



University of Nevada, Reno  
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## MEMORANDUM

March 6, 2009

To: Milton Glick, President  
From: Elliott Parker, Professor of Economics

### **RE: How much can we increase student tuition?**

For the 2008-2009 fiscal year, the university's main campus had an operating budget of \$196 million dollars, with a general fund appropriation of \$144 million, budgeted registration fees of \$31 million, out-of-state tuition of \$11 million, and other revenues of \$10 million, including investment income which the university no longer receives. Including registration fees, student tuition thus covered 22% of the operating budget.

In January, the Governor proposed that state support for this budget be reduced by almost half, in the hope that part of the shortfall could be met with increases in student tuition. How much can we pass on to students at the university to help cover this gap?

If we assume that enrollments would be entirely unaffected by any price increase, students would need to pay 127% more ( $0.50/0.22 - 1 = 1.27$ ) to entirely fill the hole. Of course, the university is finding ways to save and would not expect students to shoulder the entire burden, and we need to consider what our students would think fair. In addition, we must consider that many of our students would choose to drop out or go elsewhere if their registration fee rose from the current \$84 to \$190 per credit, and you can't increase revenue if you lose too many students.

Our undergraduate students pay \$130 per credit, of which \$46 includes fees for capital improvement and other special purposes. For an average in-state student taking 30 credits per year, this is almost \$4000 per year, not including books, living expenses, health care, and other special-purpose fees. Our in-state tuition is lower than in any of the Six-PAC universities, and lower than in most of the WAC schools. However, in-state tuition for the California state schools is even lower, a fact which may constrain our ability to recruit out-of-state students if our tuition rises significantly.

Our tuition has long been relatively low, and while our tuition has risen by an average of 6.3% per year since 2000, other universities have been increasing their tuition faster. Since 2000, the Consumer Price Index for college tuition and fees has increased by an average annual rate of 7%, more than double the average rate of general price inflation. If we raised our tuition by an additional 5.5%, we would return to our relative position in 2000.

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This difference is more striking if we go back an additional decade; if we raise our tuition by an additional 12%, in addition to the 7% average increase per year, we would return to our relative position in 1990. And this does not even adjust for the Millennium Scholarship or increases in other financial aid, which has reduced the cost of tuition by almost half for the average in-state students with good grades.

How many students will we lose as a result, and how much could we collect from students to fill the budget gap? Estimating the elasticity of demand is easy in theory but a bit more difficult in practice, because many other factors affect the number of students enrolling, including population growth and demographics, average income and employment opportunities, the perceived quality of education, the relative wage of skilled to unskilled labor, the availability of classes, admission standards, recruiting effort, and the availability of financial aid. A recession, for example, has complicated effects, as some parents can't afford to send their kids to school and some students find they need to work more to replace the income of an unemployed spouse, while students close to graduation extend their studies to wait out the recession, and other older students who become unemployed return to school to improve their skills. There is concern, for example, that the news of an imminent budget crisis at the university may induce some students to apply elsewhere.

Craig Gallet (*Economics Bulletin* 9(7):1-14, 2007) published a very useful "study of studies," in which he reviewed the results of a wide array of tuition studies. He found an average price elasticity of -0.6, meaning that for every 10% increase in tuition and in fees, holding everything else constant, the number of student credit hours fell by 6%. This elasticity was smaller in the short-run, as many students were already committed to completing their education, and dependent on many other factors. For example, non-white students were found to be more sensitive to price.

David Oxborrow, a graduate student in my department, did a little research on this subject, and found that many universities in our region have increased tuition faster than the national average, and results have been mixed. The University of Arizona increased tuition by 33% in 2005, but the effects on enrollment were ambiguous. UC Davis increased tuition by 30% in 2003 and 16% in 2004, and new enrollment growth fell from 4% in 2002 to -7% in 2004. The University of Oregon increased its rates by 17% in 2003, slowing the growth rate of total enrollment from 5 to 6% before the increase to 0% the year it took effect. A similar increase of 12% at Oregon State University in 2003 only reduced enrollment growth from 4% to 1%.

