Competitiveness of Public Research Universities & Consequences for the Country: Recommendations for Change

by Peter McPherson, Howard J. Gobstein, David Shuleburger & Christine Keller

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Competitiveness of Public Research Universities & Consequences for the Country: Recommendations for Change

A NASULGC Discussion Paper

*****Working Draft*****

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Executive Summary

Public universities are too important to this country to permit them to deteriorate as compared to private universities. For decades slow erosion in state funding and rapid erosion in relative overall resources have occurred. While there is no evidence that educational quality or research performance of public universities has declined relative to that of private universities, it seems fully rational to be concerned that relative performance decline will follow if the current funding trends are not arrested and reversed.

This NASULGC discussion paper examines the unique contribution made by public research universities, the competitiveness of their financing, and growing evidence that that they are less able to compete for faculty, staff and students but remain able to compete for research funding. The paper concludes with a set of three recommendations that might be pursued to restore some of the loss of competitiveness. As with all NASULGC discussion papers the intent is to foster awareness, discussion, revision and then actions. We invite your comments on this paper. Subsequent editions of it will reflect the contributions made by the NASULGC community.

Unique Contributions of Public Research Universities:, Public research universities are major contributors to undergraduate and graduate education in the United States. They are the major source of undergraduates who ultimately populate the nation's doctoral programs and they produce a disproportionate number of bachelors and doctoral graduates in the identified areas of national need. Finally, both minority and low income students attend public research universities in far greater numbers than attend private research universities.

Financial Competitiveness of Public Research University Financing: We find that public research universities are at a serious funding disadvantage relative to their private peers. But this paper is not about envy; we examine funding relative to private universities because public universities compete in the same markets for resources as the privates. Having relatively less funding may mean in time that public universities will not be able to compete with private universities for the best faculty members, highly skilled technicians, post-doctoral candidates, doctoral candidates and even the most able undergraduate students.

From 1987 through 2006 revenue per student in private research universities in every revenue category except state funding has grown to be multiples of that available to the publics. The major revenue advantages of the privates are in tuition and endowment funding. Real state funding per student for public research universities declined over the twenty year period. Similarly, expenditures per student for full educational cost in the very high research privates are now nearly $38,000 more per student than in the publics. Finally, growth of private university endowments has added to their ability not only to spend more than the publics, but to sustain their levels of spending in hard times.

Areas of Reduced Competitiveness: The publics' funding disadvantage is reflected in slower growth of faculty salaries with salaries for full professors falling to 79% of the private level in 2007 from parity in 1976. Student/faculty ratios have widened over the years; they now stand at 19.3 to 1 in public research universities and 13.1 to 1 in private research universities. The public–private gap of entering freshman SAT scores is large and growing as well.

Competitiveness has been Maintained in Research: Over the long period 1972 to 2007 the proportion of federal science research expenditures by public universities steadily increased. More recently, between 1999 and 2006, the proportion of federal science expenditures by public universities increased from 60.3% to 61.5%. In this recent period the finding of increased public university share of research funding is pervasive across the categories and subcategories of science, as their share of total funding increased in 28 of the 33 categories.

Three Recommendations to Restore the Loss of Competitiveness: We call for serious discussion and additional analysis of the funding disparity that has occurred. That discussion should focus on the threats to quality that we believe to be developing and the consequences for the country should those threats materialize. Finally, we ask that methods for correcting this funding disparity be considered, subjected to wide discussion and subsequent revision, and ultimately, additional funding be put in place or other compensating actions be taken to ensure that the quality of public research universities remains on par with that of private research universities.

Our recommended actions to begin correcting this funding disparity are: 1- restoration of the state public subsidy per student to levels that existed when public universities were more evenly matched in funding with private universities, 2- continued restraint by public universities over costs combined with greater understanding by governing boards, legislators and the public that disproportionately increased tuition may be needed if public research universities are to be able to compete more evenly with private universities; and 3- a reexamination of federal research policies to ensure that federal agencies pay the full cost of research.

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I. The Competitiveness of Public Research Universities

Public research universities are at a funding disadvantage relative to their private peers in the U.S. But this paper is not about envy; it is about the rapidly developing possibility that public universities will cease to provide this country with the competitive edge necessary in a globalized market for new ideas and a well educated workforce. A significant funding disadvantage means over time the quality of public universities may decline relative to private universities, and public universities will not be able to compete with private universities for the best faculty members, highly skilled technicians, post-doctoral candidates, doctoral candidates and even the most able undergraduate students. While there is no evidence – yet – that quality has been adversely affected by this growing resource disadvantage, the situation of public universities is simply not sustainable in the long-run.

What is at stake is the future of the United States. Public universities educate over 70% of the students in this country. They educate 58% of the Ph.D.s and conduct more than 60% of the federally-funded research. On average, the very high public research universities charged $6,479 for required tuition and fees in 2006-07, while their private counterparts charged $33,551.[1] If this country is to use the human capital of all its citizens (not just those who can afford very high tuition) to be competitive in this flat world, affordable but fully competitive public universities must continue to play a major role.

[1] Peter McPherson and David Shulenburger, "Tuition,, Consumer Choice and College Affordability: Strategies for Addressing the Affordability Challenge – A NASULGC Discussion Paper," 2008, p. 14.

This paper considers the revenue and wealth gulfs that have developed between public and private research universities because the width and depth of the differences threaten the continued competitiveness of public research universities. In this paper we review the literature on this matter and bring it up to date with our own findings. After sorting out the consequences, we suggest remedies that we think ought to be considered. The scope of the paper will not include detailed international comparisons of research university competitiveness. However, the development of those comparisons is a major research project that should be undertaken.

Thomas Kane and Peter Orszag (now the Director of the Office of Management and Budget in President Obama's administration) have been primary scholars on higher education funding.[2] Their 2005 paper states:

> *. . . over the past twenty years, state government support for higher education has gradually waned, and the share of higher education expenditure subsidized by state appropriations has declined. One result of declining state support has been the widely publicized rise in tuition at public institutions. However, there is a second result, which is less well recognized, namely a widening gap in expenditures per student and in average faculty salaries between public and private institutions. The relative decline in spending per student at public universities appears to be exerting an adverse effect on the quality of faculty, students, and education delivered at such institutions.*

Our examination broadens Kane and Orszag's compelling studies to examine the total funding picture of public and private universities, not just the portion of the funding that derives from governmental sources. Much of the recent analyses focuses on state funding of public universities and variation in tuition and required fees. Such analyses are limited to the funding patterns of educational programs of universities as state appropriations plus tuition represent most of the funding base for those programs. This examination is broader as it focuses on the overall competitiveness of public research universities vis-à-vis private research universities.[3]

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[2] Thomas Kane and Peter Orszag, "Funding Restrictions at Public Universities: Effects and Policy Implications," Brookings Institution Working Papers, Brookings Institution, September, 2003; "Financing Public Higher Education: Short-Term and Long-Term Challenges," Ford Policy Forum, Brookings Institution, 2004, pp. 33 - 39, and with Emil Apostolov," Higher Education Appropriations and Public Universities: Role of Medicaid and the Business Cycle," Brookings-Wharton Papers on Urban Affairs, 2005, pp. 99 – 146.

[3] Our analysis is enabled by the meticulous work of Jane Wellman, et. al. (Jane Wellman, Donna Desrochers and Coleen Lenihan, "The Growing Imbalance: Recent Trends in U.S. Postsecondary Education Finance, " The Delta Cost Project, Washington, D.C. 20008). Prior to that Wellman work, changes in some IPEDS and revenue and expenditure data reporting definitions and categories made data comparability over the last twenty years impossible. The Delta Project ". . . adjusted for these changes as much as possible." Changes in reporting due to accounting convention switches from (FASB/GASB) leave data differences prior to 1987 for private institutions and after 2002 for public institutions that Wellman's group could not reconcile and, hence there is less than strict comparability of data across the changes. Following Wellman's convention, gaps in the data displays below alert the reader to the accounting standards change period.

The competitiveness arena is broader than educational programs as research universities engage in an array of activities that includes graduate programs, internally and externally funded research programs and service activities as well as undergraduate instruction. In a competitive market for resources, having relatively less purchasing power than competitors means reduced ability to compete. As the highly respected Center for Measuring University Performance puts it, "*Public and private institutions might once have competed primarily within their own sectors, but now public and private universities compete with each other in all markets."*[4]

Our analyses demonstrate that public universities have larger student to faculty ratios and pay lower salaries to faculty. They also have far smaller endowments per student. Other things being equal, one would expect public research universities to be limited to hiring faculty who are further back in the performance queue than the faculty hired by private research universities. Ultimately, one expects that performance of the public research university would decline relative to that of the private research university for as Lombardi, Capaldi and Abbey of The Center put it, *". . .our focus on the Top American Research Universities shows that the fundamental requirement for research university success is money."*[5]

Burrelli and Rapoport writing for the National Science Foundation in January 2009[6] provide a glimpse of how the United States has fallen behind the rest of the world in providing access to higher education. In the following table they illustrate that the United States has fallen to 14th in the world in the proportion of the 20 to 24 year old population receiving first university degrees. In 1990 the U.S. was second (only marginally behind Norway) and in 1975, the U.S. was first. Their data also demonstrate the stunning 30-year decline of United States from a close second in the relative share of 20 to 24 year olds receiving a first degree in the natural sciences or engineering, to near the bottom of 22 countries. By 2005, the proportion of the population in the top nation with science degrees was 2-3 times that of the U.S. Major public research universities are a prime producer of undergraduate science and engineering degrees. We cannot hope to regain our place in the world unless the public research university sector remains strong and grows both in overall size and in the proportion of science degrees awarded.

[4] John Lombardi, Betty Capaldi and Craig Abbey, "The Top Research Universities – 2008 Annual Report," Center for Measuring University Performance, Arizona State University, Tempe, p. 3
[5] *Ibid*, p. 5.
[6] Joan Burrelli and Alan Rapoport, *Reasons for International Changes in the Ratio of Natural Science and Engineering Degrees to the College-Age Population*, InfoBrief National Science Foundation, Directorate for Social, Behavioral and Economic Sciences NAF 09-308 (January 2009) p.3.

Table I: All first university degrees and first university degrees in NS&E per hundred 20–24 year-olds, and NS&E share of all first university degrees, by selected country/economy: 1975, 1990, 2005 (Sorted on 2005 All Degrees proportion for use in this paper.)

	1975			1990			2005		
Country/economy	All degrees	NS&E degrees	% NS&E	All degrees	NS&E degrees	% NS&E	All degrees	NS&E degrees	% NS&E
India	1.11	0.21	0.19	0.97	0.23	0.24	NA	NA	NA
Taiwan	1.51	0.53	0.35	2.26	0.81	0.36	11.30	4.19	0.37
Finland	2.26	0.63	0.28	3.57	1.35	0.38	10.93	3.52	0.32
Denmark	2.76	0.41	0.15	3.10	0.88	0.28	10.84	1.81	0.17
Netherlands	0.96	0.32	0.33	1.57	0.42	0.27	9.37	1.57	0.17
Italy	1.83	0.47	0.26	1.86	0.42	0.23	9.35	2.35	0.25
Norway	2.70	0.31	0.11	5.47	0.71	0.13	9.12	1.30	0.14
Sweden	2.38	0.47	0.20	2.57	0.66	0.26	8.74	2.40	0.27
United Kingdom	1.43	0.58	0.41	1.71	0.62	0.36	7.91	1.97	0.25
Ireland	1.55	0.41	0.26	3.54	1.26	0.36	7.77	1.42	0.18
Japan	3.42	0.93	0.27	4.55	1.21	0.27	7.31	1.77	0.24
South Korea	1.12	0.42	0.38	3.87	1.20	0.31	7.21	2.78	0.39
France	0.85	0.39	0.46	2.25	0.71	0.32	7.03	1.89	0.27
Portugal	1.68	NA	NA	1.50	0.40	0.27	6.92	1.90	0.27
United States	4.72	0.76	0.16	5.45	0.87	0.16	6.83	1.12	0.16
Spain	1.03	0.36	0.35	3.76	0.66	0.18	6.68	1.76	0.26
Switzerland	1.23	0.31	0.25	1.60	0.40	0.25	4.75	1.19	0.25
Greece	2.01	0.44	0.22	2.40	0.66	0.28	4.71	1.30	0.28
Germany	1.75	0.56	0.32	2.31	0.80	0.35	4.62	1.35	0.29
Austria	0.82	0.14	0.17	1.60	0.38	0.24	4.23	1.17	0.28
Belgium	2.14	0.22	0.10	3.43	0.86	0.25	3.90	1.03	0.26
Singapore	0.95	0.28	0.29	1.94	0.81	0.42	3.79	2.10	0.55
China	NA	NA	NA	0.21	0.11	0.52	1.45	0.71	0.49

NA = not available. NS&E = natural science and engineering (natural sciences in this table are agricultural; biological; computer; earth, atmospheric, and ocean; physical; and mathematical sciences).

Source: Joan Burrelli and Alan Rapoport, Reasons for International Changes in the Ratio of Natural Science and Engineering Degrees to the College-Age Population, SRS Publication InfoBrief, NSF 09-308 | January 2009, http://www.nsf.gov/statistics/infbrief/nsf09308/?govDel=USNSF_178#fn1

II. The Educational Importance of Public Research Universities to This Economy

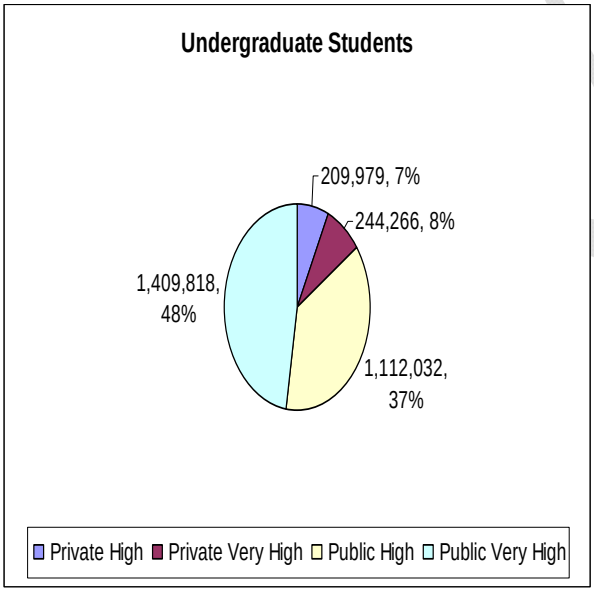
Research universities, public and private, enroll approximately 4.1 million students. This number represents one- fourth of all post-secondary enrollments and half of all undergraduate enrollments in bachelors' degree- granting institutions. The 198 public research universities make up less than 10% of the roughly 2,200 bachelors' degree-granting universities in this country but enroll over half the nation's students.

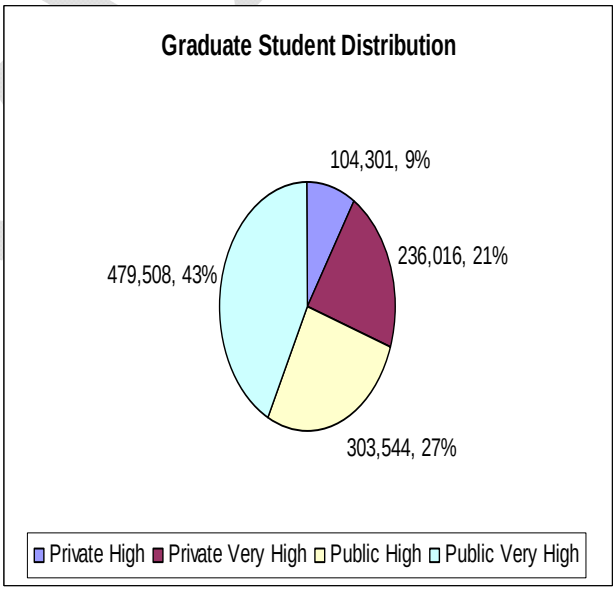
Table II: Carnegie Research Categories by Control and Enrollment

Carnegie Basic Classification	Number of Universities	Average Enrollment
Public, Very High Research	62	34,446
Public High Research	76	18,623
Private, Very High Research	33	14,554
Private, High Research	27	11,604

Source: IPEDS 2006 enrollments and Carnegie Foundation

As the figures below demonstrate, public research universities enroll many more students than private research universities. Public research universities have 85% of the total research university undergraduate enrollments and 70% of the graduate enrollments.





