

Do business professors who excel at both teaching and research exist?

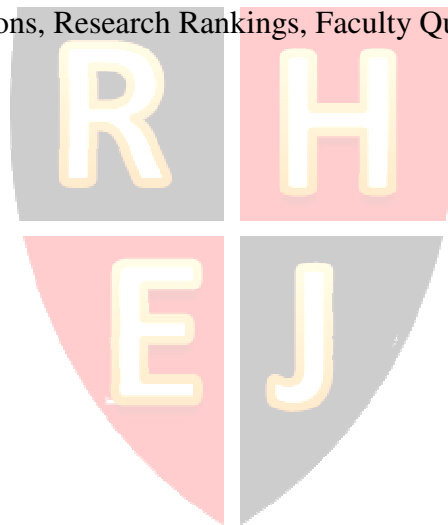
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ABSTRACT

This paper examines professor teaching and research ratings. Specifically, this research examines the extent to which professors excel both at teaching and research. Similarly, this work examines the extent that professors who excel in one area are deficient in the other. Data for analysis involves paired research and teaching data for 300 business professors from 104 U.S. universities. The results show that only a small number of professors excel both at teaching and research. Many professors are seriously deficient on one or both dimensions. The data reveals mixed evidence on gender differences. Results show that faculty at private universities outperform faculty at public universities.

Keywords: Teaching Evaluations, Research Rankings, Faculty Qualifications, Hiring Faculty

JEL: A2, A20, A22, A23, I21



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INTRODUCTION

Universities expend a great deal of resources to hire professors that can best help them achieve their mission. Identifying the best person for a given position stands critical for the university's success. An outstanding candidate can improve the profile of the university and provide an excellent educational experience to students. However, top quality business discipline candidates come at a significant price with full professors often commanding annual salaries exceeding \$200,000 (AACSB 2017). Moreover, start-up and benefit costs for faculty add considerably to these expenditures.

Faculty often remain at a school for an extended period, further underscoring the importance of a successful hiring process. A faculty member who achieves tenure may stay with a university for 20 years or more. If the individual performs at the margin, there is often little a university can do to release the faculty member. Moreover, an adverse selection problem exists. Competing universities often recruit top faculty away with better compensation offers. Marginal professors, on the other hand, receive few offers from other universities and thus have few opportunities to move.

Every university hopes to hire faculty that excel at teaching, service and research. However, the university's ability to offer a competitive compensation package tempers this desire. A select few universities have funds available to attract the very best faculty on all three metrics. However, most universities lack sufficient funding to hire the very best faculty. These universities must make a trade-off between teaching, service and research talents to employ faculty that best help them achieve their primary objectives.

In the hiring process, universities assess the ability of candidates to teach, research and provide service. These three activities compete for a professor's time. If quality performance in any one of the three areas leads to clear benefits in the other areas, there exists little to be concerned about how faculty apportion their time. However, if improvements in one area come at the expense of another, tradeoffs necessarily occur.

This paper focuses on the teaching and research components. A great deal of research examines the independent ability of professors to teach and research. However, surprisingly little research examines the joint ability of professors to achieve excellence both in teaching and

research. This paper addresses this void by examining both research and teaching performance from a random sample of business faculty. This study provides a companion study to Jalbert (2018) who examines relationships between teaching and research based on the same sample utilized here. He uses regression analysis to identify joint determinants of teaching and research performance.

This research provides a tool for universities to establish a faculty profile goal that provides a sufficiently large pool of candidates from which to select. This process can help them establish realistic goals given the available resources to compensate. Finally, the work here may prove valuable for establishing tenure and promotion guidelines.

Faculty can identify their own research and teaching ratings and plot their performance into tables provided here. Armed with this information, faculty can identify where their talents fit in the overall candidate pool. Knowing this information, they can apply to positions most likely to desire their combination of talents and negotiate appropriate compensation packages.

LITERATURE REVIEW

There exists an expansive body of literature on teaching and research. The discussion here only includes key elements of the literature. One line of research investigates faculty perceptions of the teaching and research relationship. Vidal and Quintanilla (2000) interviewed 36 faculty from Spain. Their results indicate that professors believe unavoidable links exist between teaching and research. The authors suggest that research leads to improvements in teaching quality. However, specialized research negatively impacts teaching of general and basic courses.

Oliveras, Blake and Dowds (2003) surveyed 226 faculty from European universities. Their results show that service activities, more than teaching activities, impact available time for research. Between 57 and 69 percent of faculty viewed research as more important than teaching for career success. Mathews, Lodge and Bosanquet (2014) surveyed early career academics. Their results show that about 95 percent of early career faculty believe that becoming a successful professor requires them to focus on research. Between 42 and 68 percent indicated they needed to focus on teaching.

Moses (1990) surveyed 400 faculty, finding that 90 percent viewed research as enhancing their teaching. Later, Smeby (1998) found that more than 90 percent of faculty thought their teaching was affected by their research. Administrators seem to share the views of a positive relationship between teaching and research. Leslie, Harvey and Leslie (1998) surveyed chief academic officers from U.S. institutions. Some 92.5 percent indicated that faculty research activity enhances teaching effectiveness.

Students also have a stake in the teaching versus research relationship. Jenkins, Blackman, Lindsay and Paton-Salzbart (1998) and Lindsay, Breen and Jenkins, (2002) utilized focus-groups to identify teaching and research relationships. Results show that students view faculty research positively. Students viewed courses as current and stimulating when faculty incorporate their own research into the course content.

