Trends in American & German Higher Education

Edited by Robert McC. Adams

AMERICAN ACADEMY
OF ARTS & SCIENCES

Trends in American & German Higher Education

Published by
the American Academy of Arts and Sciences
with the support of the
German-American Academic Council
in collaboration with the Berlin-Brandenburg
Academy of Sciences and Humanities

ISBN#: 0-87724-028-0

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Foreword

This report is the result of a study sponsored by the German-American Academic Council (GAAC) with grants to the American Academy of Arts and Sciences and the Berlin-Brandenburg Academy. As explained in the introductory chapter by Robert McC. Adams, editor of the report, the essays that follow were initially designed to provide an introductory orientation for a more extensive comparative study of German and American systems of higher education and research. Termination of the GAAC in December 2000 has made continuation of this study impossible. However, we believe that the essays in this report are of sufficient value on their own, dealing as they do with critical issues raised by changes that now face both university systems, that they should be made available. For this reason the American Academy has undertaken to publish the report, which has implications for decision making and scholarship in both countries.

It should be noted that the following report is only one of many contributions to scholarship that have fulfilled the original mission of the GAAC—to strengthen German-American cooperation in all fields of sciences and humanities. On behalf of those who have played an active role in the GAAC, we hope that the transatlantic cooperation stimulated by the GAAC will continue.

KENNETH W. DAM

Chairman, German-American Academic Council

Preface

The present publication is the end result of a complicated process of collaboration, which nevertheless has not been without its own share of academic interest. The original conception of the undertaking can be traced to the mid-1990s. That it now, with some delay, can be made available to a specialized readership in the United States and Germany, and also to the general public of both countries, is due in no small measure to the generosity of the American Academy of Arts and Sciences, which has expressed its willingness to accept the collected contributions as part of its series of publications.

Both the German and American research and university systems find themselves under the influence of the changing world political and economic situation of the late twentieth and early twenty-first centuries in a complex process of transformation. All affected parties are called upon to participate both actively and critically in the construction of their future. This consideration motivated the German-American Academic Council (GAAC), with headquarters in Bonn and Washington D.C., to lend its support to a binational, comparative study by the American Academy of Arts and Sciences on the one side and the Berlin-Brandenburg Academy of Sciences and Humanities on the other.

This study, which marks the beginning of a collaboration between the two academies, at first bore the provisional title, "Changing German and American Systems of Higher Education and Research." The objective of this problem-oriented and multi-disciplinary undertaking was to be the investigation of the changes and challenges which have emerged on the threshold of the new millennium, for both systems. The study was to compare the challenges and the opportunities with which the academic community on both sides of the Atlantic is presented in the face of the considerable political, economic and social pressures currently exerted upon the university. The particular focus of the project was the future of institutions of higher education in Germany and the United States. It was the original intention of the participating institutions to establish the foundation for recommendations to those on the political side, and to the institutions themselves on the academic side, in both countries. In addition, it was intended to provide a secure basis for successful future German-American collaboration in scholarship and research.

For the more detailed conceptualization of the project both Academies set up planning groups or "steering committees," whose representatives first met in joint session in New York in September 1996. They identified themes of joint interest and formulated general theoretical conceptions.

It was then possible on the German side to engage several young academics, proven by their track records and existing publications to be experts in their respective fields, as contributors to the project. The German and American partners agreed on the production of two national reports, one for each country, prepared by the two teams of contributors that would address key questions and problems. These reports were also intended to establish the basis for an impartial comparison of the different systems.

This German-American undertaking represents an attempt at a political study. In its realization it also illustrates clearly the problems inherent in a binational comparative approach. Thus even the basic concepts of "higher education" and "research" proved in large measure to be expressions of the respective cultural and national traditions which, even in the age of globalization, have lost nothing of their basic, formative power. In this connection one thinks immediately of the absence of an all-embracing American concept of a "further education system" such as can be readily applied to the Federal Republic of Germany.

The continuation of this project in the direction of a more policy-oriented study was not to be fulfilled. Unfortunately, the GAAC found itself unable to continue its support of the study, and shortly thereafter the Council itself was dissolved. In the light of this history, the present collection of contributions can have no pretension to comprehensiveness. A whole range of subjects could not be treated, such as, to name but one example, the huge complex of biomedicine, traditionally a field with unique problems requiring specific consideration and recommendations. The collected individual contributions of the German and American participants therefore fulfill a double function. On the one hand they attempt to provide a perspective on the basic principles and salient characteristics of both the higher education and research systems, and on the other hand they are intended to stimulate further and more detailed future studies. Such studies should contribute to a deeper mutual understanding of the higher education systems in both countries.

I would like to express special thanks to our partner, the American Academy of Arts and Sciences, specifically in the person of Professor Robert McC. Adams, who not only undertook the task of finding qualified U.S. researchers for this study, but also held both the theoretical and organizational reins in his hand. For their dedication and not least for their patience, thanks are also due here to the authors of the German contribution, Dr. Jürgen Enders, Dr. Barbara M. Kehm, and Professor Uwe Schimank, as well as to the other members of the German team. Not only have they competently and critically participated in the project through some difficult phases, but have exerted considerable effort in guiding it in the direction of its originally conceived continuance through specialized studies. Finally, thanks are due to the GAAC for its financial support of the study from 1996 to 1998.

Berlin, January 2001

DIETER SIMON

President, The Berlin-Brandenburg Academy of Sciences and Humanities

CHAPTER 1

Changing German & American Higher Education & Research Systems: *A Comparative Assessment*

ROBERT McC. ADAMS

AT ITS VERY INCEPTION, the German-American Academic Council (GAAC) recognized that higher education and its linkages to research held a central place among its concerns. Most of the Council's members had long occupied positions of personal leadership in one or both of these subjects. In the face of more immediate priorities, however, the present monograph must constitute the GAAC's sole effort to take a comprehensive, systemic view of the condition of higher education and research in Germany and in the United States, and of the needs and challenges that lie ahead.

These studies were originally intended merely to provide an introductory orientation—a common framework of basic understanding—for further, more detailed analyses and policy recommendations to come. Not wholly unexpectedly, they may better serve to illustrate the great complexity and difficulty of making such large-scale comparisons. Higher education and research, undeniably involving a loosely related, generic set of issues in all developed countries, are deeply embedded in their many national traditions. Point-for-point comparisons, especially of a kind that might facilitate useful policy recommendations in either Germany or the United States, too easily lose sight of layer upon layer of fundamental differences in their larger societal contexts.

Plans for this undertaking evolved slowly, under different institutional auspices. Although we recognized the importance of an iterative approach involving frequent contacts between independent teams of investigators, a variety of scheduling and financial consider-

ations sharply limited such contacts. In their present form the two studies largely stand side-by-side, with regrettably limited internal effort at integration. Fortunately, the circumstance of their common origin and auspices, and the familiarity of both sets of investigators with each others' studies as well as at least the broad outlines of the relevant literature on both countries, suggest many commonalities that readers will quickly discover for themselves.

The two studies were commissioned by the GAAC under agreements respectively with the American Academy of Arts and Sciences and the Berlin-Brandenburgische Akademie der Wissenschaften. Many thanks are due to Professor Dr. Dieter Simon, President of the Berlin-Brandenburgische Akademie, for organizing and convening the German team of investigators. This writer undertook the same role for the United States, and as a member of the GAAC also provided overall liaison with the Council and its Executive Committee. It should be noted that the U.S. team was to have included Dr. Robert Rosenzweig, former President of the Association of American Universities, who was unable to continue because of illness.

This introduction perhaps may serve in part as a kind of Executive Summary of the studies' common features. For those familiar with only one of the two national systems, it may also provide a very basic introduction to the other. Given the complexity of the differences in institutional frameworks, it narrows the field of view from the entire class of higher educational institutions to universities that closely resemble one another in conducting significant levels of basic research as well as doctoral and postdoctoral training.

It should be stressed that it was never intended to portray the recent history of the two systems, nor to compare and contrast them as idealized equilibrium models. Both are currently caught up in large, contending forces of change. It is not unlikely that there will be a convergence in at least some respects, but a further effort at prediction would be merely speculative. Since it is clear that few of these forces are more than marginally under the control of universities in either country, one major focus of interest involves only the current and immediately prospective directions and dynamics of the ongoing changes.

RELEVANT GENERAL CHARACTERISTICS OF THE TWO SYSTEMS

To begin with the U.S. system of higher education, it comprises, in its full breadth, some 3,000 public and private institutions. It is almost completely lacking in centrally established standards or direction. Federal funding primarily takes the form of research grants and contracts on the one hand and various programs of student aid on the other; at the baccalaureate and higher levels what are defined as public institutions are primarily funded by the individual states.

About a third of the 18–19 year-old cohort are enrolled upon approval of their individual applications, mostly participating initially on a full-time basis. Somewhat more than five million of these, a large majority, enroll in four-year colleges and universities, with fewer than a third of this number pursuing their studies only on a part-time basis. In graduate programs in the arts and sciences, on the other hand, the proportion shifts: part-time enrollments contribute more than 70 percent of the total. Tuition charges for all students, mitigated by scholarship and some fellowship support and sometimes subject to discounting, are all but universal.

Gross statistical comparisons with Germany are somewhat complicated by changes accompanying German unification. On the eve of the Wall's removal, there were fewer than 100 universities among the 248 West German institutions of higher education. Unification added 17 universities and 50 other institutions of higher education, with new categories of educational institutions, to total 655 institutions of higher education; this total, however, may have been based on varying criteria. Funding responsibilities are shared between the federal government and the individual states. General policy-setting and specific governance responsibilities involve federal as well as state inputs, although on a more differentiated basis, as described in the German part of our study.

German students passing the *Abitur* examination have a right to matriculation in a university, but by assignment rather than by individual application. Part-time status is common, but remains unrecorded. Equality of opportunity is the dominant consideration, with the side-effect that institutional loyalty is generally much weaker than is the case with graduates of American universities. Under German law, no charges are ordinarily levied for tuition in non-professional degree programs. Consideration is being given to placing a limit on the number of years of enrollment, but currently there is no such limit. University enrollments have grown very rapidly—approximately doubling since the early 1970s and including an increase of more than two-thirds in the 1990s alone.

In population, the United States is slightly more than three times larger than Germany, a difference in scale that suggests the possibility of a variety of non-linear disproportions between the two higher education/research systems. But other differences are not so easily accounted for. For example, Germany, with nearly 2 million students enrolled in post-secondary educational institutions, has not one-third but only about one-eighth of the U.S. enrollment level of 14 million. Clearly, other factors must be called upon to explain this.

The picture looks different, however, when we disaggregate post-secondary education. Fewer than 30 percent of U.S. students are enrolled in universities with graduate programs leading to the Ph.D. degree, while this applies to about two-thirds of German students. For students in this presumably more specialized, demanding category,

German enrollments amount not to a proportionate one-third but to about 46 percent of the U.S. total. With respect to the number of Ph.D. degrees awarded annually, the U.S. total of about 45,000 is about four times Germany's total of 11,200; an additional 800 receiving *Habilitation*, necessary for university teaching at the professorial level, will have previously received doctoral degrees. The substantially higher proportion of foreign graduate students (concentrated in engineering and the sciences) in U.S.institutions significantly augments the number of Ph.D's, so that German-American differences very closely follow the proportional differences in population.

For both countries, these numbers would be much larger if M.Ds as well as Ph.D's were taken into account. The difficulty with doing so is that most physicians become primarily practitioners rather than research specialists, and hence fall somewhat outside the frame of this more narrowly focused study. Moreover, the biomedical complexes in both countries are so large and specialized that here they cannot receive the attention they deserve. Setting aside doctoral training in medicine, this suggests that differences in scale between the sets of institutions in the two countries with Ph.D. training programs and substantial research commitments are of relatively little significance.

Other, more heterogeneous factors are likely to play a larger role. Those most likely to have common effects in the two countries include: the increasing salience of medical care expenditures in state and federal budgets, accentuated by a parallel rise in the proportion of the elderly in both populations; public demands for greater relevance and accountability on the part of universities and their faculties; the impacts of the Information Age not only on academic operations but on the pursuit of knowledge generally; the approaching full participation of women not only in higher education but in careers made accessible by this training; the increasing return of older individuals for mid-career re-training (in part reflecting growing employment insecurity); rapid advances in high technology and the resulting intensified global economic volatility and competition; and increasing world-wide concerns over issues of sustainability and environmental deterioration.

Among the trends or forces less likely to have parallel effects in the two countries are: widening disparities in income levels and the sharply attenuated role of minorities in higher education (United States); and the impact of high levels of structural unemployment especially affecting younger people entering the workforce (Germany). German unemployment remains at high levels, with income transfer and welfare payments remaining high, while beginning to decline significantly in the United States. Military expenditures in the United States, on the other hand, have been and remain a much higher proportion of GDP than those of Germany. Within the limited scope of the present effort, it may be reasonable to assume

that, wherever the balance lies, it tends to promote greater convergence than differentiation between the two systems.

There is a fundamental difference between governance structures in U.S. and German universities. In private U.S. institutions final authority generally rests in the hands of self-perpetuating boards of private trustees. Individuals who are chosen (often including some alumni) tend to be prominent in business or professional life, but very rarely hold current academic positions or are active in politics. With varying levels of consultation with faculties (and to a much more limited degree, with students) these boards exercise fiduciary responsibility, approve budgets, and appoint and set the terms for university senior officers. While informally open to considerable faculty input, they have final authority in setting broad directions of academic growth or change upon the recommendation of those officers and have ample freedom to stand against most forms of external pressure. Finally, the members of these boards assume many representational responsibilities with government bodies and the broader public, and are expected to be generous in meeting the financial needs and goals of the institutions. In the American system of values, this type of public service constitutes an important personal honor and is usually exercised by individuals with the level of serious and disinterested behavior it deserves.

American public (state) universities modify this pattern to varying degrees. Regents or trustees of these institutions are elected in many cases, and political considerations almost always enter into their selection in varying degrees. But the ethic of detachment from at least short-term considerations of personal or political interest is generally strong and prevailing. The placing of ultimate authority in such boards is almost never seriously challenged, and can fairly be described as having been a bulwark of the autonomy of these institutions and their faculties and students.

In Germany, by contrast, internal decision-making power, including the election of Rectors, is largely vested directly in university faculties (with some representation also of non-academic staffs and students). As the German chapter of this report states: "This character of the university as a corporation manifests itself in academic self-regulation which is respected by state authorities." "… no strong hierarchy exists. University leadership—rectors and deans—cannot disregard the majority of the chair-holders." That set of understandings is described as having encouraged "non-aggression pacts" to defend the interests of individual faculty members, "a marked tendency to preserve the status quo," and a practice of seldom making decisions that are not unanimous (see Chapter 4).

At a national level the Science Council (Wissenschaftsrat), a very prestigious body lacking any U.S. counterpart, has the crucial role in

recommending broad structural, strategic, and investment decisions involving universities generally. Approval and costs for construction of major new academic facilities are shared by the federal and state governments. Basic decisions on the establishment or elimination of positions or departments in individual universities rest with their respective state governments.

CHANGING LEVELS OF AUTONOMY, DIFFERENTIATION, AND PRIVATIZATION

Differences between the current states of the German and American systems emerge most strikingly in a dominant American tendency to strive for institutional differentiation while in Germany this trend, though growing, still seems substantially outweighed by considerations of equality and uniformity. Conceptualizing this disparity in other terms, the U.S. study presented here makes "privatization" its central theme. For comparative rather than purely descriptive purposes, however, privatization may inadequately locate or characterize the major differences. Private institutions of higher education are still relatively rare in Germany, although they are beginning to play a significant part in some sectors, such as business and engineering. But broadly similar considerations are in play even in the absence of a pronounced public-private contrast.

Privatization is an area in which the United States almost inevitably holds the lead, for reasons deeply rooted in its own history and culture. A major institutional focus in U.S. universities is on maintaining, and if possible increasing, the level of excellence of elite institutions through processes that are frankly competitive. It is taken for granted that there will be relatively fewer, more successful, competitors in any such processes. The prevailing value system is such that less attention is paid to assuring common, minimal standards of quality or opportunity applying to all members of the class of universities, than to the standard-setting successes of the very best institutions.

The German pattern, by contrast, includes an emphasis on state-supported equality of student opportunity and on procedural safeguards that often have the effect of sharply constraining inter-institutional competition. Each of these two national emphases can be construed as a kind of value position, but it should be stressed that neither is absolute and both are variably held and in flux.

U.S. tendencies, as reported under the heading of "privatization," are highly differentiated and becoming more so. Our attention can be directed primarily to what are known (following the widely accepted Carnegie classification) as Research Universities, 125 in number and enrolling about 2.7 million undergraduate and graduate students. This group of institutions accounts for a large majority of the annually awarded arts-and-sciences doctorates and about 88 percent of federally funded research in universities. Both private and

public universities are included in this category, the former dominating rankings of prestige although they are all considerably smaller than most of the state institutions. The distinction between the two types of institution needs further discussion, since it contributes to the dynamics of change in U.S. higher education and as yet lacks any counterpart in the German system. This is not to imply, however, that the distinction is entirely clear-cut even within the U.S. system. On the contrary, it is already somewhat blurred, and probably is becoming more so.

Public funds flow to virtually all U.S. private as well as public universities, primarily for research and student support but also for many specialized programs. Levels of direct support from their state legislatures are progressively declining at many of the major state universities, in some cases to substantially less than 20 percent of their annual budgets. These institutions are meeting their needs in ways that more and more closely resemble those of private universities. Some are correspondingly acquiring aspects of autonomy popularly associated only with a private status. Tendencies of a rather similar (although on the whole as yet less well developed) kind, aimed at securing a greater amplitude of autonomy and independence, are also increasingly to be found at many German universities.

The internal vs. external location of primary levels of decision appears to be a more fundamental criterion for comparison than private vs. public in the most usual meaning of those terms. Privatization implies in the first instance that ultimate control is vested largely in a board of individuals who tend to be self-perpetuating in their membership and generally are not public officials; the axis of change is precisely in the direction of increasing levels of individual and institutional autonomy.

Privatization is not exclusively a matter of structural autonomy and formal freedom of action. It is closely coupled with more subtle transformations in perceptions, assumptions, and values. What was once commonly thought of as new knowledge, for example, is increasingly often characterized today as "intellectual property." The same applies to the growing entrepreneurialism that can be documented in university planning, cost-accounting, outside contracting for ancillary operations, and exploitation of faculty patents in pursuit of profit (often shared with the inventor, using various formulas) as well as public benefit. Inevitably, this trend involves some concurrent shrinkage in the breadth of faculty oversight.

Although not easily subject to generalization for this reason, the prestige ranking of the individual institution appears to form another principal axis of variation. An overlapping source of differences in institutional strategy is that public and private universities prevailingly follow different courses of action. A basic element in the approach taken by the most prestigious private universities in the U.S. involves their having found it both necessary and possible to stabilize their

enrollment levels and increase their revenue flow by annually raising announced tuition levels by several percentage points above the prevailing rate of inflation. Harvard University's tuition level, to cite a single example, has increased more than five-fold (in current dollars) over the course of two decades. Demand has heretofore proved relatively elastic (although this may now be changing, with rates of tuition increase showing signs of moderating) so that such increases have had little or no effect on selectivity even where undergraduate enrollments have also been permitted to grow.

The success of this strategy of differentiation reflects widening public recognition of the later career advantages conferred by degrees from elite institutions. It also reflects the generally very favorable (although increasingly stratified) economic climate: there is a significantly enlarged pool of U.S. families of university applicants for whom even substantially heightened tuition levels are not a serious deterrent.

The pursuit of increasing prestige along multiple paths is a key unifying element of a strategy that is reported in the U.S. study to have "paid handsomely." Careful control of overall levels of expenditure, including holding faculty size and graduate student enrollment relatively constant, is not inconsistent with this. But limits in that respect are accompanied by rising faculty salary levels and the recruitment of faculty "stars," often with highly individualized, special inducements, in order to highlight the purported superiority of an institution's faculty. Other substantial investments, with the same general objective, are made in the amenities offered to undergraduate students. With a concern for social equity as well as for recruitment of the most able students from a wide variety of backgrounds, policies of "need-blind" admission are followed (although rising costs now place them in jeopardy in all but the wealthiest institutions). Such policies amount to tuition-discounting for many, while still enabling prestigious institutions to receive full revenue from those most able to pay.

Lower-ranked private institutions are affected in two contradictory ways by the pursuit of this elite-focused strategy. On the one hand, with doctoral production since the early 1970s having "far outstripped the number of faculty openings in most fields," lower-ranked universities have benefited from a buyers' market to upgrade their potential for externally funded research as well as prestige through superior junior faculty appointments. Simultaneously, however, a widening of the gap between leading and following institutions reinforces a system that was already hierarchical. Some weaker institutions may presently be in real jeopardy, although, as they are viewed as private institutions, this is not a matter of direct governmental concern.

Escalating faculty salaries and related expenditures, typically rising at rates well above that of general inflation, affect weaker as well as stronger institutions but leave the former with fewer means of responding effectively. Less prestigious institutions face the prospect

of having to engage in steeper tuition discounting, losses of selectivity in admissions, or even rollbacks in announced levels. More generally, most institutions at the base of the private-sector pyramid face conditions varying only in degree of uncertainty and risk.

While private U.S. universities have on the whole preserved their freedom of initiative and decision making on matters like these, most public universities encounter greater difficulties in following the same course. Public institutions, particularly lower-ranking ones, have had to absorb by far the larger part of the long-term growth in the proportion of high school graduates seeking some form of college education. With more externalized modes of governance, hard choices are more difficult both to make and to follow. The most prestigious and successful of the public institutions tend to be those that have also attained the greatest degree of effective autonomy from political oversight and "occasional meddling," and that have the most assured control over their own revenue streams. These aspirations and tendencies are clearly an aspect of a convincing public-institution surrogate for privatization.

As Dean David W. Breneman of the University of Virginia has commented with reference to that institution's Board of Visitors, declining state support of a public institution raises the obvious question of why a minority stakeholder (the state) should determine 100 per cent of the board's composition. A logical next step (although politically not an easy one) would be for the legislature to allow some members of the governing board of this privately financed public university to be selected by other means (*Chronicle of Higher Education*, 7 March 1997).

The major state-based Research Universities, with state-supplied capital budgets and some operating subsidies, can maintain much larger enrollments at substantially lower tuition levels. As the rationale has received wide currency that students receiving a prestigious education should be expected to pay more for it, steeply rising state university tuition levels have compensated for declining state funding. Within their category, these universities also dominate in faculty quality and size as well as in volume of externally funded research. On the other hand, their relatively more public character places constraints on their ability to match elite private institutions in salary levels to attract and hold faculty stars.

But, at least partly compensating for this, state universities can often sustain much larger departments with wider arrays of specialists in some mainstream disciplines. Equally within their means are far larger research departments on the peripheries of traditional fields—peripheries that are frequently associated with enhanced prospects for social or commercial relevance. This capacity to be a "loosely coupled adaptive system of growing complexity" gives them a seldom-recognized but significant competitive advantage over elite private

universities, with whom they may in other respects be unable to keep pace in terms of spending. In the long term, it may be an advantage that can seriously threaten the leadership presently provided by elite private universities.

Generalizing for the class of research universities as a whole, Roger L. Geiger in his U.S. report notes that rising cost constraints, a shrinkage of the academic market for Ph.D.'s, and other considerations have led to a shift to undergraduate education as the "top priority." Marketing plays an increasing role in student recruitment as formerly steep rates of budgetary growth (and consequent faculty growth) decline. Increasing competition for the most qualified students leads to increasing selectivity on the part of the most prestigious institutions, with the disquieting result of enhancing the degree of social stratification within higher education. The constraint of static faculty size at a time when there are increasing research demands along disciplinary "peripheries" is said to have "stretched the university intellectually and organizationally in ways that may be unstable in the long run."

Turning to Germany and the issue of emergent, "market-driven" differentiation vs. the prevailing ethic of equality of opportunity, the relative absence of private institutions of course gives the subject an entirely different dimension. No less important is the critical general problem of the growing disparity between the educational services German universities as a group are called upon to provide and their available means to do so. Privatization, insofar as there may presently be an emerging counterpart to the U.S. pattern, can take place only within an atmosphere bordering on crisis.

The trend through time in the financing of German universities must be as disconcerting to any outside observer as it is a matter of deep concern to most immediate participants. The size of the professorial faculty, after quadrupling in the 1960s and 1970s as many new universities were founded, has remained (excluding the different situation in eastern Germany) almost exactly static for almost two decades even as the number of students has approximately doubled. This trend is far more serious in its effects than the less severe tendency in the same direction reported above for the United States, with consequently even more disquieting effects.

Similarly, in figures adjusted for inflation, budgetary provisions for higher educational institutions in Germany have increased only very slightly since the mid-1970s. The substantial erosion of resources (especially on a per-student basis) this represents has been only partially compensated for by modest increases in third-party funding.

Faculty teaching loads in German universities are surprisingly high as well, at a uniform level of eight hours per week, using U.S. research universities as a standard of comparison. This is said to apply to professors only, with "relatively few teaching duties" for the

"vast majority of non-professorial academic staff" in order to permit them to "spend a considerable amount of time for their research work relevant for further qualification." If this is so, the aggregate burden of teaching for professors is even higher when reckoned as a faculty:student ratio—an almost unmanageable level of 1:59, with 25,000 professors and nearly 1.5 million students. The Humboldtian principle of a unity of teaching and research must often be difficult to maintain under these circumstances. Hence it is no surprise to find "massive dissatisfaction" with the availability of professors coupled with professorial complaints of lack of time for research. Political intervention in the ensuing zero-sum game looms as a possibility, to the likely disadvantage of faculty-led, university-based research.

This increasing shortfall of resources in the face of uncontrollably swelling enrollments has an even heavier impact on the training of graduate students than on undergraduate programs, although the U.S. graduate-undergraduate distinction finds little application in German universities. With so large a proportion of the entire student body enrolled in universities rather than in institutions with less exacting academic objectives, the proportionately much greater, more individualized allocations of resources and especially faculty time required for graduate training are particularly likely to suffer. It is noteworthy that in the United States, by contrast, almost all recent growth in enrollment has been accommodated by two- and four-year public institutions with lesser standards.

Conditions in the United States with regard to teaching loads and the research-teaching balance are obviously somewhat different from those in Germany. In accordance with the considerably greater autonomy and diversity of university-level institutions, no comparable uniformity exists with regard to formal teaching responsibilities. With the major private universities taking the lead, the research-teaching balance has for at least a generation shifted irregularly but progressively in the direction of research. The balance is, to be sure, "both unstable and … contested." Individually negotiated arrangements are common, with teaching loads tending to be higher and more explicit in the humanities than in the natural sciences (a contrast, however, that is blurred by laboratory requirements). There is also a gradient toward lesser teaching loads in graduate department programs than in undergraduate ones. U.S. graduate distinction "is the most decentralized of all university functions," and is "far more … dominated by hierarchy and prestige."

A pervasive, growing source of concern in the United States is the substitution of temporary, non-tenure-track appointments for regular faculty members, frequently taking place through attrition as senior professors retire. All too frequently, these new positions involve real exploitation of young, vulnerable scholars under conditions of a buyers' market. With payment often being made on a per-

course basis, opportunities for research and publication are minimal. Such positions can become a trap from which it is very difficult to escape. Students confront an evident two-tier system, diluting the publicly expressed support of universities for the unity of research and teaching. This constriction of research opportunities for individuals who have arduously trained for academic careers is likely to have long-term, negative effects on the choice of such careers by the "best and brightest" of coming generations of students.

Turning once again to Germany, the same negative effects of a constriction in the demand for new, young faculty are evident. Swelling enrollments unmatched by any significant increases in university budgets present problems that emerged only gradually but in their cumulative dimensions are now critical. These difficulties are diffuse in their impacts and probably not well understood by the public, so that the public dissatisfaction they engender is directed not at financial shortfalls but at the performance of universities. An undercurrent of such dissatisfaction helps to explain the low priority given by federal and state authorities to providing more adequate levels of university funding and staffing.

To be sure, there are other, only partly related, sources of dissatisfaction. Concerns over prevailing rigidity and the declining quality of teaching (independent of the faculty-student ratio) are reportedly a factor, as is the impression of "oligarchic academic self-regulation." There is also public skepticism about the quality of university-based research. Still a third factor, cited by the president of the Max-Planck-Society, for which there is little evidence of a U.S. counterpart, has been the hostility of a vocal part of German society toward high-tech developments, from nuclear energy to biotechnology. "Combined with administrative overregulation, this movement has succeeded only in driving billions of marks worth of high-tech investment abroad. The scientific community has an obligation to reverse these trends, not only out of self-interest and responsibility for future generations of scientists, but because such attitudes—from the luddite to the lunatic—are endangering the economic future of the whole country" (Hubert Markl, *Science*, 10 May 1996).