Undergraduate students enrolled in a research university have an experience that differs in many dimensions from students attending other types of institutions. The instructors teaching the courses are generally involved in research; the campus itself contains laboratories and research facilities; the library and computing resources are generous; and a very wide variety of majors and minors are available. Such an environment is ideal for educating the able and curious student as their options are so numerous and so diverse.

Because research by definition is at the cutting edge of knowledge, the environment provided by research universities places students in a milieu that immerses them in technology, intellectual arguments and global issues that those who attend educational institutions with less rich environments may not experience until well after graduation. While the research university environment may not be best for every undergraduate, in the flat world described by Thomas Friedman, it is critical that the research university environment educate a large proportion of this country's graduates. Student exposure to faculty, whose research keeps them aware of the world-wide breadth of knowledge, while being seated beside class mates from all over the world, is the ideal educational recipe for keeping this country competitive. While this recipe exists in both public and private research universities, the scale of the publics is required to match the magnitude needed to take on world-wide competition.

Public research universities are a critical source of students who continue to doctoral study. To further reinforce the importance of public research universities to the competitiveness of the United States, consider NSF's compilation of the top ten undergraduate schools attended by those receiving U.S. Ph.D.s in 2006 .

Table III: Top Ten Undergraduate University Sources of U.S. Doctoral Students

1. Tsinghua U. (China)	7. U. of Texas at Austin
2. Beijing U. (China)	8. Brigham Young U. (Utah)
3. U. of California at Berkeley	9. U. of California at Los Angeles
4. Seoul National U. (Korea)	10. U. of Florida
5. Cornell University (NY)	10. U. of Illinois at Urbana
6. U. of Michigan at Ann Arbor	

Three of the top four undergraduate educators of the 2006 doctoral recipients were international schools but seven of the remaining eight schools (two schools tied for tenth place) are public. (Cornell is included in this accounting as a public university as it is the public land-grant university in the State of New York but some of its constituent schools are private.) Attraction of top students from international schools to U.S. doctoral study is clearly a plus, but the increasingly typical outcome is for these students to return to their home countries and pursue research careers there.

The largest domestic source of science and engineering undergraduates who ultimately receive the doctorate is the public very high research university[7]. Should public research universities fail to maintain the strength of their undergraduate programs, the quality of doctoral programs would also be weakened. Strong doctoral programs are

[7] According to Joan Burrelli, Alan Rapoport, and Rolf Lehming, (*Baccalaureate Origins of S&E Doctorate Recipients* NSF 08-311 | July 2008 http://www.nsf.gov/statistics/infbrief/nsf08311/) The private very high research university produces 5.4 students per hundred graduates who receive a S&E doctorate within nine years of receipt of the undergraduate degree. Public very high research universities have a ratio of 2.2, private baccalaureate colleges have a ratio of 2.1 and public baccalaureate colleges have a ratio of .7. Because very high public research universities have seven times the number of students of their private counterparts, their sheer scale results in more of their students earning S&E doctorates than from any other Carnegie basic classification. The Oberlin group of 50 liberal arts colleges has the same 5.4 ratio of the Private very high universities but their collective small size diminishes their numerical impact.

essential to the strength of research programs at the universities where they pursue doctoral studies and to the universities that hire doctoral recipients into faculty positions. They are also indispensable for the competitive research and development efforts of industry and government labs. Neither public research nor private research universities can maintain their research strength unless they have reliable sources of well educated students to admit into their doctoral programs.

Public research universities are the major source of bachelors and doctoral recipients in areas of national need. Public research universities not only award a large proportion of degrees but the areas of study offered closely correspond with national needs of the country exceedingly well. Because many public research universities were born out of the Morrill Act, which specified that each state should contain ". . . at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts…" they are particularly apt at providing education that meets the societal demands. Tables IV and V provide detailed information on degree production at the bachelors and doctoral levels by both public and private research universities in "Areas of National Need"[8] by the U.S. Department of Education.

As demonstrated in Tables IV and V, public research universities produce over 92% of all the U.S. doctoral degrees in agriculture, nearly 90% of those in natural resources and conservation and 60% to 80% of the doctoral degrees in computer and information sciences, engineering, foreign languages and linguistics, math and statistics, physical sciences and security. Indeed, they generate over 50% of the doctorates produced in the U.S. in 11 of the 13 national needs categories. The U.S. would be sorely disadvantaged if the massive proportion and large number of quality doctorates supplied in national needs areas by public research universities were jeopardized.

At the baccalaureate level, public research universities account for 78% to 95% of the bachelor's degrees produced by all research universities in each area of national need, including over half of all the U.S. bachelor's degrees in agriculture, natural resources and conservation and engineering. The 9,612 engineering BS degrees they grant annually represent 61% of the nation's entire annual production. Given the strong science background of these universities, the 2,295 education degree recipients produced by public research universities are arguably in the best position to help correct the deficiencies in our science and math primary and secondary education systems. Public research universities also produce 45.5% of the nation's foreign language graduates and 81% of these graduates from all research universities. Clearly public research universities contribute at a scale that could not be replaced from other sources.

[8] See CFR establishing a graduate support program in these areas at http://edocket.access.gpo.gov/cfr_2008/julqtr/pdf/34cfr648.2.pdf

Table IV: Doctoral Degrees in Designated Areas of National Need in the U.S. Awarded by All Universities and by Private and Public Research Universities (2005-06)

	Agri-culture (01)	Natural Resources and Cons. (03)	CS and IS (11)	Education (13)	Engineering (14)	Foreign Language, etc. (16)	Biological and Biomedical (26)	Math and Statistics (27)	Physical Sciences (40)	Security and Protect. (43)	Soc. Work (44.07)	Nursing (51.16)	Health Professions, etc(51)
Total US Degrees-All Sources	721	473	1,392	7,237	7,428	1,082	5,823	1,294	4,501	72	317	518	7,030
Total-Research	711	442	1,287	4,940	7,221	1,075	4,966	1,275	4,405	46	279	376	3,590
Public VH Degrees	547	280	710	2,519	4,251	652	2,720	724	2,462	20	123	196.0	1,629
Public High Degrees	112	116	194	1,361	1,006	74	619	163	672	26	45	56	705
Total by Public Research	659	396	904	3,880	5,257	726	3,339	887	3,134	46	168	252	2,334
Private VH Degrees	52	40	322	475	1,671	342	1,475	349	1,130	0	87	99	1,050
Private High Degrees	0	6	61	585	293	7	152	39	141	0	24	25	206
Total Degrees by Private Research	52	46	383	1,060	1,964	349	1,627	388	1,271	0	111	124	1,256
% of All by Public Research	91.4%	83.7%	65%	53.6%	70.8%	67.1%	57.3%	68.5%	69.6%	63.9%	53.0%	48.6%	33.2%
% of Research by Public Research	92.7%	89.6%	70%	78.5%	72.8%	67.5%	67.2%	69.6%	71.1%	100.0%	60.2%	67.0%	65.0%

Source: Computed by DAS-T Online Version 5.0 on 2/25/2009 from IPEDS (2006)

Table V: Bachelor's Degrees in Designated Areas of National Need in the U.S. Awarded by All Universities and by Private and Public Research Universities (2005-06)

	Agri-culture (01)	Natural Resources and Cons. (03)	CS and IS (11)	Education (13)	Engineering (14)	Foreign Language, etc. (16)	Biological and Biomedical (26)	Math and Statistics (27)	Physical Sciences (40)	Security and Protect. (43)	Soc. Work (44.07)	Nursing (51.16)	Health Professions, etc(51)
Total US Degrees-All Sources	14,394	8,796	35,691	110,563	68,023	19,537	70,176	14,831	20,385	33,397	14,167	52,235	89,854
Total-Research	10,187	4,973	13,691	31,610	51,136	10,995	36,826	6,664	9,799	8,196	3,947	15,354	29,097
Public VH Degrees	7,452	3,032	6,415	12,062.	28,658.	6,177	22,440	3,871	5,106	2,826	1,361	5,792.0	11,975
Public High Degrees	2,258.	1,601	4,438	17,253	12,866	2,722	8,495	1,476	2,597	4,829	2,341	7,123.0	12,768
Total by Public Research	9,710	4,633	10,853	29,315	41,524	8,899	30,935	5,347	7,703	7,655	3,702	12,915	24,743
Private VH Degrees	408	250	1,443	538	6,195	1,484	3,750	1,021	1,561	2	29	1,140	1,972
Private High Degrees	69	90	1,395	1,757	3,417	612.	2,141	296	535	539	216.0	1,299	2,382
Total Degrees by Private Research	477	340	2,838	2,295	9,612	2,096	5,891	1,317	2,096	541	245	2,439	4,354
% of All by Public Research	67.5%	52.7%	30.4%	26.5%	61.0%	45.5%	44.1%	36.1%	37.8%	22.9%	26.1%	24.7%	27.5%
% of Research by Public Research	95.3%	93.2%	79.3%	92.7%	81.2%	80.9%	84.0%	80.2%	78.6%	93.4%	93.8%	84.1%	85.0%

Source: Computed by DAS-T Online Version 5.0 on 2/25/2009 from IPEDS (2006)

Public research universities are the primary route to a research university degree for minority students. Significantly more minority students attend public research universities as compared to private research universities. As the following table illustrates, over 800,000 minority students attend public research universities while just over 182,000 attend private ones. In every demographic and degree level category more minority students attend public than private; for some groups, such as Native American undergraduates, over 90% attend public research universities. Without first class public universities, this country with its growing diversity would be far less prepared for a future in which all citizens were equipped to contribute to its prosperity and to benefit from that prosperity.

Table VI: Enrollment of Minority Students in High and Very High Research Universities by Program Level

	Public Research Universities	Private Research Universities	% in Public
Hispanic First professional	6,898	6,531	51.4%
Hispanic Graduate	42,418	15,573	73.1%
Hispanic Undergraduate	210,474	33,903	86.1%
Native American First professional	1,076	441	70.9%
Native American Graduate	4,422	798	84.7%
Native American Undergraduate	22,128	2,286	90.6%
Asian or PI First professional	14,426	10,899	57.0%
Asian or PI Graduate	32,662	20,778	61.1%
Asian or PI Undergraduate	217,088	47,571	82.0%
Hispanic First professional	7,202	3,897	64.9%
Hispanic Graduate	34,256	10,497	76.5%
Hispanic Undergraduate	211,488	28,920	88.0%
All Minority Students All Levels	804,538	182,094	81.5%

Public research universities are a major higher education access point for low income students. The economic diversity of those receiving higher education is of critical importance to our economic future. Public research universities feel a special obligation because of their public funding to ensure that all can attend, without regard to family wealth. One measure of access for low income students is the number and proportion of Pell Grant recipients attending. In the absence of direct measures of family income, it is the best measure available to us but we note that since Pell eligibility

increases as tuition levels increase, the student who might not have been eligible for a Pell grant at a public university might be eligible for the grant at a much higher tuition private institution. (This is because one must exhibit financial need to qualify for Pell and the probability of doing so increases as tuition levels go up.) Thus the use of the Pell grant as a proxy for low income includes slightly higher income students within its eligibility definition at private universities with higher tuition than at lower tuition public universities.

The following table reports the number of Pell Grant recipients estimated to be attending research universities. Approximately 596,000 Pell Grant recipients attend public research universities while about 63,000 attend private research universities. Over 26% of the students at the average public research university are Pell Grant recipients compared with 15% of the students at the average private research university. Clearly, low income students differentially attend public research universities.

Table VII: Estimates of Pell Grant Recipients at Research Universities By Sector & Carnegie Classification (Fall 2005)

Sector	Carnegie Class	Data	Total
Private	Research High	Pell Recipients (Sum) As % of Undergrads (Mean)	34,621 19.3%
	Research Very High	Pell Recipients (Sum) As % of Undergrads (Mean)	28,214 12.5%
Private Pell Recipients (Sum)			62,835
Average Proportion of Pell Grant Recipients in Private Research University Undergraduate Class			15.4%
Public	Research High	Pell Recipients (Sum) As % of Undergrads (Mean) % of total Pell Recipients	288,587 29.3% 43.8%
	Research Very High	Pell Recipients (Sum) As % of Undergrads (Mean) % of total Pell Recipients	307,879 23.5% 46.7%
Public Pell Recipients (Sum)			596,466
Average Proportion of Pell Grant Recipients in Public Research University Undergraduate Class			26.6%
Total Pell Recipients at Research Universities			**659,300**

Source: IPEDS 2005; EdTrust College Results (www.collegeresults.org)

In summary, public research universities are major contributors to undergraduate, and graduate education in the United States. They are the major source of

undergraduates who ultimately populate the nation's doctoral programs and they produce a disproportionate number of bachelors and doctoral graduates in the identified areas of national need. Finally, both minority and low income students attend public research universities in far greater numbers than they attend private research universities. Keeping public research universities strong is clearly critical to the overall competitive health of the nation and to the welfare of its people.

III. The Analysis

The analysis is based on universities classified by the Carnegie Foundation in 2005 as Very High Research or High Research. We included in the sample only those universities for which data was reported for all years from 1987 to 2006, thus the findings are not affected by the intermittent inclusion or exclusion of a university. The sample includes 60 very high public research universities, 33 very high private research universities, 66 public high research universities and 26 private high research universities. When reporting data from other sources we note any differences in the use of Carnegie classifications. As not all studies cited use the Carnegie 2005 classifications some caution should be exercised in generalizing the findings across different classification schemes.[9]

The data are expressed in constant dollars using the CPI-U and a 2006 base, unless noted otherwise. Because we are comparing universities with similar mixtures of activities one to another, the relative expenditure patterns of the two groups would not differ if we were to use HEPI or HECA. Thus, we use CPI-U for the sake of consistency. When reporting expenditures or revenue for the universities in a Carnegie classification we use the median, not the mean. We do so because some universities have category revenues or expenditures so relatively large that the mean value of the group is distorted by the inclusion of that institution and is not typical of the universities in the category. Medians are not distorted by outliers.