Fox (1992), examined a survey of nearly 4,000 faculty. Her results show that research and teaching are not complimentary. She found that teaching related variables negatively impact research productivity. An often-cited work by Hattie and March (1996) provides a meta-analysis

of previous studies with results providing little evidence of a relationship between teaching and research. Terenzine and Pascarella (1994) also found minimal evidence of relationship between undergraduate teaching and research with correlations below 0.20. Some authors find teaching and research relationship differences vary by discipline (Becher and Trowler, 2001, Healey, 2000 and Colbeck (1998).

Astin (1993) conducted a survey of faculty at 212 baccalaureate-granting institutions. The sample included both public and private universities. Results show that institutions emphasizing teaching and student development positively impact students. On the other hand, institutions that emphasize research produce negative student outcomes. Astin and Chang (1995) examined the ability of universities to emphasize both teaching and research. Their results reveal that one-half of the top 20 research institutions appear among the bottom 20 student focused institutions. Furthermore, only one research-oriented institution classified in the top 70 percent of teaching focused institutions.

A plethora of research examines determinants of student teaching evaluations. McPherson (2006) found a negative relationship between class size and teaching evaluations. He argues that unobservable professor characteristics influence student evaluations by as much or more than the combination of all observable effects. Findings also show that expected grades have explanatory power for student evaluation scores. Evidence from Bilgen Susanh and Kaytaz (2015) also revealed a positive relationship between grades and teaching evaluations.

Many personal characteristics, of both teachers and students, could impact teaching evaluations. Bosow (1995) studied teaching evaluation differences by gender of both student and professor. Her results show that student gender does not affect male professor teaching evaluations. However, female professors received higher teaching evaluation from female students. Similarly, Centra and Gaubatz (2000) obtained results that female professors receive higher teaching evaluations from female students.

DATA AND METHODOLOGY

The author hand collected data, with permission from the data owners, from Social Science Research Network (SSRN, 2017) and ratemyprofessors.com (RMP). Further, research data at the professor-level were collected from SSRN. SSRN provides a large open-source repository for research. As of May 2017, the repository included more than 682,000 abstracts and 572,000 full text downloadable articles from more than 339,000 authors. (Social Science Research Network, 2017).

Individuals may include an abstract or a full manuscript in the SSRN database. Individuals may include working papers and published papers but must certify they have legal standing to list the work. Some works may include copyright limitations that restrict including the work in the SSRN repository. Personal preferences may also limit contributions to SSRN. SSRN users may view the abstract or download the entire manuscript. SSRN tracks a variety of statistics including the number of papers produced by each author, number of full text downloads received, and number of citations attributed to the work. SSRN compiles these data for individual faculty member to create overall professor ratings.

Data collection involved randomly selecting universities from the SSRN, top US business school list for inclusion in the sample. SSRN provides a list of individual faculty members for each university from which I selected individuals for inclusion in the study. I obtained faculty-level data from the SSRN top 30,000 authors list. The sample includes only professors with data

in both the SSRN and ratemyprofessors.com (RMP) databases. RMP is a relatively recent database, thus limiting the dataset to more currently active faculty. The sample includes only individuals identified as assistant, associate or professor. This approach eliminated faculty classified as emeritus, lecturers and other non-tenure track faculty.

Dataset creation further limited the data to include only professors having ten or more RMP student reviews, thereby assuring that no single student evaluation drives the results. To limit the influence of any university on the results, I select, at most, four faculty from any institution.

Data were collected on three measures of research performance. Data collected for each author from SSRN includes *Number of Papers*, *Total Downloads* and *Total Citations*. *Number of Papers* measures the research quantity for individuals, indicating the total number of papers, attributed to an individual, in the SSRN database. *Total Downloads* measures the number of times SSRN users download the author's work, thereby indicating the popularity of an author's work. I use *Total Citations* to measure research quality. Citations imply that other academics consider the work especially noteworthy.

Teaching performance data were collected from ratemyprofessors.com (ratemyprofessors.com, 2017). The ratemyprofessors.com website indicates, as of May 2017, the dataset includes 17 million reviews, for 1.6 million professors (ratemypro-fessors.com, 2017). Students evaluate their professors on the RMP platform. The measure *Raw Teaching Rating*, provides a Likert scale evaluation (1-5 with 5 indicating the highest ranking) that rates professors. Students also rate the course difficulty. The variable *Difficulty* ranges from 1 to 5, with larger numbers indicating a higher level of difficulty.

RMP data were supplemented by developing two new measures of teaching effectiveness. RMP aggregates data to obtain an average teaching rating measure for faculty at each university. Variation in teaching evaluations across universities could influence cross-university professor comparisons. To control for these influences, I standardize individual teaching scores based on the individual's university affiliation. Consider a professor who works at a university having average professor rating of *Ueval*. The professor has Raw Teaching Rating equaling *Eval*. Then the professor's *Standardized Teaching Rating* equals:

$$\text{Standardized Teaching Rating} = \frac{Eval}{Ueval} \quad (1)$$

The analysis proceeds by examining the impact of course difficulty on teaching evaluations. Some faculty argue that that teaching evaluations directly reflect course difficulty. This research develops a measure to combine the effects. This new measure equally weights teaching and difficulty measures. For a professor with difficulty rating, *DiffRtg*, the *Weighted Teaching Rating* equals:

$$\text{Weighted Teaching Rating} = \frac{Eval + DiffRtg}{2} \quad (2)$$

Weighted Teaching Rating values can range from 1-5 with 5 equaling the highest possible rating.

