7/12/09

American Universities in a Global Market

INTRODUCTION

Charles T. Clotfelter[1]

Since World War II American universities have occupied an unchallenged position of preeminence in the world. Owing to high rates of educational attainment, vigorous governmental support of scientific research, and a massive influx of scholars from Europe seeking refuge, America during the 20th century supplanted Europe as the home of most of the world's leading universities. Today, American institutions dominate the highest rungs of the various world rankings of great universities. When universities around the world seek to improve themselves, they commonly look to universities in the United States as their model. As a result of America's comparative advantage in this industry, higher education has become one of our major exports.

But there are signs that this position of preeminence could be in jeopardy. The flow of foreign graduate students and scholars into American universities, while still massive, has shown signs of slowing, in the wake of heightened security concerns and competition from foreign universities. Not only are European universities girding themselves for more vigorous international competition, but those in Australia, China, and other parts of Asia have signaled their intention to become major players in the global higher education market. Meanwhile, America's own production of university

[1] This introduction was shaped and informed not only by the chapters contained in this volume, but also by the formal comments delivered by the papers' assigned discussants and the lively discussion among all the participants at the NBER conference held October 2-4, 2008. I am also especially grateful for the helpful comments I received on an earlier draft from Peter Doeringer, Lex Borghans, Frank Cörvers, Ronald Ehrenberg, Richard Freeman, Caroline Hoxby, Han Kim, Charles Phelps, and Debra Stewart.

graduates has slowed relative to that of other developed nations, a trend that was highlighted with alarm in the National Academy of Sciences' 2007 call to arms, *Rising above the Gathering Storm.* Adding to the sense of crisis were the unmistakable signs that America's position of leadership in the world – financial, military, intellectual, and moral – is increasingly being challenged.

The purpose of this volume is to examine aspects of American higher education today that will affect its future global standing. Will American universities retain their leading role? Surely the advantages of scope and scale that they currently enjoy will continue to redound to their advantage. But the ultimate outcome is far from clear. A warning issued by Roger Noll posed a decade ago seems all the more relevant today: "American research universities have enjoyed a wonderful century, rising from a distinctly inferior status to world domination. But in the waning years of this golden age of American science and engineering, the future of these institutions is in doubt."[2]

This volume contains 11 chapters addressing key issues surrounding the position of American universities in the global higher education market. This introduction provides an overview of those issues. It begins by considering the evidence of U.S. preeminence among the world's universities as well as indications that this position might be in jeopardy. Next, I discuss aspects of American higher education that distinguish it as an industry and highlight the ways it has responded to global pressures. The third section addresses the nature of the foreign competition that the U.S. faces in the global higher education market. I then conclude by considering what is at stake for the U.S. in its standing in the world in this industry.

[2] Roger Noll (*Challenges to Research Universities*, Brookings, 1998), p. 1.

I. **A Golden Age for American Universities**

Roger Noll's evocative phrase aptly describes for American higher education the current period of unrivaled ascendancy, a period that began sometime during the first half of the 20th century and continues to this day. To introduce the analyses that follow, I offer some evidence in support of this claim, list some of the advantages enjoyed by American universities, and take note of storm clouds on the horizon.

Documenting American Preeminence

The modern university took shape in Europe, and Europe retained unquestioned world leadership in scientific research through the 19th century.[3] In the United States, some of the colleges that had been founded for the purpose of training teachers and ministers in the 19th and early 20th century, including some public institutions operated by state governments, began to take on some of the characteristics of the renowned German universities, including a serious devotion to research and graduate training. These fledgling universities continued to expand opportunities for undergraduate education, they grew larger, they increasingly incorporated professional training, and they adopted the structures and attitudes to enable them to conduct research at levels that would allow the best of them to compete with European universities.[4]

Today there can be little doubt that most of the world's leading universities are in the United States. One ready indication of this high standing can be found in the various rankings of top universities that have appeared in recent years. The oldest and most

[3] For a comparison of the development of universities in the U.S. and Europe, see Windolf (1997). For analyses of the comparative standing of American and European universities in the 19th and 20th centuries, see, for example, Noll (1998, pp. 2-3) or Weinberg (2008).

[4] For a discussion of the development of American universities in the period 1890 to 1940, see Goldin and Katz (1999).

prominent of these is a ranking that is published by Shanghai Jiao Tong University. A research-oriented, global version of the familiar *U.S. News and World Report* ranking of U.S. colleges, this ranking employs a collection of quantitative measures of research output and scholarly awards, heavily weighted on science, to produce an ordered list based on an arbitrary weighting of these measures.[5] In its most recent ranking, for 2008, 17 out of its 20 top-ranked universities were American. The other frequently cited ranking, by the *Times* of London, produces a list featuring fewer American universities and more from Britain and Commonwealth countries.[6] Of the 13 universities that made both of these top-20 lists for 2008, one was Japanese (Tokyo University), two were British (Oxford and Cambridge), and 10 were American (Harvard, Stanford, MIT, Cal Tech, Columbia, Princeton, University of Chicago, Yale, Cornell, and Penn). Interestingly, a total of seven public universities in the U.S. appeared on one of these two lists for 2008, but none appeared in both.[7] If one expands the list of top universities, for example to the top 50, the dominance of American universities remains apparent. As shown in Table 1, 36 of the Shanghai Jiao Tong top 50 universities for 2008 are in the United States.[8]

---

[5] As explained on its Web site, the Shanghai Jiao Tong University Academic Ranking of World Universities employed "several indicators of academic or research performance, including alumni and staff winning Nobel Prizes and Fields Medals, highly cited researchers, articles published in Nature and Science, articles indexed in major citation indices, and the per capita academic performance of an institution." http://www.arwu.org/rank2008/ARWU2008_A(EN).htm, 12/26/08. As noted by Aghion et al. (2008, p. 2), this ranking scheme places heavy weight on research in science.

[6] Times World University Rankings 2008. http://www.timeshighereducation.co.uk/hybrid.asp?typeCode=243&pubCode=1&navcode=137 12/26/08.

[7] Two other rankings available on the Web include those produced by Webometrics (http://www.webometrics.info/top4000.asp, 12/27/08) and *Newsweek* (http://talk.collegeconfidential.com/graduate-school/226863-newsweek-ranks-world-s-top-100-global-universities.html, 12/27/08). In these two rankings, American universities occupied 20 and 15, respectively, of the top 20 spots in the worldwide ranking.

[8] It is worth noting that the United States is markedly less dominant in global rankings of business schools. For example, the Financial Times ranking for 2009 listed just 24 American business schools among its top

It is instructive to see how the American hegemony suggested by such rankings manifests itself in a single discipline. Drèze and Estevan (2007) spell this out for the discipline of economics, showing how American economists have dominated international recognition and American economics departments have led in training top economists. Coming from a country with a population just three fourths the size of Europe's, American economists accounted for more honors and more research output than their European counterparts. As illustration, the U.S.-to-Europe ratio in Nobel laureates was 2.9, in Econometric Society Fellows, 3.2, in entries in *Who's Who in Economics,* 4.8, and in various measures of publications, 1.9 to 8.3.[9] American leadership is also revealed by the tendency for top economists to obtain their Ph.D.s in the U.S., even if they subsequently return to their home countries. Among 585 economists listed in *Who's Who in Economics* who received their Ph.D.s at American universities, 26% came from abroad (that is, having received their first degrees outside of the U.S.). By contrast, fewer than 20% of the 112 of economists so listed who received their Ph.D.s outside of the U.S. were Americans (Drèze and Estevan 2007, Table 3a, pp. 273-274). In advanced training in economics, therefore, the U.S. is a net exporter.

Indeed, one of the primary byproducts of America's leadership in higher education is the huge number of foreign students who come to the U.S. to study, especially at the most advanced graduate levels. In 2006 the U.S. enrolled a fifth of the world's international students (OECD 2008, Chart C3.3 p. 354). Except for the years

---

50.; http://rankings.ft.com/businessschoolrankings/global-mba-rankings, 1/26/09. Note that business schools require less physical capital than is required in science and engineering and that business education is one of the most active areas for overseas operations of U.S. universities.