IIIA: Revenue Patterns

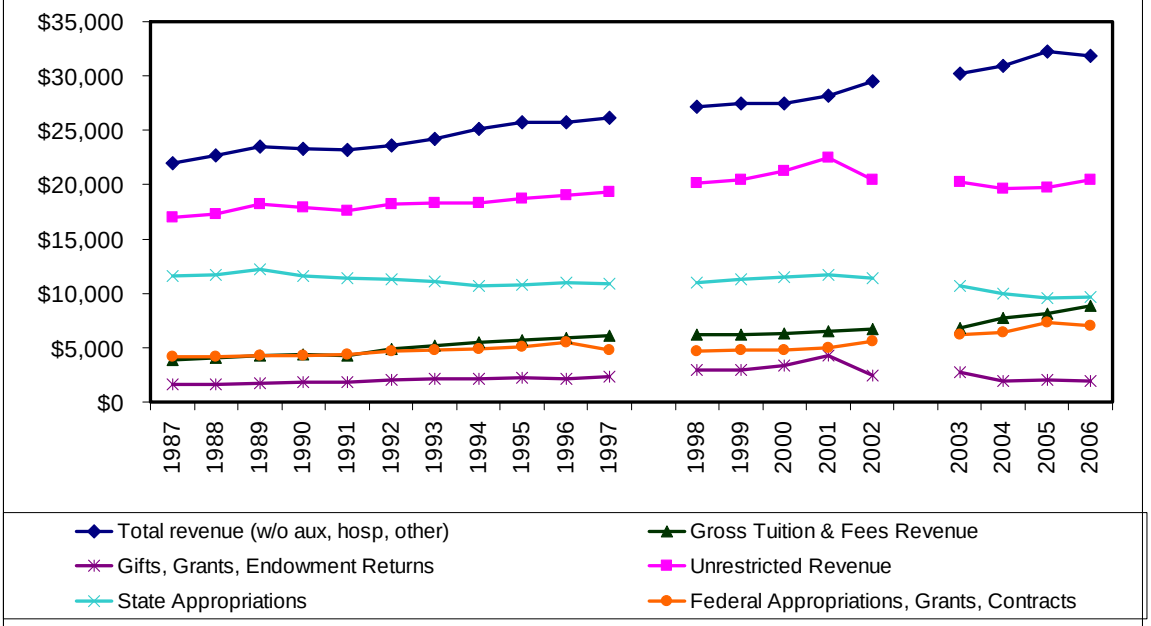
The revenue patterns public and private very high research universities are seen in Figures I and II. (The appendix to this paper contains the graphs for high research universities.) The breaks in the time axis denote the period when FASB/GASB accounting conventions changed producing distortions in the revenue and cost reported for private universities. The reader might wish to block out the 1997-2002 period when

[9] In this regard readers familiar with our earlier work, (Peter McPherson and David Shulenburger, "Tuition,, Consumer Choice and College Affordability: Strategies for Addressing the Affordability Challenge – A NASULGC Discussion Paper," 2008 https://www.nasulgc.org/NetCommunity/Document.Doc?id=1296) should remember that it used data for all public higher education, including both two and four year schools. Thus the findings on revenues and cost differ considerably from those reported here for only the research-focused segment of four year universities.

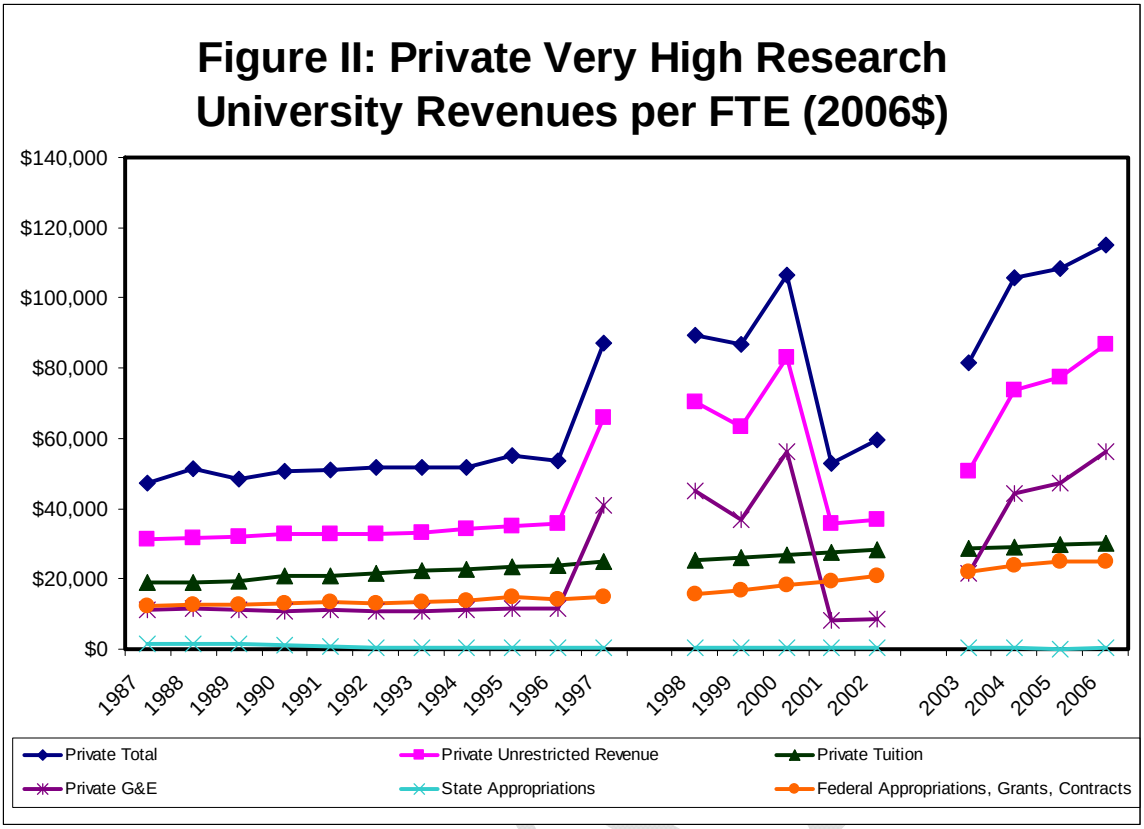
assessing trends in the data, but must remain aware that precisely comparable data over time simply does not exist because of the accounting changes.

Of special note are the differences in the scales of the publics and privates graphs. The largest data element, total revenue per student, tops out at $31,873 in 2006 for public universities and at $115,175 in 2006 for private universities – a figure 360% higher. (Note from the Appendix that the public/private scales differences, while noteworthy, are not as great in the high research classification where total revenue per student for publics tops out at $21,053, and for privates at $39,337.) One variable requires definition: *Total Unrestricted Revenue* is the sum of tuition, appropriations, and private gifts, investment returns and endowment returns[10] Institutions generally have the most discretion in spending this category of funding, however restrictions are not uncommon. The gift and returns categories are frequently tied by donor and/or bond covenant restrictions; tuition and appropriations are restricted by law for some public universities.

Figure I: Public Very High Research Revenues per FTE (2006$)

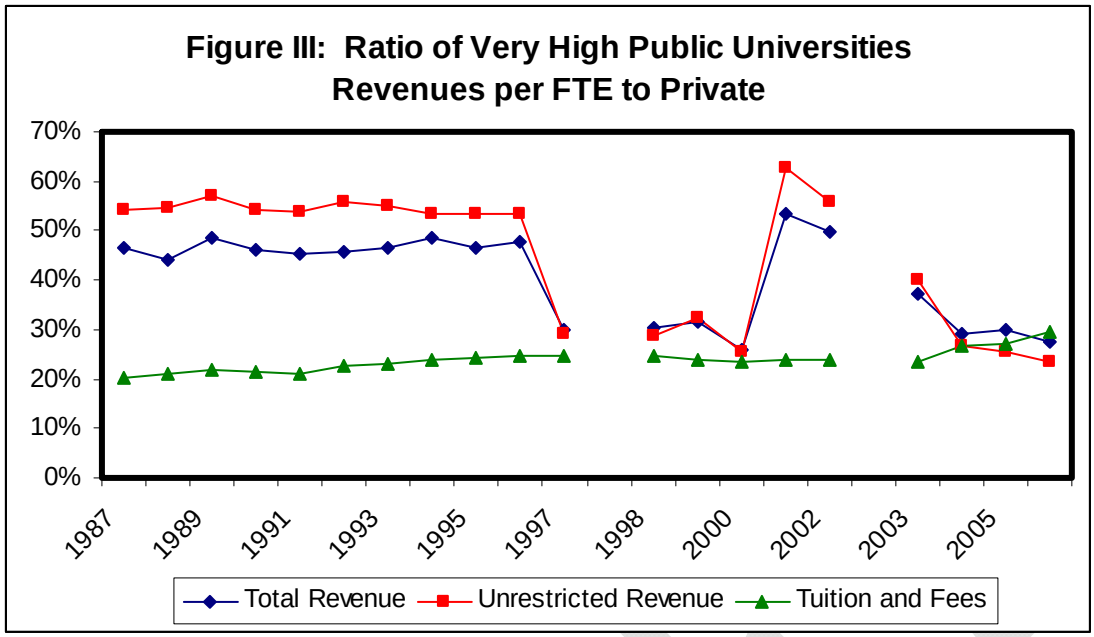


[10] Wellman, *op.cit.*, page 50.



Major differences between public and private university funding can be seen in "gift income, investment and endowment returns," where private universities' per student totals ($56,275 in 2006) massively exceed those of the publics ($1,943 in 2006). While the state appropriation series is present in both the public and private university graphs, it is of such a relatively small amount for private universities ($470 per student in 2005) that it is largely indistinguishable from the base line.

Figure III examines the ratio of three key public university-to-private revenue ratios – total revenue per FTE, unrestricted revenue per FTE, and tuition/fees per FTE. The overall picture is of declining relative revenues per student, with a sharper decline in the unrestricted revenue category, the revenue source with fewer restrictions on it. The total revenues ratio declines from about 46% in 1987 to around 28% in 2006. The unrestricted revenue series declines from 54% to 24% during the period. The only ratio that increases is tuition, a subcomponent of the other two categories, which rises from 20% to 29%. Note that all three revenue series converge in the 24% to 29% range by 2006.



Because universities spend dollars and not ratios, we subtracted private university receipts from public university receipts for the three categories. This yields in Figure IV the revenue deficit by category of public universities. The per FTE student total revenue deficit began at $25,431 in 1987 and grew to $83,303 by 2006. The unrestricted revenue deficit began smaller, at $14,446 in 1987 but grew to $66,428 by 2006. The tuition revenue deficit grew from $15,192 to $21,273 over the period despite a narrowing of the ratio between public and private tuition.

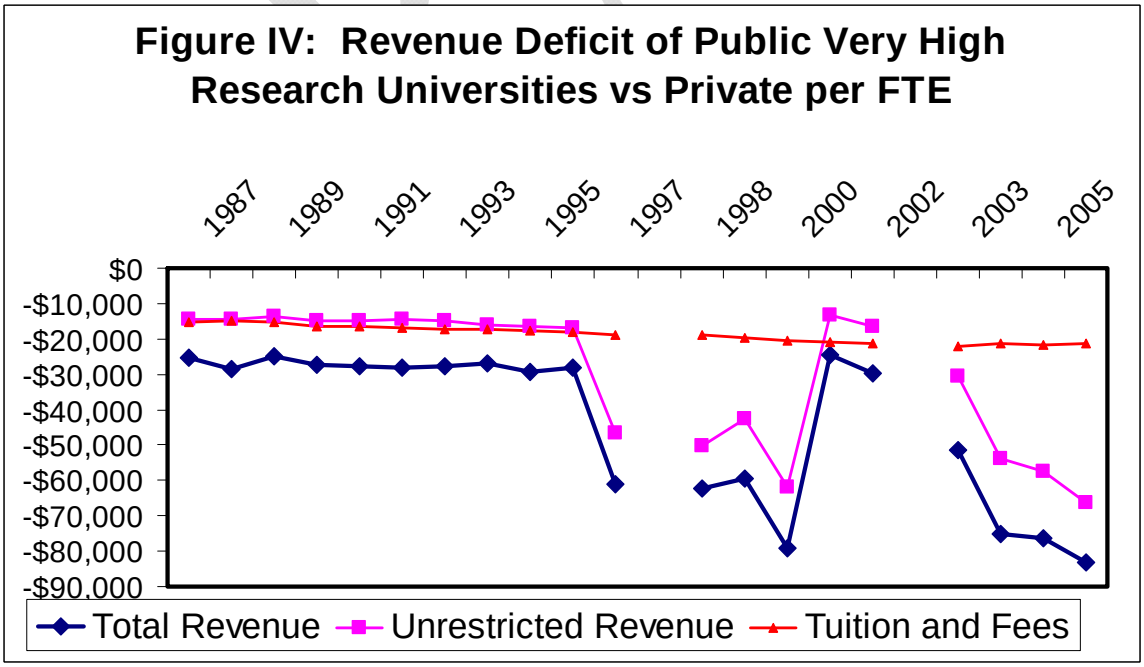
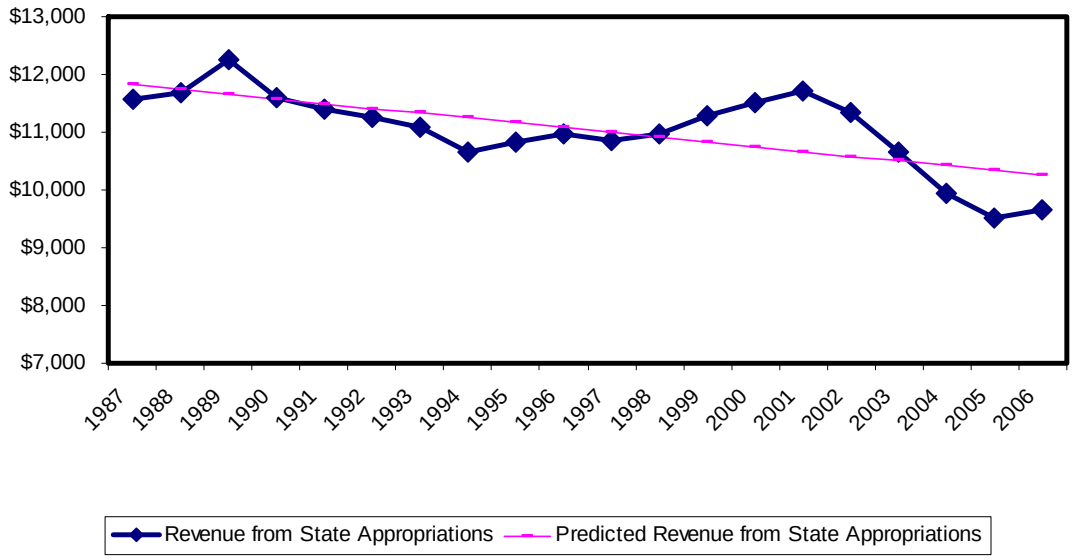


Figure IV's Total Revenue line includes all sources of university revenue. Included within the aggregate figure are state appropriations, the one source of revenue available in significant amounts to public universities but not to private universities. Figure V graphs the pattern of those state appropriations over time. Also included in the chart is a predicted state appropriations line, based on a linear regression of state appropriations with a time trend variable.

Similar to the downward trend reported for all public higher education in our earlier paper,[11] real, per student state appropriations for very high public universities decrease over time. Appropriations per student begin at $11,579 and fall to $9,646 in 2006, a drop of $1,640 in real terms per student. There is a cyclical pattern in state appropriations but the trend over time is clearly downward. Appropriations reached a cyclical peak of $11,286 in 2001 but have been lower in each subsequent year. Given the very significant cuts being made to public higher education in the 2009-10 academic year and we do not see an end to the steep decline in real appropriations that characterizes the whole of the period.

Figure V: Actual and Predicted State Appropriations Revenue per FTE (2006$)



University managers operate from semester to semester and year to year. What variation in revenue per student could they expect from year to year during the period we examine? To answer that question we regressed three revenue variables on a time trend variable (Time = 1 to 20). The statistical fits are surprisingly high given the noise from the accounting convention changes so the time trend coefficients can be interpreted as providing reasonable expectations for annual variation in revenue. For comparison, we include the coefficient on the state appropriations' trend variable.

[11] McPherson and Shulenburger, *op. cit.*, p. 38.

Table VIII: Linear Annual Increase per FTE in Revenue for Very High Research Universities, 1987-2006 ($2006)*

	Public Research Universities	Private Research Universities
Total Revenue	$536	$3,388
Total Unrestricted Revenue	$192	$2,672
Tuition and Required Fees	$231	$ 635
State Appropriations	-$87	

* The amount of the annual increase is the estimated coefficient on the time trend variable in a linear regression equation.

The results from the regression in Table VIII show that on average a university manager at a public university could expect an additional $536 per FTE each year, while a manager at a private university could expect over six times that amount - $3,388. What is particularly striking is the difference between the additional $192 per FTE in unrestricted revenue the public university manager could expect each year and the $2,672 the private university manager could expect. This is a significant difference as it continued annually over the full 20 years. For public universities, tuition increases produced $231 more per FTE per year while the private university received $635 more per year per student. During this period public university real net tuition and fee revenue per student increased at a compounded annual rate of 4.2% (from $3,824 to $8,859) while private university real net tuition revenue increased at a lower 2.1% rate (from $19,016 to $30,133). However, when the base tuition and fee amounts differ by such a great amount one easily can be misled by annual percentage rates of increase. In this case, the lower rate of increase by the privates annually produced 2.75 times as much real additional tuition revenue per student than was available at the public university.