Preliminary analysis indicates a correlation of 0.9954 between the Raw Teaching Rating and Standardized Teaching Rating. However, the Raw Teaching Rating and Weighted Teaching Rating have correlation equaling 0.6050. Based on the high degree of correlation, the remainder

of the paper excludes Standardized Teaching Rating results. The analysis continues with the Raw Teaching Rating and Weighted Teaching Rating measures.

Next, the analysis involved classifying the sample universities as public or private based on simple internet searches. Well-documented differences exist between Public and Private universities. These differences could affect the relationship between teaching and research. A dummy variable, *Public or Private*, equals 1 for public institutions and 0 for private institutions controls for public and private university differences. *Gender* was determined based on name. Ambiguous names were classified based on written comments by students on RMP.

The sample includes data for 300 professors. These professors come from 104 United States universities. SSRN ranks these sample universities from top ten to between 600 and 620 based on number of downloads in the last twelve-month period. A single professor represents nineteen universities in the sample. The data includes 17 universities with two included professors. Twenty-five universities produced three professors. Forty-three universities produced data for four professors. Data collection occurred between March 31, 2017 and April 18, 2017.

Table 1 (Appendix) shows summary sample statistics. The tables report some statistics as ranges to preserve sample anonymity. The largest number of papers reported by any individual falls between 55-60 with the lowest equaling one. The largest number of citations falls between 350 and 400, with a minimum of zero. Total downloads ranged from 1 to between 35,000 and 40,000. The average Weighted Teaching Rating equals 3.4502 and the average Raw Teaching Rating equals 3.616. The sample indicates an average teaching rating by university of 3.7338. Average course difficulty equals 3.2840.

Table 2 (Appendix) provides more summary statistics. Panel A reports differences by gender. The sample includes 84 females and 216 males. T-tests show that male professors receive significantly lower Raw Teaching Ratings than female professors. However, no significant gender differences appear for Weighted Teaching Ratings. Males receive Raw Teaching Evaluations 0.1641 (3.7345 - 3.5704) lower than females on a 5-point scale. These results reveal consistency with other authors who find that males receive lower teaching evaluations (Bosow, 1995 and Centra and Gaubatz, 2000). The analysis here does not attempt to explain this finding. The result could occur because of evaluator bias, or because females make better teachers than males.

Panel B compares public and private universities. The sample includes 213 professors from public universities and 87 from private universities. T-tests for differences in means show significant differences, by university type, for each variable except Weighted Teaching Rating. Private university professors receive higher teaching evaluations. They include nearly twice as many papers on SSRN. Moreover, their work receives nearly twice as many downloads and nearly three times as many citations.

RESULTS

Professor Ratings by Percentile

We wish to determine if professors exist that excel both at teaching and research? Alternatively, does achieving a high research or teaching rating come at the expense of the other? If a sufficiently large number of individuals exist that excel along both metrics, a weakness in either area could render an individual unemployable. On the other hand, if professors that excel

at one area, necessarily do not excel in the other, universities must make tradeoffs and faculty must optimally position themselves based on their talents and market demand.

Missions vary considerably by institution. Some institutions demand the very best researchers, but have flexibility regarding teaching quality, in pursuit of their goal. Other institutions demand the very finest teachers but have some flexibility in research quality or quantity. Still other institutions demand the very best in both teaching and research. Many combinations can be achieved by identifying the correct individual. However, in other instances, universities might find themselves targeting a nonexistent individual and a reality check must occur. The analysis here examines professor ratings by joint percentile to provide universities and faculty a guideline for positioning themselves.

The analysis begins by independently calculating the percentile placement for each faculty in research and teaching. The very highest scoring researcher equals the 100th percentile for research. The top 30 researchers constitute the 90th percentile. The lowest 30 scoring researchers form the 10th percentile. Similar percentiles were assigned based on teaching scores. The tables report both the teaching and research ratings in a matrix that allows observation of joint faculty abilities.

Table 3 (Appendix) shows results using the Raw Teaching Rating variable. The column and row titled Criteria indicate the numerical threshold for a professor to fall within the category. Panel A reports results for the Number of Papers research metric. Panel B shows results for the Total Downloads metric. Panel C reports results for the Total Citations metric.

Consider a university wishing to hire a faculty both in the top 50th percentile of teachers, and the top 50th percentile of researchers. Panel A shows the university must select from a pool of 90 qualified candidates, out of a 300-faculty pool. Thus, 30 percent of available professors meet the joint criteria. Another interpretation is that 210 professors (70 percent of all professors) fall in the bottom 50th percentile on one of the two dimensions. A school wishing to hire at the 90th percentile for both teaching and research faces a pool of only nine qualified candidates. An 80/80 criteria (80th percentile on both dimensions) results in a pool of twenty candidates. Results presented in Panel B, using the Total Downloads metric, and Panel C, using the Total Citations metric indicate an even more limited pool. The 50/50 percentile criteria, reveals 74 qualified candidates using the Total Downloads metric and 84 qualified candidates based on Total Citations.

