIONS BY JAMES STEINBERG

THE AMERICAN HIGHER EDUCATION system is unequaled in many respects. First and foremost, it is a system of world-renowned excellence in teaching and research. U.S. colleges and universities attract students and faculty from the world over. Our global trade position in higher education — 11 percent of all U.S. graduate students are not U.S. nationals — is but one indication of America's extraordinary comparative advantage in it. This supremacy is due, in large measure, to a system of nationwide competition among both public and private schools. In that sense, we are virtually unique; the United States has one of the few higher education systems in the world with a large and vibrant private sector. Private colleges and universities compete with state systems — and with each other — for students, faculty, and resources. Over the past decades, competition has increased along with the greater geographic mobility of both American and international students. Yet, not all parts of the United States have developed



## The tradition of public institutions

*New England states have long had relatively low enrollments in public colleges and universities.*



NOTE: Public school enrollment is all students in nonpreparatory departments, including undergraduates, graduate students, and those in professional programs.

SOURCE: All charts in this article are from Claudia Goldin and Lawrence F. Katz, "The Shaping of Higher Education: The Formative Years in the United States, 1890 to 1940," NBER Working Paper no. 6537, April 1998.

the same mix of public versus private institutions. Some, such as New England and the Middle Atlantic states, have long seen relatively high enrollments per capita in private colleges and universities, low enrollments per capita in public institutions of higher education, and low government expenditures per capita on the same. Others, such as the states in the midsection of the country and in the West, have displayed the opposite pattern.

These regional differences were already determined more than a century ago. In New England, it seems that the existence of a large group of extremely fine private institutions was significant in altering the path of higher education there. One result of historically lower expenditures and enrollment rates at public institutions was reduced rates of college attendance generally, whether at public or private schools. New England also recorded lower rates of college enrollment of women as compared with men, since private (secular) schools were less open to women than were public institutions. Today these connections appear to be less important, as three of the New England states are among the top nine in college-going among young residents. But the legacy of low public spending in New England continues to raise concerns about the accessibility of higher education for the region's low- and middle-income residents.

### PERSISTENCE AMIDST CHANGE

A prospective college student in the United States today is faced with a mind-boggling set of choices: small liberal arts colleges and large research universities, residential and commuter colleges, religious-based and secular institutions, and two-year and four-year schools. And nearly all can be found in both the public and private sectors, where "public" and "private" are de-

termined by who "controls" the institution.

But this was not always the case. A century ago, the U.S. higher education system was not yet the finest in the world. In many of the sciences, for example, German universities reigned supreme. Most American institutions were small compared with current standards and not much larger than the liberal arts colleges of the day. Public universities were often no larger than private universities and research was not a central part of a faculty member's daily activities. Most professional schools, such as law and medical faculties, were independent entities, unattached to large universities. The grand division of labor in universities, which has given us countless disciplines, professional schools, and graduate programs, did not yet exist.

The distinctive features of today's U.S. higher education system began to emerge around the 1890s and, by the 1920s, the U.S. higher educational system had assumed its modern form. But even though this transition — what we term, "the shaping of higher education" — took only about 30 years, history would matter considerably, particularly in the division between the public and private institutions. In that sense, New England's higher education system became distinctive a long time ago.

Almost all New England and Middle Atlantic states already had a noted private college at the time they joined the Union. Harvard, in Massachusetts, founded in 1636; Yale, in Connecticut (1701); Princeton, in New Jersey (1746); Columbia, in New York (1754); University of Pennsylvania (1749); Brown, in Rhode Island (1764); Dartmouth, in New Hampshire (1769); and Bowdoin, in Maine (1794). Only Vermont began statehood without a private college — at least not one that survived to

## THE UNITED STATES IS ONE OF WHERE PRIVATE AND

the 1890s — and only Vermont, among the nine states of the Northeast, set up a state-funded and state-controlled university before the Civil War. The University of Vermont was founded in 1791, several years before the state's first private institution, Middlebury College (1800).

The states (and regions) that early in their histories had established numerous excellent private colleges and universities have given scant support to public institutions on a per capita basis and continue to be less generous today. Similarly, states that in the past were generous in terms of per capita state and local government spending on higher education continue to give amply today. A strong positive relationship exists between state and local higher education spending per capita in 1929 and more recently. There is considerable persistence in governmental commitment to public institutions of higher education.