To more comprehensively illustrate the differences in revenue between public and private universities, we depart here from our practice of placing the findings concerning high research universities in the Appendix. Table VIIIA displays the time trend data for the high research universities.

Table VIIIA : Linear Annual Increase per FTE in Revenue for High Research Universities, 1987-2006 ($2006)*

	Public Research Universities	Private Research Universities
Total Revenue	$386	$878
Total Unrestricted Revenue	$199	$898
Tuition and Required Fees	$193	$584
State Appropriations	-$35	

* The amount of the annual increase is the estimated coefficient on the time trend variable in a linear regression equation.

As with the very high research universities, the equation fits are sufficiently strong to suggest that the coefficients represent a reasonable estimate of the next year's revenue for each category. Similar to the patterns for public and private very high research universities, at the high private research universities the expected revenues per FTE are multiples of their public counterparts – e.g., a private high university manager could expect more than 3 times the revenue per FTE student than a public high university manager. In addition, the expected revenues per FTE are on the same scale for public research universities in both very high and high categories. However, the expected revenue patterns are vastly different between the very high and high private universities. The very high privates could expect 3.4 times the additional total revenue per student than could their high private counterparts and 2.9 times the additional unrestricted revenue. The differences between the private groups were much smaller for the expected tuition per FTE category – additional tuition for the very high privates was only 1.08 times that of the high privates, showing a parallel approach to tuition across private research universities.

Table IX summarizes the revenue levels and differences in 2006 in four major per student revenue categories for very high research universities and Table X summarizes those figures for high research universities. Revenues for very high publics in the total, tuition and unrestricted revenue categories range from 24% to 28% of private counterparts, while their gift, endowment and investment revenue is only 3% of the privates. High publics have tuition revenues that are 30% of the privates and total and unrestricted that are 53% and 46%, respectively. Endowment revenue is only 11% that of the privates.

Table IX: 2006 Per Student Revenue Levels and Differences for Very High Research Universities

	Total Revenue	Tuition Revenue	Gift, Endowment & Investment Revenue	Unrestricted Revenue
Public	$31,873	$8,860	$1,943	$20,450
Private	$115,175	$30,133	$56,275	$86,877
Public minus Private	-$83,302	-$21,273	-$54,332	-$66,427
Public as a Percent of Private	28%	29%	3%	24%

Table X: 2006 Per Student Revenue Levels and Differences for High Research Universities

	Total Revenue	Tuition Revenue	Gift, Endowment & Investment Revenue	Unrestricted Revenue
Public	$21,045	$ 7,236	$ 966	$15,093
Private	$39,377	$24,047	$8,691	$32,852
Public minus Private	-$18,332	-$16,811	-$7,725	-$17,759
Public as a Percent of Private	53%	30%	11%	46%

In summary, additional revenue per student was multiple times higher in every category for private universities when compared to public universities. In addition, the private very high research universities had significantly more additional revenues than did their high research counterparts in every category except tuition. The pattern reveals a rapidly widening revenue gap between public and private research universities with very high private research universities further distancing themselves from the entire field.

IIIB: Expenditure Patterns

Figures VI and VII illustrate the variations in expenditures per FTE over time, by category, for public and private universities. The overall patterns are similar those of the revenue graphs, but because revenue sources are not associated with expenditure categories in IPEDS reporting, there are differences. Again the scale differences of the expenditures at private very high research university versus expenditures at public very high research universities are significant. Public university education and general (E&G) expenditure per FTE begins at $22,762 in 1987 and rises to $29,885 in 2006. Private university E&G begins at $51,062 in 1987and ends at $93,257 in 2006. Relevant to the educational program is the full educational expenditure figure that increases of the period from $12,939 to $15,167 for public universities and from $25,660 to $52,912 for private universities. Significantly, at private universities every category of expenditures except public service begins at a higher level and rises more than at public universities during this period.

Figure VI: Public Very High Research University Expenditure per FTE (2006$)

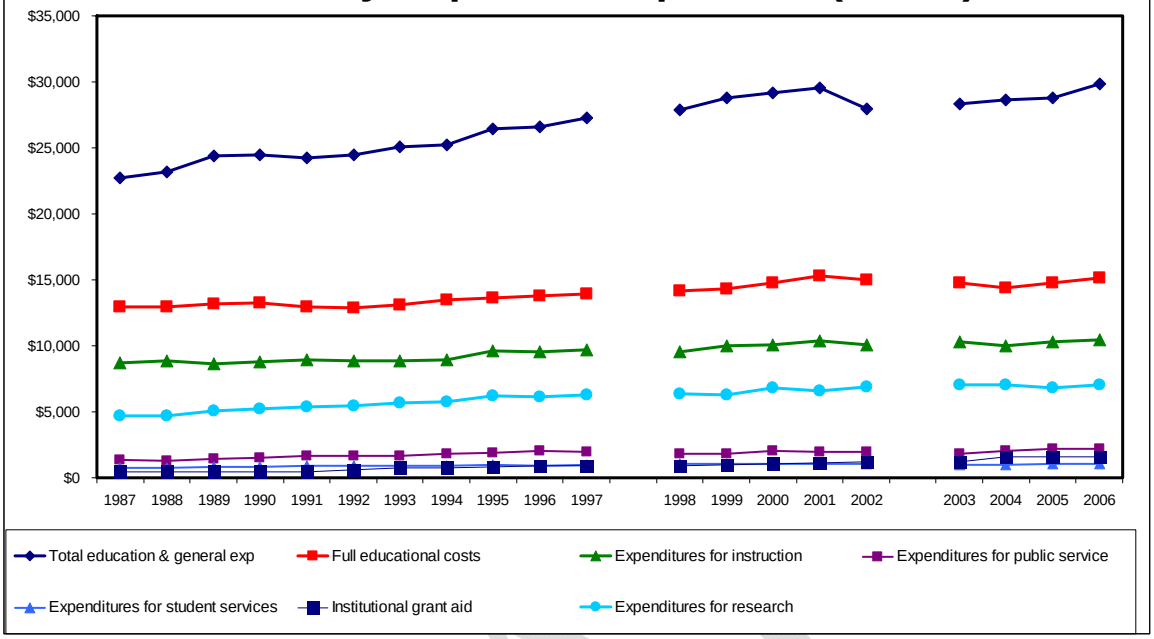
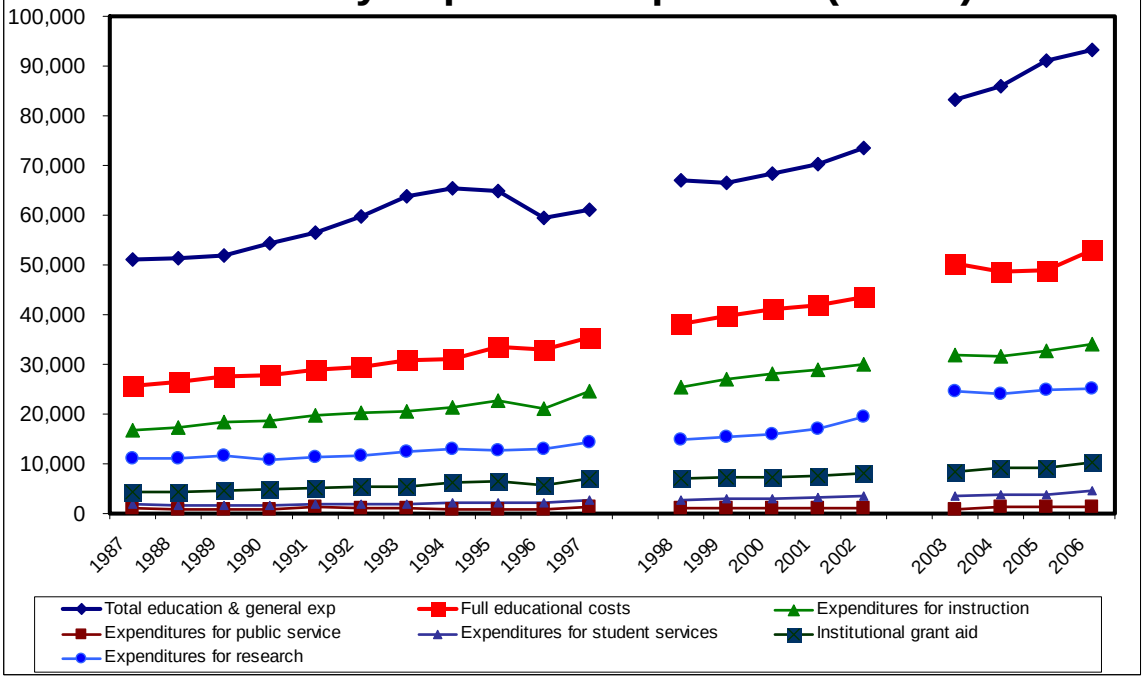
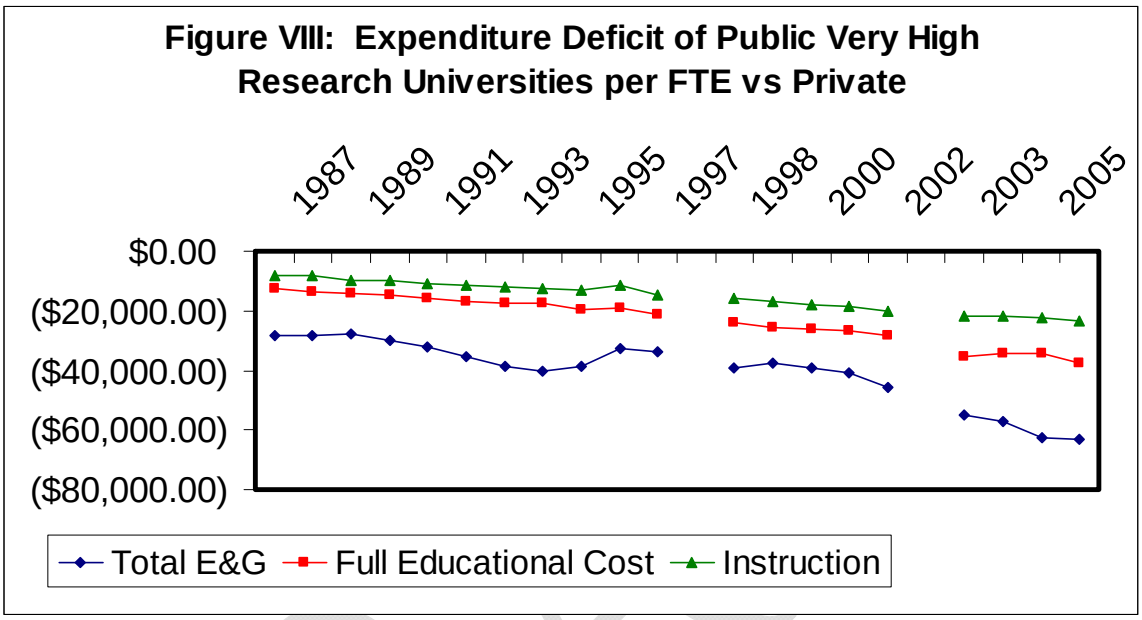


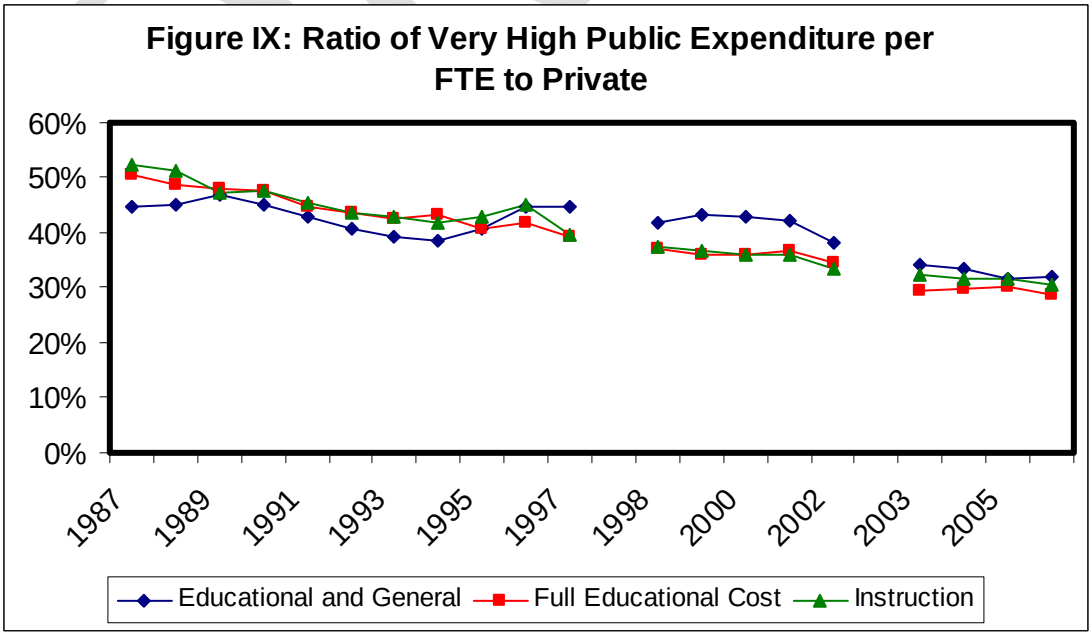
Figure VII: Private Very High Research University Expenditure per FTE (2006$)



Because the scales of the two graphs are so different, we examine the dollar amount of the expenditure deficit by subtracting private university expenditure from that of public university expenditures in Figure VIII. For the major category Full Educational expenditure, the expenditure deficit per FTE begins at $12,721 in 1987 and ends at $37,744 in 2006. The instruction deficit begins the period at $8,003 and rises to $23,610.



The patterns of expenditure ratios (public expenditures divided by private expenditures) are shown in Figure IX. The total E&G expenditure ratio for the public universities drops from 45% to 32% per FTE from 1987 to 2006. The drop for the full educational cost ratio is from 50% to 29% and the drop for the instruction cost ratio is from 52% to 31%.



The patterns of the expenditure variables over time are generally linear. The fit of the simple linear regression is good (with each expenditure category serving as the dependent variable and the time trend [T= 1- 20] as the sole independent variable). Thus the coefficients on the time variable shown in Table XI are reasonable estimates of the average increase in the per FTE expenditure each year at a public university and at a private university.

Table XI: Linear Annual Increase per FTE in Expenditures for Very High Research Universities, 1987-2006 ($2006)*

	Public Research Universities	Private Research Universities
Total Education and General Expenditure	$355	$2,082
Full Educational Expenditure	$134	$1,481
Instruction	$105	$ 958
Student Services	$ 15	$ 151
Institutional Grants to Students	$ 66	$ 298

*The amount of the annual increase is the estimated coefficient on the time trend variable in a linear regression equation

The results in Table XI show that on average a public university spent an additional $355 per FTE each year in total E&G, while a private university spent $2082. The private E&G expenditure is 5.7 times the additional annual expenditure at a public university and that amount was sustained over two decades. Of particular note is the private university increase for instruction of $958 per FTE while the public increased only $105, a ratio of increase of 9.1 to 1. A second component of full educational expenditure, student services, increased in the private universities at 10 times the rate in the publics. Clearly, the added resources expended to finance the full student experience, both inside and outside the classroom, by private universities grew far more rapidly on a sustained basis than did the resources that funded the educational experience in public universities. This difference is consistent with the observed differences in the additional per FTE revenue available to the private universities.