There is in general much less overt inter-institutional competition in Germany, along lines characterized above for the United States as embodying a shift of the public-private interface toward the private direction. This is partly a matter of existing laws and bodies of regulations that exercise "strong pressures toward 'homogeneity'." But it is also a product of rules requiring unanimity before taking action on the part of coordinating bodies like the Standing Conference of the Ministers of Cultural Affairs. Not only reinforcing explicit arguments for "homogeneity," these can also encourage resistance to constructive changes of any kind. With competition for the best entering students virtually absent and that for faculty seriously constrained by the uniformity of teaching loads, prestige rankings—on either an inter-departmental or inter-institutional basis—have not been undertaken

in Germany on an authoritative, regular basis.

University governance mechanisms allow only for prevailingly weak, rotating leadership since there is little or no centralized power to implement decisions. The deeply ingrained ethics of full consensus and equality of treatment, not tied to any performance criteria, weaken and defer the dynamic of adaptive change as it has developed in the United States. Similarly, the "large status-related distance between junior and middle level academic staff and professors in Germany" leaves little room for an infusion of fresh viewpoints that might be expected to come from succeeding academic generations. With "each chair as a highly sovereign organizational unit" there is correspondingly little inducement to cooperate in initiatives for the common good. As this suggests, and in some contrast to conditions in most American research universities, the general position of junior staff is widely considered to be at a serious disadvantage.

In some subjects problems in the recruitment of junior academic staff are already manifest today, because professional fields outside higher education clearly have more to offer as regards independence of work, security of career and considerably higher incomes. For many academics in these subjects the status of junior academic staff is just a parking or waiting position until they have found something better.

A careful reading of criticisms like these in the study by Enders, Kehm, and Schimank clearly conveys the sense of a general, possibly impending, crisis. It is also acknowledged, to be sure, that there is widespread recognition—at least in academic circles—of the urgency and complexity of the problems that must be addressed. But unfortunately this situation is interpreted by actors responsible for higher education policy as an efficiency and legitimation crisis with relatively high effects on public opinion, whereas higher education institutions see themselves in a financial crisis. These views are radically divergent and make it extremely difficult to work out a solution for the problems. The report contains many references to new initiatives directed at these problems. Among these, for example, are experiments with "lump-sum" budgeting for individual universities, greatly reducing the problem of bureaucratic over-regulation and strengthening the hands of university administrators to promote internal changes. Most of these initiatives are as yet on a very small scale and often tentative basis. Still, there are grounds for hope here, although it apparently remains highly uncertain how quickly the persuasive case for change will lead to public recognition and support of the needed governmental as well as institutional reforms.

CHANGING ROLES OF UNIVERSITIES IN THE PRODUCTION OF NEW KNOWLEDGE

In a refreshingly candid vein, Hubert Markl not long ago comprehensively summarized for an American audience the foregoing

criticisms and their deleterious effects:

> Scientific standards have undoubtedly been compromised; too little care has been taken to ensure that the most talented are given the opportunity to develop in the best of challenging academic environments. Centers of excellence comparable to those in the United Kingdom or the United States are rare in the German university system, and it is urgent that they be strengthened.
>
> Fortunately, the Deutsche Forschungsgemeinschaft and the Max-Planck-Gesellschaft (and perhaps also the Helmholtz Centers) have not followed the egalitarian trend. Both have focused uncompromisingly on evaluation of research and promotion of scientific excellence. The best research centers, within and outside universities, have continued to do first-rate research, in some cases of Nobel Prize quality, and have become truly international enterprises. (*Science*, 10 May 1996)

These conditions are not without some parallels in U.S. science, and it is important that efforts should be made to learn from and overcome them in both countries. A special factor in Germany, however, is that universities there "have lost ground as producers of academic knowledge" through the emergence of a number of competing research institutions of great distinction like the Max-Planck-Society, the Fraunhofer Society, and other Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz (or WGL, formerly "blue list") institutions. But as our report goes on to warn,

> In the view of the higher education institutions, the fewer research resources they have, and the more the government-funded extra-university research establishments have, the less satisfying is their parallel existence. (see Chapter 4)

In terms of both relative quality and quantity of research, these parallel or competing institutions appear to have a considerably larger role in Germany than do most of their counterparts in the United States. As a question of common interest in the two countries, there must be tradeoffs involved in concentrating some of the most eminent and productive scholars and scientists in relatively isolated settings. While this undoubtedly facilitates their own research by allowing them to work with greatest intensity and fewest distractions, it deprives universities of the stimulus and example of their active presence. A policy of creating special institutional settings would seem to require, as a minimum, an intensified, well-coordinated effort to encourage comparable standards and conditions in the universities.

The German research system currently expends about 2.28 percent of GDP, a slight but significant reduction since unification. It is composed of three major parts. Industrial research constitutes about

two-thirds of the total, with university research and (state and federal) government-funded extra-university research accounting for the rest in approximately equal parts and with foundation-funded research amounting to perhaps five percent of the total.

For a U.S. comparison we may turn to a recent overview prepared by Jack Halpern for the GAAC's 1997 Leopoldina Conference. The United States currently spends about $270 billion annually on R&D, 2.6 percent of GDP, a level that has remained relatively constant for almost two decades. The federal share has been falling steadily with reductions in defense spending, however, while that of industry has been rising; the current proportions are roughly 38% and 58% respectively. Industrial (U.S. 70%, Germany 64%) and university (U.S. 13%, Germany 17%) expenditures for research are not very different.

Examining U.S. university-based research more closely, the theme of a shifting public-private interface continues to have some relevance. While expressed intentions on the part of Congress and the White House are prevailingly optimistic, it is quite uncertain whether federal investment in university R&D will grow appreciably in the long term under budget-limiting pressures. Currently almost 25% of federal R&D is allocated to universities, while this is the case with less than 3% of industrial R&D.

This would seem to raise the possibility that industry-based as well as industry-supported research might assume a more central role. Richard Atkinson, president of the University of California system, however, has expressed strong doubts that this will happen (*Science*, 6 June 1997). The closure of major corporate laboratories in recent years and the broader shift of industrial research to short-term rather than basic problems are both indications of a trend running in the opposite direction. Universities, Atkinson believes, will not be replaced by industry as the "vital center of the American research enterprise" in the foreseeable future. Of course, this does not deny the possibility of some continuing growth of industrial subsidization of research in universities (especially in engineering and biotechnology). But it is interesting that the most significant source of recent growth of university-based research has been from the universities' own resources.

The National Institutes of Health complex of laboratories, the largest and most distinguished of its kind in the world and clearly a counterpart to some of the German institutions mentioned earlier, is the first to come to mind. As defense budgets at least temporarily shift away from the development of new weapons systems with the ending of the cold war, a continuing shift of federal support away from the physical sciences and toward the biomedical sciences seems all but certain. The impressive, long-continuing growth of biomedical research, in any case, has been almost immune to past fluctuations in economic conditions or even in the budgets annually submitted by the President

to the Congress. With biotechnology also coming of age and beginning to make significant contributions not only to human health but to agriculture, this is likely to be mirrored in university-based basic research as well.

Also federally funded are the U.S. National Laboratories. They play a quite different role, with responsibilities especially directed toward defense and energy questions, and except in a very few specialized areas they provide no recognized leadership in terms of research quality. The National Aeronautics and Space Administration, similarly, is a U.S. mission agency, with activities largely of a technological character, although basic research provides the rationale for many of them.

Very relevant, on the other hand, are a great variety of university-affiliated, non (or not primarily)-federally funded activities. Some adopt a corporate structure to concentrate on applied forms of research, permitting university faculty members to be funded for long-term activities outside of the normal scope of academic programs. University-industry research centers in the United States are another, increasingly important development. Their vigorous growth has not been in numbers and scale alone but in their successful leveraging of new forms of support and research cooperation. Atkinson, addressing the same theme, reports that "almost one-quarter of all papers by university-based authors published in the peer-reviewed scientific literature are co-authored with at least one scientist from an industrial or government laboratory." But the difficulty with this, as Roger L. Geiger's report notes, is that industrial support for R&D has a discouraging history of volatility.

Universities have naturally been responsive to the massive, continually reaffirmed support of NIH and major private foundations. Academic health centers, originally growing up around university-affiliated medical schools, in many cases now dwarf in scale not only the medical schools but sometimes even the parent universities. These are enormous institutional complexes, with an internal as well as a societal dynamic of their own. A deeper comparative study of their scope, modes of operation, and research effectiveness in relation to German institutions like the Deutsche Krebsforschungszentrum in Heidelberg and the Max-Delbrueck-Centrum fuer Molekulare Medizin in Berlin could initiate an important reciprocal flow of useful information between their American and German counterparts.

The two studies making up this publication leave little to be said about the effects of peer review, beyond the simple affirmation that it plays a central part in extra-institutional awards of research funding. Competitive pressures on performance are generally weaker in Germany than in U.S. research universities, but the parallelism of common dependence on peer-reviewed past research performance of future research awards helps to mitigate this difference. In the United States the selection of individual reviewers and the makeup of review panels is a responsibility of granting agencies, leading to a careful balancing of

criteria like seniority, gender, and geographic or institutional representation. Reviewers in Germany, on the other hand, are proposed by the relevant academic or disciplinary bodies and elected every four years by secret ballot. A corresponding shift of emphasis toward mainstream orthodoxy and away from newer fields, methodologies and problems is a likely consequence. Yet as the German study observes, a result is still that "competitive pressure is stronger in research than in teaching."

CHALLENGES IN NEED OF FURTHER STUDY

Both the United States and Germany play leading parts in this age of global transformation. At its base, undeniably, is the generation, application and transmission—across both space and time—of new knowledge. Varying in the closeness of their identification with research within and between both countries, and with the severity of the immediate challenges facing them, universities have a central role in these ongoing processes. At the very least, their graduate and undergraduate educational programs supply the disciplinary training and the flows of talent and commitment that can sustain an accelerating pace of change which has no end in sight. At the same time, it is in the very nature of universities that they remain the essential elements in the endless refinement and reconfiguration of older knowledge for new and previously unimagined contexts. Somehow the Humboldtian ideal of the unity of teaching and research has found a way to remain valued and sought after (if rarely achieved) in both countries, retaining its enduring validity even under increasing stress. If often painfully and with attrition, ways have eventually been found heretofore to bridge most seemingly irreconcilable demands and ambitions. Tensions and uncertainties are amply attested to by both of the substantive studies forming the body of this report, closer at hand and more perplexing in Germany, but credible on the longer-term American horizon as well. Yet an underlying consensus seems to hold in both of them that the essential, indefinite centrality of universities in most of their present roles in both countries is assured.

It is to be regretted that the scope and direction of this effort are incomplete and in serious respects over-aggregated. As originally conceived, it was to be a preliminary to a series of further, more detailed studies, the possibility for which came abruptly to an end when the GAAC was itself terminated for other reasons. The quite different circumstances and challenges confronting the social sciences and humanities, for example, receive essentially no attention here. Largely missing, as well, is a serious assessment of the relative health of the major fields of the natural as well as human sciences—the adequacy of research funding and academic staffing levels, the effectiveness of existing inducements to young scholars to make career choices, the decisive contribution that foreign students on temporary

visas have come to make to graduate enrollments in some of the sciences and engineering, and the availability and encouragement of interdisciplinary programs. And behind these merely operational features, of course, lie questions about the conceptual state of health as well: the bringing together of new methods and new questions, and the capacity for critical assessment of what individual disciplines have to offer to the improvement of human life and the understanding of the human condition. The makeup of the GAAC made it an unusually well qualified body subsequently to take direct charge of pursuing these questions, had that opportunity ever come.

Also inadequately dealt with here are areas in which major structural as well as substantive change can be anticipated, but with the outlines still too questionable or dim for even a preliminary analysis. What will be the evolving impacts of the Information Age, for example, on university standards, on campuses as citadels of independent thought and as providers of the conditions not only for research but for context-setting discourse, and on traditional university functions like libraries and presses? How should graduate degree programs change as increasing numbers of doctoral graduates embark on proliferating careers outside the academy? Perhaps more immediately for Germany with the advent of the European Union but no less necessarily for the United States as well, what can universities do to help facilitate and find a place in the internationalization of research that is a certain concomitant of globalization? The current study can only serve as an invitation for other studies in these and many other directions to follow.

Perhaps the major conclusion to be drawn from a comparative exercise like the present one is that there is no single, optimal path, nor perhaps even any single, long-term goal, toward which different institutional systems that somehow must embrace higher education and research are inexorably converging. But then, we hope, wisdom may be found instead in compelling illustrations of the multiplicity of possible patterns and the visions, influences, compromises and conditions that have led to them not just in these two countries but in others as well.

CHAPTER 2

Differentiation, Hierarchy, and Diversity: *An Overview of Higher Education in the United States*

ROGER L. GEIGER

The size and decentralized nature of higher education in the United States create a system of daunting complexity. However, the relative position and role of any institution may be characterized along three dimensions: differentiation, hierarchy, and diversity. "Differentiation" encompasses the multiple functions performed by institutions of higher education—the several levels and numerous kinds of degree programs that are offered. Each institution can be defined, in effect, by its unique collection of offerings. "Hierarchy" is built principally upon two separate standards of quality: the scientific and scholarly abilities of the faculty as recognized by their professional peers, and the measured academic abilities of undergraduate matriculants, conventionally referred to as selectivity. Relatively few institutions excel on these scales of prestige, but the values they represent are normative among four-year colleges and universities. "Diversity" here designates the clientele to which an institution caters. Although open in theory to all qualified students, institutions, especially in the private sector, generally serve identifiable groups, who are well known to the offices of admissions and fund-raising. The interaction of these three dimensions produces a particularity that insulates colleges and universities from some of the rigors of direct competition. Every college or university can claim its own form of "excellence"—in x degree program, or among y kinds of colleges, or within z locality. The strongly hierarchical features of the system are thus muted in practice by diversity and differentiation.

DIFFERENTIATION

The most obvious feature of the American system is its immense size. With more than 14 million students in 1995, it is easily the world's largest system of postsecondary education, but differentiation frustrates comparisons with other national systems. For example, just 40 percent of those 14 million students are 21 years of age or younger, and thus largely dependent young people being educated for future careers. A slightly larger number are 25 years of age or older, and hence for the most part independent adults. Serving older, nontraditional students for initial or recurrent education clearly constitutes a major function of the system, fulfilled by some colleges or universities and eschewed by others. The key to understanding the American system is to grasp how its different functions are allocated among its many types of institutions.

Using the most visible characteristics, American higher education can be differentiated vertically, by level of work, and horizontally, by type of institution. Table 1 reports enrollments by level of study:

TABLE 1: 1994 ENROLLMENTS BY LEVEL OF STUDY

	FULL-TIME	PART-TIME
IN 2-YEAR INSTITUTIONS *(mostly community colleges)*	2,031,713	3,497,896
UNDERGRADUATES IN 4-YEAR COLLEGES AND UNIVERSITIES	5,136,993	1,596,000
FIRST PROFESSIONAL STUDENTS	263,311	31,400
GRADUATE STUDENTS	705,758	1,015,612
TOTALS	8,137,776	6,141,014

Enrollment figures confirm that full-time undergraduate study in a four-year college or university remains the center of gravity in the American system. Nearly one-third of all 18–19 year-olds enroll for full-time study, and another six percent study part-time. The number of bachelor's degrees awarded annually (1,160,000) represents about 32 percent of a single-year cohort of young adults. First professional students (mostly in law and medicine) are a small but highly selected segment of college graduates, whose annual degrees (76,000) represent almost two percent of a cohort. Graduate students are a diverse lot, demographically and socioeconomically. The majority are pursuing master's degrees, mostly in professional fields (400,000 degrees, 10 percent of a cohort) (Conrad, Hayworth, and Miller, 1993). A few of these programs, in business or engineering for example, afford entry to high-paying careers. The number of doctoral degrees awarded each year (44,000) approximates one percent of thirty-year-olds.

Although specifically designed for local commuters, community colleges serve a broad spectrum of students, with variations from state to state. Academic programs aimed at transfer to baccalaureate institutions have suffered a relative decline since the mid-1970s, but they remain important in states like California where admission to public universities is restricted. For the most part, programs aimed at developing vocational skills have grown to about two-thirds of associate degrees. Although plagued by irregular enrollments and low completion rates, community colleges keep the gate to higher education open for students with a high risk of failure.[1]

The standard categories for a horizontal classification of institutions of higher education have been developed and updated by the Carnegie Foundation for the Advancement of Teaching (Table 2).

TABLE 2: 1994 CARNEGIE CLASSIFICATION, TYPE, NUMBER, AND ENROLLMENT

DOCTORATE GRANTING	INSTITUTIONS	ENROLLMENT (000)
RESEARCH UNIVERSITIES I	88	2,030
RESEARCH UNIVERSITIES II	37	641
DOCTORAL UNIVERSITIES I	51	658
DOCTORAL UNIVERSITIES II	60	651
MASTER'S COLLEGES & UNIVERSITIES	529	3,139
BACCALAUREATE COLLEGES		
BACCALAUREATE COLLEGES I	166	268
BACCALAUREATE COLLEGES II	471	784
ASSOCIATE OF ARTS (2-YEAR) COLLEGES	1,471	6,527

SOURCE: CFAT, *Classification of Institutions of Higher Education* (Princeton, NJ, 1994).

The Research I Universities (RUI) dominate the system in a number of ways. They consist of the principal state universities, which average nearly 30,000 students, and most of the wealthiest private universities (average size about 13,000). They perform roughly three-fourths of separately budgeted academic research; graduate most of the Ph.D's who will become future faculty and researchers; train the majority of medical doctors and lawyers; and award a quarter of the nation's bachelor's degrees.[2] The private RUIs usually have as many

1. See Dougherty (1994). The debate about vocationalism in community colleges has failed to acknowledge a parallel vocational shift in the awarding of bachelor's degrees.

2. The Carnegie classification has been revised periodically, changing the institutions that qualify for each category. Hence, comparisons of a class of institutions from different classifications are imprecise.

post-baccalaureate students in their graduate and professional schools as undergraduates; the larger public RUIs typically have one-quarter to one-third post-baccalaureate students. The other three categories of doctorate-granting universities, although enrolling nearly as many students as the RUIs, are more heavily weighted toward undergraduate education. They perform the same tasks as RUIs, but generally with less distinction.

In contrast, the Baccalaureate I Colleges (BCI) concentrate on the single task of undergraduate education, primarily in the liberal arts. They occupy a strategic position in the overall system. The leaders among the BCIs are private colleges with large endowments and highly selective admissions. Like private research universities, they charge the highest rates of tuition and offer "high-cost/high-quality" undergraduate education. Only a minority of BCIs can credibly identify with this top echelon, but the others approximate this ideal to the extent that their resources allow. The Baccalaureate II Colleges, on the other hand, are largely forced by limited resources to meet the needs of a more localized clientele for career-oriented educational programs.

The principal orientations of institutions at the extremes of the American system are more readily characterized than those in the broad middle. In many Doctoral Universities, most of the "Master's" group (formerly called "comprehensive colleges and universities"), and in the middle ranks of the Baccalaureate Colleges, administrators juggle the desire to maintain or enhance academic quality, to attract sufficient numbers of students, to balance revenues with expenditures, and to meet the needs of a regionally or culturally defined clientele. Here the pull of academic prestige and the dictates of the marketplace are, to varying extents, strongly felt and acted upon. Nevertheless, in ideal-typical terms, it is possible to identify two fundamental fault lines in American higher education, the first for research and the second for recruitment. With respect to research, the divide is between those institutions that expect their faculty to be actively engaged with the advancement of knowledge and those that ask only that faculty master the knowledge base sufficiently to teach it effectively. In recruitment, the divide is between institutions that are essentially limited and restrictive in intake and those that are "demand-absorbing"—largely open and expansive.

Interpreting faculty data from the end of the 1960s, Oliver Fulton and Martin Trow discerned a "division of labor … between and within the institutions of American higher education," with respect to teaching and research (Fulton and Trow, 1975: 39–84). In what they termed "extreme differentiation," there were entire sectors where teaching dominated to the virtual exclusion of research, while at the strongest universities teaching and research made fairly equal claims on faculty time and were in fact closely integrated. In between, in the less prestigious doctoral universities and the most prestigious col-

leges, the division seemed to be between individual faculty who were or were not heavily committed to research, with teaching assignments apparently reflecting this division. Data from faculty surveys conducted two decades later suggest that this research-teaching frontier had shifted. Faculty at top universities became more heavily committed to research, time in the classroom declined for most faculty, and the reward system for all four-year institutions tilted more in favor of research (Fairweather, 1996: 114–116). Anecdotal evidence for the 1990s indicates that these tendencies have, if anything, been magnified.

The proximate cause of this academic drift has been the large numbers of Ph.D.'s produced annually since the early 1970s, which have far outstripped the number of faculty openings in most fields. With supply in excess of demand, qualifications for appointments have ratcheted upward. In the humanities, a chronic structural imbalance has meant that new Ph.D.'s typically need to demonstrate a record of published scholarship before winning faculty appointments. In the natural sciences, where there was less oversupply, postdoctoral fellowships nevertheless became increasingly *de rigueur* for aspirants to a faculty post. Everywhere, Ph.D.'s trained for research in some of the world's best universities were forced to accept appointments further and further down in the hierarchy of the American system. It became increasingly rare for a four-year institution to reject an applicant as "overqualified" (as was sometimes done in the past)—in effect admitting that it was not qualified to employ a first-rate scholar. In some ways this process was a continuation of the institutional upgrading that Jencks and Riesman (1968), in reference to the 1950s and 1960s, had called the "academic revolution." But the 1990s have witnessed a decided backlash.[3]

Politicians, journalists, and apostate academics have raised a chorus of allegations that faculty devote too much of their time and energy to their own scholarly pursuits and too little to students and teaching. One line of criticism focuses on the nation's best universities, where faculty preoccupied with external commitments have been accused by university leaders of neglecting the responsibilities of academic citizenship.[4] Another focuses on the middle ranks of institutions where, it is alleged, faculty research is not integrated with undergraduate teaching, and hence is detrimental to student interests (Fairweather, 1996). A third source of concern, more internal to universities, is that the heightened expectations placed on junior faculty—to establish a proven research agenda and excel in classroom teaching—have generated dysfunctional pressures on those beginning academic careers. As a result, the balance between teaching and research,

3. See also Finnegan (1993) and Jencks and Riesman (1968). Jencks and Riesman critique an overemphasis on scholarship for its own sake in the 1960s, which seemed to provoke a similar reaction against research in general.

4. Henry Rosovsky, "Report of the Dean of the Faculty of Arts and Sciences, Harvard University," 1990–91, quoted in Kennedy (1997: 63).

which is fundamental to the American system, is currently both unstable and to a considerable extent contested.

By way of contrast the second fault line, which separates the selective and the demand-absorbing sectors, has been unnaturally stable. The evidence to support this statement can be inferred from enrollment data (Table 3). If one looks at the enrollments of first-time freshmen, the difference between the two sectors becomes apparent. Over two decades, the fluctuation in beginning students was only 8.3 percent for private four-year colleges, and 11.6 percent for public four-year institutions. For community colleges this figure was 32.2 percent, which approximates the variation among high school graduates of 33.3 percent.

TABLE 3: VARIATION IN FIRST-TIME FRESHMAN ENROLLMENTS, 1975–1994

	HIGH	LOW	VARIANCE
PRIVATE 4-YEAR	426,000	392,000	8.3%
PUBLIC 4-YEAR	783,000	697,000	11.6%
PUBLIC 2-YEAR	1,318,000	952,000	32.2%
HIGH SCHOOL GRADUATES	3,186,000	2,276,000	33.3%

A similar picture emerges for changes in total enrollments since 1980. Community colleges added a million students, two-thirds of them part-timers. Public four-year institutions added almost a half-million, which represented a growth rate of less than one percent per year. The private sector also gained a half-million students, but independent nonprofit schools (which include most selective institutions) had no growth at all. Religiously affiliated colleges, which tend to be relatively unselective, added 400,000 (+40 percent); and proprietary schools more than doubled their enrollments, adding over 100,000 students.

The comparative stasis of the last two decades raises two important issues. The first concerns the nature of change in the American system. Mesmerized by the percentage increases in community college and part-time students, scholars have hypothesized a dramatic transformation of the undergraduate population (Pascarella and Terenzini, 1998: 151–166). In fact, this is misleading. The fundamental change has been an addition of new students, many older and/or studying part-time, who have flowed into the open sector of American higher education. However, most of the country's more prestigious colleges and universities have continued to focus on serving traditional-age, full-time undergraduates, whose numbers have remained remarkably stable for two decades. Additive growth of this nature has been the characteristic process by which the American system has adapted to

provide for new tasks and new clienteles without immediately disturbing mainstream institutions.

The second development during the long stasis has been that prestige has paid handsomely for American colleges and universities, especially since the early 1980s. For example, selectivity has served as a shock absorber to smooth the demographic bumps. The most prestigious institutions have been well situated to reinforce their advantages; somewhat less strong colleges and universities have been powerfully motivated to emulate prestigious models. The overall result has been to reinforce the inherent hierarchical features of the American system.

HIERARCHY

The most internationally renowned feature of the American system is the stature of its great universities, grounded on the ability of their faculty to advance knowledge in their field. This is a universal standard of quality, recognized by academics throughout the world. It is also the basis for judging quality in doctoral programs. Quality in this sense inheres in the individual scholar or scientist, but for graduate programs it is lodged in the department or program that certifies the Ph.D. The quality of an entire university is an ineffable concept: it consists partly as the sum or average of its academic units, but it also has a holistic reality in an institution's commitment to foster and sustain academic excellence. This latter facet of academic quality helps to account for the historic stability of America's top universities.

The first peer rating of faculty was published in 1906 and the most recent in 1995. Over nine decades the charmed circle of the top 12–15 universities has been shuffled somewhat but hardly changed: Johns Hopkins slipped some (though not far), neophyte Caltech (founded in 1919) gained membership, and the University of California colonized new centers of excellence (Geiger, 1986: 39; Goldberger, Maher, and Flatteau, 1995. See also Webster, 1983).

Ratings of academic programs have always elicited controversy.[5] The most authoritative studies, based on peer ratings and conducted under the auspices of the National Research Council, appeared in 1982 and 1995. They seem to show a considerable diffusion of academic quality even as the peak of the hierarchy remained little changed. In 1995, when 41 academic programs were rated, 42 universities managed to have at least one department rated among the top five in its field (see Table 4). Half of those institutions, however, had only one such department; whereas the top six universities garnered half of all the top-five places.

5. For the recent systematic rankings based on per-faculty publications and citations, see Graham and Diamond (1997).

TABLE 4: THE TOP UNIVERSITIES, 1995 RATINGS

PROGRAMS IN THE TOP FIVE		AVERAGE DEPARTMENT RATING	
UC BERKELEY	24	MIT	4.62
HARVARD	20	UC BERKELEY	4.52
MIT	17	HARVARD	4.51
STANFORD	15	STANFORD	4.34
YALE	13	CALTECH	4.29
PRINCETON	13	PRINCETON	4.29
CHICAGO	9	CHICAGO	4.27
CALTECH	9	YALE	4.13
MICHIGAN	8	UC SAN DIEGO	4.08
DUKE	8	UCLA	3.92
COLUMBIA	7	MICHIGAN	3.92

Looking at the very top of the hierarchy invariably produces such skewed results. When average departmental ratings are employed, a continuum emerges. Programs were rated on a 0 to 5-point scale, where 5 was "distinguished" and 0 was "not sufficient for doctoral education." A total of 3,634 programs were evaluated with the following average ratings:[6]

Distinguished	(4.01 +)	11%
Strong	(3.01– 4.00)	32%
Good	(2.51– 3.00)	19%
Adequate	(2.00– 2.50)	19%
Marginal	(1.00– 1.99)	16%
Not Sufficient	(<1.00)	3%

In the 1982 ratings, 14 universities achieved average ratings of 4.0 or higher, and 28 had scores between 3 and 4 (Geiger and Feller, 1995. University averages compiled by author). In 1995, just 10 universities managed averages above 4, but 47 had averages from 3 to 4. Since more departments were rated in 1995, very high scores may have suffered. However, the 36 percent increase in the number of universities with average department ratings above 3.0 indicates a general strengthening between the two surveys that is consistent with the abundance of well-trained Ph.D.'s. However, the larger question is what attributes underlie this type of academic quality.

Robert Rosenzweig (1982) has remarked that stability ought to be expected at the top of the academic hierarchy because academic research is a capital-intensive activity with formidable barriers to

6. Goldberger, Maher, and Flatteau (1995: 32). University averages compiled by author. Ratings in the Humanities were most generous (49% strong or better vs. 13 % marginal or worse); the social sciences most severe (38% vs. 23%).

entry. The distinctive attributes of the leading research universities consist of physical capital in the infrastructures supporting research and human capital, chiefly in faculty but also in graduate students. There is little need to belabor the importance of infrastructure: the list of the nation's largest university libraries largely duplicates that of the academic leaders; the ample provision and constant renewal of state-of-the-art laboratories and instruments are imperative for cutting-edge research in most fields. All universities struggle with these demands, but the leaders have been most able to meet them. With regard to human capital, the leading research universities are characterized by relatively large numbers of faculty, heavily weighted toward senior scholars, and paid at the highest levels of faculty compensation.[7] Maintaining the quality of the faculty is also an incessant demand, requiring the wherewithal to compete for top academic talent. The ratings data also consistently show a relationship between the size and the quality of graduate programs. Size has little significance by itself. Rather, doctoral students interested in academic or research careers tend to seek the most distinguished programs or faculty. This national—and international—competition creates a kind of queue, in which the top programs enroll an optimum number of the best-qualified applicants, and the remainder "flow" down to less distinguished departments (Goldberger, Maher, and Flatteau, 1995: 35; Geiger, 1997). Although doctoral students contribute to teaching and research, they require substantial amounts of support. Graduate education is thus another expensive input to academic quality, and most expensive for those institutions that do it best.

