

THE UNIVERSITY OF ARIZONA®

*A Trend Analysis of
Student Educational
Expenditures
in the 1990s*

March 2002

Decision and Planning Support



Consulting Group

Executive Summary

The University of Arizona has not done well financially compared to its peers over the last decade because of chronic underfunding due to insufficient state appropriations combined with a mandated statewide policy of low tuition. The University is successful in tapping other revenue sources including research and development but these are not enough to sustain quality higher educational opportunities for Arizona.

This conclusion is based on a study comparing per-student educational expenditures between the University and its Arizona Board of Regents (ABOR) peers from 1991 to 1999. The findings, using expenditure and student FTE data from the Integrated Postsecondary Education Data System (IPEDS), show that the University of Arizona has been structurally underfunded by the state during the 1990s. While other states took advantage of the longest peacetime economic expansion in history to invest in higher education, Arizona did not. And with continued state budget shortfalls in the new decade, there is risk that the University will no longer be able to compete with its peers chosen by ABOR as a benchmark for University performance.

Key Findings Include:

- ***Even when the higher than average cost of running a medical school was not accounted for, the UA lagged behind its peers by \$1,900 per student FTE expenditure in 1991. By 1999, this had grown to \$3,400 per student FTE.***
- ***State appropriated increases did not match rising costs.*** With adjustments made for increasing expenditures, the University was 20% below the average peer student expenditure in 1991. By 1999 it had more than doubled, growing to 44% below the peer average.
- ***When the cost of operating a medical school was accounted for, the deficit became even more pronounced. The UA lagged behind its peers by \$2,400 per student FTE expenditure in 1991. By 1999, this had grown to \$4,000. This translates into a yearly funding deficit of \$70 million increasing to \$115 million.***

The UA must continue to pull its weight with continued research funding. But future victories in this area are increasingly compromised because the UA's respectable top 20 ranking among public research institutions is pegged on the high quality and commitment of its outstanding faculty who are progressively lost to competitors for financial reasons. With operations and maintenance expenditures already cut to the bone, the institution's viability is exposed to ever-increasing *brain drain*.

A change in state policy is needed to stop the faculty exodus that threatens the future of the institution as a primary source for economic growth in the knowledge-based economy. This minimal requirement is a long overdue first step to recreate an atmosphere for the continued success of a student-centered university with maximum creativity and technological innovation that will ultimately benefit all in the state.

Introduction

Chronic underfunding directly affects the economic health of the state.

The UA has been structurally underfunded over the past decade.

The economic performance of the 1990s was the greatest in Arizona history. Unfortunately, the UA did not share in this unprecedented economic prosperity. During the decade, other states used their economic good fortune to significantly increase public funding of higher education, leaving Arizona universities lagging further behind. With education as the single biggest determinant of economic prosperity in the new, knowledge-based economy, this chronic underfunding problem directly affects the economic health of the state of Arizona. In times of economic downturn as we face today, underfunding over the last decade places our universities in an extremely difficult position. The per-student educational expenditures at The University of Arizona (UA) and its peer institutions are compared over the last decade to illustrate the severity of the past underfunding problem. And the findings show that the UA has been *structurally* underfunded by the state over the past decade. The severity of the problem got worse over time, as the rising costs of higher education grew faster than state allocations for student expenditures, compounded by the higher costs of running a medical school. The underfunding dilemma is not confined to the UA alone in Arizona. All three state universities are facing funding problems, but the UA has suffered the most over the last decade (forthcoming study).

Method

This study used the Finance Survey data from the Integrated Postsecondary Education Data System (IPEDS), to derive educational expenditures per student full-time equivalent (FTE). Educational expenditures are comprised of total instruction, academic support, institutional support, and student services, the same definition used by *U.S. News & World Report*. Student FTE numbers are derived by the standard formula of all full-time students plus one-third of all part-time students. An average measure of expenditures per FTE comes from dividing total educational expenditures by student FTE. This measure is used over time to compare the ABOR peer institutions.

ABOR Peer Institutions for the UA

Michigan State University -- MI-S	University of Michigan-Ann Arbor -- MI
Ohio State University -- OH-S	University of Minnesota-Twin Cities -- MN
Texas A&M University -- TX	University of Missouri-Columbia -- MO
University of Arizona -- UA	University of North Carolina-Chapel Hill -- NC
University of California-Berkeley -- CA	University of Utah -- UT
University of Florida -- FL	University of Virginia -- VA
University of Illinois-Urbana -- IL	University of Washington -- WA
University of Iowa -- IA	University of Wisconsin-Madison -- WI

Statistical adjustments based on regression techniques were used because of the much higher per-student costs of operating a medical school and the rising costs of higher education in general. This is standard practice when comparing institutions with different characteristics.

Expenditures rather than revenues were used as the comparator because the accounting practices and business rules for expenditures exhibit more consistency among states and universities in how they are reported to IPEDS. Using the state appropriation per student to compare the status of student funding is misleading. The non-instructional allocations for research and public service for example are included in state appropriations. It follows that the state appropriation per student is measuring more than the educational activity of the university. In addition, when business rules require the state to directly pay for university buildings, the corresponding allocation will not show in the total state appropriations. The unrestricted funds, net of mandatory transfers, may reduce such variability in the data, but cannot eliminate it. As a result, IPEDS state appropriations are not directly comparable among peer institutions.