[9] Drèze and Estevan 2007, Table 1, p. 273. For Europe, the authors used the EU 15 plus Norway, whose population in 2000 was 382,283, compared to the United States' 282,339. www.demographia.com/db-eu-pop.htm, 12/19/08; *Statistical Abstract of the United States* 2006, Table 1314.

immediately after the 9/11 attacks, international enrollments in all U.S. programs have grown rapidly, increasing at an average rate of 4.8% a year between 1997 and 2001 and a rate of 5.0% a year between 2005 and 2007.[10] In 2007 this amounted to some 623,000 foreigners studying in the U.S. Of these international students, about 44% were enrolled in graduate programs.[11] Although foreign students account for larger shares of bachelor's level college and university enrollments in many other countries than in the United States, the foreign share in U.S. advanced research programs is one of the highest in the world and has risen over time (OECD 2008, Table C3.3). As a consequence, the percentage of graduate students in American universities who are foreign has risen steadily over time. For example, the percentage of science and engineering doctoral degrees received by foreign nationals increased from 26% in 1985 to 40% in 2005 (National Science Board 2008, Figure 2-23). There is no more emblematic sign of the growing number of foreign graduate students than the fact noted by Richard Freeman in his chapter that two Chinese universities – Tsinghua and Peking – have pushed aside the likes of Berkeley, Cornell, and Michigan to become the two most common sources of bachelor's degrees among those obtaining Ph.D.s in American universities.[12]

Explaining America's Dominance

Numerous explanations have been offered for the rise and prominence of American higher education in the 20th century. There are four that I believe deserve

[10] McMurtrie, Beth, "Foreign Students Pour Back into the U.S.," *Chronicle of Higher Education*, November 21, 2008, p. A1.

[11] Between 2005/06 and 2007/08, the number of international students in graduate programs in the U.S. increased from 259,704 to 276,842, for a growth rate of 3.2% a year. Redden, Elizabeth, "Record Year* for Foreign Student Enrollment," *Inside Higher Ed*, November 17, 2008.

[12] In 2006, the top six bachelor's degree-granting institutions represented among recipients of American Ph.D.s were, in order, Tsinghua, Peking, University of California Berkeley, Seoul National, Cornell, and Michigan. See Mervis (2008, p. 185).

particular emphasis: generous government support, the industry's decentralized structure, openness to people and ideas, and the so-called first-mover advantage.

Beginning with the first of these, American universities have benefited from government support, both direct and indirect, and at both the state and the federal levels, and this support, in turn, was made possible by America's buoyant economy and relative affluence. Unlike the public support typical of European universities, that has mostly been in the form of direct funding from central governments, the most common form of direct public support in the U.S. first came from state governments. Inspired both by the desire to see the benefits of education spread widely across the population and an appreciation of the value of imparting practical knowledge, the state universities, especially those in the newer states of the Midwest and West, grew in scale. Federal support was important as well. Before 1900 it came by way of the Morrill Acts of 1862 and 1890. In the 20th century it took other forms, including military-related research during World War II, the subsequent G.I. Bill (1944), which provided generous financial support for veterans to attend college, the National Defense Education Act (1957), which supported graduate students intending to become college and university professors, and numerous other programs to give financial aid to students.

Of particular significance was federal support of non-defense spending through agencies such as the National Science Foundation (1950) and the National Institutes of Health.[13] Not only did these agencies provide funding for university research, they helped to foster collaboration among researchers, and not only those in universities. According

[13] The Public Health Service Act (1944), which launched a period of tremendous growth in spending on public health after World War II, was a significant step toward the creation of the National Institutes of Health (National Institutes of Health, http://history.nih.gov/exhibits/history/docs/page_06.html, 1/25/09). Morris (1965, pp. 419 and 464); National Science Foundation, http://www.nsf.gov/about/history/, 1/25/09.

to Owen-Smith et al. (2002, p. 40) the N.I.H. played a critical role in integrating re3gional collaborative clusters in U.S. biomedical research. The fedral government's contribution to American leadership in this research did not arise, therefore, principally from the dollar value of federal support that universities received. In contrast to that conducted in European universities, biomedical research in American universities relied on a greater variety of funding sources, including a significant share from industry. In 2006 federal support for academic R&D amounted to about $30 billion, which was just 63% of the $48 billion total from all sources. The chief federal funding agencies were the Department of Health and Human Services, the National Science Foundation, and the Department of Defense. Taking into account all sources of support, funding for academic R&D grew in real terms for over three decades. In 2006 it represented 0.4% of GDP (National Science Board, Chapter 5 and Table 5.2).

Indirect government aid may have been equally important for American success, however, especially for private nonprofit universities. Not only did the federal income tax exempt all nonprofit organizations from income taxation, most donations to universities were deductible in calculating the personal income tax, the corporate income tax, and the estate tax. Private foundations, a noteworthy beneficiary of the tax laws, also provided support to universities. At the local level, universities both public and private were exempted from paying most property taxes. In sum, these various forms of government support, both direct and indirect, made more potent by America's affluence, were instrumental in creating research universities that, unlike the specialized research institutions in Europe, simultaneously served several major aims: broad-based

undergraduate education, practically-oriented professional training, basic research in arts and sciences, and applied research and outreach to industry and farm.[14]

A second reason that has been offered for the success of American higher education is its decentralized market structure. In 2005 there were over 4,000 colleges and universities in the U.S., of which about 200 were research universities.[15] Small in number but relatively large in size (they accounted for 23% of total college and university enrollment), these research universities count among their number both private and public institutions. It is precisely their large number, the diversity of their funding, and their autonomy one from another that create the conditions that have allowed them to develop a tradition of vigorous but friendly competition that has proven to be conducive to the pursuit of their core research mission. This friendly competition embodies two seemingly contradictory components. On the one hand, these research universities compete for resources and prominence. They bid against each other to attract prominent and promising faculty. The top, most desired faculty members are highly mobile and are responsive to both financial incentives and attractive working conditions. This responsiveness and mobility is summed up in the apocryphal comment of one dean, "I don't control what they make, only where they work." Owen-Smith et al. (2002, pp. 25, 41) note, for example, the higher levels of mobility among young scientists in the U.S. as compared to Europe. Significantly, such responsiveness operates, albeit for a more

[14] For discussions of the multiplicity of functions in American research universities, see Goldin and Katz (1999, p. 45) and Ash (2006, p.251).

[15] For 2005, the Carnegie Foundation for the Advancement of Teaching listed a total of 4,391 institutions, of which 199 were research universities.
http://www.carnegiefoundation.org/classifications/index.asp?key=805, 12/28/08

limited number of faculty, at the international level as well.[16] In a parallel contest, research universities also actively compete as well for top students – from applicants for doctoral programs to the high school seniors applying for undergraduate spots. These universities (and their faculty) also compete against one another to attract donations and grant funding. In some instances, the availability of public funding provides public universities with a natural edge. In other instances, the freedom from outside interference plus access to pots of private money give the private universities the upper hand.[17]

Competition also occurs within universities, and its widespread use and acceptance as a mechanism for resources allocation in the U.S. contrasts with the resistance it has run into in many European universities (Liefner, Schätzl and Schröder 2004, pp. 35-36). In support of the value of this competition at various levels, Aghion et al. 2008 present evidence that university research output is positively correlated with institutional autonomy and market-like competition.

As fierce as the competition may be between universities, it is joined by a cooperative way of doing business that is as deeply embedded in scholarly custom as it is alien to commercial competition. This cooperation, arising from the openness and collaborative attitudes that are core values in the long tradition of scientific scholarship, means that – contrary to what happens in other industries – employees of different institutions have no compunction about forming partnerships with each other to do research. And this willingness to partner extends beyond universities, to government research shops and industry as well. Although there is nothing uniquely American about this second component, its combination with the distinctly decentralized structure of the

[16] See, for example, Drèze and Estevan (2007, p. 287).
[17] Charles Phelps particularly emphasized the value of having private institutions, with their relative freedom to act, as competitors in the American higher education market.

U.S. higher education industry has produced an environment quite conducive to independent research, powered by strong incentives to be first and be the best. To be sure, a system so rooted in social Darwinism will be one in which some institutions rise at the expense of others. In fact, during most of the three decades preceding the economic shocks of 2008, the entire public sector appears to have languished relative to the wealthiest of the private institutions, as large endowments ballooned while state funding lagged. This public-private divide is a theme touched on by several of the chapters in this volume.

