

ISSUES

IN SCIENCE AND TECHNOLOGY

SPRING 2018

NATIONAL ACADEMIES OF
SCIENCES, ENGINEERING,
AND MEDICINE

THE UNIVERSITY
OF TEXAS AT DALLAS

ARIZONA STATE
UNIVERSITY

Preparing for

THE NEXT FLOOD

A Response to Reactionary Populism

Straight Talk on Workforce Skills

New Rules for Self-Driving Cars

Infrastructure in the Anthropocene

The Downton Abbey University System

Using Data to Make Better Decisions

USA \$12.00 / CAN \$13.00

8 1 >



0 56698 57433 0

SHIRI M. BREZNITZ AND MARTIN KENNEY

Slouching Toward the Downton Abbey University System

Dwindling financial support and ever-increasing federal and state unfunded mandates are forcing public universities to take actions that undermine the effectiveness of a vital component of the US innovation system and the nation's most powerful engine of social mobility.

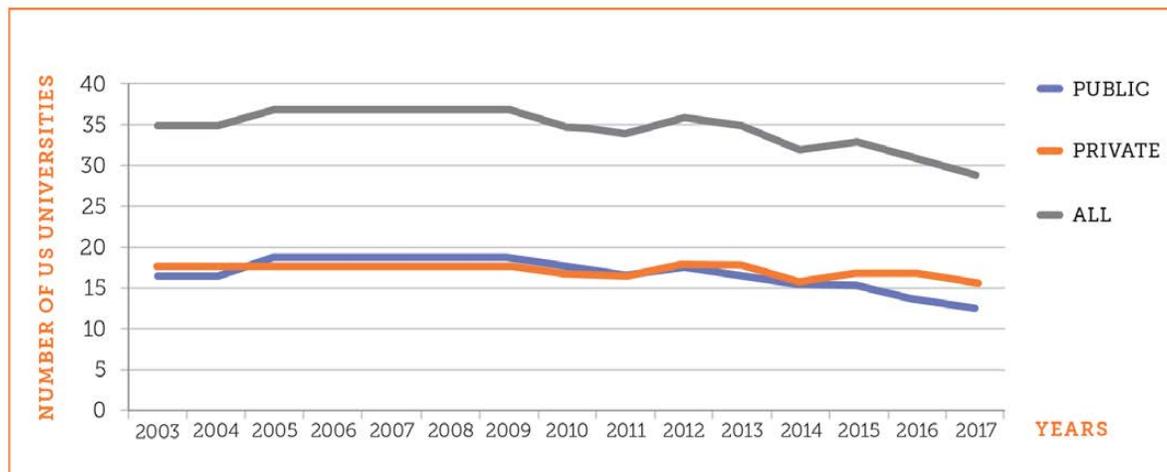
The US research university system, which continues to be the global gold standard, is a unique blend of public and private not-for-profit universities. Research universities are a core part of the overall higher education system, which has been pivotal in boosting the national innovation system, stimulating regional economic growth, and enhancing social mobility. And yet, the entire research university system is experiencing stress, and public universities in particular are facing profound challenges. State governments are cutting their financial support even as operational costs increase. Public research universities are seeking solutions, but nearly all of these are also problematic because they involve a narrowing of the institutions' mission.

The rise to global prominence of the postwar US research university system was due to a confluence of factors. Its growth paralleled, contributed to, and benefited from the expansion in the middle class. Americans of the time believed in the power of higher education and research to create new economic opportunities and make it possible for all citizens to share in the wealth created. Public research universities, in particular, developed an education system that trained masses of students who, upon graduation, staffed the postwar expansion in middle-management positions in government and industry.

The US economic model worked exceedingly well while economic growth continued and the share of productivity growth going to labor and business remained roughly unchanged. This undergirded a vibrant middle class. After the 1980s, as the erosion of middle class economic strength began, a university education became even more important as significant portions of the US economy became knowledge- and innovation-intensive and thus needed more highly skilled workers. Not surprisingly, research universities were vital players in producing not only the educated students, undergraduate and graduate, but significant portions of the research that contributed to this technological change. In fact, over the past two decades, established US firms downsized their research investments, while the university increasingly assumed responsibility for not just the basic research but also some applied research.

