Tuition Task Force Report (1-5-04)

0. Executive Summary

The Tuition Task Force was appointed by Provost Benjamin Allen to consider alternative options for charging tuition on a differential basis. These alternatives were to be considered from the standpoints of fairness, ease of implementation, effect on revenues, effect on enrollment, and predictability of tuition for students. Two stimuli for the study were a Board of Regents directive (Sept. 16-17 Meeting, G.D. Memorandum #4) to look at differentials based on institution, degree program, class standing, and credit hours; and past requests for differential charges (tuition as well as fees or surcharges) from on-campus units.

We (the Task Force) identified several institutional values and Regents' policies that should be considered in evaluating alternative tuition structures, including the following: (a) accessibility to education should be maintained; (b) there should be flexibility in students' choice of study; (c) undergraduate tuition should be the same at the three Regent universities; (d) tuition of Iowa residents should be subsidized; (e) nonresident student tuition should support the full cost of (nonresident) education; and (f) graduate and professional programs may charge more.

We assembled and evaluated information in order to develop assessments of the advantages and disadvantages of each option. The effects on tuition revenue and student enrollment were considered explicitly in a limited simulation. It should be noted that the model developed for these particular simulations (see Appendix 7) could be used to assess other alternatives. Our tentative findings are as follows.

1. Although we did not pursue this question in great depth, our belief is that tuition differentials by institution may be appropriate for UNI but are not desirable in the cases of ISU and SUI.

2. Tuition differentiation based on number of credits taken appears conceptually reasonable and straightforward. However, it raises the most questions as to operational difficulty from the standpoint of implementation and management of financial aid. It also has the greatest detrimental impact on students targeted for recruitment and the ability of students to take courses that enhance their educational experience at ISU.

3. Tuition differentiation by program may be worthy of further consideration. It could be justified based on student demand elasticities and varying costs of education across programs. Such a tuition differential would be more appropriate if applied after students are "officially" in a specific program (e.g., junior/senior standing in the major). There is some concern that such a differential tuition may conflict with the perceived institutional values of access to education and student choice. Among the alternatives we considered, tuition differentiation by program perhaps holds the greatest potential for increasing total tuition revenue. If tuition differentiation by program were to be implemented, however, budget allocation policies would need to be addressed at the same time in order to ensure fair allocation of the combined base and differential revenues.

4. Tuition differentiation by student classification (e.g., junior or senior) may strengthen enrollment of new students but seems less promising for revenue enhancement.

5. Experiences at other institutions suggest that each option could, in principle, be implemented, although our study did not gather enough data to gauge the broader impacts or difficulty of implementation.

In the course of this work, the Task Force identified several issues that were not a part of our original directive that need to be integrated into any final decision concerning differential tuition options. These related issues include the budget allocation process, the structuring of financial aid and its impact on students' net cost, critical factors in students' choice of a university, the existing rationale for the differential based on residency, and the mechanism by which state funding is used to subsidize resident tuition.

The need to provide a timely report did not allow for sufficient gathering of student input. Such input needs to be obtained and integrated as well.

The recommendation of the Task Force is that differential tuition alternatives merit further consideration. There is potential for enhanced revenue, and differentiation could be accomplished in conjunction with financial aid policies that would conserve institutional values and support the institutional mission and strategic plan. The additional tuition revenue, if properly coupled with budget allocation instruments, could result in program enhancements to improve the competitiveness of university programs. Implementation would require investment, and thus the net revenue potential should be clarified. There are risks, however, in implementing a differentiated tuition regime, because such a policy requires additional and more sophisticated information than does a uniform tuition system. Predictability of tuition levels for students, on the other hand, does not seem particularly sensitive to the choice of a differential tuition structure. Because of the integration required with the broader financial aid, allocation, and state funding policies, the Provost and President should first decide how to integrate the Task Force findings with those policies. In the course of making that decision, broader student input should be obtained. At that point, a more refined revenue estimation should be carried out before making a final decision on the specific differential option and the size of that differential.

1. Task Force Charge

Provost Allen directed the Task Force to examine alternatives for charging differential tuition on the basis of different characteristics of students. The motivation for studying this issue was twofold: (A) a charge by the Regents (Sept. 16-17 Meeting, G.D. Memorandum #4) to look at various alternatives (listed below) from a revenue-neutral standpoint; and (B) a charge by the University to respond to requests for differentials to increase the budgets of specific programs and a broadening of the Regents charge to consider the potential for revenue gain through differential charges. The Task Force was to consider alternatives from the standpoints of fairness, ease of implementation, effect on revenue, effect on enrollment, and predictability. The Task Force aimed at providing a report giving advantages and disadvantages of various options and, if possible, a recommendation.

Alternatives identified by the Board of Regents on which to base differentials were by institution, by degree program, by class standing, and by credit hours.

Because differential charges for graduate and professional programs are already allowed and much of graduate tuition is not paid directly by students, we did not consider this differential in any depth. We also did not look at charges for off-campus offerings or on-campus continuing education.

2. Method of Task Force Operation

Members appointed to the Tuition Task Force are (in alphabetical order)

Mark Chidister, Exec. Asst. to the President
Larry Ebbers, Professor of Education
Charles Glatz, Professor and Chair of Chemical Engineering (Task Force Facilitator)
Angela Groh, Undergraduate Student
Kathy Jones, Registrar
GianCarlo Moschini, Professor of Economics
Gregory Palermo, Professor of Architecture
Diwakar Ramanathan, Graduate Student
Ellen Rasmussen, Asst. Provost
Roger Stover, Professor of Finance
Pat Strah, Budget Officer

The Task Force met weekly beginning in October. The initial charge was refined to that stated above by iterative exchanges with the Provost. The Task Force identified data that would be germane to its work and assigned appropriate members to gather that data from sources that included the offices of Institutional Research, Admissions, Registrar, and Financial Aid on this campus and contacts with other universities currently using tuition differentials. Subgroups were formed to analyze specific aspects of the problem and each was then scheduled to give reports to the entire Task Force. The outcome of this phase was an informed listing of the advantages and disadvantages of the alternatives. The Task Force then identified a subset of the alternatives

most in need of a revenue impact study before final evaluation. With the revenue impact estimates added to the earlier considerations of fairness, ease of implementation, recruitment and retention, effect on revenue, predictability, program quality, accessibility, student choice of study, time to degree, and – to a limited degree – the differential application of financial aid, the Task Force considered their recommendation.

The Task Force's intent was to solicit student input (beyond the student members of the Task Force) at this point by means of forums for additional consideration of student reaction in the report recommendation. However, because this point was reached just before finals week, it was not reasonable to schedule forums. Additional student input should be sought in the near future, possibly at the beginning of the spring semester.

3. Guiding Principles in Evaluation

In making our deliberations, members of the Task Force identified what we felt were the institutional values of ISU's mission. In particular, two principles in guiding our evaluation were recognized: (1) ISU's commitment to accessibility and (2) the value of flexibility in students' choice of study. We also assessed our understanding of the Regents principles guiding the current tuition policies. We judged those to be that (a) undergraduate tuition should be the same at the three Regent universities; (b) tuition of Iowa residents should be subsidized; (c) nonresident student tuition should support the full cost of their education; (d) graduate and professional programs may charge more; and (e) students, once enrolled, should have free access to a degree choice.

4. Differential Tuition Alternatives: Preliminary Considerations

Before addressing the advantages and disadvantages of alternative differentials, a number of overall factors need to be discussed.

4.1 Basis for charging differential tuitions

Students attending ISU are highly heterogeneous with respect to a number of important attributes (such as family background and cultural heritage, disposable income, personal aspirations and career goals, learning abilities, nationality and/or state of residence). Furthermore, once at ISU, students pursue a variety of paths leading to different educational "products." A differential tuition policy would recognize such heterogeneity and differences as a rationale for charging different monetary amounts for attending ISU.

Students' willingness/ability to pay. Some students have a higher willingness to pay than do others for what ISU has to offer. That means their choices are less sensitive to tuition increases. By charging more to students who are willing to pay more, in principle, the University can increase tuition revenue while reducing the impact of that change on enrollment. This is essentially the "demand"-driven rationale exploited by firms (such as airlines) that try to increase profit by charging a different price for a seemingly similar product.

Cost of providing education. Some programs at ISU are considerably more costly to provide than are others. For example, training in science and engineering is generally considered costlier than in the humanities. A uniform tuition can then be construed as an implicit subsidy for the expensive programs at the expense of cheap ones, which raises considerations of "efficiency" (is this the best way for an institution to finance the provision of differentiated products?), as well as of "equity" (is the implicit subsidy fair to the students?).

Value of the product. It is believed that an ISU degree in some disciplines offers better earning potential than in others. This may be related to reasons specific to the economics of a field and/or discipline (e.g., information technology vs. philosophy), or may be related to the relative national standing of a program. Should ISU charge more for its more valuable products? It should be noted that this notion is somewhat subsumed in the willingness-to-pay rationale (individuals are willing to pay more for more valuable products, *ceteris paribus*) and in the cost-of-education rationale (better programs tend to be more costly, *ceteris paribus*, although clearly it does not follow that programs that cost more are better).

4.2 The role of student aid

Because a good share of student aid is based on "need," it is clear that ISU is already engaged in an extensive differential tuition practice. Specifically, a uniform tuition policy coupled with extensive need-based aid results in a differentiated net cost for attending ISU. Essentially, at present, students are sorted according to their ability to pay and charged a different net tuition accordingly. Whereas the Task Force has not analyzed current aid practices with any depth, we note that for FY 2003, ISU allocated 20% of undergraduate tuition income to undergraduate financial aid (Regent policy dictates that at least 15% be used in this manner). It appears that 75% of this aid was awarded on the basis of need, with 52% of the aid going to in-state students. Either as a cause or as a result of this financial aid policy, the average level of need is higher at ISU than at the other two Regent universities. At any rate, it is apparent that the interaction of any differentiated tuition policy with student aid will have to be studied closely.

4.3 Differential tuition and the ISU budget allocation process

Given the charge to the Task Force, especially part (B) of section 1 above, Task Force members felt that an evaluation of the advantages and disadvantages of alternative differential tuition policies could not be abstracted from the current process of allocating the University's general budget (which includes tuition revenue), nor from the implicit reallocation that would derive from any particular mechanism that links a differential tuition policy to specific programs.

Our modest review of allocation of the budget indicates that it is influenced by some mix of history (previous allocations), cost of delivery, external salary competition, competitive program offerings at alternative institutions, and student clock hours. In particular, there appears to be no explicit link, at present, between tuition revenue generation and general budget allocation. For example, the College of Liberal Arts and Sciences currently claims about 38% of the general budget allocation while providing about 52% of the student credit hours.

Of course, assuming that the additional revenues from the differentials would follow the students paying the higher amounts, the revenues could lead to higher quality and hence more attractive programs. Similarly, assuming a portion of additional revenues are allocated to areas of the University not charging the differential, additional programs could also improve in quality.

But it is important to understand that tuition increases, *ceteris paribus*, tend to decrease demand, resulting in two counteracting effects on total revenue: a positive effect (higher tuition) and a negative effect (lower enrollment). A mechanism that explicitly allocates a tuition increase would effectively "decouple" positive and negative effects, with direct implications for the allocation of tuition revenue (to the detriment of the general budget, which is not earmarked). Specifically, if the rules used to allocate the "common pool" of tuition revenue remain unchanged, every unit (i.e., college or program) would have a strategic incentive to seek differential tuition when the latter can be "appropriated" (as with the mechanism of tuition surcharges, for example).

5. Advantages and Disadvantages of Alternative Tuition Differential Options

In this section we list the main advantages and disadvantages that were identified as being relevant to the various tuition differential alternatives under consideration.

5.1 Tuition differentiated by INSTITUTION

The possibility considered here is that the three Regent institutions be allowed/mandated to charge different tuition. To a minor degree, some differentiation already exists. A new policy in this respect, therefore, may be expected to pursue a much more systematic differentiation, possibly moving from what is essentially a two-tier system to a three-tier system.

ADVANTAGES

1. Differentiated tuition rates could better match those of the peer institutions with which each competes.

2. ISU and SUI are both doctoral extensive institutions while UNI is not. A differential tuition may reflect that difference.

DISADVANTAGES

1. A generalized differential tuition between ISU and SUI is *not* viewed as an advantage from the perspective of ISU.

2. Similar programs could end up having different costs at each institution, thus changing enrollment patterns to the detriment of the higher-priced program, while perhaps requiring enrollment management in the lower-priced program.

3. Differences in tuition cost may complicate transfers between institutions, and/or provide an incentive for opportunistic behavior by students.

Additional COMMENTS

1. Differentiating by institution may be an alternative (strategic) approach to differentiating by program in order to focus on the specific missions of the different institutions and to provide the means of achieving excellence in those missions.

