

Faculty Productivity and Costs at The University of Texas at Austin

A Preliminary Analysis

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Center for College Affordability and Productivity

The Center for College Affordability and Productivity (CCAP) is an independent, nonprofit research center based in Washington, DC that is dedicated to researching public policy and economic issues relating to postsecondary education. CCAP aims to facilitate a broader dialogue that challenges conventional thinking about costs, efficiency and innovation in postsecondary education in the United States.

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Executive Summary

Recently released preliminary data from the University of Texas strongly suggest that the state of Texas could move towards making college more affordable by moderately increasing faculty emphasis on teaching. Looking only at the UT Austin campus, if the 80 percent of the faculty with the lowest teaching loads were to teach just half as much as the 20 percent with the highest loads, and if the savings were dedicated to tuition reduction, tuition could be cut by more than half (or, alternatively, state appropriations could be reduced even more—by as much as 75 percent). Moreover, other data suggest a strategy of reemphasizing the importance of the undergraduate teaching function can be done without importantly reducing outside research funding or productivity.

Noting that the findings are very preliminary, the Director of the Center for College Affordability and Productivity, Dr. Richard Vedder added ~~the~~ results are so striking that they suggest a reallocation of resources within UT Austin holds great promise as a way of containing soaring higher education costs.”

Other highlights of the study:

- 20 percent of UT Austin faculty are teaching 57 percent of student credit hours. They also generate 18 percent of the campus’s research funding. This suggests that these faculty are not jeopardizing their status as researchers by assuming such a high level of teaching responsibility.
- Conversely, the least productive 20 percent of faculty teach only 2 percent of all student credit hours and generate a disproportionately smaller percentage of external research funding than do other faculty segments.
- Research grant funds go almost entirely (99.8 percent) to a small minority (20 percent) of the faculty; only 2 percent of the faculty conduct 57 percent of funded research.
- Non-tenured track faculty teach a majority of undergraduate enrollments and a surprising 31 percent of graduate enrollments.
- The most active researchers teach nearly the average of all faculty; increasing teaching loads of others would trivially impact outside research support.

Introduction

In this report we examine recently released preliminary data concerning faculty compensation, teaching loads and external research grant awards at one of the nation's largest college campuses, The University of Texas at Austin. We use these data to assess faculty productivity (in terms of both teaching and research), and our analysis reveals vast disparities in the functions professors actually perform and the compensation which they receive for their services. The data reveal that a relatively small portion of faculty teaches a sizable majority of the students, and, similarly, a minority of faculty secures the vast majority of funded academic research. Conversely, a significant proportion of the faculty is far less productive: teaching little while also generating little external research grant dollars.

This paper is based upon data provided by The University of Texas System in its recently released report which includes faculty and course data for UT System Academic Institutions. While data exist for all of the nine campuses of The University of Texas System, our present analysis focuses exclusively on the flagship Austin campus. Due to insufficient data on teaching, a total of 162 faculty at the Austin campus are excluded from our analysis of teaching productivity; because these exclusions account for less than 4% of all faculty (there are 4,362 faculty at the Austin campus, according to the UT System dataset), it is doubtful that these exclusions materially impact the findings reported here. For the purpose of gauging the true costs and productivity of faculty, we incorporated into our calculations overhead costs which the University incurs for facilitating both teaching and research. In other words, our analysis accounts for the fact that aside from providing for the compensation of faculty, there are legitimate overhead costs which the university must cover to meet both its teaching mission as well as its research mission. Further details about the data we use and the methodology we employ, are available in the "Data" and "Methodology" sections of this report.

It cannot be emphasized too strongly that this report is based entirely upon *preliminary* data. These preliminary data contain a number of imperfections which preclude us from performing a final analysis of faculty teaching productivity and cost.^{1,2} A final analysis of the data would require controlling for various factors (such as differences in the teaching and

¹ In terms of data imperfections, the raw dataset reports, for instance, that some faculty have 0% of a total or normal workload but nonetheless teach some courses and students.

² In the 821 page document in which The University of Texas at Austin released the data, the following disclaimer is provided: "The data in its current draft form is incomplete and has not yet been fully verified or cross referenced. In its present raw form it cannot yield accurate analysis, interpretations or conclusions."

research loads of part-time faculty compared to full-time faculty as well as the per-student costs associated with teaching) as well as corrections to any anomalies in the raw dataset.³

Why issue a report based on ~~preliminary~~ data that the University of Texas makes clear that it does not want analyzed? We assume that while there may be some data imperfections, that the bulk of the information on teacher teaching loads, salaries, fringe benefits, and other variables is mostly correct. Why would the university publish large amounts of inaccurate data? Given the substantial media interest in the topic, and given its importance to the future development of the Lone Star State, we decided that some limited analysis could show the power of the data set in pointing the direction for future change, and roughly outline, albeit imperfectly, the possibilities that changing personnel usage could have on college affordability and productivity.