Of course, there is another side to this ledger—the millions of dollars of external research support that have shaped and made possible American research universities as they exist today. These funds are entrusted overwhelmingly to those institutions having the will and the capability to sustain their capital base. The American system for supporting academic research has largely produced investments in universities that have themselves been willing and able to invest their own resources in academic quality. Conversely, past efforts to enhance institutions that lacked such a commitment generally yielded dismal results.[8]

The second principal form of hierarchy in American higher education is based upon selectivity of undergraduate students. A significant portion of the country's most academically talented high school graduates seek admission to highly selective institutions. At the top of

7. Faculty size, structure, and compensation varies considerably between public and private research universities (see the following chapter, Table 2). Hence, comparisons must be made within sectors, not across sectors. Faculty salary data are compiled by the AAUP and published in each March issue of Academe.

8. Foundation and government programs of the 1950s and 1960s to stimulate the development of research universities largely bear out this conclusion: see Geiger (1993: 203–211). More recently, the EPSCOR Program of the NSF has attempted selectively to aid universities in states where research is little supported: see Albert H. Teich (1996).

this hierarchy are many private research universities, some public RUIs like the University of Michigan or the University of Virginia, and a few dozen BCI colleges[9] —all basically "high-cost/high-quality" institutions. Here too there is a continuum, and it would be somewhat arbitrary to judge where the first tier ends and the second tier begins.[10] Of course, there are quantitative indicators—average scores on the Scholastic Aptitude Tests, standing in high school graduation class, or ratios of applicants, acceptances, and matriculations. But such measures are supplied by the colleges themselves, and often carefully crafted for use in their marketing efforts.[11] In any case, elite colleges do not choose the very best students who apply—they choose carefully from among a pool of highly able students.

The admissions process for elite colleges may be the most singular feature of American higher education (see Klitgaard, 1985; Fetter, 1995; Duffy and Goldberg, 1998). It operates according to a set of strongly held norms. First, the object is to achieve a balance in terms of social and demographic criteria as well as talents. Each college interprets its needs in its own way, but the values upon which all act are virtually identical. Only a few engineering schools look solely at academic ability. The others, since selective admissions began in the 1920s, have skewed this process with social or demographic criteria. For at least two decades, elite schools have striven to achieve an adequate representation of minority students. In addition, they seek to curry favor with alumni and donors by (if possible) accepting their children. Athletic teams need players; the chemistry department needs majors. Every constituency has recruitment needs that, ideally, ought to be met. Above all, the admissions office seeks to divine combinations of ability and character that, in the future, will produce graduates who redound to the credit of the college. This is discussed in some depth in the following chapter.

A further article of faith is that a student should choose his or her college through the purest of motives. Selective colleges endeavor to offer admission on a "need-blind" basis—solely on the applicant's attributes—and to meet any financial need through the process described above. In recent years, this approach has become financially impossible for all but the wealthiest colleges. The elite colleges actually used to cooperate to offer identical aid packages, so that a student's choice would be unsullied by financial inducements, but this

9. Faculty at highly selective liberal arts colleges also engage in research and scholarship, sometimes at levels comparable to RUI faculty. See Robert A. McCaughey (1994).

10. The Consortium on Financing Higher Education (COFHE) is the most prestigious grouping, consisting of 32 of the wealthiest and most selective private colleges and universities.

11. An integrated rating system has been devised by the Princeton Review *but is not really comparable between different types of institutions:* The Best College for You *(*Time/the Princeton Review*, 1998).*

specific tactic was outlawed by the federal government.[12] Collusion rather than direct competition nevertheless remains the characteristic behavior of these institutions, in admissions as well as other areas.

The elite colleges in fact constitute an admissions cartel. They cooperate tacitly or explicitly in setting tuition prices, in preserving market share, in setting product standards, as well as in mutual endeavors like athletics. The rules of the game are understood by all and define an activity, more like gymnastics than football, in which each seeks chiefly to better individual performance. Institutions compare themselves to selected rivals for this purpose. In a typical example, Carleton College, at the pinnacle of elite colleges in the Upper Midwest, gauges its relative standing against a group of Midwestern BCI colleges it wishes to stay ahead of, and a group of highly selective "national" colleges it wishes more closely to emulate (Clotfelter, 1996: 72). By using such benchmarks, each college monitors rather precisely (and privately) its place in the pecking order of the cartel (Duffy and Goldberg, 1998).

To an outsider, it might not be readily apparent why the selectivity-based prestige is so vital to American colleges and universities. In fact, expenditures for student aid (or tuition discounting), which support selectivity, have been identified as the fastest rising expenditure for private institutions. These funds represent an investment in the quality of the undergraduate student body.[13] Student quality is conceived to be an important input to undergraduate education. Hence, the more selective a college, the better the education, and the greater the number of students who should want to attend. But there are other beneficiaries. Alumni take obvious pride in the stature of their alma mater, its prestige in effect lending value to their degrees. In fact, highly selective colleges generate tremendous alumni loyalties, which are expressed tangibly in gifts to the college. However, to describe this relationship solely in monetary terms is not only crass but insufficient. For two decades elite institutions have been in the fortunate position where internal incentives to bolster academic prestige have been validated externally through the provision of ever-greater resources. For this reason, the factors bolstering an institution's standing in the academic hierarchies have assumed paramount importance.

12. The Federal Government, in its wisdom, decided that collusion in this form of charity was a violation of anti-trust law—a restraint to the trade of being a student, or offering one's studenthood to the highest bidder.

13. For colleges with unfilled places, tuition discounting may be a strategy for optimizing revenues; however, for selective institutions facing excess demand, tuition discounting is a discretionary expenditure intended to enhance student quality. See Breneman (1994) and Clotfelter (1996).

DIVERSITY

In comparison, the dimension of diversity seems less momentous and considerably more elusive. American colleges and universities nevertheless possess a kind of personality shaped by the clienteles they have traditionally served. The distinctiveness of clienteles is far greater for private institutions, but is not absent from the public sector.

The most obvious case in which an institution is shaped by a distinct clientele would be those private colleges retaining a religious affiliation. Their recent gains in enrollment would seem to testify to the advantages that can be derived from serving a culturally defined community. In a longer perspective, however, their experience in other decades, notably the 1960s, might be used to illustrate the disadvantages of such linkages. For other private colleges, the alumni constitute a self-selected community, at least as far as the institution is concerned. There are three crucial areas where the influence of such clienteles or communities are decisive: recruitment of students, sources for voluntary support, and membership of the board of trustees. This last factor is often overlooked; however, trustees are the ultimate stewards of the institution, and changes in their composition generally correspond with changes in character and mission as well (Potts, 1997).

The importance of diversity can best be appreciated by seeing institutions in comparative and evolutionary terms. In one of the few such studies, Richard M. Freeland (1995) has traced the development of the eight universities of Greater Boston in the postwar era (1945–1970). While the effects of diversity are not easily separated from the influences of differentiation and hierarchy, Freeland's study noted that "differences among campuses remained evident in the students they enrolled, the nonacademic communities on which they relied for support, and even—though to a lesser extent—the faculties they attracted and the emphases of their programs (Freeland, 1995: 417). The developmental possibilities of these universities—the space in which they could grow—were thus strongly shaped by the particular clienteles to which they were linked.

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CHAPTER 3

The American University at the Beginning of the Twenty-First Century: *Signposts on the Path to Privatization*

ROGER L. GEIGER

INTRODUCTION

For the universities of the United States, the closing years of the twentieth century have been the best of times and the worst of times. Larger than ever before in the scale and scope of their endeavors, they have been assailed nonetheless by a steady barrage of criticism. Leaving aside the controversy over their role and responsibility in the Culture Wars,[1] as well as the wilder journalistic jeremiads,[2] there still remains a plethora of more or less *bona fide* analyses that condemn American universities for, among other things, systematically neglecting and overcharging students, harboring an inefficient and self-interested professorate, resisting pressures for change, and demanding ever more resources from society. Whether such accusations represent fundamental realities or malevolence, their very existence demands a response. Yet, existing scholarship has largely failed to provide satisfying explanations for the principal vectors of change, positive or negative.

Arthur Levine, for example, has ascribed the woes of higher education to its status as a "mature industry" (Levine, 1997). This diagnosis seems consistent with the long-term trend in enrollment as well as

1. *The critique of culture studies and the academic Left was touched off by Allan Bloom's* The Closing of the American Mind *(1987). The case was extended by Roger Kimball,* Tenured Radicals *(1990), Dinesh D'Souza,* Illiberal Education *(1991), and Paul Gross and Norman Levitt,* Superstition: The Academic Left and Its Quarrels with Science *(1994). Recent titles have become legion.*

2. *Charles Sykes,* Profscam *(1988), heads a long, dishonorable list.*

relations with government. Since about 1975 American higher education, for the first time in its history, essentially ceased to grow (Geiger 1999: 38–69). In the following twenty years, the number of full-time students increased by just one percent per year. Stasis in enrollments has been accompanied, particularly in the 1990s, by stagnation in state appropriations and a zeal to contain costs through government oversight and regulation. As a consequence, Levine concludes, higher education must now reduce its scale of operations in line with diminishing resources—"institutions will have to do less with less."

But business firms in mature industries are rarely so fatalistic. Mature industries typically possess large, secure bases of operations, from which innovative and entrepreneurial activities can be launched. Firms diversify into areas of greater growth, and they allocate capital to uses bringing higher returns. Universities, as multiproduct institutions with multiple sources of revenues, have similar opportunities. Over the last two decades, as will be seen, many have in fact behaved more like intelligent firms than benighted bureaucracies.

Another view hypothesizes that advanced nations have developed beyond mass higher education to a pathological state of "post-massification." Applying this notion to the United States, Robert Zemsky sees a saturation of labor markets for college graduates causing decreased public investment and increased stratification of institutions (Zemsky, 1997). Wealthier students invest in prolonged and costly education at "medallion" institutions whose names, like logos on sportswear, connote celebrity status, while according to Zemsky the majority of students are forced into "outlet markets" where they grope for economic betterment through part-time course-taking. Zemsky, like Levine, thus depreciates the actual content of post-secondary education and treats degrees as no more than labor-market credentials. He also sidesteps data that show the economic advantage of college graduation rising steeply since 1980. The symptoms he describes may well exist, but they ought to be seen in a wider frame of reference.

A third, implicit, interpretation of higher education emphasizes the need for "accountability." The numerous indictments that fall under this rubric share the conviction that institutions can no longer be trusted to conduct their business as usual: that student learning will be neglected unless there is external "assessment"; that faculty will pursue their own interests unless required to be in the classroom; and that institutions will be profligate with their funds unless held to account. Despite an uncertain basis for such skepticism, the fact that federal and state legislation has been aimed at each of these alleged failings gives considerable weight to these views.[3] However, Martin Trow has noted that accountability to outsiders is not only an alter-

3. The 1992 Amendments to the federal Higher Education Act attempted to use problems with federal student assistance programs to establish intrusive forms of accountability, including required "State Postsecondary Review Entities." On the state level, see Chronicle of Higher Education Almanac *(Aug. 29, 1997): 12 and passim.*

native to trust, but antithetical to it. Efforts to impose external accountability tend to diminish the autonomy of an institution and its means of internal governance (Trow, 1996). The perceived need for accountability is exceedingly difficult to refute, since it reflects a cynical view of self-interested behavior and demands practices that are common in primary and secondary education.[4] Nevertheless, it too is a symptom of the times—a datum for any larger interpretation of the state of higher education.

A quite different portrait of universities can be found in writings that take a longer view of higher education and society. From the perspective that Daniel Bell termed "social forecasting"—meaning an ability to project structural social analysis by examining "arrangements rooted in demographic, technological, and economic institutions"—postindustrial societies appear to be increasingly dependent on the university mission of fostering knowledge and expertise. Thus, Bell designated the university as "the central institution of the next 100 years because of its role as the new source of innovation and knowledge" (Bell, 1973; 1987).

Management guru Peter Drucker paints a similar picture of a "knowledge society" in which knowledge workers are the leading class and gain access "to work, job and social position through formal education" (Drucker, 1994). Universities are obviously critical for the education of knowledge workers, but Drucker sees the careers of those workers being characterized by continuous learning, a high degree of specialization, and above all application of knowledge—elements that might or might not involve higher education.

Historian Harold Perkin has interpreted conditions in advanced contemporary nations as constituting a "professional society," based more on the production of services than on agriculture or industry, and dominated by professional experts in all spheres. Along with Daniel Bell, Perkin considers the university to be the axial institution of professional society—the generator of human capital and a key arbiter of meritocratic social rewards (Perkin, 1996).

Lester Thurow, in *The Future of Capitalism*, joins this consensus, arguing that future economic advantage will depend on intellectual skills. The "knowledge infrastructure," of which universities are the preeminent component, will be the future key to building "brainpower industries [that] require research and development investments" (Thurow, 1996: 291).

None of these writers takes the leadership role of universities for granted. Drucker raises the possibility that universities might become intellectually obsolete by remaining fixated on abstract, "Mandarin" knowledge. He even contemplates their physical obsolescence due to the advancement of information technology. Both Perkin and Thurow argue that knowledge-dependent societies require sustained

4. For a constructive discussion and counterproposal, see Graham, Lyman, and Trow (1995).

public investments that might not be forthcoming under the apparent hypertrophy of free-market capitalism in the United States. Hence, social forecasts recognize the contingency of events upon politics and policies, making all the more important an accurate, unbiased depiction of the realities of American higher education at the end of the twentieth century.

American universities have in fact excelled in producing the knowledge and knowledge workers needed in a postindustrial society. The percentage of all scientific and technical papers emanating from the United States ranges from 23 percent in chemistry to roughly 40 percent in biomedical science, mathematics, and earth sciences. More than 100,000 foreign nationals currently pursue graduate studies in S&T fields in American universities, one-quarter of their enrollments (NSB, 1996). Burton R. Clark has best described the structural features that seem to underlie this success. Compared with other advanced nations, the "graduate department university" of the United States has vertically integrated the teaching of codified knowledge to relatively large numbers of undergraduates with the exploration of research frontiers by a chosen few doctoral or postdoctoral assistants (Clark, 1995). The special conditions that support this structure will become apparent in the course of this paper. At this point, such testimony of the crucial role of U.S. universities in the transition to new modes of social organization stands in marked contrast to the litany of university critics.

The challenge clearly is to devise an analytic framework for American higher education that will account as much as possible for both the charges of critics and the encomiums of sympathizers. In such a spirit, this chapter will endeavor to explicate the current state and vectors of change for the university system of the United States. Its principal focus will be the interface between universities and American society, the processes by which resources are exchanged and benefits provided.

The principal topics addressed here are, first, the nature and characteristics of universities in an age of privatization. The next two sections address the major characteristics and dynamics of, respectively, the private and the public sectors of higher education, each of which claims social resources in a somewhat different way. The fifth section will analyze the system of academic research from a national perspective, and the sixth will examine research issues from the viewpoint of universities.

The process of privatization provides the broad framework for this exploration (Geiger, 1988). Strictly speaking, privatization signifies a process of change toward greater dependence on private actors and resources, and less dependence on government. There is a deceptive simplicity to such a definition, especially when this process is measured in terms of public versus private financial support. But there are at least three other levels where more subtle dynamics operate. The

overall drift toward privatization has been marked by important transformations in perceptions, assumptions, and values. Such changing *mentalities* signify both the overcoming of previous points of resistance and an easing of the way for further developments. New and intensified forms of competition also accompany privatization. Such competition can be salutary or (for the unsuccessful) destructive, but in either case it generates pressures within organizations. These pressures tend to produce second-order effects in favor of rationalization that transform institutions from within. Finally, privatization would scarcely occur unless there were significant private benefits to be realized. Thus, no analysis of this phenomenon can avoid examining the positive outcomes that elicit private efforts and investments.

AN AGE OF PRIVATIZATION

The movement toward privatization has been felt in American higher education for nearly two decades (Geiger, 1993: chap. 10). In the years around 1980 a decisive shift occurred from an era of nationalization that extended back to the 1930s to a new era of privatization that has not yet run its course. For higher education the old era ended with a flourish. The last of the postwar, baby-boom generation surged into newly built community colleges and regional state universities just as a comprehensive federal system of student financial aid promised access to higher education for all qualified students regardless of wealth. But then the expansive energy of this massive public commitment was spent. In this vast and vaguely unhappy system, a new spirit was taking form.

If any single factor can be held responsible for launching the transformation it would be inflation. During the years 1979–1981, the U.S. currency suffered inflation of nearly 40 percent. This "great inflation" was the catalyst that touched off a concatenation of intended and unforeseen developments. The ideological tone was set in part by a widely shared perception of a "crisis of the welfare state." The crescive requirements of government programs, it was alleged, were choking the economies of the very societies they served. In the United States, a consensus formed that national economic competitiveness had declined, in part due to neglect of research, a realization that marked the beginning of a new rapprochement between industry and universities. Within institutions of higher education, financial stringency gave administrators increased leverage to effect a new managerial style. Defenders of the ivory tower among faculty and students became less able to shape events; administrators claimed increased authority to rationalize the operations of their institutions (Keller, 1983: 27–39). The great inflation triggered unexpected financial developments, as the entire system of federal student aid was silently reori-

ented from grants to loans. Private institutions, in particular, had little recourse but to impose hefty hikes in tuition. As the economy improved, the earnings premium of college graduates began to expand. Parents willingly paid the higher charges as their children clamored for admission to the most selective—and expensive—schools. By the mid-1980s, higher education had a new aspect and tone. An Age of Privatization had commenced in which new dynamics were at work.

The main features of the new age took time to develop, but they persisted through the ensuing economic vicissitudes. Privatization took hold in the years of recovery after the great inflation, especially during the buoyant prosperity of the mid-1980s. The next five years brought renewed but milder inflation and ultimately the recession of 1990–1991. From that juncture, the mentality and manifestations of privatization intensified, never more so than in the "goldilocks" economy of 1995–1998. Its defining features have been, first, a shifting of the cost of higher education onto the shoulders of students and their parents; second, the privatization of academic research, both in its funding and its utilization; and third, a growing entrepreneurialism on the part of universities, both in external engagements and in internal management.

PRIVATIZING THE COST OF HIGHER EDUCATION

The most notorious development of these years in the mind of the public—or at least the journalists and politicians who claim to speak for the public—was the inordinate rise in the price of higher education. Most conspicuous was the escalation of tuition bills at selective private colleges and universities, but more recently public institutions have followed this same path.

TABLE 1: RATES OF CHANGE IN TUITION, 1977–1993 (1995$)[5]

	1977–78 TO 1985–86	1985–86 TO 1993–94
GROSS DOMESTIC PRODUCT	20%	22%
AVERAGE TUITION, PRIVATE UNIVERSITIES	40%	46%
AVERAGE TUITION, PUBLIC UNIVERSITIES	28%	42%
TUITION, HARVARD UNIVERSITY	57%	28%

5. Financial data are adapted from the series of the National Center for Education Statistics, reported annually in the Digest of Education Statistics *and also available on CASPAR, the database of the National Science Foundation.*

Indeed, Table 1 shows the average tuition at private universities growing at roughly twice the rate of the economy as a whole, measured in constant dollars. In current dollars, the psychological effect was much greater. Annual tuition at Harvard increased from $4,100 in 1976 to $21,900 in 1996—more than a five-fold jump in two decades. Harvard is used here as a proxy for a group of expensive and highly selective institutions that have acted as pricing leaders.[6] Their prices constitute a tacit "ceiling" for the amount of tuition any institution dares charge. Harvard, in fact, stood fourteenth in 1996 among 60 private institutions with tuition exceeding $20,000. Collectively, these institutions enrolled only about four percent of all undergraduates,[7] however, the key role of the pricing leaders in raising private tuition is suggested by Table 1.

Harvard and its like raised tuition at double-digit rates from 1979 through 1983 in order to compensate for the ravages of the great inflation, then imposed healthy annual increases for the rest of the decade. These highly selective institutions enjoyed substantial excess demand for their places, and positive economic trends virtually precluded any adverse reaction from their clientele.[8] They were perceived as offering *high-cost/high-quality* education; of these two linked attributes, the second—high quality—was clearly paramount. Any perceived diminution of educational quality would have been far more detrimental than the suspicion that they charged too much. In fact, a high price was so closely interwoven with the assumption of high quality that it was largely assumed to be an indicator of the latter. The pricing decisions of Harvard et al. thus had a double impact on the private sector: the ceiling for allowable tuition charges was substantially raised, providing other institutions ample room for similar hikes; and the linkage of price and quality gave them an opportunity at once to raise both revenues and status. Hence, the general rise in private-sector tuition continued well after leaders like Harvard decided it was prudent to restrain their annual increases (see Table 1).[9]

6. Harvard tuition tracks the average for the highly selective private colleges and universities in the Consortium on Financing Higher Education (COFHE) (Clotfelter, 1996: 81).

7. See Chronicle of Higher Education, XLIV, 1 *(August, 29, 1997): 34; XLIII, 38 (May 30, 1997): A14.*

8. Clotfelter notes as facilitating conditions: "(1) the improvement in the economic well-being of the most affluent households, (2) the increase in the economic returns to college training, (3) the concentration of top students in selective colleges and universities…" (Clotfelter 1996: 59).

9. Several factors undoubtedly served to moderate the tuition hikes of Harvard and other price leaders: highly adverse reactions in policy circles and the press; a diminishing urgency of need for additional revenues; and, the 'moderate' hikes they did institute (c. 5%) represented large dollar amounts—e.g. 5% of $20,000 = $1000, or one-third of the average public university tuition!

Price increases do not necessarily imply shifts in financial burden. To investigate this issue, one must delve into changes in the relationships of revenues and expenditures.

TABLE 2: TUITION REVENUES VS. EXPENDITURES, 1977–1993

	1977–78 CHANGE	1985–86 CHANGE	1993–94
PUBLIC SECTOR			
TUITION REV/ADJUSTED E&G	18%	21%	27%
REAL CHANGE, TUITION REV.	40%	71%	
PER FTE STUDENT	34%	46%	
REAL CHANGE, ADJUSTED E&G	23%	30%	
PER FTE STUDENT	18%	11%	
PRIVATE SECTOR			
TUITION REV/ADJUSTED E&G	62%	65%	71%
NET TUITION REV/ADJ. E&G	56%	58%	59%
REAL CHANGE, TUITION REV.	47%	57%	
PER FTE STUDENT	30%	45%	
NET REAL CHANGE, TUITION REV.	43%	48%	
PER FTE STUDENT	27%	31%	
REAL CHANGE, ADJUSTED E&G	39%	45%	
PER FTE STUDENT	23%	29%	

E&G = Education and General Expenditures

ADJUSTED E&G = E&G – Research in public sector; E&G – (Research + unrestricted student aid) in private sector.

NET TUITION = Tuition Revenues – Expenditures for Unrestricted Aid

Table 2 reveals three interesting features about the rise in student charges. First, as measured by gross tuition revenues, developments have been remarkably similar in both the public and private sectors. In each, students have assumed an additional nine percent of adjusted educational and general expenditures (18 to 27%; 62 to 71%). Also, adjusted per FTE enrollment, gross tuition revenues have risen at comparable rates for both periods measured here (34 vs. 30%; 46 vs. 45%).[10]

Second, the picture for the private sector changes when unrestricted student financial aid is taken into account. These funds have been the fastest-growing expenditure category for private institutions, although in reality they constitute money credited to students

10. Of course, the magnitude of the increases is much higher in private institutions: A 5% increase in the average public university tuition bill would be $160; that for a private university would be $780 (1996).

and then booked as tuition—an expenditure that is counted as revenue. These transactions should more accurately be seen as tuition discounts.[11] Eliminating this bookkeeping fiction reveals that private sector students, on average, have only assumed an additional three percent of the financial burden. Of course, the nine-percent figure would still represent the experience of full payers, who comprise about a third of full-time private students.

Third, the increased tuition payments also pay for an improving product, here represented by the increase in adjusted E&G expenditures. The discrepancy between the two sectors is marked in this respect, especially since 1985 (11 vs. 29%). For the private sector as a whole, the net increase in student charges has nearly been matched by (unidentified) product improvement,[12] but in the public sector higher tuition has spurred only fractional and diminishing increases in educational spending (34 vs. 18%; 46 vs. 11%). The implications of these findings will be explored below in the sections dealing with the respective sectors. Here, the privatization scenario requires an explanation of how colleges and universities were able to raise tuition more rapidly than most Americans have raised their capacity to pay.

The answer to this apparent paradox lies with the pluralistic provision of student financial aid. Most students qualify for some form of financial aid when the estimated cost of attendance exceeds the expected contribution of parents and student, determined by well-established formulae measuring income and wealth. The remaining need is then met in two or three ways:[13]

For public institutions:

Estimated cost of attendance:	=	Expected family contribution
	+	Eligible need-based aid
	+	Federal subsidized loans

For private institutions:

Estimated cost of attendance:	=	Expected family contribution
	+	Eligible need-based aid
	+	Federal subsidized loans
	+	Tuition discount

These elements are addressed serially. That is, first the family contribution is established; then all aid for which the student is eligible is applied, with most of these funds targeted to assist lower-income

11. See Griffith (1996). Accounting standards have now been changed to eliminate this discrepancy by having institutions report net tuition revenues.

12. This was also the principal finding of Clotfelter (1996).

13. This explanation simplifies the process by lumping together several different kinds of grants and loans. See Johnstone (1986).

students. The remaining need is then met with a federal loan or, for private institutions, a loan and a tuition discount. During the years in question, family income and hence contributions grew at less than the rate for GDP (Table 1).[14] Grant aid for students has also been comparatively stagnant in real terms, rising 21 percent in fifteen years (Table 3). That left federal loans and (in the private sector) tuition discounts to meet the escalating costs of higher education.

TABLE 3: GRANTS, LOANS AND PRIVATE UNRESTRICTED STUDENT AID (1995$)

	1980	1985	1990	1995
EDUCATION OPPORTUNITY GRANTS & WORK STUDY	5,865	5,680	6,290	7,104
FEDERAL STUDENT LOANS	8,703	11,596	12,319	23,733
UNRESTRICTED STUDENT AID (PRIVATE)	1,340	2,169	3,608	5,180

Indeed, loan volume grew by 173 percent in these years, and tuition discounts to an even greater extent. Loans essentially tapped a new source of revenue. Ignoring for now the cost to taxpayers, which ranges from one-third to one-half of principal,[15] the colleges succeeded in tapping into the post-graduation incomes of their students.[16] Tuition discounts have exerted an indirect though undeniable pressure on tuition escalation, precisely because not everyone pays the higher charges.[17] Thus, both loans and tuition discounts were clearly instrumental in leveraging greater payments from students and their families.

14. Household or family income series are plagued with at least two difficulties: the definition of a household bears little relation to the population supporting offspring in college; and the GDP deflator is probably exaggerated when used for this purpose. From 1977 to 1992, Census Bureau data indicate that mean family income increased by 9.7%; that for the top quintile, 18.1% (Clotfelter, 1996: 77).

15. The government faces three expenses with Guaranteed Student Loans (the most popular program): 1) interest while the student is still in school; 2) an interest subsidy to the lender, which varies with prevailing rates; and 3) the cost of defaulted loans. These future expenses are unpredictable for a given loan.

16. The American Council on Education has challenged this conclusion in a study that demonstrates no short-term linkage between percentage increases in federal loan volume and percentage hikes in private tuitions. However, other analysts endorse the logic presented here (Burd, 1977).

17. If a 5% increase in tuition revenues were needed to meet rising expenses, and one-half of students would be paying the additional amount, tuition would have to be raised by 10%. Thus, the financial aid system has the dual effect of causing higher rates of tuition increase and buying off potential price resisters.

PRIVATIZING ACADEMIC RESEARCH

The privatization of academic research is at bottom a manifestation of deeper changes in the assumptions about the nature and uses of academic knowledge. Federal largesse during the "golden age" of the 1960s fostered an ivory-tower mentality concerning the purity of academic inquiry and the critical stance the university should assume toward society. These attitudes largely persisted through the 1970s, but eroded quickly after 1980. The demands that academic research contribute toward national economic competitiveness generated pressure in this direction, but the paradigmatic breakthrough came from the spectacular success of biotechnology, where the frontiers of molecular biology and commercial pharmaceutical products were conjoined. Linkages with industry were a relatively small wedge, but as academic research surged they opened the system to a new spirit of entrepreneurialism.[18]

Academic research grew more in the 1980s than in any previous decade ($6 billion in 1987$), and this growth was led by private sources of funds.