The decline in government support is endangering the well-being of the US research university system. State universities are being hurt more than are the private institutions, and the public universities that are not in the top tier are suffering the most. These lower- and middle-tier public institutions that are less attractive to international students and cannot expand their endowments will experience the greatest budget tightening and will be forced to

Figure 1 Public and Private US Universities in the AWRU Global Top 50 by Year



Source: Adapted from Shanghai Jiaotong University AWRU.

decrease their commitment to research. As a result, they will concentrate on vocational training and narrow their remit to their local communities. This is a profound shift in what US society will provide for many of its young people and what universities can contribute to the society. University leaders are faced with choices they don't want to make: difficult decisions are being taken to make ends meet. We will look at some of the problematic solutions that some universities are pursuing and consider some options for rebuilding higher education.

Accomplishments

The investment by US society, from both the federal and state governments, in research universities was unprecedented, and the societal benefits produced

Table 1 Number of Global Top 50 US Universities by Decile, Selected Years

DECILE/YEAR	2003	2004	2010	2017
1-10	8	8	8	8
11-20	7	9	9	8
21-30	7	5	5	6
31-40	9	8	7	4
41-50	4	5	6	3
TOTAL	35	35	35	29

have been nothing short of astounding. Prior to World War II, a few US universities were quite good but very few were in the top ranks globally. More recently, US university dominance was widely accepted but never measured. Not until the early 2000s were international university ranking systems introduced. The most widely accepted of them, the Shanghai Jiaotong University Academic World Ranking of Universities (AWRU), was developed in China but used the US research university as the template for excellence. The 2003 AWRU ranking demonstrates the overwhelming dominance of US research universities: 35 US universities, 17 of which were public, were in the top 50. In 2017, US dominance was intact but had diminished somewhat: there were 29 US universities, of which 13 were public universities, in the top 50 (See Figure 1). Importantly, the decline is manifested not at the top, but in the second tier of US universities. (See Table 1).

US public universities contribute enormously to the US society and economy. Several key sectors of the US economy—including the new biotechnologies, medical and scientific instruments, the information and communication technologies, and agriculture—have benefited greatly from university research and even more from being able to hire highly skilled graduates. Firms established by university students, faculty, and researchers include Amgen, Cisco, Dell, Facebook, Google, Quintiles, SAS, Yahoo!, and thousands of smaller, defunct, and acquired firms, such as Biogen, Chiron, Digital Equipment Corporation, Genentech, Netscape, Silicon Graphics, Sun Microsystems, and Sybase. Interestingly, although laboratories have been important, so

have dorm rooms. Of the top five US firms by stock market valuation in 2017—Apple, Google, Amazon, Microsoft, and Facebook—two were established by undergraduates, one in a university laboratory, and the other two outside the university ambit.

If one considers the ideas, inventions, processes, and products that can be traced to university research, then US research universities' performance is remarkable. It includes vaccines, anticancer drugs, antibiotics, laser eye surgery, the internet, software (e.g., Apache, statistical analysis packages, BSD Unix, and computer-aided design), and numerous scientific and medical devices, plant seeds of all types, economic forecasting tools, and even Gatorade. The economically valuable contributions are largely uncatalogued and extend to every aspect of the contemporary US economy. This cornucopia of direct benefits from university research is unrivalled in any other nation.

Patents are an important measure of innovation and research university output. US Patent and Trademark Organization data show that, in nearly all states, research universities are among the top five patenting organizations statewide. Even in patent-intensive California, the University of California is among the top ten patenting organizations. In most states, the local research universities are among the top five patenting organizations.

