THE 2010 NATIONAL RESEARCH COUNCIL DATA-BASED ASSESSMENT OF RESEARCH-DOCTORAL PROGRAMS IN THE UNITED STATES

Faculty Senate Research Council and Graduate School Forum on the NRC Assessments

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- **Prior (1982, 1995) NRC rankings were reputation-based. Department heads and senior scholars rated programs in their field with scores between 5 (distinguished) and 0(not qualified to offer doctoral work). Ratings were averaged over respondents, and departments ranked by the magnitude of their average ratings.**

- **The 2010 NRC assessments were data-driven, based on quantitative information about 20 (19, in the humanities and computer science) program features, captured in values of variables V_1,…, V_{20}.**

V_1 = publications per "allocated faculty"

V_2 = cites per publication

V_3 = percent faculty with grants

V_4 = percent interdisciplinary faculty

V_5 = percent non-Asian minority faculty

V_6 = percent female faculty

V_7 = awards per allocated faculty

V_8 = average GRE

V_9 = percent 1st year students fully funded

V_{10} = percent 1st year students externally funded

V_{11} = percent non-Asian minority students

V_{12} = percent female students

V_{13} = percent international students

V_{14} = average PhDs 2000-2006

V_{15} = percent completing within 6 years

V_{16} = time to degree full and part time

V_{17} = percent students in academic positions

V_{18} = student work space

V_{19} = health insurance

V_{20} = number of student activities offered

- **Except for V_{16}, larger values of V_i are better.**

- **Rough description of S-ranking methodology, say, for the UT mathematics department:**

1. Standardize values of $V_1,\ldots,V_{20}$ to $V_1^*,\ldots,V_{20}^*$ so that, for each j = 1,…,20, the mean of the values of V_j^*, taken over all 127 math doctoral programs is equal to 0, and the standard deviation is equal to 1.

2. Choose weights $w_1,\ldots,w_{20}$ with $0 \le w_j \le 1$ and

$w_1 + \ldots + w_{20} = 1$.

3. For each of the 127 math departments calculate the weighted average

$$w_1V_1^* + \ldots + w_{15}V_{15}^* - w_{16}V_{16}^* + w_{17}V_{17}^* + \ldots + w_{20}V_{20}^*$$

and rank departments according to the magnitude of these weighted averages.

4. This procedure was actually done 500 times using different weights. The weights each time came from calculations based on a random sample of half of a set of respondents who had indicated what importance they attached to each of the 20 variables. This produced for each of the 127 math departments, a set of 500 ranks. The top and bottom 25 ranks were then trimmed, and the highest (i.e., numerically smallest) and lowest (i.e., numerically largest) of the remaining 450 ranks were then reported for each department. These are the so-called "middle 90 percent ranges of S-ranks."

- **By restricting attention only to variables measuring (1) research activity, (2) student support and outcomes, and (3) diversity, and using similar methodology, the NRC produced for each department a (1) middle 90 percent research-rank range, (2) a middle 90 percent student-rank range, and (3) a middle 90 percent diversity-rank range.**

- **In addition, using all 20 variables, but with weights constructed from reputational ratings of departments by a statistical method called "regression," the NRC produced for each department a "middle 90 percent R-rank range."**

- **CAVEAT. It appears that S-rankings tended to give the most weight to faculty research activities, while R-rankings gave substantial weight to program size. Moreover, since females and minorities are often underrepresented in highly regarded departments of science and mathematics, this led to variables such as percent of female faculty being given <u>negative</u> weight in some samples. In such cases, the larger the percentage of female faculty members in a department, the more this detracts from its weighted average, and hence lowers its rank!**

• HOW SHOULD, e.g., S- RANK INFORMATION BE PRESENTED IN ORDER TO DISPLAY THE RELATIVE POSITION OF A DEPARTMENT…

COMPARED TO DEPARTMENTS IN THE SAME FIELD AT OTHER UNIVERSITIES ?

1. Report the range, along with the total number of programs: e.g., 36-62 among 127 programs

2. Report the position of the department in a linear ordering of all programs in the same field according to the mid-point of the range: e.g., 49/127

3. Report the position of the department in a linear ordering of all programs in the same field at <u>public universities</u> according to the mid-point of the range: e.g., 30/88.

4. Report the number of programs, say, at public universities with range strictly above, overlapping, and strictly below that of the department under consideration: e.g.,

Number strictly above: 11/87

Number overlapping: 39/87

Number strictly below: 37/87

5. Carry out 3. and 4. above with reference to UT's 39 "benchmark peers."

COMPARED TO OTHER DEPARTMENTS IN THE SAME COLLEGE (OR UNIVERSITY),

1. First, put all departments on the same scale by dividing the end-points of the NRC range for each department by the number of national doctoral programs in its area.

For example, the middle 90% S-rank range 36 – 62 for a UT department offering one of 127 doctoral programs in its field is converted to

$$36/127 - 62/127 = 28.3 - 48.8$$

(midpoint = 38.55)

Then, list departments in increasing order of the midpoints of their re-scaled ranges (or by the left-hand endpoints, or the right-hand endpoints, of those ranges).

2. Either for (i) all doctoral programs in field of a given department, or (ii) all such programs at public universities, or (iii) all such programs at UT's 39 benchmark peers, determine the percentage of programs with S-rank range* (a) strictly above, (b) overlapping, and (c) strictly below that of the given department. For one UT department, for example, we have, for comparison (i) above

% Above	% Overlapping	% Below
17.3	45.7	37.0

Departments could be listed in increasing order of % Above, or in decreasing order of % Below.

* **as calculated by NRC**