TABLE 4: SOURCES OF SUPPORT FOR ACADEMIC RESEARCH, 1980–1995

	1980	1985	1990	1995
ACADEMIC RESEARCH (1987$)	8,588	10,271	14,538	16,770
% FEDERAL	67.6	62.6	59.2	60.2
% STATE	8.1	7.8	8.1	7.4
% INDUSTRY	3.9	5.8	6.9	6.9
% UNIVERSITY	13.8	16.7	18.5	18.1
% OTHER	6.6	7.2	7.3	7.4
[% PRIVATE (SUBTOTAL)	24.3	29.7	32.7	32.4]

Table 4 indicates that privatization of research funding was essentially a phenomenon of the 1980s (the private subtotal had risen by only two percent in the 1970s). Although federal support for academic research rose by a robust 48 percent, private support expanded by 127 percent. Support from industry increased most rapidly, and is still understated in these data. However, the largest dollar increment of private growth came from universities' own expenditures for separately budgeted research.[19] These shifting patterns of funding belie a change in the balance of academic research.

18. See Geiger (1993). This discussion leaves aside defense-related academic research—a large, complex subject discussed in ibid. and summarized in Geiger (1992a). See also Kennedy (1996: 101–102).

19. Industry-related academic research is also funded through cooperative arrangements and by industry foundations. University expenditures for research are discussed below.

During the 1980s a greater proportion of academic research became oriented toward the development of future technology. This change is evident from the scientific areas of greatest growth—biotechnology and engineering—as well as from the forms of support—industry-university partnerships and government-subsidized cooperative research centers. The scientific character of research was apparently stable: roughly two-thirds of academic research was classified as 'basic' throughout the decade. But the most dynamic areas of science tended to be associated with "research-based technologies." Policy makers employed terms like "strategic" or "pre-commercial" research without precise definition, but they had in mind fields like superconductivity or optoelectronics, where today's basic research could be expected to contribute to future commercial products (Press, 1992).

The growing emphasis on such fields within universities affected the organization of academic research. When a distinction is made between a core of academic departments and a periphery of specialized centers and institutes, then it is evident that research in the 1980s grew more rapidly on the periphery. Both federal and state governments sponsored new centers intended to foster university-industry cooperation in economically relevant fields. University medical schools, responding in part to burgeoning support for biomedical science, became honeycombed with research institutes. The decade saw little growth in the number of S&E faculty, but there was substantial expansion of professional research staff and postdoctoral fellows. Thus, university research as it privatized became more removed from departmental teaching. There was little effective resistance to this development because it was impelled by the inherent value of the new research.

In one of the most marked behavioral changes of this era, universities sought to capture for themselves some of this value emerging from their own laboratories. A revision of patent law in 1980 gave universities the right to patent discoveries made under federal grants. They were enticed as well with the apparent lucrative returns that a few universities garnered from research parks. But the issue was forced, above all, by the enormous returns to patenting and faculty-linked firms in biotechnology. New language captured this new reality, as academic knowledge in these fields became "intellectual property."

By the end of the decade, most major universities had organized an array of similar units, establishing offices of technology transfer (or intellectual property) chiefly designed to work with researchers—from disclosures of promising discoveries through the obtaining of patents to the managing of licenses and royalties. Although initially regarded with much skepticism, revenues from patent licenses have now become a substantial source of income for a good number of

universities.[20] Research parks, although 90 percent real estate development and perhaps 10 percent research, have nevertheless been justified primarily in terms of facilitating university-industry research interactions. Business incubators, similarly, are touted as a service for faculty, or others, who wish to commercialize discoveries. Finally, after anguishing over the propriety of participating in firms spawned by faculty research, some universities have found an acceptable way to do this through wholly-owned but legally separate venture capital funds. All of these organizational creations represent university participation in the commercialization and capitalization of research. Although historical adumbration of all these practices might be cited, the pervasiveness of these recent creations signifies the crossing of a threshold to new levels of involvement with commercial firms (Geiger, 1992b: 165–297; Abramson et al., 1997: 91–124).

RATIONALIZING UNIVERSITY MANAGEMENT

Given university immersion in cutthroat markets like patenting and venture capital, there should be little surprise that universities now resemble other economic actors more closely when investing, transacting business, and administering ancillary activities. The Age of Privatization has been characterized by the intense and virtually incessant pursuit of gifts (euphemistically called "development"). As holders of large endowments, universities have been forced to become sophisticated investors, resorting to asset-allocation models, professional money managers, program trading, and other Wall-Street stratagems du jour. But with greed comes risk, including the risk of embarrassment. One group of institutions was victimized by a fund-raising Ponzi scheme; another university's endowment gyrated with the fortunes of a wholly-owned biotechnology company; and a stampede of institutions into interest-rate arbitrage using tax-exempt bonds had to be corralled by an act of Congress. A struggle during the 1980s to hold universities to a higher moral standard in their investments, which centered on the boycott of Apartheid South Africa, was for all practical purposes abandoned in the wild bull market of the 1990s.[21]

This entrepreneurial freedom has been turned as well to the running of the campus. Auxiliary enterprises have become much more tightly managed to assure that they will, at the very least, pay for themselves. At the same time, universities have been steadily divesting certain services to private corporations, which operate them more efficiently and pay the institution a fee for the privilege. Bookstores

20. See Matkin (1990: 56–145). Patents awarded to U.S. universities increased roughly fourfold from the early 1980s to the early 1990s. Revenues from licensing were estimated to be $242 million in 1993 (NSB, 1993: 5-42–5-43).

21. For an influential guide before the 1990s, see Simon, Powers, and Gunnemann (1972).

have been privatized at most universities; food service, dormitories, and the operation of physical plants have been divested more sporadically. Most of these transactions have on balance saved money. Other ventures in commercialization are opportunistic and (to some) unseemly. Universities, especially those with major athletics programs, market their names and logos shamelessly on all kinds of merchandise, while at the same time their coaches and players conspicuously wear the trademarks of sportswear companies. Brand-name merchandising today brings major universities windfall revenues that can exceed $3 million annually. Additional income has been raised from signing exclusive contracts with beverage and junk-food companies (Griner, 1997; Ikenberry, 1997). All this meets the test of economic rationality, which seems to be the only one that matters.

Universities have nevertheless been consistently criticized for being shielded from market forces—for failing to undergo the ruthless downsizing and rationalizing undertaken in American industry (Laing, 1995). The reference here is to the large administrative apparatus that universities now sustain and particularly to the position of the faculty. Despite such criticism, these realms too have been affected by the rationalization of management associated with privatization. The widely recognized managerial revolution in higher education has either weakened or narrowed the sphere in which traditional collegial decision-making occurred. On the other hand, much administrative energy is directed to strategic planning, cost-centered budgeting, and gimmicks from business-sector managerialism, such as Total Quality Management. These practices seep into the academic departments as well, where they are resented by faculty; their impact is probably greater at less prestigious institutions. However, the new managerialism is a pervasive fact, and academic stewardship oversees a considerably smaller purview than it did just a generation ago.

PRIVATE UNIVERSITIES IN THE MARKETPLACE

The Age of Privatization has been, on the whole, a boon to private colleges and universities. The seismic shift in values from public dependence to private responsibility and choice rehabilitated the traditional role of the private sector. In addition, the enrichissez-vous spirit that emerged in the 1980s lent renewed respectability to selectivity and elitism in American culture, although heavily seasoned in the case of higher education with a concern for social justice. The conditions generated by this environment have largely steered the principal trends in the private sector: a high priority accorded to undergraduate students, the necessity of effective management, an emphasis on quality, the pronounced influence of marketing, and in some cases a precarious financial structure.

Economic theory of nonprofit sectors assumes that democratic

governments provide collective goods, like education, in the quantity and quality demanded by the majority of voters. People with minority preferences for those goods consequently seek to fulfill them through private, voluntary actions. Applied to higher education, the American private sector has assumed the role of complementing public institutions by offering either more, or better, or different alternatives (Weisbrod, 1977; Geiger, 1986: 214–236). Before 1900, the private sector provided most access to higher education, and even in the twentieth century private universities took the lead in bringing higher education to urban markets. The highest quality of higher education, however defined, has also been found in private institutions. In addition, the majority of private colleges or universities were at one time associated with a religious denomination, and thus constituted culturally distinctive educational settings. During the long era of nationalization in the last half of the century, and particularly its final phase, these private missions were attenuated under the combined pressure of public opinion and government actions.

Providing access to higher education was almost entirely usurped by state governments, with the result that private institutions in all markets had to compete with their lower-cost public counterparts.[22] Prevailing values undercut the other missions of the private sector. Elitism was heartily disdained throughout much of higher education, but particularly among students. "Elite" campuses were most compromised during the student rebellion, considerably weakening ties with former supporters. The pervasive secularism of the era also found little use for the kind of cultural distinctiveness represented by denominational colleges. During the 1970s, in particular, it was widely assumed that much of the private sector would disappear, and that even traditional leaders might, through regulation and subsidization, be substantially transformed. That this did not occur was due to the onset of the Age of Privatization. The fact that the last act of federal largesse toward higher education put purchasing power into the hands of students rather than public institutions turned out to be an important bonus. However, the key to the rejuvenation of private universities lay largely within the institutions themselves.

The sociologist Edward Shils cast his analytical gaze on the American private university at the juncture of its greatest demoralization.[23] Through the gloom of the early 1970s, he perceived an underlying strength in the capacity of the major private universities "to

22. Private colleges and universities have nevertheless been adept at finding market niches that are protected from public competition. State coordinating boards have generally been cooperative in preserving such niches. Urban private universities have been especially resourceful in meeting the demand for professional programs. Hence, the private sector even today supplements public provision with more higher education alternatives of certain types (Geiger, 1986a).

23. Shils (1973). Shils depicts the cultural forces of the early 1970s as inimical to private universities.

have their centres of initiative and decision within themselves." The private universities had the power to limit their size and commitments, and thus to preserve their relative affluence even through those difficult times. Above all, they were able to employ these attributes to pursue a course of intellectual distinction and freedom.

The great private universities proved Shils to be prescient. They gradually resolved the immediate crisis by putting their financial houses in order. After having overexpanded in costly graduate programs during the go-go 1960s, private universities faced frightful prospects: cutbacks in federal research support, endowments shrunk by declining financial markets, and the alienation of their donors (Geiger, 1993: 243–252). They were thus compelled to find ways to expand income and reduce commitments. The particulars are less important in this context than the process: private universities of necessity became much more effectively managed. In particular, they learned to plan their budgets and live within their means. Private universities emerged from the 1970s as far more tightly run entities than their public counterparts, a difference that has persisted to this day.

Compared with public universities, the leading private institutions have greater control over their income stream: they set their own tuition levels (within the parameters discussed above); conservative spending rules determine the income available from endowments; gifts, indirect-cost reimbursements from research grants, and auxiliary income fill out their revenues. Keeping expenditures within these limits leaves little scope for logrolling. Expenditures have to be justified within the mission of the institution. Open positions are not automatically refilled, but rather scrutinized for possible reallocation. New commitments tend not to be made unless justified financially and philosophically. Most private universities develop strategic plans to guide their actions. Public universities produce such plans as well, but are less able to make hard choices or to follow them. Private universities can set fiscal targets and plan academic development within carefully drawn and consensual parameters. Precisely because they have their centers of initiative within themselves, they are able to set and hold a course.[24]

Emerging from the crisis of the 1970s, private universities essentially resolved to expand their income first and only then to undertake desirable enhancements. This approach was initially frustrated by the great inflation, but those trying years ultimately gave way to a far more propitious environment. Led by the most prestigious institutions, private universities were able to raise tuition sufficiently to cover the escalation of expenditures for current activities (Shapiro and McPherson, 1991). For incremental expansion and improvement of those activities, they largely turned to their donors in an endless succession of capital campaigns. These efforts have been impressively

24. Cf. the accounts of academic strategies by private and public universities in Keller (1983: 80–97).

successful, as indicated by their ability to raise E&G expenditures. The question to pose here, given their sovereignty and freedom, is how did they choose to utilize these additional funds (see Table 5)?

TABLE 5: EXPENDITURES PER FTE STUDENT, 1979 AND 1989 (1990–1991$)

	1979	1989	ANNUAL CHANGE (%)
INSTRUCTION			
71 PUBLIC UNIVERSITIES	$4,973	$5,684	1.34
52 PRIVATE UNIVERSITIES	7,316	10,490	3.70
15 COFHE UNIVERSITIES	11,659	17,658	3.49
13 COFHE COLLEGES	6,086	8,146	2.91
ACADEMIC SUPPORT			
71 PUBLIC	731	973	2.86
52 PRIVATE	910	1,514	5.09
15 COFHE	1,674	2,302	3.18
13 COFHE	649	1,557	8.75
LIBRARIES			
71 PUBLIC	415	470	1.24
52 PRIVATE	846	944	1.10
15 COFHE	1,616	1,736	0.72
13 COFHE	972	749	-2.61
STUDENT SERVICES			
71 PUBLIC	479	574	1.81
52 PRIVATE	703	1,068	4.18
15 COFHE	1,103	1,442	3.53
13 COFHE	1,247	2,025	4.85
INSTITUTIONAL SUPPORT			
71 PUBLIC	899	1,193	2.83
52 PRIVATE	1,856	2,986	4.76
15 COFHE	2,509	4,423	5.67
13 COFHE	2,089	3,676	5.65

	1979	1989	ANNUAL CHANGE (%)
OPERATIONS & MAINTENANCE:			
71 PUBLIC	1,137	1,177	0.34
52 PRIVATE	1,833	2,136	1.53
15 COFHE	3,001	3,606	1.84
13 COFHE	2,152	2,467	1.37
TOTAL, EDUCATION-RELATED CURRENT-FUND EXPENDITURES			
71 PUBLIC	8,634	10,071	1.55
52 PRIVATE	13,464	19,238	3.46
15 COFHE	21,562	31,167	3.71
13 COFHE	13,195	18,620	3.44
INSTITUTIONAL FINANCIAL AID			
71 PUBLIC	384	578	4.09
52 PRIVATE	1,551	2,664	5.41
15 COFHE	2,759	4,017	3.76
13 COFHE	1,603	3,536	7.91
ADDITIONAL CAPITAL PLANT			
71 PUBLIC	1,387	2,369	5.35
52 PRIVATE	1,445	4,862	12.12
15 COFHE	1,811	8,593	15.57
13 COFHE	1,100	3,944	12.77

Source: Data compiled by Consortium on Financing Higher Education (COFHE). COFHE is composed of 32 private, highly selective colleges and universities that share information on admissions and finance.

According to Charles Clotfelter (1996), the favorable financial conditions allowed private universities to seek to fulfill their "pent-up institutional imperative for excellence."[25] With respect to faculty, this produced a roughly similar pattern. Private universities added few new faculty positions, but used enlarged salary budgets to hire senior faculty, particularly star-quality scholars or scientists. Table 5 reveals the widening advantage of private over public universities. They also improved the working conditions of faculty by decreasing time in the classroom and expanding time and support for research. Private universities were highly supportive of research, but do not appear to have sought to maximize research expenditures.[26]

In the natural sciences, of course, it would be hair-splitting to distinguish funded research from faculty qualifications. In fact, private universities dominated the highest ratings in the biomedical sciences, which comprise more than half of academic research expenditures. However, private universities also dominated the ratings in the humanities.[27] There, it seems certain, they sought intellectual distinction, which bolstered the reputation of both graduate departments and undergraduate programs. Overall, their penchant for hiring and retaining eminent faculty was manifest in a salary advantage that doubled from the late 1970s to the early 1990s.[28]

Less obvious is the major investment that private universities made in their undergraduate students. The celebrity of "name" professors may have brought renown to the colleges, but other investments specifically sought to enhance the attractiveness for undergraduate students. Student financial aid has already been identified as the largest increase in expenditure. The "high-tuition/high-aid" strategy that private universities adopted demonstrated a genius for exploiting the excess demand for their places while also sustaining the quality of undergraduate students (and, one might add, preserving an image of social equity). Table 5 reveals that elite private colleges increased their tuition discounting more rapidly than did universities. The financial aid totals for universities were still the largest, but they also included support for graduate students.

25. The account given here is consistent with the findings of Clotfelter's empirical analysis, but draws upon additional sources of evidence.

26. Behavior in this respect was similar across public and private sectors, but differed according to level of peer-rated quality (Geiger and Feller, 1995).

27. The top five ratings in each discipline: Humanities: private 41, public 14. Physical sciences: private 29, public 11. Biosciences: private 23, public 12. Social Sciences: private 17, public 18. Engineering: private 19, public 21. Total: Private 129, public 76. In the ratings done in the 1960s, private universities claimed 65% of the top six places in 1964, and 64% in 1969 (Shils, 1973: 15n); their share of the above ratings is 63%.

28. Average salaries for private university faculty were 10% greater than public salaries in 1976, and 23% greater in 1991 (Clotfelter, 1996: 283). In 1997–1998, this gap reached 26%. See Academe*, Special Issue, "The Economic Status of the Profession" (March–April, 1998): 26.*

A substantial, though unquantifiable, expense has been devoted to student amenities—refurbished dormitories, student centers, and recreational facilities. In the fiercely competitive market for high-ability students, institutions have had to present attractive, in some ways luxurious, living facilities for their precious and precocious charges.[29] By the end of the 1980s, private institutions were in the midst of a building boom that far outstripped their public counterparts (Table 5).

A third source of expenditure has been increased spending on student services—the professional staff who look after the increasingly abundant needs and activities of undergraduates. These expenditures are closely linked with those for marketing—an unavoidable commitment. In Table 5, admissions offices fall under student services, and development (fundraising) under institutional support. For COFHE universities, these two units absorbed almost one-quarter of increased educational spending; for COFHE colleges, this figure was 44 percent (Table 5). Clearly, the overhead of sustaining an elite undergraduate college is a large and growing burden, reflecting its importance to the institutions.

It is frequently alleged that universities have stressed their research role for the stature and grant income that it brings. However, judging from the ways they have chosen to spend their funds, it seems clear that they have perhaps invested most heavily in the prestige of their undergraduate colleges. Hence, the student-centered university of the 1990s.

The contemporary prosperity of private universities has allowed them to fulfill admirably the role Edward Shils ascribed to them as qualitative leaders.[30] At the pinnacle of the academic hierarchy, in a class by themselves, seven of the eight leading universities are private. In the next tier of 20 highly distinguished universities, half are private (see Table 6). These institutions account for a good portion of the best research and scholarship performed in the American system, and they exert a salutary influence on the academic standards, graduate programs, and treatment of faculty in public universities. Thus, private universities have continued to fulfill their historical role. The impressive strength at the peak of the system, however, is attenuated as one moves down the hierarchy. The cracks in the private-sector pyramid are most evident in the base. Whether or not they will someday work upward, or how far, is probably unanswerable today.

An issue seldom addressed is the latent incongruity between the two principal forms of quality exemplified by private universities. Academic excellence is internationally recognized, signifying a capacity to contribute original thought to the corpus of human knowledge. The excellence sought in undergraduate admissions is quite different. Robert Klitgaard has modeled this process after the desire to maxi-

29. To that end, college guides include ratings of dormitory rooms and food services.

30. Shils (1973: 7–9, 15); for NRC Ratings (aggregated), see Table 6.

TABLE 6:

INSTITUTION	Academic Rating 1982	Academic Rating 1995	% of Academic Research 1980	% of Academic Research 1990	% of Academic Research 1995	Undergraduate Students	Post baccalaureate Students	Selectivity Rating—U.G Admissions	Faculty 1980	Faculty 1990	Faculty 1995	Avg. Prof. Salary 1998 ($000)
PRIVATE												
MIT	4.70	4.62	2.87	1.96	1.71	4,429	5,107	99	880	913	918	$104.2
HARVARD	4.58	4.51	1.79	1.41	1.27	7,098	14,172	99	926	1,064	1,024	116.8
STANFORD	4.50	4.32	2.02	1.94	1.47	6,550	9,057	98	748	837	836	111.0
CALTECH	4.65	4.29	0.76	0.67	0.64	893	1,840	97	237	253	260	110.2
PRINCETON	4.11	4.28	0.51	0.57	0.48	4,601	1,865	99	549	632	644	110.3
UNIV. OF CHICAGO	4.40	4.27	1.11	0.58	0.75	3,515	7,437	94	733	761	781	106.0
YALE	4.26	4.13	1.28	1.15	1.07	5,401	5,747	99	748	760	704	108.4
CORNELL *(endowed)*	3.96	3.97	1.96	1.93	1.59	13,512	5,055	97	704	786	776	89.9
COLUMBIA	3.96	3.84	1.74	1.16	1.13	3,570	12,449	98	850	946	838	103.6
UNIV. OF PENNSYLVANIA	3.78	3.75	1.66	1.19	1.26	9,450	10,644	98	952	1,005	989	104.6
CARNEGIE MELLON	3.59	3.70	0.51	0.66	0.58	4,823	2,325	91	401	522	507	93.9
NORTHWESTERN	3.58	3.69	0.75	0.82	0.80	7,609	8,015	97	764	880	878	101.4
JOHNS HOPKINS	3.30	3.56	1.50	1.54	1.58	3,623	11,277	97	460	571	628	91.1
TOTALS									8,952	9,930	9,781	104.0
PUBLIC												
UC BERKELEY	4.61	4.52	1.56	1.45	1.34	21,000	8,600	91	1,259	1,399	1,154	$ 92.7
UC SAN DIEGO	3.87	4.08	2.19	1.49	1.65	14,300	3,500	80	488	688	650	88.3
UCLA	4.05	3.92	1.55	1.56	1.40	23,600	11,500	92	1,401	1,468	1,304	92.6
MICHIGAN	4.10	3.92	2.06	1.94	2.05	23,200	13,300	85	1,564	1,695	1,730	91.9
WISCONSIN	4.05	3.92	2.45	1.95	1.87	27,500	11,800	87	1,337	1,586	1,436	73.9
WASHINGTON	3.64	3.78	1.99	1.53	1.80	24,600	9,100	79	1,595	1,674	1,669	73.0
ILLINOIS	4.05	3.75	1.50	1.44	1.14	27,600	10,900	85	2,048	1,883	1,799	83.6
TEXAS	3.64	3.72	1.40	1.38	1.06	34,700	13,200	86	1,665	1,896	1,946	82.4
MINNESOTA	3.75	3.60	2.12	1.81	1.55	37,800	13,700	80	1,664	1,480	1,493	81.0
NORTH CAROLINA	3.51	3.53	0.68	0.80	0.97	15,800	8,700	90	1,095	1,094	1,123	86.0
PURDUE	3.52	3.33	1.10	0.84	0.94	29,400	6,800	71	1,302	1,398	1,424	80.8
PENNSYLVANIA STATE	2.97	3.29	1.28	1.72	1.53	31,500	6,800	85	1,279	1,478	1,525	83.1
TOTALS									16,697	17,739	17,253	84.1

mize the social value-added of each admitted student. However, this approach requires at least an implicit definition of social value, hence an irreducible element of subjectivity exists in these decisions. Stanford, for example, rates its students on two scales, one for academic achievement and a second for "extracurricular achievement." Some schools have devised scales for personal qualities as well (Klitgaard, 1985: 61–83; Fetter, 1995: 22–25). But such scales are merely sorting devices, and are not determinative. Applications are read numerous times to reach consensual decisions. Since Stanford applicants are all academically talented, intense scrutiny inevitably focuses on the applicant's personal statement, record of activities, and letters of recommendation—all in order to divine the potential "social value-added" that each might contribute as a Stanford student. The same process, with unique permutations, occurs at every highly selective private college.[31] The end result is an incoming class consisting of highly talented young people who will undoubtedly benefit greatly from each other's company, and may benefit even further from being around eminent academics.[32]

This latent incongruity between academic excellence and the characteristics sought in undergraduate students has been present in American universities since their inception (Vesey, 1965). But it has not been without problems. The fact that elite private universities during the interwar years maximized their social value-added by discriminating against Jewish applicants is thought to be quite reprehensible today; fifty years from now, who knows how informed opinion will judge such current departures from academic merit and universalism as demographic tailoring, or the high value placed on stereotypical extracurricular activities?

The ineluctable role of values in admissions is also linked with the growing importance of marketing. In the admission of each new class the university recreates the image it wishes to project to students past, present, and future. Maintaining the proper image is hugely important for retaining the loyalty and generosity of alumni. Further, it is an ongoing process that always has the next prospective class in view. For these reasons it has become exceedingly important for private selective institutions to receive numerous applications from the right sorts of prospects: the gifted and the affluent. Fortunately, there is a positive correlation between academic achievement and family income; unfortunately, the number of high achievers who can afford to attend a selective college is finite and not large. The 60 institutions that charge more than $20,000 tuition enroll at most 300,000 undergraduates. Two-thirds of these students receive some form of student aid; for one-third this includes a hefty tuition discount. Thus, no more

31. For the evolution and current predicament of private college admissions, see Duffy and Goldberg (1998).

32. For a description of the outcomes of elite private undergraduate education, see Katchadourian and Boli (1994).

than 100,000 students pay the full $100,000+ price to be educated at a private, highly selective college. These fortunate few (and larger numbers who might afford nearly as much) are the object of an avid competition by the selective colleges (Duffy and Goldberg, 1998).

The admissions cartel has largely been able to control the terms of this competition, but signs of strain are evident. Their weakest link is need-blind admissions. As a practical necessity, more and more institutions have had to cap their own aid (tuition discounts). Given the complicated nature of the admissions process, this can largely be done without abandoning the principle, but rather by becoming by degrees less and less blind to ability to pay. Tuition discounting itself has raised troubling questions. It has become so extensive that savvy consumers now shop and bargain for the most favorable offers, practices that in fact undermine the legitimacy of the entire process. The policy of high-tuition/high-aid was predicated on the notion that all student assistance was based on financial need. Well-to-do students paid fractionally more, but were compensated by having the company of talented classmates. Among somewhat less-selective colleges, however, this system has broken down. Urged by paid consultants to raise tuition and aid to the limit, they now individually negotiate the highest price they can attain from each student. Partly this is done with the subterfuge of merit scholarships, unrelated to need (Duffy and Goldberg, 1998: 205–227; Wick, 1997).

In 1995, Muskingum College (not a cartel member) broke ranks in an effort to opt out of this system. With 90 percent of its students receiving $4000 or more in tuition discounts, it decided to lower tuition by that amount (Shea, 1995). Thus far, only a few institutions have followed this lead. Nevertheless, the situation is precarious. Extensive tuition discounting is a short-term expedient for private institutions that for the moment seems to deliver needed students and revenues.[33] However, the best evidence suggests that beyond a certain point it exacerbates the problems it was designed to cure—discouraging applications because of "sticker shock" and hypocritically charging "full" tuition to only a handful of students. The gravest danger is that it will undermine the legitimacy of the private tuition structure supported by cartel members, who are wealthiest and most responsible. Even should that not occur, it seems inconceivable that the current system of tuition discounting in the private sector will be intact twenty years from now.

The incongruity between academics and undergraduates poses a particular problem of scale for private universities. Whereas private colleges must find only 300–500 of the best and the brightest each year, private universities typically recruit 1500–2000. Their undergraduate base is nevertheless small, and must remain so if they are to preserve the great advantages of being highly selective. Their profes-

33. For an economic rationale see Breneman (1994); but see Griffith (1996).

sional schools are typically self-supporting to a considerable degree, but the undergraduate college is the base supporting a research-active faculty and graduate programs in the arts and sciences. The result is an implicit constraint on research activity for all but the wealthiest of private universities. This stricture does not apply to medical schools, however, which are financially autonomous and operate increasingly like independent research institutes. Their exuberant growth, in fact, has tended to mask the more fastidious research policies of the rest of the university, where the dominant approach has been to focus research commitments in limited areas of excellence, and preferably in the academic core rather than on the periphery. In an era when an additional faculty position in the natural sciences can cost more than $1 million, the lure of seeking intellectual distinction (or notoriety) in the humanities is obvious. However, if the future direction of academic research is toward ever-larger teams and separately organized institutes, as will be suggested below, the trend will not favor the private research universities.

The leading private universities are as vigorous and financially healthy today as at any time in their histories. Their current plaints and worries conceal an ample cushion that would allow them to adapt to unanticipated setbacks. It may be somewhat incongruous that this prosperity is owed chiefly to the undergraduate college and that, come what may, they can be expected to defend the current premises that buoy its popularity. But this has been the historical case for American universities. More important, and also true to tradition, the universities have employed their affluence to exemplify and further academic excellence. The antinomy of these two alternatives has typically needed renegotiation and adjustment for each new generation of American higher education. That the current system is at once suffused with present-day values and financially vulnerable, virtually assures that such a renegotiation will occur again.

STATE UNIVERSITIES AND THE POLITY

Public institutions of higher education enroll some 78 percent of all students, but this headcount figure includes most of the open sector of the American system. The colleges and universities of the public sector confer twice as many bachelor's and doctoral degrees as do their private counterparts, and on average are also twice their size. However, the best of these universities are considerably larger. The dozen most highly rated state universities average 26,000 undergraduate and 11,000 post-baccalaureate students (see Table 6). Their size is an inherent source of their academic strength. It allows them to have huge departments in some mainstream disciplines and also to have academic programs in many specialized, professional fields. Largely for this reason, state universities dominate the top rankings

for volume of academic research in much the same way as their private counterparts dominate the quality ratings. Fourteen of the top 20 research performers are public, and 34 of the top 50.