Research universities are also vital contributors to their local economies. Direct employment benefits are geographically concentrated around the focal university. Numerous studies have shown that universities generate positive outcomes for the economy in the region in which they are located. With their large workforces and excellent benefits, research universities are core employers. In university cities such as Madison, Wisconsin, or Ann Arbor, Michigan, the local research university is the largest employer, often by far. Even in a city as large as Los Angeles, the University of California, Los Angeles (UCLA) is the fourth-largest employer after the city, the school system, and the Department of Water and Power. In Seattle, the University of Washington is the fourth-largest employer. In the San Francisco Bay Area, Kaiser Permanente and the City of San Francisco are the two largest employers, followed by UC-Berkeley, Stanford University (including its medical system), and the University of California, San Francisco (UCSF).

The economic gains from university-developed innovations have created significant benefits in terms of knowledge transferred to local businesses. University spinoffs have often been the seeds at the

core of the development of regional biotechnology and information clusters. To illustrate, San Diego's success as one of the world's leading biotechnology centers can be traced to a University of California, San Diego (UCSD) spin-off, Hybritech. The world's largest biotechnology cluster is in the San Francisco Bay Area and can be traced directly to UCSF, UC-Berkeley, and Stanford.

The importance of public universities to local regional development is not confined to biotechnology and computer science. The diversity of contributions is impressive. Agricultural colleges played an important role in the development of US agriculture. To illustrate, the University of California, Davis, had a central role in the birth and growth of the fine wine industry in Napa. Cornell University has had a similar impact in the Finger Lakes region. In an entirely different way, the statistics departments at North Carolina State University and the University of North Carolina, Chapel Hill, were the source of two of the largest North Carolina entrepreneurial firms, SAS and Quintiles, both of which are massive employers. Countless studies have shown that the headquarters for university spin-off firms often remain in close proximity to the university from which they were born and thus provided vital economic stimulus.

For many families, the most visible benefit of state universities is the opportunity it provides for social and economic advancement of young people. Research by economists, including Raj Chetty, Carolyn Hoxby, and Sarah Turner, demonstrates that university educations contribute to inter-generational mobility and are vital for retaining one's position in the socioeconomic hierarchy, but this vital function is in danger. They found that, from 2000 to 2011, access to higher education fell "specifically at colleges with high success rates and high access" for lower-income students, who were normally at mid-tier public universities—precisely the universities that face the most significant budget cuts and concomitant tuition increases.

Conundrums

In spite of the widely recognized social contributions that universities make, most states have been steadily reducing their financial support. These state budget cuts have created challenges both for universities and for students. To contain costs, university leaders have taken actions such as hiring teaching staff instead of research staff, eliminating "lower income-earning" departments, and increasing tuition. In the 1960s and 1970s, any qualified student could afford a highly subsidized public university education, and job

prospects for college graduates were very bright. But today many students must assume a considerable debt to finance their education and then enter a job market that is much less promising, particularly for graduates with degrees in the social sciences and humanities.

The fundamental dilemma for all public research universities is that delivery costs continue to increase even as state support declines. As data from the State Higher Education Executive Officers Association show, in 2001 state investment per full-time student nationally reached a high of \$9,120 (inflation adjusted). After declines in the early 2000s, support rebounded to \$8,380 in 2008. Then the Great Recession strained state budgets, and by 2016 state support per student had fallen to \$6,954. The result is that state funding comprises a relatively small share of the budget at many public research universities, as the data in Table 2 illustrate.

A review of state appropriations in 2016 finds that, with an average 3% increase over eight years and a median of 0%, many states are still not funding universities at the same levels as they did prior to 2008. The sole federal initiative to soften the blow was the 2009 American Recovery and Reinvestment Act (ARRA), which created a one-time infusion of research funds but had no impact on the larger structural issues facing public research universities.

In order to make ends meet many public universities increased tuition for residents and intensified efforts to recruit out-of-state students, who pay higher tuition rates, to offset reduced state appropriations. Decreasing state support and rising tuitions initiate a vicious cycle. As tuition increases, taxpayer goodwill toward public universities erodes, particularly among middle-class families who must pay the full cost of their children's education. The loss of middle-class support makes it easier for politicians to cut funding, which then exacerbates the need to raise tuition. The losers in this cycle are the students and families who must borrow large sums to cover the cost of education.