## THE FEW COUNTRIES PUBLIC COLLEGES COMPETE

Such differences in public largesse have had long-term impacts on the composition of student enrollments. States with greater public college enrollments per capita in 1929 are, by and large, those with greater public enrollments today.

Because the states with numerous private institutions of higher education are primarily in the Northeast and were, by and large, among the original thirteen, the year of statehood strongly predicts which states have extensive private systems. The four New England states that were among the original thirteen had the highest private enrollment rates in 1901. But even without New England, there is a clear relationship between early statehood and the private enrollment rate. The states that entered the Union first had private institutions early in their histories. The states that entered after the Civil War often set up state institutions before private institutions could be established.

One consequence of having successful private colleges and universities early in a state's history is low per capita expenditures on public higher education. The private enrollment rate in 1901, it appears, had negative consequences not only for per capita state support in 1929 but also for that a century later.

A number of reasons might account for the link between early private colleges and low public funding of higher education. When the private sector is strong, there may be a diminished demand by students and their families for access to public higher education. In states with early and excellent private universities, those nominally in power often had degrees from those institutions and were particularly susceptible to the efforts of private universities to thwart public-sector competition.

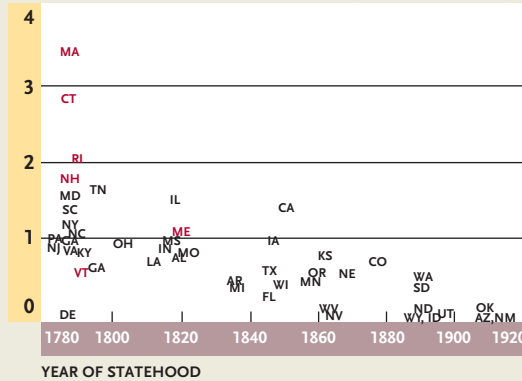
Whatever the reason, it is clear that early establishment of a private higher education system is related to diminished support for public institutions. The upshot? Some states have extremely good private higher education systems and some have extremely good public higher education systems, but few states have both, with California and Illinois among the notable exceptions.

One result was a long-term impact on college enrollments generally. States with low per capita support to public institu-

## Early admission

States that entered the Union early tended to have high enrollment rates in private colleges.

1901 PRIVATE COLLEGE ENROLLMENT RATE (PER 1,000 RESIDENTS)



NOTE: Private college enrollment includes any (nonpreparatory) student attending a privately controlled institution of higher education in the state.

tions were also those with low overall college enrollment rates of their residents in 1930. That is, it appears that lower expenditures on public higher education have been associated with lower college enrollment rates of their state residents, regardless of the type and location of college. This has been especially evident in New England. Even in Massachusetts, long a leader in education, residents ranked seventeenth in the nation in college enrollment rates in 1930; New Hampshire was twentieth, and the rest of New England states ranked in the bottom third. Over time, however, this association, while still present, appears to have weakened. By 1994, enrollment rates in the region appeared to be far less related to spending on public higher education.

### THE EMERGENCE OF ECONOMIES OF SCALE AND SCOPE

No matter how rich a philanthropist is today — even Bill Gates, for example — that person's name will probably never adorn a first-rate private institution of higher education. A building, perhaps. Maybe even a professional school. But not an entire institution. Andrew Carnegie, Andrew Mellon, Leland Stanford Jr., Cornelius Vanderbilt, and John D. Rockefeller endowed their universities at the close of the nineteenth century (all eponymous except for Rockefeller's University of Chicago). But they did so at the end of an era. Only one private university in a recent *U.S. News & World Report*, "Top 50 National Universities," was founded after 1900. And that institution, Brandeis University (founded in Massachusetts in 1948), was able to take advantage of a minority population with money and talent who had been denied equal access to many of the great private institutions in the region.