In comparison, data on expenditures are not subject to such fluctuations. The comparability of funding status is determined by the fact that resource data are reported by source, and expenditure observations by activity. Educational expenditures are directed to an activity, the same one that is used by *U.S. News and World Report* and many other studies in the cost comparison literature [see for example Toutkoushian (1999), Koshal and Koshal (1995)].

Results

The rising costs of higher education in the 1990s, and the high cost of running a medicine school combined, in the case of the UA, to exacerbate an existing chronic underfunding problem.

Fig 1a: Educational Expenditure per Student FTE in Current Dollars

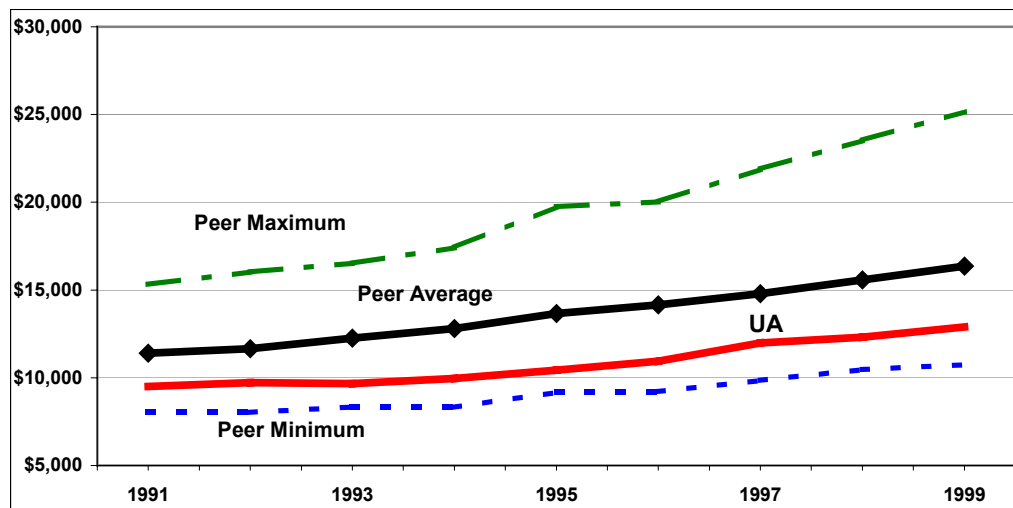


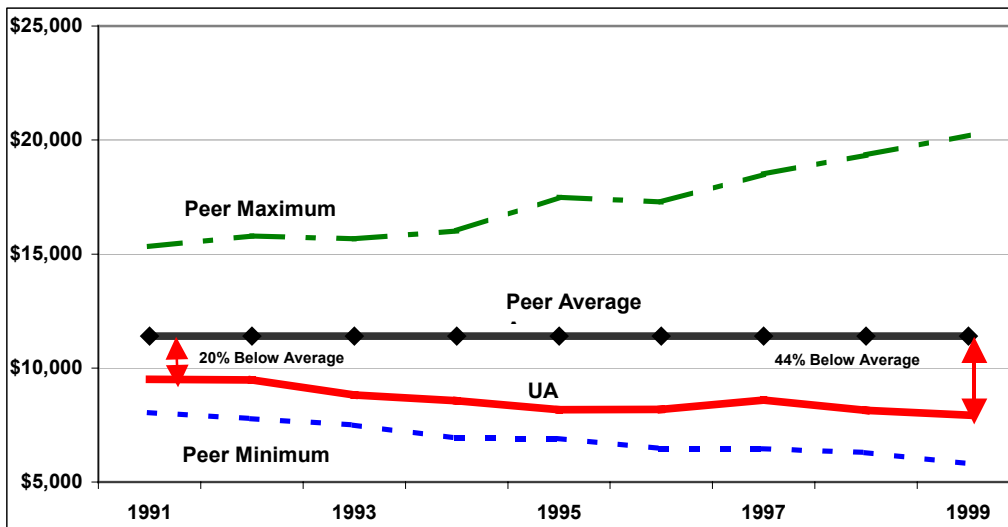
Figure 1a shows that the average educational expenditure per student FTE increased steadily over the last decade for the UA and all its ABOR peers. But the expenditure growth rate was not uniform for all institutions.

Revenues from state appropriations and fees fell short of the rising costs in higher education by an average of \$200 per student each year.

In the 1990s, the UA student expenditures per student FTE increased on average by \$420 per year. This represents a growth rate of about 4% per year, which by itself suggests a favorable environment. But, the expenditure of its peers grew by an average of \$620 per year. As a result, revenues from state appropriations and tuition fell short of the rising costs in higher education by an average of \$200 per student each year at the UA. The corollary is a cumulative growing gap between the UA and its peer average that is illustrated in **Figure 2a**.