2. Narrowed missions will hinder student choice at any one institution.

3. It could be argued that a more appropriate alternative would be to differentially distribute state support.

5.2 Tuition differentiated by DEGREE PROGRAM

The possibility considered here is that of charging different base tuition rates depending on the major (specifically, the degree program) chosen by the students.

ADVANTAGES

1. Different tuition rates could reflect the different costs of providing training in a particular program, thereby addressing an issue of efficiency in education provision as well as the issue of equity with respect to students (the users of higher-cost programs pay more).

2. Different tuition rates could reflect the different demand elasticities for various programs. Programs in high demand could charge relatively more. This would address the revenue-enhancement motive for charging differential tuitions.

3. Insofar as programs that cost more or that are in high demand also provide greater earning potential for their graduates, a fairness argument could be invoked to justify why differentiated tuition could be more equitable from the point of view of students.

4. This type of tuition differentiation could be a strategic means of enhancing excellence in selected programs.

DISADVANTAGES

1. The differential would violate a philosophy of providing to each what is needed and/or desired at a uniform cost, which perhaps offers greater access to educational opportunities. Such access is viewed as a core value of this land grant institution.

2. The differential could bias career choices and complicate changes of major.

3. If such a differential tuition were to be applied "by college," the criterion may be too coarse for some colleges (e.g., LAS and Agriculture) because these colleges include very different programs, both in terms of their cost of delivery and in terms of quality (relative to competing institutions).

4. Students majoring in the more costly programs would still take many courses in other areas, raising the question of how additional tuition revenue could/should be distributed.

5. Competing programs at other institutions that are not charging a differential would obtain a price advantage.

6. Programs at ISU that are not enrollment-limited are more likely to suffer enrollment declines in response to higher tuition than those at peer institutions where enrollment limits have provided a pool of unmet demand.

Additional COMMENTS

1. Applying the differential only to upperclassmen in the differentiated program would lessen the opportunity for students to take non-optimal paths through the curriculum (such as delaying their declaration of major).

2. A number of peer universities have implemented the same differentials so that ISU may not be put at a competitive disadvantage.

3. Experiences at a small number of institutions suggest that such differentials may not hurt enrollment.

5.3 Tuition differentiated by STUDENT CLASSIFICATION

The possibility considered here is that of charging different tuition to students depending on their classification by year (i.e., freshman, sophomore, junior, or senior). The presumption, further articulated below, is that lower-division students (freshmen and sophomores) would be charged less and upper-division students (juniors and seniors) would be charged more.

ADVANTAGES

1. This type of tuition differentiation could reflect the lower cost of instruction that is typically associated with lower division courses. Thus, it could be viewed as more equitable from a student's perspective.

2. Freshman students arguably have the most flexibility, and thus their choices may be more sensitive to tuition rates. This provides a "demand" justification for this method of implementing differentiated tuitions.

3. Lower beginning tuition rates would allow ISU to compete more effectively with alternative institutions.

DISADVANTAGES

1. Implementation could be complicated by the various ways that class standing is attained or might be avoided, such as the following:
   a. Some credits are earned in high school, transferred, earned by test-out, or earned in pursuit of an earlier/abandoned choice of major that do not apply to the current major.
   b. Graduating with more credits will become more costly because a higher percentage would be taken at the higher rate. Programs such as honors and music courses that draw students taking "extra" credits would become more costly for students, as more credits would be earned with upper-class standing.
   c. Students might delay transfer of credit, test-out, etc., to delay change of classification.

2. There could be lost revenue from students who leave the University before taking the higher-cost credits.

5.4 Tuition differentiated by NUMBER OF CREDITS

The possibility considered here is that of charging different tuition to students depending on the number of credit hours that they take. It should be noted that the current system already envisions tuition differentials based on credit hours taken (with undergraduate students achieving the maximum tuition level at 12 credits). Many alternative schemes are possible here. One would be a linear tuition schedule, with a constant per-credit tuition rate. Another possibility would be a multi-tiered system (e.g., one rate up to 12 credits per semester, another rate for 12-18 credits, yet another rate for credits above 18 per semester). Obviously, a more coherent discussion of advantages and disadvantages would have to specify explicitly which alternative is being considered. Nonetheless, the following general considerations are offered.

ADVANTAGES

1. This system might be viewed as more equitable.

2. Cases of students starting courses with the plan of later dropping something would be reduced (however, with the current drop limit this benefit is not expected to be very significant).

3. Relative to differentiating tuition by classification, here there is no benefit to manipulating advancement since graduation requires a fixed number of credits regardless of the number taken per semester.

DISADVANTAGES

1. Students would be less likely to enrich their education by taking exploratory and/or minor courses.

2. Students currently taking greater numbers of credits are more likely to be those whom the University wishes to attract:
   a. High-ability students
   b. Honors program students
   c. Nonresident students
   d. Those taking performance/health classes who contribute positively to the campus climate and personal well-being.

3. Implementation of this tuition differential could be quite complex. Charging of tuition would require reprogramming; ongoing adjustments would be more frequent, though past experience is that most credit changes are completed by the current fee assessment date. Though payments would not be affected, billings (done at an earlier time) would be.

4. Determination of financial need and awards would be complicated.

5. Term-by-term predictability of tuition costs for families would be hindered. A tier added beyond 18 would be less problematic for predicting total enrollment and would have less impact on revenue.

6. Impacts on Revenue and Enrollment: Some Simulation Results

To provide a benchmark on the potential impact on enrollment and revenue of alternative tuition structure, we developed a simulation model that implements in a coherent way the basic critical features of the problem at hand. We elected to consider explicitly two differentiated tuition structures: tuition differentiated by student classification (e.g., junior or senior), and tuition differentiated by college. [Note that our choice of the "by college" criterion is meant to be a proxy for a more detailed system that differentiates by degree programs.] The model implements consensus beliefs about the different degree of responsiveness associated with the underlying differentiated demands. In this simulation we considered only full-time undergraduate students, but we did distinguish explicitly students by their residency status.

The model was calibrated to the fall 2003 ISU enrollment and tuition data. Starting from that benchmark point, we considered the impact (on revenue and on enrollment) of a uniform tuition increase equal to $500 for in-state students and $1,000 for out-of-state students. Two differentiated tuition schemes were then compared to this uniform increase. The two differentiated tuition schemes were specified as follows. In the "by classification" scenario, upperclass students pay $400 more than underclassmen. In the "by college" scenario, design students pay $400 more and engineering students pay $500 more than all other students. To peg these relative differential schemes to an absolute level, two conceptual experiments were carried out. In the first, the two differentiated tuition schemes were calibrated to deliver the same total tuition revenue as the uniform tuition increase. In the second, the two differentiated tuition

schemes were calibrated to deliver the same total enrollment (number of students) as the uniform tuition increase.

More details on the model and on the results are reported in the memo "Alternative Tuition Structures – Comparison of Some Scenarios," included in the Appendix to this report. As a brief summary, Table 1 reports the main results in terms of revenue and enrollment. To understand this table, note that the uniform tuition increase (again, $500 for resident and $1,000 for nonresident students) is estimated to raise an additional $6 million, relative to fall 2003, while resulting in the loss of 927 students (*ceteris paribus*). Relative to such a uniform tuition increase, differentiating by student classification would increase revenue by an additional $353,313 or, if revenue is held constant, it can increase enrollment by 59. Alternatively, differentiating tuition by college, as described earlier, would increase revenue by an additional $1,374,114 relative to the uniform tuition policy or, if revenue is held constant, it can increase enrollment by 226. In conclusion, there seems to be some scope for positive effects of differentiated tuition on both enrollment and revenue. Although the marginal impacts are perhaps not great, they would seem more sizeable for the "by college" criterion than the "by classification" criterion.

Table 1. Summary impacts of two differentiated tuition structures

		Tuition Increase		
		Uniform	By Classification	By College
		Change from Fall 2003	Change from uniform	Change from uniform
Revenue-neutral Scenario	Revenue	$6,006,269	0	0
	Enrollment	-927	59	226
Enrollment-neutral Scenario	Revenue	$6,006,269	$353,313	$1,374,114
	Enrollment	-927	0	0

7. Summary Findings and Recommendations

The Task Force assessed the advantages and disadvantages of various bases for differentially charging tuition. Institutional and graduate/professional differentials did not receive thorough evaluation. The Task Force identified issues of budget allocation, financial aid, mechanism of state subsidy of educational cost, and the existing differentiation on the basis of residency that need to be integrated with this analysis before deciding on the best policy. Nonetheless, the Task Force did conclude that there is sufficient potential for maintaining institutional values while enhancing the University's educational mission to justify pursuing differential tuition as an option to be integrated with the other policy decisions.

The Task Force's deliberations resulted in the following conclusions regarding each of the differential tuition options we were asked to consider.

1. Although we did not pursue this question in great depth, our belief is that tuition differentials by institution may be appropriate for UNI but are not desirable for either ISU or SUI.

2. Tuition differentiation based on number of credits taken appears conceptually reasonable and straightforward. However, it raises the most questions as to operational difficulty from the standpoint of implementation and management of financial aid. It also has the greatest detrimental impact on students targeted for recruitment and the ability of students to take courses that enhance their educational experience at ISU.

3. Tuition differentiation by program may be worthy of further consideration. It could be justified based on student demand elasticities and varying costs of education across programs. Such a tuition differential would be more appropriate if applied after students are "officially" in a specific program (e.g., junior/senior standing in the major). There is some concern that such differential tuition may conflict with the perceived institutional values of access to education and student choice. Among the alternatives we considered, tuition differentiation by program perhaps holds the greatest potential for increasing total tuition revenue. If tuition differentiation by program were to be implemented, however, budget allocation policies would need to be addressed at the same time in order to ensure fair allocation of the combined base and differential revenues.

4. Tuition differentiation by student classification (e.g., upper/underclassmen) may strengthen enrollment of new students but seems less promising for revenue enhancement.

5. Experiences at other institutions suggest that each option could, in principle, be implemented, although our study did not gather enough data to gauge the broader impacts or difficulty of implementation.

The recommendation of the Task Force is that differential tuition alternatives merit further consideration. There is potential for enhanced revenue, and differentiation could be accomplished in conjunction with financial aid policies that would conserve institutional values and support the institutional mission and strategic plan. The additional tuition revenue, if properly coupled with budget allocation instruments, could result in program enhancements to improve the competitiveness of University programs. Implementation would require investment and thus the net revenue potential should be clarified. There are risks, however, in implementing a differentiated tuition regime, because such a policy requires additional and more sophisticated information than does a uniform tuition system. Predictability of tuition levels for students, on the other hand, does not seem particularly sensitive to the choice of a differential tuition structure. Because of the integration required with the broader financial aid, allocation, and state funding policies, the Provost and President should first decide how to integrate the Task Force findings with those policies. In the course of making that decision, broader student input should be obtained. At that point, a more refined revenue estimation should be carried out before making a final decision on the specific differential option and the size of that differential.

8. Final Considerations and Issues for Further Study

In the course of its deliberation, the Task Force discussed a number of issues that, while not directly part of its charge, were nonetheless deemed quite relevant to the question of tuition differentiation. Of those, we single out the following issues as deserving of further study.

8.1 Resident versus nonresident tuition rates

Predictions based on current K-12 student enrollments in Iowa suggest that the number of Iowa high school graduates will decline considerably over the course of the next twelve years. Thus, enrolling nonresident students will become even more important to the viability of ISU. Because of the higher tuition paid by nonresidents, tuition income from these students is already critical to the University. The concern is that the repeated and steep increases in nonresident tuition rates implemented in the recent past may make it difficult for ISU to effectively compete for and expand its recruitment of out-of-state students. The issue of what is the optimal resident/nonresident tuition rate differential, from the specific viewpoint of ISU, would seem to be strategically important and in need of further study.

8.2 A new mechanism for resident/nonresident tuition differential?

An entirely different way of approaching the task of using state funds to subsidize residential tuition rates was discussed. ISU could develop a single tuition schedule for both resident and nonresident students, possibly differentiated by degree program and/or student classification. Resident students would then get a rebate calculated from the state budget appropriation. In that way, ISU would not discriminate according to residency but could ensure that state dollars are used only to subsidize Iowa students. In addition to making transparent the extent of state support for state students, such a method would have the additional potential of reducing budget uncertainty at ISU. While the Task Force did not explicitly consider this option, the consensus is that such a radically new mechanism may deserve further analysis and study.

9. Appendices – Subcommittee Reports

1. External Peer University Comparisons (Chidister, Stover)
2. Current Operation (Jones, Glatz)
3. Implementation Issues (Strah, Groh)
4. Student Response (Groh, Ramanathan, Ebbers)
5. Allocations (Palermo, Strah, Rasmussen)
6. Economic Factors Affecting the Demand for College Education (Moschini, Wohlgemuth)
7. Alternative Tuition Structures – Comparison of Some Scenarios II (Moschini, Wohlgemuth)

Appendix 1.