Universities willing to sacrifice one area or the other can select from a larger pool of candidates. Returning to Panel A, there exist 31 individuals in the 90th percentile for teaching, but who are only in the top 50th percentile for research. Similarly, there exist 16 faculty in the 90th percentile for research and the top 50th percentile for teaching. Careful readers will notice the 90th percentile on teaching and 0 percentile on research count equals 50. This number exceeds ten percent of the sample. This occurs because there exist numerous ties for some Raw Teaching Ratings.

Still other schools may wish to develop a pool of candidates that simply avoids very poor faculty on either dimension. Consider a school wishing to avoid the bottom 30th percentile on either the teaching or research scale. They would select from a pool of 150 candidates. Most interestingly, 150 (300-150) candidates fall in the lower 30th percentile on either, or both, of the teaching or research dimensions. Some 161 (300-139) faculty fall in the lower 40th percentile on either the teaching or research dimensions. Again, the evidence in Panel B, for Total Downloads, provides a more restrictive sample, with 155 (300-145) individuals failing to meet the 30/30 requirement. Values below the 40th percentile on research are not particularly

meaningful for the Total Citations metric. For the Total Citations metric, research levels below the 40th percentile all involved comparisons to a criteria value of zero. Thus, readers are cautioned against making such comparisons.

Table 4 (Appendix) shows percentile results when using the Weighted Teaching Rating metric. Panel A reveals that more individuals meet the dual 50th percentile criteria using this measure. This measure produces 96, 86, and 92 candidates for the Number of Papers, Total Downloads and Total Citations criteria respectively. However, substantially fewer candidates meet the 80/80 requirement using the Weighted Teaching Ratings metric. When using Weighted Teaching Ratings, 9, 12, and 15 candidates meet the criteria based the above three research criteria respectively. This compares to 20, 18 and 19 when examining Raw Teaching Ratings. Similarly, a 90/90 criteria results in far fewer candidates when using Weighted Teaching Ratings. The Raw Teaching Ratings result in 9, 7, and 7 candidates while the Weighted Teaching Ratings result in 4, 6, and 4 candidates.

Combined, the results indicate that a relatively small portion of faculty achieve both the 50th percentile in teaching and the 50th percentile in research. Indeed, approximately one-half of all faculty fall below the 30th percentile on either the teaching rating, research rating, or both. Universities wishing to select candidates at above the 70th percentile on both dimensions must select faculty from a small pool of qualified candidates. The results here are consistent with those of Austin and Chang (1995) who conducted an institutional level analysis, finding that schools with strong research orientations did not simultaneously achieve a high-level teaching orientation.

Gender Differences

The analysis continues by segregating the data by gender. Recall the sample includes 216 male professors and 84 female professors. Due to the relatively small number of observations, this section considers a reduce number of classification percentiles. Further, the analysis here uses only the Total Downloads research measure.

Table 5 Panel A and B (Appendix) show results for Raw Teaching Ratings. Panel A shows the number of professors falling into each classification. Panel B shows the percentage of the sample falling into each classification. The left-hand side of each panel shows results for males and the right side shows results for females. The results show that 31 percent of females fall in the upper 50th percentile for both teaching and research. Only 22.2 percent of males meet the same criteria. Similar results appear for the 40/40 criteria with 41.7 percent of females and 34.7 percent of males meeting the criteria. However, a larger percentage of males reach the highest standards. Some 10.2 percent of males meet the 80/80 criteria versus 9.5 percent for females. Overall cell analysis reveals no evidence of differences between females and males for three cells. For twelve cells, a larger percentage of males meet the criteria. For 37 cells, females achieve a higher percentage of qualified faculty. Clearly females exceed the performance of males based on this metric.

Panels C and D of Table 5, report results for Weighted Teaching Ratings. Males fare better using this measure. Males continue to achieve higher percentages at the 80/80 level with 4.2 percent of males vs. 3.6 percent of females meeting the criteria. More males than females meet the 40/40 criteria with 37.5 percent of males and 34.5 percent of females meeting the standard. An overall examination reveals three cells with no difference. Females exceed males in 20 cells. Males exceed females in 25 cells.

Combined, the results indicate that females outperform males based on Raw Teaching Ratings, but underperform based on Weighted Teaching Ratings. This finding suggests the need for additional research to further explore the relationship between gender and evaluation criteria.

Private vs. Public School Differences

Next, the data were segregated by private versus public universities. Recall the sample includes 213 observations from public universities and 87 observations from private universities. Table 6 shows the results. The left and right side of Table 6 (Appendix) shows public and private university results respectively. Panel A and B provide numeric and percentile results for raw teaching scores. Substantial differences exist between public and private universities. Public universities produce the top-quality professors. However, most of the evidence indicates private universities outperform public universities. Some 40.2 percent of private university professors achieve the 50/50 standards while only 18.3 percent of public university professors meet the standards. Similarly, for the 80/80 criteria, 11.5 percent of private university professors achieve the criteria, but only 3.8 percent of public school professors meet the criteria. For the 40/40 criteria, 47.1 and 32.4 percent of private and public university professors respectively meet the criteria. On a cell-by-cell basis, twelve cells produce higher percentiles for public university professors. Three cells indicate no differences. For 34 cells, private schools achieve higher percentages.

Panels C and D show results for Weighted Teaching Ratings. The results here are remarkably different than Raw Teaching Ratings results. The data shows three zero-difference cells. Twenty-six cells contain observations where public schools outperform private schools. Nineteen cells show private schools outperforming public schools. Combined, the evidence indicates that private school professors outperform on Raw Teaching Ratings, but underperform on Weighted Teaching Ratings.