In fact, the UA lagged behind the average of its peers by only \$1,900 per student FTE in 1991, translating into an annual underfunding of \$55 million. By 1999, this had grown to \$3,400 per student FTE, or over \$100 million per year for the institution. During this time span, the corresponding ranking out of 16 peers dropped from 11th to 13th.

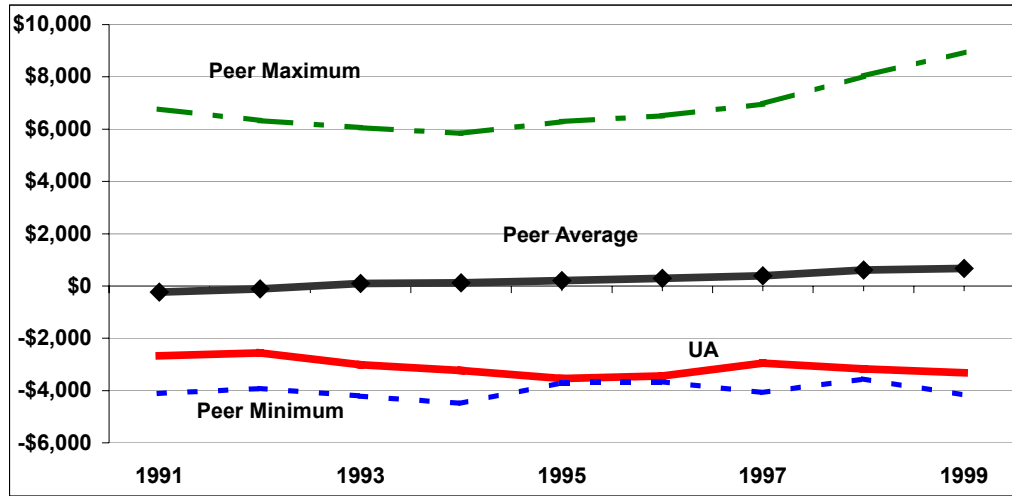
Fig 2a: Educational Expenditure per Student
(Adjusted for Rising Cost of Higher Education Among Peers)



When we account¹ for the higher than average cost of running a medical school in **Figure 3a**, the underfunding situation gets worse.

(1) A linear regression model was used on all public Research I universities to estimate the additional expenditures from a medical school.

Fig 3a: Educational Expenditure Deficit Per Student
(Accounting for Additional Costs of Medical Schools)

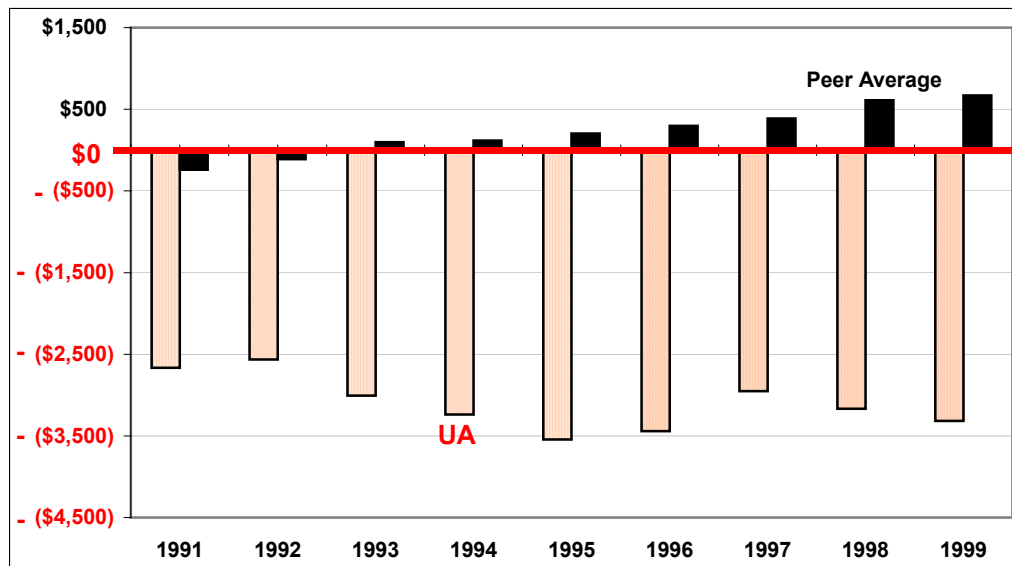


**UA's
annual
funding
deficit grew
from \$70 to
\$115
million.**

In the early 1990s, the UA's adjusted expenditure per student deficit ranked 12th of its peer group. In the mid-90s, it slipped to the last position, and ended the decade 14th out of 16. Within this time span, the gap from our peer average grew from \$2,400 per student to well over \$4,000. The corresponding annual funding deficit grew from about \$70 million to \$115 million.

These findings are summarized in **Figure 4** that compares the deficit trend for the UA and the peer group average.

Fig 4: Educational Expenditure Deficit Per Student
(Accounting for Additional Costs of Medical Schools)



Both the UA and the peer average among public Research I universities started the decade underfunded. But as the peers went from deficit to surplus, the UA diverged in the wrong and opposite direction.

Consequences

Faculty are leaving the UA for better financial opportunities elsewhere.