The deepening debt problems among university graduates have many origins, and although particularly egregious for those who enroll in for-profit private universities, they are also entrapping public university students. Student debt is, in essence, borrowing from the increased earnings expected to result from a college degree. However, the value of a bachelor's degree as an investment has deteriorated as entry-level wages for many graduates have stagnated. A growing number are settling for part-time jobs with no benefits or worse unpaid internships.

Cost pressures: Universities are labor-intensive organizations. The Lincoln Project, a study launched

Table 2 Revenue Sources at Four State Universities, 2016

REVENUE SOURCES	UNIVERSITY OF MICHIGAN, ANN ARBOR (includes two regional campuses)		UNIVERSITY OF CALIFORNIA (Pell Grants and national laboratories omitted)		UNIVERSITY OF WASHINGTON		UNIVERSITY OF KANSAS	
	In \$000s	%	In \$000s	%	In \$000s	%	In \$000s	%
State appropriations	346,000	4.85	3,052,540	10.73	302,000	6.01	237,045	19.68
Student tuition and fees	1,162,000	16.30	4,132,352	14.53	949,000	18.89	304,318	25.27
Grants and contracts	1,150,000	16.13	5,272,595	18.54	1,348,000	26.83	275,416	22.87
Endowment investments and gifts	464,000	6.51	1340224	4.71	265,000	5.27	62,762	5.21
Health system	3,587,000	50.30	14,638,715	51.48	1,435,000	28.56	104,672	8.69
Auxiliary & dept. activities	288,000	4.04	N/A*	N/A	574,000	11.43	180,975	15.03
Other	134,000	1.88	N/A	N/A	151,000	3.01	39,178	3.25
TOTAL	7,131,000		28,436,426		5,024,000		1,204,366	

* Combined with health system

by the American Academy of Arts and Sciences, found that labor comprises 50% of the total costs at the typical public research university. These labor costs are relatively inelastic. Adding more students generally requires more administrators, support staff, and faculty. Similarly, the ever-increasing number of federal and state mandates requires either adding staff or hiring high-cost consultants. For public universities, particularly those in the lower ranks, these cost pressures are intense and create unique conundrums for the university administration.

At universities, especially public ones, many faculty members believe that the number of administrators and staff has been unjustifiably increased. Of course, this will continue to be debated, though the Lincoln Project report suggests that the rate of increase in the administrative headcount is not significantly greater than that of the increase in university size. Some of the growth in administrative staff is the result of the need to comply with government regulations and reporting requirements and the growing expectation that universities will provide a portfolio of enhanced services to students ranging from mental health and disability counseling to beautiful athletic facilities and much more.

Public universities, in particular, have been asked to address the results of deep-rooted social problems, the causes of which do not stem from the university. For example, the acceptance of increasing numbers of underprepared students from poorly funded high schools has created a need for enlarged tutoring services, and managing these services requires administrators. The belief that the research university should be engaged with the local community requires dedicated support staff and is rarely funded. The role of the university teaching hospital as the hospital of last resort for the indigent means that the most complex, costly, and difficult-to-bill cases are often the responsibility of the university. Similarly, the passage of the Bayh-Dole Act and the increased desire for universities to be involved in technology transfer and local economic development led to the formation of yet another bureaucracy. Each service has clear value, but with each expansion, new managers are needed, and the overall operation of the university becomes more expensive and complicated.

Unfunded mandates: Universities have experienced a proliferation of unfunded mandates that are often costly and sometimes entirely unnecessary. For example, recent federal rules apparently intended to address abuses by for-profit universities require certification that universities are meeting learning objectives; this has meant that universities undergo lengthy

and costly review procedures. New administrative units have been created to manage audits from certification boards. There are an ever-increasing number of classes, trainings, and certification required of faculty and staff. No unfunded mandate is particularly onerous in isolation, but the cumulative effect is a growing arcane bureaucracy to address issues ranging from crime reporting and human subject protocols to conflicts of interest, intercollegiate sports, and more.