CONCLUDING COMMENTS

This paper examines combined research and teaching performance of professors. The examination involves research data from Social Science Research Network (SSRN) and teaching quality data from ratemyprofessors.com (RMP). The sample includes matched data for 300 business professors from 104 United States universities. The paper considers two measures of teaching performance. Raw Teaching Rating reflects scores assigned by students who have taken a class from the professor. Weighted Teaching Rating equally weighs Raw Teaching Ratings and course Difficulty ratings. The paper considers three measures of research performance: Number of Papers listed on SSRN, Total Downloads on SSRN, and Total Citations as identified by SSRN. The analysis classifies professors based on their teaching and research ratings and presents analyzes of this data.

Results show that a small number of professors excel at both teaching and research. Only 74-90 professors, from a sample of 300, achieve the 50th percentile for both teaching and research. Only 18-20 faculty achieve the 80th percentile on both dimensions. Some 150-155 faculty fall in the lower 30th percentile on one or the other dimensions.

The methodology segregates the sample by professor gender. Raw Teaching Rating results indicate that a larger proportion of females achieve most percentiles than males. However, males achieve higher percentages using the Weighted Teaching Rating criteria. The

methodology also segregates the data by public vs. private universities. Raw Teaching Rating analysis shows that private university professors substantially outperform their public university counterparts. However, public university professors outperform their private university counterparts based on Weighted Teaching Ratings. Given the mixed results here, additional research is needed to further identify differences between Raw Teaching Ratings and Weighted Teaching Ratings.

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Table 1: Summary Statistics

	Scale	Mean	Medium	Max	Min	Standard Deviation
Number of Papers		5.9233	3.0000	55-60	1.0000	8.0336
Total Citations		19.9267	0	350-400	0	46.4750
Total Downloads		1675.95	446	35,000-40,000	1	3,287.3830
Teaching Rating	1-5	3.6163	3.7000	4.9000	1.10-1.40	0.7734
Weighted Teaching Rating		3.4502	3.4500	4.700	1.800	0.3853
Teaching Difficulty	1-5	3.2840	3.3000	4.9000	1.30-1.60	0.6866
Average Teaching Rating for University	1-5	3.7338	3.7400	3.9-4.0	3.5-3.60	0.0740

This table shows summary statistics for variables included in the study. The table reports some figures as ranges to protect the anonymity of universities and professors included in the sample.

Table 2: Summary Statistics

	N	Raw Teaching Rating	Weighted Teaching Rating	Number of Papers	Total Downloads	Total Citations
Panel A: Gender						
Male	216	3.5704	3.4588	6.3843	1,787.4	20.8519
Female	84	3.7345	3.4280	4.7381	1,389.5	17.5476
t-statistic		-1.77*	-1.74*	0.62	2.11**	1.13
Panel B: Private or Public						
Private	87	3.7621	3.4695	8.2759	2545.6	36.9885
Public	213	3.5568	3.4423	4.9624	1320.7	12.9577
t-statistic		2.10**	0.56	3.29***	2.35**	3.08***

This table reports summary statistics for two categorical variables utilized in this study. *** and ** indicate significance at the 1 and 5percent levels respectively. Raw Teaching Rating refers to the teaching rating assigned by evaluators in ratemyprofessor (RMP). The values range from 1-5 with higher values indicating better performance. Weighted Teaching Rating equally considers the Raw Teaching Rating and course Difficulty. This variable also produces values ranging from 1-5. Public or Private indicates the type of institutional ownership. Number of Papers shows the number of papers an author has included in the Social Science Research Network (SSRN) database. Total Downloads equals the number of times SSRN users have downloaded a paper. Total Citations indicates the frequency that other authors cite an individual’s work.

Table 3: Number of Professors within Percentiles for Raw Teaching Ratings

Panel A: Raw Teaching Ratings versus Number of Papers													
Teaching Percentile	Criteria	1	0.95	0.90	0.80	Research Percentile							
						0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.9	0	0	1	2	2	3	3	3	3	4	4	4
0.95	4.7	0	1	2	4	8	10	11	14	14	18	18	18
0.90	4.5	1	7	9	15	20	27	31	42	42	50	50	50
0.80	4.3	1	7	11	20	26	37	42	55	55	71	71	71
0.70	4.1	1	8	14	24	32	47	56	72	72	97	97	97
0.60	3.9	1	8	14	31	40	58	70	89	89	123	123	123
0.50	3.7	1	8	16	35	49	72	90	115	115	159	159	159
0.40	3.5	1	8	18	38	55	85	106	139	139	190	190	190
0.30	3.27	1	9	20	40	61	93	115	150	150	210	210	210
0.20	2.98	1	10	21	46	70	106	128	170	170	240	240	240
0.10	2.5	1	14	26	56	84	124	150	196	196	276	276	276
0	1.2	1	15	30	61	93	138	164	215	215	300	300	300
Criteria		58	19.05	14.1	9	6	4	3	2	2	1	1	1