DIFFERENTIAL TUITION TASK FORCE

SUBCOMMITTEE ON EXTERNAL PEER UNIVERSITY COMPARISONS

MEMBERS: Mark Chidister, Roger Stover

Our charge was to expand the information that the Task force already has on the approaches taken by other universities with respect to the charging of differential tuition within the institution. Based on the last meeting of the Task force, we concentrated our examination on three categories: 1. Differential tuition/fees by discipline; 2. Differential tuition by class level; 3. Differential tuition by credit.

The telephone survey was managed by Gebre Tesfagiorgis, Director of Institutional Research at Iowa State University. His telephone contacts with counterparts at the sampled universities occurred on November 12-13, 2003.

Given the time constraint for compiling this information, the subcommittee elected to sample five universities. Three of those universities were selected according to their experience with differential tuition with the remaining two as a control sample of one university with close geographic proximity to Iowa State University and the other a peer institution that has not engaged in any differential tuition programs. The schools are University of Wisconsin, Madison (differential tuition by credit), Michigan State University (differential tuition by student class), University of Illinois (differential tuition by discipline and by credit), University of Nebraska (adjoining state university), and Texas A&M (no differential tuition)

Attached is the "Suggested Response Grid for External Feedback on Tuition Differentials" that the subcommittee sent to Institutional Research to aid in standardizing the survey. While it was used in the telephone contact, the interviewer was not always able to obtain information in each category.

Summary of Results

1. University of Wisconsin-Madison – differential tuition by credit

- Goal was to discourage students from taking over 18 credits and later dropping them. It proved very effective. Course drop rate decreased from 9% before to 4% after implementation.
- Implementation went smoothly primarily because the school already used per credit tuition for part-time students
- Effect on revenue was never considered. Likely minimal.
- Student response – not a controversial issue; no opposition.
- UW-senior administration does not support differential tuition by discipline primarily because it would cause students to delay declaring a major and the claiming of added revenues by selected deans/department heads would lead to resentment from others.

2. Michigan State University – differential tuition by student class

- This feature began about 30 years ago.
- Goal was to charge more for upper division classes because they tend to be smaller and cost more.
- No known problem with implementation. Later the decision to implement a tuition guarantee did cause greater operating costs. The guarantee was repealed.
- Hard to say about student response that long ago. It is currently accepted as an integral part of the tuition structure.
- Additional revenue was created and not difficult to measure based on the number of student credit hours generated at the upper division level.

3. University of Illinois – differential tuition by discipline and credit

- 1982-3, differential tuition by class was initiated; abandoned 10 years later in favor of differential by discipline
- Focus on "high cost, high demand and nationally competitive programs" such as engineering, architecture and business.
- Students were actively consulted on the change, particularly in how the revenues would be distributed. Because of this active consultation, there was no opposition from students. It was agreed that 5% would go to the university general budget.
- Student class demand was not affected; no impact on diversity of students in the affected programs either.
- Implementation was "quite a challenge" because the computing system was old and difficulties were encountered until new system was in place.
- Added revenue of about $5 million was generated by switch to differential tuition by discipline.

4. University of Nebraska – no tuition differentials

- Added technology fees for courses in engineering, computer science and architecture. This fee is $10 per credit when taking courses in these disciplines. Primary motivation – cover the higher costs of such coursework.
- This was not controversial from students' perspective particularly when the cost differences were recognized.
- No implementation problems for the added fee.
- Fee revenue stays with the programs in question.

5. Texas A & M University – no tuition differentials

- Currently looking into tuition differential by discipline. Main affected programs would be business, engineering and architecture.
- Revenue is a "driving force" but not the only factor.
- This consideration is now the focus of a university committee established for that purpose.
- This tuition differential by discipline is now less actively being pursued because the state of Texas recently deregulated tuition, allowing state universities to charge tuition as they see fit. In the past, the state established a maximum beyond which the universities could not charge

The subcommittee felt that these interviews did yield a unique perspective. Unfortunately, the sample was small given the time constraints and all of the considerations we wanted information on (see the attached grid) could not be covered. We would be happy to extend the information base further if needed.

Appendix 2.

Summary Report on Current Operation
Kathy Jones and Chuck Glatz
November 12, 2003

Scope

Our group look at current enrollment patterns at the University to see how much direct effect changes in the tuition charging algorithm would have. Data obtained included the following:

- Distribution (or average) of credits taken as influenced by upper/lower division, residency, college, GPA, H.S rank, membership in Honors, imminent graduation.
- Drop activity by time executed.
- In some cases historical data was reviewed – the trends were very similar from term to term (for terms recent enough not to include any significant rule changes).

Observed Trends

1. Since the rule change that limited the number of drops students are allowed during their tenure:
    a. Most drops occur early most in the first week before any fee is charged or the drop counts toward the limit and the next largest number in first 3 weeks before the course counts in fee assessment.
    b. These early drops are largely offset by adds during the same period.
    c. Later drops counting toward the limit are usually tied to poor performance (leading to midterms).
    d. Dropped credit frequency rises with the total number of credits enrolled (3% of students <12 cr total to 16.7% of students with 18 or more cr). The largest number of those droppers are students with the average number of credits (somewhat lower frequency but greater pool size).
2. There are trends indicating (in most cases the differences are not highly significant statistically) that the students taking higher credit loads are:
    a. Nonresidents rather than residents (15.0 cr vs. 14.7 cr overall with the largest difference at the junior level, 15.5 vs. 14.7).
    b. Better students (by measures of ISU GPA or entering H.S. rank)
        i. 15.35 for top 10% H.S. vs 14.55 for 50-59%ile.
        ii. Approx. 15 cr for GPA>3.5 vs. 14.4 for GPA 2-2.5.
    c. Honors students who average 16.3 cr take more than the high GPA students.
    d. Of those taking 18+ cr.
        i. About 1/6 are Honors program, about 1/3 are GPA 3.5-4.0.
        ii. Total number is 10% of Honors students and 2.5% of non-Honors.
        iii. Honors students are almost 5% of students.
    e. Underclass rather than upperclass. Senior classification, the largest grouping takes 14.2 (wide s.d. = 3.3) vs 15.0 for underclass. Seniors in their final term are lower still – 13.5 cr. In contrast, upperclass nonresidents have the higher frequency of taking 18+ cr.
    f. Enrolled in Spring (higher loads) than Fall – small but consistent difference going back five years (or more not checked).
    g. More likely Ag than Business; however, differences among colleges are so small (and the variability within colleges relatively high) that historical data (this was one semester only) will likely show other outcomes.

Conclusions from data

1. Three (or two depending on your perspective) groups highly valued by the University – nonresidents, high-ability students, and participants in Honors – would see a larger impact of going to a per credit charging scheme.
2. Drops counting toward the limit might decrease but the impact on drops before the billing period would be inconsequential.

Additional expectations based on reflection rather than data

1. The rooms in most demand are those with larger capacity and could be better utilized if courses were offered at less desirable times. However, this is not being pursued by departments primarily because of instructor preference. One department judged most constrained by room availability was consulted – the Math department. They confirmed this reason and added that their experience with 8 a.m. and 4 p.m. classes is that students would sign up when nothing else was available; however, attendance was markedly lower. Hence, differential by time of offering does not seem worth pursuing.
2. There would be a decrease in the numbers taking minors, honors seminars, and music (performance) and Exercise classes since these are often not applied to graduation. These are courses that enrich the campus climate, health, and competitiveness of our graduates. This could be examined by looking at what courses appear in the NA category of the degree audit.
3. Credit requirements for degrees became more uniform several years back so credit charging would not translate into higher cost for particular majors. The data would be available in the catalog to better assess this.
4. Among undergraduates, the current most "differential" charge is the computer fee (+$224/AY for Engr and + $138 for ComSci and MIS). The higher charge paid by engineering students has no perceived impact on choice of major. This higher cost should be compared to differences in scholarship availability among colleges, but this data would need to be obtained. (College choice – for the same major – has been influenced by this e.g. Food Science through FCS or Ag). Engineering reports that differentially higher tuition at other schools has not hurt enrollments.

Appendix 3.

Tuition Task Force Sub-Committee on Implementation Issues

Pat Strah and Angela Groh
November 11, 2003

Although this is a tremendously important topic, we have unfortunately be given the shortest of timelines to identify possibilities and evaluate among different choices and offer observations and issues if not a recommendation. To that end, this represents a relatively brief level of examination on the question of implementation issues if there were changes to Iowa State University's current tuition structure.

In the full committee we have discussed examining differential tuition in primarily three approaches: by major/course/college, by student level – lower versus upper, and by number of credits. A brief mention of tuition differentials by campus was made but not included. Also it was immediately determined that of the three, implementation of differential tuition by major/course/college would be the most difficult.

By Major/Course/College

Obviously, a differential tuition based on any combination of major/course/college would require tracking of each student as they move through their education in much greater detail than simply knowing that they are taking "x number of credits." In a meeting last week, Marc Harding from the Admissions Office was talking about students in general and some of the trends his office is seeing as they work to recruit students. The one he mentioned that is particularly relevant here is the increasing numbers of students indicating undecided when taking the ACT or SAT. The numbers are more than double any other category of choice. At Iowa State University, the percentage is running over 20% of our students beginning as undeclared. How this fact would be handled in this choice would require a great deal of thought.

Possible implications of this choice might be:

*****more students entering and remaining as undeclared to avoid added tuition costs, perhaps longer than would be advisable.
*****curriculum might be determined more by the cost of tuition rather than the interest and talents of the student.
*****delayed decisions may have implications for colleges in determining potential enrollments and the associated needs, i.e. number of faculty, classrooms, labs etc.
*****changes in major/college mid-stream would impact tuition but when and how.
*****much greater involvement by Registrar's office to determine appropriate tuition requiring a complex database, programming changes.

Student input and questions gathered over the past several days:

*****How do you designate tuition when a student is pursuing a double major?
*****What happens when a student decides to declare a minor?
*****How will minor changes in minors/majors during a semester affect students?
*****"College is a time to experience new things. However, if I it comes down to the point where I can save money by taking as few classes as possible I will."
*****"If a student is interested in a program like engineering and it is more expensive than the rest of the programs why would they choose to come to ISU? Why not go somewhere that tuition is the same for every program."
*****"People will be mad that you are putting one program over another."
*****Will funds be split into accounts for each college/major or will all tuition be funneled into a general account?

*If you increase tuition on the state level, will it go up by percentage for each college or by a single increment?
*"Let's say I drop a class at 7 ½ weeks. Do I pay tuition for that class?"

By Student Level

This approach would seem to be easier to implement than by major/course/college. It would require less individual tracking and tuition would be assessed according to their level: lower level (freshman and sophomores) or higher level (juniors and seniors). Although not specifically mentioned, it would be assumed that the higher tuition levels for graduate students and professional students would continue to be at a higher rate than either of the lower or higher levels.

Implementation would require programming changes in the Registrar's office to tie the student level to the correct tuition rate. This is based on the assumption that the level is determined by the total number of credits taken by the student and not influenced by the course level (100-400) being taken by the student. Kathy Jones had visited with Mike Barron from UI who indicated that their task force had received negative comments on this approach from the University of Minnesota. They had tried this and found that one of the unintended consequences was that students did what they could to avoid being promoted to junior status until the latest point possible.

Financial aid determination would require some adjustments. However, some aid is already based on level, such as Veterinary Medicine, which implemented a surcharge that is being grandfathered in so currently there are two different tuition rates based on class.

Possible implications for this choice might be:

*students may want to refuse specific transfer credits that will not apply so class level is delayed.
*students may delay reporting enrollment at other institutions until after promotion to upper division (junior status).
*definition of lower/upper for students bringing in 30-60 credits of AP, PSEOA, etc.
*students purposefully taking fewer credits to remain at lower level at end of term, such as 59 credits rather than 60, to delay move to upper level.
*incoming freshmen may find a lower rate more competitive with community colleges and decide to attend ISU.
*students may perceive as more fair and equitable given the accepted premise that lower level instruction is less expensive. Regents require on a biennial basis that the institutions provide a Unit Cost Study. For FY01 for ISU, lower division cost of instruction was $6,926, upper division was $9,621, composite undergrad $8,402, graduate and professional programs markedly higher with the overall composite at $9,957. (This was also supported in some of the readings.)

Student input and questions gathered over the past several days:

*"Does this increase dropout rates after two years of college?"
* "Students are going to try and stay sophomores as long as possible."
*How would this affect financial aid?
*What if students attend community colleges during the summer and then don't send their transcripts until they get enough ISU credits to be declared earlier.
*"This is not a good promotion for the soar if four program."