During the 1980s, the trend toward privatization had a discernible effect on most state universities. In keeping with their missions, these institutions fairly readily embraced initiatives to provide greater research and service to the private sector of the economy. They benefited in return from increased voluntary and research support. Over the course of the decade, the primary finances of public institutions were privatized only moderately. The financial statements of these billion-dollar organizations can be quite complicated, but support for their educational operations comes chiefly from two sources—tuition and state appropriations. The relative change in these revenues for the public sector as a whole is given in Table 7 (compare to Table 2).

TABLE 7: REVENUES FOR PUBLIC COLLEGES AND UNIVERSITIES, 1980–1995 (IN MILLIONS)

	1980–81	1989–90	1995–96
TUITION	$ 5,570	$13,820	$23,257
STATE APPROPRIATIONS	19,007	34,859	40,081
TUITION RATIO	22.7%	28.3%	36.7%

The tuition ratio, which had been stable in the late 1970s, rose steadily throughout the 1980s, a trend accelerated by the recession of 1990–91. Historically, economic slowdowns have decreased state revenues and depressed appropriations for higher education; recoveries generally bring some degree of restitution. In the 1990s, both processes were less favorable than normal for public higher education. In the two years following the recession, year-to-year changes in total state appropriations were negative in real terms; the pick-up in appropriations was anemic despite the subsequent robust economy. From 1990 to 1993, the public sector added $10 of tuition revenue for each $3 of additional support from the states. The fundamental issues for public-sector finance are the cause and the implications of this trend.

One popular explanation sees higher education being crowded from the public feeding trough by more vigorous claimants. The chief culprit here is Medicaid, which enlarged its share of state general-funds outlays from eight to fourteen percent (1987–1995). In contrast, higher education saw its share diminish by three percentage points. The next-fastest growing competitor has been correctional institutions. One can only react with dismay upon learning that the state of Michigan, with one of the country's best systems of public universities, now spends

more on prisons than on higher education.[34] Of course, public spending reflects the assumed priorities of the citizenry: the crowding-out theory implies a shift in public values.

Some observers claim to detect an alteration in public perceptions: the increased value to the individual of a college degree seems to support the notion that those same individuals ought to pay more of the cost of their own education. This same position has been advocated by economists, who see in the high-tuition/high-aid strategy of the private institutions a socially equitable way to resolve the funding malaise of public universities. Of late, little public notice has been taken of the value to society of higher education, other than keeping people off welfare or out of jail. In truth, there has been little demand for additional workers in the public sphere—teachers, social workers, or—heaven forbid!—government bureaucrats. Higher education is increasingly viewed as training employees for the private economy, where they should be adequately compensated to repay their loans.

Access is still highly valued by the public, but it seems to be associated more strongly with student financial aid than with state support for institutions. The states themselves, in fact, have been more willing to increase aid for students than support for institutions.[35] One striking manifestation of this new mentality was provided by the Board of Visitors of the University of Virginia, which voted in 1995 to phase out all support for the University's schools of law and business, making them completely self-supporting, largely through tuition (Breneman, 1997). The potentially high-earning graduates of these schools will now be forced to pay for the education that supposedly will make them rich.

Were the attitude of the Virginians to become generalized, any social investment in higher education would be discouraged. But ignoring such extreme sentiments, a look at the demographics of higher education still makes it difficult to justify much increased public investment. The prolonged stasis in enrollments has meant that existing campuses and faculties are largely adequate to handle demand. The incremental growth in funding during the 1980s and 1990s (Table 2) may well have been sufficient to sustain existing levels of quality. Little wonder, then, that state legislators have found more compelling recipients for their discretionary spending. Such a detached view, however, has little relevance to the schizophrenic attitudes now dominating public higher education.

34. Callan and Finney (1997: 6–10). Michigan in 1997 spent "$1.4 billion for the education of 250,000 students in its public universities, and over $1.4 billion for the incarceration of 40,000 inmates—at an annual cost, per-inmate, of $35,000, somewhat more than the cost of a Harvard education!" (Duderstadt, 1996).

35. State student financial aid increased by 50 percent ($800 million) from 1990 to 1994 compared with less than 10 percent ($3,500 million) for appropriations to colleges and universities. Such financial assistance generally supports students in private institutions as well.

As states constricted their financial support for universities during the 1990s, they also sought to exert closer control over these institutions. It is often difficult to separate political rhetoric (which exaggerates the issues) from state actions (which often mitigate impacts); and with fifty states some are always moving in different directions. But given these caveats, states in the 1990s have consistently shown concern for 1) holding down the cost of higher education, 2) making their universities more accountable, particularly for the instruction of undergraduates, and 3) exerting greater control over faculty.

States have been of two minds about the rise in tuition. Like the Virginians, many would favor maximizing what wealthy, professional, or out-of-state students pay; but states also wish to minimize the costs for ordinary voters. Political expediency has tended to predominate, leading numerous states to impose caps or freezes on public tuition. Judging from the financial trend already cited, these restrictions appear to have been imposed after the fact. Thus, tuition has ratcheted upward, but state universities themselves have lost some measure of control over their future tuition revenues.

Concerns for accountability have led almost half the states to institute some form of performance-based budgeting. Many of these performance measures monitor things that universities are expected to do anyway, such as to graduate students. But now some increment of funding will be determined by quantitative indicators. Another popular approach is assessment of student performance. Both policies signify a lack of confidence in universities to perform their most basic tasks, and instead endeavor to impose bureaucratic measures of control.

The same is true for legislative efforts, or more commonly threats, to place controls over faculty workloads. Such initiatives reflect widespread impressions, fanned occasionally by newspaper exposés, that faculty spend little time working, particularly in a classroom. These simplistic notions seek to shoehorn all faculty into the single role of undergraduate teachers, and are blind to other aspects of faculty work.

This bleak picture has been complicated by a flurry of recent positive developments, especially in 1997–1998. California continued to rebound from its severe retrenchment during the early 1990s by providing healthy increases in appropriations. Tuition also remained frozen after huge percentage increases earlier in the decade. Florida and Georgia both opted to devote new sources of state revenue to higher education. Each chose to establish scholarships for high school graduates with superior academic records. A more favorable national mood has also resulted in federal legislation increasing the value of Pell grants and creating tax deductions for the first two years of college. These steps have become possible because of an improving fiscal outlook for state and federal governments, but it is nevertheless significant that higher education was specifically designated for favorable treatment.

Altogether, these divergent tendencies can be reduced to a coherent, if not consistent, view. Legislators and public opinion seem to be acknowledging, in both negative and positive ways, the ineluctable importance that higher education has assumed in contemporary society. Negatively, legislators have postured as supporters of undergraduate instruction, most commonly by demonizing faculty. They have also championed access, which is now at an all-time high, by attacking college costs even while cutting support. Positively, additional public money has been directed toward student financial aid. To a lesser degree, university appropriations in many states have been restored to their pre-recession rates of growth, although with a permanently larger student contribution. The overall outlook is populist and anti-elitist. For example, the fixation on research and technology transfer of the 1980s now seems largely forgotten. What has been lost in the prevailing populism is any appreciation of the traditional autonomy of universities and the importance of advanced and high-quality learning for the academic enterprise. Instead, an implicit threat of deprofessionalism hangs ominously over the public sector, which would have faculty conform to work rules and students advanced through standardized assessment. For the nation's state research universities, the challenge is to preserve a modicum of autonomy in management and flexibility in research.

The political oversight and occasional meddling experienced by many state universities tend to constrict their capacity to duplicate the managerial practices of private institutions. Large, compartmentalized organizations are by their very nature difficult to manage, but state universities have the additional disadvantage of tenuous control over their own revenues. State appropriations are to some degree unpredictable. Sometimes they are set *after* the budget year has already begun. During the 1990s, many universities had to remit funds back to state treasuries because of fiscal shortfalls. Nor can universities readily compensate by raising tuition, since the wrath of lawmakers might be felt in the next budget cycle. Universities have turned as never before to voluntary support, but even the minor contribution made by such funds must be carefully manipulated so that they do not appear to displace normal revenues.

On the expenditure side, state universities largely deal incrementally with their multiple units. Logrolling is the most expedient approach to maintaining the organization, given the long lead times for change and the gridlock of interests. At best, incremental adjustments can be achieved through strategic planning and budgeting formulae. Private universities occasionally close units that no longer fulfill their mission, but this is virtually impossible in the public sector, where every unit has an external constituency to defend it. As a consequence, meaningful planning is difficult to achieve and even harder to implement.

The capacity of universities to control revenues and expenditures, to manage and plan effectively, are clearly relative matters. It thus seems significant that the most academically distinguished state universities are also the most autonomous. The University of California is governed by an appointed Board of Regents that delegates wide latitude of control over intellectual matters to the Academic Senate. The University of Michigan is under an elected Board of Regents that has also allowed a high degree of autonomy. Both institutions have endured controversies with their governing boards, but in recent years they have demonstrated a rare ability to implement fundamental reforms. In the early 1980s, UC Berkeley found itself ill-equipped to respond to the revolution occurring in the biological sciences. Faced with possible erosion of its vaunted academic standing, the university reacted by totally reorganizing the departmental structure of those fields. Instead of the old divisions like botany-zoology, biological departments were reshaped according to the scale of the matter under study—populations, organisms, cells, and subcellular phenomena (Trow, 1983).

The University of Michigan undertook similar restructuring in its engineering and medical departments during the 1980s. The revitalization of these units created the foundation for a surge in research funding that lifted Michigan to become the largest performer of academic research.

The transformation of the University of Michigan exemplifies the possibilities that exist for public universities in the Age of Privatization. Beginning in the 1980s with a 25 percent drop in the real value of its state appropriation (fiscal 1981–1983), it initially resolved to preserve excellence by downsizing. However, a different strategy soon evolved—aggressive expansion in the scope and the quality of its activities, largely through private means (University of Michigan, 1996). The institution envisions "reinventing the university" in the next twenty years, and briefly entertained the possibility of foregoing all ties with the state and becoming an elite, private institution.

For public universities, an overriding concern has been meeting the high cost of improving and sustaining academic quality. The public sector as a whole, including much of the open sector, has been weighed down by the financial trends already cited, unable to match per-student spending increases in the private sector and facing a structural disadvantage in faculty salaries (Table 6). However, the top public research universities, such as the University of Michigan, have some formidable strengths. The leading public RUIs attract a large and possibly growing share of the nation's talented undergraduates. In their myriad degree programs they offer the potential for high quality undergraduate education, particularly for upperclassmen. Despite their growing expense, they still possess a cost advantage over the private sector. And (not to be ignored in America) they

register very high "celebrity" recognition. A second strength has been a persistent improvement in faculty quality, research, and graduate education. Many of the public RUIs were structurally positioned to benefit from faculty turnover and the new opportunities for cooperative research. Data on both research dispersion and faculty ratings indicate that they have done so (Geiger and Feller, 1995). A third and related strength has been their capacity for expanding roles, again like the University of Michigan. The state universities generally consider it part of their mission to expand service and research activities on the periphery of the institution.

In precisely this respect public and private universities, when viewed as ideal types, present ironic mirror images. Private universities, with their dynamics principally dictated by the imperatives of upholding elite undergraduate colleges, have become more affluent than ever before by restricting their numbers. Now, however, their scale of operations constrains them from participating in the kind of emerging research opportunities that require large teams and special organizational arrangements. Public universities, having endured adverse financial circumstances, have been unable to keep pace with them in terms of spending. While they are too huge to enroll any more students, this is no constraint; their large base of operations allows them to accommodate a larger scale and scope of knowledge-based activities, which may permit more ready adaptation to the research-based technologies of tomorrow.

ACADEMIC RESEARCH: THE NATIONAL VIEW

In few areas has privatization brought greater change in belief and behavior than academic research. In the 1980s, universities gradually embraced the view that the commercialization of their research was both a service to the public and a source of institutional revenue. They also forged research linkages with the private sector as never before.[36] The forces pushing these changes made research on many campuses an overriding priority during that decade. But in the student-centered universities of the 1990s, this central university mission has been relegated to a less prominent and at times defensive role. However, for the American economy academic research has never loomed so large.

In forty years the size of academic research as a proportion of GDP has increased about four-fold. The Age of Privatization produced its own distinctive growth spurt, which began in the mid-1980s and carried academic research from 0.23 to 0.32 percent of GDP in 1993—in magnitude a greater increase than in the 1960s. Since then, the relative size of academic research has ceased expanding; available figures show a healthy growth rate of around five percent, but the growth

36. These trends are surveyed in Geiger (1993).

rate for the economy has been even more robust. Regarding this pattern, one might note either the overall upward trajectory or the discontinuous nature of this movement. Both phenomena are significant for American universities.

Writing at the beginning of the 1960s, historian of science Derek de Solla Price discerned a striking regularity. Since the Scientific Revolution of the seventeenth century, scientific activity has appeared to double about every fifteen years (Price, 1963 [1986: 1–29]; Geiger, 1994). He knew that such exponential growth could not persist indefinitely, and he expected to witness imminent signs of "saturation." Since he wrote, however, real expenditures for basic research in the United States have stayed on course, doubling in each subsequent fifteen-year period. Whether by law or happenstance, it is not unreasonable to expect that investments in basic research in a technology-based economy would increase at some such rate. Since the late 1960s, universities have performed half, more or less, of the nation's basic research. Hence, academic research has also paralleled Price's exponential growth. But this relationship is by no means automatic: it requires that universities keep pace with the nation's needs for basic research for whatever purposes. This partly explains the discontinuities in growth.

If reliable data existed to extend Figure 1 back to 1900, it would most likely show research gaining in share of GDP during four periods, each reflecting a new research task undertaken by universities and a corresponding new kind of funding. In the 1920s, the great philanthropic foundations supported a major expansion of basic research in universities. From World War II until the mid-1950s, federal defense agencies poured enormous sums into universities to develop and sustain research related to national security. After Sputnik, the growth engine switched to the civilian federal agencies—NSF, NIH, and NASA—which supported for the most part pure disciplinary research in their respective areas (Geiger, 1997a). Once universities embraced these tasks and their supporters, a kind of ratchet seemed to be in place that prevented appreciable backsliding. The reason, most likely, is that universities institutionalized enduring research relationships. But for relative growth to occur for the entire sector, new economic actors are needed to establish new relationships that bring new sources of funds. Hence, the question: How did this occur in the Age of Privatization?

The simple answer has been outlined at the beginning of this chapter. Concern for the country's economic competitiveness galvanized an ideological consensus behind closer linkages between university research and the development of products and services for industry. The biotechnology paradigm supplied the compelling exemplar of a close nexus between research and commercialization. In addition, that field in itself was the locus of huge growth in academic and industrial research. Policies of both state and federal

governments specifically subsidized university-industry cooperative research. The increased investment by industry in academic research, often linked with government subsidies and some contribution by universities themselves, represented a new rationale and a new source of funds for university research. Added to fairly robust continuing support from existing sponsors, these funds raised the nation's investment in academic research to an all-time high.

This overall development was conventionally justified with reference to "technology transfer." The phrase has come to encompass a host of specific university activities, especially patenting and the encouragement of firm-formation (Matkin, 1990; Abramson et al, 1997: 91–124). In current parlance it has also acquired a decided short-term connotation—turning "discoveries" made in university laboratories into commercial products. Such an emphasis, however, tends to obscure longer-term relationships, predicated on developing technology, on which much of the academic research system rests.

Since World War II the United States has developed two enormous and effective systems of technology transfer—investments in university research to advance scientific knowledge that would contribute to the development of usable technology. The first is centered on the Department of Defense (DOD) and the second on the National Institutes of Health (NIH). The thrust of public policy in the 1980s was toward creating a third such system, in this case oriented toward civilian technology (outside of biomedical science). Developments in each of these systems are central to understanding the current state of academic research.

Universities and the DOD depend on one another far less now than they did in the immediate postwar era, but this relationship remains important for both. It reached a nadir in the mid-1970s after the Mansfield Amendment. But the efforts of the 1980s associated with "Star Wars," and with electronic warfare generally, caused support from DOD to briefly reach 10 percent of academic research. In 1995, DOD obligations for university research represented nearly seven percent of the total, almost as much as all industrial support. Research funds from DOD are heavily concentrated in units that have a long relationship with the agency, which has been a source of stability. Although the future funding and organization of defense R&D have been hotly debated, real spending on basic research has remained fairly steady (1985–1995). Here is where universities make the greatest contribution to defense technologies. In 1995, DOD allocated almost 60 percent of its funding of basic research to universities, equivalent to five percent of the academic total.

The National Institutes of Health, the world's largest research organization, oversees and integrates biomedical research wherever it is undertaken. Universities are nevertheless its largest clients, receiving 57 percent of its R&D support and 63 percent of its funding for basic research (1995). Thus, universities have benefited most from its con-

sistent growth. Since the 1950s, the NIH has flourished under an unwavering political consensus that public investments in biomedical research would contribute to improvements in healthcare. Funding for NIH consequently increased during the 1970s, when other kinds of federal research support were stagnant or falling. It rose faster than that of other agencies during the expansive 1980s, and it largely resisted the budget-balancing obsession of the 1990s. Now that federal finances are on firmer ground, proposals abound to augment NIH support further. The NIH by itself has risen from 37 to 53 percent of all federal funding for academic research (1971–1995). Since 1980, the biological and medical sciences have risen from 40 to 44 percent of all university expenditures for research.

The biotechnology revolution brought a much greater industrial presence in this arena (Abramson et al. 1997: 177–193). Large pharmaceutical firms had maintained close ties with university research since the 1930s, but the creation since 1980 of biotechnology firms in all shapes and sizes gave an entirely new aspect to the field. Drugs and medicine constituted the fastest growing category of industrial R&D after 1980. Also, whereas manufacturing firms accounted for virtually all R&D before 1980, non-manufacturing firms now perform 27 percent. University scientists are far more likely to become stakeholders in the latter type of enterprise. Partly for that reason, and also because patenting is crucial, the biomedical sciences have been the focus for the most pressing problems associated with the commercialization of academic research—secrecy, unethical behavior, patenting disputes, and divided allegiances.[37]

A third distinctive feature of the biomedical research system is the unique role of academic health centers. Built initially around university medical schools, they have grown to dwarf the schools and sometimes their parent universities. Some academic health centers are freestanding—unconnected with a university teaching arts and sciences—and in some other universities virtually all research is concentrated in the health center. Over the last two decades, the distance between academic health centers and universities has grown. Finances are separate, and often reporting lines are distinct as well. In terms of research, the health centers have been induced to move decidedly in the direction of clinical medicine. Graham and Diamond found that the number of full-time clinical faculty at a sample of medical schools increased by 160 percent, compared with a 37 percent rise in basic science faculty (1968–1988), and that they outnumbered the latter better than 4 to 1 (Graham and Diamond, 1997: 127–129). Both NIH and the health centers have been responsible for this trend. NIH has increased its emphasis on patient care, and hence funding

37. David Blumenthal and his associates in the Health Policy Research and Development Unit, Massachusetts General Hospital, have studied these problems most effectively. Recent results have been reported in Blumenthal et al. (1996: 368–373) and Blumenthal et al. (1997: 1224-28)

for clinical medicine. The centers have used a portion of their income from patient care to bolster research in clinical medicine, which might then attract additional NIH support. A good deal of the university component of research expenditures (Table 4) has come from this source. In recent years, however, the revolution in health care reimbursements has undermined this system. Academic health centers, in order to meet cost guidelines, have had to pare away much of the overhead that is inherent to a research setting, as well as ceasing to subsidize research. These changes are now underway, but the eventual consequences are far from clear.

The biomedical research system, the largest component of academic research, is structurally unique. Its academic scientists can be divided into three groups. Clinical researchers tend to be primarily engaged in patient care, secondarily in research, and occasionally in teaching. Basic scientists in health centers are primarily researchers with the lightest of teaching responsibilities. Faculty in university science departments bear more resemblance to their colleagues elsewhere in the university, dividing their time between students and research. For research purposes, the health centers appear to function more like autonomous research institutes. For any analysis of academic research that takes the university as the unit of analysis, the large size of biomedical research and its anomalous structure will influence the result.[38]

The steady growth of support for biomedical research has been accompanied by an even greater expansion of the biomedical research community. The consequence has been a situation of "doing better and feeling worse." Institutions or research groups that are on the cutting edge of critical fields have garnered ample and growing support (see below). However, the system also exhibits telltale signs of the pathologies of excessive competition. One sign is the political battles being waged in and around NIH over the relative emphasis of research areas. Another is "proposal pressure": with only 30 percent of NIH proposals receiving funding, the peer review system becomes strained. Suspicions abound that ratings are inflated for favored projects; that scientists are tempted to submit "safe" rather than more risky, innovative projects; and that personal vindictiveness and intellectual theft taint this inherently delicate process.[39] One way in which NIH had softened the rigors of the competition was to establish a separate category for young investigators; but in 1997 this practice was abolished in order to enlarge the central, merit-only, pool of research funding.

The federal budget for 1999 contained generous additional appropriations for NIH. The system of biomedical research that NIH sustains nevertheless may find these funds insufficient to quiet the

38. Graham and Diamond (1997), for example, analyze what they call the "medical school advantage."

39. Cf. Donald Kennedy's critical view of peer review: (Kennedy, 1997: 151–159).

prevailing turmoil. The uncertain fiscal foundation of health-center research, the effects of cutthroat competition, and the pressure for applicability produce much discontent across the largest field of academic research in spite of the dizzying pace of scientific advance.

In contrast to the first two major systems of technology transfer, the system based on civilian technologies was essentially elaborated during the 1980s.[40] It also differed from the others in being specifically focused on assisting and enabling private industry to produce and market technology-based products. The ostensible goal was to build bridges from university research to industrial development, but bridge-building in this case required the active intervention of intermediaries. The National Science Foundation under Director Erich Bloch added technology transfer to its official mission and enlarged its mandate from science to "science and engineering." The centerpiece of this effort was the establishment of twenty-three Engineering Research Centers at universities on the basis of competitive proposals. Numerous states pursued economic development strategies during the 1980s through programs that subsidized university-industry research centers. Independent organizations such as the Government-University-Industry Research Roundtable also furthered this cause. Such intermediaries were needed because of the nature of the endeavor.

Industries as different as electronics and pharmaceuticals interact with university research in quite different ways. However, a general rule largely prevails for the commercialization of basic research. Since the knowledge resulting from basic research is a social good that cannot be monopolized, those who invest in it cannot recapture the full benefits or perhaps even the cost of the investment. Because social returns are large, public investment is the appropriate arrangement. Exceptions have existed where one firm controlled so large a share of the market that it could reap the lion's share of social returns, like the former AT&T Bell Labs, in telecommunications. The new public policies of the 1980s squarely met these conditions. By subsidizing university-industry research relationships and by facilitating the formation of consortia, these policies permit firms to pool delimited investments in specific technologies from which they might expect valuable results.

The characteristic new form of this era was the university-industry research center (URIC). Although arrangements for university-industry research have existed throughout the twentieth century, the policies of the 1980s brought explosive growth. By 1990, more than 1000 URICs were operating at some 200 universities, the large majority of them founded in the 1980s. Their reported R&D expenditures of $2.5 billion represented fifteen percent of academic research. The sources of those expenditures reveal the crucial importance of subsidization

40. See the overview in Abramson et al. (1997: 91–124).

and cooperation: 34 percent were from the federal government, 12 percent from states, 18 percent from universities, and 31 percent from private industry (Cohen, Florida, and Goe, 1994). The cooperative nature of these endeavors leveraged funds from public and private sources, and from universities themselves, which would not otherwise have been spent on academic research. This effect is visible in the pattern of industrial spending for academic research. For the first half of the 1980s, increases tracked an overall rise of industrial R&D, but during the second half of the decade, due to the probable effect of URICs, universities received a larger share of industrial R&D outlays (Geiger, 1992b: 265–298).

By any account, the policies encouraging linkages between university research and civilian technology have been strikingly successful. They stimulated research and cooperation that would not otherwise have taken place; the continued investment of industry is testimony of the value of such research. However, the dynamic of growth seems to have been lost. The problem is not with universities, which remain largely open to such arrangements, but with the other partners. University-industry cooperation is inherently a function of industrial R&D. Real R&D funding by industry leveled off in the mid-1990s; industrial funding for university research slowed from 12 percent growth during the 1980s to 3 percent in the 1990s. Many of the gems of industrial research—the laboratories at AT&T, IBM, and Kodak—suffered as these firms lost dominant market positions (Thurow, 1996: 291–292). However, to speak of decline would be facile and premature. The extraordinary quality of industrial R&D is its volatility. In contrast to the stability of research rankings for universities, the top 100 industrial R&D spenders gained 38 new members in a decade (1984–1994).[41] Computer firms typically spend around 10 percent of their huge sales on R&D; software companies still more; and biotechnology firms more yet. The R&D budgets of the largest industrial performers exceed that of NSF. R&D is the lifeblood of high-tech industries, but the extent to which universities are involved may well depend on governments.

The Clinton Administration originally stepped away from the encouragement of university-industry linkages in favor of direct government technology assistance programs, largely through the new National Institute of Standards and Technology. At NSF, on the other hand, the emphasis of the previous administrations on URICs has been maintained but not augmented. A program of somewhat smaller Science and Technology Centers supplemented the Engineering Research Centers at the end of the 1980s. Although 80 to 100 centers were envisioned, 25 have been established. Throughout the 1990s, ERCs and STCs have garnered stable portions (4% and 2%) of the NSF

41. See NSB (1996: 121); change of position among firms on both lists was considerable. See also Rosenbloom and Spencer (1996).

CONSUMER-DRIVEN BASIC RESEARCH

The old linear interpretation of the relationship between science and technology—that basic research gives rise to applied research and technological development—is no longer believed. Rather, technology is seen to generate a demand for at least some basic, "consumer-driven" research.

The need for basic research as a byproduct of technological development has long been recognized. For example, the large development projects of the Department of Defense used about one-twentieth of their funds for basic research. The Department now expends less than four percent of its R&D funds on Basic Research. Industrial investment in basic research, four percent as late as 1980, rose to more than eight percent in the early 1990s. Some technologies generate more basic research than others, but one could reasonably hypothesize that applied research and development generate a demand for basic research approximating five to seven percent of expenditures.

On this basis, the $141 billion of applied research and development performed in the United States in 1995 would generate a "demand" for between $7.4 and $10.6 billion of basic research. This compares with actual expenditures of nearly $30 billion. Thus, consumer-driven basic research may account for between one-quarter and one-third of all basic research in the United States, probably most of that in non-academic settings. So, despite the importance of consumer-driven research for universities, it cannot come close to sustaining academic research. Rather, academic research must rely upon long-term investments by interested and disinterested parties, but especially the federal government.

budget. Evaluations have nevertheless concluded that no limit has been reached to the scientific questions best addressed through such centers (NSF, 1988; COSEPUP, 1996).

The weakest link in the backing for UIRCs has been state governments, whose emphasis has shifted from university-centered to industry-centered approaches, then to economic development through technical assistance to small business and technology development within firms. Whatever the merits of this approach, political or economic, it carries little assistance for university research (Plosila, 1996).

The overall effect of these developments cannot be accurately gauged, but the loss of dynamism, outside of biomedical science, appears evident. Industrial investment in university research has remained constant at about seven percent, but that figure includes a large biomedical component. Engineering and computer science, important areas of growth in the 1980s, saw their share of academic research contract slightly in the 1990s. In sum, the efforts of the 1980s to foster cooperation between universities and industry resulted in a valuable and permanent augmentation of academic research. In the 1990s, however, although the potential clearly existed for more fruitful interaction, supporting policies were neglected.

ACADEMIC RESEARCH: THE CAMPUS VIEW

The national trends in academic research just reviewed define the

essence of the problem facing universities: the inherently expansive demand for research lies increasingly with "science-based technologies," but accommodating these fields stretches universities intellectually into arcane specialties, organizationally into separate research units, and philosophically into relationships with self-serving commercial firms. Universities collectively face the choice of defending their recent role in the ecology of knowledge—performing half of all basic research—or limiting their involvement and forfeiting some portion of activity in these burgeoning research fields to other parties. For individual universities, this challenge often presents itself in terms of rival claims of the academic core of teaching departments and the developmental periphery of research and service units.

Burton R. Clark, in his study of entrepreneurial, innovative universities in Europe, identified the key role of the developmental periphery:

> a set of organizational programs and specific operational units, largely but not wholly outside the traditional departments, that fashion new environmental relationships as they reach outside old boundaries … to city councils, professional associations, and, preeminently, business firms. (Clark, 1998; cf. Clark, 1996).

A university's periphery consists of units for service and research-based services, as well as research per se. American universities can trace such endeavors back to the Agricultural Experiment Stations created by the 1887 Hatch Act, if not further. But it is also evident that much of the expansion of research in the Age of Privatization occurred in peripheral settings.