One historical factor sometimes cited as a reason for the 20th century American leadership in higher education is the influx of European scholars that took place in the wake of Nazi ascendancy and rule. This episode serves as a vivid illustration of a third, more general characteristic to explain the success of American universities: their openness to people and ideas. Many of the émigrés who fled European universities in the early 1930s, including such luminaries as Albert Einstein and Edward Teller, ended up in the United States. Not only did this immigration and the terror that motivated it cause leading scholars to move to American universities, it dealt a double blow to German universities, by also revealing their subservience to the Third Reich (Ash 2006, pp. 252-253). Historians do not agree on the ultimate importance of the migration of European scientists. One side argues that it was an essential ingredient for American ascendency in higher education, while the other maintains that it was helpful but not necessary.[18] In either case, the boon from this historical event surely may be viewed as one illustration of

[18] For example, Weinberg (2008, p. 1) quotes Robert Fogel making the former argument. Ash (2006, p. 253) takes the latter view, saying that, while it may have influenced content in some disciplines, the migration "had no transformative impact on the structure or philosophy of American higher education." Likewise, Weinberg (2008, p. 19) assigns to the migration "a modest role" in America's 20th century scientific leadership.

a larger advantage that American universities have enjoyed by virtue of being American, that of a general spirit of openness, to both people and ideas. Despite some glaring exceptions to the contrary, it is no mere expression of chauvinism to distinguish American policies toward immigration and free expression from those of many other countries in the world. This openness turns out to be powerfully complementary with creativity and the vitality of the research university as an enterprise. When taboos are few on the questions that can be asked and the restrictions are few on who can participate in inquiry, scholarly investigation has its best climate in which to thrive.

Fourth among the reasons why America emerged as world leader in higher education is also an argument for why it may remain so for a while. It is a set of factors that can be lumped together under the heading of "first-mover advantage." By establishing a position of leadership, the U.S. has in effect erected barriers to entry into the top rungs of higher education. That is, being at the top makes it easier to stay there and harder for others to get there.[19] One aspect of this advantage is the collection of favorable local externalities created by faculty, other researchers, and trained resource and support personnel within universities. Despite the marvelous advances in communication of the late 20th century, many of the production relationships in higher education stubbornly retain a reliance on face-to-face communication. These spillover effects on research productivity seem especially strong when it comes to having others in one's own field and in lab settings that require hands-on work. In the terms of textbook economics, universities enjoy economies of scope, and these economies of scope require a certain degree of scale before they become operational. So when a scholar chooses between two universities, one an established university with a full complement of active

[19] For an application to biomedical research, see Owen-Smith et al. (2002, p. 40).

scholars in his or her discipline, and another just starting to undertake a research program, the established university will have an obvious appeal. Where the prominent universities are, therefore, is also where academic jobs will carry automatic advantages. A similar, but more general, advantage that American universities share with those in other English-speaking countries is the use of English itself, the language that became in the 20th century the dominant language in science, engineering, and other technical fields. As Drèze and Estevan (2007, p. 278) noted, with admirable irony, "English is the undisputed *lingua franca* of economics!"

Trouble Ahead?

Despite the abundant evidence that American universities are in fact kings of the global hill, troubling pieces of evidence have appeared that cast some doubt on the permanence of the present state of affairs. To be sure, it may be that a certain degree of equalization across countries is simply to be expected, as incomes elsewhere rise relative to those in the United States, causing demand for higher education to rise abroad. From this perspective, if America loses its dominant position in terms of numbers of students and institutions, this should not be a major concern. Such a sanguine point of view is evident in part of Richard Freeman's chapter of the volume. But evidence of a loss of leadership at the top rungs of institutions, a weakening of the ability to attract the top graduate students and scholars, or an absolute decline in scholarly output would be cause for genuine concern, at least from the standpoint of the United States.

One source of concern lies in the diminishing numbers American college students who undertake advanced study in science, technology, engineering, and math (STEM)

fields, a trend that is aided by high rates of attrition among college students who start out majoring in a STEM field, only to switch majors (U.S. National Academy of Sciences 2007, p. 327). These falling STEM enrollments among American college students may be connected to two other troubling indicators: the stagnation of U.S. college completion rates and the lackluster performance of American students on international tests. In the last two and a half decades, the expansion of college degree attainment in the U.S. has been eclipsed by advances in other developed countries. In 1980 the U.S. rate of college completion was 22%, exactly twice that of the median of 13 other OECD countries. By 2004, this rate had risen in the U.S. to 39%, but the median in the 13 comparison countries had caught up with and soared ahead of the U.S., to 46%.[20] In international comparisons of math and science, American youngsters turn in middling performances. In the PISA international test of science performance in 2006, for example, the percentage of American 15 year-olds who scored in the top two levels (7.5%), was near the median of 30 OECD countries.[21] In the 2007 TIMSS math tests, American 4th and 8th graders scored above some advanced countries and below others, consistently being beaten by Japan and England.[22] To be sure, some observers believe that such international tests paint an unfairly negative portrait of American education. Gary Becker

[20] Cascio et al. (2008, Table 2). The 13 OECD countries in this comparison group were: Australia, New Zealand, Britain, Austria, France, Germany, Italy, the Netherlands, Spain, Switzerland, Denmark, Finland, and Sweden.

[21] PISA stands for Programme for International Student Assessment, a test administered by the OECD. The 14 countries whose 15 year olds surpassed the United States were Australia, Austria, Belgium, Canada, the Czech Republic, Finland, German, Ireland, Japan, Korea, the Netherlands, New Zealand, Switzerland, and the U.K. OECD (2008, Table A5.2, p. 116.)

[22] U.S. National Center for Education Statistics, *Trends in International Mathematics and Science Study (TIMSS)*, http://nces.ed.gov/timss/table07_1.asp, 1/5/08.

has argued, for example, that what American students lack in rigor at the high school level they make up for with creative thinking and more diligence in college.[23]

In his chapter in this volume, Eric Bettinger examines the decline in the propensity of American college students to obtain Ph.D.s in math, science and engineering. Between 1970 and 2005, the numbers of U.S. citizens who obtained doctoral degrees in these STEM disciplines declined in absolute terms.[24] The decline was 23% in engineering, 44% in physical sciences, and 50% in mathematics (Bettinger p. 1). He endeavors to explain these troubling declines by looking closely at the pipeline that produces Americans with Ph.D.s in STEM fields. One likely culprit is insufficient preparation at the K-12 level, illustrated by the humble standing of U.S. students in international tests such as those noted above. But Bettinger finds that the pipeline leaks in several places. Among students who start college in a STEM major, even for those with high test scores, there are high rates of attrition. Instead of science and engineering, American undergraduates tend to gravitate toward business, education, and the social sciences. Some of these defections can be attributed to the lure of more lucrative earnings possibilities, but certainly not all. At the end of the day the question remains just how serious a problem such leaks in the pipeline are when market signals appear to make at least some of it quite rational.[25]

Another sign that American universities might be losing ground is revealed in a marked deceleration in science and engineering research publications. Between 1995 and

---

[23] Gary Becker, "Test Scores and Economic Performance," *The Becker-Posner Blog*, September 10, 2006; http://www.becker-posner-blog.com/archives/2006/09/, 1/26/09.

[24] Bettinger focuses on these fields: computer science, math, engineering, and natural sciences.

[25] The plentiful supply of foreign graduate students and post docs is one probable cause for unattractive prospects in STEM fields. One conference participant, Michael Teitelbaum, has argued that the avoidance of STEM careers by Americans should not be a cause of concern, in light of the uncertainties and relatively low wages that characterize many careers in STEM disciplines. (Teitelbaum 2007).

2005 the number of science and engineering articles authored by Americans grew at an average rate of 0.6% a year, a rate that was outpaced by authors in Europe (1.8%) and Asia (6.6%) (National Science Board 2008, Table 5-19). The result of these disparate growth rates is that the U.S. share of global science and engineering articles has fallen. As Table 2 shows, the U.S. share of world article production fell from 34.2 to 28.9% over this ten-year period. Europe's share also fell slightly, while that of ten Asian countries jumped from 13.5% to 20.4%. Declines also mark the U.S. share in most-cited articles (62.3 to 54.6%) and in citations (49.6 to 40.8%).