By Credit/Tiered Credit Levels

This option appears to be used by many of our peers and Big 12 institutions. In visiting a number of institutional websites, it becomes apparent that there is great variability in how this option is applied: different if resident or non-resident (University of Arizona residents are per credit up to 6 and then

charged full-time, but non-residents are per credit up to 11 and then full-time), different in how many credits is considered full-time (Purdue 8 credits, University of Nebraska-Lincoln 15 credits), different in tiered levels, etc.

What we currently do not have, and would be valuable in our assessment, is a reporting from other institutions concerning their experience in examining this tuition structure and why they switched or why they did not change or changed to a different model.

The only thing currently available is a copy of a report that the North Dakota University System made in 1998 to their State Board of Higher Education "Per-Credit-Hour Report". This appears to be a fairly thorough look at their situation and what issues were examined. Apparently this institution had been involved in tuition model discussions for at least ten years. In fact the Board approved a temporary three-year experiment at one campus to move to the per-credit-hour method. However, after only two years, the campus asked to revert back to the flat-tuition charge structure (like ISU). Although there was a dramatic drop in enrollment there were a number of things occurring at the same time, such as tuition increases and reduced program and services due to budget reductions. It was difficult for them to identify a single factor so were unable to determine if the experiment was a success or failure. The report contained a summary table of pros and cons of the per credit model and included issues of units:
Business Office: effects of adds and drops, refund policy, collaborative arrangements between campuses, third party payers, student budget, tuition revenue, ease of understanding and administering the model.
Registrars Office: effects on credit hour loads, effects on liberal arts classes, graduation requirements.
Financial Office: effects on students' financial aid, i.e. how many credits is full time and would they adjust for more/less in determining aid.
Other: competitive advantage with competing institutions in and out of state, value of current model to students.

A look at the NDU website reveals that they did not change their tuition structure. An e-mail has been sent to the budget director (a member of the committee) inquiring about why they did not change and any information that might be helpful to us.

It would seem ISU would have like concerns and would need to investigate the pros and cons. Some of the same issues were mentioned by our Financial Aid Office, specifically the struggle in determining a financial aid budget on a moving target. Currently aid is awarded based on full-time status and adjusted manually downward for students who are less than full-time. If we use per credit, then ISU will need to choose a standard level of credits, such as 15, on which to award but then make adjustments either downward or upward on the basis of actual enrollment. Or, if financial aid were based on 12 credits would students view this negatively from an unmet assistance need? Would financial aid costs increase? How would our aid packages fair in the market place in comparison to other institutions? Since the fee assessment process is not automated, this means any fluctuation from whatever is standard will require a manual adjustment. This would be a huge investment in time until it could be automated and interactive between fee assessment and financial aid. This would be a fairly substantial redesign and expensive.

The Registrar's office has a number of concerns, primarily focused on the choices that students would make, such as:
-will enrollment patterns change, i.e. fewer students
-will some of our better students go elsewhere to avoid increased tuition costs
-will students take fewer: honor courses, exploratory courses, music courses, double majors/minors
-will they avoid special programs that carry credit costs, such as study abroad
-will they test out of more courses
-will they transfer in more courses taken at lower cost institutions?
Additionally, any change in our fee assessments will require redesign and programming changes, again an expensive and time-consuming project.

Any change to the current methodology would present challenges in estimating tuition revenues. Certainly the course/major/college would be most problematic with absolutely no information/trends

available to help in “guessing” what our students would choose. The lower/upper level methodology would be somewhat easier but again no history available to help with the prediction. The gathering of data would need to link the level with the number of credits, not impossible but would require programming changes in the Registrar’s office. The per-credit would be the easiest, in some respects, because a report already exists that lists the numbers of students by credit levels. HOWEVER, all the concerns listed above would impact student behavior and their choice in the number of credits. Revenue estimates would have to be very cautious and conservative until data was available.

A tiered approach could also use the student/credit report mentioned above. If we were to consider a minimal change, such as our current per credit rate up to 11 credits, full-time rate for 12-18 credits, and then either a per credit for 19+ or as one institution has, just an additional flat charge for the 19+, the revenue projection could be done with our current data. A quick look at data over the last four years revealed that approximately 350-400 resident students and 170-180 non-resident students take more than 18 credits. AGAIN, the same caution would be necessary as above and we would probably want a very conservative projection until data could be gathered after implementation.

Conclusion

Any change to our tuition assessment would create numerous challenges, many of which have been detailed above. In all probability, there are other issues beyond what we have mentioned. Implementation would require programming changes for any of the models identified by the committee. Revenue projections would be most difficult until data could be gathered reflecting changes in student behavior. However, that said, additional investigation is probably warranted and should continue.

Appendix 4.

Suggested Response Grid for
External Feedback On Tuition Differentials

Differential Tuition Options				
	By Campus	By College	By Student Class Level	By Credit Hours
Efficiency of Operation				
Implementation				
Student Demand Elasticity				
Student Response				
Others				

Alternative Tuition Task Force
Allocation Sub-Committee

11/12/03

Progress Report

Gregory Palermo
Pat Strah
Ellen Rasmussen

We have exchanged e-mails, but have yet to meet. We have shared thoughts on what information would be helpful to making judgments regarding differential tuition charges keeping in mind the following:
~ What differential tuition/fee charges and potential correlated allocation strategies would be deemed fair to those students being charged higher tuitions or specialized fees?
~ What is the basis for establishing base funding in preparation for correlated differential tuition charges and allocations accruals as noted in the provost's comments regarding the charge to the Task Force?

SUBGROUP CHARGE

Our subgroup of the Alternative Tuition Task Force (Task Force; TF) has the principal charge of inquiring into current allocations for the General University units and how allocations may be affected by differential tuition/fees.

The TF has been asked to look at tuition/fee policy alternatives within two models. The Regents have asked for alternatives in a revenue neutral situation, leaving open allocation policies. (p. 3, G.D. 5, 10/6/03, Regents docket.) The provost has indicated both differential allocation of tuition to programs/units charging higher tuition, and market competitiveness are part of the study (10/24/03 Glatz e-mail on Charge elaboration).

From an allocation perspective there are perhaps three major questions:
1) Would/ought tuition/fee differentials beyond the current ones lead to differential allocation of resources in some way? In essence, is this a plan for funding reallocation? We speculate that there will be expectations that additional differential tuitions will result in differential allocations. We've established a precedent with the recent additional charge to Vet Med students and with the distribution of the differential computer fees.
2) If tuition, which accounts for approximately 43% of the $ for the General University, is differentially allocated, how would that differential allocation be decided?
3) What might be potential broad rationales for allocation or reallocation of the other 57% of income resources? In re 2) and 3): in general, the basis for the expenditure allocations would likely be tied to the basis for the differential tuition.

This may seem like the charge for the work of the whole Task Force, but whereas the TF is expected to recommend what we ought to do, our work is that of information gathering to assist in decision making.

WHY LINK ALTERNATIVE TUITION INCOME TO ALLOCATIONS?

The TF has been asked to research alternative tuition/fee structures and policies. There may be several reasons for such an inquiry. (See G.D. 4, 9/8/2003, p. 8) Here are a few others: a) fairness to students based upon the number of credits they are taking (e.g., the current part-time, full-time structure is not reflective of actual student practice in progress toward degrees, credits taken per semester, etc.); b) fairness to students based upon the cost of providing their education (e.g., students in more expensive programs/courses should pay more, enabling students in less expensive programs/courses to pay less); c) market based pricing (e.g., charge differentials based upon cost of programs, or potential of earned income from a degree, or on marketplace elasticity); d) entrepreneurial pricing (e.g., marketplace tuition gains go to the entities that can charge more for tuition); e) leveraging differential tuition/fees to accomplish fundamental reallocation of resources to units of the university. There is also the issue of whether alternative tuition structures may be more efficient to operate than the current models.

It would seem that any differential tuition/fee charging policy, unless those proceeds are to be lumped into the general financial pot as they are now, automatically entails a correlated calculus of allocation.

UNDERSTANDING BASELINE FUNDING FOR THE GENERAL UNIVERSITY

Here is GP's naïve best shot:

Income: Tuition and fees, state appropriations, other income, and sales and services income go into one pot of $. Tuition comprises about 43% of income at this time.
Allocation: Each unit (college, library, business and finance, administration) gets a block grant from the melded pot to meet historic cost needs (salaries, equipment and space, materials and supplies), and some modest reallocation based upon growth or market equity, and some modest differential allocation based upon special fees that are outside the general fund.

Pretty clean and direct.

CURRENT TUITION DIFFERENTIALS AT ISU

- Resident and non-resident tuition, each with an associated differential part-time, full-time undergrad, and part-time, full-time grad tuition charge (all melded into the funding pot)
- Uniform fee charges (except for assigned fees, these are melded into the funding pot)

• Computer fees for engineering, MIS and CompSci (charged and allocated differentially), and managed outside the block budget given to the college. This approach, by the way, compounded through time, exacerbates other units inability to reposition themselves with regard to IT since the university administration and the Regents have been loathe to enable other differential charges.
• Vet Med, as a largely professional graduate college has a fundamentally different tuition from the rest of the university.

Regents rationale for differential tuition surcharges at SUI: "Students enrolled in specific [graduate] colleges pay the surcharge in addition to the university's base tuition and receive the benefits of additional resources." (p. 6, G.D. 5)

CURRENT ALLOCATION INFORMATION TO ASSIST THE TASK FORCE

Only a couple of potential new differential tuition/fee charging policies might lead to melding into a general fund while still being seen as 'fair': paying for credit hours actually taken; paying for credit hours taken by level. In these instances, a student is paying his or her fair share of the cost at the time they are taking various courses and credits. Thus, the entire pool of $145.5M (FY03) need not change, but there would differential contribution per student on a pay as you go basis.

Virtually all other schemes lead to some kind of differential allocation of tuition/fees. Otherwise, differentially higher charges would seem to be unfair to students. On the other hand, differential tuition/fee allocation would almost surely privilege some units of the university over others unless non-tuition funding from other sources is changed. Any effort to not only charge but to allocate tuition and fees in a differential manner in the mode outlined by the provost requires an understanding of base funding allocation of tuition as well as $ from other sources.

To help in assessing impacts, accessibility to the university, pitfalls of various approaches with respect to equity, etc., the following current baseline statistics would be helpful:

1) Provide a table arranged by college with budget allocation in $ and ratio to total collegiate budgets, number of enrolled students in each college and ratio to total enrolled students, and SCHs and ratio to total SCH's offered. This table can be sifted from the information provided by Mark C. on 10/22.
2a) What is the cost per SCH by college in $: college budget divided by SCH offered by that college.
2b) What is the cost per SCH by department: departmental budget divided by SCH offered by the departments in each college
3a) What are the number of SCHs offered by level by college: 100-200, 300-400, 500+
3b) What are the number of SCHs offered by level by department: 100-200, 300-400, 500+
4a) What are the number of SCHs taken by enrolled students in their home college; and

4b) What are the number of SCHs taken by enrolled students outside their home college
5a) Tuition allocation Method 1 (Method 1 assumes that the tuition share is evenly distributed throughout all units funded within the General University allocation and thus some tuition dollars support administration and operations). After deducting approved computer surcharges and other differentially allocated fees, what is the 'hypothetical $ allocation' of tuition dollars to each college: 43% of remaining base budget; and
5b) What is the allocation of financial resources from other sources to each college: 57% of remaining base budget.
Example for 5 a & b; Ag

College budget:	$14,725,112	(8.9% of total college budget allocations)
Tuition share source:	$06,331,798	(43% of Ag budget allocation)
Other source share:	$08,393,314	(57% of Ag budget allocation)

6) Tuition allocation Method 2 (Method 2 assumes that tuition revenues are allocated only to the colleges per Mark C.'s models of 10/22, and that only income from other sources is used to fund administration and operations.) Arrange a table with the following for each college: Base budget and ratio to total college budgets; assign tuition $ to each college based upon budget ratio and determine the ratio of the college budget covered by tuition; determine the remainder $ funded by all other sources.
Example for 6; Ag:

a) College budget (Chid10/22):	$14,725,112	(8.9% of total college budget allocations)
b) Tuition share(8.9%x$145.5M):	$12,949,500	(87.9% of Ag budget allocation)
c) Other source share (a-b):	$01,775,612	(12.1% of Ag budget allocation)
d) Tuition # enrolled (Chid10/22):	$14,746,431	(10.1% of total tuition)
e) Tuition # SCH (Chid10/22):	$11,730,000	(8.1% of total tuition)

7) Cost of SCH: university norm, for courses by level: 100/200; 300/400; 500 and higher
8) Are their normative useful processes for trying to understand actual expense per SCH or per enrolled student that are any finer grained than the factors Mark C. used or that have been requested? Do we have any information on how the U of Illinois operates with different tuitions by college – basic organizational structure, benchmarks for expense and budgeting, for fiscal independence, trading SCH charges among the collegiate units, charges for central services, etc.?