CORE REALITIES

Not only have university peripheries expanded during the current era, but also data on faculty indicate that the academic cores for the most part have not (Table 8).

TABLE 8: FACULTY AND NON-FACULTY RESEARCHERS IN ACADEMIC S&E

	FACULTY* 25 RUS	FACULTY* 200 RUS	TOTAL S&E	DOCTORAL FACULTY	POSTDOCS RESEARCHERS
1980	25,649	116,207			
1983			147,779	10,093	8,280
1990	27,559	125,641			
1993			171,819	21,983	13,334
1995	26,907				
CHANGE	(652)	9,434	24,040	11,890	5,054
	(2.4%)	8.1%	16.3%	118%	61%

**25 research universities from Table 6; 200 universities with highest research expenditures; from AAUP data in* Academe*, calculations from Geiger and Feller (1995); other data from NSF.*

It seems quite remarkable that although real expenditures for academic research increased by almost 70 percent in the 1980s, full-time faculty grew by only 8 percent at the 200 institutions responsible for 96 percent of those expenditures (Geiger and Feller, 1995). The most highly rated 25 universities in the public and private sectors (Table 6) show a similar growth of 7.4% in faculty numbers, but then register a slight contraction in the first half of the 1990s. The recession of 1990–1991 and its long hangover clearly had a depressive effect. Much of the loss occurred at University of California campuses, which were particularly hard hit, but Table 6 shows the majority of these leading institutions in both sectors declining. It is possible, but apparently difficult, to expand research while cutting faculty. Institutions that increased their relative share of full professors during the 1980s also tended to expand their share of academic research, and vice-versa. But this phenomenon was only one piece of a larger picture.[42] The fact remains: with enrollments largely stable, neither private nor public universities placed a premium on enlarging their faculties.[43]

While core faculty must have increased their per-capita volume of research, much growth took place in centers or institutes and involved non-faculty researchers. The portrait of UIRCs in 1990 revealed an employment structure of 12,000 faculty, 22,300 doctoral-level researchers, and 16,000 graduate students (Cohen, Florida, and Goe, 1994). Table 8 reveals a substantial increase in non-faculty researchers and postdocs. In addition, graduate students appreciably increased their participation in research during the decade as the number of research assistantships rose by 60 percent. The moderate increase in S&E faculty shown in Table 8 is not easy to decipher. Part of that increase is probably accounted for by clinical and pre-clinical faculty (not included in AAUP data), which grew substantially, as reported above; and part may be S&E Ph.D.'s who found faculty employment beyond the top 200 universities (that is, in essentially non-research settings).

The stability of core faculty has been one of the era's fundamental realities. Its generally depressive effect has been compounded by the waning youthfulness of university faculty, as the huge cohorts hired in 1960s have advanced toward retirement age.[44] Mobility among university faculty also appears to be relatively low. Outside of growth areas like biomedical and computer sciences, there have been few additional places at the academic bench for aspiring scientists. Research universities have in fact produced far more highly qualified scientists than the number of available academic posts, and this has

42. See Geiger and Feller (1995).

43. Outside research universities, the academic core has been constrained by the alarming growth of part-time faculty. See Schuster (1998).

44. The median age of academic S&E faculty rose from 40.6 in 1975 to 46.4 in 1991 (NSB, 1996: 204).

generated considerable pressure on graduate education.

Doctoral education is a central activity of the academic core and closely linked with research. Its dynamics appear to be relatively unaffected by the Age of Privatization, but rather to have been set by the over-expansion of doctoral production in the mid-1970s.[45] Doctoral degrees peaked in 1973 at nearly 35,000, having doubled in just seven years. They then declined to a steady plateau, before again ascending to surpass the 1973 peak in 1988. Since then, doctorates have continued to rise to a current level above 40,000. Nevertheless, the peak in the 1970s signaled a major discontinuity. First, from 1920 to 1975 the number of doctorates expanded at a rate 40 to 50 percent greater than the growth in bachelor's degrees. Afterward, however, what growth has occurred has paralleled that in first degrees. Second, American citizens have found doctoral education less attractive. In fact, fewer earn doctorates now than did two decades ago. Thus, all of the growth in doctoral degrees can be accounted for by non-citizens, who now comprise 35 percent of doctorates in the life sciences, 40 percent in the physical sciences, and 60 percent in engineering.

Were it not for this wholesale importation of foreign graduate students, the disinclination of Americans for advanced studies might also constitute a constraint on academic development. Graduate programs require a critical mass to be viable, let alone healthy, and since the mid-1980s many science and engineering departments have relied on international students to meet this need. The benefit to the United States, however, extends well beyond academic departments. This windfall of human capital has created a kind of reserve army of scientists and engineers, available for postdocs (the destination of a disproportionate number) and other academic or research appointments, but also subject to repatriation should demand slacken. The principal drawback to this arrangement is that a good deal of academic science has become dependent on individuals whose availability is determined on the other side of the Pacific.

Partly because of the reserve army of Ph.D.'s, no one believes that the United States faces a shortage of doctoral scientists; on the contrary, recent years have witnessed hand-wringing and ingenious theorizing over their alleged oversupply.[46] In a larger context, this would appear as a kind of paradox: just as universities are being implored to make their expertise more widely available to society, they are also being accused of producing too much of the quintessential product of academic learning. The explanation for this paradox, in theory at least, may be that graduate education has done little to adapt to the Age of Privatization.

An instructive comparison can be drawn between the trends in master's degrees and doctoral degrees. For master's degrees, the fields

45. The following discussion draws on Geiger (1997b) and (1998).

46. For a discussion of the literature, see Geiger (1997b).

of greatest growth have been linked with growing opportunities in the economy—business administration, health professions, engineering, and computer science. The number of graduates in these fields has more than doubled from the mid-1970s to the mid-1990s. Among Ph.D.'s, however, there is only a pale reflection of this dynamic. Graduates in engineering and the health professions have accounted for perhaps 40 percent of the growth over these decades, but there is little additional evidence of linkage with the productive economy. Instead, doctoral education remains tightly bound with the academic core.

Awareness of this general issue has been widespread. The NSF has insisted on a graduate education component for the centers it supports, and the data for UIRCs, given above, would seem to indicate substantial graduate participation in such settings. The most authoritative national report on this subject advocated measures to restructure graduate education in ways that would give Ph.D.'s more germane experiences for working in or with industry. The NSF has also organized a 1998 Forum on Graduate Education to identify and popularize innovative practices (COSEPUP, 1995). But graduate education is resistant to change precisely because it has been so effective.

Far more than undergraduate education, doctoral education is dominated by hierarchy and prestige. The actions of academic departments in pursuing the most able students produce a remarkably efficient national queuing system. The top students are recruited to the top departments and so on down the line until the national queue is exhausted. Remaining places tend to be allocated according to regional markets. This system has important implications for doctoral education. First, it is highly concentrated. The best departments usually have the largest doctoral programs. During the 1980s, for example, doctoral programs in the top 24 universities expanded at twice the rate as other programs (Geiger and Feller, 1995). Second, given the relative scarcity of top students, it is a seller's market. Support packages have been bid up to a standard of five years of guaranteed support. With such tenure in their chosen department, students have little incentive to indulge in experimental or interdisciplinary novelties. Third, it is still firmly believed that the best job-market credential is a degree from a top department and/or a leading figure in the field. Students perceive no incentive to press for change. Fourth, graduate education is the most decentralized of all university functions. Control is predominantly lodged at the departmental level, and many decisions are made on an individual basis.

Policies that seek to affect such realities in a global manner face serious obstacles. Graduate programs are constrained by circumstances of their own devising into offering long and costly courses of study that can be taken by relatively few students. This situation is probably changing at the current moment, albeit slowly. The one reality in this equation that might favor evolution is research itself.

To the extent that the ongoing forces of privatization shape the research by which graduate students are trained, so too will doctoral programs be inexorably altered. This process, however, has lagged other impacts of privatization, leaving graduate education largely immured in the academic core.

The basic conditions of supply and demand have affected institutional patterns of growth in academic research. A study of "dispersion" of academic research during the 1980s yielded unsuspected findings.[47] Changes in an institution's "market share" of total academic research turned out to be sensitive in a nonlinear manner to institutional prestige, as measured by the NAS ratings. The most prestigious 20 universities lost more than four percent of market share, but the next 50 universities—a second tier of academically strong institutions—gained almost three percent. The less distinguished universities, which had been accused of siphoning off research funds, actually lost some market share. Pure medical universities accounted for the balance of gains.

The best explanation for this pattern is as follows. The most prestigious universities apparently conduct research at near optimal levels. Given their reluctance to expand faculty, they failed to increase research as rapidly as the overall system. Second-tier institutions, however, possessed relatively good infrastructure and sub-optimal utilization. Given the abundance of scientific talent, new and replacement faculty advanced their research activity toward optimal levels. The third tier of institutions was largely precluded from a similar development by weaknesses in the conditions supporting research. Their faculties undoubtedly strengthened, which became evident in the 1995 ratings, but they lacked the infrastructure to capitalize on this improvement. The pure medical schools were focused on the most lucrative area of academic research and were also capable of adapting their research structures to the needs of these dynamic fields.

A rather cursory look at institutional research data for 1995 shows the dispersion trends to be largely intact for the first half of the 1990s.[48] The 20 top universities in the previous study lost an additional 2-plus percent of market share. Only four of them registered share increases, including the University of Michigan. The universities that tended to gain share were no longer those directly below these leaders, but were now found further down the hierarchy, among universities conducting 0.6 to 0.4 percent of research. It seems likely that the same process that occurred in second-tier universities in the 1980s operated on institutions further down the hierarchy in the early 1990s. In fact, dispersion seems to have accelerated, with the share of research performed by the top 100 universities

47. Calculated by the author from NSF CASPAR data using method from Geiger and Feller (1995). See Table 6.

48. From 1980 to 1990, graduate programs at the 24 most highly rated universities increased doctorates by an average 3.5 degrees per program; other programs added approximately 1.75 degrees (Geiger, 1997b: 245).

falling from 84 percent in 1980 to 82 percent in 1990 and 80 percent in 1995. Impressionistically, a strong presence in biomedical funding appeared to be a positive factor, although the advantage of pure medical universities was only marginal for the 1990s; and an emphasis on engineering, which was a positive factor in the 1980s, appeared negative in 1990–1995.

The persistence of the dispersion trends is consistent with the hypothesis that the stability of the academic core is a constraining factor at least for the major American research universities. The "overflow" of research opportunities to institutions with weaker infrastructures and research cultures might be regarded favorably, as more efficient utilization of scientific resources, or pejoratively, as diminution of scientific quality. It does seem to have implications for faculty work at those institutions, which form a part of the larger picture.

Perhaps the most serious underlying problem facing the academic core has been the pressure building on the faculty role. Earlier in this chapter mention was made of the external criticism directed at faculty for supposedly neglecting undergraduate education. The data presented here document that internal developments have made the faculty role more demanding. Evidence from the leading universities (Table 6) shows a static number of faculty undertaking greater amounts of research and supervising more graduate students. NSF data for S&E faculty show time spent teaching falling by a fifth (1981–1993) and time for research increasing by half.[49] Every study of workloads indicates that faculty are fully occupied for about 50 hours of the week. This would appear to be a zero-sum situation, where any increase in one activity must come at the expense of another.[50] Still, the problem is regarded differently across sectors.

Despite intermittent carping in the general press, the problem of teaching vs. research does not appear to be an administrative concern among private universities. They recognize their paying customers, and generally foster an institutional culture that values teaching. Smaller class sizes, freedom for curricular experimentation, and able, interesting students certainly reinforce such cultures.

In large public research universities the situation is more equivocal. Their size encourages a division of labor, so that some eminent faculty teach no undergraduates at all. The brute realities of numbers and resources mean that much instruction takes place in large lectures or under graduate teaching assistants. Journalists and politicians occasionally grandstand on these matters, which has made university

49. Teaching time declined from 65.4% to 52.9%; research time rose from 22.7% to 33.1%; and "other" grew from 11.9% to 14%. (NSB, 1996: 199).

50. Fairweather (1996: 25, 39) seems to leave open the possibility that in the past faculty worked fewer total hours, so that prolific researchers may also have done equal amounts of teaching. Fairweather (1996: 29) also cites data showing that assistant professors spend more time teaching and full professors more time in research and administration (p. 29). From 1980 to 1990 the proportion of assistant professors dropped from 29% to 26%, while full professors rose from 41% to 44%: 200 universities, data from Geiger and Feller (1995).

administrators hypersensitive. Most research universities can now "point with pride" at numerous programs aimed at improving undergraduate education. Still, the fundamental situation is resistant to change. Research is integral to these "multiversities," and the key as well to prestige and prosperity. Nor do undergraduates seem dissatisfied. Applications and student qualifications have been rising at most of these universities, and fund-raising has never been so productive. The leading public research universities will continue to balance research and teaching somewhat precariously, but at the financial margin they are currently tilting investments toward instruction.

The crisis, if it may be called that, largely afflicts lesser-ranking public universities located near the frontier between the teaching and research sectors, which find themselves in a vortex of conflicting forces. Policy pundits have repeatedly announced that the country has no need for additional research universities and that the weaker institutions should stick to their knitting—or teaching.[51] One problem with this prescription is that it amounts virtually to deprofessionalization for the faculty, who would no longer participate in the intellectual life of their disciplines. But regional leaders who support these institutions do not share this restrictive vision. They would like to see their institutions have the prestige and economic impact associated with a presence in academic research. These visions are endorsed by at least part of the National Science Foundation which, when facing Congressional scrutiny, harbors tremendous guilt over the geographic concentration of academic research. NSF consequently has in place programs to enhance research competitiveness (Teich, 1996).

Developments on these campuses are no less contradictory. Inhibiting research growth are deficiencies in infrastructure and graduate education, as well as inconsistencies in leadership and academic culture. In addition, the overhead cost of supporting academic research continues to escalate, while government assistance has waned. Conversely, highly qualified researchers are in oversupply. When filling positions, low-ranking universities can hardly avoid hiring faculty who are more highly qualified than the colleagues they join. Recent hires are also held to a higher standard of publication and professional activity. An additional wild card is technology, which now allows scientists to collaborate closely with distant colleagues. The upshot of this turmoil has been academic drift, which is documented by the dispersion data. The volume of research expenditures continues to expand at universities beyond the top 75. Hence, universities in this "third tier" appear to be inexorably increasing their participation in academic research even without resolving the latent conflict with their predominant teaching role.

The rather delimited conflict between teaching and research becomes a much larger issue when the matter of university outreach

51. For an example, see Peter Magrath (1998).

is included. If faculty are over-committed in their teaching and research roles, where might they be expected to find the time to provide external services or participate in research units on the developmental periphery? To a large extent they cannot, and for this reason the periphery has grown largely through the utilization of nonacademic personnel. However, the expertise of a university lies ultimately with its faculty. Thus, behind this rhetorical question lies the clash of two of the most fundamental developments of the Age of Privatization: the expansive dynamism of the periphery and the relative immobility of the academic core.

THE PERPLEXING PERIPHERY

A recent assessment of the state of universities takes as its title "Academic Capitalism," which it defines to encompass all "market and market-like behaviors on the part of universities and their faculties" (Slaughter and Leslie, 1997: 11), addressing some of the issues analyzed here under the rubric of privatization. For present purposes, however, the term "academic capitalism" will be employed in a much narrower sense. For universities, in their zeal to transfer technology and be compensated for the effort, have evolved their own form of capital formation—investing their own and borrowed funds in wealth-generating schemes both to enhance their capital base and to produce a stream of future income.

The university as capitalist seeks to reap advantage from its strategic position overseeing the generation of knowledge (Matkin, 1990: 126–130; Geiger, 1992b: 289–291). Having first access to this knowledge is the competitive advantage that universities possess in the ruthless jungle of American capitalism. Hence, the "economics of opportunism" depend upon, first, the relationship of a venture with university knowledge; second, the nature of the university's investment; and third, the outcome—the nature of the benefit that the university receives.

American universities have sporadically engaged in capitalist activities since at least the interwar years, but here again 1980 constitutes a breakthrough to new mentalities and new activities. Given the backdrop already described, the pivotal point was the Bayh-Dole Act of that year, which allowed nonprofit organizations to own patents on inventions resulting from federally supported research. Coming at the dawn of the biotechnology revolution, in which federal funding was paramount, this legislation opened vast possibilities. Besides patenting, universities rushed to create research parks, business incubators, venture capital funds, and UIRCs.

Despite the apparent opportunities, academic patenting took some time to develop. Universities, in fact, had to invest in patenting offices that can easily cost several hundred thousand dollars per year.

Such units solicit, evaluate, and process the disclosures of faculty inventions. Those deemed to have commercial promise are then patented at some cost to the institution. Returns are produced, however, only when patents are licensed for commercial use. Universities were generally slow to learn that this phase required the most proactive and aggressive actions.

When Gary Matkin described university patenting in *Technology Transfer and the University* (1990: 126–130) only four universities appeared to be earning above $1 million from patent royalties: Stanford, MIT, and the universities of California and Wisconsin. Success seemed to depend upon obtaining a rare "blockbuster" patent, so that the entire effort was likened to playing the lottery. Analysts expressed reservations that returns would cover costs (Geiger, 1992b: 290–293). Less than a decade later, this picture had changed. In 1996 American universities earned $336 million from patent licenses, roughly double the figure for 1992 (see *Chronicle of Higher Education,* 20 February 1998*:* A44). Columbia University is only one of a handful of universities now earning more than $20 million per year. Such income is usually divided between the inventor, his/her department and college, and the university. Thus, patenting has emerged as a significant source of revenue, but not an unlimited bonanza. University patenting has been increasing steadily since 1980—from 380 university patents to 1776 in 1996. For universities, patenting has been justified as technology transfer and as a service to faculty, but it nevertheless has principally become a prudent, long-term investment that promises future returns.

Probably the second most attractive investment for universities in the 1980s was research parks. The financing for such real estate deals was always complicated. Typically, such investments were insulated from Educational and General Funds through the issuance of long-term bonds. Success in these endeavors is measured along two dimensions, financial returns and integration with research. Universities can generally earn some return by renting space to all comers, but such a park would contribute nothing to the university mission. Tenants that are significantly engaged in R&D, on the other hand, will presumably interact with university faculty. A true research park will thus build productive relationships that may bring economic development (local jobs), utilization of graduate students, or gifts and contracts to support faculty research. In addition, a positive cash flow will amortize the original investment, eventually leaving the university with additional facilities. While there are no simple numbers, as with patents, to indicate the health of these investments, they represent a conceptual and geographical extension of the university periphery.

Closely akin to research parks are business incubators, which often utilize undesirable real estate in an effort to provide cheap space for aspiring companies. Once again, propinquity with the university is

assumed to produce benefits for all concerned. Some of the fledgling firms may result from faculty inventions; others may wish to draw upon faculty expertise. For universities, the initial investment is minor, and the resulting facility of small value. Hence, universities seek a return on such investments by acquiring equity in start-up companies as a part of the rent. Such equity stakes are something like roulette, having few large payoffs; but for universities it can be like playing roulette with free chips. Business incubators thus represent a long-term investment, but one in which universities can hardly lose.

There is little need to belabor the workings of academic capitalism further. The animating principle is the economics of opportunism, whereby universities have positioned themselves to take advantage of the infrequent discoveries in their midst that possess commercial potential. Throughout the 1980s there was considerable anguish and criticism over these kinds of initiatives. Without minimizing those concerns, of which the threat of deliberately withholding or distorting research findings for commercial gains is the most serious, the point of emphasis here is the peripheral nature of all these undertakings. Few faculty members make commercially valuable discoveries, consult with firms at research parks, or start their own firms. Such opportunities are confined to relatively few departments of the university. Thus, this portion of the developmental periphery, like most others, has grown prodigiously with only tenuous links to the academic core.

If the situation were otherwise—if most faculty participated in academic capitalism and other outreach activities of the periphery—the university could scarcely exist in its current form, and especially with a static academic core. Hence, the central paradox of the American research university at the end of the twentieth century: the expertise engendered by the university is in ever greater demand by society, but to meet that demand may require a transformation of the very institution that has proven so valuable. More starkly, on one side is the comprehensive vision of the University of Michigan as a "loosely coupled adaptive system of growing complexity," predicated upon learning and responding to changes in its environment; on the other is the myopic notion of critics that undergraduate education is the only important reason for the existence of universities. To a large extent, American society has validated both these views.

The contemporary university not only has the capacity to serve society in many ways, it has many advantages for these tasks as well. The major universities could all probably do much more, if they chose to, in the provision of distance and continuing education, technological services to industry, economic stimulation through inventions and firm-formation, as well as numerous forms of educational outreach. They possess the expertise and, perhaps more important, they have brand-name identification, which privileges their services in the marketplace. However, to do these things well requires man-

agement, more than scientific, expertise. As universities expand their peripheral activities, they must import professional managers and make their managerial culture more like that of the markets in which they compete. At what point does this loosely coupled adaptive system cease to be a university?

Yet, Americans value universities above all. Another unmistakable message from American society has been to preserve and augment the student-centered university of the 1990s. Parents will pay ever-higher tuition, alumni will give ever more generously, and the brand-name of the institution will become ever more valuable, it would seem, as long as universities become increasingly selective and spend growing amounts on the education of each student. Populist press and politicians may complain about the cost (National Commission, 1998), but people with money continue to vote with their checkbooks for elite higher education.

Inconsistency is nothing new in American higher education, but the forces unleashed by the Age of Privatization are exacerbating this fundamental contradiction. A dwindling public investment stands behind a larger and more inclusive view of higher education in American society; the burgeoning private wealth of corporations and individuals is, perhaps unconsciously, propelling greater hierarchy and exclusiveness. The Age of Privatization has brought enormous benefits to American higher education, but it is unlikely that the forces of privatization will extend the benefits of higher education more widely in American society.

CONCLUSION

This contribution to the GAAC project on German and American Higher Education and Research Systems has addressed the portion of American higher education that most resembles university education in Germany—universities engaged in graduate education and research. In terms of undergraduate education, these institutions and a number of colleges draw their students from among young people with the strongest academic preparation, and, despite having special relationships with certain clienteles, compete in national markets for at least some of their students.

Four conclusions about the current state of American universities emerge from this analysis. First, the undergraduate student became a top priority in the "student-centered" university of the 1990s. When the research system was growing rapidly in the 1980s, universities were criticized for placing too great an emphasis there; now, however, undergraduates are seen as being crucial to institutional prestige and prosperity, and the influence of this student-centered orientation on university behavior has been apparent.

Second, this student emphasis has placed enormous pressure on admissions and marketing, as institutions have sought to achieve or

maintain a high level of selectivity. While in many ways a salubrious development for institutions and students, the larger social effect is disquieting. This phenomenon is almost certainly producing a greater degree of social stratification between instruction for highly qualified students in high-cost institutions and the cheaper alternatives available to the majority of students.

Third, for complex reasons, universities have been reluctant to increase the size of their faculties. Yet, the demands upon faculty have grown—to be actively engaged in research and service activities, to teach more graduate students, and more recently to devote more time and energy to undergraduate instruction. Many of the conflicts noted below are related to the relative stagnation in faculty numbers.

In particular, the fourth conclusion pertains to faculty and research. Given the static numbers of faculty, the expansion of academic research has largely taken place on the "periphery" of the university—in special nonacademic units staffed by non-faculty researchers. While admirable from the point of view of adaptability, this development has stretched the university intellectually and organizationally in ways that may be unstable in the long run.

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CHAPTER 4

Structures and Problems of Research in German Higher Education: *An Overview and an Agenda for Further Studies*

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INTRODUCTION

This contribution to the GAAC project on German and American Higher Education and Research Systems was originally intended to provide an overview of the structures, functions, and problems of research carried out within German higher education institutions and to serve as an introduction to further studies that would deal with the system's current strengths, weaknesses, issues, and future prospects. It offers first a problem-oriented description of the role and function of higher education institutions in the German research system, then lays the foundation for a comparison with the American system of research in higher education, setting the stage for future in-depth analyses of issues pertaining to both. While viewing the present work rather as a trunk which still lacks branches, twigs, and leaves in the form of further studies, the authors have agreed to its publication, hoping it will provide a better understanding of the German system of higher education and research and its opportunities and difficulties, especially to readers abroad, and that further German-American comparative studies will be forthcoming.

Although the authors take responsibility for the content of this contribution, they are grateful to have had the opportunity to discuss previous drafts with a group of colleagues who supplied material from their own studies as well as critical and constructive comments and advice: Gerd Bender (Max-Planck Institute for European Legal History in Frankfurt), Prof. Dr. Hans-Jürgen Block (Rector of the Westküste University of Applied Sciences), Dr. Stefan Hornbostel (Center for Higher Education Development, Gütersloh), Dr. Martina

Röbbecke (Social Science Research Center Berlin), Dr. Andreas Stucke (Science Council, Cologne), and Prof. Dr. Hans-Heinrich Trute (Institute for Public and Administrative Law, Technical University in Dresden). Last but not least the authors would like to express their special thanks to Prof. Dr. Drs. h.c. Dieter Simon, President of the Berlin-Brandenburg Academy of Sciences, who not only initiated this collaborative undertaking but also supplied us with the hospitality of the Academy for various meetings and who continues to support the project in numerous ways. Also special thanks to Dr. Karin Elisabeth Becker from the Berlin-Brandenburg Academy of Sciences for her dedicated assistance in the organizational aspects of the work.

RESEARCH AND HIGHER EDUCATION IN THE "KNOWLEDGE SOCIETY"

In today's highly developed countries, science and technology have penetrated all parts of society. The explosive growth of the fields of science and their entrance into the "knowledge society" have brought about massive changes, in which knowledge is seen as a main source of wealth and progress and as an even more important factor of production than either labor or capital. The history of higher education in the twentieth century shows it to have played a decisive role not only in learning, education, and culture, but also as a source of innovation for future production and technology, promoting international competitiveness.

Higher education is supposed to be one of the main contributors to the trend toward a "knowledge society." But a closer look suggests at least three different and partly conflicting consequences for higher education in general and its research function—the special focus of our attention—in particular. First, universities are becoming more important as producers and disseminators of knowledge; second, at the same time they have lost their monopoly on the production of societal knowledge as a number of other research institutions have emerged to compete with them in some areas; finally, since universities are now in a more competitive situation, their structural problems and performance are increasingly subject to critical public scrutiny. Prevailing views of what constitutes highly qualified manpower and advanced research have hampered the expansion of higher education institutions, which the public often regards as being too expensive.

Thus the transition to a "knowledge society" is a mixed blessing to universities, and is accompanied by paradoxical effects on their status, function, and role. An apparent decline in their social prestige beginning some decades ago has coincided with the expansion of higher education and the gradual "scientification" of society. While education institutions have been relatively successful in preserving their dominance as the training-ground of the next generation of

highly qualified workers and experts, universities have lost ground as purveyors of advanced academic knowledge and are more and more subject to quality comparisons with industrial research establishments, government laboratories, other kinds of state-financed research institutes, various types of "think tanks," and others.[1]

Moreover, the growing importance of academic knowledge is regarded with ambivalence, as modern societies have become increasingly aware that in spite of the "usefulness" and "practical impact" of science and technology, they may be a "risky resource" in social, technological, and ecological terms. Being one of the main producers of academic knowledge, universities, like other research institutes, are increasingly considered societal risk-producers.

The cosmopolitan approach of higher education and its research function in the twentieth century have placed universities among the first "global players." Economic, political, social, and scientific globalization, however, are not an unqualified benefit to the research function of higher education. National systems must increasingly compete in an international "market"; highly innovative research is more often conducted across traditional boundaries of systems, disciplines, and institutions. New information and communication technologies influence the distribution and dissemination of knowledge as well as the textual and epistemological meanings of "knowledge" and "science."

Such problems of higher education arising from the long-term trend toward a "knowledge society" are linked with a number of structural problems emerging within the universities themselves, where research costs often rise faster than their budgets permit. While research funding policy tends toward more applied research in universities, there are limits to their capacity to adjust to the expectations of sponsors and society (HRK, 1993; Wissenschaftsrat, 1996a; DFG, 1997).

Many experts believe that as higher education expands, its quality can best be ensured through diversification of institutions, research approaches, or staff involvement in research. In many countries, we also note that the need for cooperation, especially in research, is at odds with the traditional organizational and personnel structure of universities.

Universities, moreover, continue to face the dilemma of how to fulfil their dual mission of excellence in both teaching and research. A balance and cross-fertilization of teaching and research would be

1. The term "higher education institutions" is here used to include not only universities, but also art academies and universities of applied sciences (Fachhochschulen). Studies at universities of applied sciences are shorter and more practically oriented than studies at universities. Students graduate with a diploma to which the letters FH (for FachHochschule) are added in order to distinguish the degree from a university diploma degree. Access requires one year less of secondary education than access to universities, and frequently entering students have previously completed a vocational training course. Typically, universities of applied sciences offer study programs in various fields of engineering, business studies, social work, and public administration and thus have a more limited spectrum of subjects than universities.

desirable, but their complexity and freedom might lead to a neglect of some functions; most honors and quality assessments refer to the research function, while most daily pressures are directed toward teaching.