The implications for maintaining the quality of the institution are devastating and getting worse. The salary level of faculty and staff is lagging behind the market by 8%. Faculty are leaving the university for better financial opportunities elsewhere. It is estimated that \$42 million² would restore UA salaries to the market average. But this amount accounts for only 35% of the spending deficit, suggesting that non-salary operations are also seriously underfunded.

With faculty leaving the university for higher external offers, hiring costs for new faculty at prevailing market rates have increased, putting additional strain on an already stressed budget. Moreover, the number of faculty losses is jeopardizing the quality of the institution.

The state will lose revenues from forgone ... new technologies and new industry with high paying jobs in the state

Declining faculty quality translates into lower university productivity. And the state will suffer an opportunity cost in terms of lost revenues from the forgone potential of new technologies and products, attraction of corporations with high paying jobs in the state, and other increased revenue benefits.

The impact on students may result in lower than expected quality of education in the short run. But those in search of high quality instruction may have to exercise the option of choosing other institutions for their education in the long run. And in-state students will unfortunately have to suffer higher transaction costs as they move out of state.

Limitations

Scholars come at a price determined by a competitive international job market

What has the UA been doing to offset state underfunding? Over the last decade, the UA has been more than pulling its weight in tapping non-state revenue sources. In 1998, the UA ranked 19th in the nation in garnering research grants and contracts. In contrast, The University of Missouri, the best funded peer institution, ranked 58th. For the UA's research program to be a major engine of state economic growth creating new technologies and providing quality employment opportunities, the professional quality of its core professors has to be first rate. But quality scholars come only at a price determined by a competitive international job market, while the UA's affordability level is clearly declining.

(2) Includes salaries & related expenditures. The University of Arizona's Multi-year Plan to Restore Competitiveness of Salaries, September 2001, and Estimates of Local Funding Needs.

The accelerated upward trend in educational expenditures can be attributed to at least two factors, neither of which could be controlled by any single institution. A hot job market for intellectual talent needed in both public and private sectors resulted in serious employment shortages. Competitive faculty wages shot up and attracted a significant number of professors away from the UA. The information revolution also brought about additional costs for telecommunication and related computing hardware and software that require more high cost personnel to operate and maintain.

It is important to note that the nature of these factors makes it impossible for any institution to maintain a lid on these types of cost increases. For example, top-tier universities could not do without well-equipped computer labs and staff to operate and maintain them. To be competitive, the market now requires that students must have information-technology skills to succeed.

Some Prerequisites for a Solution

The spending increase observed each year at the UA--\$420 per FTE, well short of the peer group increment of \$620 per FTE, may have given an illusion of financial improvement. In reality, the long-term financial prospects were seriously undermined with an average shortfall from the peer group's growing costs of \$200 per FTE per year. This suggests that the long-term financial recovery plan should include at least two components. The first priority is to keep up with the peer group expenditure growth rate to prevent the gap from growing larger. Then, the structural problem of closing the financial gap with peers could be addressed without any of the problems observed previously.

Figure 1b in appendix shows a clear bimodal distribution, with an affluent group of institutions well above the peer group average and an underfunded group below the average with the University of Virginia hugging the peer average. Better than average funded universities not only sustained elevated expenditure levels throughout the decade, but also increased their expenditures at a significantly higher rate than universities near the bottom. In fact, none of the initially underfunded institutions was able to improve enough to be overfunded. Conversely, all the better-funded schools were able to stay above average throughout. These facts suggest a clear difference in state policy priorities between the two groups. The UA will not be able to financially sustain itself with the current combination of insufficient state appropriations and a mandated statewide policy of low tuition. It follows that the state will need a fundamental change in priorities to move out of the poorly funded group of universities.

The examples of peer success in the 1990s were based on state policies of sustained and gradual funding increases over time.

The examples of peer success in the 1990s were based on state policies of sustained and gradual funding increases over time. Sharp expenditure increases in a particular year or two year span, were always followed by a sharp decline. This suggests that the way to a robust financial recovery is through sustained, rather than one-time funding efforts.

Conclusion

Other states have taken advantage of the unprecedented economic prosperity of the 1990s to strengthen the financial health of their universities, a step not taken in Arizona that compounded the UA's comparative financial disadvantage over time.