Panel B: Raw Teaching Ratings versus Total Downloads													
Teaching Percentile	Criteria	1	0.95	0.90	0.80	Research Percentile							
						0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.9	0	0	1	1	1	2	2	2	3	3	4	4
0.95	4.7	0	0	3	3	7	8	28	11	13	14	15	18
0.90	4.5	0	2	7	11	19	21	48	32	36	41	45	50
0.80	4.3	1	6	13	18	26	32	61	45	51	56	65	71
0.70	4.1	1	6	13	22	31	39	48	57	67	75	88	97
0.60	3.9	1	7	14	25	38	51	61	71	85	97	111	123
0.50	3.7	1	8	16	30	45	61	74	91	109	126	145	159
0.40	3.5	1	8	17	34	52	72	89	110	131	152	176	190
0.30	3.27	1	9	18	37	56	79	98	122	145	167	192	210
0.20	2.98	1	11	20	43	66	90	113	139	164	187	217	240
0.10	2.5	1	14	28	55	82	109	135	163	192	220	250	276
0	1.2	1	15	30	60	90	120	150	180	211	240	271	300
Criteria		>35,000	8,106.45	4,446	2,350.6	1,294.8	694	446	276.2	167	95.6	45	1

Panel C: Raw Teaching Ratings versus Total Citations													
Teaching Percentile	Criteria	1	0.95	0.90	0.80	Research Percentile							
						0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.9	0	0	1	1	1	1	1	2	4	4	4	4
0.95	4.7	0	0	2	3	4	7	8	12	18	18	18	18
0.90	4.5	0	2	7	13	18	24	31	38	50	50	50	50
0.80	4.3	1	5	11	19	27	36	44	51	71	71	71	71
0.70	4.1	1	7	13	21	34	44	54	63	97	97	97	97
0.60	3.9	1	8	14	28	42	55	66	78	123	123	123	123

0.50	3.7	1	8	17	33	50	68	84	103	159	159	159	159
0.40	3.5	1	8	17	38	59	80	99	119	190	190	190	190
0.30	3.27	1	11	20	42	64	87	108	130	210	210	210	210
0.20	2.98	1	13	22	46	72	98	124	149	240	240	240	240
0.10	2.5	1	14	26	55	86	15	144	171	276	276	276	276
0	1.2	1	15	30	60	93	126	156	185	300	300	300	300
Criteria		373	106.2	64.6	21.4	10	4	2	1	0	0	0	0

This table shows the number of professors that fall into each percentile of teaching and research. The variable Raw Teaching Rating reflects student evaluators for each professor. Panel A uses Number of Papers for the research metric. Panel B uses Total Downloads as the research metric. Panel C uses Total Citations as the research metric. Number of Papers indicates the total number of papers an author has included in the Social Science Research Network (SSRN) database. Total Downloads indicates the number of times SSRN users have downloaded the author’s papers. Total Citations indicates the number of citations associated with an author’s works.

Table 4: Number of Professors within Percentiles for Weighted Teaching Rating

Panel A: Weighted Teaching Rating versus Number of Papers													
Teaching Percentile	Criteria	Research Percentile											
		1	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.7	0	0	1	1	1	1	1	1	1	1	1	1
0.95	4.1	0	0	1	3	4	4	7	12	12	18	18	18
0.90	3.9	1	3	4	7	9	16	19	26	26	35	35	35
0.80	3.75	1	3	5	9	17	29	37	48	48	66	66	66
0.70	3.65	1	4	9	18	29	44	58	70	70	95	95	95
0.60	3.55	1	4	13	25	40	60	77	95	95	131	131	131
0.50	3.45	1	7	17	32	50	75	96	121	121	168	168	168
0.40	3.4	1	9	19	35	54	80	102	131	131	181	181	181
0.30	3.25	1	10	20	43	66	100	123	158	158	220	220	220
0.20	3.15	1	10	21	48	74	111	134	175	175	248	248	248
0.10	2.95	1	13	26	54	82	122	148	196	196	274	274	274
0	1.8	1	15	30	61	93	138	164	215	215	300	300	300
Criteria		58	19.05	14.1	9	6	4	3	2	2	1	1	1

Panel B: Weighted Teaching Rating versus Total Downloads													
Teaching Percentile	Criteria	Research Percentile											
		1	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.7	0	0	0	1	1	1	1	1	1	1	1	1
0.95	4.1	0	1	2	4	5	8	10	10	15	15	16	18
0.90	3.9	0	3	6	10	11	14	21	24	29	31	33	35
0.80	3.75	0	4	7	12	17	25	34	41	52	58	62	66
0.70	3.65	0	5	10	21	30	42	53	61	73	80	89	95
0.60	3.55	1	8	14	30	42	58	71	82	97	108	120	131
0.50	3.45	1	10	19	37	50	70	86	102	118	135	152	168
0.40	3.4	1	10	20	38	53	74	93	110	127	145	164	181
0.30	3.25	1	12	22	46	63	87	110	129	152	173	197	220
0.20	3.15	1	12	23	51	75	99	123	148	172	195	222	248
0.10	2.95	1	14	28	56	81	107	132	160	189	216	246	274
0	1.8	1	15	30	60	90	120	150	180	211	240	271	300
Criteria		>35,000	8,106.45	4,446	2,350.6	1,294.8	694	446	276.2	167	95.6	45	1

Panel C: Weighted Teaching Rating versus Total Citations													
Teaching Percentile	Criteria	Research Percentile											
		1	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0
1	4.7	0	1	1	1	1	1	1	1	1	1	1	1
0.95	4.1	0	2	2	4	7	9	11	12	18	18	18	18
0.90	3.9	0	3	4	8	12	15	20	22	35	35	35	35
0.80	3.75	0	4	5	15	22	30	39	42	66	66	66	66
0.70	3.65	0	6	11	25	34	43	53	59	95	95	95	95
0.60	3.55	1	9	14	30	46	60	73	83	131	131	131	131
0.50	3.45	1	10	17	36	56	75	92	106	168	168	168	168
0.40	3.4	1	10	18	37	60	80	99	114	181	181	181	181