In his chapter, James Adams examines evidence of both American preeminence and America's weakening position. Its undeniable dominance after World War II, he argues, can be attributed not only to the previously noted emigration to the U.S. of European scientists and other scholars, but also to the growth in U.S. federal funding for research and development during and after the War, the burgeoning access in America to college and university training, and the growth of technology-intensive industries. By the 1980s, however, the growth of research output in Europe and Asia had begun to outpace that of American universities. As an illustration, the American share of world citations declined from 52% in 1992 to 42% in 2003. To explain this slippage, Adams examines factors associated with scholarly output in American research universities, using data compiled by field, university, and year. He documents, and then seeks to explain, a marked slowdown in research output beginning in the mid-1990s, especially in public universities and in lower-ranked disciplines within universities. Over the same period, private universities strengthened their ability to bid for top faculty.

II. **Universities as Firms in Global Competition**

Before one can analyze the effects of global forces on American universities and their international standing, it is necessary to look closely at the research university as an organization, as a firm. How are the large numbers of foreign students flowing into the U.S. utilized in the production that research universities undertake? How do universities respond to growing demand for training and research abroad? In the vocabulary of economics, questions such as these go to the heart of two aspects of these firms: their production functions and their objective functions. Thus it is vital to begin by trying to answer these basic questions concerning universities as firms. Doing so leads directly to a consideration of two issues directly related to the link between American universities and the global higher education market: the role of foreign students and post docs in the production of research and decisions by universities to set up overseas programs.

A Peculiar Kind of Firm

As a "firm," the modern research university differs from the modern corporation in at least three important respects. As explained by sociologist James Coleman in a 1973 essay, the university as an organizational form retains one of the essential characteristics of its medieval forebear: it is more a community than it is a hierarchy. Top-down decision-making is rare; today's successful university presidents are those who can persuade or coax various groups of stakeholders to do what needs to be done. Two other features follow from this community structure. The first is that the university has no overarching aim, except "to be the best." Second, those who carry out its main functions are not employees in the traditional sense, but rather "semi-independent professionals" (Coleman 1973, p. 369). These characteristics produce a "firm" whose production process resembles a neighborhood of busy bee hives or independent shops more than it

does an assembly line tended by workers performing specialized tasks. Not only must the CEO and his lieutenants – president, provost and deans – suffer the indignity of their employees occasionally refusing their requests, these corporate officers must also accustom themselves to seeing these employees routinely join with those working for rival universities in projects of joint production, sharing ideas and expertise in the process.[26] This is not to suggest that presidents and provosts are without the power to nudge their institutions in one direction or the other, especially when this can be accomplished by creating new entities under the university's umbrella. It is simply to say that top-down, disciplined, hierarchical control, a pillar of the modern corporation, has no real parallel in the modern research university.

Production in these firms yields research (of many highly differentiated varieties, to be sure), training, and a variety of activities loosely described as "service." Some of this training is highly complementary with the research function, illustrated by the graduate student who acts as lab assistant in a research project while she learns advanced skills and collects data as part of her doctoral training. In such labs and other collaborative research projects in the university, the utility of face-to-face contact and common access to research facilities makes it infeasible for universities to set up branch plants. Another feature that discourages branches may be fear of possible damage to the university "brand" that could result from sub-par or disreputable research. Whether or not these are in fact the reasons for it, one distinctive feature of research universities is the remarkable rarity of branches and franchises as they are defined in the corporate world.[27]

[26] Feldstein (1992, pp. 38-39) argues that university administrators not only lack power, they lack the incentive to bring about any changes that would make too many waves, or enemies.

[27] To be sure, many state universities have branches, but these are typically branches in name only. A state's branch campuses are more aptly described as a loose confederation linked by a common source of

These peculiarities in production have particular relevance for the likely effects of foreign graduate students and for decisions regarding overseas programs.

The Role of Foreign Students in Production

The high percentage of foreign graduate students in American graduate programs has a double significance. On the one hand, it is a sure sign of quality, a natural byproduct of the high standing enjoyed by American universities. The best universities in the world attract the best graduate students in the world. On the other hand, it is at the same time a sign of vulnerability, of the fragility of American hegemony. Should the high quality graduate students whom we have become accustomed to welcoming and putting to work in our universities decide instead to stay at home or go elsewhere for graduate training, American universities could be in for a painful adjustment.

John Bound and Sarah Turner document the flows of international students into American universities, noting that the sources and effects of flows of graduate students are quite distinct from those of undergraduates. At the doctoral level, where complementarities with research are the highest, the flows of graduate students have been massive, leading to the marked increases in the shares of foreign graduate students noted above. Tracking doctoral students by the beginning dates of their programs, they show an increase of 20 percentage points in the share of Ph.D. candidates from abroad, that share having risen from 29% for the cohort beginning study in 1980 to 49% in the 1996 cohort. This growing share of foreigners has been especially noteworthy in science, social science, and engineering. In some fields it was the result of absolute declines in Americans as well as increases among the foreign-born. The absolute number of foreign

---

funding and a single regulatory body. They seldom constitute branches of a single research university in the sense of an auto manufacturer's plants or an accounting firm's regional offices.

doctoral students has exceeded that of Americans since the late 1970s in engineering, since the late 1980s in economics, and since the mid-1990s in physical sciences. In the life sciences, enrollments by U.S. citizens have continued to grow, but at a slower rate than foreign enrollments.

It is not enough simply to count the number of students, however. A full accounting requires attention to differences in quality as well. Bound and Turner show that the growth in numbers of foreign students in U.S. universities has generally occurred outside the top programs. They find little evidence to suggest that foreign students are "crowding out" American students in these graduate programs. One implication of their analysis is that American universities have less to fear from any future declines in the number of foreign doctoral students, as long as they are limited to second-tier U.S. programs. Bound and Turner are also attentive to geographical patterns, showing that the top three source countries for doctoral students in science and engineering are China, India, and Korea.

What do these waves of foreign graduate students mean for the productivity of research universities? It has become a truism that doctoral training is complementary with the production of research, but can that complementarity be documented? How dependent have American universities become on the ready availability of foreigners to work in their labs and collaborate on research projects? These are the questions that motivate the chapter by Grant Black and Paula Stephan. To assess the role of foreigners in the research of American universities, Black and Stephan get under the hood of university research by concentrating on the central role of collaborative work in the sciences, most of which occurs within labs. While most previous research has focused on the importance of

faculty who are foreign nationals, Black and Stephan take a new approach that allows them to ferret out the role of graduate students and post docs in research projects. They document the role of these participants in university research by analyzing authorship patterns for articles published in the journal *Science*. Analyzing articles whose last authors were affiliated with a U.S. university and which had fewer than 10 authors, they determine the position and ethnicity of all authors as a way of characterizing the role of foreign graduate students and post docs in the research projects associated with these articles. They document that graduate students and post docs are quite important, serving as authors in over 85% of all articles and as first authors in three quarters of the cases. Using ethnic identification of names to suggest country of origin, they find that over half of the articles had a foreign student or post doc as a coauthor. They conclude that foreign graduate students and post docs are not simply important in staffing the labs of American universities; they actually play leading roles in university research projects.

Overseas Programs

International figures on post-secondary enrollments make clear that the market for higher education, like those for a multitude of other goods and services, is growing at much faster rates abroad than at home. This burgeoning of foreign demand has led American corporations of all stripes to boost exports and establish beachheads of production and distribution abroad. A similar instinct is evident among American universities, although it is restrained by the strong reluctance, noted above, to establish branches away from the main campus.

In spite of this reluctance, instances of American universities setting up overseas programs have occurred with surprising regularity in recent years. In addition to

programs offering distance learning, this export instinct has manifested itself primarily in professional education. For example, Cornell Medical College's branch in Qatar, opened in 2002, graduated its first class in 2008. It was the first time an American medical school had awarded degrees overseas. Other universities, including Duke, Johns Hopkins, Indiana, and Ohio State, have gone part way toward setting up full-fledged branches by forming partnerships with foreign medical schools.[28] A different sort of partnership, one that is designed to create a new research university out of whole cloth, is the partnership between three prominent American universities with the new King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. The University of Texas, Berkeley, and Stanford will each receive at least $25 million in return for assistance in establishing programs in computer science and engineering.[29] In yet another model of outreach, Duke University proposed to establish partnerships and branch campuses in five different locations – Dubai, London, New Delhi, Shanghai, and St. Petersburg – where it plans to offer an MBA plus other professional degrees in what they are calling the "first global business school."[30]

Not only are they of obvious relevance to the future global position of American universities, programs such as these raise the question of just what objectives universities are pursuing. Given the view put forth by Coleman, that universities have no clearly defined purpose, this becomes a doubly interesting category of programs to study. This is

[28] Mangan, Katherine, "Cornell Graduates its Inaugural Class at Its Medical College in Qatar," *Chronicle of Higher Education*, May 7, 2008.
[29] Lewin, Tamar, "U.S. Universities Join Saudis in Partnerships," *New York Times*, March 6, 2008.