One might conclude from examination of this data either that public research universities have achieved greater economies in instruction than have private research universities or that privates have improved their instructional offerings more than have publics because they have spent much more to produce the product. We are unable to determine which of these conclusions is correct because no consistent data on learning outcomes exists to show whether students at private universities learn more than students at public universities. Nor is there data that demonstrates the rate of change in learning is

related to either the amount of resources or the rate of change in resources used in the educational process. Similarly, research on earnings after graduation does not substantiate a difference in earnings between public and private university graduates when one holds constant the economic, educational and social capital of the entering students.[12] All one can conclude legitimately is that private research universities spend more to educate each student and that the rate of increase in full educational expenditure in both absolute dollars and percentages is greater at private universities than at public universities.

As with the revenues analysis, we depart from our practice of putting all information on high research universities in the Appendix. Table XIA reports the time trend regression coefficients for high research universities. As with the very high research universities the equation fits are sufficient to use these coefficients as expectations of expenditure by category.

Table XIA: Linear Annual Increase per FTE in Expenditures of High Research Universities, 1987-2006 ($2006)

	Public Research Universities	Private Research Universities
Total Education and General Expenditure	$265	$399
Full Educational Expenditure	$ 99	$512
Instruction	$ 51	$249
Student Services	$ 18	$ 83
Institutional Grants to Students	$ 48	$273

In every case the average expenditures per FTE for high private universities are larger than those for the publics, as was the case when comparing the very high research universities. The ratios between private and public expenditures are lower for each category than in the case of the very high research universities. The smaller ratios are due to the fact that the average expenditures per FTE for the public high universities are only slightly smaller than those for the public very high universities; however, the average expenditures per FTE for the private high universities are dramatically smaller than for the private very high universities. For example, the additional annual E&G expenditure for private very high is 5.2 times that of the private high and the additional instructional expenditure at the private very high is 3.8 times the additional instructional expenditure at the private high.

Tables XII summarizes expenditure levels and differences for very high research universities in four key expenditure categories. In each category, the public universities have between 24% and 32% as much per student to spend as private universities. Table XIII summarizes this 2006 data for high research universities. Public highs have from 40% to 64% per student as much to spend as their private counterparts.

[12] See our discussion of these points in McPherson and Shulenburger, *ibid*., pp. 63-65.

Table XII: Per Student 2006 Expenditure of Very High Research Universities

	Total E & G	Full Educational Cost	Instruction	Student Services
Public	$29,885	$15,167	$10,417	$1,093
Private	$93,257	$52,911	$34,027	$4,628
Public minus private	-$63,972	-$37,774	-$23,610	-$3,535
Public as a Percent of Private	32%	29%	31%	24%

Table XIII: Per Student 2006 Expenditures of High Research Universities

	Total E & G	Full Educational Cost	Instruction	Student Services
Public	$18.597	$11,556	$ 6,901	$1,019
Private	$28,977	$24,313	$12,230	$2,537
Public minus Private	-$10,380	-$12,757	-$5,329	-$1,518
Public as a Percent of Private	64%	48%	56%	40%

Thus the conclusions drawn here are similar to those drawn in the very high/high revenue comparison. The public highs and very highs have additional expenditures in each category that are fractions of the additional expenditures of their private counterparts. In addition, the private very high research universities have dramatically moved ahead of their private high counterparts.

IIIC: Other Input Differences

The IPEDS data that serves as the basis for our analyses include operating costs only; capital costs are not included. While occasionally studies show differences in physical plants of private and public research universities, no consistent institution level data source is available to track differences in the physical facilities available to public and private universities over time. Thus any potentially important physical capital differences between public and private universities cannot be accounted for here.

The preceding analyses examined flows of revenues and expenditures over time. They did not examine the sustainability of those flows into the future. There simply is not a good method of measuring sustainability. Currently in 2009, many public universities are experiencing substantial reductions in budgets that are related to the revenue reversals their states are experiencing. These state budget reversals may be corrected in time as cyclical variability has been a common historical pattern of state and public university revenues. On the other hand, since state appropriations per student are now below their year 2001 level, one legitimately may wonder whether the long term trend of per student appropriations to public research universities has turned down.

Both public and private universities suffered real and substantial declines in endowments during 2008. Private universities depend more on endowment earnings than do publics, so the decline affects total revenues more for them. The differences in the levels of endowment per student are vast, particularly in the very high research Carnegie category, as Table XIV illustrates.

Table XIV: Endowment Per Student in Very High Research Universities in 2006

	Mean	25th Percentile	75th Percentile
Public Very High Research Universities	$183,374	$ 4,443	$ 20,014
Private Very High Research Universities	$391,902	$102,229	$407,260

Source: IPEDS

Table XV: Endowment Per Student in High and Very High Research Universities in 2006, Combined

	Mean	25th Percentile	75th Percentile
Public High & Very High Research Universities	$ 12,744	$ 3,462	$ 15,486
Private High & Very High Research Universities	$237,206	$39,058	$198,186

Source: IPEDS

Because a few private universities have immense endowments, the mean endowment per student is a relatively meaningless statistic. For that reason we supply both the 25th percentile and 75th percentile figures. Assuming a 5% annual endowment payout, at the 75th percentile level, a public university has roughly $1,000 in endowment revenue per year per student, while their private counterpart has $20,300 per student per year. It should be noted that the differences in endowment revenues are reflected in the revenue per student figures discussed earlier and should not be "counted" twice. However, in addition to the increased revenue, a large endowment provides a university with greater ability to sustain expenditures than does a small endowment, as a university with a larger endowment has more discretion to make the decision to expend principle. Similarly, the university with the larger endowment has greater flexibility to finance physical plant additions or to hire talented faculty than one with a smaller endowment. Thus, apart from annual revenue production, endowment size does matter and a large endowment may convey significant advantage to a university over time. As an illustration of the importance of endowment size, the Center for Measuring University Performance includes endowment assets in its compilation of attributes of "research" universities.[13]

[13] John Lombardi, Betty Capaldi and Craig Abbey, " The Top Research Universities – 2008 Annual Report", Center for Measuring University Performance, Arizona State University, Tempe, pp. 46 to 53.

A 2006 study of endowments by the National Association of Business Officers found that public universities collectively held $95 billion in their endowments while private universities held $245 billion endowments. Thus 72% of university endowment holdings are in the private sector and 28% are in the public sector.[14] This in sharp contrast to the distribution of students across institution types – each year on average 4 million students (80%) attend public research universities and 1 million students (20%) attend private research universities

A 2008 study by Cheslock and Gianneschi includes a finding that complicates interpretation of endowment funds as revenue source. Their statistical study using cross-sectional, pooled data from 1994 to 2004 demonstrates ". . . a slight positive relationship between state funding and private donations." [15] While the effect is "slight," a $19 reduction in private giving for each $1,000 reduction in state funding,[16] the relationship is troubling. The finding suggests either that reductions in state funding signal to donors that their money will have less utility if given to a public university or else that the same factors which cause states to reduce university support (generally an unhealthy economy) also cause private donors to reduce contributions. While an earlier research finding is at odds with the Cheslock/Gianneschi conclusion,[17] the possibility exists that fiscal restraint by the state undermines private support and exacerbates the disadvantage suffered by public institutions.

IV. Evidence of a Growing Competitive Disadvantage

IVA: Staffing and Faculty Workload

In addition to monetary differentials, other disparities have developed between public and private research universities over the decade. Some of them necessarily follow the widening revenue and expenditure differences and others, arguably, are related to them. Almost certainly following from these resource differentials are staffing differentials.[18] Table XVI shows the ratio of all students to full-time faculty for selected years since 1989. Both public and private research universities have been able to reduce their ratio of students to full time faculty over the period but the private universities have had relatively greater reductions. This can be seen in the bottom row of the table as the

[14] University endowment values fell sharply during the last half of 2008. We know of no study that establishes differential declines of public university endowments relative to private or vice versa. In the absence of such evidence we assume that the decline in both was of roughly equal proportion; given this assumption, the ratio of private to public endowments is unchanged.
[15] John J. Cheslock and Matt Gianneschi, "Replacing State Appropriations with Alternative Revenue Sources: The Case of Voluntary Support," The Journal of Higher Education, 79, #2, March/April 2008, p. 27.
[16] *Ibid*., pp. 214.
[17] See R.S. Steinberg, "Voluntary Donations and Public Expenditures in a Federal System," American Economic Review, Vol. 77, #1, 1987, pp. 24-36.
[18] *op cit.*, Kane and Orszag, 2003, pp. 6,7.

staffing disadvantage of the publics has grown from 1.28 times that of the privates to 1.47 over these years. Again, we do not know the impact this trend has had on educational outcomes but it clearly has resulted in greater reduction of teaching responsibilities for the full-time faculty at private universities.

Table XVI: Ratio of All Students to Full-Time Faculty*

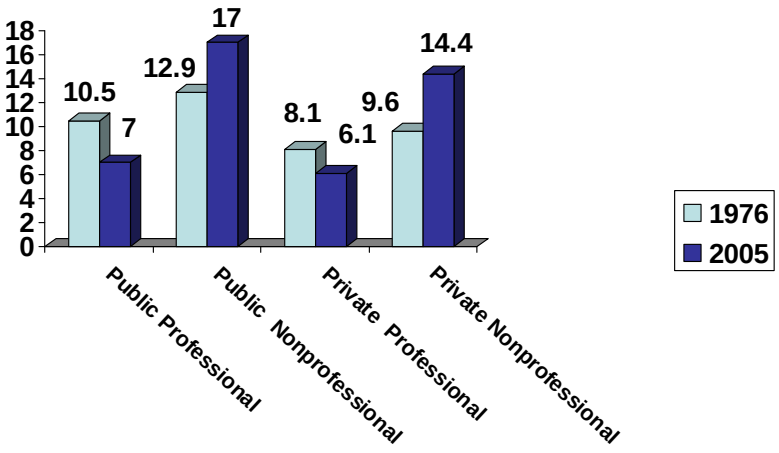
	1989**	1997	2006
Public High and Very High	21.64	20.01	19.32
Private High and Very High	16.82	14.89	13.12
Ratio of Public to Private	1.28	1.35	1.47

* Computed from IPEDS **For 1989, the ratio is of full time faculty in 1989 to all students in 1990 due to unavailability of same-year data in IPEDS.

The data in Figure XVI extends the pattern found in student/faculty ratios to professional and non-professional staff and over a longer time period (1976 to 2005). (Note that "professional staff" includes faculty as well as the broader array of professionals required to make a modern university function. Also, this older trend data can only be subdivided into public and private universities as opposed to public and private research universities)

Over the 30 year period, both public and private universities show fewer students per professional staff member and more students per nonprofessional staff member. In private universities the numbers of students per professional staff in 2005 decreased to 66% of its 1975 level, while in public universities staffing dropped only to 77% of the prior level. This pattern is the same as that of the ratio of all students to full-time faculty in the previous section – the work load of professional staff as measured against FTE student declines more in private than in public universities.

Figure X: Per FTE Student Staffing Levels of Public and Private Degree Granting Institutions*

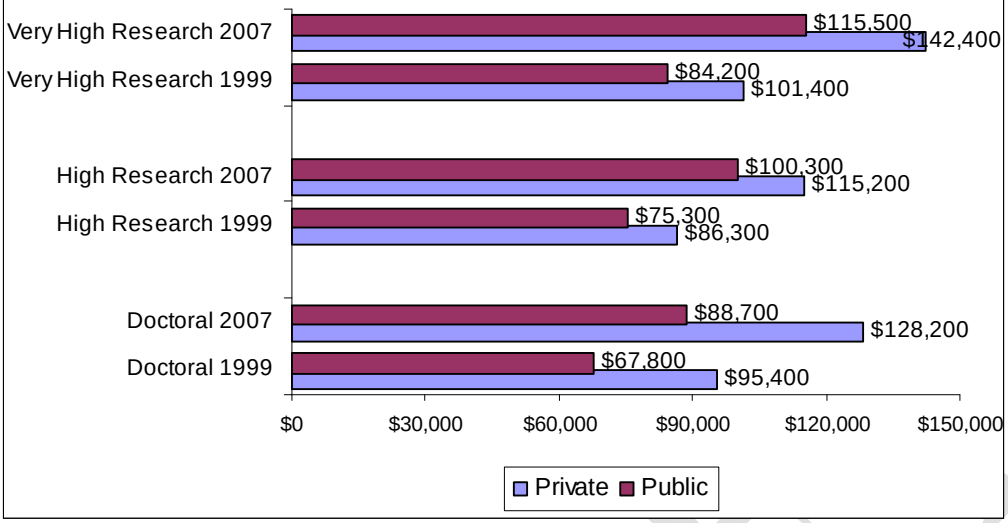


*Digest of Education Statistics- 2007, U.S. Department of Education, p, 266

IVB: Faculty Salaries

Not only have faculty teaching loads increased more at public research universities, faculty salaries have become relatively less. To more fully illustrate this point, Figure XI shows the salary levels for full professors at public and private research universities in the Carnegie categories we have used throughout the paper – very high research and high research – as well as for the doctoral category. Across all categories of public and private research universities, the salary levels have increased, but faculty salaries have grown more, in some cases significantly more, at private research universities.

Figure XI: Salary by Carnegie Classification for Professors 1999 and 2007[16]



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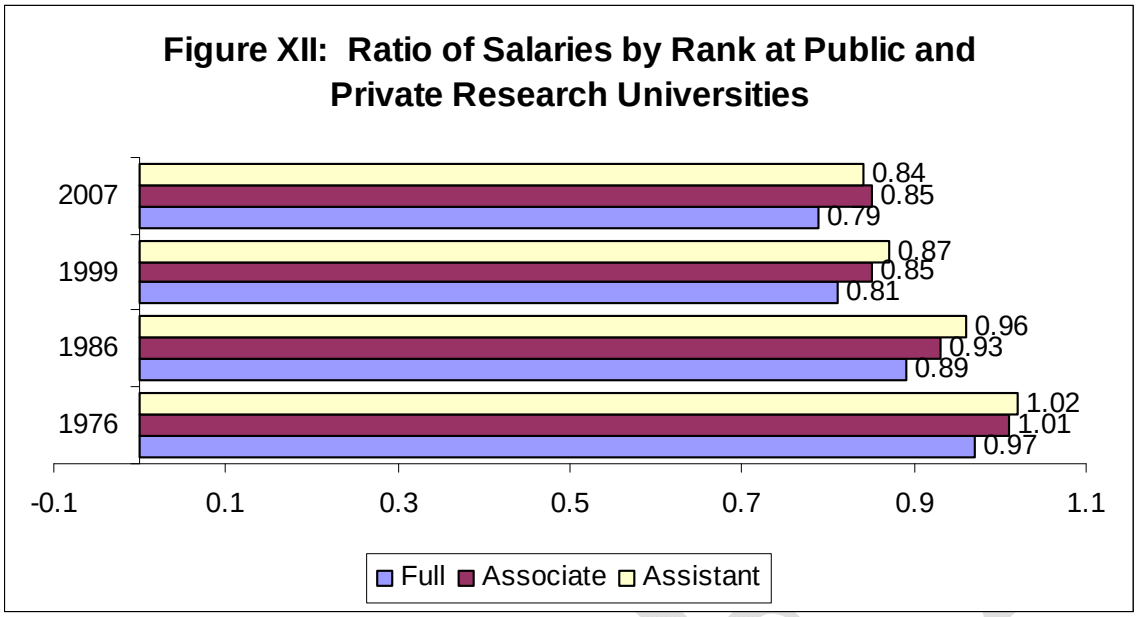
The growing relative disadvantage of public research university faculty salaries can be more easily seen in Figure XII where the ratios of public to private salaries are shown by rank for the years 1976, 1986, 1999 and 2007.[20] [21] In 1976, salaries for each of the three ranks were roughly the same between public and private universities. By 2007, the salaries for full professors at public universities dropped to 79% of that at private universities. Salaries for associate and assistant professors dropped to 85% and 84% respectively. Over the 30 year period, salaries at public research universities have become less and less competitive and are now 15 to 20% lower than salaries at private universities

[19] From AAUP Annual Salary Surveys

[20] The 1976 and 1986 data are taken from Kane and Orszag (*op. cit.*) pp. 6,7 and 26.