The University of Idaho, however, increased tuition by a total of 47% over the four years from 2003 to 2006, and the number of entering freshmen, which had been rising at a rate of almost 4% per year, fell instead by 8% over the same period. Relative to trend, this was a long-run elasticity of roughly -0.75.

Most telling for us, the Millennium Scholarship program reduced the average cost of tuition by roughly a fourth, as roughly half of our undergraduates were eligible to have their tuition reduced by almost half. As a result, our enrollments grew by an additional

25% over trend for the next five years. From this, we could infer a long-run elasticity of approximately -1, which means that price increases would not increase revenue at all.

Over the past five years, our enrollments have slowed again to an average growth rate of roughly 1% per year. I will project this forward, assuming our recruiting efforts and improved quality offset the effects of the recession and the scary news about the imminent budget catastrophe, and I will assume this growth is consistent with an annual increase of 6% in tuition and fees. Finally, let me assume that half of our students receive the Millennium Scholarship (75% or more of freshman, and lower ratios of other students), and are thus will not leave as long as tuition does not increase too much. If we assume that Gallet's elasticity figure of -0.6 is appropriate for our student population, then my simple predictions would be as follows:

Table 1:

<u>Tuition Increase</u>	Elasticity = -0.6 <u>Enrollment Response</u>	<u>Adjusted</u>	<u>Tuition Revenue</u>	<u>Increase</u>
			\$42,372,141	
6%		1.0%	\$45,363,614	\$2,991,473
10%	-6%	-0.2%	\$46,516,136	\$4,143,995
15%	-9%	-1.7%	\$47,899,587	\$5,527,446
20%	-12%	-3.2%	\$49,219,479	\$6,847,338
25%	-15%	-4.7%	\$50,475,813	\$8,103,672
30%	-18%	-6.2%	\$51,668,589	\$9,296,448
35%	-21%	-7.7%	\$52,797,806	\$10,425,665
40%	-24%	-9.2%	\$53,863,466	\$11,491,325
45%	-27%	-10.7%	\$54,865,567	\$12,493,426
50%	-30%	-12.2%	\$55,804,110	\$13,431,969
100%	-60%	-27.2%	\$61,693,837	\$19,321,696
150%	-90%	-42.2%	\$61,227,744	\$18,855,603

Under these assumptions, if we raise tuition by 6%, our average annual increase in recent years, then students would be contributing almost \$3 million towards our \$71 million shortfall. Raising tuition by 20% instead would reduce enrollments by 3.2% (remember that we are assuming that only half of our students will respond to the price increase), and revenues would rise by almost \$7 million. Raising tuition by 150%, however, would cost us almost all of our non-scholarship students, and certainly we should expect the scholarship students to begin to leave as well, so an increase of \$19 million is probably not really possible.

In the short-run, it is possible that demand may be much less elastic, as students are committed to their degrees and will likely continue to attend. If we assume a low elasticity of -0.2, how does this affect our results? Under this very optimistic assumption, a 20% increase in tuition would only cost us 0.4% of our students, and revenues would rise by \$8 million, while a 250% increase in tuition would only cost us 23.4% of our students, and would thus increase student tuition revenues by the entire amount of the budget gap (again, assuming none of our Millennium scholars left, which is very unrealistic).

Table 2:

<u>Tuition Increase</u>	Elasticity = <u>Enrollment Response</u>	-0.2 <u>Adjusted</u>	<u>Tuition Revenue</u>	<u>Increase</u>
			<b>\$42,372,141</b>	
6%		1.0%	\$45,363,614	\$2,991,473
10%	-2%	0.6%	\$46,889,011	\$4,516,870
15%	-3%	0.1%	\$48,776,690	\$6,404,549
20%	-4%	-0.4%	\$50,643,183	\$8,271,042
25%	-5%	-0.9%	\$52,488,490	\$10,116,349
30%	-6%	-1.4%	\$54,312,610	\$11,940,469
35%	-7%	-1.9%	\$56,115,545	\$13,743,404
40%	-8%	-2.4%	\$57,897,293	\$15,525,152
45%	-9%	-2.9%	\$59,657,856	\$17,285,715
50%	-10%	-3.4%	\$61,397,232	\$19,025,091
100%	-20%	-8.4%	\$77,625,762	\$35,253,621
150%	-30%	-13.4%	\$91,735,685	\$49,363,544
200%	-40%	-18.4%	\$103,727,001	\$61,354,860
250%	-50%	-23.4%	\$113,599,710	\$71,227,569