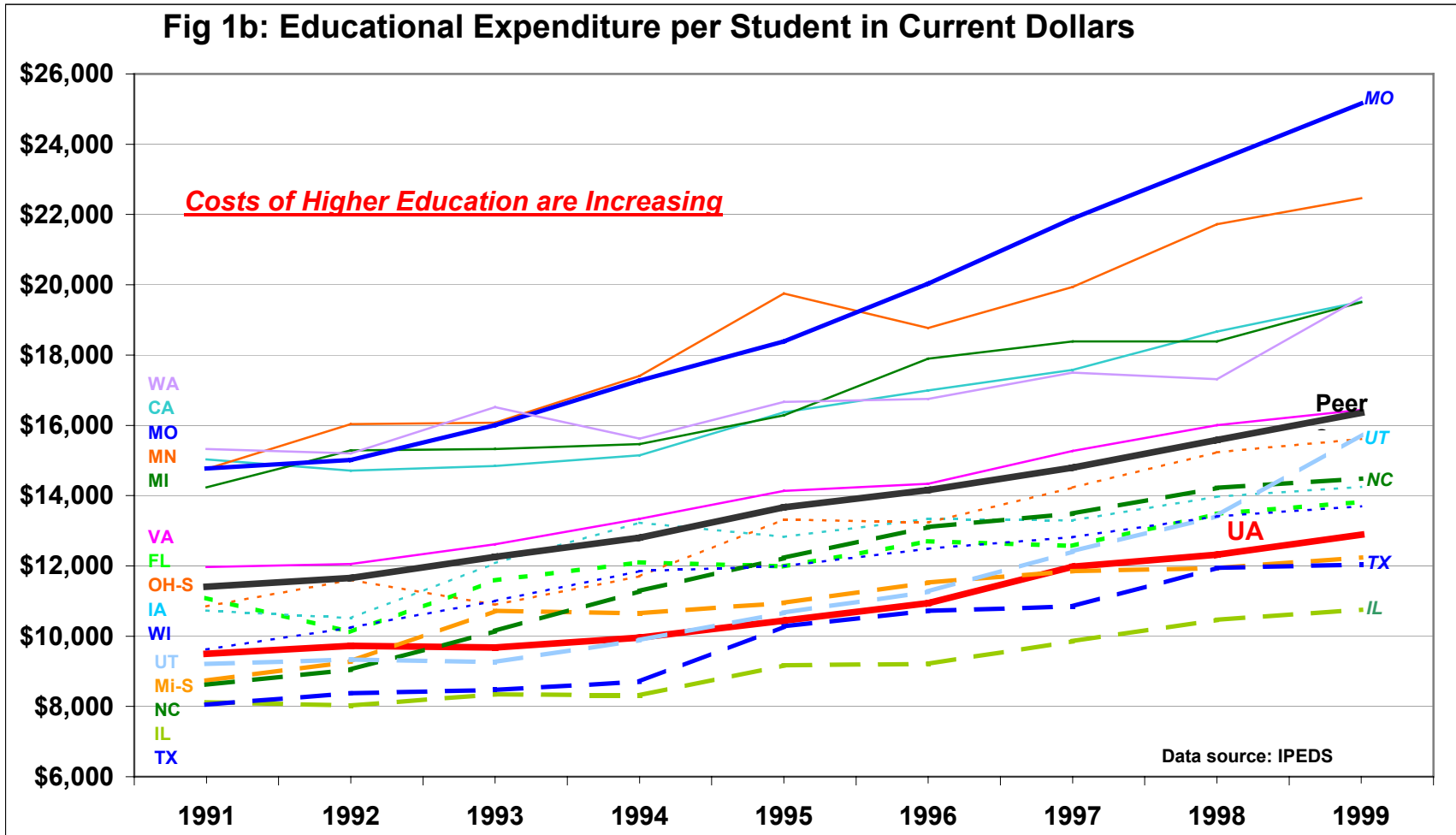
With universities becoming increasingly more pivotal to states' competitiveness in the new, knowledge-based economy, the analysis suggests that a tremendous effort is needed for the state to successfully overcome the history of underfunding higher education. This may require a paradigm shift in Arizona to move the UA and our other state universities up onto equal financial footing with their peers.

Ultimately, it is the long-term transition to a sustained financial recovery that is going to position the state to compete in the knowledge-based economy.

In the short run, with an economic downturn characterized by midyear budget rescissions in Arizona, staying in its peer group is going to be a major challenge for the UA. If the gap of \$380 per FTE between the UA and the last institution in its peer group in 1998 were to stay the same, a budget cut of more than \$11 million would drop the UA out of its peer group. The danger is that history of underfunding may repeat itself. The current budgetary shortfall cannot be overlooked, but ultimately, it is a long-term transition to a sustained financial recovery that is going to position the state to compete in the knowledge-based economy.