[21] 1999 and 2007 data from AAUP Annual Salary Surveys and 1976 and 1986 data from Kane and Orszag, *Funding Restrictions op. cit.* pp. 26. The data from the earlier pair of years are not strictly comparable to that from the latter pair as the 2005 Carnegie classifications were used for the later years and the 2000 Carnegie classifications were used for the earlier years.



A study by King Alexander[22] also concluded that salaries at public and private research universities have moved from being roughly equal in 1980 to more than a 20% advantage at the private universities by 1998.[23] He also found that fringe benefits are less generous at public universities and do not serve to reduce the compensation gap.[24] An interesting facet of Kings' analysis is his calculation of the "noncompetitive" salary ranking of the twenty least competitive public universities

In 2003, Cindy Zoghi examined the decline in relative salaries for the 1975 to 1994 period. She found that the decline in relative salaries was not offset by broadly defined amenities, including intangible job attributes as well as more traditional fringe benefits. In other word, the relative decline is in total compensation not simply wage levels. Zoghi observed that "Changes in the level of amenities over time do not explain the relative wage trends observed."[25] Her summary conclusion is also a warning, "Unless public faculty are somehow compensated for this loss of income . . . those who can find positions in higher-paying private institutions will do so, and the public university will only be able to recruit and retain lower-quality faculty."[26]

[22] King Alexander, "The Silent Crisis: The Relative Fiscal Capacity of Public Universities to Compete for Faculty," The Review of Higher Education, Winter 2001, Vol. 24, No. 2. pp. 113-129.
[23] *Ibid*. p. 120.
[24] *Ibid*. p. 127
[25] Cindy Zoghi, "Why have public university professors done so badly?" Economics of Education Review, 22 (2003), p. 56.
[26] *Ibid*. p 56.

IVC: Student Quality

As a final measure of relative competitiveness, we examined the differences in the measured quality of freshmen who choose to attend public research universities as compared to private research universities. (We acknowledge that using SAT scores to measure student academic ability is limited and exceedingly narrow; however, at this point it is the only available metric that can be used for national comparisons across institutions.) Table XVII demonstrates the decline in SAT scores at public research universities from 1986 to 2000 using Kane and Orszag's work and from 2001 to 2007 using IPEDS reporting.

Table XVII: Change in SAT Scores of Entering Freshmen 1986 to 2007

	Public Very High Research Universities 2001	Private Very High Research Universities 2001	Public Very High Research Universities 2007	Private Very High Research Universities 2007	Relative Gain of Private over Public Universities 2001-2007*	Relative Gain 1986 to 2000 matched selectivity group of Public and Private Institutions**
SAT Critical Reading 25th Percentile	516	626	517 (55th percentile of all students)	638 (87th percentile of all students)	11	12-18
SAT Critical Reading 75th Percentile	627	719	632 (85th percentile of all students)	736 (98th percentile of all students)	12	12-13
SAT Math 25th Percentile	537	652	544 (58th percentile of all students)	659 (88th percentile of all students)	0	16-23
SAT Math 75 Percentile	649	737	657 (87th percentile of all students)	752 (97th percentile of all students)	7	17-23

*Computed from IPEDS ** from Thomas Kane and Peter Orszag, Brookings Institution Working Paper, September 2003, p. 12 *** from SAT Percentile Ranks, College Board

First, the SAT scores of students at public very high research universities are significantly lower than those at private very high research universities in both critical reading and math at the 25th and 75th percentiles of entering freshmen students. Second, the differential between the public and private university entering student SAT scores has grown since 1986 in each of the four categories. The only positive indicator for public research universities is that the SAT-Math differential did not widen for the 2001-2007 sub period at the 25th percentile level.

Noteworthy are the differences in the levels of the 75th percentile of the students at the private very high universities and at their public counterparts. The SAT math score for the private university students is 752 and the critical thinking score is 736. The corresponding public university student scores at the 75th percentile are 657 and 632. The

SAT scores of students at the private universities are not far from the maximum score of 800 but the privates continue to widen the gap over the publics. In this very narrow tail of the distribution, the competition is for the very best students, but still the privates widen their advantage.

The Higher Education Research Institute's periodic survey of College faculty finds that university faculty perceptions correspond with this data. In the 2005 survey, only 37% of public university faculty felt that that "*most students are well-prepared academically*" in sharp contrast to the 67% of private university faculty who agreed with that statement. At the other extreme, 33% of public university faculty agreed that "*most of the students I teach lack the basic skills for college level work,*" while 16% of their private university counterparts agreed.[27]

In our "University Tuition, Consumer Choice and Affordability" paper we reflected on the growing preference for private over public higher education:[28]

> *One often hears the contention that attending a prestigious private university is worth the large price differential between it and a public university. During the last two years, applications to prestigious private universities have skyrocketed far beyond the rate of growth of high school graduates or of applications to public universities, apparently reflecting the applicants' belief that obtaining a degree from such a school confers benefits that more than justify the higher cost and that will last a lifetime.[29, 30] A recent Gallup Poll found that 40.9 percent of respondents believed quality was higher at private universities, 36.5 percent believed that public and private universities were equal in quality, while only 3.7 percent believed quality was higher at public universities.[31]*

That academically more able students gravitate toward private universities is confirmation that these beliefs are being converted by students into action.

What we report here is the differential choice of students earning higher scores on the SAT to attend private universities. We infer their reasons from opinion research like that cited above. It is worth repeating that there are not robust research findings to support the conclusions that improved learning or life-time earnings and opportunities are associated with graduating from a private research university rather than a public one. Nevertheless, perceptions acted upon clearly impact reality.

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[27]" The American College Teacher, National Norms for the 2004-2005 HERI Faculty Survey, " Higher Education Research Institute, UCLA 2005 http://www.gseis.ucla.edu/heri/PDFs/ACT-Research%20Brief.PDF

[28] McPherson and Shulenburger, *op.cit*, p. 62.

[29] For a glimpse at the continuation of this activity in 2008 see Karen Anderson, "Applications to Colleges are Breaking Records," *New York Times*, January 17, 2008.

[30] See also "Elite Colleges Reporting Record Lows in Admission," *New York Times*, April 1, 2008.

[31] "Americans Split on Government Control of Tuition," *Chronicle of Higher Education*, April 4, 2008 (online)

V. Are There Measurable Effects on Research Success?

The question of whether public research universities are experiencing less success in research must be addressed. If faculty members are more poorly paid in public universities and their teaching work loads are heavier, it is reasonable to believe that better paying private universities would seek to lure the very best faculty researchers away from public universities. The education press is replete with accounts of such raiding and of concerns that the exodus from public to private universities will increase.[32]

One measure of research success is the data from the National Science Foundation's annual survey of research expenditures at universities. Specifically we examine the proportion of total federal government research and development funding expended by universities (Table XVIII). Federal funding to universities grew quite substantially during this period, and funding grew by a great amount at publics. Public universities had $305 million dollars more in 2006 than their 1999 proportionate share would have yielded.

Table XVIII: Federally Financed R&D Expenditures at Universities FY1999 to 2006

(Dollars in thousands)

	1999	2000	2001	2002	2003	2004	2005	2006
Public	9,716,252	10,654,671	11,726,674	13,404,241	15,305,715	16,950,698	17,903,254	18,464,218
Private	6,387,184	6,883,615	7,506,747	8,459,684	9,453,138	10,679,926	11,288,115	11,568,938
	16,103,436	17,538,286	19,233,421	21,863,925	24,758,853	27,630,624	29,191,369	30,033,156

Figure XIII examines the trends for the extended time period of 1972 – 2005. The trend for public universities is upward through the entire time period with public universities showing a greater share of both total R&D and for federally financed R&D.

[32] See for example, Jack Stripling, *In Recruitment Wars a New Front*, Inside Higher Education, July 24, 2008 http://www.insidehighered.com/news/2008/07/24/poaching and Elia Powers, *A Prominent Public Targets Faculty Retention*, September 12, 2007, http://www.insidehighered.com/news/2007/09/12/cal

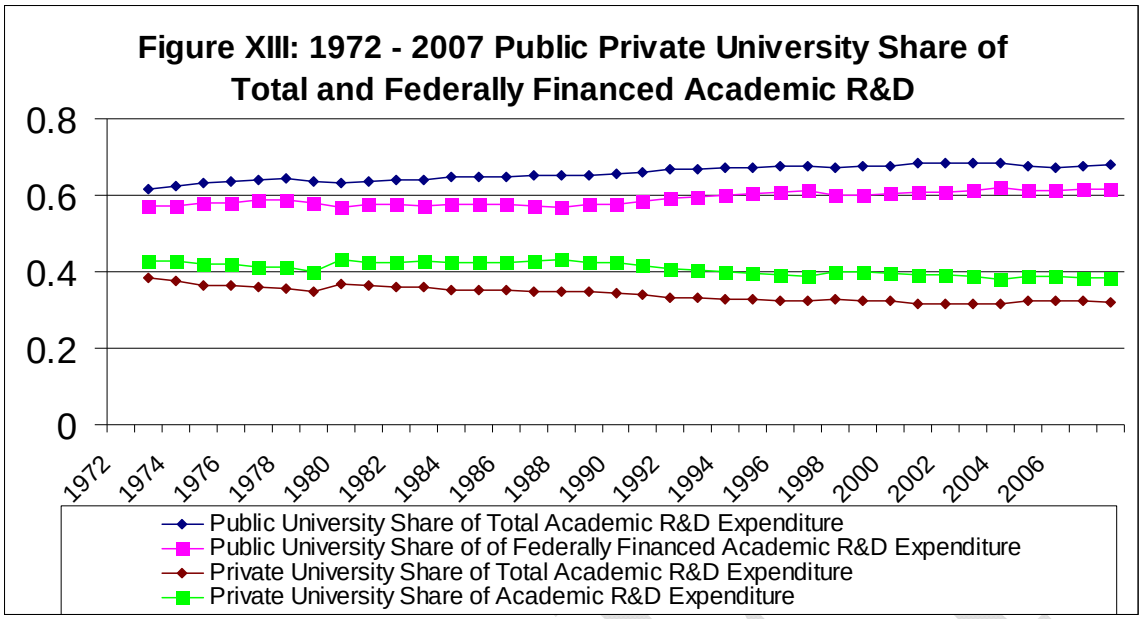

Table XIX examines the percent change in the share of Federal R&D received by public universities by field between 1999 and 2006. Overall, the proportion of expenditures by public universities increased by 1.14 percentage points – from 60.3% to 61.5% during the period. The pattern of the medical and biological research expenditures, the categories most affected by NIH's "doubling," is particularly important. The public universities' share of expenditures in the biological sciences decreased by 0.76 percentage points, from 57.7% to 56.8%. On the other hand, public universities' share of medical research expenditures increased by .95 percentage points, from 55.5% to 56.4%. The pattern of public university increase is nearly ubiquitous across funding areas, as only four of the categories or subcategories decreased for public universities, while 28 increased and one was unchanged. Nothing in this data indicates that public universities were less competitive for public funding in this period of time. In fact, public universities were generally more successful in the competition for federal science research funding.

Table XIX: Public University Percentage Share of Federal Science R&D Expenditures Received by Public Universities from 1999 to 2006

	1999	2006	Per Cent Change 1999-2006
All Federal R & D	60.34%	61.48%	1.14%
Science	60.00%	61.27%	1.27%
Computer Sciences	48.93%	54.48%	5.55%
Environmental Sciences	74.78%	77.01%	2.23%
Atmospheric Sciences	79.01%	81.46%	2.45%
Earth Sciences	69.01%	78.62%	9.61%
Oceanography	80.08%	80.69%	0.62%
Environmental Science, nec	66.67%	53.79%	-12.88%
Life Sciences	58.51%	58.86%	0.36%
Agricultural Sciences	96.83%	95.72%	-1.11%
Biological Sciences	57.58%	56.83%	-0.76%
Medical Sciences	55.48%	56.43%	0.95%
Life Sciences, nec	48.47%	66.64%	18.18%
Mathematical Sciences	52.31%	59.73%	7.42%
Physical Sciences	56.71%	62.54%	5.82%
Astronomy	47.25%	60.13%	12.88%
Chemistry	61.99%	69.00%	7.00%
Physics	59.03%	61.51%	2.48%
Physical Sciences, nec	30.98%	41.23%	10.25%
Psychology	70.97%	71.46%	0.49%
Social Sciences	75.28%	77.51%	2.22%
Economics	75.87%	80.06%	4.19%
Political Sciences	54.68%	60.02%	5.33%
Sociology	69.22%	76.51%	7.28%
Social Sciences, nec	84.03%	84.14%	0.11%
Sciences, nec	64.43%	68.04%	3.61%
Engineering	62.21%	62.77%	0.57%
Aeronautical/Astronomical Engineering	66.29%	63.25%	-3.03%
Bioengineering, Biomedical Engineering	40.95%	49.95%	9.00%
Chemical Engineering	66.47%	68.96%	2.50%
Civil Engineering	77.59%	79.66%	2.06%
Electrical Engineering	63.90%	65.59%	1.69%
Mechanical Engineering	57.49%	57.33%	-0.63%
Metallurgical/materials engineering	64.61%	67.51%	2.90%
Engineering, nec	56.40%	57.01%	0.61%

Another method to measure the relative research performance of universities over time is to count citations of research published by faculty at private and public research universities. Unfortunately, the measurement of any changes in citation patterns for public or private university faculty over time is not meaningful as more recent citation counts include a greater proportion of the scholarly literature. Therefore, citation counts today are more complete than those from one, five, ten or more years ago.

The Webometrics Ranking of World Universities[33] is based largely on citation data. Public universities were well represented in the 2008 ranking of U.S. universities with 17 public institutions in the top 25. But even such cross-sectional use of citation rankings has serious limitations for measuring institution performance.[34] One problem is their failure to control for scale – the ranking heavily favor the larger research universities. So it is not a surprise that the public universities in the top 25 tend to be far larger than the private universities.

In 2003, a thorough examination of the correlates of institution research measures found that publication counts correlated at very high level with both absolute and per faculty expenditure levels as well as the level of full professors' salaries.[35] Thus, expenditure data such as that from the NSF survey may serve as a reasonable proxy for all university research.

VI. What Should We Make of This?

The resource and expenditure indicators examined here show *relative* declines on most measures for public research universities when compared to private research universities. The data show that public research universities experienced modest real per student funding increases during the last twenty years. While state appropriations declined, tuition increases, external research funding and funding from other activities offset these declines, and total resources per student in real terms increased in public research universities – just to a smaller degree in than in the privates. But public research university revenue and expenditure in every category increased by a much lower rate than did revenues and expenditures at the private research universities.

This paper does not produce evidence of decline in relative performance of public universities in production of educational outcomes; however, this failure may be largely an indication of the state of measurement of university performance. We have no accepted, universally applied measures of educational learning outcomes, so there is simply no way to compare learning outcomes of public and private research universities cross-sectionally or over time. The research published on earnings of graduates fails to demonstrate consistently a difference between graduates of public and private research universities, once test scores and background factors are taken into account. We clearly need to have the sort of data that a national unit record system might provide so that such matters can be examined systematically over time in ways that periodic surveys do not permit. We need measures of real research output of our universities instead of indicators based on inputs like research funding or faulty measures of output like publication and citation counts provide. Without them we do not have the ability to make precise

[33] http://www.webometrics.info/top100_continent.asp?cont=usa_canada
[34] See for example, Anthony F.J. Van Raan, "Fatal Attraction: Conceptual and methodological problems in the ranking of universities by bibliometric methods," Scientometrics, Vol. 62, No. 1 (2005) pp 133-143.
[35] Robert K Toutkoushian, Stephen R. Porter, Cherry Danielson and Paula R. Hollis, "Using Publications Counts to Measure and Institution's Research Productivity," Research In Higher Education, Vol. 44, No. 2, April 2003, p. 140.

comparison. More importantly, university presidents and chancellors do not have the indicators they need to better understand where their universities stand competitively so that they can guide further improvement.