The proliferation of unfunded mandates and new requirements emanating from the federal government tend to affect private and public universities equally. Unfortunately, public universities also are subject to the whims of their respective state governments. For example, the University of California is regularly audited by the state government for an astonishing variety of reasons, many of which appear to be trivial or overtly political. Problems, almost all of which are innocuous, often arise in the complicated accounting systems that public universities have developed to separate the various “types” of money. When misconduct allegations arise, politicians are quick to condemn the entire institution, with no consideration of the seriousness of the matter. Legislatures demand that universities conform to whatever political cause is most useful to the ruling party’s political fortunes, whether it is about the use of bathrooms, carrying guns, or the appearance of controversial speakers on campus. Private universities are either not subject to these mandates or are in a stronger position to resist them. Public universities have no choice.

Research funding: Research funding patterns are also changing, creating challenges that fall more heavily on the middle-tier public research universities. The first change is that federal overhead rates, which used to be a source of income, now in expensive disciplines such as the biological sciences scarcely cover the costs of grant administration. This escalation in administrative costs is due not only to the proliferation of mandates, but also to the ever-increasing cost of laboratory buildings, maintenance, and faculty start-up packages. Universities increasingly are subsidizing research from their institutional funds. As Figure 2 indicates, since the 1970s universities have significantly expanded their contribution to the overall research funding. Not surprisingly, available institutional funds are not uniformly distributed.

The middle-tier public research universities must compete with the wealthier universities blessed by huge endowments that can hire the best researchers by giving them larger start-up packages and purchasing expensive research equipment. Not surprisingly, a faculty member

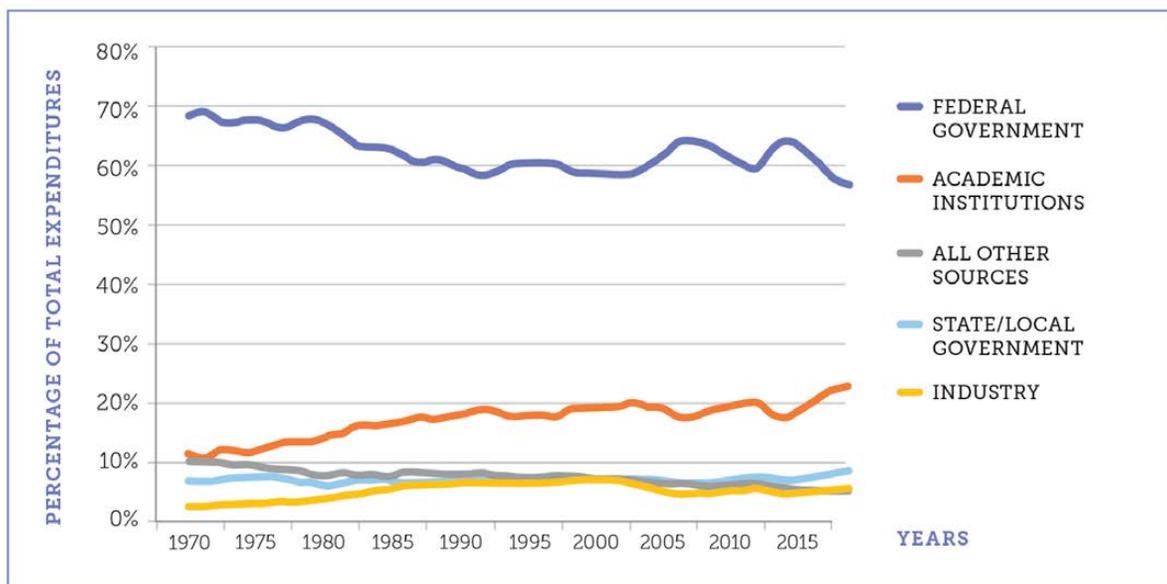
with a larger start-up package has a significant advantage competing for grants. The virtuous circle is clear; more funds contribute to an increase of publications, strengthening the university's global reputation and improving competitiveness for yet more grants. All of which improve recruitment of undergraduates, graduate students, and faculty.