0.30	3.25	1	11	20	44	72	96	117	137	220	220	220	220
0.20	3.15	1	11	21	49	78	106	131	151	248	248	248	248
0.10	2.95	1	13	25	53	85	114	142	165	274	274	274	274
0	1.8	1	15	30	60	93	126	156	185	300	300	300	300
Criteria		373	106.2	64.6	21.4	10	4	2	1	0	0	0	0

This table shows the number of professors that fall into each percentile of teaching and research. The variable Weighted Teaching Rating provides an equally weighted measure of Raw Teaching Ratings and Difficulty ratings. Panel A uses Number of Papers for the research metric. Panel B uses Total Downloads as the research metric. Panel C uses Total Citations as the research metric. Number of Papers indicates the total number of papers an author has included in the Social Science Research Network (SSRN) database. Total Downloads indicates the number of times SSRN users have downloaded the author’s papers. Total Citations indicates the number of citations attributable to an author’s works.

Table 5: Percentage analysis for Males and Females

Panel A: Observations for Total Downloads Vs. Raw Teaching Score														
Research Percentile														
Males N=216								Females N=84						
Teach %	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.5	0.40	0.20	0
1	0	0	1	1	1	2	3	0	1	1	1	1	1	1
0.80	1	14	21	27	31	40	52	0	4	11	13	14	16	19
0.60	1	18	34	40	48	68	86	0	7	17	21	23	29	37
0.50	1	22	41	48	60	87	110	0	8	20	26	31	39	49
0.40	1	25	49	59	75	106	132	0	9	23	30	35	46	58
0.20	1	30	59	73	91	127	166	0	13	31	40	48	60	74
0	1	46	86	105	125	170	216	0	14	34	45	55	70	84

Panel B: Percentiles for Total Downloads Vs. Raw Teaching Score														
Research Percentile														
Males N=216								Females N=84						
Teach %	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.50	0.40	0.20	0
1	0.000	0.000	0.005	0.005	0.005	0.009	0.014	0.000	0.012	0.012	0.012	0.012	0.012	0.012
0.80	0.005	0.065	0.097	0.125	0.144	0.185	0.241	0.000	0.048	0.131	0.155	0.167	0.190	0.226
0.60	0.005	0.083	0.157	0.185	0.222	0.315	0.398	0.000	0.083	0.202	0.250	0.274	0.345	0.440
0.50	0.005	0.102	0.190	0.222	0.278	0.403	0.509	0.000	0.095	0.238	0.310	0.369	0.464	0.583
0.40	0.005	0.116	0.227	0.273	0.347	0.491	0.611	0.000	0.107	0.274	0.357	0.417	0.548	0.690
0.20	0.005	0.139	0.273	0.338	0.421	0.588	0.769	0.000	0.155	0.369	0.476	0.571	0.714	0.881
0	0.005	0.213	0.398	0.486	0.579	0.787	1.000	0.000	0.167	0.405	0.536	0.655	0.833	1.000

Panel C: Observations for Total Downloads vs. Weighted Teaching														
Research Percentile														
Males N = 216								Females N=84						
Teach %	1	0.8	0.6	0.5	0.4	0.2	0	1	0.80	0.60	0.5	0.40	0.20	0
1	0	1	1	1	1	1	1	0	0	0	0	0	0	0
0.80	0	9	17	22	28	41	48	0	3	8	12	13	17	18
0.60	1	23	39	46	56	75	95	0	7	19	25	26	32	36
0.50	1	29	50	60	75	100	127	0	8	20	26	27	35	41
0.40	1	30	54	65	81	108	135	0	8	20	28	29	37	46
0.20	1	38	69	83	101	137	178	0	13	30	40	47	58	70
0	1	46	86	105	125	170	216	0	14	34	45	55	70	84

Panel D: Percentiles for Total Downloads vs. Weighted Teaching														
Research Percentile														
Males N = 216								Females N=84						
Teach %	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.50	0.40	0.20	0
1	0.000	0.005	0.005	0.005	0.005	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.80	0.000	0.042	0.079	0.102	0.130	0.190	0.222	0.000	0.036	0.095	0.143	0.155	0.202	0.214
0.60	0.005	0.106	0.181	0.213	0.259	0.347	0.440	0.000	0.083	0.226	0.298	0.310	0.381	0.429
0.50	0.005	0.134	0.231	0.278	0.347	0.463	0.588	0.000	0.095	0.238	0.310	0.321	0.417	0.488
0.40	0.005	0.139	0.250	0.301	0.375	0.500	0.625	0.000	0.095	0.238	0.333	0.345	0.440	0.548
0.20	0.005	0.176	0.319	0.384	0.468	0.634	0.824	0.000	0.155	0.357	0.476	0.560	0.690	0.833
0	0.005	0.213	0.398	0.486	0.579	0.787	1.000	0.000	0.167	0.405	0.536	0.655	0.833	1.000

This table shows results for Total Downloads by gender. The Raw Teaching Rating criteria equals 1.2 for the 0th percentile, 2.98 for the 20th percentile, 3.5 for the 40th percentile, 3.7 for the 50th percentile, 3.90 for the 60th percentile, 4.30 for the 80th percentile and 4.9 for the 100th percentile. The Weighted Teaching Rating criteria equal 1.8 for the 0th percentile, 3.15 for the 20th percentile, 3.4 for the 40th percentile, 3.45 for the 50th percentile, 3.55 for the 60th percentile, 3.75 for the 80th percentile and 4.7 for the 100th percentile. The Total Downloads criteria equal 1.0 for the 0th percentile, 95.6 for the 20th percentile, 276.2 for the 40th percentile, 446 for the 50th percentile, 694 for the 60th percentile, 2350.6 for the 80th percentile and >35,000 for the 100th percentile.