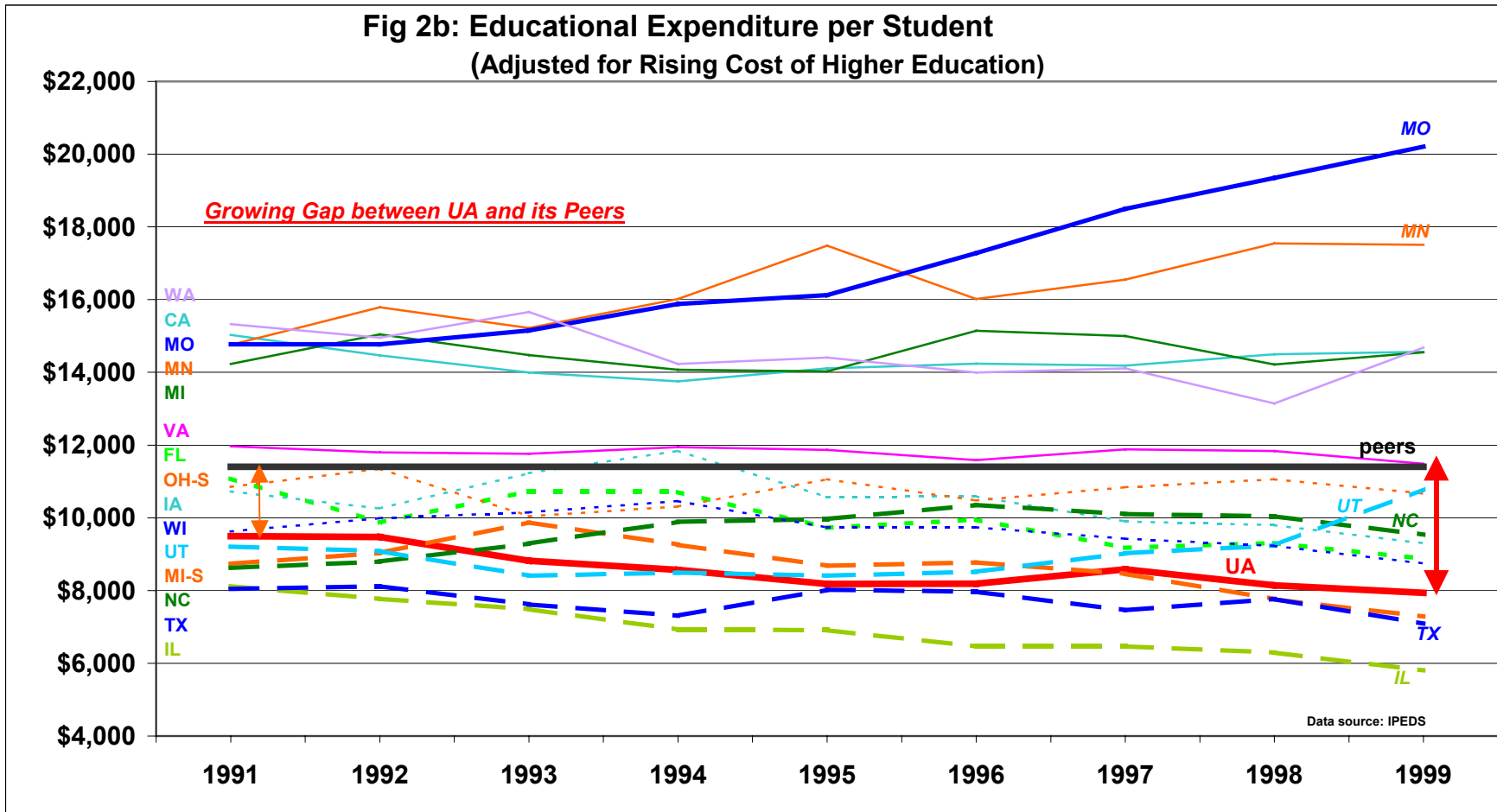
The University has been more than pulling its weight in tapping non-state revenue sources. The UA is an outstanding performer in research and development efforts as measured by research grant and contract dollars, while the state is chronically underfunding the institution. Unfortunately, the net result of combining outstanding research grant and contract production with chronic state underfunding has not been able to keep the university from falling further behind; superior research funding cannot make up for the magnitude of the growing state funding shortfall. The gulf between the outstanding results of external research funding and low student funding needs to be addressed. But, the limitations of the UA's ability to independently manage these persistent financial problems reveal its vulnerability. A more favorable financial response from state policy makers is needed to maintain the quality of an outstanding student-centered research university that is a major economic engine in the state. ♦