AVAILABILITY OF REQUESTED INFORMATION

Much of the requested information appears to be available based upon our exchanges so far. We expect to have it available by Friday morning.

USING WHAT WE GATHER:
EXAMPLES OF THE TYPE OF ANALYSIS WE MIGHT PURSUE AS A TASK FORCE

Our objective is to have a database that would inform our discussions relative to various proposals that may be made. Even if we decide <u>not</u> to go forward with a proposal, we would probably need to prepare a statement on how we reached the decision.

Case Example #1: Mining some of the data we already have (Chid10/22), in considering a hypothetical tuition alternative: differential tuition charges by college with a correlated differential distribution by college.

Method 2 (Item 6 above; based upon the tables provided by Mark C on 10/22) appears to reveal at least four interesting factors regarding tuition income and allocation by college for our consideration: 1) The extreme degree to which Vet Med is underwritten by general resource funds when tuition income from either enrolled students or SCHs taught is factored; 2) That college based tuition differential based upon college enrollment if accrued to (or implicitly – deducted from) a unit is risky business. It would privilege a college such as Engineering given that distribution based upon Student Enrollment pushes their tuition funding 21% above their budget allocation, while their SCH load is 43% below their allocation -- when compared to a college such as LAS where enrolled students only generate 73% of budget share, while SCHs delivered factor is 138% of their budget ratio. Which means -- engineering collects the premiums while LAS teaches their students (or it means that an SCH in Engineering is extremely expensive while an SCH in LAS is extremely inexpensive; or a bit of both); 3) From an SCH teaching load perspective only three colleges are underfunded relative to normed budget share: LAS, Business and Education in that order – meaning these are teaching sinks for other colleges' SCH spin-offs or they are underfunded to base SCH obligations; 4) But -- the approach in Method 2 fails to take into account faculty salaries, teaching loads and actual share of college budgets allocated to teaching, equipment and space expense for teaching, etc., factors that only exacerbate the difficulty in determination of reliable factors for unit (college, department or program) based differential tuition charges and allocations.

Method 1 (Item 5 above) does not shed any light on the determination of a reliable base for differential charges and allocation either. Tuition as a percentage of college budget has no correlation to teaching obligations, or the # of students enrolled; it is simply a share of block grant allocation which in total is sufficient to cover collegiate expenses.

The conclusion from this sample case is that only a cost specific need, determined by some much more fine-grained detailed analysis of expenses versus current allocations, would support differential tuition or fees accruing to an academic unit. Such an approach is difficult to define as a matter of general policy, which is presumably what the Regents and the provost are seeking.

Some economic factors affecting the demand for college education[1]

GianCarlo Moschini and Darin Wohlgemuth[2]

November 11, 2003

0. Background and Summary

GianCarlo Moschini and Darin Wohlgemuth met twice, and were joined by Diwakar Ramanathan at one of these meetings. The discussion centered on some economic features of demand for college education that were deemed relevant for the current discussion concerning alternative tuition structures. This memo is to report on the subject of our discussion. Briefly, the empirical models of enrollment demand indicate that tuition is an important factor in the decision to attend Iowa State University. In addition, there seems to be support for these other tentative conclusions:

- There is a negative relationship between enrollment and tuition cost, other factors held constant.
- The elasticity estimates indicate that an increase in tuition will lead to a decrease in enrollment, although this decrease is expected to be less than proportional.
- The demand for enrollment appears to have become more sensitive to tuition cost in recent years.
- New student enrollment appears to be more sensitive to tuition rates than does continuing student enrollment.
- Over the longer run, the expected declining number of high school graduates in Iowa may be an important variable to consider in the context of alternative tuition strategies.

1. The demand for college education

A student's decisions concerning college education are many and complex, encompassing such diverse questions as where to go, what to study, how to finance it, as well as whether to seek higher education at all. Many factors influence such decisions, including one's personal aspirations and career goals, individual learning abilities, family background and cultural heritage, and disposable income. An economist looking at the problem may view education choices as an investment in human capital, and emphasize the trade-off between the expected benefits (in terms of increased skills, which impact favorably one's lifetime earning potential) and its costs.[3] The relevant costs here include the opportunity cost of time and, perhaps more directly, the monetary costs of tuition and fees (and room and board).

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[1] Memo prepared for the Task Force on Alternative Tuition Structures, Iowa State University.

[2] Department of Economics and Enrollment Services, respectively, Iowa State University.

[3] An alternative viewpoint is to consider education as a "signaling" device, which allows higher-ability individuals to differentiate themselves in the marketplace. Whereas in such a context education, *per se*, may have little intrinsic value, a student's demand for education still depends on a similar set of factors.

Such monetary costs are becoming more prominent in decisions about higher education, given the nationwide trend towards higher college tuitions experienced in recent years.

The foregoing considerations apply to an individual decision process, and individuals are highly heterogeneous in the attributes that affect their college education decisions. But what is often of more direct interest is the "aggregate demand" for college education, which is obtained by integrating individual choices over the distribution of the heterogeneous parameters in the population. More specifically, in our context we are interested in the demand for college education at Iowa State University, as measured by the number of students that elect to pursue college education at this institution (enrollment). Two sets of factors that affect such a demand in a direct way are (i) the demographics of high school graduates, and (ii) the cost education (relative to comparable alternatives).

2. Demographics

The great majority of first-time college students come from the set of newly graduated high school students. The dynamics of the population of new high school graduates is illustrated in Figure 1. Nationwide, the expansion of high school graduates ended in the mid-1970s, and was followed by a decline until the early 1990s. Since 1995, the number of U.S. high school graduates has grown steadily. The dynamics of Iowa high school graduates, the group that has traditionally generated the largest number of first-time ISU students, parallels that of the United States as a whole, with a few differences. One such difference is that, unlike the nation, the number of high school graduates in Iowa has not grown in the last five years. In fact, as Figure 2 illustrates, this lack of growth of Iowa high school graduates is expected to become a fairly clear downturn in the near future, with a 16% drop over the next 11 years. This reduction in the number of Iowa high school graduates is expected to represent a considerable challenge to ISU's efforts to maintain and expand the size of its student population, especially in the new climate of increasing tuition costs.

3. The rising cost of college education

The cost of college tuition has been increasing steadily in real terms (that is, after accounting for the effect of inflation) since 1980. The College Board data reported in Figure 3 illustrate such a tuition cost increase for three separate groups of institutions: 4-year private universities, 4-year public universities, and 2-year public colleges. The evolution of the cost of tuition and fees at Iowa State University, illustrated in Figure 4, follows the pattern of the national trend for 4-year colleges (but with steeper increases in the last two years). Notably, the cost of tuition for non-resident students has increased much more, in real terms, than the corresponding cost for resident students.

4. The "elasticity" of education demand

Faced with such large increases in the cost of college education, a relevant question is whether this higher education cost is likely to affect students' demand for college education. The earlier brief discussion of demand for education suggests that the standard feature of consumer behavior, known as the "law of demand," should apply in our context as well. Specifically, this principle says that, *ceteris paribus*, the quantity demanded of a good or service is inversely related to its own price. The fact that demand (enrollment) is responsive to price is just a qualitative statement, of course. What one would like to know is "how responsive" the demand of interest is to a change in own price, and the notion of "elasticity" addresses such quantitative properties of a demand function.

It should be clear at the outset that there are several "demands for education" that may be of interest, each with different properties. For example, one may consider the aggregate demand for a 4-year college education in the United States (all schools, all fields), or one may consider the demand for education at a specific institution such as Iowa State University. The former would be expected to be less responsive to changes in tuition cost than the latter, for example, because in the latter case there are many other institutions that can substitute for the services provided by Iowa State University. Thus, to have a meaningful discussion about demand elasticity, one ought to be clear about which demand is being analyzed. To be explicit, let y denote the aggregate demand for educational services at a given institution (as measured by student enrollment, for example). Similarly, let t denote the cost of tuition and fees at this institution (measured in \$/year, say), and let x denote the vector of all other relevant variables affecting the demand for education. The latter includes, as per the above discussion, the price of alternative education providers, eligible population (i.e., number of high school graduates), per-capita disposable income, availability of student aid, access to credit, etc. Given that, the demand function for education at a given institution may be written as $y = f(t, x|q)$, where q is a vector of parameters linking the "explanatory" variables (t, x) to the "dependent" variable y. The elasticity of this demand with respect to the price of education may therefore be defined as

$$e \equiv \frac{\partial f(t,x|q)}{\partial t}\frac{t}{f(t,x|q)} \cong \frac{\%\Delta y}{\%\Delta t} .$$

Thus, the elasticity tells us the percentage change in demand (enrollment) associated with a given percentage change in price (tuitions). The law of demand predicts that the elasticity e is a negative number, but its magnitude is an empirical question. The magnitude e, of course, matters a lot. If $e < -1$ we say that demand is "elastic," and in such a case a change in tuition would bring about a more-than-proportional change in enrollment (implying, *inter alia*, that total tuition revenue would decreases as a result of a tuition increase). If $-1 < e < 0$, on the other hand, we say that demand is "inelastic," and in

such a case a change in tuition would bring about a less-than-proportional change in enrollment (implying that total tuition revenue would increase as a result of a tuition increase).

5. Elasticity estimates for Iowa State University

As much as knowledge of tuition elasticities may be desirable, estimating their value is a difficult task. Taking the above framework as a reference, one needs to specify the function $f(t,x|q)$, including the unresolved question of which variables exactly should be included in x; and, one needs to estimate the (unknown) parameter vector q using appropriate data and statistical procedures. A number of subjective choices are necessary in this process, and data limitations may come into play, such that alternative estimates of e are possible. To pursue the question in more detail, we have carried out some estimation using a model maintained by Darin Wohlgemuth. The main purpose of this model is to forecast ISU enrollment, but its specification is also suitable for the calculation of some benchmark tuition elasticities for four different models pertaining to education demand at Iowa State University. Specifically, the left-hand-side variables of the four models are, respectively, (i) first-time student enrollment, resident, (ii) first-time student enrollment, nonresident, (iii) continuing student enrollment, resident, and (iv) continuing student enrollment, nonresident.[4] The main conclusions that one can make are as follows:

- All tuition elasticities of interest have a point estimate in the inelastic range (i.e., $-1 < e < 0$). Thus, it appears possible to increase total tuition revenue at ISU by raising tuition and fees.
- But, estimates appear statistically different from $e = 0$, and some are close to $e = -1$, suggesting that higher tuitions are partly offset by declining student enrollment. (Recall that $e = -1$ implies that tuition changes are exactly offset by opposite enrollment changes, leaving total tuition revenue unchanged).
- Enrollment of first-time students appears more responsive to increased tuitions than does the enrollment of continuing students.

7. Preliminary conclusions

The demand for college education confronting any one institution, such as Iowa State University, is bound to have some sensitivity to changes in the level of tuitions. The extent of this "elasticity" will

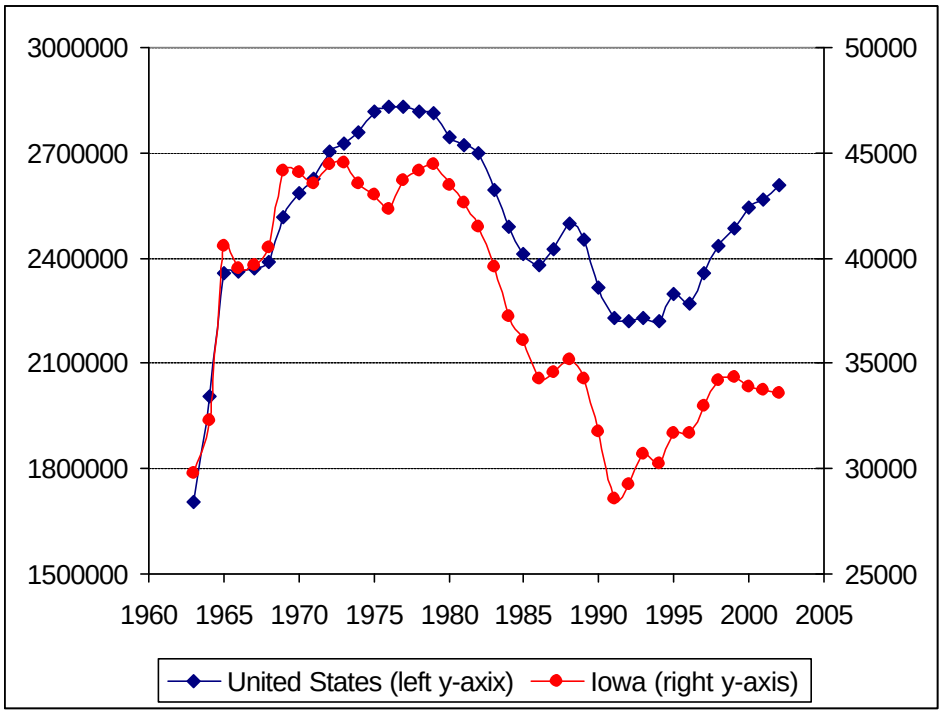
[4] The database used to estimate these models is at the county level for the Iowa "resident" models, and at the state level for the "nonresident" models. The functional form of the four models is essentially the same (a log-log formulation, except for dummy variables), but the specification of the conditioning variables x differs across models. For example, the specification of the models for first-time students includes the number of high school graduates (in the corresponding county or state, whichever applies), whereas that variable is not deemed relevant for modeling the number of continuing students. The nonresident models controls for higher education spending variations across states, but do not control for the recent enhancement to nonresident recruitment initiatives.

depend on the availability of close "substitutes." Thus, for example, a critical factor for resident enrollment at ISU is likely to be the cost of tuitions at the other regent institutions. A substantial change to the virtual parity of tuition policy across regent institutions, which has been followed historically, may trigger possibly sizeable responses. Hence, any unilateral tuition policy change (i.e., affecting ISU but not the other regent institutions) would need to be scrutinized very carefully. Conversely, substituting some of the training at ISU with education at a state 2-year community college is an option that may appeal to an increasing number of students. As noted earlier, first-time students at ISU appear to be more sensitive, vis-à-vis the cost of tuition, than continuing students. Thus, one of the differential tuition schemes under discussion (i.e., where lower division students pay a lower rate than upper division students) may hold some appeal for Iowa State University.