[30] Redden, Elizabeth, "An Ambitious Approach to Overseas Expansion," *Inside Higher Ed*, September 16, 2008.http://www.insidehighered.com/news/2008/09/16/duke, 12/29/08.

the backdrop to the chapter by E. Han Kim and Min Zhu. They view universities as firms, to be sure, but firms that are different in some important ways from conventional for-profit corporations. For one thing, one of their principal outputs, research, is a public good that often has no immediate payoff. The other principal output, teaching, is a largely private good whose payoff is both tangible and rapidly realized. They argue that, in their consideration of overseas commitments, universities act like multinational firms. The authors argue that universities appear to maximize the present value of their net revenues, and that this orientation is most evident in their practice of price discrimination.

. Not all universities are the same, of course. Kim and Zhu divide universities into two groups. One is composed of research-oriented institutions with high intellectual capital, whose fortunes are heavily dependent on their reputations. These universities are reluctant to put their reputations on the line by starting programs or forming alliances that might produce substandard research. The other group, universities with modest research reputations, depend mainly on teaching for revenue, can afford to be less picky about their partners, and are consequently more likely to offer overseas programs. Asia and the Middle East have become popular destinations for such programs. The authors note two waves of foreign programs. The first, beginning in the 1980s and reaching a peak in 1995 before declining, was marked by the failure of almost all of the programs started in Japan. The second wave, after 2000, has involved some high profile universities, such as the ones noted above. Kim and Zhu conclude that the actions of American universities in the global market for advanced training reveal that economics, not altruism, guides their decisions.

III. **External Forces on American Universities**

The future position of American higher education in the world is not, of course, entirely in its own hands. As the discussion above makes clear, that position depends in part on a large and continuing flow of talented graduate students from abroad to help fill a university's graduate rosters and staff its labs. More generally, the fortunes of American universities will be directly influenced through two main channels by a host of forces and developments, ranging from economic growth and geopolitical alignments to government policies directly affecting higher education. One of these channels is obviously the flow of students from abroad to American universities. Although undergraduates are a part of this flow, the critical component is the graduate student portion. The number of such students, their quality and thus their suitability as researchers, and their desire to remain in the United States after they finish their degrees are all aspects that are both important to American universities and influenced by conditions in the students' home countries. The chapters in this volume that cover three Asian countries well illustrate how these kinds of influences make themselves felt. The other primary channel through which conditions and institutions abroad directly affect American universities is in the international academic labor market. Next to ideas and graduate students, probably the most mobile of factors important to higher education is research faculty. To the extent that foreign universities are able to attract and keep top scholars, the competitive position of American universities is clearly going to be challenged. Indeed, this is the ultimate threat to the continued preeminence of American universities.

The Competition for Graduate Students and Faculty

The number of foreigners willing and able to enroll in American graduate programs depends on the number who obtain appropriate undergraduate training and the availability and quality of graduate programs outside the U.S., both in their own countries and in third countries. Growth in the first of these – undergraduate education – has been strong worldwide and breathtaking in a few countries. According to UNESCO figures, the number of students worldwide enrolled in all postsecondary ("third level") programs grew at an annual rate of 5.0% between 1990 and 2004. (This compares to growth of only 1.6% a year in the U.S.) But enrollment growth was spectacular in the world's two largest countries: it was 6.2% a year in India and 12.3% a year in China. As of 2004 China had 21.3 million students enrolled in these postsecondary programs, more than the United States' 17.3 million. India had another 11.8 million in such programs (U.S. Department of Education 2007, Table 385).

While these figures clearly overstate the number of students who are prepared to enter doctoral programs, let alone top-ranked ones, they surely suggest the kind of growth that has taken place in potential graduate enrollments. All of which lends significance for the U.S. of the inability of China and India to provide sufficient high-quality graduate programs to accommodate the burgeoning demand for graduate training by their own citizens. Given the vast disparity between the growing numbers of potential graduate students and suitable places for them in their home countries, it is little wonder that American universities – as well as those in Britain, Europe, Australia, and elsewhere – have enjoyed a flood of applications from Chinese and Indian students. Nor is it surprising that China and India account for the two largest groups of foreign students in the U.S., followed by South Korea.

Besides these wellsprings of enrollment growth, the other element in determining America's success in attracting the best graduate students is the ability of competing universities to attract these students. The stronger the competition, the more successful foreign universities will be in attracting top faculty as well as strong applicants for advanced study. Thus the prospects for continued American preeminence in higher education depend in large part on the rate of improvement of universities abroad, particularly in the two giant countries producing so many of the world's aspiring scholars and researchers. And, indeed, a number of countries around the world have set out explicitly to bring about just such improvement.

One prominent effort at reforming higher education is Europe's so-called Bologna Process, a series of concerted efforts begun in 1999 to rationalize and standardize degree requirements throughout much of Europe. As Ofer Malamud describes in his chapter for this volume, these reforms will make European programs more closely resemble those of American universities. More significantly, it will cause them to resemble each other, and this uniformity will make it easier for students to transfer between institutions in Europe. Interestingly, similar changes have recently occurred in Australia, where six universities have revised their academic programs in an attempt to put them more in line with the American model.[31]

Particularly important for the issues stressed in the current volume are reforms that seek to beef up universities' capacity to do research capacity and, as a by-product, undertake high-level doctoral training. The most audacious among these policies are the efforts by China to build world-class universities, discussed by Haizheng Li in this

[31] Overland, Martha Ann, "Australian Universities Revamp Degree Programs to Become More Like Those in the U.S." *Chronicle of Higher Education,* September 30, 2008.

volume. To provide incentives for high-quality research, countries have adopted policies with explicit incentives. For example, Britain adopted rating procedures for departments in its universities, wherein funding is directed to those departments rated highly by review boards using criteria based on publication records. Similarly, Germany allocated funds to universities largely on the basis of quality of research, and faculty salaries in Chinese and Australian universities were made dependent in part on the basis of numerical scores based on publications and citations. [32] And India announced in 2008 plans to set up a quasi-independent National Science and Engineering Research Board, patterned after the American National Science Foundation, and to double such government funding for science and technology.[33]

Reforming European Higher Education

After the United States, Europe is the world's leading region for higher education. It awards more Ph.D.-equivalent degrees than the United States, and its universities are among the most storied and prestigious in the world. According to the Shanghai Jiao Tong ranking for 2008, Europe contained over a third of the world's top 100 universities. Through the Bologna Process, Europe is setting about to reform its system of higher education by homogenizing various countries' degree programs and creating a system of course credits, making it easier to transfer between institutions and generally making European courses of study be more comparable to those in American colleges and universities. Ofer Malamud's chapter in this volume examines the scope and likely effects of these reforms. By shortening the time required for a bachelor's degree and

[32] Labi, Aisha, "Obsession with Rankings Goes Global," *Chronicle of Higher Education*, October 17, 2008, p. A27 and Hicks (2007, p. 236).
[33] Neelakantan, Shailaja, "India to Double Spending on Scientific Research,' *Chronicle of Higher Education*, December 4, 2008.

making many course credits transferable between different institutions, the cost of false starts will be reduced, possibly allowing students to obtain degrees that better fit their own skills and predilections, and degree completion should be speedier. These changes should also, he argues, make European universities more attractive to foreign students and therefore more successful in competition against American universities.