Universities deserve credit for stepping up to support research, but public universities are limited in what they can do because they lack the large endowments held by the top private institutions. To illustrate, in 2017 Harvard University received \$1.8 billion (36% of its operating budget) from its endowment. This subsidized university operations. No public university has this luxury.

but who had no political advocates—that is, out-of-state students and, in particular, those from overseas.

Out-of-state and international students: At private universities, as long as no overt discrimination was practiced, student acceptance was entirely at the discretion of the university, and it could charge what the market would bear. Although many were affected by the 2008 financial crisis, private universities tended to increase tuition but not significantly expand the number of undergrads. Public universities, in contrast, were restricted by state legislatures from raising tuition very much and turned to out-of-state and international students, who pay a higher tuition. Students from rapidly developing countries, China in particular, are filling more seats at state universities.

Figure 2 R&D Expenditures at US Universities by Source of Funds, 1970-2015



Source: National Science Foundation, "Higher Education Research and Development Survey, Fiscal Year 2015" (2017).

Problematic solutions

Obtaining more industry support and increasing endowments are strategies that all universities have adopted, but these depend on an ability to "sell" research to firms or attract significant philanthropic gifts. Corporations and wealthy individuals have consistently chosen to allocate most of their support to the most prestigious private universities. Hence, public universities are forced to increase income through higher tuition, which then sparks resistance among state politicians and their constituents. One solution to this dilemma was to find students who could be charged the full cost or more than full cost,

At the University of California, for example, 24.4% of UC-Berkeley's 29,000 undergraduates are not California residents; at UC-San Diego and UCLA, 23% of undergraduates are nonresident. Much of the increased tuition income from international students subsidizes the tuition for lower-income, in-state students. But the trade-off is that fewer places are available for state residents. Hypocritically, politicians unwilling to appropriate more funds have excoriated public universities for growing the student body by accepting more international students. In response to political pressure, the UC system capped the proportion of nonresident students at

20% of the total undergraduate student body, while allowing the three universities that have already exceeded that percentage to maintain current levels.

Because the number of places available at the elite public universities is limited, state taxpayers soon discovered that some “qualified” in-state applicants were no longer accepted, thereby eroding public support. For the public institutions with the best reputations, the eroding support is not such a great concern, as out-of-state demand will remain high. For middle-tier public research universities, the situation is more difficult. Their out-of-state applicants are likely to be fewer and of lower quality, with greater language and acculturation issues, and therefore more costly to retain. Attracting these new out-of-state students will be difficult when they discover that they are paying tuition nearly equal to that at a private university but receiving the less-personal public university education, with large class sizes, courses taught by graduate assistants, antiquated facilities, and so on. For the elite public universities, the value of their “brand” may be sufficient to overcome these drawbacks, but for middle-tier universities, justifying the price of such a “mediocre” product may be more difficult.

The financial benefits of out-of-state students are clear, and the competition for such students is intense. As the Institute for International Education reports, 32% of the 429,313 foreign undergraduates at US universities in 2015-16 were Chinese—an 8.9% increase over the year before. This inflow of foreign students is accompanied by some managerial complications. For one thing, not only the Chinese but also others are brand conscious. Thus, as universities become more dependent on foreign undergraduates, US research universities that previously were most concerned with the *US News and World Report* undergraduate school rankings must now contend with the AWRU global ranking system, which prioritizes scientific and engineering research performance.

Increased dependence on foreign undergraduates means that budgets at US universities are increasingly contingent upon policy decisions by both the US and foreign governments. For example, universities whose decisions offend foreign governments such as China could experience a dramatic drop in foreign students and thus trigger a financial crisis if they cannot be replaced by other out-of-state students.

Labor costs: Cost pressures on public research universities are particularly intense, as they must balance burgeoning mandates, competition for their most successful faculty members, the need to provide reasonable salaries and benefits for their

support staff, and reluctance to outsource various tasks to lower-cost providers. Faculty salaries are an important cost, and as Paul Courant and Sarah Turner show in a recent National Bureau of Economic Research paper, increases are “concentrated at the universities where faculty are expected to produce both scholarly research and teaching, and it is the research contributions which are most broadly priced in the national marketplace.” They suggest that the “price of research has increased at a greater rate than the price of instruction.” Because research excellence determines status and therefore university brand value, a vibrant market for faculty has emerged, and it is characterized by superstar economics. Further, compensation increasingly differs between departments and colleges; for example, the business school faculty earn much more than their colleagues in the humanities.