As for nonresident enrollment, it appears that out-of-state tuitions have taken a disproportionate share of recent tuition increases. Tuitions for nonresidents at ISU are not unlike those at comparable institutions (they are actually lower than the average of our peer institutions). A major moot point in the current state of affairs needs to be addressed, however. At Iowa regent institutions, nonresidents are expected to pay, at a minimum, the full cost of their education, such that state appropriations subsidize only resident student tuitions. But when tuitions are increased to offset a decrease in state appropriations (presumably unrelated to the actual costs of providing education), it is not obvious why the increase ought to affect nonresident tuition rates. Yet, nonresident tuitions have increased considerably more than resident tuitions (recall Figure 4). Whereas this trend is not limited to Iowa institutions of higher education, one should remember that the demographics of Iowa are not necessarily the same as elsewhere. In particular, for example, if one wanted to increase the size of the undergraduate population at ISU, it is unclear how that objective could be achieved without a strong contribution by the out-of-state student pool.

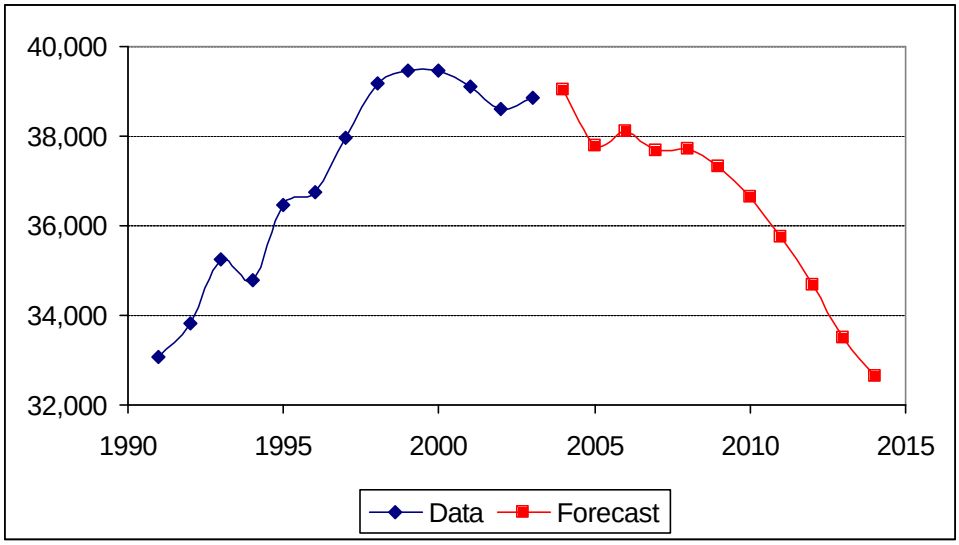
We also discussed other features of some of the changes in the tuition structure being discussed, including (i) tuitions proportional to the number of credits, and (ii) tuitions differentiated by major and/or College. The consensus was that such changes are bound to trigger an adjustment in behavior by those students that are most directly affected by the change. The direction of such behavioral changes can probably be inferred from a simple decisional model. For example, a tuitions-by-the-credit scheme is likely to reduce the number of students taking a credit overload, without a corresponding increase in student participation at the lower level. Similarly, charging differential tuitions by College within ISU may trigger strategic behavior on the part of students and may require additional monitoring costs to ensure that unintended effects do not take place. In any event, based on the data at our disposal, we believe that quantifying such behavioral changes is likely to be quite difficult. We decided to postpone serious discussion of related issues until the alternatives are clarified.

Figure 1. Number of Public High School Graduates, United States and Iowa (1963-2002)



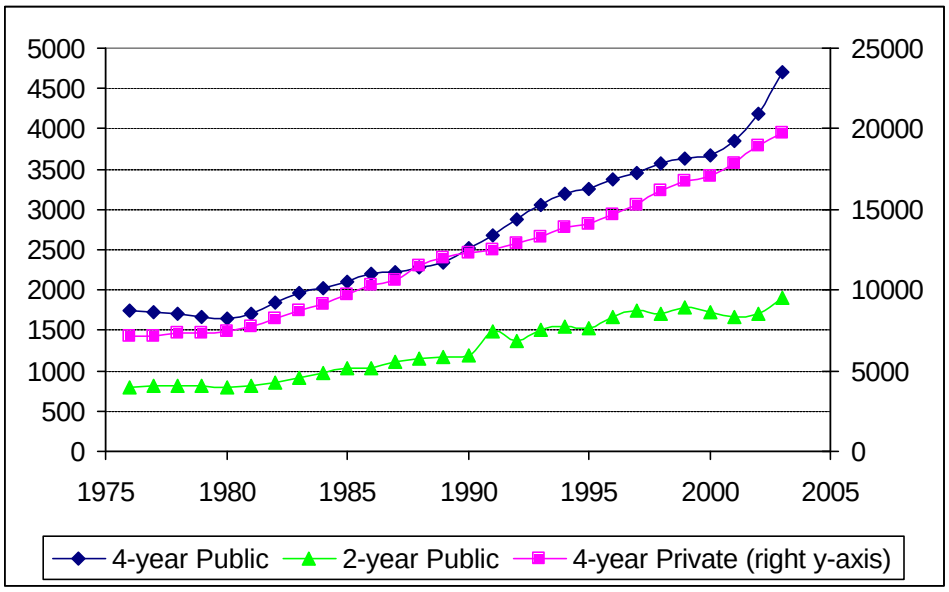
Source: Digest of Education Statistics, National Center for Education Statistics, U.S. Department of Education.

Figure 2. Number of Grade 12 Students in Iowa: 1991-2003 (Data), and 2004-2014 (Forecasts)



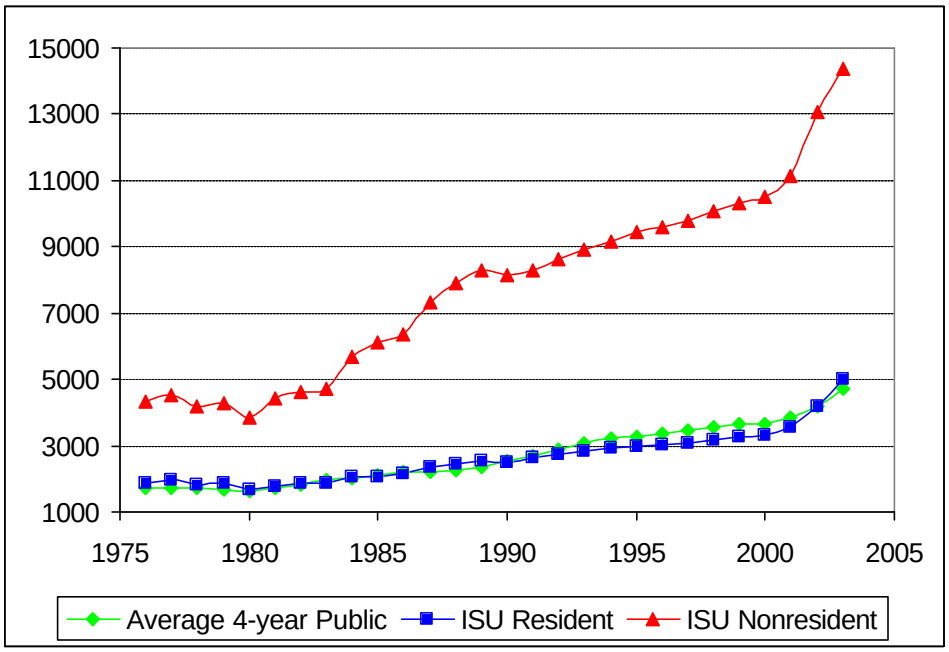
Source. Data: Iowa Department of Education. Forecasts: our model.

Figure 3. Average Tuition and Fees at U.S. Universities, 1976-2003
(real prices expressed in 2003 dollars)



Source: College Board nominal data, deflated by CPI.

Figure 4. Tuition and Fees at Iowa State University, 1976-2003 (real prices expressed in 2003 dollars)



Source: Fact Book, Institutional Research, Iowa State University; Historical Records of the Office of the Registrar, Iowa State University, and College Board.

Alternative Tuition Structures – Comparisons of Some Scenarios[1]

GianCarlo Moschini and Darin Wohlgemuth[2]

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0. Summary

Here we illustrate how the problem of quantifying the potential impact of alternative tuition structures can be handled in a coherent way. Specifically, we develop a simulation model to assess the impact on enrollment and revenue of two structures: tuition differentiated by student classification (i.e., junior or senior), and tuition differentiated by college (as a proxy for a more meaningful system that differentiates by degree programs). It should be noted that the model developed could be adapted to assess other alternatives as well. The model implements consensus beliefs about the different degree of responsiveness associated with the underlying differentiated demands. In this simulation we consider only full-time undergraduate students, but we do distinguish explicitly students by their residency status. The model is calibrated to the fall 2003 ISU enrollment and tuition data. Starting from that benchmark point, we consider the impact of a uniform tuition increase equal to $500 for in-state students and $1,000 for out-of-state students. Two differentiated tuition schemes are then compared to this uniform increase. In the "by classification" scenario, upper class students (juniors and seniors) pay $400 more that lower division students (freshmen and sophomores). In the "by college" scenario, design students pay $400 more, and engineering students pay $500 more, than all other students. To peg these relative differentials to an absolute level, two conceptual experiments are carried out. In the first, the two differentiated tuition schemes are calibrated to deliver the same total tuition revenue as the uniform tuition increase. In the second, the two differentiated tuition schemes are calibrated to deliver the same total enrollment (number of students) as the uniform tuition increase. The results illustrate that there may be some scope for enhancing revenue or enrollment by implementing differential tuitions. The potential impact is larger when differentiating by college than by student classification. Sensitivity analysis illustrates the fact that a sound implementation of differential tuitions requires more detailed information than that necessary for a uniform tuition, and that there exists the potential for adverse unanticipated effects on both revenue and enrollment. Finally, we illustrate how the method of implementing differential tuition may interact with the budget allocation process. Among other things, it emerges that the use of a surcharge method may be a particularly poor way of implementing differential tuition by programs.

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[1] Memo prepared for the Task Force on Alternative Tuition Structures, Iowa State University.

[2] Department of Economics and Enrollment Services, respectively, Iowa State University.

1. Objective

The task here is to evaluate the impact on revenue and enrollment of different tuition structures. For a differential tuition to be of interest, relative to a uniform tuition, it is necessary to have heterogeneity in the underlying demand for education at ISU. Thus, the first step is to model heterogeneity in a coherent manner.

2. Modeling Framework

We postulate an aggregate demand function for education at ISU that is downward sloping and linear:

(1) $y = a + bt$

where y is the number of students enrolled, t denotes tuition, and (a,b) are demand parameters satisfying $a > 0$ and $b < 0$. Now suppose that the aggregate demand reflects individual demands with different responsiveness. The demand for each homogeneous "group" is written

(2) $y_i = a_i + b_i t \quad , \qquad i = 1,2,...,N$

such that, at least locally, we have $a = \sum_{i=1}^{N} a_i$ and $b = \sum_{i=1}^{N} b_i$.