An entirely different aspect of reform in Europe is addressed by Lex Borghans and Frank Cörvers in their chapter. They focus on research and graduate training, using the discipline of economics in Dutch universities as a case in point. They observe a broad shift in perspective from national to international among faculty in European research universities in the last two decades, a shift that is heavily influenced by American standards and practices. The internationalization of research has brought with it a set of changes that have tended to break down national boundaries and deemphasize purely national concerns. English has become the language of internationally-focused professional writing, a change that is evident not only in professional journals but in dissertations as well. English is becoming the language of teaching at the doctoral level. Research faculty increasingly strive to publish in foreign (especially American) journals, and international travel to professional meetings has become almost commonplace. Structurally, faculties and graduate programs in European universities have come to look more and more like American ones. As Borghans and Cörvers explain, although faculty must incur costs in making some of these changes, the professional benefits are palpable. But these benefits differ by field (they are greater in the sciences, where research interests differ little across countries) and by language area (they are greater in smaller language areas, in such countries as Sweden or the Netherlands). Accordingly, the switch to

English tended to start earlier in these fields and countries. Like the reforms embodied in the Bologna Process, these changes have the effect of making European universities more competitive with American ones for the best trained international students.

Developments in Asia

As the enrollment figures above attest, there is no area of the world to rival the large countries of Asia when it comes to potential for future development in university research and training. With the exception of Japan, however, Asia has so far failed to develop universities on a par with the scholarly accomplishments of its native sons and daughters. It remains a huge and alluring question just when the region will produce world-class universities. Thus Asia bears attention on two planes: the contribution of its natives to research universities abroad and its development of domestic research universities. Separate chapters analyze, in turn, China, India, and South Korea.

No country boasts a longer or richer history of cultural and scientific achievement than China. Yet, owing to the cataclysm of the Cultural Revolution, modern higher education in China had a very late start, as Li spells out in his chapter. Following a ten-year hiatus, China resumed administering its national college entrance exam in 1978. Thereafter enrollments grew with breathtaking speed. In recent years the Chinese government has announced an objective of launching as many as 800 colleges in the next 15 years.[34] Over the last three decades, the flow of talented students from China to the U.S. has made Chinese education an important complement, or input, in the work of American universities. An alternative role that the Chinese education system could play vis-à-vis American universities is that of a competitor. In an effort to enhance its

[34] Mooney, Paul, "The Wild, Wild East; Foreign Universities Flock to China, But are There Riches to be Made, or Just Fool's Gold?" *Chronicle of Higher Education*, February 17, 2006, p. A46.

competitiveness, China has embarked on a bold effort to create world-class institutions by pouring resources into China's most established institutions and adopting policies to enhance their quality. One strategy described by Li is to recruit scholars from abroad, focusing particularly on the thousands of native Chinese who have built academic careers in the U.S. and elsewhere. To bolster this effort, Chinese universities are offering markedly higher salaries, as Li documents using data for the discipline of economics. Whether such efforts, added on top of pre-existing trends and the undeniable realities of scale, will someday thrust Chinese universities into the top rungs of global ranking seems clear. The only question is, how soon.

India presents a starkly different situation. In contrast to the ambitious plans laid out by the Chinese, Devesh Kapur describes in his chapter on Indian higher education a state-supported structure of universities and training institutes weighed down by a brittle bureaucracy and patronage politics. The few flashes of brilliance on the Indian higher education scene seem to occur as much in spite of government policy as because of it. Traditional, state-supported universities in India, Kapur writes, are plagued by insufficient funding, debilitating centralized regulation, rent-seeking, a weak culture of research, and massive faculty shortages. Public institutions have also become subject to an extensive system of ethnic quotas designed to increase the enrollment rates of students from lower castes. The weaknesses of the established universities have led to wholesale flight by elite students to doctoral programs overseas, chiefly to those in America. As for professional training, the market has responded to the state-supported system's shortcomings by sprouting home-grown private substitutes – new private institutions and corporate-sponsored training programs. The private sector's growth has produced a

doubling since 1980 in the shares of engineering and medical degrees awarded in the private sector. Even if recently announced plans to launch new institutes in technology and management come to pass, however, India's institutions of higher education appear likely to continue to keep lagging behind the educational achievements of its best students.

The case of South Korea, as described in the chapter by Sunwoong Kim, is a vivid demonstration of the interplay between home-country conditions and American opportunities in guiding the career decisions of foreigners who obtain doctoral training in American universities. This case also illustrates the bonds of influence that are created and sustained when foreigners receive their training in American universities, although the case of Korea is distinctive, since relations with the U.S. have been close for over a century. Having achieved more economic prosperity sooner than either China or India, South Korea could more effectively beckon to its scholar-expatriates abroad with the prospect of university or other professional employment back home. The strength of this pull to return has varied over time, depending on economic conditions and education policy in Korea, alternately fostering brain-drain of scholars to the U.S. and later encouraging them to return home. An underlying but powerful theme of this history is the legacy created by the massive number of Koreans who obtained their doctoral training in America. One lasting result is that Korean higher education has a heavy American flavor; half of the faculty at Seoul National University with Ph.D.s got them from American universities. Not only have Korean students and scholars contributed on a large scale to the American higher education enterprise, the resulting ties, both professional and

personal, illustrate the dimensions of interrelationships evident in the global position of American universities.

IV. **Looking Ahead and Taking Stock**

After at least a half century as undisputed global leaders, American research universities face a future that in many ways looks as promising as the recent past. Yet unbridled confidence seems quite unwarranted. Chief among the items that give pause is a global financial crisis whose first calamitous shocks were unfolding just as this conference was taking place, in early October of 2008. The events that shook the world's financial system in the fall of 2008 made a dramatic dent on the endowments of private American universities, and the accompanying recession seems destined to put a crimp on both state revenues and household income, posing an equal or greater threat to the well-being of public universities. In considering future prospects for American universities, and for the country itself, it is important to look beyond the likely effects of the recession to the longer run trends analyzed in the studies contained in this volume.

To assess how American universities will fare in the next decade or two, a natural starting place is to consider the favorable characteristics and circumstances that have made possible their current high standing. The four traits noted in section I of this introduction were: government support, decentralized competition, openness, and first-mover advantage. The prospects for continued American advantage arising from the first two traits – government support and decentralized competition – rest to some degree on the shape and severity of the current economic recession and on the federal government's response to it. As American dominance in higher education has in part been a function of its strong economy, economic vulnerability will surely raise questions about the

continuation of public, as well as philanthropic, support. If federal spending for research and development in the U.S. fails to grow at least as fast as such spending in European universities, that would surely not auger well for future world standing. Even before the financial crisis of 2008, however, a distinguished science panel was calling for the federal government to construct a new giant particle accelerator so that the U.S. would not be left behind in physics.[35] Early indications from the Obama administration, building on a promise to double federal funding of basic research over a decade, appeared to bode well for federal support.[36] But in the wake of the 2008 global financial collapse, neither government support nor private resources can be taken for granted; this goes for American universities and their foreign competitors alike. Stay tuned.

Equally difficult to predict is the effect of recession and other forces yet unseen on the vigorous competition among universities for faculty and other resources, dependent as it is on those universities having the financial wherewithal to compete. In light of the daunting economic conditions of the current moment, any jaunty confidence remaining from the heady decades of the recent past must surely be tempered with caution. For some time observers have expressed concerns about the ability of the top public research universities to remain competitive with elite private universities, given evidence of divergences in faculty salaries and other spending useful in attracting top scholars. It seems likely that a severe recession will do nothing but further weaken the economic position of public universities, but large question marks will hover over future private donations as well as the performance of endowments, both of which have been

[35] See Overbye, Dennis, "Science Panel Report Says Physics in U.S. Faces Crisis," *New York Times*, April 30, 2006, p. 26.
[36] See Kelly Field, "Cautiously, Scientists Put Faith in Obama Promise," *Chronicle of Higher Education*, January 30, 2009, p. A1.

critical to the achievements of private universities in recent decades. In a backhanded way, the advantages of institutional autonomy and market competition may work against the continued dominance by American universities, if this structure is emulated elsewhere. In a recent statement, French President Nicolas Sarkozy signaled his support for greater institutional autonomy: "there is not a single example in the world of great universities that are not autonomous."[37]

As for the third advantage – openness – the prospects for continued openness would appear fairly good. There remain, for example, few restrictions on permissible topics and methods of research, although federal restrictions on embryonic stem cell research are a conspicuous exception to this general rule. A greater threat to openness lies in manifestations of post-9/11 national security concerns, such as delayed visa approvals, restrictive visa policies, and an unwelcoming attitude toward foreign visitors, that discourage foreigners from visiting or studying in the U.S.[38]

What of that last item, the first-mover advantage? Although it has not gone away, the efforts of scholars and universities abroad to adopt American modes of operation – ranging from the structure of degree programs to the use of English – will surely serve to lessen its power. As Malamud argues in his chapter, the Bologna reforms promise to

---

[37] "French President Attacks 'Infantilizing System' of 'Weak Universities,'" *Chronicle of Higher Education*, January 28, 2009. If Western Europe is now partially emulating American higher education, it would reflect the similar, limited Americanization of European economic institutions in the decades after World War II. See Djelic (1998).