Bidding wars for the most successful faculty push salaries ever higher, with deleterious effects for the larger higher education market. One of the most pernicious outcomes is that the public universities lose their best faculty to the richer private universities—a process that can ignite a vicious cycle of decline at the weaker universities and a virtuous circle of improvement at the stronger universities. The ultimate result is reinforcing the “steeples of excellence” that serve primarily the children from the elite while undermining the poorer institutions that serve the middle and lower classes.

Beyond the research faculty is a massive number of non-tenured faculty. To control costs, many public universities employ poorly compensated lecturers and graduate teaching assistants to teach undergraduates. At some universities, often with the support of their students, these lecturers form unions. At some public universities, there are multiple unions driving a proliferating number of job classifications, rules, and grievances. The inevitable result was an expansion of the personnel bureaucracy and an extension of conflictual labor relations to the public universities.

US research universities operate according to a “little-city” model, meaning that they integrate not only direct academic staff, but also a wide variety of general service employees. Private universities have already outsourced many functions, from janitorial services to certain accounting functions, thereby lowering costs. Fear of criticism from students, faculty, and politicians has discouraged most public universities from taking this step. Outsourcing is likely to save money, but it also contributes to the inequality plaguing our society—a difficult moral dilemma.

Grim, but not hopeless

The US research-intensive university system composed of private and public institutions fully flowered in decades following World War II. It was built on a burgeoning middle class confident that an undergraduate degree would allow the attainment of a middle-class life and that research would generate new industries and a cornucopia of jobs, creating wealth to be shared by all. Today, the society's faith in that vision is eroding.

In 2017, many undergraduate degrees are only tickets to a lottery, with the odds of success lengthening. A degree appears necessary for securing an opportunity, but not a guarantee of employment of reasonable quality. For graduates from an elite school, the odds of a favorable outcome are excellent. For graduates from a middle-tier public university, the odds are not nearly so good. When a public higher education was low in cost, students faced

inter-unit cross-subsidies, decreasing community engagement, or making other difficult cuts. All choices will have consequences for social equity and public support, as well as for the nation's ability to remain competitive in a knowledge-based economy.

As the competition for research funding increases and research success drives ranking, the elite private universities with large endowments and massive tuition income will maintain or even improve their position. The elite public universities with sufficient brand recognition should be able to follow the University of Michigan in extricating themselves from the control of their state governments. If they become self-supporting, they will acquire the freedom to set tuition levels and recruit students as they see fit. States with multiple research universities may choose to triage their weaker campuses to protect the elite—a process that will occur naturally if the elite institutions are allowed to disengage

Increased dependence on foreign undergraduates means that budgets at US universities are increasingly contingent upon policy decisions by both the US and foreign governments.

little downside risk. But the current cost of public research university education for a middle-class student has increased the downside risk considerably. Families are realizing that it is becoming increasingly difficult for their children to gain admission to the top state universities, and that even if they do get in, there is no guarantee that it will be worth the significant expense. In some states, the regions that are home to these research universities are the only parts of the state experiencing positive economic outcomes. In the rest of these states, the consensus of support for the flagship public research universities is fraying, as is particularly evident in the dramatic budget cuts in states such as Illinois, Kansas, and Wisconsin, to name a few of the most severe.

The unrivalled success of the US university in combining world-class research and undergraduate education was a function of public subsidies that enabled qualified but not wealthy students to attend a public research university. With the increasingly restricted state budgets, Hobson's choices have emerged: move away from the support of expensive research and transform many more of the poorer public universities into teaching institutions. Make difficult decisions between increasing tuition, cutting

from the overall system. For the middle-tier public research universities that have less international recognition, smaller endowments, or less-desirable locations, difficult decisions will be made as the distance between them and the elite universities widens. Should they compete by concentrating on particular fields where they may have a competitive advantage? Should they discontinue the expensive research function and concentrate on teaching? Will the departments that have low student-faculty ratios become targets for contraction or discontinuation? If each university makes such decisions individually, what will be the collective outcome?