3. Calibration of Parameters

Based on statistical analysis of historical data, we have some prior information on the aggregate demand "elasticity," which, given our model, can be expressed as

(3) $$e \equiv \frac{\partial y}{\partial t}\frac{t}{y} = \frac{bt}{y}.$$

But to simulate the impact of differentiated tuition, we need to know individual group elasticities, which are defined as

(4) $$e_i \equiv \frac{\partial y_i}{\partial t}\frac{t}{y_i} = \frac{b_i t}{y_i}.$$

Because little is known about such individual group elasticities, we proceed by noting that, by definition,

$$e \equiv \sum_{i=1}^{N} e_i \frac{y_i}{y}. \tag{5}$$

This is useful because we have stronger prior beliefs on the value of the aggregate elasticity e. Next, note that we know the current enrollment and uniform tuition rates. Let this initial point be denoted by overstruck bars. Thus, currently we have a common tuition $\bar{t}$ and we observe $\bar{y}_i$, $i = 1,2,...,N$, and of course $\bar{y} = \sum_{i=1}^{N} \bar{y}_i$. Given that, the simulation involves the following additional steps:

(a) Start with a value of $\bar{e}$ which is believed accurate based on statistical analysis of aggregate data.

(b) Assume proportionality coefficients among the various group elasticities $\bar{e}_i$ to reflect prior beliefs (e.g., demand for program A is twice as responsive to tuition increases than program B).

(c) Given the value of $\bar{e}$ [as per point (a)] and the assumed proportionality coefficients [as per point (b)], compute group elasticities $\bar{e}_i$ by using equation (5) along with observed $\bar{y}_i$ and $\bar{y}$.

(d) Given the computed $\bar{e}_i$ and the observed $\bar{y}_i$ and $\bar{t}$, compute individual demand parameters a_i, b_i.

4. Evaluation of Alternatives

Given the individual demand functions in equation (2), with calibrated parameters as described, uniform or differential tuition increases can be modeled as an increase in t, away from $\bar{t}$, and impacts on enrollment and revenue can be tracked. As the benchmark, we use enrollment and tuition data that apply in the Fall semester 2003. In the foregoing notation, these data provide the observations for $\bar{y}_i$, $\bar{y}$, and $\bar{t}$. Next, we need to specify a value for the aggregate elasticity $\bar{e}$. From prior statistical analysis we know that demand is generally "inelastic," and that it is more inelastic for resident students than for nonresident students. Which values are "correct" very much depends on the context. If ISU were to unilaterally raise tuitions, for example, different elasticity values would apply than if ISU tuition changes were matched by competing institutions. As a reference point, we start with the following values:

Resident students demand:	$\bar{e}^R = -0.4$
Nonresident students demand:	$\bar{e}^N = -0.6$

Finally, we need to make assumptions about which demand is more elastic and which demand is less elastic. Table 1 reports the coefficients of proportionality between group elasticities that we postulate.

Table 1. Coefficients of proportionality for elasticities

By College:			By Classification:	
Agriculture	1.0		Freshmen	1.4
Design	0.5		Sophomores	1.1
Education	1.0		Juniors	1.0
Engineering	0.33		Seniors	1.0
FCS	1.0			
Business	0.67			
LAS	1.0			

To discuss these coefficients briefly, note that Agriculture, Education, FCS, and LAS are assumed to have the same base elasticity. Engineering demand is assumed to be the most inelastic (one-third of base values). Design is assumed to have the next most inelastic demand (one-half of base values), and Business is also assumed to have more inelastic demand (two-thirds of base values). Similarly, looking at responsiveness of demand by classification, we posit that junior and senior students have the same responsiveness, whereas sophomores are 10 percent more responsive, and freshmen are the most responsive to a tuition increase (40 percent more elastic).

5. Results

We analyze three scenarios:

(1) A uniform tuition increase.

(2) A tuition increase differentiated by classification.

(3) A tuition increase differentiated by college.

Scenarios (2) and (3) were constrained to generate (approximately) the same total revenue as scenario (1) (i.e., they are revenue neutral relative to the uniform increase). We differentiate between resident and nonresident tuition, but we confine ourselves to analyzing undergraduate full-time students only. As noted elsewhere, our belief is that the "by college" method is too coarse if the intent is to differentiate by degree program, but this is the best approximation given the time constraint for this study.

Specifically, for the uniform tuition increase we considered the effects of a $500 increase in resident tuition and a $1,000 increase in nonresident tuition. These changes correspond to a 11.5% increase for in-state tuition and a 7.3% change for out-of-state tuition. The first configuration of tuition

structures that we considered is reported in Table 2. Clearly, there are many differentiated schedules that would yield the same revenue as a uniform increase (given the parameters of the model). What are reported here are just one such possibility for each of the two differentiation criteria: "by classification" and "by college"). Specifically, when differentiating "by classification" the solution we are illustrating generates a $400 differential between lower-division and upper-division students, whereas when differentiating "by college" our solution entails a $500 differential for engineering students and a $400 differential for design students. Furthermore, the particular configuration derived here is calibrated so that the two differentiated tuition structures generate the same revenue as the uniform tuition increase (in that sense they are "revenue neutral").

Table 3 reports the impact of the changes considered on revenue. Note that the uniform tuition increase considered here leads to an overall revenue increase of 4.6%. That revenue increases at all is implied by our assumption that demands are inelastic (to a varying degree). But because elasticities are assumed to be different from zero, revenue will have to rise less than the percentage increase in tuition. As mentioned earlier, the simulations were calibrated such that the differentiated tuition scenarios generate the same total revenue as the uniform increase. Thus, the "by classification" and the "by college" scenarios raise the same overall revenue, although, of course, the distribution of the burden is different.

Table 4 reports the impact of tuition increases on enrollment. Under our parametric assumptions, the uniform tuition increase considered here leads to a loss of 927 students overall (a 4.6% decline). Both differentiated tuition increase scenarios improve student enrollment (relative to the uniform tuition increase). The effect is more pronounced in the "by college" differentiation scheme.

An alternative set of simulations uses the tuition structures illustrated is Table 5. Here, we keep the same absolute differentials implemented in Table 2 (+$400 for senior, relative to junior students; +$400 for design and +$500 for engineering, relative to all other college students), but the two differentiated scheme are designed so as to keep the same level of enrollment as a uniform tuition increase. In some sense, therefore, these simulations are more useful to quantify the "value added" of differentiated tuition in terms of total tuition revenue. Table 6 illustrates the impact of the alternatives considered on student enrollment, making it transparent that in these simulations enrollment is the same across alternatives. Table 7 illustrates the impact on tuition revenue of the uniform and differentiated tuition structures. Thus, for example, differentiating tuition by classification here raises an additional $353,313 relative to the uniform tuition increase, whereas differentiating tuition by college is even more effective, raising an additional $1,374,114 (relative to the uniform tuition increase).

Table 8 provides some sensitivity analysis to illustrate the fact that outcomes depend on the assumed values of elasticities. In particular, one may note that the potential "cost of ignorance" about

such parameters is not trivial. For example, if all elasticities were equal at the base point (instead of differing according to the proportionality coefficients of Table 1), implementing the tuition scheme of Table 2 would lead to a total tuition revenue loss of $790,742.

Finally, we wish to discuss briefly the implications of implicitly reallocating claims on tuition revenue via tuition differentiation by degree program (by college, in our case). The first question that needs to be answered is whether units charging higher tuition should have priority claim on the additional revenue that is generated. Indeed, that is arguably not a defensible position given the current budget allocation procedure in place. If the rules used to allocate the "common pool" of tuition revenue remain unchanged, every unit (i.e., college or program) would have a strategic incentive to seek differential tuition increases when the latter can be "appropriated." But even granting the premise that only selected programs would be allowed to raise differential tuition, it remains unclear how the resulting differential contribution to revenue ought to be evaluated.

Table 9 briefly summarizes the possible problem of implicitly reallocating claims on tuition revenue for the scenarios considered here, where two colleges (Design and Engineering) were presumed to charge differential tuition. The first column reports the difference between the college-labeled revenues that arise under the differentiated tuition scheme and the uniform tuition scheme (which, recall, generate the same overall revenue for the University). The second column, on the other hand, treats the differential tuition ($400 for Design and $500 for Engineering) as a "surcharge," such that the college-specific differential is computed by multiplying the surcharge by the number of students enrolled (after the tuition increase). Finally, the last column reports the additional total tuition revenue to Iowa State University. Table 9A illustrates the problem in a dramatic fashion. Because the tuition structures were designed to be revenue-neutral, the university gets zero additional tuition revenue from differentiating tuition by college. Yet, if the tuition differential were to be implemented as college-specific surcharges, Design would claim an extra $649,200 and Engineering would claim an additional $2,141,500 (and thus the general fund revenues from undergraduate tuition would be decreased by $2,790,700). Table 9B, being based on the enrollment-neutral scenario, allows for a net increase in total tuition revenue. But even here it is apparent that the net gain to the university is less than the college-specific tuition increase (relative to the uniform) and certainly far less than the values implied by the surcharge method. For example, the combined tuition differential when computed as a surcharge ($2,773,600) is twice as large as the actual increase in total tuition revenue ($1,374,114). Such comparisons illustrate that the mechanism selected to implement and distribute a differential tuition structure would have a crucial role. Indeed, every unit (i.e., college or program) would have a strategic incentive to seek differential tuition when the latter can be appropriated. Thus, the surcharge method would seem a particularly poor way of implementing a differential tuition structure.

Table 2. Uniform and Revenue-Neutral (Relative to Uniform Increase) Differentiated Tuition Schedules

		Increased Tuition								
	Fall 2003	**Uniform**			**by Classification**			**by College**		
			Change from Fall 2003			Change from Fall 2003			Change from Fall 2003	
	$	$	$	%	$	$	%	$	$	%
Resident										
Agriculture	4,342	4,842	500	11.5%				4,665	323	7.4%
Design	4,342	4,842	500	11.5%				5,065	723	16.7%
Education	4,342	4,842	500	11.5%				4,665	323	7.4%
Engineering	4,342	4,842	500	11.5%				5,165	823	19.0%
FCS	4,342	4,842	500	11.5%				4,665	323	7.4%
Business	4,342	4,842	500	11.5%				4,665	323	7.4%
LAS	4,342	4,842	500	11.5%				4,665	323	7.4%
Lower	4,342	4,842	500	11.5%	4,609	267	6.1%			
Upper	4,342	4,842	500	11.5%	5,009	667	15.4%			
Nonresident										
Agriculture	13,684	14,684	1,000	7.3%				14,289	605	4.4%
Design	13,684	14,684	1,000	7.3%				14,689	1,005	7.3%
Education	13,684	14,684	1,000	7.3%				14,289	605	4.4%
Engineering	13,684	14,684	1,000	7.3%				14,789	1,105	8.1%
FCS	13,684	14,684	1,000	7.3%				14,289	605	4.4%
Business	13,684	14,684	1,000	7.3%				14,289	605	4.4%
LAS	13,684	14,684	1,000	7.3%				14,289	605	4.4%
Lower	13,684	14,684	1,000	7.3%	14,437	753	5.5%			
Upper	13,684	14,684	1,000	7.3%	14,837	1,153	8.4%			

Table 3. Effects of Uniform and (Revenue-Neutral) Differentiated Tuition Increase: Gross Tuition Revenue

	Fall 2003	Uniform Increase			Increase by Classification		Increase by College	
			Change from Fall 2003			Change from Uniform		Change from Uniform
	$	$	$	%	$	$	$	$
Resident								
Agriculture	8,128,224	8,533,962	405,738	5.0%	8,555,381	21,419	8,403,021	-130,940
Design	5,436,184	5,877,399	441,215	8.1%	5,847,983	-29,416	6,062,050	184,651
Education	6,699,706	7,040,848	341,142	5.1%	7,061,958	21,110	6,930,389	-110,459
Engineering	12,465,882	13,622,147	1,156,265	9.3%	13,565,345	-56,802	14,338,906	716,759
FCS	4,276,870	4,492,746	215,876	5.0%	4,506,100	13,354	4,422,948	-69,798
Business	11,970,894	12,832,823	861,929	7.2%	12,858,769	25,946	12,540,266	-292,558
LAS	19,213,350	20,140,986	927,636	4.8%	20,145,373	4,387	19,843,329	-297,656
Lower	30,320,186	32,085,847	1,765,661	5.8%	31,306,134	-779,713	32,198,195	112,348
Upper	37,870,924	40,455,063	2,584,139	6.8%	41,234,773	779,710	40,342,714	-112,349
Total	**68,191,110**	**72,540,910**	4,349,800	6.4%	**72,540,910**	0	**72,540,910**	0
Nonresident								
Agriculture	4,105,200	4,126,727	21,527	0.5%	4,132,529	5,801	4,122,750	-3,977
Design	6,020,960	6,249,086	228,126	3.8%	6,239,876	-9,210	6,250,081	996
Education	3,776,784	3,797,890	21,106	0.6%	3,802,913	5,023	3,793,695	-4,194
Engineering	21,114,412	22,174,511	1,060,099	5.0%	22,137,629	-36,882	22,281,659	107,148
FCS	2,764,168	2,778,534	14,366	0.5%	2,782,423	3,889	2,775,909	-2,625
Business	8,908,284	9,162,341	254,057	2.9%	9,165,825	3,485	9,068,364	-93,977
LAS	16,954,476	17,011,664	57,188	0.3%	17,039,560	27,896	17,008,294	-3,369
Lower	32,171,084	32,820,362	649,278	2.0%	32,681,645	-138,717	32,877,654	57,292
Upper	31,473,200	32,480,390	1,007,190	3.2%	32,619,110	138,720	32,423,099	-57,291
Total	**63,644,284**	**65,300,752**	1,656,468	2.6%	**65,300,752**	0	**65,300,752**	0
Grand Total	**131,835,394**	**137,841,663**	6,006,269	4.6%	**137,841,663**	0	**137,841,663**	0