The structure of knowledge began to change radically in the late nineteenth and early twentieth centuries. Although these

changes often did not originate in universities and colleges, they were to affect them greatly. The changes can be likened to those that occurred in manufacturing when technologies like the steam engine, electricity, or, later, computers spread throughout the economy and firms in a host of industries were forced to adjust. In higher education, a different set of wide-ranging changes transformed what was taught, who taught it, and how it was taught. They created a new relationship between research and teaching and affected both the scale and scope of higher education.

In the late nineteenth century, institutions of higher education were generally small and staffed by a handful of professors. The college president was a member of the faculty and often chose the rest. The difference in size between private universities and liberal arts colleges and between private and public universities was relatively small. In 1897, for example, the largest private institution, Harvard University, was also the largest among all institutions and enrolled almost 2,100 undergraduates, and 3,700 students including those enrolled in professional programs. The largest public university was the University of Michigan, with about 1,500 undergraduates and 2,900 including those in professional programs. The largest liberal arts college in 1897 was all-female Smith College, with about 930 undergraduates. The University of Illinois had only 900 students; Oberlin, the first coeducational college in the United States, had about the same. Many of the modern distinctions between colleges and universities, and between the public and the private sectors, were yet to emerge.

But by the latter part of the nineteenth century, academic subjects had become increasingly subdivided and specialized. First in the sciences, a bit later in the social sciences and engineering, and then finally filtering into the humanities and history, specialized fields began to emerge that were taught by separate faculty and housed in separate academic departments. The changes in each discipline were brought about by different factors and at slightly different times. Yet, they shared several factors, including the application of science to industry, the growth of the scientific and experimental methods, and an increased awareness of social problems brought about by a more industrial and urban society.

Chemistry and physics became progressively more important in industry, most notably in the manufacture of steel, rubber, chemicals, sugar, drugs, nonferrous metals, petroleum, and goods directly involved in the use or production of electricity. Firms that had not previously hired trained chemists and physicists did so at an increasing rate, as did federal and state governments. Science replaced art in production; the professional replaced the tinkerer as producer. With greater demand for trained scientists, universities expanded their offerings.

With new research findings, the classical scientific disciplines became ever more fragmented and specialized. In biology, the driving force was less industry and government than

the general increase in empiricism and experimentation borrowed from other fields and stimulated by the appearance of Darwin's *Origin of the Species*. In the agricultural sciences, the impetus was, in part, the vastly expanding varieties of crops grown in the United States, a by-product of the great trunk railroads that spurred cultivation clear across the continent.

Even the social sciences expanded and splintered in the late nineteenth and early twentieth centuries. They were given a mission by the growing social problems of industry, cities, immigration, and prolonged depression, first in the 1870s and later in the 1890s. They were shaped by Darwinian thought, Mendelian genetics, and later by the increased role of statistics, testing, and empiricism generally.

To illustrate, consider the increase in the numbers of learned

societies founded between 1890 and 1910. In the social sciences, economists formed their society in 1885 and the rest quickly followed: psychologists in 1892, anthropologists in 1902, political scientists in 1903, and sociologists in 1905. The biological and chemical fields also proliferated, and societies were formed for botanists, microbiologists, pathologists, electrochemists, and biological chemists.

These changes, or “technological shocks,” in the structure of knowledge had far-reaching implications for the “firms” in the knowledge industry, by which we mean universities and colleges. The scientific method, courses with a practical orientation, the “lecture” method of teaching, and specialization in a host of dimensions swept the world of knowledge.