Thus we are left with a strong caution: Funding for U.S. public universities relative to that for U.S. private universities is clearly declining. This decline may already have led to relative diminishment in educational outcomes or research quality or quantity that available measures do not detect. Further relative declines will mean that there is less time for faculty in public research universities to focus on students. Public universities will suffer diminished ability to hire and retain the most able faculty. Diminished relative performance in teaching and/or research may well follow.

VII: Reducing This Growing Disadvantage

Alexander concludes his examination of the growing competitive disadvantage of public universities in competing for faculty with the judgment that his findings ". . . should raise serious concerns about how market incentives and government restrictions have collaborated to disadvantage public universities in the academic labor market."[36] *We concur. Serious concern is appropriate, and action based on that concern is urgently needed.* The nation needs strong public research universities, not systematically weakened ones. Three major changes would help reverse this trend toward diminishment of our public universities:

1- Restoration of the public subsidy per student to levels that existed when public universities were more evenly matched in funding with private universities;

2- Continue discipline over cost combined with the development of understanding that disproportionately increased tuition may be needed if public research universities are to be able to compete more evenly with private universities; and

3- Reexamination of federal research policies to ensure that federal agencies pay all the costs associated with the conduct of federally funded research.

VIIA: Restoration of Public Subsidy per Student to more Favorable Levels

This is a quest to return to the "golden age" when public research universities competed evenly with private research universities. While we have documented diminished public university faculty/student ratios, faculty salaries, student credentials and per student endowments relative to private universities, we do not have adequate data measuring the whole university funding environment and other characteristics to specify when, if ever, public universities had the resources to compete evenly with private

[36] Alexander, *op. cit.*, p. 127.

universities. We therefore pick a period when each of the ratios was more favorable and data quality was reasonably good and then calculate how much additional state support it would take to return to that year.

Such a year was 1986. At that time $7,424 (in 2007 constant dollars) per student was appropriated by the states for public higher education at all levels. By 2007, state appropriations had fallen to $6,773 per student. To return to the 1986 per student funding level in 2007, the states would have to appropriate $6.68 billion more than they actually appropriated in 2007. Not only would appropriations per student have to increase by $651, but the additional amount would have to be appropriated for 10.24 million students, 3.05 million more students than were enrolled in 1986.[37] Thus total additional appropriation would have to increase by $6.658 billion. This is absolutely a large amount; it represents an increase of 9.69% over the $69.3 billion appropriated in 2007.

If we could turn the clock back in this manner the additional funding might permit full professor salaries to rise at the publics as compared to the privates from 79% to 89%. We might see the student to faculty ratio of the publics fall from 1.47 times that of the privates to 1.25 times. We might see the 75th percentile SAT critical thinking scores of entering students at the publics rise by 23 to 31 points relative to the privates. All of these statements are in the subjunctive because more than state funding per student has been diminished in the last twenty years. Additional state funding might in fact go to fill other gaps that have opened in the interim. It would likely take the return of all public university funding categories to their 1986 levels to create the possibility that additional state funds would be adequate to return most indices to 1986 levels. Nonetheless, returning state per student funding to 1986 levels would be a grand beginning and should be pursued.

VIIB: Increased Cost Discipline May be Required as well as Disproportionate Tuition Increases

Gross tuition and required fee receipts per student at both public high and very high research universities are roughly 30% of those at private universities. Given the higher base of private tuition, each year over the last two decades saw public research universities receive only $1 additional in tuition per FTE for each $3 per FTE received by private research universities – even with tuition receipts increasing at a higher rate in public research universities (4.2%, public and 2.09%, private). There probably is no way public research universities can recover their competitive funding position relative to the privates unless they increase tuition at a much more rapid rate than the privates. Indeed, unless public universities increase tuition at three times the rate of the privates, their per student funding will fall further and further behind.

[37] The data in this paragraph are from SHEEO/Shef
http://www.sheeo.org/finance/shef/2008%20tables/All%20States%20wavechart.xls

These are the hard realities with which public universities live. Another hard reality is that dramatic increases in tuition serve to reduce access unless offset by financial aid. Over the last two decades many public research universities have abandoned a low tuition/low financial aid policy in favor of a moderate tuition/high financial aid policy. With the latter policy in place institutions can, and often do, use tuition receipts from wealthier students to provide financial aid to lower income students. Whether such intra-student body subsidy is best from a public policy point of view is debatable, but moderate tuition/high aid has been for many universities the only feasible way to provide needed revenue while protecting access.

Of course it is critical to the success of both public and private research universities that they manage cost carefully. All very high research universities are exceedingly complex organizations in which management of cost and quality is made more difficult by their sheer complexity. We repeat here our nuanced conclusion on cost management in these universities from our earlier paper:

> *"We do not propose to tell our colleagues at very high research universities (in which we both have considerable experience) that they should unbundled and use separate personnel, equipment, facilities for each of the various products they produce. We merely point out that cost of producing an undergraduate education are lower in less complex settings and that reduced complexity is at least part of the cost difference. We do suggest that the unbundled research university would have a better chance of understanding the quality and costs of each of the "products" produced."*[38]

Rigorous efforts to understand cost by product line, e.g. undergraduate education, graduate education and sponsored research, is key to controlling cost. For public research universities gaining the political elbow room needed to ensure that they remain fully competitive is most likely dependent on their ability to demonstrate that proper attention has been given to cost management. We note that real cost per student in research universities has been managed tightly over the last twenty years. Indeed, the Delta Cost Project found that public research universities increased real full educational cost per student at only a 0.7% annual rate during the 1987 to 1996 period but reduced this to a 0.0% annual increase in the 1998-2006 period. Thus public research university managers have adroitly managed cost when their competitors in private research universities were increasing full educational cost per student at a 1.8% annual rate from 1987 to 1996 and at a .6% annual rate in the 1998 to 2005 period. Tuition increases in the public sector have largely offset state government budget reductions while those in the private sector have gone to expand instructional and other categories of expenditure.[39]

We call upon governing boards, legislators and the public to understand these hard realities. Public universities must be supported when their governing bodies raise tuition at rates higher than private competitors; the alternatives are for donors and tax payers to fund public universities at a level to obviate the need for greater tuition

[38] McPherson and Shulenburger, op. cit. p. 55.
[39] Ibid. The Growing Imbalance, p 35.

increases or accept an ever widening gap between public and private universities. While we hope for greater funding with our hearts, our heads tells us that public research universities will have little alternative to raising tuition in future years at higher rates than their private counterparts.

VIIC: Reexamination of Federal Research Policies

Both public and private research universities spend institutional funds to support research. The Council on Governmental Relations (COGR) in examining this practice concluded that a significant part of this expenditure is due to the implicit subsidy universities provide from institutional funds to cover indirect costs that are not paid by federal funders.

According to COGR, institutional funds contributed to research come from two categories: 1- institutionally financed organized research and 2-unreimbursed indirect cost.[40] While unable to parse precisely these two categories, COGR relied on a 2000 RAND study (*Paying for Research Facilities and Administration*) to develop an estimate of the size of the institutional subsidy of federal indirect cost.[41] [42] Following their rule of thumb we calculate the F&A subsidy figure for 2007 at $1,572,448,400 for the public university in conjunction with their $18.8 billion in federally-funded science research and at $896,524,000 for the subsidy paid by private universities for the $11.7 billion they had in federally funded science research.[43]

In addition to reduced receipts because facilities costs are underestimated, there is also underpayment because the administrative costs that can be reimbursed are capped. The RAND study examined only the facilities portion of the F&A rate, but the COGR "2005-06 Survey of F&A Rates" showed that 90% of research institutions could support a rate for administration above the current 26% cap and suggested that the average administrative component would be over 28% in the absence of the cap. COGR therefore

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[40] Council on Governmental Relations, *Finance of Research Universities*, March 2008, COGR, New York. p. 12.

[41] Briefly, the factors COGR identified as contributing to the subsidy are:

1. Agency and/or statutory restrictions on F&A rates. Of particular importance to public universities is the low USDA overhead rate of 20% overhead rate. Public universities had 95.7% of Agriculture research funding in 2006, so they are differentially affected by this agency practice. Similarly, public universities do a disproportionate share of Education and Engineering research. The Departments of Education and Defense overhead policies have a major impact on public universities. Bringing all agencies up to the NIH overhead payment rate would remove some of public higher education's funding disadvantage.
2. Cost Sharing.
3. Research Compliance Costs and the 26% administrative cap.
4. Miscellaneous F&A restrictions, such as the library expenses calculation guidelines and rigid utility 1.3-percent allowance have an impact.

[42] *Ibid*. p. 17.

[43] The data for total federal science research dollars and institutional contribution by university control comes from the Survey of Research and Development Expenditures at Universities and Colleges (http://www.nsf.gov/statistics/srvyrdexpenditures/).

estimated that $500 million was required to cover the federal subsidy for 2005. Using the same criteria to estimate a 2007 figure, two percent of the total public university federally-financed R&D is calculated to be $375,598,660 and, for private universities, the resulting sum is $233,216,240. The sum of the administration subsidy for private and public universities in 2007 was $608.8 million.

Underpayment of the facilities cost must be added to the administrative costs that are beyond the cap to get the total institutional subsidy for federal research. Thus the facilities-plus-administrative subsidy of federally-financed R&D for public universities in 2007 is estimated to be $1.948 billion for the $18.8 billion they received in federal funds and for private universities $1.130 billion for the $11.7 billion they received in federal funds.

These are substantial subsidies by universities, both public and private, to federal research. COGR concluded its analysis with these words:

> *"The funding concerns of research universities, both public and private, are legitimate threats to the nation's basic research capability. While research universities boast significant tangible and intangible assets, there still exists a real and growing imbalance between available resources and the mandatory outlays of the nations' research universities. This issue needs to be addressed in the context of the historically productive Federal Government-University research partnership; doing so will ensure that effective and constructive solutions are found".* [44]

We concur with COGR in this conclusion. We do not recommend that the question of overhead rates be reopened at this time. We do suggest that discussions begin among interested parties on the principle that research funders should cover all the costs associated with their research programs. There is not a sufficient justification for federal research funding policy or practice that results in universities diverting scarce funds from other priorities, such as instruction, to support federal research.

VIII. Summary and Conclusion

Public universities are too important to this country to permit them to deteriorate as compared to private universities. For decades slow erosion in state funding and rapid erosion in relative overall resources have occurred. While there is no evidence that educational quality or research performance of public universities has declined relative to that of private universities, it seems fully rational to be concerned that relative performance decline will follow if the current funding trends are not arrested and reversed. Thus we propose actions in three areas to correct some of the funding inequity that has developed. While these proposals involve significant resources, the alternative – second-class public research universities – is not consistent with a world-class, competitive U.S. economy.

[44] *Ibid*. p. 17.

Michael E. Porter, writing on the eve of the 2008 presidential election, called on the nation to develop a strategic plan to remain competitive. He acknowledges U.S. higher education as unique competitive strength, "*the U.S. has the world's best institutions for higher learning, and they are getting stronger*," but warns that simply having them is not enough:

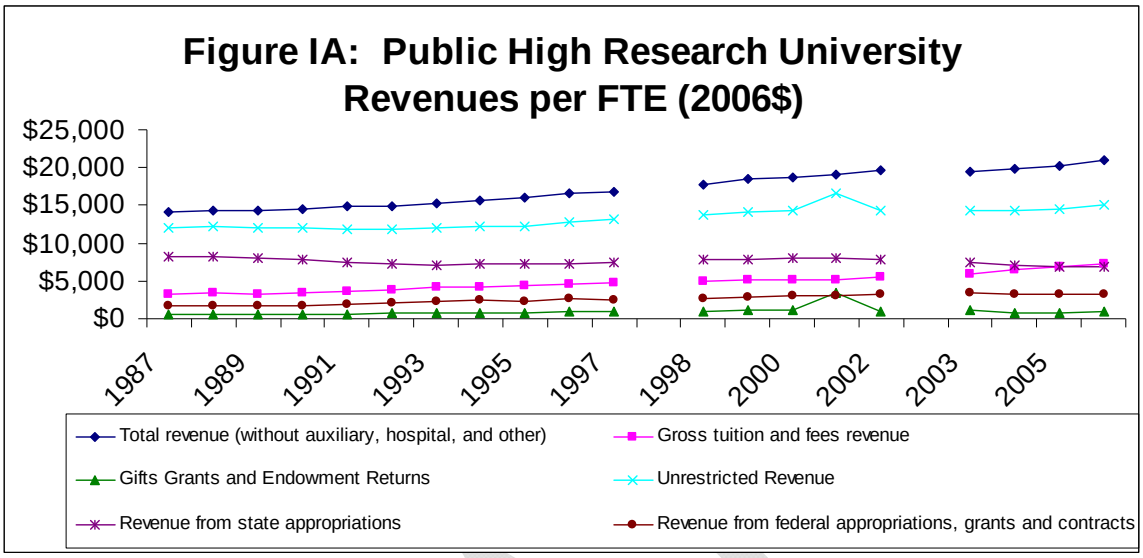
> *U.S. colleges and universities are precious assets, but we have no serious plan to improve access to them by our citizens. America now ranks 12th in tertiary (college or higher) educational attainment for 25- to 34-year-olds. We have made no progress in this vital area over the past 30 years, unlike almost every other country. This is an ominous trend in an economy that must have the skills to justify its high wages. Instead of mounting a serious program to provide access to higher education, like the G.I. Bill and National Science Foundation programs of earlier years, Congress grandstands over the rate of endowment spending in our best universities.* [45]

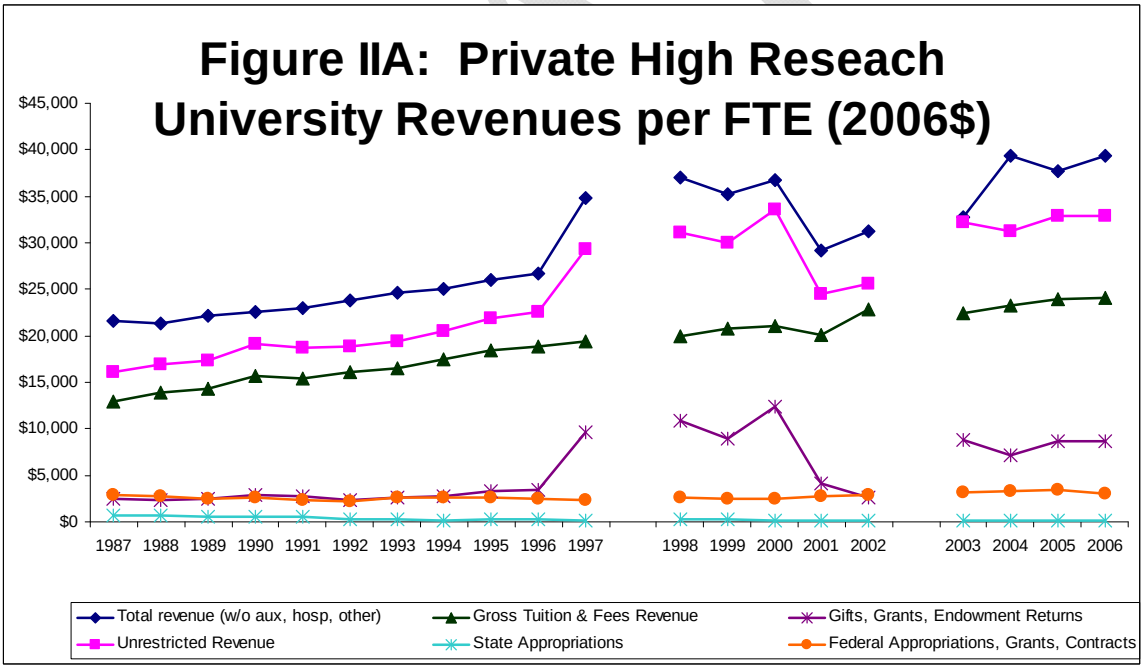
If this nation is to provide the access that Michael Porter sees as essential to a successful U.S. strategic plan, public universities must play an important role. The scale of need is so great that it is impossible to accomplish the nation's goals without the public research university sector. The publics have the necessary scale and are willing to increase it further, just as they did when the GIs returned from World War II. The difference is that in the decade after World War II public universities were funded in a more competitive manner with private universities. Today, they are not. Unless there is a major infusion of resources to public universities, expansion to accommodate the additional students needed to get U.S. tertiary attainment back to its historic world-leading state will result in further enlargement of class sizes and attenuation of the student to faculty ratio disadvantage that public universities already have relative to their private counterparts. Given the already lower salaries in the publics, this would increase further their disadvantage in competing to hire and retain the best faculty.