Appendix 1



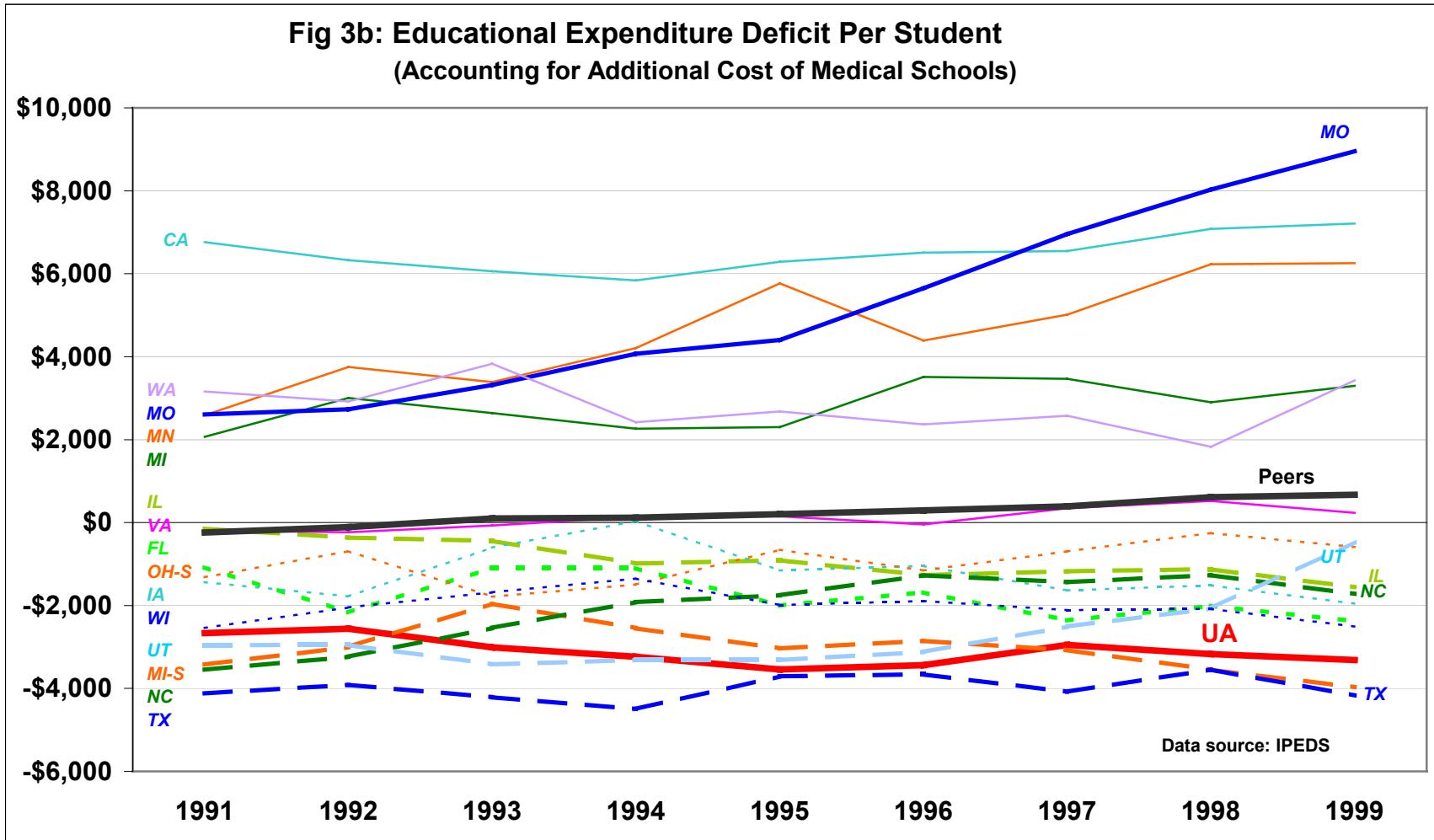
Note: Graphs are labeled from the highest to the lowest order of the 1991 expenditures per student, and the corresponding colors. Labels on the right side identify some specific cases of interest.

Appendix 2



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Appendix 3



Note: Graphs are labeled from the highest to the lowest order of the 1991 expenditures per student, and the corresponding colors. Labels on the right side identify some specific cases of interest.

Appendix 4

University of Arizona Educational Expenditure per Student by UA ABOR Peer Institutions

Figure 1: Average Student Expenditure by UA Peer Institutions in Current Dollars

		1991	1992	1993	1994	1995	1996	1997	1998	1999
U. Arizona	U of A	9,498	9,723	9,674	9,961	10,440	10,940	11,976	12,319	12,890
U. California-Berkeley	CA	15,030	14,713	14,846	15,143	16,374	16,991	17,577	18,670	19,517
U. Florida	FL	11,088	10,114	11,588	12,102	11,984	12,699	12,567	13,480	13,826
U. Illinois - Urbana	IL	8,117	8,022	8,343	8,315	9,174	9,211	9,853	10,467	10,751
U. Iowa	IA	10,730	10,508	12,077	13,232	12,826	13,337	13,291	13,972	14,252
U. Michigan - Ann Arbor	MI	14,233	15,291	15,326	15,466	16,288	17,894	18,392	18,387	19,503
Michigan State University	MI-S	8,738	9,282	10,724	10,650	10,947	11,524	11,853	11,938	12,237
U. Minnesota	MN	14,754	16,036	16,071	17,409	19,749	18,770	19,940	21,720	22,459
U. North Carolina - Chapel	NC	8,618	9,049	10,143	11,280	12,227	13,108	13,489	14,219	14,488
U. Missouri - Columbia	MO	14,774	15,017	16,001	17,271	18,384	20,033	21,884	23,521	25,160
Ohio State University	OH-S	10,845	11,600	10,893	11,703	13,325	13,226	14,231	15,236	15,616
Texas A & M	TX	8,045	8,373	8,469	8,701	10,280	10,720	10,846	11,943	12,035
U. Utah	UT	9,207	9,338	9,263	9,886	10,671	11,263	12,415	13,413	15,741
U. Virginia	VA	11,969	12,052	12,611	13,338	14,131	14,334	15,272	16,008	16,442
U. Washington	WA	15,326	15,204	16,516	15,620	16,665	16,749	17,502	17,315	19,632
U. Wisconsin - Madison	WI	9,622	10,243	10,999	11,851	11,993	12,486	12,816	13,406	13,697
UA Peers	Peers	11,406	11,656	12,258	12,798	13,668	14,156	14,795	15,580	16,357
Peer Min		8,045	8,022	8,343	8,315	9,174	9,211	9,853	10,467	10,751
Peer Max		15,326	16,036	16,516	17,409	19,749	20,033	21,884	23,521	25,160