Table 4. Effects of Uniform and (Revenue-Neutral) Differentiated Tuition Increase: Enrollment

	Fall 2003	**Uniform**			**By Classification**			**By College**		
			Change from Fall 2003			Change from Uniform			Change from Uniform	
	Students	Students	Students	%	Students	Students	%	Students	Students	%
Resident										
Agriculture	1,872	1,762	-110	-5.9%	1,766	3	0.18%	1,801	39	2.20%
Design	1,252	1,214	-38	-3.0%	1,219	5	0.42%	1,197	-17	-1.40%
Education	1,543	1,454	-89	-5.8%	1,455	0	0.03%	1,486	31	2.16%
Engineering	2,871	2,813	-58	-2.0%	2,819	6	0.22%	2,776	-37	-1.33%
FCS	985	928	-57	-5.8%	929	1	0.07%	948	20	2.18%
Business	2,757	2,650	-107	-3.9%	2,653	3	0.10%	2,688	38	1.42%
LAS	4,425	4,160	-265	-6.0%	4,185	26	0.62%	4,253	94	2.26%
Lower	6,983	6,627	-356	-5.1%	6,793	166	2.51%	6,703	76	1.15%
Upper	8,722	8,355	-367	-4.2%	8,233	-122	-1.46%	8,446	91	1.09%
Total	**15,705**	**14,982**	-723	-4.6%	**15,026**	44	0.29%	**15,149**	168	1.12%
Nonresident										
Agriculture	300	281	-19	-6.3%	282	1	0.41%	289	7	2.67%
Design	440	426	-14	-3.3%	427	1	0.31%	426	0	-0.02%
Education	276	259	-17	-6.3%	260	1	0.40%	266	7	2.65%
Engineering	1,543	1,510	-33	-2.1%	1,512	2	0.15%	1,507	-3	-0.23%
FCS	202	189	-13	-6.3%	190	1	0.43%	194	5	2.67%
Business	651	624	-27	-4.2%	625	1	0.18%	635	11	1.71%
LAS	1,239	1,159	-80	-6.5%	1,166	7	0.63%	1,190	32	2.75%
Lower	2,351	2,235	-116	-4.9%	2,264	29	1.28%	2,268	33	1.48%
Upper	2,300	2,212	-88	-3.8%	2,198	-13	-0.61%	2,237	25	1.14%
Total	**4,651**	**4,447**	-204	-4.4%	**4,462**	15	0.34%	**4,505**	58	1.31%
Grand Total	**20,356**	**19,429**	-927	-4.6%	**19,488**	59	0.30%	**19,655**	226	1.16%

Table 5. Uniform and Enrollment-Neutral (Relative to Uniform Increase) Differentiated Tuition Schedules

		Increased Tuition								
	Fall 2003	**Uniform**			**by Classification**			**by College**		
			Change from Fall 2003			Change from Fall 2003			Change from Fall 2003	
	$	$	$	%	$	$	%	$	$	%
Resident										
Agriculture	4,342	4,842	500	11.5%				4,781	439	10.1%
Design	4,342	4,842	500	11.5%				5,181	839	19.3%
Education	4,342	4,842	500	11.5%				4,781	439	10.1%
Engineering	4,342	4,842	500	11.5%				5,281	939	21.6%
FCS	4,342	4,842	500	11.5%				4,781	439	10.1%
Business	4,342	4,842	500	11.5%				4,781	439	10.1%
LAS	4,342	4,842	500	11.5%				4,781	439	10.1%
Lower	4,342	4,842	500	11.5%	4,639	297	6.8%			
Upper	4,342	4,842	500	11.5%	5,039	697	16.1%			
Nonresident										
Agriculture	13,684	14,684	1,000	7.3%				14,574	890	6.5%
Design	13,684	14,684	1,000	7.3%				14,974	1,290	9.4%
Education	13,684	14,684	1,000	7.3%				14,574	890	6.5%
Engineering	13,684	14,684	1,000	7.3%				15,074	1,390	10.2%
FCS	13,684	14,684	1,000	7.3%				14,574	890	6.5%
Business	13,684	14,684	1,000	7.3%				14,574	890	6.5%
LAS	13,684	14,684	1,000	7.3%				14,574	890	6.5%
Lower	13,684	14,684	1,000	7.3%	14,512	828	6.1%			
Upper	13,684	14,684	1,000	7.3%	14,912	1,228	9.0%			

Table 6. Effects of Uniform and (Enrollment-Neutral) Differentiated Tuition Increase: Enrollment

	Fall 2003	Uniform Increase			Increase by Classification		Increase by College	
			Change from Fall 2003			Change from Uniform		Change from Uniform
	Students	Students	Students	%	Students	Students	Students	Students
Resident								
Agriculture	1,872	1,762	-110	-5.9%	1,759	-3	1,776	13
Design	1,252	1,214	-38	-3.0%	1,217	3	1,188	-26
Education	1,543	1,454	-89	-5.8%	1,449	-5	1,465	11
Engineering	2,871	2,813	-58	-2.0%	2,816	3	2,763	-51
FCS	985	928	-57	-5.8%	925	-3	935	7
Business	2,757	2,650	-107	-3.9%	2,647	-4	2,663	13
LAS	4,425	4,160	-265	-6.0%	4,169	10	4,192	32
Lower	6,983	6,627	-356	-5.1%	6,771	145	6,621	-6
Upper	8,722	8,355	-367	-4.2%	8,210	-145	8,361	6
Total	**15,705**	**14,982**	-723	-4.6%	**14,982**	0	**14,982**	0
Nonresident								
Agriculture	300	281	-19	-6.3%	281	0	283	2
Design	440	426	-14	-3.3%	426	0	421	-4
Education	276	259	-17	-6.3%	258	0	261	2
Engineering	1,543	1,510	-33	-2.1%	1,510	0	1,497	-13
FCS	202	189	-13	-6.3%	189	0	191	1
Business	651	624	-27	-4.2%	623	-1	627	3
LAS	1,239	1,159	-80	-6.5%	1,160	1	1,167	9
Lower	2,351	2,235	-116	-4.9%	2,255	20	2,235	0
Upper	2,300	2,212	-88	-3.8%	2,192	-20	2,212	0
Total	**4,651**	**4,447**	-204	-4.4%	**4,447**	0	**4,447**	0
Grand Total	**20,356**	**19,429**	-927	-4.6%	**19,429**	0	**19,429**	0

Table 7. Effects of Uniform and (Enrollment-Neutral) Differentiated Tuition Increase: Gross Tuition Revenue

	Fall 2003	Uniform			By Classification			By College		
			Change from Fall 2003			Change from Uniform			Change from Uniform	
	$	$	$	%	$	$	%	$	$	%
Resident										
Agriculture	8,128,224	8,533,962	405,738	5.0%	8,576,688	42,726	0.50%	8,490,327	-43,635	-0.51%
Design	5,436,184	5,877,399	441,215	8.1%	5,873,854	-3,544	-0.06%	6,154,834	277,435	4.72%
Education	6,699,706	7,040,848	341,142	5.1%	7,079,834	38,986	0.55%	7,003,989	-36,859	-0.52%
Engineering	12,465,882	13,622,147	1,156,265	9.3%	13,634,070	11,923	0.09%	14,589,803	967,656	7.10%
FCS	4,276,870	4,492,746	215,876	5.0%	4,517,410	24,664	0.55%	4,469,469	-23,277	-0.52%
Business	11,970,894	12,832,823	861,929	7.2%	12,907,836	75,012	0.58%	12,733,382	-99,442	-0.77%
LAS	19,213,350	20,140,986	927,636	4.8%	20,194,715	53,729	0.27%	20,042,026	-98,959	-0.49%
Lower	30,320,186	32,085,847	1,765,661	5.8%	31,411,968	-673,879	-2.10%	32,573,949	488,102	1.52%
Upper	37,870,924	40,455,063	2,584,139	6.8%	41,372,438	917,375	2.27%	40,909,880	454,816	1.12%
Total	**68,191,110**	**72,540,910**	4,349,800	6.4%	**72,784,406**	243,496	0.34%	**73,483,829**	942,919	1.30%
Nonresident										
Agriculture	4,105,200	4,126,727	21,527	0.5%	4,132,789	6,061	0.15%	4,126,216	-511	-0.01%
Design	6,020,960	6,249,086	228,126	3.8%	6,255,986	6,900	0.11%	6,309,845	60,759	0.97%
Education	3,776,784	3,797,890	21,106	0.6%	3,803,252	5,362	0.14%	3,797,268	-622	-0.02%
Engineering	21,114,412	22,174,511	1,060,099	5.0%	22,214,657	40,146	0.18%	22,570,122	395,611	1.78%
FCS	2,764,168	2,778,534	14,366	0.5%	2,782,592	4,058	0.15%	2,778,205	-329	-0.01%
Business	8,908,284	9,162,341	254,057	2.9%	9,182,831	20,490	0.22%	9,137,041	-25,300	-0.28%
LAS	16,954,476	17,011,664	57,188	0.3%	17,038,464	26,800	0.16%	17,013,252	1,589	0.01%
Lower	32,171,084	32,820,362	649,278	2.0%	32,725,191	-95,171	-0.29%	33,039,300	218,938	0.67%
Upper	31,473,200	32,480,390	1,007,190	3.2%	32,685,379	204,989	0.63%	32,692,648	212,258	0.65%
Total	**63,644,284**	**65,300,752**	1,656,468	2.6%	**65,410,570**	109,818	0.17%	**65,731,948**	431,196	0.66%
Grand Total	**131,835,394**	**137,841,663**	6,006,269	4.6%	**138,194,976**	353,313	0.26%	**139,215,777**	1,374,114	1.00%

Table 8. Sensitivity Analysis (Baseline: Revenue-Neutral Model)

Table 8A -- Effects of Alternative Elasticity Values

		Tuition Increase		
		Uniform	By Division	By College
		Change from Fall 2003	change from uniform	change from uniform
Baseline: $\bar{e}^R = -0.4, \quad \bar{e}^N = -0.6$	Revenue	6,006,269	0	0
	Enrollment	-927	59	226
More elastic: $\bar{e}^R = -0.6, \quad \bar{e}^N = -0.8$	Revenue	3,256,742	164,062	717,116
	Enrollment	-1,357	86	329
More inelastic: $\bar{e}^R = -0.2, \quad \bar{e}^N = -0.4$	Revenue	8,755,796	-164,061	-717,117
	Enrollment	-498	32	123

Table 8B -- Effects of Alternative Proportionality Coefficients

		Tuition Increase		
		Uniform	By Division	By College
		Change from Fall 2003	change from uniform	change from uniform
Baseline: Coefficients as in Table 1	Revenue	6,006,269	0	0
	Enrollment	-927	59	226
Coefficients all equal to one	Revenue	6,006,269	-226,645	-790,742
	Enrollment	-927	26	116

Table 9. Difficulties in Measuring College Contribution with Differential Tuitions

Table 9A -- From Revenue-Neutral Simulations

	Differentiated tuition revenue minus uniform tuition revenue	Differential tuition as surcharge	Combined value added to ISU total tuition revenue (relative to uniform)
Resident			
Design	184,651	478,800	0
Engineering	716,759	1,388,000	
Nonresident			
Design	996	170,400	0
Engineering	107,148	753,500	
Total			
Design	185,647	649,200	0
Engineering	823,907	2,141,500	

Table 9B -- From Enrollment-Neutral Simulations

	Differentiated tuition revenue minus uniform tuition revenue	Differential tuition as surcharge	Combined value added to ISU total tuition revenue (relative to uniform)
Resident			
Design	277,435	475,200	942,919
Engineering	967,656	1,381,500	
Nonresident			
Design	60,759	168,400	431,196
Engineering	395,611	748,500	
Total			
Design	338,194	643,600	1,374,114
Engineering	1,363,267	2,130,000	