As academics claim that higher education and research are best served by letting academics decide themselves upon the definition of goals, procedures, and measurements of outcome, it is obvious that "society" asks for increasing quantitative and qualitative output, but remains relatively vague about what is wrong and how output could be increased.

This list of issues, while by no means exhaustive, should show that universities, particularly in their research function, must cope with a set of conflicting pressures. These pressures are not recent phenomena, but seem to be imbedded in long-term secular trends of modern societies. Nor are they national phenomena: at present, the research and higher education systems in most highly developed countries find themselves undergoing a difficult transformation. To what extent do national traditions and characteristics of higher education influence the capacities of these systems to cope with the transformation process? The main concern of this joint study was to analyze the capacities for innovation and to identify factors within the present system of higher education that are particularly conducive or obstructive to institutional innovation.

This chapter offers a comprehensive overview of the structure and problems of research in German higher education institutions, identifying specific areas of stress and change that deserve further research. We begin with some basic information on the institutional, financial, and personnel structures of the German system with a special emphasis on their research function. Then we identify several areas of stress concerning the role and future of research at universities: increasing financial constraints and a growing emphasis on the teaching function of higher education; growing pressures toward accountability and usefulness; changing conditions and expectations for research training and junior staff careers; and tendencies to shift research to institutes outside the universities. Our next step is to analyze structures of and actors in regulation, steering, and control of higher education in Germany, and the growing concern inside and outside higher education that the traditional distribution of power and patterns of regulation may block the search for necessary reforms.

STRUCTURAL FEATURES OF RESEARCH AT GERMAN HIGHER EDUCATION INSTITUTIONS

In order to characterize the research carried out at German higher education institutions it is necessary first to be aware of its relative

position within the overall German research system, before turning to the institutions themselves and their institutional and staff structures. Finally, we will take into account patterns of research support and higher education policy.

The Higher Education Sector within the German Research System

The system of research in Germany comprises three sectors: research conducted in industry and enterprises (industry research); government-funded research outside universities (extra-university research); and research conducted in higher education institutions. The last-mentioned is the oldest form, established under the Humboldtian university reforms at the beginning of the nineteenth century (Ben-David, 1971: 108–138). From the mid-nineteenth century on, industry research evolved as a second sector of the German research system, at first mainly in the chemical industry, later also in the field of electrical engineering (Freeman, 1974: 15–157; Borscheid, 1976). In the 1870s government-funded research outside universities was established as a third sector (Hohn and Schimank, 1990). One of the first institutions in this last sector was the *Physikalisch-Technische Reichsanstalt* (Physical-Technical Institute), founded in 1887. The Max Planck Society (MPG), founded in 1911 as the Kaiser Wilhelm Society, is in this sector, as well as the Fraunhofer Society, establishments for research in specific fields on the federal and state levels, other large-scale research facilities (establishments of the Helmholtz Society), and the research institutes of the "blue list,"[2] renamed the Gottfried Wilhelm Leibniz Research Community.

At the beginning of the 1990s, German unification led to an almost complete cutback of East Germany's previously extensive state and industry research, long-term research activities giving way to the short-term fight for survival. East German higher education institutions, however, which had been mainly restricted to education and training under Socialism, broadened their research activities. To a large degree, basic research in East Germany had been conducted at the academies; after these were dissolved, in particular the Academy of Sciences, some of the institutes and research groups that survived evaluation by the West German Science Council were either integrated into East German higher education institutions or associated with extra-university research establishments in West Germany. The number of institutes on the "blue list" increased threefold. Thus, German unification led in particular to increases in the amount of extra-university research and to an extension of research capacities at East German higher education institutions (Meske, 1993). All three

2. Named for the color of the paper on which a list of such institutes was first compiled.

sectors of the German research system combined received about 2.46 percent of the GNP in 1981 and 2.90 percent in 1988; in 1995, in the reunited Germany, they received 2.28 percent of the GNP (*Bundesbericht Forschung*, 1996: 532).

Germany, while no longer an international leader in research, remains in the upper middle tier. From the beginning of the 1960s to the mid-1980s, the industry research portion of overall expenditures for research and development in West Germany increased from three-fifths to almost three-quarters; in the united Germany it is now two-thirds, with the remainder roughly equally divided between the other two sectors. German higher education institutions at the beginning of the 1990s received slightly less than one-sixth of the overall German budget for research (*Bundesbericht Forschung*, 1996: 532).

Each of the three research sectors has a different orientation (Schimank, 1996): industry research is generally application-oriented, addressing the needs of its industrial sponsors;[3] government-funded extra-university research is also application-oriented, conducting research for various enterprises as well as state authorities, the health sector, and the military (the large-scale research facilities may also engage in some basic research); and higher education institutions, traditionally the centers of basic research, also perform some application-oriented research. The recent trend is to reduce the amount of basic research in the first two sectors. A notable exception is the Max Planck Institutes which also carry out basic research to a certain extent.

Much of the research conducted at faculties for life sciences and clinical research, engineering, or chemistry is strongly application-oriented. Nevertheless, higher education institutions are the specific domain within the German system of research in which the largest proportion of basic research takes place.

It is said that basic research is the "humus of research"; without it applied research would sooner or later lose its innovative capacity. For this reason, universities may rightly be called—as they are in German research policy—the "foundation" of the German system of research (*Bundesbericht Forschung*, 1988: 37). This also holds true in another respect: higher education institutions train researchers for the whole system. The first phase of academic education up to a *Diplom* or *Magister* degree takes place exclusively there, and the vast majority

3. Orientation to basic or to applied research is not regarded here as constituting poles within one dimension but rather as constituting two independent dimensions for the characterization of types of research (Rosenberg and Nelson, 1994: 332). Thus, there can be basic research with strong leanings to application—for example, plasma physics or large areas of molecular genetics—and there can be research not oriented to application but without the theoretical orientation of basic research. Orientation to basic research means that this type of research aims to discover general theoretical principles which hold true for a multitude of phenomena.

of doctoral awards and *Habilitations* (a postdoctoral degree qualifying the recipient as eligible for a university professorship) are based on university research. Another reason universities are the "foundation" of the German research system is their almost complete spectrum of research fields, a number of which are represented nowhere else, and others only to a limited extent in other research establishments or research sectors.

Institutional and Human Resources: Framework Conditions for Research at German Higher Education Institutions

In 1990, there were 248 higher education institutions in West Germany, among them fewer than 100 universities, more than 100 universities of applied sciences, and more than 30 art academies. In East Germany—the post-war German Democratic Republic (GDR)—seven technical higher education institutions, seven pedagogical institutes, three medical academies, and three higher education institutions in the field of arts were at first established; a trend to establish specialized institutions gave the GDR in 1989 71 higher education institutions: six multi-disciplinary universities, 48 specialized institutions in the fields of engineering, teacher education, agriculture, art, and others, and 17 political higher education institutions of the party, the police, labor unions, and military forces (Mönikes, 1993: 6f.). After German unification 17 universities, two theological higher education institutions, 14 art academies and 34 universities of applied sciences were established in the new East German states, following the West German model. Currently, 1.8 million students are studying at German higher education institutions. Since the beginning of the 1970s, the number of students has more than doubled.

In the German higher education system two types of institution are dominant: universities and universities of applied sciences, both state-funded public institutions. Unlike in the United States, the sector of private higher education in Germany is small and of little importance, in particular with regard to research. In 1994–1995 about 65.9 percent of German students were studying at universities, 7.9 percent at comprehensive universities, 24.6 percent at universities of applied sciences, and another 1.6 percent at art academies.

Although many students study only part-time, for example because they must also work, there is no official part-time student status (and thus no statistics on them) in Germany. This lack of information contributes to a distortion of analyses of time-to-degree

and average age of graduates.[4] The number of foreign students studying in Germany has also caused concern recently. Although Germany belongs to the "golden triangle" of those EU member states (with France and Great Britain) among which the highest numbers of students are exchanged for periods of study abroad, it is feared that studying in Germany might have lost its attraction for foreign students.[5]

German universities traditionally maintain close links between teaching and research, which equally constitute the tasks of professors and other academic staff. This nexus of teaching and research is based on Humboldt's ideal of a community of teachers and students, and is supposed to be a determining principle at the undergraduate level. Although this idea of the German university is still valid in principle, it can hardly be found in its pure form under present conditions of mass higher education. Among the higher education institutions only universities train future research staff and award doctoral degrees, which, sometimes acquired in the framework of organized graduate education, are often won by individual research work with a professor. Universities also award *Habilitations* (the *venia legendi*), the formal postdoctoral qualification for a university professorship.

While the principle of the teaching-research nexus pervades the universities, the universities of applied sciences at first had no research tasks, being more practically oriented and educating their students more directly for future professional work. This means that the prerequisite for a professorial position at this institution is not the *Habilitation* but a minimum of five years of practical experience. As a rule, the teaching load of professors at universities of applied sciences is twice as high as that of a university professor (16 hours per week during term time as compared to eight hours). Until recently graduates from universities of applied sciences could not go directly into a university doctoral degree program, but had to acquire a uni-

4. Regular surveys on the social situation of students have, for example, shown that students who do not depend on a job spend 41 hours per week for their studies compared to 34 hours for those students who need to secure (additional) income through a job (Bundesministerium für Bildung und Wissenschaft, Forschung und Technologie, 1995: 127).

5. Overall figures of foreign students studying in Germany increased from 5.7 percent in 1975–1976 (West Germany; 2.4 percent for the GDR in the same year) to 8.2 percent in 1996–1997 (West and East Germany). Some figures for other countries in 1996 were 8.7 percent in France, 8.0 percent in the UK, 8.4 percent in Australia, and 1.4 percent in Italy. If those foreign students studying in Germany are discounted who are children of immigrant workers—either born or having had their schooling in Germany—the proportion of foreign students in Germany is 5.5 percent (Bundesministerium für Bildung und Wissenschaft, Forschung und Technologie, 1998: 192).

versity degree first.[6] However, because of a certain amount of "academic drift" at universities of applied sciences, they have during recent years increasingly attempted to take over application-oriented R&D (HRK, 1997b). Neither mergers between universities and universities of applied sciences nor the upgrading of universities of applied sciences to universities is currently on the agenda; rather the debate is about institutional and, with regard to professors, status-related upgrading within the present system.

Until the 1950s, the term university was only used in post-war West Germany for multi-disciplinary establishments conducting both research and teaching. Apart from universities there were a number of specialized higher education establishments with university-level study programs (for example, in engineering sciences, human and veterinary medicine, agricultural sciences, and economics) as well as many, mostly small pedagogical institutions for teacher training, art academies, and theological higher education institutions. From the beginning of the 1960s until the mid-1970s, when the number of universities had almost doubled through new establishments, many of the specialized institutions were awarded the same status as the multi-disciplinary universities,[7] while most pedagogical higher education institutions were integrated into universities. However, parallel to this trend toward a uniform system the question of institutional diversification again became salient when higher education expanded beyond the traditional concept of offering education for an academic and professional elite. At that time, former engineering schools and other post-secondary institutions of education and professional training (mostly in the field of business studies and social work, later also in public administration) were upgraded to universities of applied sciences, creating today's binary system. For a short time attempts were made to integrate this duality into the new model of comprehensive universities, however, politically this model was unpopular and today exists only as a few institutions in two German states (Kehm, and Teichler, 1992; Kehm, 1998).

Table 1 shows that there has been no increase in staff positions at German higher education institutions since the 1980s, discounting East German higher education, where there are many fewer positions than before 1989.

6. However, recently debates have begun about a greater permeability between universities of applied sciences and universities. In compliance with recommendations of the Science Council to facilitate access to doctoral studies for highly qualified graduates from universities of applied sciences, the Higher Education Framework Law was revised. Instead of getting a degree from a university of applied sciences before applying for a university degree, graduates can now apply directly to doctoral programs. However, most universities set high grade standards and often also require special examinations before admitting these graduates into their doctoral programs.

7. Only the art academies kept a special status because they conduct no research and award no doctoral degrees.

TABLE 1:

ACADEMIC STAFF AT HIGHER EDUCATION INSTITUTIONS IN GERMANY 1960–1995 (IN THOUSANDS)[a]

STAFF CATEGORIES UNIVERSITIES[b]	1960	1965	1970	1975	1980	1985	1990	1995 West	1995 East	1995 Total
PROFESSORS AND OTHER ACADEMICS	5.2	8.8	13.3	17.8	20.3	21.5	21.2	19.2	5.8	25.0
AND CREATIVE ARTS STAFF[c]	11.7	24.1	34.8	50.3	55. 7	61.1	76.1	83. 1	27.9	111.0
TOTAL ACADEMIC STAFF	16.9	32.9	48.1	68.0	76.0	82.6	97.6	102.4	33.6	135.9
ACADEMIC STAFF: STUDENT RATIO	1:15	1:9	1:9	1:10	1:11	1:13	1:12	1:11	1:6	1:10
UNIVERSITIES OF APPLIED SCIENCES[d]										
PROFESSORS AND OTHER ACADEMICS	0.3	0.6	1.5	7.2	7.9	8.8	9.3	10.2	2.5	12.7
AND CREATIVE ARTS STAFF	1.9	3.0	4.0	1.0	1.3	1.5	1.7	2.5	1.3	3.8
TOTAL ACADEMIC STAFF	2.2	3.6	5.5	8.1	9.2	10.3	11.0	12.7	3.8	16.5
ACADEMIC STAFF: STUDENT RATIO	1:22	1:20	1:19	1:18	1:22	1:29	1:34	1:30	1:18	1:27

Source: BMBF: Basic and Structural Data 1997/98, pp. 212–215.

a) The number of academic staff actually employed at higher education institutions is about ten percent higher than the number of officially listed and budgeted staff positions. This can be explained by the number of contract researchers paid from external funds and not occupying a budgeted staff position and by the number of positions shared by two or more persons.

b) Including comprehensive universities, teachers' colleges, theological seminaries and art academies.

c) Including teachers for special assignment.

d) Including predecessor institutions and Fachhochschulen for Public Administration.

Following the principle of the unity of teaching and research, few academic staff positions exist at universities that are dedicated exclusively to either teaching or research. Not only professors but also other academic staff (assistants and academic employees) both teach and do research. However, the number of teaching hours per semester week is usually lower for non-professorial staff than for professors.

The second principle on which the organization of research and teaching at universities is based is scientific and scholarly freedom in the search for new knowledge. Beyond the requirement that faculties and departments organize their teaching so that the curriculum of all study programs on offer is fully covered, professors as well as other academic staff may offer seminars or lectures and conduct research in

their respective fields. Since professors are tenured civil servants, this also includes the freedom to determine the extent to which they actually engage in research; it is possible not to engage in research at all.[8]

Research Promotion and Higher Education Policy

Because many research projects are too costly to be funded out of institutional accounts, other funding groups have been established. The German Research Association (DFG), a registered association financed almost exclusively by public funds, is the most important research promoter, with a 2 billion DM budget in 1996, approximately a third of all external research funds available to higher education institutions. Research support by the DFG is mainly organized in three procedural forms: normal, special emphasis, and special research areas (DFG, 1996: 17; 1997: 28, 31). In 1996 these areas received about 40 percent, 15 percent, and 27 percent respectively, of all available DFG support funds. The normal procedure is the classical support concept of the DFG, open to all qualified researchers, with no restrictions as to topic. By the 1950s, the DFG had begun to establish some priorities by planning and setting up special-emphasis programs to support trans-regional research projects lasting from five to ten years. Toward the end of the 1960s, the category of special research areas was created to support local concentrations of research projects within selected and often interdisciplinary themes. These last receive support for a maximum of 12 to 15 years and are provided with an above-average research infrastructure of material and personnel. Awards are made on a peer-review basis, with reviewers chosen every four years by secret ballot. The DFG also emphasizes high quality according to academic criteria; the non-academic relevance of projects is not an important criterion for DFG awards.[9]

Other ministries of the states and the Federal Government also provide public funds to support research projects at higher education institutions or to commission research. Federal Government ministries finance about four-fifths of this so-called "departmental research," among which the Federal Ministry for Education and Research (BMBF) is by far the most frequent funder, especially in

8. According to the legal regulations of public service, teaching and research are defined as duties to be fulfilled by a professor. However, according the to prevailing interpretation research "can only be regarded as free intellectual activity not enforced as duty of service…" (Scheven, 1982: 439)

9. Review and award procedures as well as collaboration of professors in the various bodies of the DFG exemplify its character as a self-governed academic body and contribute to the relatively high acceptance of the DFG in higher education and politics (Neidhardt, 1988). The competitive character of the procedures assures high standards. The DFG is especially supportive of basic research conducted at higher education institutions. Questions recently arose about the self-governing capacities of science and scholarship and the system of peer review. The DFG then conducted a survey whose responses showed a high degree of overall satisfaction with its work (DFG, 1998).

technology-oriented fields. Commissioned research frequently relates to policy planning for the funding department. However, apart from these non-academic criteria of relevance, selection or commission also follows academic quality criteria. In order to assess or evaluate proposals the ministries often avail themselves of the expert opinion of academic reviewers.

A further important pillar of research at higher education institutions financed by third parties is support from private foundations. In 1990, German higher education institutions received external support of about 280 million DM from foundations and other private societies for the promotion of research, of which the Volkswagen Foundation was by far the largest, providing almost a quarter of the research funds available from foundations and private societies. The foundation's research support covers all disciplines, among which the humanities and social sciences receive a comparatively large proportion. Other important foundations are the Fritz Thyssen Foundation, the Wilhelm Sander Foundation, the Robert Bosch Foundation, the Krupp Foundation, and the *Stifterverband* for German Science, all financed by annual contributions from German enterprises, and the Alexander von Humboldt Foundation, which is mainly active in the field of international exchange of scholars and scientists. In addition, there are a number of foundations of political parties, associations, and labor/trade unions financing research projects at higher education institutions, although on a smaller scale and with more limited means. Frequently, foundations establish their own thematic emphases in the framework of their research support by means of special-priority programs. Similarly to the DFG, their selection procedures for research funding stress competition and peer review.

Research commissioned by enterprises is another source of research funding at higher education institutions, especially in those disciplines more closely related to application, such as engineering and chemistry. However, a number of other disciplines, for example linguistics, have also established contacts with industry and enterprises. The proportion of third-party industry funds has therefore considerably increased since the beginning of the 1980s and now accounts for about a sixth of all external research funds (Wissenschaftsrat, 1986; 1993). In contrast, research funds from the EU—which carry a considerable weight in other European countries—still constitute only a negligible proportion of research funding at higher education institutions in Germany, although this might recently have begun to change. With further steps toward European unification it seems justified to anticipate a growing influence of European strategic policy on research and other activities carried out in higher education institutions (Kehm, 1996). Among the issues on the European research policy agenda are the increased promotion and availability of resources for bio-technology research; development of software and hardware for distance learning and flexible delivery within a framework of lifelong

learning; setting standards for more homogeneous sets of quality indicators; setting standards and evaluation procedures for research; and questions related to copyright and ownership of research products (Kehm and Last, 1997; Wissenschaftsrat, 1998b; 1998c).

At the end of the Second World War the framers of the new constitution, wary of the strong centralization that had characterized the Nazi regime, declared that higher education institutions were to be state institutions and corporations under public law, as part of the new cultural policy. Thus, responsibility for funding and legal or jurisdictional authority for any particular higher education institution are in the hands of the ministry of the state in which it is located. But higher education policy cannot be determined single-handedly by each state; in the early years of the Federal Republic the states established a coordinating body, the Standing Conference of the Ministers for Cultural Affairs (KMK), whose spectrum of activities and decision-making is determined by educational policy issues. Thus, for example, there is legal homogeneity across all states with regard to certification of study programs and degree recognition, enabling unlimited national mobility of students and academic staff. Decisions of the KMK must be unanimous; this contributes to the fact that higher education policies of the German states are formally homogenized to a considerable extent (Enders and Kehm, 1994).

The Federal Government in the 1960s, because of its superior financial power,[10] began to buy itself into setting educational policy. In exchange for generous subsidies for the maintenance of higher education buildings and new construction, needed by the states in the face of rapidly growing student numbers, in the mid-1970s the Federal Government enacted a unifying higher education law, including a definition of tasks to be performed jointly by the Federal Government and the states. The Federal Government has two further means of influencing higher education policy. First, expenditures for the construction of higher education buildings and for the budget of the DFG are procured jointly by the Federal Government and the German states according to fixed proportions which are coordinated in a special joint planning committee, the Commission for Educational Planning and Research Promotion (BLK). And, as mentioned above, the Federal Government, in particular the BMBF, is an important provider of external funds for research at higher education institutions.

One of the most influential advisory bodies for shaping German higher education and research is the Science Council (*Wissenschaftsrat*). It was established as a trans-regional planning and advisory body under an administrative agreement between the Federal Government and the states in 1957, and is composed of administrative and academic commissions. In the administrative commission an equal number of representatives of the Federal Government and the states work

10. The 1999 Federal Government's research promotion budget was 2 billion DM.

together. The academic commission consists of scientists and scholars proposed by the German Rectors' Conference (HRK), the German Research Association (DFG) and the Max Planck Society (MPG), and of representatives of public life jointly appointed by the Federal Government and the states. Decisions made in the commissions and the general assembly need a two-thirds majority; although these decisions have the character of recommendations, in fact they carry a high degree of political influence.

In order to assure coordination between the Federal Government and the states, the Science Council was originally supposed to work out an overall plan for the promotion of the sciences, to formulate an annual priority program, and to issue recommendations for the distribution of the available budget, an assignment never carried out, although the Science Council has made recommendations on many issues in higher education and science policy. Recently it has become more involved in evaluation exercises, but previously it dealt only with certain establishments of extra-university research.

Other organizations are important in higher education policy, the most salient being the German Rectors' Conference (HRK), the successor to the pre-unification West German Rectors' Conference (WRK). The HRK serves two main purposes: internal coordination and the harmonization of the views, opinions, and expression of the interests of higher education institutions. The HRK is a free alliance of higher education institutions which originally required its member institutions to have the right to award doctoral degrees and the *Habilitation*—that is, to be universities. At the beginning of the 1970s, it became open to all types of higher education institutions. In addition to the HRK, there is the German *Hochschulverband* (DHV), with about 16,000 members, which mainly organizes university professors and represents their interests. Similarly, the *Hochschullehrerbund* (HLB), founded in 1972, represents the interests of about 4,000 professors at universities of applied sciences. Another important organization is the German Association of Civil Servants (*Deutscher Beamtenbund*), with about 1.1 million members, including civil servants from other domains. Other academic staff of higher education institutions, including a small number of professors, join unions. But whereas in most of the other sectors of production and services in Germany the principle of "one company—one union" is dominant, academic staff in higher education may either organize in the Union for Public Services, Transport and Traffic (OTV) or in the Union for Education and Science (GEW). In both of these, academic staff of higher education institutions are a minority compared to other groups, but they are more influential within the GEW. Overall, the extent of union organization among academic staff in higher education institutions is small.

PROBLEMS OF RESEARCH AT HIGHER EDUCATION INSTITUTIONS SINCE THE MID-1970S

Beginning in the mid-1970s issues of financial constraints, additional expectations regarding usefulness and relevance, increases in the teaching load due to higher student numbers, problems of support for junior academic staff, and emigration of research from higher education institutions have acquired a growing urgency in the eyes of many observers and actors; however, their extent is a matter of some disagreement. This section will briefly discuss each of these issues.

Shortage of Research Funds

After the rapid expansion of the German higher education system between the mid-1960s and the mid-1970s, a phase of stagnation began in the provision of public resources for higher education institutions. In higher education policy this was at first widely accepted by a consensus creating the "open door decision."[11] In recent years this consensus has shattered, but continuing retrenchment is legitimized on the grounds of growing constraints in state budgets and lower economic growth rates. Adjusted for inflation, the funds provided to higher education institutions have hardly increased since the mid-1970s and even decreased temporarily in the 1980s; the same is true for academic and non-academic staff in higher education, where the number of professors even decreased slightly (Schimank, 1995: 75–77). Since the early 1990s, as problems worsened for West Germany due to the immense costs of unification, resources for education and research were disproportionately cut.

All this would have been less serious if student numbers had remained constant; instead they increased by more than two-thirds. The growing discrepancy between available resources and demand for services has been perceived by higher education institutions as a deep crisis. At the same time, they were reproached for drops in efficiency and quality, so that the financial crisis became increasingly intertwined with a legitimization crisis.

Both teaching and research are funded from a common pool. Since teaching, with time constraints imposed by its very nature, is also supported by influential social interests, the danger to research funding became evident. Losses to the research area could only partially be compensated by an increase in third-party funding (Schimank, 1995: 137f.). It was also feared that an increased teaching

11. In the second half of the 1970s, the increase in student numbers was interpreted as a passing phenomenon due to demographic developments. Due to political pressure higher education institutions agreed to "keep their doors open to all" for a few years, that is, to accept a higher teaching load without an increase in funds and staff, until the increase in student numbers would reverse to an expected decline. However, student numbers have continued to rise, while higher education institutions have not been provided with increased resources.

load would reduce the time available for research. The policy makers see this as an efficiency and legitimization crisis; higher education institutions see it as a financial crisis. These radically divergent views make it extremely difficult to work out a solution.

Relevance, Evaluation, and Quality Assurance

Traditionally, the purposes of university research have been (a) the search for new knowledge in the framework of theoretically-oriented basic research; (b) the education and training of future researchers and junior academic staff; and (c) the provision of research-based academic teaching. Some research conducted at higher education institutions has been oriented to external purposes as well, for example in faculties or departments of engineering sciences. The traditional perceptions of a "purpose-free" search for truth and new knowledge, and its contribution to cultural identity, are losing ground to new concepts that see research as a means to achieve international economic competitiveness, to create wealth, and to reach other economic goals. Fundamental to this process is technology transfer, which has been the subject of growing public discourse and is a focal point of policy interest (Abramson et al., 1997). As in other countries, German higher education institutions are increasingly confronted with pressures for relevance following other than academic criteria, mainly expressed in controversy about the definition of quality criteria for research. In addition, government observers assume that research carried out at higher education institutions is held to lower standards than those acceptable in pure inner-academic or inner-scientific circles. The popular cure for these, partly imagined but also real, weaknesses is increases in efficiency and more competition among higher education institutions (Pasternack, 1998).

Other nations have established regular evaluation procedures for both teaching and research; in Germany, while there has been occasional debate about applying such procedures to scientific research, until recently it was generally assumed that such measures were unnecessary because the peer review system permitted the proper allocation of research funds, in particular those from the DFG. Since the end of the 1980s, teaching quality has moved into the foreground of the evaluation debates, and the mass media and increased public awareness have kept it there. At first, the issue of evaluation in higher education was an internal debate; picked up politically, it is now high on the agenda of various public and policy arenas (See, for example, Wissenschaftsrat, 1996c; HRK, 1995; 1998b).

Beginning in the 1980s, weekly magazines such as *Der Spiegel, Stern*, and *Focus* have occasionally published results of higher education ranking studies they commissioned, which caused quite a stir in a system that was assumed to be more or less homogeneous.

Although methods, instruments, and approaches chosen for these studies were often criticized, they managed to call attention to issues of quality and differentiation. After the comprehensive evaluation of the East German Academies of Sciences carried out by the Science Council and an intensive screening and evaluation of East German academic staff at higher education institutions in which many West German academics were involved, debates about evaluations in the West German higher education system have acquired additional importance.

At this writing a large variety of activities in this field are taking place and some kind of evaluation activity is going on in nearly all institutions of higher education. It is typical of the German system, with its federalist structure, that approaches are largely decentralized. Some states, Bavaria for example, have chosen a top-down approach to quality assurance and evaluation while others, Lower Saxony for example, prefer bottom-up approaches. Although approaches and methods might differ considerably, higher education institutions have frequently reacted proactively to the current trends; there are several examples of self-organized activities and the regional cooperation of higher education institutions to address these issues. Areas considered for potential evaluation are in particular the organizational structure of higher education institutions (efficiency, management, and budget); the work of departments (performance and leadership, curricular innovation); transparency of course programs (study and examination regulations, duration of studies, degrees); and the quality of teaching. Less attention is given to an evaluation of research, although it has come into sharper focus inside as well as outside higher education institutions. For example, the DFG has stimulated activities in which their practice and procedures of research promotion are evaluated, and an evaluation of the "blue list institutes" has been carried out by the Science Council which has stimulated further self-evaluation.

The developments described above with regard to the issue of evaluation of higher education teaching and research in Germany thus indicate several trends:

- The growing competitive thrust within the research system requires new criteria for evaluation which should be more strongly oriented to micro-economic criteria.
- Debates about evaluation and first experiences with various forms of evaluation exercises have caused some changes within the sector of higher education research and teaching.
- Traditional patterns of negotiation for funds and infrastructure in German higher education are weakening due to new actors and new forms of bargaining.