Figure 2: Average Student Expenditure per FTE by UA Peer Institutions in Current Dollars Adjusted for Cost Increase in Higher Education

		1991	1992	1993	1994	1995	1996	1997	1998	1999
U. Arizona	U of A	9,498	9,474	8,823	8,569	8,179	8,190	8,587	8,146	7,939
U. California-Berkeley	CA	15,030	14,463	13,994	13,752	14,112	14,241	14,188	14,497	14,566
U. Florida	FL	11,088	9,865	10,737	10,711	9,723	9,949	9,179	9,307	8,875
U. Illinois - Urbana	IL	8,117	7,772	7,492	6,923	6,913	6,462	6,464	6,294	5,801
U. Iowa	IA	10,730	10,258	11,225	11,841	10,565	10,587	9,902	9,799	9,301
U. Michigan - Ann Arbor	MI	14,233	15,041	14,475	14,074	14,027	15,144	15,003	14,214	14,553
Michigan State University	MI-S	8,738	9,032	9,872	9,259	8,686	8,774	8,465	7,765	7,286
U. Minnesota	MN	14,754	15,786	15,220	16,018	17,487	16,020	16,552	17,547	17,509
U. North Carolina - Chapel	NC	8,618	8,799	9,291	9,889	9,965	10,358	10,100	10,046	9,537
U. Missouri - Columbia	MO	14,774	14,768	15,150	15,880	16,123	17,283	18,496	19,348	20,210
Ohio State University	OH-S	10,845	11,351	10,041	10,311	11,064	10,476	10,842	11,063	10,665
Texas A & M	TX	8,045	8,123	7,617	7,310	8,019	7,970	7,457	7,769	7,085
U. Utah	UT	9,207	9,088	8,411	8,495	8,409	8,513	9,026	9,240	10,790
U. Virginia	VA	11,969	11,803	11,760	11,947	11,869	11,584	11,883	11,834	11,491
U. Washington	WA	15,326	14,955	15,664	14,229	14,404	13,999	14,113	13,142	14,681
U. Wisconsin - Madison	WI	9,622	9,993	10,148	10,459	9,731	9,737	9,427	9,233	8,746
UA Peers	Peers	11,406	11,406	11,406	11,406	11,406	11,406	11,406	11,406	11,406
Peer Min		8,045	7,772	7,492	6,923	6,913	6,462	6,464	6,294	5,801
Peer Max		15,326	15,786	15,664	16,018	17,487	17,283	18,496	19,348	20,210

Figure 3: Expenditure Deficit of UA Peers

		1991	1992	1993	1994	1995	1996	1997	1998	1999
U. Arizona	U of A	-2,668	-2,563	-3,008	-3,239	-3,543	-3,440	-2,950	-3,169	-3,317
U. California-Berkeley	CA	6,762	6,325	6,062	5,842	6,289	6,510	6,549	7,080	7,209
U. Florida	FL	-1,078	-2,172	-1,094	-1,098	-1,999	-1,681	-2,359	-2,008	-2,381
U. Illinois - Urbana	IL	-150	-366	-441	-987	-910	-1,270	-1,175	-1,122	-1,557
U. Iowa	IA	-1,436	-1,779	-606	32	-1,157	-1,043	-1,636	-1,516	-1,955
U. Michigan - Ann Arbor	MI	2,067	3,004	2,644	2,266	2,305	3,514	3,465	2,899	3,296
Michigan State University	MI-S	-3,428	-3,005	-1,959	-2,549	-3,036	-2,856	-3,073	-3,550	-3,970
U. Minnesota	MN	2,588	3,749	3,389	4,209	5,765	4,389	5,014	6,232	6,252
U. North Carolina - Chapel	NC	-3,548	-3,238	-2,540	-1,920	-1,757	-1,272	-1,437	-1,269	-1,719
U. Missouri - Columbia	MO	2,608	2,730	3,319	4,071	4,401	5,653	6,958	8,033	8,953
Ohio State University	OH-S	-1,321	-687	-1,790	-1,497	-658	-1,154	-696	-252	-592
Texas A & M	TX	-4,121	-3,914	-4,214	-4,499	-3,703	-3,660	-4,081	-3,545	-4,172
U. Utah	UT	-2,959	-2,949	-3,420	-3,314	-3,313	-3,117	-2,511	-2,074	-466
U. Virginia	VA	-197	-235	-71	138	147	-47	346	520	234
U. Washington	WA	3,159	2,918	3,833	2,420	2,682	2,368	2,576	1,827	3,425
U. Wisconsin - Madison	WI	-2,544	-2,044	-1,683	-1,349	-1,990	-1,894	-2,110	-2,081	-2,510
UA Peers	Peers	-240	-111	95	118	204	296	389	612	670
Peer Min		(4,121)	(3,914)	(4,214)	(4,499)	(3,703)	(3,660)	(4,081)	(3,550)	(4,172)
Peer Max		6,762	6,325	6,062	5,842	6,289	6,510	6,958	8,033	8,953

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