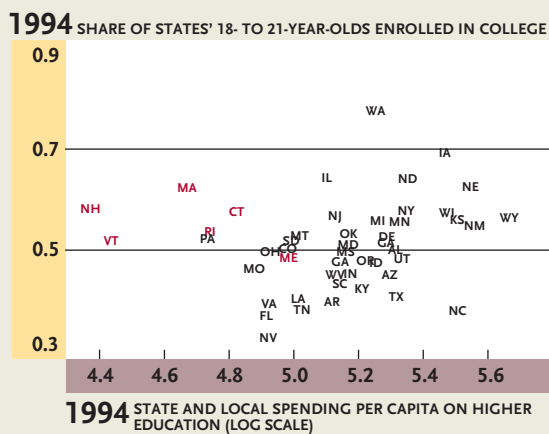
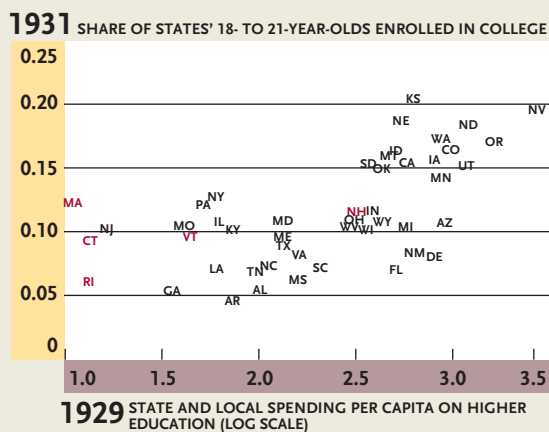
The diffusion of knowledge, moreover, became closely bound up with the creation of knowledge, and research became the handmaiden of teaching. European universities, particularly those in Germany, had long emphasized graduate studies and research, almost to the virtual exclusion of undergraduate training. The Johns Hopkins University, the first graduate and research center in the United States, and Clark University, in Worcester, Massachusetts, were created along these lines, but the model never caught on. Instead, the typical American university as it emerged at the beginning of the twentieth century was a veritable department store of higher education services. It offered courses in specialized disciplines in the sciences and social sciences and modern professional training, along with the more traditional and broader classical subjects. The university also became a production center in which research of one part of the institution enhanced teaching and research in others. And the role of institutional reputation also grew in importance, particularly for professional schools.

Most of these changes also served to increase economies to scale and to raise the number of faculty members and students that were required to remain viable. A respectable college could no longer be maintained with a mere handful of faculty. In 1897, the median private institution had only 130 students; the median public-sector institution, at 240 students, was not much larger. By 1924, the median private-sector school had grown to 360 students, with public-sector institutions (1,220 students) growing even more rapidly. As we approached the turn of the twenty-first century, the median number of students per institution was about 1,600 in the private sector and almost 8,200 in the public sector — about five times as high.

The growth in scale and scope favored those institutions that could expand most easily. Public-sector institutions, in part because of their diverse nature and, in part because the new fields were deemed valuable to many states, were in a particularly good position compared to liberal arts colleges and even some private universities. Enrollment in public institutions (as a share of all enrolled students) continued to grow in the ensuing decades. In 1890, only 22 percent of students in four-year programs were in public-sector schools. By 1940, that number had

## Public spending & total enrollments

*In the early 1930s, states with relatively paltry spending on public institutions of higher education were also those with low overall college enrollment rates, regardless of the type and place of college. By 1994, this association appears to have weakened, but is still present.*

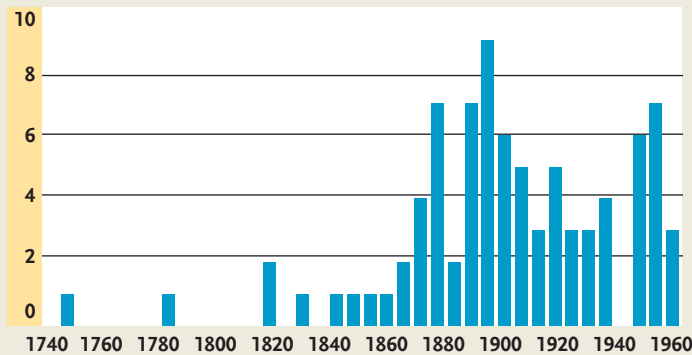


NOTE: College data (freshmen or total) refer to the residents of the state only and are independent of the state in which the college or university is located. They include both public and private institutions.

## The emerging academic division of labor

*The number of learned societies expanded greatly after 1880, reflecting increasing specialization in the way academic subjects were organized and taught. For example, the American Economic Association was established in 1885, the American Political Science Association in 1903, and the American Sociological Association in 1905.*

NUMBER OF LEARNED SOCIETIES ESTABLISHED



NOTE: The year given is the date of founding. Data are grouped in five-year intervals, and the year given is the midpoint.

reached 40 percent. Today about 70 percent of students in four-year programs are enrolled in state schools, and about 80 percent if students in two-year programs are included.