Productivity in Teaching

The data reveal a profoundly sharp disparity in the teaching loads for individual faculty members. The top quintile (20 percent) of the faculty with respect to teaching loads teaches 57% of all student credit hours. Conversely, the bottom quintile teaches only 2% of all student credit hours, and generates a disproportionately smaller percentage of external research funding than does other segments of the faculty. We discuss these findings in more detail below.

The ~~student credit hour~~ is perhaps the best measure of faculty teaching loads. The credit hour definition measures not only the total number of students (both undergraduate and graduate) enrolled in courses taught by each faculty but also the number of credit hours for those courses.⁴ Unless otherwise specified, when we refer to teaching loads, we are referring to the teaching loads as measured in ~~student credit hours~~.

³ In some of our preliminary calculations, not reported fully here, we do control for part-time and full-time status of faculty and found that there is little material change in our results. For instance, if we do not control for part-time status, the 20% of faculty with the highest teaching loads teach 57% of all ~~student credit hours~~. Once we control for faculty with only part-time status, the 20% of faculty with the highest teaching loads teach 55% of all ~~student credit hours~~.

⁴ The number reported in the UT Austin faculty dataset for ~~student credit hour~~ also takes into account the ~~faculty member responsibility factor~~ to account for the fact that faculty sometime split teaching responsibilities for a course.

The Top Quintile

The 20% of faculty members (that is, 840 out of the 4200 faculty within our sample) with the highest teaching loads carry 57% of the total number of student credit hours taught at the University's (or 55% of the total teaching load if we control for the part-time status of some faculty). These 840 faculty members teach, on average, 896 student credit hours and 318 students per year.⁵ Of these 840 faculty nearly 60% are either tenured or on tenure-track while just over 40% are non-tenured.⁶

Given the number of students these faculty teach and their salaries, on average the faculty cost is \$662 per student taught per year. Despite teaching 57% of the student credit hours, these 840 faculty account for only 28% of the total faculty costs at UT-Austin, or less than half of their teaching proportion. In terms of external research grants, these 840 faculty members generate 18% of the campus's research funding—nearly their proportion of the total faculty. This suggests that these faculty are not jeopardizing their statuses as researchers by assuming such a high level of teaching responsibility. In other words, there are hundreds of UT faculty who appear to teach large numbers of students while maintaining an active sponsored research program.

The Bottom Four Quintiles

On the other hand, the remaining 80% (or the remaining 3,360 faculty members) perform only 43% of the total teaching duties on the Austin campus (or 44% after controlling for the part-time status of some of the faculty). The faculty members falling in these four bottom quintiles teach an average of 167 student credit hours per year and an average of 63 students per year, the equivalent of about 1.26 3-hour courses per year with an average student enrollment of 50 students per course, or three courses with an enrollment of 21 students each.

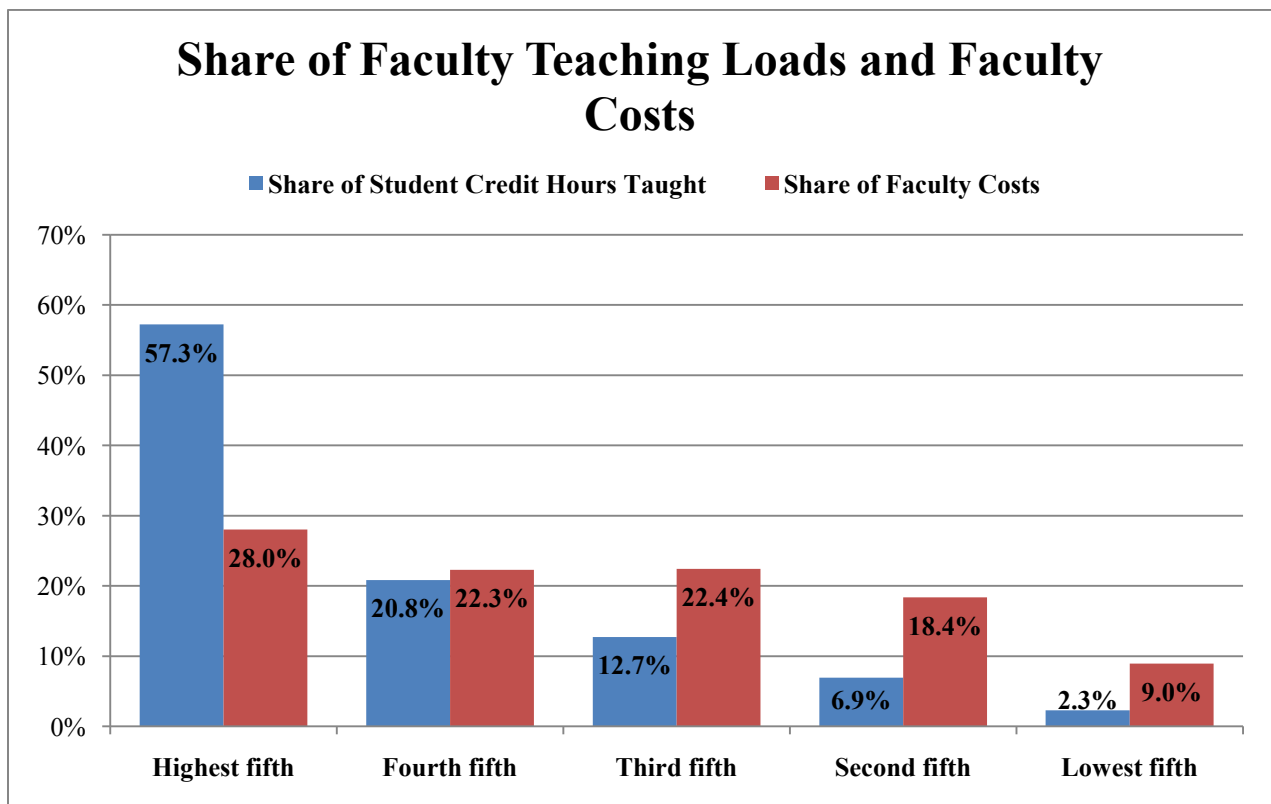
Although this 80% of faculty carries a minority of the campus's teaching load, it accounts for 72% of all faculty costs to the Austin campus. Per-student costs associated with these 3,360 faculty members are \$2,142 per student per year, more than three times the level of cost per student for the 20% of the faculty who carry the largest teaching loads.

⁵ This teaching load is roughly equivalent to teaching a total of six 3-hour courses a year (or three such courses per semester), with an average student enrollment of 50 students per course.

⁶ In the UT Austin dataset, tenure status of faculty is broken down into the following three categories: tenured, tenure-track, and non-tenured. The difference between tenure-track and non-tenured faculty is that the former will—or at least will pursue—full tenured status in the future while non-tenured faculty are not in a position to achieve tenure.

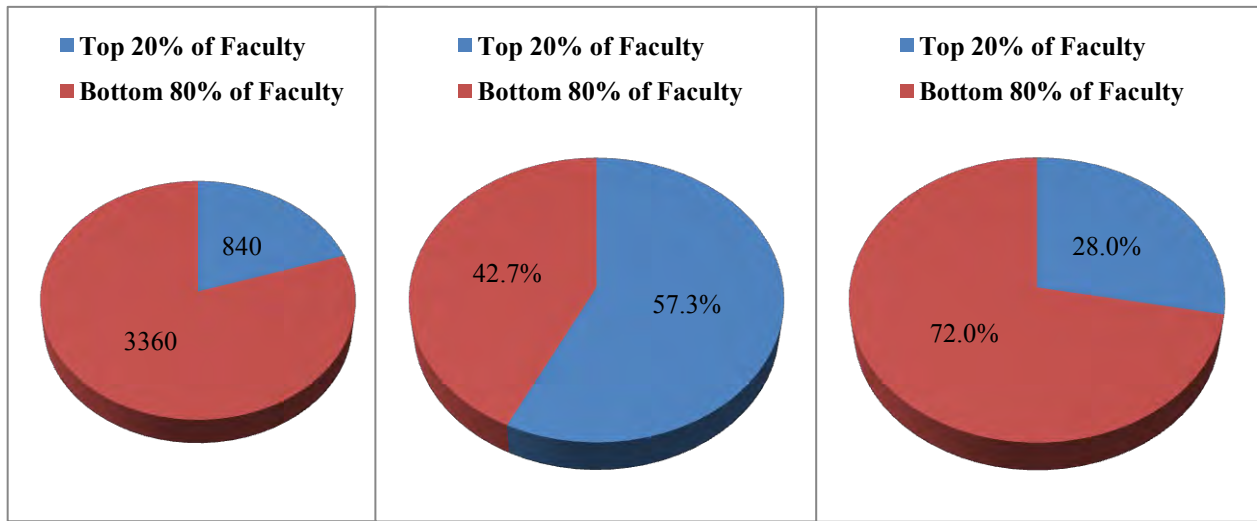
The Bottom Quintile

The 20% of the faculty with the lowest teaching loads (again, a total of 840 faculty members) carry only 2% of the total teaching load (or 5% after controlling for the part-time status of some faculty) in terms of student credit hours (and only 3% of all students taught at the Austin campus), an almost negligible amount compared to the 20% who do the most teaching. The total loaded cost (that is, faculty compensation plus overhead costs; for more details see the methodology section of this report) to the University for these 840 faculty totals \$56,569,023, or an average of \$3,794 per student taught. Curiously enough, the explanation of such a low teaching load for the 20% of faculty with the lowest amount of teaching is *not* that they are otherwise occupied by research. Indeed, they bring in a disproportionately low amount of external research funding (13% of all external research grants), lower even than the proportion of research funding that the 20% of faculty with the highest teaching loads generate (a total of 18% of all research grants). Of the 840 faculty with the lowest teaching loads, only 18% are tenured or tenure-track while the clear majority (nearly 82%) are non-tenured.⁷

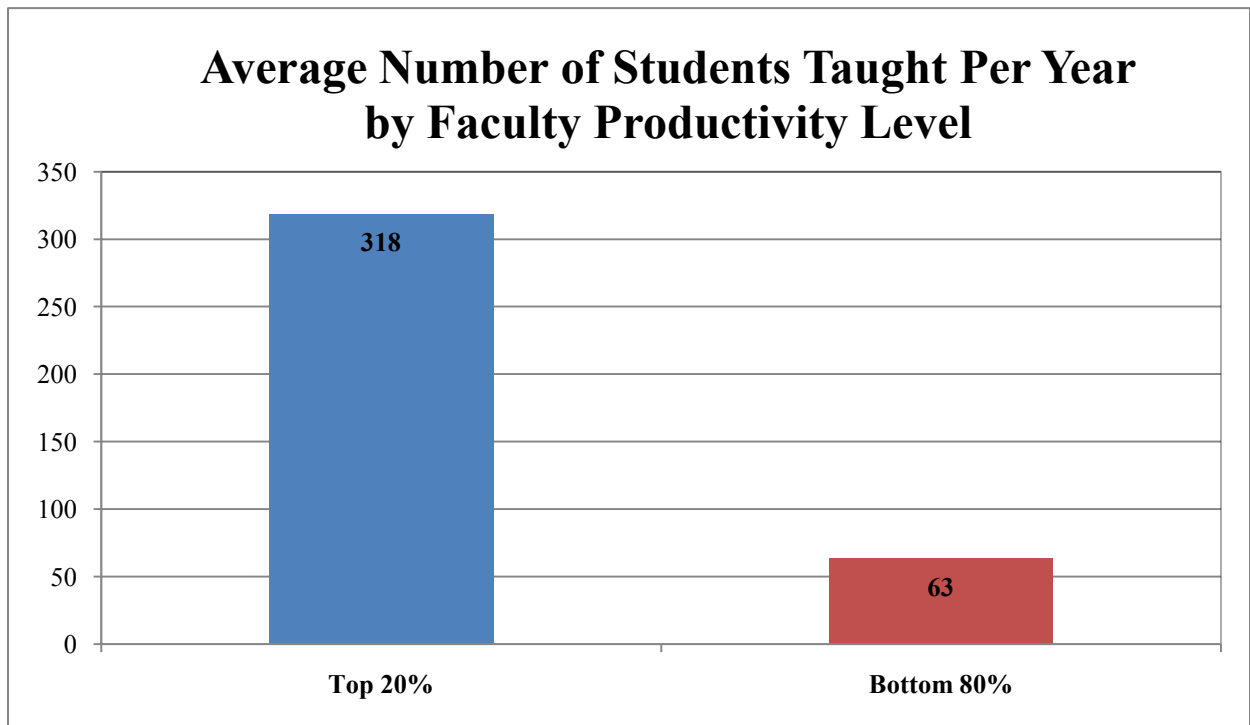


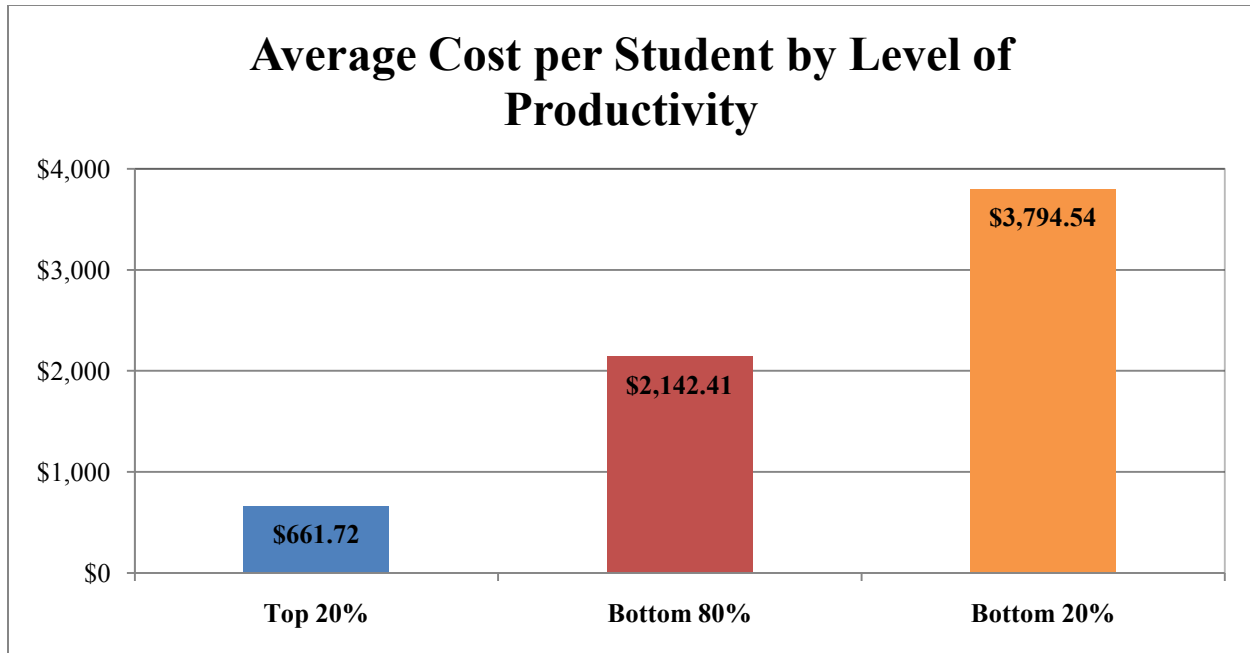
⁷ For purposes of comparison, campus wide, 48% of all faculty are tenured or tenure-track and the remaining 52% are non-tenured.

Faculty Number, Proportion of Teaching Load and Proportion of Total Loaded Cost



Average Number of Students Taught Per Year by Faculty Productivity Level





Teaching Loads by Tenure Status

Independent of the costs associated with faculty teaching, it is instructive to examine the level of students taught by tenure status. For instance, some might expect that instruction of graduate students would rely much more heavily upon tenured faculty than would undergraduate education. Conversely, one would expect that undergraduate education would be more heavily dependent upon non-tenured faculty than tenured faculty. Indeed, the data show that 52% (a slight majority) of undergraduates at The University of Texas at Austin are taught by non-tenured faculty while the remaining 48% are taught by tenured or tenure-track faculty. While it is true that tenured or tenure-track faculty account for a clear majority (69%) of the graduate students taught, a surprisingly significant minority (31%--that is, nearly one-third) of graduate students are actually taught by non-tenured faculty.⁸

⁸ Regardless of tenure status, evidence provided by the National Survey of Student Engagement shows that students at UT-Austin are relatively lacking in engagement with the faculty. In the 2009 NSSE survey, freshman and senior students rated their relationships with faculty members as worse than students did at the UT system as a whole and Texas A&M University.

Number and Percent of Students Taught by Level and Tenure Status of Faculty

	Taught by Non-Tenured Faculty	Taught by Tenure/Tenure-track Faculty	Total
Percent of Undergraduate Enrollment	52.4%	47.6%	100%
Percent of Graduate Enrollment	31.3%	68.7%	100%

A Thought Experiment: What if Teaching Productivity Increases?

Besides analyzing current levels of faculty productivity, the faculty dataset can also be used to estimate the cost-savings to the University of Texas at Austin if faculty productivity is hypothetically increased. For instance, if all faculty were as productive as the top 20% of faculty at teaching (that is, each faculty member taught, on average, 896 student credit hours), then the University would require a faculty only 34% its present size. This could potentially save up to \$323 million in total loaded costs for faculty (faculty compensation plus overhead costs), where the total loaded cost for each faculty member is \$211,000—the current average total loaded cost of the 840 faculty who are the most productive at teaching.

Perhaps, though, it is unrealistic to expect all faculty to have the same level of productivity as the 20% most productive. Perhaps the rest of the faculty, for one reason or another, can at best be expected to increase teaching productivity by only a fraction of the productivity of the most productive teachers.

Even if all of these faculty with lower productivity cost the current faculty average (that is, a total loaded cost of \$150,000 per faculty), there is potential for significant savings for the university. The following table depicts scenarios in which the 840 most productive teachers maintain their current level of teaching productivity (and their current level of average cost at \$211,000 per faculty member) but requires all other faculty to be 25%, 50%, 75% or 100% as productive as the top 840 faculty members. For purposes of these calculations, all of these additional faculty cost, on average \$150,000.⁹ It should be emphasized that none of these

⁹ In the case where their productivity is 100% of the most productive, in which case all faculty are assigned a cost of \$211,000 per faculty on average. In the case where productivity is set at 75%, the total loaded cost for faculty is set at 75% of the total loaded cost of the 840 most productive teachers (that is, 75% of \$211,000).

potential scenarios contemplates any direct changes for the 840 faculty who are the most productive currently (their teaching loads would not change nor would their levels of compensation from the University). Again, we must stress that because this is a *preliminary* analysis of *preliminary* data, these cost-savings estimates are by no means definitive but are merely illustrative of particular approaches The University of Texas at Austin could explore for purposes of lowering costs.

Hypothetical Savings from Increasing Faculty Teaching Productivity¹⁰

Proportion of Top 20% Productivity (A)	Student Credit Hours Per Additional Faculty (B)	Number of Additional Faculty (C)	Total Loaded Cost of Additional Faculty (D)	Savings (E) = \$455 million – (D)
100%	895.7	627	\$132,156,472	\$322,682,675
75%	671.8	836	\$132,156,472	\$322,682,675
50%	447.9	1,254	\$188,685,578	\$266,153,569
25%	223.9	2,508	\$377,371,157	\$77,467,990
Actual 2009-10	167.2	3,360	\$454,839,147	—

Even in the case where average faculty productivity of additional faculty reaches a level equal to 25% of the teaching load of the 840 most productive teachers, hypothetically the University could save roughly \$77 million by consolidating its total faculty by releasing 852 faculty. Interestingly enough, this figure of 852 “excess” faculty is almost exactly equal to the number of faculty who perform only 2% of the teaching, suggesting that if the University released the 840 least productive faculty, there would only be minimal adjustments needed to the teaching loads of remaining faculty. Indeed, were the University to release the 840 least productive teachers, our calculations show that the average number of additional students the remaining faculty would need to teach on an annual basis is less than 4.5, which constitutes an increase of 6% for the remaining faculty who are outside the top 20% with the highest teaching loads (i.e. the average teaching load for the 840 most productive faculty would remain at its present level while teaching loads of the remaining 2,520 faculty members would increase 6%).

¹⁰ The hypothetical savings for the 100% and 75% productivity levels are equivalent because, in the case of 75% productivity levels, the average compensation of the additional faculty is increased to a level equal to 75% of the compensation of the most highly productive teachers.

With increased faculty productivity in teaching, the University would be positioned to lessen the financial burden it imposes on both students and taxpayers. The University could decrease tuition significantly, reduce taxpayer subsidies or a combination of both options. During the FY 09-10 (the year of this data), UT-Austin collected \$507,500,000 million dollars in tuition revenue, while also securing \$344,024,324 in the form of state taxpayer subsidies.¹¹ In the scenario in which all faculty achieve the same level of teaching productivity as the most productive teachers, tuition or state subsidies could be reduced dramatically, while even more modest increases in teaching productivity would see considerable savings as well. The chart below details potential reductions in tuition and state subsidies that could occur under the various levels of productivity increases, based on our preliminary analysis.

Two Scenarios for Potential Savings in Tuition or State Appropriations Due to Increases in Teaching Productivity: Tuition Reductions or State Subsidy Reductions

Proportion of Top 20% Productivity	Scenario 1		Scenario 2	
	Tuition Reduction % (100% of Savings)	In-State Tuition 2009 with Productivity Increase	State Subsidy Reduction % (100% of Savings)	Remaining State Subsidy
100%	63.6%	\$3,254	93.8%	\$21,341,649
75%	63.6%	\$3,254	93.8%	\$21,341,639
50%	52.4%	\$4,250	77.4%	\$77,870,755
25%	15.3%	\$7,572	22.5%	\$266,556,334
Actual 2009-10	—	\$8,936	—	\$344,024,324

In the two scenarios in which teaching productivity is increased the most, in-state tuition at UT-Austin in 2009 could potentially fall below the \$3,500 level if the savings were applied solely to tuition. Tuition of \$3,500 a year would be a big step toward Governor Perry’s goal of a \$10,000 college degree and could conceivably improve access. Since the net tuition (amount paid after tuition discounts from scholarships and grants) is actually less than tuition fees, the \$3,500 tuition fee nearly achieves the governor’s objective. Reductions in non-teaching personal

¹¹ http://utdirect.utexas.edu/budget/pdf/UTAustin_Budget_VolI_09-10.pdf

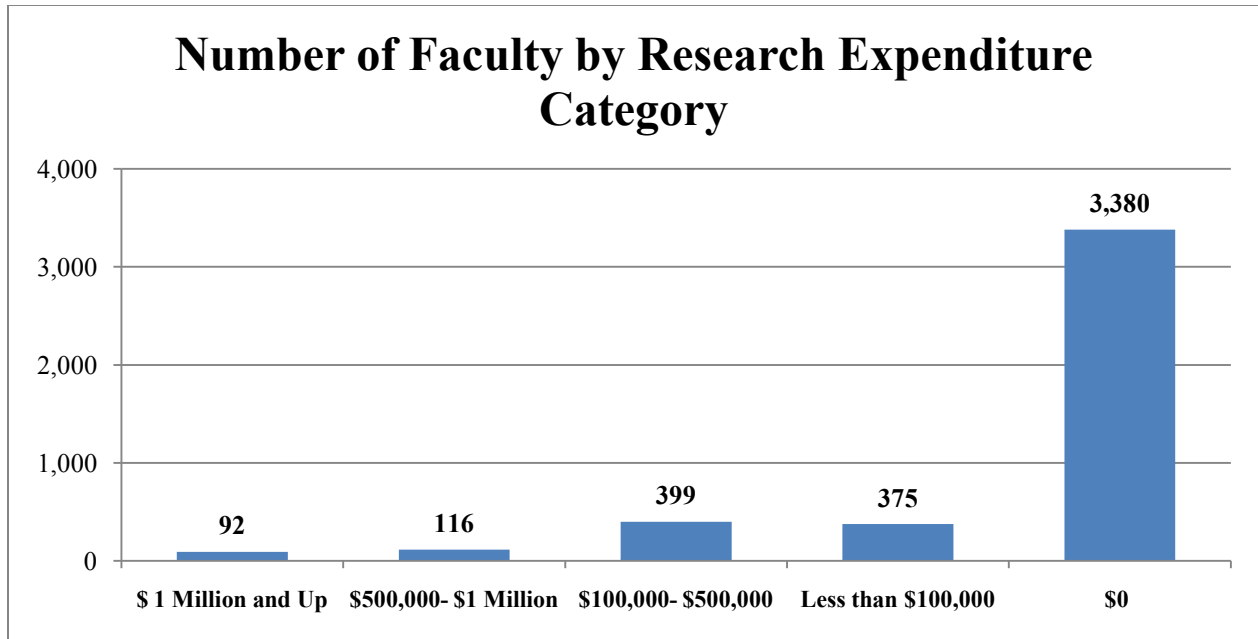
costs could no doubt make that goal achievable. Additionally, if savings were applied solely to state subsidies, state appropriations would drop considerably – to nearly zero in two scenarios. To be sure, these savings need not apply solely to either tuition or solely to taxpayer subsidies. If the potential savings are split evenly, for example, between tuition and state subsidy reductions, then tuition could be lowered to \$6,100 and state subsidies to roughly \$183 million or slightly over half the 2009-10 levels.

How Potential Savings Could be Split Between Tuition and State Appropriations

Proportion of Top 20% Productivity	Tuition Reduction % (Shared Savings of 50%)	In-State Tuition 2009 w/ Productivity Increase	State Subsidy Reduction % (Shared Savings of 50%)	Remaining State Subsidy
100%	31.8%	\$6,095	46.9%	\$182,682,987
75%	31.8%	\$6,095	46.9%	\$182,682,987
50%	26.2%	\$6,593	38.7%	\$210,947,540
25%	7.6%	\$8,254	11.3%	\$305,290,329
Actual 2009-10	—	\$8,936	—	\$344,024,324

Productivity in Research

While the majority of this paper has examined productivity in teaching, we did conduct a preliminary analysis on research activity/productivity at UT-Austin. The disparity among faculty for external research funding is even greater than the disparity in teaching loads. Only a small minority (982) of all faculty receive any of the \$455,286,329 in external research grants. A total of 3,380 faculty (77% of all faculty at the Austin campus) receive no external research grants. Of the 840 faculty who carry only 2% of the total campus teaching load, 704 are among those faculty members receiving no external research dollars. By comparison, a smaller number of the 840 faculty who teach the most receive no external research funding (623). In other words, 16% of the faculty both bring in no externally sponsored research and also have some of the lowest teaching loads while even those faculty who carry some of the highest teaching loads also perform some of the externally funded research.



Research Tier	Research Dollars	Percent of Total Faculty	Percent of Total Research Dollars
\$1 million +	\$261,210,633	2.1%	57.4%
\$500,000-\$1 million	\$81,442,340	2.7%	17.9%
\$100,000-\$500,000	\$97,602,188	9.2%	21.4%
<\$100,000	\$15,031,168	8.6%	3.3%
\$0	\$0	77.5%	0.0%

Further analysis is warranted in terms of the research productivity of faculty, especially to determine the extent to which research productivity and teaching productivity present a trade-off in terms of faculty time and resources (in other words, further analysis is needed to determine how much—or even if—increases in faculty teaching loads will actually lead to a decrease in the amount of externally funded research faculty perform).

An examination of research expenditures for academic year 2009-10, 20% of the faculty at UT-Austin accounts for over 99.8% of all research dollars; 10% of the faculty account for 91.2% of all research dollars at the University. Whereas 57% of the teaching is done by 20% of

the faculty, in terms of externally funded research, roughly only 2% of the faculty conducts 57% of the funded research.

While the analysis to this point is preliminary, the data clearly show that the notion that increasing teaching responsibilities for the bulk of the faculty would even under the worst case scenario impact research funding by only miniscule amounts. For example, if teaching loads were raised only for the 80 percent receiving the least amount of research grants, the possible impact on those grants is only a small fraction of one percent.

Conclusions

The analysis above needs to be extended and revised as corrections in data are made. There are some data points that may well need to be excluded from the analysis, for example. Nonetheless, the findings thus far are so compelling and striking that it appears that UT Austin could achieve dramatic savings in funds, allowing big reductions in tuition costs or state appropriations, simply by adopting teaching loads of a reasonable size.

Moreover the analysis above ignores the enormous potential financial savings from reductions in expenditures on non-instructional professional personnel. With reductions in those areas, the very substantial tuition and/or appropriation reductions noted in the “75 percent of full load” model above could be further reduced, e.g., to an average teaching load per professor of 200 or less per year (e.g., one class of 125, two classes of 30 students, and one class of 15 students).

The analysis suggests that the cries that examination of faculty productivity meant an end to UT Austin’s status as a major research institution are at the very minimum highly exaggerated, and more likely totally inappropriate. These preliminary results highlight the dramatic financial consequences of low teaching loads.

Appendix

Data

The extensive faculty dataset provided by The University of Texas System is for Academic Year 2009-10. It includes the revenue and spending for individual faculty members and provides information on salaries (plus benefits), the number of classes, the number of credit hours and students taught, and among other things, and the amount of external research funding for each faculty member. The inclusion of the external research funding, allowed us to account for any external funding sources provided to the university through the research of any given faculty member.

In terms of our actual analysis we focused on several specific parts of the dataset. We frequently used the total salaries and benefits portion of the data to start our cost analysis. We added an institutional overhead component to this and external research FY 09-10 (exact details on this can be found in the methodology). Additionally in order to gauge teaching levels, we used the data from the total class enrolment and total student credit hour (unweighted) columns. We used the unweighted credit hours as to not allow judgments about the worthiness of teaching undergraduates vs. graduate students play into our analysis. Even if one considers the weighted vs. unweighted argument, there is a very high correlation between the two (over .75), making it highly unlikely to change our analysis.

As noted earlier, in our analysis of teaching, we excluded 162 faculty as they lack adequate data, mostly on the instructional side. For our aggregate research analysis, we did use information from every faculty member in the data set. Only in the calculations tying together research and teaching did we not use this full set, striking the 162 faculty again.

Methodology

We adjusted the raw faculty compensation data to account for any legitimate overhead costs incurred by The University of Texas at Austin associated with both faculty teaching and faculty research. We used a uniform estimate of overhead costs and applied this overhead to the calculated costs for every individual faculty member for which data is available in the dataset to measure the institutional cost for each faculty member. Using the average institutional overhead cost for The University of Texas at Austin, we used the detailed faculty data, accounting for

faculty teaching salary and benefits, to calculate the cost (to the institution) of each faculty member. We took into account those with external research funding into our cost analysis. In our formula (displayed below), faculty are rewarded for the research dollars they secure.

The overhead cost figures were derived from the comprehensive database Integrated Postsecondary Education Data System (IPEDS) provided by the U.S. Department of Education. The IPEDS data includes overall university financial information such as revenue by source of funds and expenditures by function. The earliest available institutional financial data from IPEDS are for survey year 2008-2009. From the IPEDS data reported for The University of Texas at Austin, we calculate that for every \$1 spent by The University of Texas at Austin on instruction, \$2.12 was spent elsewhere by the university (excluding auxiliary operations).

We calculated the cost of each individual faculty member using the following equation for the individual Total Loaded Cost (TLC):

$$\textbf{Total Loaded Cost} = (\textit{Teaching Salary and Benefits} \times \textit{Overhead}) - (\textit{Research Funding} / \textit{Overhead})$$

The following equation provides a simple, numerical example of our calculation, for the case of a faculty member who receives \$100,000 in salaries and benefits, with research funding of \$25,000 and an overhead cost of \$2.12. Given these data, the TLC for that faculty member would be:

$$\text{TLC} = (\$100,000 \times \$2.12) - (\$25,000 / \$2.12) = \textbf{\$200,208}$$