These internal stresses have already affected the humanities, as universities eliminate cross-subsidies that support smaller departments such as those in foreign languages and some of the humanities disciplines. This is also affecting science and engineering programs that have few students and attract little outside research support. Even some core professional schools such as law and architecture risk downsizing or even closure. What previously was unthinkable is now being considered. Departments are exhorted to become self-supporting or be closed. The traditional university model where money-earning

departments or colleges were taxed to support their less affluent relatives is increasingly questioned, as the latitude for supporting cost centers narrows.

The picture we paint is necessarily dire. Yet, it is a tribute to the public research universities that they have resisted the burgeoning wealth inequality in US society and remained vehicles for social mobility and vibrant contributors to the global knowledge society. Although numerous critics, including many faculty members, have decried the increasing responsiveness of universities to economic pressure, at least thus far many public universities have resisted evaluating all activities by their financial contribution. How much longer this will be possible is open to debate. The larger question that remains is whether the unique mixture of public and private universities that made the US research system the envy of the world can survive—or must the elite public universities privatize to survive as research institutions?

Some relatively simple measures could be implemented that would give universities some breathing

unless they have sufficient income. Fifth, public universities should continue to educate their local and national legislators on the benefits from their local universities in terms of taxes paid and economic and social impact. It is vital to continue and even redouble efforts to demonstrate the public research university's importance, even while suggesting that it could do more if it were not hampered by the fetters that the state governments impose.

The federal government's policies toward research universities are among the most pernicious. It constantly requires new and more convoluted reporting requirements for grants, necessitating layers of bureaucracy to the point where the overhead no longer covers grant administration costs. Its efforts to control the financial abuses and unreliable quality of the for-profit colleges have created cumbersome certification procedures that require all universities to create ever-larger "teaching effectiveness" bureaucracies.

Questions that US society must consider are:

In 2017, many undergraduate degrees are only tickets to a lottery, with the odds of success lengthening.

room. First, an internal discussion on the universities' funding, mandates, missions, and costs will be vital. Second, given the current trajectory, the public research universities must find ways to decouple themselves from their state governments. Ideally, this would be through an agreed-upon, long-term road map that would give public research universities freedom from yearly state budget cycles, allow rational planning, and enable the accumulation of rainy-day funds. For students, this would be an improvement, as universities would no longer be forced to implement tuition increases during recessions—exactly when they are the most punishing. It would also, partially, free public universities from the ever-greater number of unfunded state government mandates. Unfortunately, this is likely to be accompanied by a decision that student tuitions can no longer subsidize all of the meritorious but unfunded contributions public universities make to society.

Third, lower-tier research universities should assess their unique strengths and specialize to build excellence in certain fields—competing across the board with the elite universities that are far better off will result in uniform mediocrity. Fourth, as in the UK student loan system, the government should consider not requiring students to repay loans

Is further public university privatization the best direction for society as a whole? Can the Good Society be one with universities increasingly driven by profit-and-loss calculations for each faculty member, department, and college? Is it socially desirable for the noblesse oblige of the elite private universities and increasingly "private" public universities to create "elite" graduates, while the other public universities provide an educational experience tailored for the local job market? Will the movement to a narrow set of top-tier research universities erode the broad base of educated research-capable citizens and US competitiveness? Will the US university system just reinforce our emerging Downton Abbey society: a privatized research university education for those upstairs and a bare-boned trade school-like university education for the rest?

Shiri M. Breznitz is associate professor at the Munk School of Global Affairs at the University of Toronto. Martin Kenney is professor of human and community development at the University of California, Davis, the senior project director at the Berkeley Roundtable on the International Economy, and an affiliated professor at the Institute of Management at the Scuola Superiore Sant'Anna.