Within higher education institutions this pressure for external relevance and evaluation is regarded with a certain amount of mistrust. On the one hand it is feared that there might be a "sellout" of basic

research with no immediate application; on the other hand many evaluation procedures and criteria are criticized as inadequate, while some suspect that the government's insistence on evaluation is only an attempt to legitimize its shrinking support of higher education institutions. In order to keep external interference in check, many institutions have begun to organize self-evaluation procedures, sometimes individually and sometimes in cooperation with others in the region. Activities are decentralized and the choice of methods and approaches varies widely. Thus, evaluation exemplifies more than any other reform issue the gradual changes currently taking place in the structure and steering of higher education. Here again we find a large divergence of interpretation on the part of both governmental actors and those in higher education.

Teaching Load

The unity of teaching and research is still regarded as desirable in principle in order to assure their cross-fertilization and reciprocal stimulation. However, there are increasing claims that university teaching and research are drifting apart, and there are widespread complaints of the difficulty of maintaining a sensible link between the two functions.

There is a growing concern on the one hand about the quality of teaching in the face of continuously increasing student numbers and stagnating staff resources; its assumed wretched state is based on the argument that since within universities everything is focussed on research anyway, any conflict between teaching and research will be resolved in favor of research. On the other hand, the fear that research will be neglected with increased teaching and administrative duties is one of the recurrent debates about working conditions and performance of academic staff at higher education institutions. Complaints about lack of time for research are underpinned by the results of various surveys in which academic staff stated that they wanted to spend more time on research and less on administrative duties.

However, empirical surveys also show that the proportion of time university professors spend on research has slightly increased over the last twenty years (Enders and Teichler, 1995a; Schimank, 1995: 98–123).[12] Furthermore, a majority of professors say there has been no decline in their research productivity. This raises the question of what kind of individual and collective strategies can deal with increasing

12. A survey of academic staff at West German higher education institutions carried out in 1992 resulted in the following time budget during term time: university professors use on average 43 percent of their working time for teaching, 29 percent for research, and 16 percent for administration. The remaining proportion of working time is spent for academic services and other activities. Academic staff in non-professorial positions at universities spent 26 percent of their working time for teaching, 49 percent for research, and 9 percent for administration. The proportion of academic services is highest in this group, at 14 percent. Professors at universities of applied sciences use 69 percent of their time for teaching and 12 percent each for research and administration (Enders and Teichler, 1995a: 47).

student numbers and a higher teaching load while at the same time protecting research time. Are the flexible time quotas for teaching minimized? Is non-professorial academic staff increasingly deployed to relieve the teaching load? Or are students expected to take over a larger share of "self-responsibility"—a euphemism for fewer contact hours and less guidance?

There is also a contrary assumption that under these conditions teaching suffers more than research. Naturally, this is predominantly asserted by the students, who have begun to demand better performance in teaching and are supported in their claims by political campaigns to introduce evaluation and to improve the quality of teaching. In the face of such massive dissatisfaction a zero-sum game in the competition between teaching and research could begin which would end to the disadvantage of research.

Problems of Junior Academic Staff

Young academics are in a paradoxical position. On the one hand, German universities offer many positions for junior academics working toward a doctoral degree. Most non-professorial academic staff members have relatively few teaching duties and spend much of their time on their research work (Enders, 1996); they enter their scientific community through publication, participation in conferences, and so on, while having access to the material resources necessary for their own work through their department, institute, or chair.

On the other hand, there is widespread dissatisfaction among junior academic staff because of employment insecurity, a lack of opportunity to move up the career ladder, and restricted autonomy and participative rights. Postgraduate and postdoctoral qualification in many fields has long been characterized by isolation and sometimes poor communication and guidance from the professor (Holtkamp, Fischer-Blum, and Huler, 1986). Many young faculty are inadequately trained, not only to teach, but also to carry out functions such as publication, acquisition of external research funds, or how to approach administrative work—this last is traditionally ignored (Webler, 1993).

In contrast to many other higher education systems with smoother transition arrangements and a broad acknowledgement of various status groups as belonging to the profession, there is a large status-related distance between German junior and mid-level academic staff and professors, expressed by long-lasting dependence and a sense of insecurity on the part of junior academic staff who claim they are kept dependent for too long by professors; in contrast to the decisive step of being awarded a professorship, which includes a considerable gain in status, prestige, and professional acknowledgement, all other posi-

tions are considered to be only junior or "trainee" phases. The insecurity, lengthiness of training, and high selectivity of an academic career are particularly reinforced by the practice of awarding only temporary contracts in later career development stages and the emphasis on *Habilitation* and first call to a chair. The practice of fixed-term contracts enforced by labor law contributes greatly to a sense of unpredictability in an academic career.

In some fields difficulties in recruiting junior academic staff are becoming manifest. Professional fields outside higher education clearly have more to offer as regards work independence, career security, and considerably higher incomes, draining the institution of its best young talents. And it is only a superficial advantage of higher education institutions that there are fields in which appropriate alternatives are scarce. For many academics in these fields the status of junior academic staff is just a parking position until they have found something better. Neither those looking constantly for alternatives nor those becoming unmotivated and worn down due to temporary employment and dependence can give their best to research in higher education. These problems are significant because junior academic staff carries out a large part of research at higher education institutions.

The debates on these problems have led to a number of initiatives and recommendations. In 1990, a new publicly financed model for doctoral training, the graduate colleges (*Graduiertenkollegs*), was established by the DFG (DFG, 1990). The idea for this new form of doctoral training goes back to recommendations of the German Science Council and was first taken up in some pilot projects financed by the Volkswagen Foundation, the Federal Government, and the Joint Commission of the Federal Government and the States for Research Promotion and Education Planning. In 1989, the Federal Government and the states agreed on joint funding and the DFG was asked to monitor the program. The direct and indirect aims of the graduate colleges were challenging: first, research and research training was to be promoted in a more cooperative and interdisciplinary way; second, doctoral training was to be reorganized and restructured while its international competitiveness was strengthened; third, setting incentives for a general restructuring of undergraduate and postgraduate studies would strengthen the overall reform of German higher education. The number of graduate colleges established rose from 51 in 1990 to about 200 in 1993 and about 300 in 1997. By 1999 a total of 4,400 doctoral candidates were studying in these graduate colleges, 2,500 being financed by graduate college grants and another 1,900 by other means. In 1997, the German Research Association also established a program for European Graduate Colleges to strengthen international cooperation in this area.

The relevance of the issues described above was underlined by recommendations of the Science Council on training and career status at the postdoctoral stage (Wissenschaftsrat, 1996b), that while the

general philosophy of the postdoctoral stage as a further qualification period for future professors should remain unchanged, there should be a clearer structure for this stage and greater institutional responsibility for the further training of junior academics, with earlier independence and a qualification period of no longer than six years. The Science Council recommended against the general abolition of the *Habilitation*, but supported the idea of a greater variety of possible qualification patterns depending on the situation in the discipline. The *Habilitation* as a second *opus magnum* after the doctoral thesis is no longer seen as a necessary prerequisite in those disciplines, in particular the natural sciences, in which the qualification and reputation of younger scholars is evaluated in direct exchanges with the international scientific community. Additionally, the German Rectors' Conference supported the establishment of assistant professorships as a further step in the post-doctoral academic career of younger academics (HRK, 1998a). More recently, the Science Council discussed options to support the careers of female scholars in higher education (Wissenschaftsrat, 1998a).

Emigration of Research from Higher Education Institutions

In the mid-1970s, only one quarter of all professors still believed that the principle of the unity of teaching and research, valid for universities, could be upheld in the future; almost a quarter thought it realistic to assume that there would be increasing emigration of research from higher education institutions, to the benefit of government-funded extra-university research establishments like the MPG and of large-scale research facilities. Since then this concern has lessened. Meanwhile almost two-thirds of professors predict a continuation of the status quo, while only one in ten predicts an emigration of research (Schimank, 1995: 323ff.).

However, the actual picture is less clear. While resources for higher education institutions have stagnated since the mid-1970s, they continued to increase for government-funded extra-university research until the beginning of the 1990s (Schimank, 1995: 78f.). This changed with unification: in the face of an expected sudden increase in student enrollment, more capacity was preserved at East German higher education institutions than in extra-university research, while research capacities from the academies of sciences were transferred to higher education institutions. However, those special circumstances do not relate to the problem of how the future relationship between government-funded extra-university research and research at higher education institutions will develop.

Since the end of the 1980s, this problem has also been addressed by the (West) German Rectors' Conference and the Science Council. The developments have led to a recommendation of the Science

Council that new extra-university research capacities should only be established in specifically justified cases and that consideration should be given to the transfer of certain research activities back from the extra-university sector to the university sector. The latter recommendation has not been implemented at all in West Germany and did not work out quite as well as expected in East Germany. In the view of the higher education institutions, the fewer research resources they have, and the more the government-funded extra-university research establishments have, the less satisfying is their parallel existence. It is not at all assured that higher education institutions, given the prevailing conditions, can hold on to their position in comparison to that of government-funded extra-university research. Will their prevailing institutional mechanisms enable them to react adequately to these problems? Can higher education institutions be reformed with respect to the requirements of their research? Are they possibly strong enough to reform themselves? Or are we seeing the widely discussed "reform congestion"?

INSTITUTIONAL MECHANISMS OF PROBLEM PROCESSING

In this section we turn to the institutional mechanisms of problem processing in the German university system, conceptualizing a number of special studies which could point out the problem-processing capacities of each and relating them to the existing problems to assess the possibility of satisfactory solutions. If we find not only accidental and temporary, but structural, deficits of problem processing, we will explore how existing mechanisms can be improved.

To do this, an analytical typology of mechanisms of problem processing will be applied which Burton R. Clark (1983) worked out in his international comparisons of higher education systems. Four kinds of mechanisms can be distinguished: political guidance of universities by state authorities; the self-regulation of oligarchic academic communities; competition between and within universities for strategic resources and for customers of their services; and finally, hierarchical self-guidance of universities by their leaders.[13] Within each university system all four kinds of mechanisms coexist, but their arrangements and mixture can vary among different national systems, and each system may change over time. Using this general analytical framework, we will analyze the present institutional profile of the German university system.

13. Clark (1983: 136–181) at first worked with a "triangle of coordination" which consisted of the first three kinds of mechanisms. More recently he has also emphasized the institutional entrepreneurship of university leaders.

Political Guidance by State Authorities

The Humboldtian university idea of "solitude and freedom" was implemented by an authoritarian state, nineteenth-century Prussia, which financed universities and granted them autonomy and other privileges in exchange for their subordination to state authority. The German university system is still characterized by a combination of undisputed nourishment and control by the state and the state's constitutional duty to respect the "freedom of teaching and research." In legal terms, this amounts to a dual nature of universities as both institutions under public law and autonomous corporations (Kimminich, 1982). Accordingly, Clark (1983: 140) portrays the German system's dominant mechanisms of problem processing as a combination of political guidance by the state and self-regulation by academic oligarchies. In this "division of labor," state authorities quite often confine themselves to providing certain prerequisites of academic self-regulation, or simply ratifying and legally formalizing the outcomes of the other's problem-processing mechanism. However, in other respects state authorities do intervene in university affairs according to their own aims and interests.

With respect to their "external matters," including financial and personnel issues, universities are regarded as part of the public administration, personified by the *Kanzler*, or chief administrator of a university, and highly regulated and controlled by state authorities. The number, kind, and organizational allocation of established posts and especially the appointment of professors need the agreement of the appropriate ministry. Basic organizational decisions, such as the establishment or elimination of universities, departments, or professorships, are also decided by the state, as are decision-making rules and procedures within universities, especially regarding the competencies of rectors, deans, and the university senate, and the rights of participation of the different status groups (professors, academic staff, non-academic employees, and students).

In contrast, issues of teaching and research are regarded as "internal matters." Here the state carefully refrains from political guidance—especially when decisions are substantially based on specialized scientific knowledge. In teaching, the selection and presentation of scientific knowledge to students and the assessment of students' performance; in research, the selection of research topics, methodological and theoretical approaches, and the critical discussion of research results—all are "internal matters," where state authorities leave much room for academic self-regulation.

Nevertheless, some kinds of political guidance also extend to "internal matters." Requirements of studies and examinations must be approved by the state; teaching duties of professors and other academic staff are also decided upon by the ministry. Research has been and still is much less regulated politically, with the notable exception

of the law on genetic research, which prohibits certain research topics and methods. But this may change in the future if more research fields leave the confinement of the laboratory and create actual or possible societal risks (Krohn and Weyer, 1990). Research at universities is also affected by stricter general legal workplace safety regulations and a more extensive legal protection of privacy. Finally, it is also an important political intervention in the "internal affairs" of the university that—as mentioned above—the appointment of a professor needs the approval of the ministry.

Still, it can be concluded that while "internal matters" of university research are subjected only to loose political regulation, this does not necessarily mean that political decisions do not shape research conditions. By a tight legal regulation of "external matters"—financial, personnel, and organizational issues—state authorities may strongly, albeit perhaps unknowingly—impede university research (Meusel, 1977). Legal stipulations which apply to the whole public sector, and which may very well be quite fitting to many public administrations, may have highly dysfunctional side-effects in universities. Many observers maintain that such phenomena constitute the most serious negative consequences of political guidance for research at universities.

All this must be seen against the background of strong pressures toward "homogeneity" in political regulation. All universities of a particular state are subjected to the same legal rules and regulations by that state's ministry responsible for higher education. Moreover, as a result of the framework law of the Federal Government and the coordination of states in the KMK, this standardization of regulation extends to all states. Compared to the nineteenth century, when the plurality of independent German states brought about a vigorous and innovative competition, especially in higher education policy (Ben-David and Zloczower, 1962: 132), the present situation basically amounts to institutional immobility.

From this sketch of the first group of problem-processing mechanisms two directions can be deduced in which current debates in Germany search for institutional innovations. State authorities try to reduce what appears as an over-regulation of universities; at the same time they attempt to abandon too much regulatory standardization. "Deregulation" and "differentiation" of the German university system are frequently used keywords in these debates (See for example HRK, 1997c).

Deregulation policies presently have two main aspects. The first consists in granting universities more financial autonomy. In pilot projects at several universities, the traditional highly restrictive cameralist budgeting system has been replaced by a "global" (lump-sum) university budget. If this is successful, all universities will receive a "global" budget in the future. The second kind of deregulation policy refers to university law in general, especially the framework law of the Federal Government. This law as well as the university laws

of the particular states have recently been or are currently being reformed, not only with regard to financial but also with regard to personnel and organizational issues. State authorities promise to reduce their involvement in the "external matters" of universities. The same points are being discussed with respect to "internal matters"—regulation of studies and examinations. The outcomes of such political intentions remain to be seen.

The Federal Government, especially, hopes that "deregulation" will also lead to a stronger "differentiation" of the university system. Many political regulations at the federal level have been reduced to make more competition possible between the higher education policies of the states. A far-reaching step in this respect is the new framework law for higher education in which many of the rather detailed regulations concerning the organization and administration of higher education institutions have been dropped, thus making it possible to introduce "experimental clauses" in the various state laws. Such clauses allow each state to encourage and support temporary institutional experiments. On the state level, too, political authorities want to enlarge their universities' room for maneuver so that institutions are enabled to work out their own particular teaching and research profiles in competition with each other. All this means that political guidance by state authorities will be considerably replaced by competitive pressure—an issue with which we will deal in the following section.

Oligarchic Academic Self-Regulation

Traditionally, strong political guidance of German universities went along with the strong individual position of each professor—especially the full professors holding a chair. They are still the most important pillars of a "chair-based organization"—and since there are hundreds of chair-holders at each university, the overall structure of the German university system looks like "small monopolies in thousands of parts" (Clark, 1983: 140). This organizational status is based on academic merit because the appointment to a chair is a step in an academic career in which the chair-holder has gone through a long socialization in his or her scientific community, has gained scientific reputation for his or her research work, and has passed the *Habilitation* as the final formal examination after the first degree and doctorate. Consequently, academic self-regulation is strongly oligarchic: chair-holders are the dominant decision-makers within German universities, and other professors and academic staff, non-academic employees, and students are clearly in subordinate positions. With each chair as a sovereign organizational unit, academic self-regulation is very decentralized. With their constitutionally granted academic "freedom of teaching and research," chair-holders are similar to small businessmen with a

number of subordinates; as civil servants, professors also enjoy special privileges, especially in that they cannot be dismissed. In a nutshell, chair-holders are small businessmen who cannot go bankrupt—which is an important restriction of all the competitive pressures to be discussed later.

From the point of view of each chair-holder, the university as a whole and the department to which he or she belongs is a local corporation of academic colleagues—the other chair-holders—among whom exists a basic equality of rights and opportunities. This character of the university as a corporation manifests itself in academic self-regulation, which is respected by the state authorities. As a mode of collective decision-making, self-regulation establishes for all chair-holders a direct participation in those decision-making processes which most affect them.[14] This means that majority decisions must be arrived at within universities and departments, where no strong hierarchy exists. University leadership—rectors and deans—cannot disregard the majority of the chair-holders.

In principle, a majority can decide against the interests of particular chair-holders, for example to take away certain of their resources; but this kind of "unfriendly act" almost never happens: in practice, most decisions are made unanimously. Academic self-regulation on the level of chair-holders is informally ruled by "cooperativeness," and each can normally expect that no decision will be made which violates his or her interests. Implicit non-aggression pacts transform the majority rule into a structure of veto-powers of each chair-holder—a veto-power usually employed to defend one's own interests.

These non-aggression pacts result from a number of considerations of each chair-holder about the expected or anticipated reactions of others if he or she does not act "cooperatively." To begin with, this would create emotionally disturbing conflicts with persons whom they often meet daily. Additionally, the solidarity of the department or university against threats from outside—especially from state authorities—would be weakened. To mobilize a majority for one's particular interests would require an enormous effort to build up and maintain fragile coalitions of interests; even if this could be achieved and a majority decision for one's own and against someone else's interests could be reached, one would have to fear in future that others would try the same tactic, and one could not be sure to be always on the winning side. In most cases, a mixture of these considerations motivates a chair-holder not to undertake "uncooperative" initiatives.

Therefore it is not surprising that academic self-regulation among chair-holders shows a marked tendency to preserve the organizational status quo. State authorities especially have long criticized this as the universities' inability to reform themselves—for example, to reallocate

14. In the 1970s, the other status groups also gained some rights of participation. But the dominant position of the chair-holders has been maintained.

resources according to performance criteria. To improve this situation, a strengthening of organizational leadership within universities will be proposed and discussed below.

For research at universities in particular, it is important that the mechanisms of funding agencies are modeled to recognize this oligarchic academic self-regulation. Decisions about project proposals in the DFG, or the various programs of research promotion of state or federal ministries, are dominated by peer review; these peers are most often chair-holders with considerable reputations. The same holds true for most of the representatives of academia in the Science Council. Furthermore, in public debates about the higher education system the DHV—the association of university professors—has more standing than those labor unions in which other status groups of the universities are organized. All in all, the concerns of the universities in general, and of university research in particular, are mainly defined and articulated by professors.

Competition for Resources and Customers

We have seen that two kinds of institutional problem-processing mechanisms in the German university system show obvious deficiencies. It has also been mentioned in passing that the search for ways to overcome these deficiencies often turns to the other two kinds of mechanisms. Many observers call for "more market!"—meaning higher competitive pressure on universities—and "stronger leadership!"—meaning more hierarchical institutional governance. Both proposals are often seen in close connection. Only higher competitive pressure, culminating in threats to organizational or departmental survival, could strengthen university leadership against the non-aggression pacts of academic self-regulation; and only by rigorous leadership that builds up a strong "corporate identity" can a university realize competitiveness. Both arguments are partly influenced by a look at the American higher education system which is seen, first as being very successful, and second as being characterized by a dominance of exactly this combination of high competitive pressure and strong university leadership.

With this general perspective of the present German initiatives and debates in mind, we can now take a closer look at the competition for resources and customers as an institutional problem-processing mechanism.

Competition is generally rather weak in the German university system, especially compared to the American system. German universities do not compete for students as their principal "customers"; in other respects as well competition is limited by political regulation. However, universities do compete to a certain extent for the best professors. They try to attract professors by allocating resources from their institutional funds to a chair to which they want to recruit a

particular person. But the standardization of teaching duties does not allow universities to attract excellent researchers by reducing their teaching load.

In spite of the intense political regulation and control of universities, state authorities have not gone very far in the direction of a regular and comprehensive evaluation of teaching and research performance. It is not to be expected that regular and comprehensive evaluation exercises, like the ones that take place in Great Britain, will be installed in Germany in the near future. Rather we observe a broad variety of activities and approaches in the different federal states and institutions of higher education. This means that information is vague on relative performance as a crucial precondition for any performance-based allocation of resources to universities, departments, or individual professors.

Competitive pressure is stronger in research than in teaching. The amount of resources a professor has for research depends significantly on his or her previous research performance. Allocation of institutional funds varies with an individual's research achievements because these resources are allocated with the appointment, and research performance is more important than teaching performance in appointment decisions. An excellent researcher can apply for other professorships from time to time to increase his or her personally allocated funds; however, this competitive mechanism is limited because the personal allocation of funds is irreversible as long as the position or chair is held by that individual and cannot be reduced if a professor's performance declines. Recently all state ministers decided to increase competitive pressure in this field and in future to award these personally allocated funds only temporarily. Another performance-related element of competition has recently been put on the agenda by the German Rectors' Conference (HRK, 1998a) supporting the idea of splitting the remuneration of professors into two parts, a basic salary and a more variable salary based on special performance, work-load, or functions.

More important, resources for research at universities are often separately budgeted funds for specific research projects. In many research fields, especially in the natural, engineering, and medical sciences, no significant research is possible without project funds. In contrast, some research in the humanities and social sciences can still be done with small project funds. Thus, this kind of competitive pressure varies considerably among disciplines and research fields.

Since the demand for separately budgeted funds has increased faster than their supply, provision of such funds can guide university research effectively in several respects. It may promote high quality research and discourage or eliminate mediocre (or worse) research, a criterion dominant within the DFG. Using the criterion of extra-scientific relevance, research activities may be promoted that deal with topics of interest to particular users of research results, be they indus-

try, the health care system, or the military. This criterion dominates contract research, and also the research promotion of the ministries or the EU.

Despite all the "market" enthusiasm of present discussions, one should not forget the possible negative consequences (Matthes, 1988; Schimank, 1995: 301–316). Professors might come under pressure to become more and more "acquisition professionals" and to leave the genuine research work behind; the short time-horizon of many projects does not allow the slow maturing of radical theoretical innovations; contract research may even degenerate to boring routine work with no intellectual challenge; members of peer review committees, who often belong to that research field's orthodoxy, may resist unconventional approaches; finally, high competition for separately budgeted funds may also encourage certain kinds of misconduct, especially scientific fraud. Experiences in the United States, where the share of separately budgeted funds in the total amount of resources for university research has been much higher than in Germany, seem to underline such fears.

In German debates about higher education policy, a strengthening of competitive pressure is also discussed with regard to the idea of "differentiation" of the university system. Concerning teaching, this refers to special profiles of particular study or degree programs as well as to the introduction of bachelor and master programs. Initiatives in this direction are supported by the German Rectors' Conference (HRK, 1997a). Similarly, departments may build up special research profiles. Another kind of "differentiation" that is an important feature of the American system seems to be unrealistic in Germany: a "differentiation" in more teaching-oriented and more research-oriented universities, departments, or professorships. If such a "differentiation" existed, research-oriented professors would be under a permanent competitive pressure to produce good research work because otherwise their teaching duties would be increased beyond the level they prefer.

Hierarchical Organizational Self-Governance

Political guidance, academic self-regulation, and competitive pressures are three problem-processing mechanisms that influence universities from the outside. State authorities are outside actors, customers and providers of resources, as are scientific communities.[15] In contrast, a fourth kind of mechanism, hierarchical self-governance by university leaders, is clearly an internal one. American universities, compared to

15. It is true that universities as organizations provide professorships as places to work. However, scientific discussions in which someone gains his or her reputation transcend the organizational boundaries of departments or universities. See in this respect Robert K. Merton's (1949) distinction between "locals" and "cosmopolitans" and Niklas Luhmann's (1990: 672–680) observation that there are no intra-organizational careers in science.

German ones, have given ample room for maneuver and the institutional entrepreneurship of university leaders.[16]

Rectors and deans are leaders who might enact hierarchical organizational self-governance at German universities, although we have already mentioned that their decision-making competencies are rather limited by the formal majority rules and informal non-aggression pacts of academic self-regulation. Clark (1983: 140) notes that German universities show a self-contradictory organizational structure "… since chair power fragments the formal structure." Leaders do not have effective power to implement decisions against the professors, especially the dominant status group, the chair-holders. This weakness of leadership was for long an intended feature, securing the autonomy of individual professors. Accordingly, rectors and deans stay in office only for a short period of time so that they have scant opportunity to become experienced leaders. The attractiveness of these positions is also rather low. Those who are elected by their colleagues understand that they are "primi inter pares," their power restricted by the logic of "cooperativeness." This means that university leadership, unable to free itself from oligarchic academic self-regulation, is another of its expressions and cannot overcome its deficiencies.

Another look at American universities—which are much less bound to the principle of academic self-governance—shows that the conditions for hierarchical university governance are an independent mechanism of problem processing. Three conditions are crucial for such a "professionalization" of university leadership: rectors and deans must have authority independent from the vote of professors in their university or department; they may need the formal approval of the professors but must be selected by other actors—for instance, a university board. The rector or dean must have genuine competencies and be able to overrule the majority of the professors and effectively to sanction individual professors either positively or negatively. Finally, the term of office of a rector or dean must be long enough to give him or her a chance to gather experience and implement "visions." In addition, such leadership positions must be installed as new career paths within and between universities. Only if all these conditions are fulfilled can leaders within the German university system emancipate themselves from oligarchic academic self-regulation. But such institutional innovations can be discerned only in disconnected initiatives, which tend to fail. For example, in some states the terms of office of rectors and deans have been prolonged and new tasks have been added to their responsibilities, but they have not been given more power (See also the recommendations in HRK, 1997d).

Another institutional mechanism that might improve hierarchical

16. Therefore it is all the more surprising that Clark's initial typology of mechanisms of problem processing neglected this fourth kind of mechanism. However, American universities were also the paradigmatic case of "organizational anarchies" (Cohen and March, 1974).

control is university boards (*Hochschulräte*),[17] which some universities have established on an experimental basis. To become members of these boards government actors have in mind eminent personalities from industry, politics, and other societal sectors. Possible competencies of the boards could include the overall monitoring and evaluation of a university's performance and a number of rights of approval—most importantly with respect to the university statutes, the establishment or closure of departments, the establishment or removal of particular professorships, and the recruitment of professors, all of which are now possessed by state ministries. This may suggest a skeptical view of university boards. If they simply do what the ministry did before, how can one expect them to do better?

Still, some proponents of university boards hope that a delegation of these competencies to such a new body might lead to a better understanding of the needs of those who use their services. But again, whether a university board can work as an effective counterforce against the prevailing model of "cooperativeness" among professors, especially in matters of resource allocation, is an open question. In this respect it would be crucial for the board to have the right to approve the annual university budget on a detailed basis, including the right to change particular items proposed by the decision-making bodies of the university. But as of now at least, such a far-reaching competency of university boards is rarely discussed.

It is clear that this fourth kind of institutional mechanism of problem processing has been the weakest in the German university system, and there are no indications that this will significantly change. The danger might be that under these circumstances a successful increase of competitive pressure would not bring about desirable organizational reforms and the buildup of a corporate identity of universities; instead, oligarchic academic self-regulation might run out of control into a free-for-all battle for survival. Furthermore, universities, departments, and individual professors could be played off against each other by state authorities with "divide and conquer" strategies, eliminating the potentially positive effects of more competition.

CONCLUSION

These reflections on the institutional mechanisms of problem processing in the German university system center on three points:

- The traditional combination of political guidance by state authorities and oligarchic academic self-regulation still dominates today.
- By now its marked deficiencies have become apparent, drawing attention to the other two kinds of mechanisms, competitive pressure and hierarchical organizational self-

17. For a very critical appraisal of such proposals see Fittschen (1997).

governance, although little of either has been put into practice.
- Future development could lead to a situation of increased competitive pressure without strengthening university leadership. This would overcome immobility, but by erratic changes which might be no improvement at all.

This is a rough sketch of what we see with regard to the role of research within the German university system. Further studies will be needed to analyze specific topics and deepen our understanding of certain critical aspects of this situation. A thorough assessment of what might or should happen to improve the system's abilities to master the new challenges to its research function must go into much more detail than is possible in this overview. Issues of special interest for such further studies will include the following:

1. discussion of the effect on universities of current activities to modernize the public sector;
2. reflections on the adequacy of existing legal regulations of working conditions of academic staff;
3. measures to overcome the university's limited capacities for self-regulation;
4. possibilities for university reform through privatization and public-private partnerships;
5. intensified evaluations of university research;
6. new approaches to research promotion;
7. cooperative and competitive relationships between universities and research institutes outside the university sector;
8. conditions of research training and junior staff careers;
9. perspectives of applied research and cooperation with industry in universities of applied sciences;
10. discourses and patterns of mutual observation and perception of higher education in the United States and Germany.

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