[38] The National Academy (U.S. National Academy of Sciences 2007, p. 34) stated, "Immigration procedures implemented since 9/11 have discouraged students from applying to US programs, prevented international research leaders from organizing conferences here, and dampened international collaboration. As a result, we are damaging the image of our country in the eyes of much of the world. Although there are recent signs of improvement, the matter remains a concern." Regarding restrictive visa policies, see also ibid., p. 36. For a report reflecting these various influences, see McCormack, Eugene, "U.S. Visa Data Suggest a Coming Rise in Foreign Enrollments," *Chronicle of Higher Education*, July 21, 2008.

make European universities as a whole a more homogeneous product and its component programs more comparable and therefore interchangeable. Not only will this increase the attractiveness of European universities within Europe, it could also make them more attractive for those outside Europe to the extent that the European degree structure, particularly its three-year bachelor degree, becomes widely accepted. Indeed, European authorities are actively working to build on the standardization achieved through the Bologna reforms to establish linkages to universities in Canada, Australia, and Latin America.[39]

In research, the first-mover advantage remains a potent force to the extent that universities depend on face-to-face contact, but it is diminished to the extent that new modes of communication and data retrieval lessen the need for geographical propinquity and physical access. Change there has been. Whether they constitute the revolutionary democratizing agent that many believe they have become (Friedman 2005), digital innovations such as JSTOR and Google, not to mention the Internet itself, have dramatically reduced the advantage of having an office within walking distance of the reference desk of a world-class university library or, for that matter, the office of a coauthor. To borrow the words of Black and Stephan, advances such as these have surely transformed "the technology of discovery." Kim, Morse and Zingales (forthcoming) argue that such innovations have already begun to nullify the advantages arising from physical proximity. Using research output data of economics faculty from the 1970s to the 1990s, they document the decline and disappearance of the benefit of being affiliated

[39] The European University Association on its website describes its efforts, including "forging institutional alliances and partnerships which, as European universities respond to global challenges and increasingly seek to position themselves internationally, become more and more important." http://www.eua.be/international-relations/, 1/26/09

with a top 25 university, although average productivity although average productivity of top departments remains high, owing to the effect of past agglomeration patterns. Thus, as cell phones have allowed late-developing countries to dispense with the need to lay land lines, the Internet will render superfluous many of the reference volumes that were considered indispensible in 1980. Countries and universities attentive to new technologies and intent on improvement, then, may benefit from a second-mover advantage.[40]

In short, American universities will continue to benefit from a having arrived there first, but the potency of this advantage seems destined to diminish over time. This advantage could be further reduced if American higher education as a whole rests on its laurels, a possibility that is more than a little bit credible. Consider for example the changes in work processes and productivity being wrought by technological innovations. Any close examination of such changes in higher education compared to those in other service industries will reveal that the changes in higher education have been relatively modest. While many processes in other industries have been "re-engineered," universities continue to do many things in much the same way they were done in the 19th century: lecturers employ blackboards, journals are printed and bound, and bachelor's programs take four years. At the undergraduate level, colleges and universities have resisted calls for greater accountability and assessment, at the same time that worrisome trends continue, including a long-term secular decline in the amount of time undergraduates spend on academic work and the above-noted drop in STEM enrollments.[41] To the extent that dominance breeds self-satisfaction, American universities could be vulnerable. One

[40] The concept is not unlike the advantages of backwardness once put forth by Gerschenkron (1962).
[41] See the AAUP's reaction to recommendations of the Spellings Commission (AAUP 2006) and Babcock and Marks (2008).

need look no farther than the case of automobiles to see how an American industry, once the envy of the world, can quickly fall from grace.[42]

In his chapter, Richard Freeman takes a broad look at the implications for the U.S. of the changes in the global market for higher education and America's position in it. To a great extent, he reminds us, the catching-up in enrollments abroad, and the concomitant fall in America's share of global enrollment, are natural outcomes of rising propensities for higher education in both advanced countries and very populous developing ones. Thus the U.S. share of all higher education enrollments worldwide fell from 29% in 1970 to 12% in 2006.[43] Our share of science and engineering Ph.D.s is higher than these, but is also falling over time. At the same time, international students are accounting for a larger share of students in American doctoral programs. This trend is fueled by the very elastic supply of foreign graduate students. Freeman points out that these trends hold benefits for our universities, by giving them access to the world's most promising graduate students and, by the way, raising the quality of applicants to those American universities beyond the most elite group, all of which should result in yet higher rates of research output for American universities as a whole. The resulting research output will contribute to the growth of knowledge, and thus to growth and rising incomes worldwide, and to the supply of highly trained graduates who can be hired by American corporations both domestic and multinational. In addition, the heavily international flavor of graduate enrollment in American universities means that many leadership roles abroad, both in universities and outside of them, will be held in the future, as is now the case, by individuals who once studied in the U.S. Freeman's chief caveat to this largely sanguine

[42] For a narrative of the auto industry's fall, see Halbersham (1986).
[43] For an analysis of broad trends in enrollments around the world, see Schofer and Meyer (2005).

view is that these benefits will accrue only to the extent that American universities hold onto their sizable competitive advantage over universities in Europe and elsewhere. Inevitably, however, this advantage is likely to diminish.

In the near term, therefore, the rising share of foreign graduate students in our universities is cause for celebration rather than concern. Those students represent high-quality inputs into what remains a vibrant American industry. The benefits accrue to the United States and to the world at large. These benefits come in the form not only of scientific knowledge itself, but also in the model provided by American universities and funding agencies of how to undertake academic research. In the words of Diana Hicks:

> The institutions of modern science have in many ways been a gift from the United States to the rest of the world. The U.S. has demonstrated that the best-quality scientific research is fostered when funding is awarded competitively, when plentiful, rigorously trained Ph.D. students and post-docs are available cheaply, when substantial amounts of money are spent, when modern equipment is used, and when transfer of research to technological application is encouraged (Hicks 2007, p. 242).

Thus, neither the shrinking U.S. share of global enrollments nor the rising share of foreign students in American universities should themselves be a cause for special concern. One is a largely natural consequence of catching-up and relative population size, and the other holds important benefits for our universities as well as the American economy and nation. Not the least of these broader benefits is the extensive yet intangible advantage that accrues from that fact that so many leaders around the world have lived in the United States for at least the years of their graduate training. The bonds of affection and appreciation that so often accompany such experience constitute an important source

of what has been deemed "soft power," an element of foreign policy that can only become more vital to U.S. national security in the coming decades.[44]

It seems likely, indeed, that global leadership in higher education is tethered in a real sense to leadership defined more broadly. In assessing the position of American universities in the world, it may be useful to look beyond the campus walls and consider economic, political, and ideological leadership. Such a broader view may be necessary in order to reach a full understanding of why American universities were able to push aside British and European ones in the 20th century to achieve preeminence. Although America's position of leadership in the world remains fairly secure in the first decade of the 21st century, it is difficult to ignore the existence of widespread negative attitudes toward the United States, especially with regard to its foreign policy and especially after its invasion of Iraq in 2003 (Katzenstein and Keohane 2007, p. 15). One perhaps small but telling sign of waning American influence is the decline among supreme courts in other countries in the frequency with which they cite decisions issued by our own U.S. Supreme Court.[45] The actual importance for higher education of leadership in these disparate domains is unknown, of course. What seems more certain is that the future standing of American universities will depend largely upon their continued ability to take advantage of those features of higher education in this country that have served it well over the past half century. One need only consider the demise of the U.S. automobile industry to realize that even a position of global preeminence can be a vulnerable one.[46]

[44] For an explanation of this concept, see Nye (2004). See also U.S. National Academy of Sciences 2007, p. 36) for an application to foreign students in U.S. universities.
[45] Liptak, Adam, "U.S. Court is Now Guiding Fewer Nations," *New York Times*, September 18, 2008.
[46] For a short history, see Halbersham (1986).