Table 6: Percentage analysis for Private and Public Schools

Panel A: Observations for Total Downloads Vs. Raw Teaching Score															
Teach %	Public N=213								Private N=87						
	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.5	0.40	0.20	0	
1	0	0	1	1	1	2	2	0	1	1	1	1	1	2	
0.80	0	8	15	22	26	35	47	1	10	17	18	19	21	24	
0.60	0	11	24	33	42	59	80	1	14	27	28	29	38	43	
0.50	0	12	29	39	53	78	105	1	18	32	35	38	48	54	
0.40	0	15	38	52	69	99	129	1	19	34	37	41	53	61	
0.20	0	21	49	69	89	123	166	1	22	41	44	50	64	74	
0	0	34	71	97	120	164	213	1	26	49	53	60	70	87	

Panel B: Percentiles for Total Downloads Vs. Raw Teaching Score															
Teach %	Public N=213								Private N=87						
	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.50	0.40	0.20	0	
1	0.000	0.000	0.005	0.005	0.005	0.009	0.009	0.000	0.011	0.011	0.011	0.011	0.011	0.023	
0.80	0.000	0.038	0.070	0.103	0.122	0.164	0.221	0.005	0.115	0.195	0.207	0.218	0.241	0.276	
0.60	0.000	0.052	0.113	0.155	0.197	0.277	0.376	0.005	0.161	0.310	0.322	0.333	0.437	0.494	
0.50	0.000	0.056	0.136	0.183	0.249	0.366	0.493	0.005	0.207	0.368	0.402	0.437	0.552	0.621	
0.40	0.000	0.070	0.178	0.244	0.324	0.465	0.606	0.005	0.218	0.391	0.425	0.471	0.609	0.701	
0.20	0.000	0.099	0.230	0.324	0.418	0.577	0.779	0.005	0.253	0.471	0.506	0.575	0.736	0.851	
0	0.000	0.160	0.333	0.455	0.563	0.770	1.000	0.005	0.299	0.563	0.609	0.690	0.805	1.000	

Panel C: Observations for Total Downloads vs. Weighted Teaching															
Teach %	Public N = 213								Private N=87						
	1	0.8	0.6	0.5	0.4	0.2	0	1	0.80	0.60	0.5	0.40	0.20	0	
1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	
0.80	0	9	16	24	31	40	47	0	3	9	10	10	18	19	
0.60	0	19	36	46	56	72	90	1	11	22	25	26	36	41	
0.50	0	23	43	56	69	92	118	1	14	27	30	33	43	50	
0.40	0	24	45	60	73	98	126	1	14	29	33	37	47	55	
0.20	0	31	61	81	100	134	176	1	20	38	42	48	61	72	
0	0	34	71	97	120	164	213	1	26	49	53	60	76	87	

Panel D: Percentiles for Total Downloads vs. Weighted Teaching															
Teach %	Public N = 213								Private N=87						
	1	0.8	0.6	0.50	0.4	0.2	0	1	0.80	0.60	0.50	0.40	0.20	0	
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.011	0.011	0.011	0.011	0.011	
0.80	0.000	0.042	0.075	0.113	0.146	0.188	0.221	0.000	0.034	0.103	0.115	0.115	0.207	0.218	
0.60	0.000	0.089	0.169	0.216	0.263	0.338	0.423	0.011	0.126	0.253	0.287	0.299	0.414	0.471	
0.50	0.000	0.108	0.202	0.263	0.324	0.432	0.554	0.011	0.161	0.310	0.345	0.379	0.494	0.575	
0.40	0.000	0.113	0.211	0.282	0.343	0.460	0.592	0.011	0.161	0.333	0.379	0.425	0.540	0.632	
0.20	0.000	0.146	0.286	0.380	0.469	0.629	0.826	0.011	0.230	0.437	0.483	0.552	0.701	0.828	
0	0.000	0.160	0.333	0.455	0.563	0.770	1.000	0.011	0.299	0.563	0.609	0.690	0.874	1.000	

This table shows results for Total Downloads by public versus private universities. The Raw Teaching Rating criteria equal 1.2 for the 0th percentile, 2.9 for the 20th percentile, 3.5 for the 40th percentile, 3.7 for the 50th percentile, 3.80 for the 60th percentile, 4.30 for the 80th percentile and 4.9 for the 100th percentile. The Weighted Teaching Rating criteria equal 1.8 for the 0th percentile, 3.15 for the 20th percentile, 3.4 for the 40th percentile, 3.45 for the 50th percentile, 3.55 for the 60th percentile, 3.75 for the 80th percentile and 4.7 for the 100th percentile. The Total Downloads criteria equal 1.0 for the 0th percentile, 95.6 for the 20th percentile, 276.2 for the 40th percentile, 446 for the 50th percentile, 694 for the 60th percentile, 2350.6 for the 80th percentile and >35,000 for the 100th percentile.