### THE POLITICAL ECONOMY OF HIGHER EDUCATION

A primary reason for state support of higher education is to provide “public goods” for the state and its citizens. Early on, state colleges and universities were often established to produce educated personnel needed to staff teaching at elementary (or common) and secondary (or grammar) schools. State institutions in the nineteenth century were more practically and, often, more scientifically oriented than were their private counterparts, in large measure because of their commitment to provide goods and services of value to local industrial interests. In 1862, Congress passed the Morrill Act, sponsored by Congressman Justin Morrill of Vermont, which gave every state a grant of public land, the proceeds of which were to be used to establish colleges in engineering, agriculture, and military science. Even though many state institutions had been founded before Morrill (although with federal land grants), and another group of schools was established with that legislation, state funding on a per capita or per student basis remained measly until the late nineteenth century, when scientific findings became important in agriculture, mining, oil exploration, engineering, and other industries.

States tended to invest most heavily in training and research when they had a concentration of economic activity in a particular industry or product. This often took the form of research in the dominant industries of the state. Thus, Wisconsin subsidized work on dairy products, Iowa on corn, Colorado and other western states on mining, North Carolina on tobacco, and

Oklahoma and Texas on oil exploration and refining. Many of the state schools established in the latter part of the nineteenth and early twentieth centuries were teaching, technical, and industrial institutes, among them the Lowell Textile Institute in Massachusetts, which opened in 1897.

In keeping with their history of private institutions, states in the Northeast were unique in blending public support with private control. Cornell University received the New York Morrill land grant funds and to this day contains several state-supported colleges within a privately controlled university. M.I.T. received the “mechanical arts” portion of the Massachusetts land grant. (The University of Massachusetts at Amherst received the agriculture portion.) In Connecticut, Yale University’s Sheffield School of Engineering received one part of the state land grant and the University of Connecticut received the rest.

One result of the region’s distinctive tradition of private institutions of higher education has been the impact on female enrollment. Public institutions tend to be more open to women in part because public institutions rely on taxpayer support and in part because private institutions were often founded by religious orders to train ministers.

In 1924, for example, the ratio of male to female students (excepting those in preparatory departments) in four-year institu-

## STATES INVESTED MORE WHEN ECONOMIC ACTIVITY

tions was 2.58 in New England, 2.34 in the Middle Atlantic, but 1.45 in the West North Central, and 1.51 in the Pacific States. The New England and Middle Atlantic states, with their paucity of public institutions and their tradition of single-sex colleges, had a far lower fraction of women among all students. The New England states remained behind other states through the 1930s in this regard, although by the late 1950s this gap began to close.

### PERSISTENCE OF CHANGE IN HIGHER EDUCATION (AND ITS IMPORTANCE FOR NEW ENGLAND)

New England was, by and large, blessed in having some of the earliest and strongest institutions of higher education. Its private colleges and universities have consistently been world-renowned. But the existence of such strong private institutions has meant far less financial support for public institutions, a po-



## THEY HAD CONCENTRATED IN A PARTICULAR INDUSTRY

tentially worrisome condition that persists to this day. New England's state universities have relatively high tuition and receive less public spending per resident than in any other region. Tuition in four-year public universities in New England is 39 percent more than in the nation as a whole. As a result, access to higher education for those from low-income and middle-income families is more difficult in New England than in the rest of the country.

The greatness of New England's private institutions has acted as a double-edged sword. Institutions of higher education were instrumental in the region's transition from a "first industrial revolution" economy to its becoming the "Route 128" and "dot.com" economy. The universities of New England, by providing ideas and new technology for local firms, created new jobs for residents even as the region's population declined rel-

ative to that of the nation.

But while they may have spearheaded a new economy, they have also meant diminished access for the disadvantaged. New England states have not educationally equipped their lower-income residents to move to other areas, both geographic and economic. But only a few states have the best of both worlds of higher education.

Almost a century ago, the governor of the Commonwealth of Massachusetts appointed the Commission on Industrial and Technical Education to investigate how industry was helped or hindered by existing educational institutions. It concluded: "We know that the only assets of Massachusetts are its climate and its skilled labor." More than ever before, one of those claims is true. \*

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