Finally, what if we are a little more pessimistic about how students respond, especially given the big response to the Millennium program itself. Consider the effects of an elasticity of -0.8 on enrollments and revenue:

Table 3:

<u>Tuition Increase</u>	Elasticity = <u>Enrollment Response</u>	-0.8 <u>Adjusted</u>	<u>Tuition Revenue</u>	<u>Increase</u>
			<b>\$42,372,141</b>	
6%		0.0%	\$44,914,469	\$2,542,328
10%	-8%	-1.6%	\$45,863,605	\$3,491,464
15%	-12%	-3.6%	\$46,973,756	\$4,601,615
20%	-16%	-5.6%	\$47,999,161	\$5,627,020
25%	-20%	-7.6%	\$48,939,823	\$6,567,682
30%	-24%	-9.6%	\$49,795,740	\$7,423,599
35%	-28%	-11.6%	\$50,566,913	\$8,194,772
40%	-32%	-13.6%	\$51,253,342	\$8,881,201
45%	-36%	-15.6%	\$51,855,026	\$9,482,885
50%	-40%	-17.6%	\$52,371,966	\$9,999,825
100%	-80%	-37.6%	\$52,880,432	\$10,508,291

In this scenario, a 20% tuition increase would reduce enrollments by 5.6%, and increase revenues by only \$5.6 million, while a doubling of tuition would only bring in an additional \$10.5 million.

At what tuition level would the Millennium students begin to respond to the price increases? Given that the scholarship covers a maximum of \$960 per semester, recipients are still currently paying over \$2000 per year. If tuition rose by 50%, while other

dedicated fees stayed the same, that would increase the out-of-pocket portion by two-thirds, and it seems likely that even some Millennium scholars would begin to have second thoughts.

Once the appropriate hike in tuition is decided, we should also ask the Legislature to allow us to adjust the undergraduate per-credit amount, in order to build in a plateau on student tuition. This would end the disincentive created by the Millennium scholarship to take more than 12 credits per semester, and help us meet our goal of reducing the time to graduation. Suppose, for example, we decide to increase tuition by 20%, and we start with our current undergraduate in-state tuition of \$84 (plus \$46 in dedicated fees) per credit. An undergraduate student taking 30 credits per year would now pay \$3,885, and an increase of 20% in the tuition portion would increase this to \$4390. If we create a tuition plateau at 12 credits per semester, however, we would multiply this by 15/12. This would lead to a per-credit fee of \$183, an increase of over 40%, for students taking 12 credits or less.

It is also important to consider how any decline in student enrollments caused by a tuition increase will affect our total general fund allocation, at least if we continue to use the formula. The general fund allocation per student FTE is over \$15,000 per student on the main campus, including tuition and fees. The instructional budget, which is roughly half of the total, is set in direct proportional to projected student FTE, and other portions of the budget, such as academic support, are also linked to it. If we assume that more than half of our budgeted expenditures are determined by enrollments, then a 4% decrease in our enrollments would decrease our total budgeted expenditures by more than 2%, and the decrease in budgeted expenditures would be significantly greater than any increase in student tuition revenues.

It is imperative that the Legislature understand this. The best option is for the Legislature to reset the formula downwards, to use it to determine the general fund allocation instead of the total budgeted expenditure. In this way, the university can determine its own best tuition rate to make up the difference. As it is, any increase in tuition whatsoever decreases the university's budget. If the Legislature decides upon a tuition increase without an adjustment of the formula, then at minimum the university should be held harmless from the reduced enrollment it will cause.