We call for serious discussion and additional analysis of the funding disparity that has occurred. That discussion should focus on the threats to quality that we believe to be developing and the consequences for the country should those threats materialize. Finally, we ask that methods for correcting this funding disparity be considered, subjected to wide discussion and subsequent revision, and ultimately, additional funding be put in place or other compensating actions be taken to ensure that the quality of public research universities remains on par with that of private research universities.

[45] Michael Porter," Why America Needs an Economic Strategy," Business Week.Com. October 30, 2008 http://www.businessweek.com/magazine/content/08_45/b4107038217112.htm .

Appendix
Revenue and Cost Data for High Research Universities





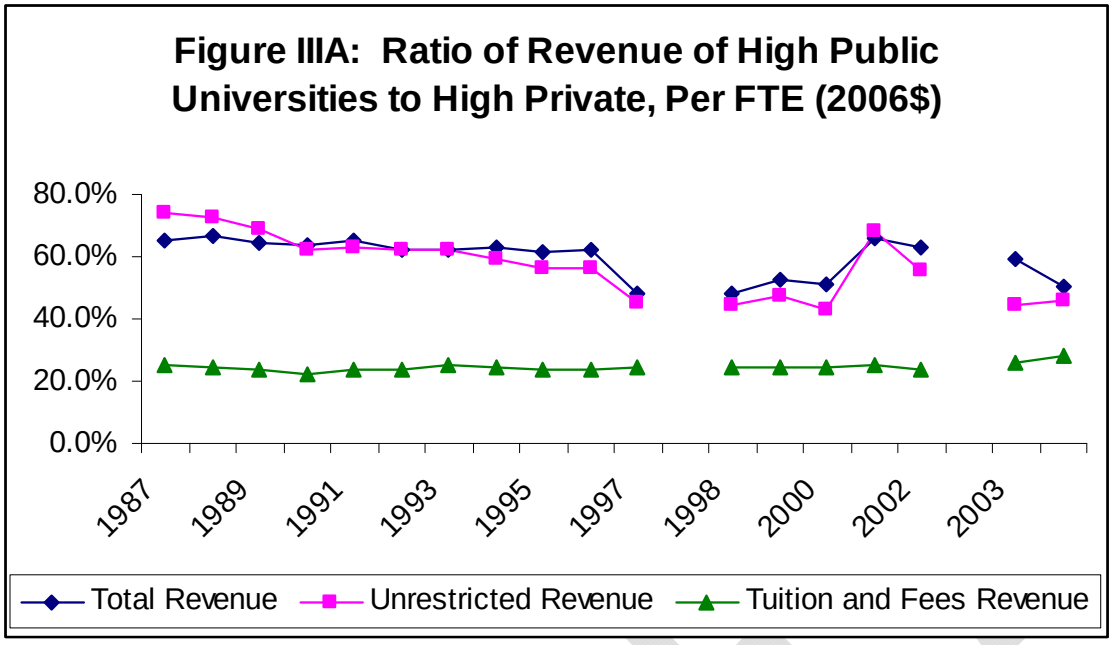


Figure IIIA: Ratio of Revenue of High Public Universities to High Private, Per FTE (2006$)
80.0%
60.0%
40.0%
20.0%
0.0%
1987
1989
1991
1993
1995
1997
1998
2000
2002
2003
Total Revenue
Unrestricted Revenue
Tuition and Fees Revenue

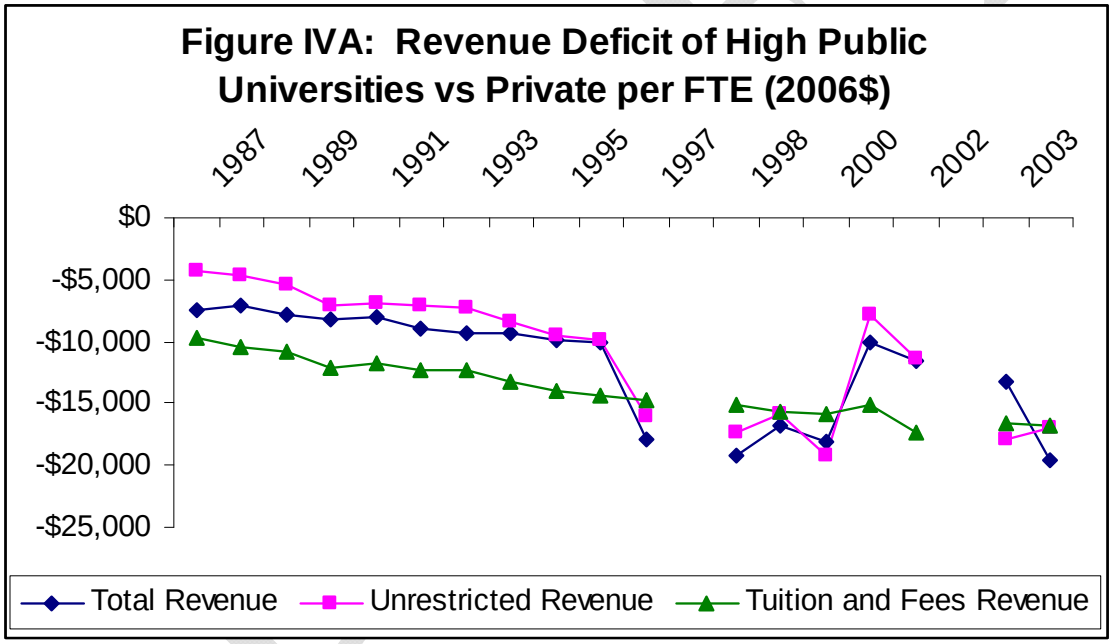


Figure IVA: Revenue Deficit of High Public Universities vs Private per FTE (2006$)
1987
1989
1991
1993
1995
1997
1998
2000
2002
2003
$0
-$5,000
-$10,000
-$15,000
-$20,000
-$25,000
Total Revenue
Unrestricted Revenue
Tuition and Fees Revenue

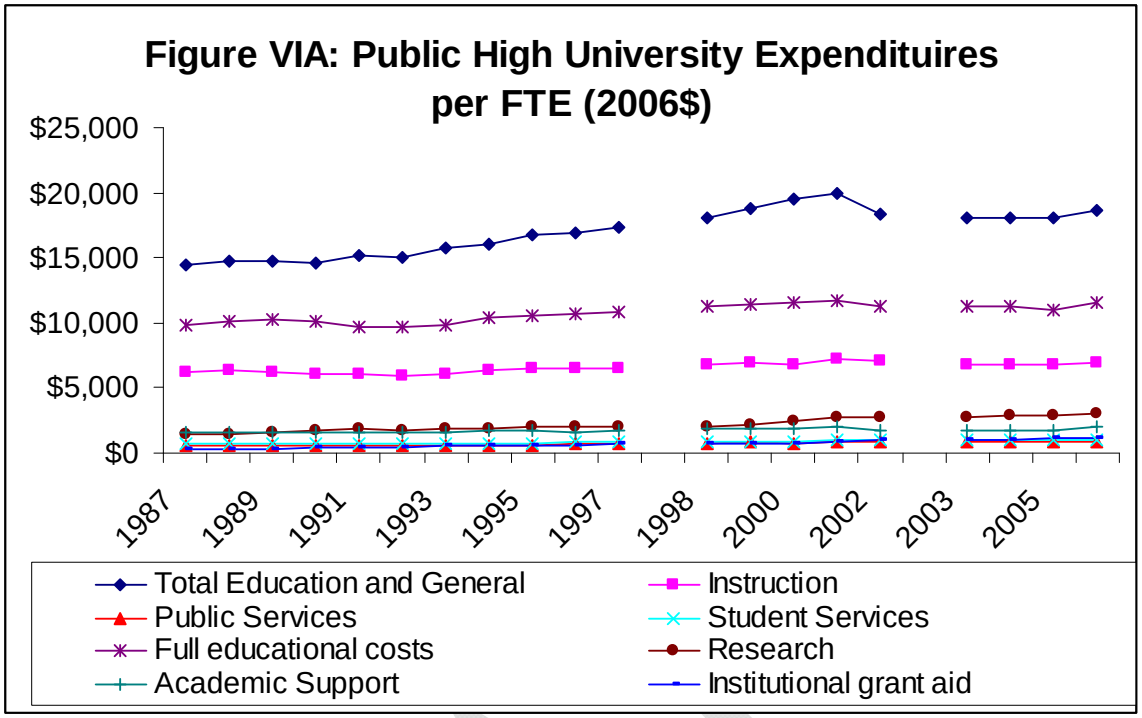


Figure VIA: Public High University Expenditures per FTE (2006$)
$25,000
$20,000
$15,000
$10,000
$5,000
$0
1987
1989
1991
1993
1995
1997
1998
2000
2002
2003
2005
Total Education and General
Instruction
Public Services
Student Services
Full educational costs
Research
Academic Support
Institutional grant aid

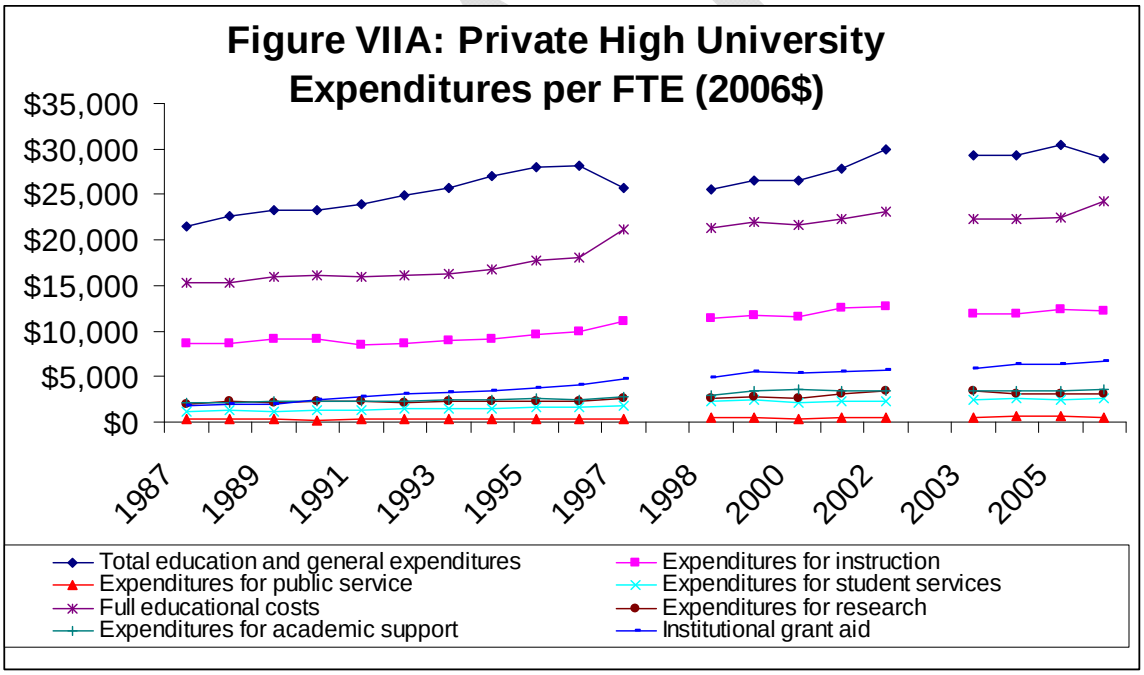


Figure VIIA: Private High University Expenditures per FTE (2006$)
$35,000
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$0
1987
1989
1991
1993
1995
1997
1998
2000
2002
2003
2005
Total education and general expenditures
Expenditures for instruction
Expenditures for public service
Expenditures for student services
Full educational costs
Expenditures for research
Expenditures for academic support
Institutional grant aid

Figure VIIIA: Expenditure Deficit of Public High Universities per FTE vs. Private

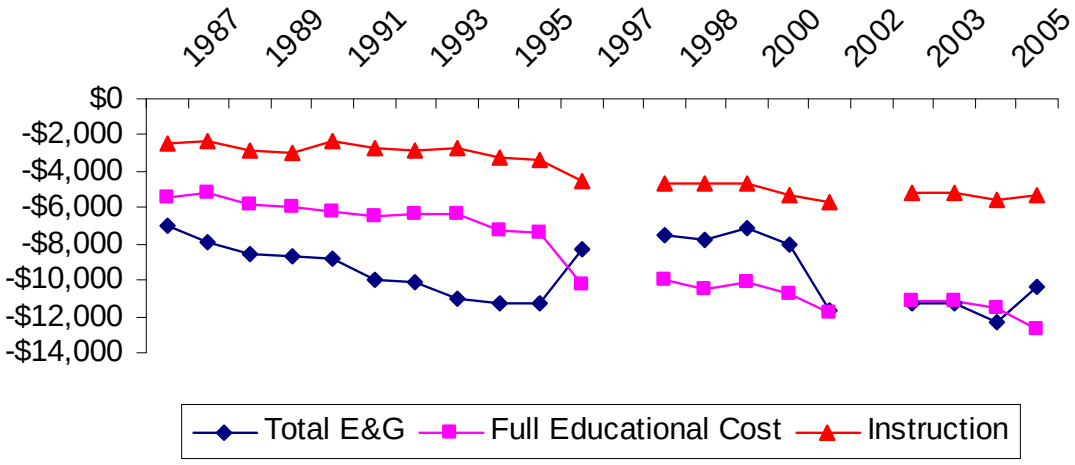
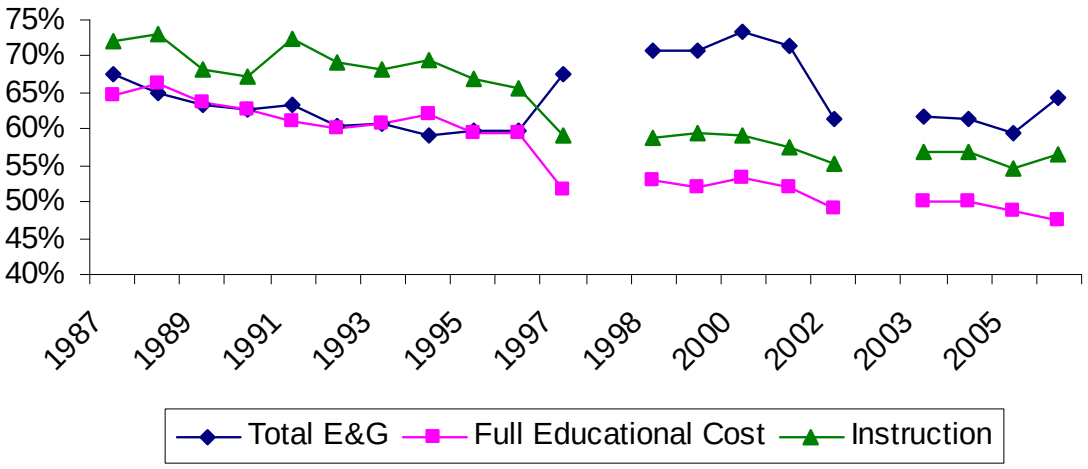


Figure IXA: Ratio of Expenditures of High Public University per FTE to Private



Acknowledgments

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All errors remaining in this paper belong to us and we accept responsibility for them. We would appreciate continuing correspondence about this work as the topic it addresses will continue to be of concern to NASULGC and its members.