References

Aghion, P., M. Dewatripont, C. Hoxby, A. Mas-Colell, and A. Sapir, "The Governance and Performance of Research Universities: Evidence from Europe and the U.S.," unpublished manuscript, December 2008.

American Associate of University Professors, Statement of the Committee on Government Relations regarding the report *A Test of Leadership: Charting the Future of U. S. Higher Education*, September 26, 2006. http://www.aaup.org/AAUP/GR/federal/FutureofHigherEd/spellrep.htm, 2/20/09

Ash, Mitchell G., "Bachelor of What, Master of Whom? The Humboldt Myth and Historical Transformations of Higher Education in German-Speaking Europe and the US," *European Journal of Education* 41(No. 2, 2006), 245-267.

Babcock, Philip and Marks, Mindy, "The Falling Time Cost of College: Evidence from Half a Century of Time Use Data," unpublished paper, June, 2008.

Cascio, Elizabeth, Damon Clark, and Nora Gordon, "Education and the Age Profile of Literacy into Adulthood," NBER Working Paper 14073, June 2008.

Coleman, James S., "The University and Society's New Demands Upon It," in Carl Kaysen (ed.), *Content and Context* (New York: McGraw-Hill, 1973), pp. 359-399.

Djelic, Marie-Laure, *Exporting the American Model: The Postwar Transformation of European Business* (Oxford: Oxford University Press, 1998).

Drèze, Jacques H. and Fernanda Estevan, "Research and Higher Education in Economics: Can We Deliver the Lisbon Objectives?" *Journal of the European Economic Association* 5(April/May 2007), 271-304.

Feldstein, Martin, "Comment," in Charles T. Clotfelter and Michael Rothschild (eds.), *Studies of Supply and Demand in Higher Education* (Chicago: University of Chicago Press, 1993), pp. 37-42.

Friedman, Thomas, *The World Is Flat: A Brief History of the Twenty-first Century* **(**New York: Farrar, Straus and Giroux, 2005).

Gerschenkron, Alexander, *Economic Backwardness in Historical Perspective* (Cambridge, MA: Harvard University Press, 1962).

Goldin, Claudia and Lawrence Katz, "The Shaping of Higher Education: The Formative Years in the United States, 1890-1940," *Journal of Economic Perspectives* 13 (Winter 1999), 37-62

Halbersham, David, *The Reckoning* (New York: William Morrow and Co., 1986).

Hicks, Diana M., "Global Research Competition Affects Measured U.S. Academic Output," in Paula E. Stephan and Ronald G. Ehrenberg (eds.), *Science and the University* (Madison: The University of Wisconsin Press, 2007), pp. 223-242.

Katzenstein, Peter J. and Robert O. Keohane (eds.), *Anti-Americanisms in World Politics* (Ithaca, N.Y.: Cornell University Press, 2007).

Kim, E. Han, Adair Morse, and Luigi Zingales, "Are Elite Universities Losing their Competitive Edge?" *Journal of Financial Economics*, forthcoming.

Liefner, Ingo, Ludwig Schätzl, and Thomas Schröder, "Reforms in German Higher Education: Implementing and Adapting Anglo-American Organizational Management Structures at German Universities," *Higher Education Policy* 17 (2004), 23-38.

Mervis, Jeffrey, "Top Ph.D. Feeder Schools are Now Chinese," *Science* 321 (July 11, 2008), 185.

Morris, Richard B. (ed.), *Encyclopedia of American History* (New York: Harper and Row, 1965).

National Science Board, National Science Foundation, *Science and Engineering Indicators 2008* (Arlington, VA: National Science Board, January 2008). http://www.nsf.gov/statistics/seind08/, 1/5/08.

Noll, Roger G. (ed.), *Challenges to Research Universities* (Washington, D.C.: Brookings Institution Press, 1998).

Nye, Joseph, *Soft Power: The Means to Success in World Politics* (New York: Public Affairs, 2004).

OECD, *Education at a Glance 2008* (2008) http://www.oecd.org/dataoecd/23/46/41284038.pdf, 12/26/08

Owen-Smith, Jason, Massimo Riccaboni, Fabio Pammolli, and Walter W. Powell, "A Comparison of U.S. and European University-Industry Relations in the Life Sciences," *Management Science* 48 (January 2002), 24-43.

Schofer, Evan and John W. Meyer, "The Worldwide Expanison of Higher Education in the Twentieth Century," *American Sociological Review* 70 (December 2005), 898-920.

Teitelbaum, Michael S., Testimony before the Subcommittee on Technology and Innovation, Committee on Science and Technology, U.S. House of Representatives, November 6, 2007.

U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*, 2007 http://nces.ed.gov/programs/digest/d07/tables/dt07_385.asp?referrer=list, 12/30/08.

U.S. National Academy of Sciences, Committee on Science, Engineering, and Public Policy, *Rising above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (Washington, D.C.: National Academy Press, 2007).

Weinberg, Bruce A., "Scientific Leadership," unpublished manuscript, Ohio State University, August 2008; presented at meeting of the NBER Higher Education Working Group, November 13??, 2008.

Windolf, Paul, *Expansion and Structural Change: Higher Education in Germany, the United States, and Japan, 1870-1990* (Boulder, CO: Westview Press, 1997).

Table 1. World Ranking of Universities, Shanghai Jiao Tong University, 2008

World Rank	Institution*	Country
1	Harvard University	USA
2	Stanford University	USA
3	University of California - Berkeley	USA
4	University of Cambridge	UK
5	Massachusetts Institute of Technology (MIT)	USA
6	California Institute of Technology	USA
7	Columbia University	USA
8	Princeton University	USA
9	University of Chicago	USA
10	University of Oxford	UK
11	Yale University	USA
12	Cornell University	USA
13	University of California - Los Angeles	USA
14	University of California - San Diego	USA
15	University of Pennsylvania	USA
16	University of Washington - Seattle	USA
17	University of Wisconsin - Madison	USA
18	University of California - San Francisco	USA
19	Tokyo University	Japan
20	Johns Hopkins University	USA
21	University of Michigan - Ann Arbor	USA
22	University College London	UK
23	Kyoto University	Japan
24	Swiss Federal Institute of Technology - Zurich	Switzerland
24	University of Toronto	Canada
26	University of Illinois - Urbana Champaign	USA
27	Imperial College London	UK
28	University of Minnesota - Twin Cities	USA
29	Washington University - St. Louis	USA
30	Northwestern University	USA
31	New York University	USA
32	Duke University	USA
32	Rockefeller University	USA
34	University of Colorado - Boulder	USA
35	University of British Columbia	Canada
36	University of California - Santa Barbara	USA
37	University of Maryland - College Park	USA
38	University of North Carolina - Chapel Hill	USA
39	University of Texas - Austin	USA

40	University of Manchester	UK
41	University of Texas Southwestern Medical Center	USA
42	Pennsylvania State University - University Park	USA
42	University of Paris 06	France
42	Vanderbilt University	USA
45	University of Copenhagen	Denmark
46	University of California - Irvine	USA
47	University of Utrecht	Netherlands
48	University of California - Davis	USA
49	University of Paris 11	France
50	University of Southern California	USA

Source: Shanghai Jiao Tong World Rankings, http://www.arwu.org/rank2008/ARWU2008_A(EN).htm, 12.30/08

Table 2. Share of World Science and Engineering Articles, Citations, and Most Cited Articles, U.S., European Union, and Ten Asian Countries, 1995 and 2005

Category		U.S.	E.U.	Ten Asian countries
S&E articles				
	1995	34.2	34.7	13.5
	2005	28.3	33.1	20.4
Top 1% of cited S&E articles				
	1995	49.6	30.6	8.2
	2005	40.8	33.7	12.9
Citations of S&E articles				
	1995	62.3	24.7	4.9
	2005	54.6	29.0	7.5

Source: National Science Board, *Science and Engineering Indicators 2008,* Table 5-19, Appendix Table 5-19, and Table 5-28.

Note: the 10 Asian countries include China (including Hong Kong), India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand.