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Introduction and Background

Over the past decade, the American higher education community has experienced a greater than ever reliance on national data for institutional peer comparisons, especially within the fiercely competitive world of research universities. The demand for these comparative data comes from various constituencies, including state-mandated accountability reporting, performance funding initiatives, accreditation reviews, academic program reviews, national benchmarking for internal analysis and evaluation, and the controversial college and university rankings published by national news magazines.

Inevitably, in conversations about institutional productivity and performance, the question arises as to whether or not comparative data should be adjusted for institutional size. This is a complex matter, and there is a definite lack of consensus among higher education researchers regarding the significance of size as a factor in institutional-level peer comparisons. Even when researchers choose to normalize institutional data for size, they find it difficult to identify which size variable is appropriate when calculating institutional averages (e.g., faculty, enrollment, budget, etc.). These important considerations warrant further examination.

Faculty are central to the university's performance, and discussions about faculty productivity attract a wide audience even though the task of defining meaningful and direct measures of faculty productivity proves problematic at best. When examining faculty productivity, it is important to distinguish between data that measure an institution's performance, such as total research expenditures, and data that measure the productivity of the faculty of that institution, such as average faculty research productivity. Given the differences in size and scope, composition, and mission, along with the differences in faculty definitions and faculty assignments, among research universities, it becomes obvious that per capita comparisons of institution-wide faculty productivity are not reliable.

Alternatively, universities may find such comparisons useful when examining faculty productivity at the discipline level. For example, accrediting agencies, such as the American Chemical Society, routinely collect and make available national data that can be used for faculty productivity comparisons, such as the average number of refereed publications per chemistry faculty member. These data can be calculated quite precisely and are widely accepted by chemistry departments across the country.

IPEDS Surveys

Researchers sometimes derive comparative per capita data for institutions by dividing a variety of institutional indicators by the number of faculty at each institution. Currently, the most readily available and widely used source of national faculty counts is data collected through the Integrated Postsecondary Education Data System (IPEDS) surveys by the U.S. Department of Education, National Center for Education Statistics (NCES). For the past several years, IPEDS has collected faculty data in two annual surveys: IPEDS Salaries, Tenure, and Fringe Benefits of Full-Time Instructional Faculty; and IPEDS Fall Staff. By definition, data reported in the Salaries survey include only full-time "instructional" faculty and exclude clinical faculty. Historically, the faculty counts used most frequently to normalize institutional data are those from the Salaries survey. These data also provide the foundation for the nationally distributed Association of American University Professors (AAUP) "Annual Report on the Economic Status of the Profession." The Fall Staff survey is designed primarily as a count of total personnel at a university and, as such, collects extensive data on the employees on an institution's payroll, listed by occupational category and employment status.

Many researchers use the data collected in these IPEDS surveys for very different purposes than the uses intended by IPEDS. According to the NCES template for the Salaries survey, the intended use of survey data is:

- For postsecondary institutions to establish competitive compensation packages;
- For state agencies to determine budgets for state-supported institutions and to make comparative studies with other states;
- For federal agencies to analyze the teaching profession as a whole; to contribute to occupational forecasting; and to develop financial indicators relating to postsecondary education; and
- For professional and educational associations to evaluate the differences in salaries between men and women and the general status of the profession.

In the IPEDS Salaries survey, *full-time instructional faculty* is defined as follows:

> Instruction/Research staff employed full-time (as defined by the institution) and whose major regular assignment is instruction, including those with released time for research.

The instructions for completing the survey clarify the phrase "major regular assignment of instruction" by defining it as an assignment of more than 50 percent instruction.

Variable Institutional Definitions

In an effort to learn more about how institutions interpret and define *full-time instructional faculty* for responding to the IPEDS Salaries survey, we conducted an informal survey of the public institutions within the Association of American Universities (AAU). Results from the 13 respondents indicate key differences among institutions, both in their interpretation of definitions and in the methodologies they use to define the population of faculty they report in the IPEDS Salaries survey.

About 40 percent of respondents use faculty rank as the basis for determining which faculty to include in the Salaries survey. These institutions report *all* full-time ranked faculty (excluding clinical, and others specified for exclusion by IPEDS instructions). The rationale for this method is that all full-time ranked faculty members have the potential to teach, and so they should be counted as "instructional faculty," regardless of whether or not they are actually teaching more than 50 percent. This method avoids the difficulty of specifying exactly what part of a faculty member's effort belongs in the instruction category. Even within this set of institutions, the definition of "ranked" faculty varied from one institution to another. Some institutions consider only the titles of full professor, associate professor, and assistant professor as "ranked" faculty. Others include instructors and lecturers in this group.

Several universities use the source of funding to determine which faculty belong in the category of "instructional faculty." More than half of the 13 institutions responding use this method and define those faculty paid 50 percent or more from state instructional funds as "instructional faculty" for IPEDS. Since these institutions do not use faculty rank as the determinant of instructional faculty status for IPEDS, university employees who teach and hold titles such as visiting professor, adjunct professor, emeritus professor, assistant instructor, academic specialist, program associate, etc. will appear in the IPEDS data as non-tenure track faculty only if their salaries come from instructional funds. In addition, other temporary, casual, or courtesy faculty paid from instructional funds may also be included in some institutions' totals. To further complicate the matter, and also impede comparability, the percentage of non-tenure track faculty an institution employs varies widely from institution to institution, depending on individual institutional policies and practices.

As one illustration of the different ways institutions report the faculty number for IPEDS, one institution reports using a combination of rank and budget as their decision rule in responding to the Salaries survey. In the first cut, they include all faculty, with the exception of visiting, adjunct, and library faculty. Then, in a second cut, they exclude those with a majority appointment, based on FTE budgeted, in a department that is typically clinical, research, or administrative. In another variation, an institution reports that the only instance in which a faculty member would not be counted is if the individual were paid 100 percent from a non-instructional source.

Institutions also vary on whether they include ranked faculty from non-instructional units, such as libraries and agricultural extension. Institutions differ in the way they classify these employees, especially since some institutions award professorial ranks to individuals in these roles while others do not. We did not specifically ask this question in our survey; however, our anecdotal information indicates that some institutions do include individuals assigned to non-instructional units in their faculty counts for IPEDS while others do not include them.

The Fall Staff survey may provide a more accurate count of a university's faculty population, since it is not designed to collect information on a subset of faculty who are defined as instructional faculty. However, just as in Faculty Salaries, the faculty counts in Fall Staff reflect the differences among institutions in how they classify employees, such as agricultural extension faculty and librarians. In addition, results will differ depending on whether faculty counts are obtained from the "Total Faculty" columns of Fall Staff or from the "Tenured and Tenure Track" columns of Fall Staff.

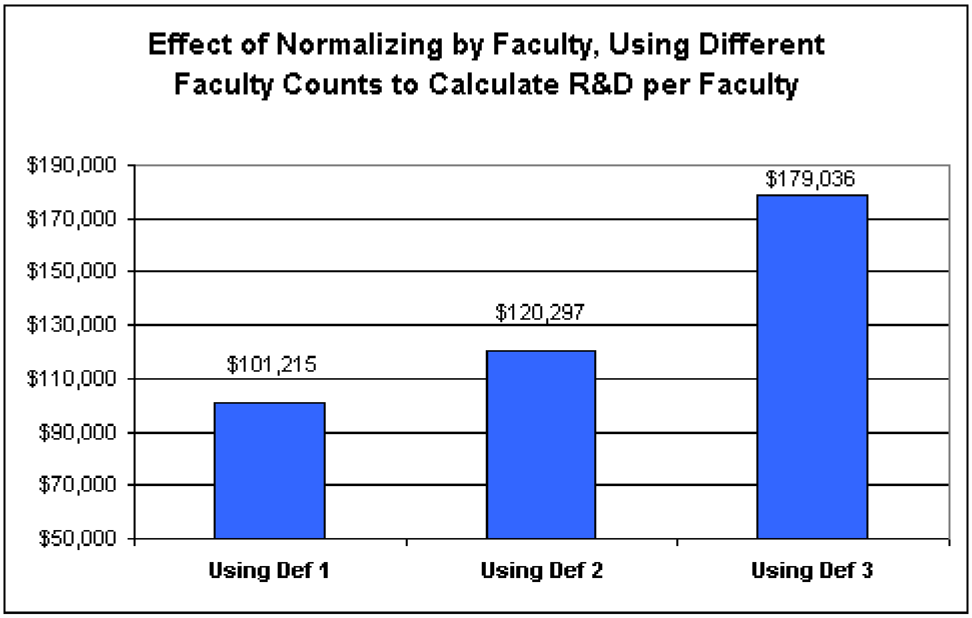
The Effect on Normalizing by Faculty

These significant inconsistencies across institutions in defining and counting faculty for the IPEDS Salaries survey produce unreliable institutional faculty counts inappropriate for use in calculating average productivity numbers for institutions based on faculty size. Furthermore, the effect of using these inappropriate data for normalizing institutions by faculty is to distort peer comparisons.

Using different populations of faculty to adjust for institutional size skews per faculty results and thus misrepresents university productivity. This is a serious concern, even if consideration has been given to important institutional characteristics when selecting peer groups for comparison, such as whether or not an institution has a medical school.

An additional defect that compounds this misuse of IPEDS faculty data is that the purpose of the IPEDS survey is to identify instructional faculty. Even if institutions reported the data in an identical fashion, it would still be inappropriate to use these data to calculate faculty research productivity because the definition speaks to instructional faculty while the measure speaks to research productivity. Worse yet, the distribution of faculty among disciplines on a campus can greatly distort the results of calculations that use federal research and development expenditures as an indicator of research productivity. Imagine two campuses that have the exact same numbers of faculty, defined in exactly the same way. On one campus, 60 percent of the faculty are in science and engineering departments while one the other campus 60 percent are in humanities and fine arts departments. Any calculation of faculty research productivity based on federal R&D expenditures will produce meaningless comparisons between these two institutions because the universe of faculty eligible to participate in the competition for federal R&D is different in the two institutions.

To illustrate further, consider the example shown below in which different methodologies are used to report what is supposedly the same population of faculty in one institution -- the number of full-time faculty. We use these faculty counts to calculate total R&D per faculty, for illustrative purposes only, and certainly do not advise using such a calculation. The point is that using different methodologies to count and report number of faculty results in dramatically different per-faculty productivity.



Source: University of Florida, Office of Institutional Research

- **Def 1** - all full-time ranked faculty (professor, associate, and assistant), excluding only clinical medicine
- **Def 2** - all full-time tenure/tenure-track faculty
- **Def 3** - ranked faculty who teach 50% or more, excluding all medicine

Further, as shown below, we obtain significantly different results if faculty counts are used from the Fall Staff survey rather than from the Salaries survey. These differences are not unexpected since the Salaries survey is designed to capture the subset of "instructional" faculty at an institution whereas the Fall Staff survey is a more comprehensive count of an institution's faculty. However, there can be major shifts in an institution's relative ranking of comparative data depending on which faculty counts are used to normalize the data. Further, when the Fall Staff survey is the source of faculty counts, another variable that can have a significant impact on results is whether total faculty are used or tenured/tenure track faculty.

Effect on Ranking, Using Different Faculty Counts to Calculate Federal R&D per Faculty				
Selected Private Research I Institutions (n = 25)				
Institution	**1998 Fed R&D Expenditures ($ thousands)**	**Rank Using Salaries**	**Rank Using Fall Staff, Total**	**Rank Using Fall Staff, Ten/Ten Track**
California Institute of Technology	177,748	1	1	1
Yeshiva University	80,000	3	2	2
Rockefeller University	43,845	11	4	3
Massachusetts Inst. Of Technology	310,741	4	3	4
Harvard University	251,876	10	6	5
Stanford University	342,426	2	5	6
Carnegie Mellon University	95,046	13	8	7
University of Pennsylvania	247,914	8	11	8
Case Western University	132,274	9	9	9
Columbia University	229,723	22	12	10
Tufts University	61,167	20	7	11
Northwestern University	127,911	17	15	12
Yale University	205,046	6	14	13
Boston University	104,428	23	24	14
Duke University	172,532	5	20	15
University of Chicago	125,982	18	19	16
Princeton University	69,005	21	9	17
Cornell University, All Campuses	204,187	16	13	18
University of Rochester	130,773	7	17	19
Vanderbilt University	106,325	14	21	20
Emory University	118,045	12	23	21
Georgetown University	84,801	15	18	22
University of Miami	101,492	19	22	23
Brown University	44,412	24	15	24
New York University	101,426	25	25	25

Impact of Redesign of IPEDS

In 1999, an NECS redesign of the IPEDS surveys deleted both the Faculty Salaries and Fall Staff surveys. In place of these surveys, NCES plans to collect data on faculty and staff in three new matrices, with optional submission in 2001-2002 and mandatory submission after that. Although NCES does not plan to continue collecting Faculty Salaries data, it is anticipated that AAUP will continue to collect and report these data.

Details of the upcoming changes for collecting IPEDS faculty and staff data may be found on the NCES website at [http://nces.ed.gov/ipeds/facstaff/facstaff.html]. The issues and background identified by the IPEDS Faculty/Staff Review Working Group are very similar to those we have presented here. The working group was charged with examining both the Salaries and Fall Staff survey and developing a relationship between the two surveys. As a result, the matrices that NCES has adopted for data collection require institutions to distribute all employees by faculty status (faculty and tenure status/non-faculty) as well as by occupational/functional categories. Decision rules are included to assist institutions in assigning faculty to the appropriate matrix.

It is not yet clear what the ramifications will be of the new reporting requirements for IPEDS faculty data for research universities. This area is one that warrants further examination as the data become available. In all such data collection efforts, one of the more difficult issues involves the external verification of institutional reporting. Absent auditable standards for reporting data, many will always suspect the consistency of voluntarily reported data..

Conclusions and Recommendations

In conclusion, when examining faculty productivity, it is important that researchers make a key distinction between data that measure an institution's performance and data that measure the productivity of the faculty of that institution. Given the differences in size and scope, composition, and mission, along with the differences in faculty definitions and faculty assignments among research universities, it becomes obvious that per capita comparisons of faculty productivity at the institution level are not reliable. On the other hand, universities may find such comparisons useful when examining faculty productivity at the discipline level.

Finally, the data clearly indicate that the faculty counts reported in the IPEDS Salaries and IPEDS Fall Staff surveys represent a variety of faculty populations defined in different ways at different institutions. The limitations of these data make them highly unreliable elements in any calculations attempting to identify average faculty productivity. Indeed, reliable counts of the number of faculty per institution do not currently exist. While it may prove practical in some contexts to use IPEDS Salaries faculty counts when comparing average faculty salaries by rank, using these data to normalize for institutional size is misleading and deceptive.

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