

Top Universities Have Top Economics Departments*

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1 Introduction

“It is nearly impossible to be a top university without a first-rate economics department.” Columbia University’s president Lee Bollinger is reported to have said this in a news article chronicling the rise of the Economics Department at Columbia in the early 2000s.¹ In this short note I seek to investigate if there is evidence for this claim. I do this in the simplest way possible, in order to have raw data speak as loudly as possible, without any fancy statistical methods. I simply look at the correlation between the broad rankings of a university and the rankings of its various departments. Doing so requires finding the right set of comprehensive data and some data manipulation. I explain this next. Section 3 summarizes the benchmark results. I intentionally only focus on the results regarding the Economics field but the tables I produce reveal many other interesting results. Interested readers can also download my data and conduct any analysis they like.² Section 4 briefly goes over various robustness exercises I considered. Section 5 concludes.

2 Data

To do this analysis, I need the rankings of universities and the rankings of a large number of their departments. Ideally, I would prefer having these from two different sources to eliminate any mechanical and direct relationship.

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For the rankings of the universities I choose the *2016 U.S. News National Universities Rankings*.³ According to the description by U.S. News, these universities “offer a full range of undergraduate majors, plus master’s and doctoral programs. These colleges also are committed to producing groundbreaking research.” These rankings are produced from a wide range of information using some weights.⁴ Inspecting the methodology closely reveals that the quality of any one department is unlikely to influence these measures in any mechanical way.⁵

For the rankings of departments, I use *A Data-Based Assessment of Research-Doctorate Programs in the United States* by the National Research Council (NRC).⁶ The data for these rankings are collected in 2005-2006 and the report is released in 2011. It includes 20 characteristics of more than 5,000 doctoral programs at 212 universities, covering 62 fields.^{7,8} There are two small issues to deal with regarding these rankings. First, instead of reporting actual rankings, the NRC data report ranges corresponding to the 5th and 95th percentiles of the ranking, in order to reflect the uncertainty underlying the rankings. Second, they report two measures, the S-ranking and R-ranking.⁹ In my benchmark analysis I take the simple average of the four numbers reported: the two percentiles for each of the types of rankings, which puts equal weight on the two rankings and assumes the best estimate of the ranking is the simple average of the two percentiles.^{10,11}

3 Results

In my benchmark results I focus on the 31 universities that are ranked (with ties) in the top 30 of the U.S. News rankings. Doing so attempts to focus on “top universities”. Results are reported in Table 1. I report the correlation of the ranking of all 62 fields with their universities’ ranking in descending order. Both variables used in the correlation are rankings, which make the use of Spearman (rank) correlation more appropriate.¹² Since calculating correlations may be problematic with small samples, I use gray shading to represent fields with less than 20 universities in the top 30. The first column of the table shows the rank of a field in this list, excluding the gray-shaded ones and the last column shows the number of universities that have a ranking for the field.¹³ Among all 62 fields, regardless of the number of observations used in the correlation, the Economics field is 6th with a correlation of 0.69. When I restrict the ordering to fields with 20 or more universities, Economics comes 2nd behind English Language and Literature.

4 Robustness

I report results of some robustness exercises in Table 2. In order to save space I only report the top 15 fields (regardless the number of universities with the field) for each case.

- **Simple correlation** [Table 2, panel (a)]: When I use simple correlation, the ordering of fields do not change much – the fields in the top 10 remains the same as Table 1, although their order change slightly. Economics is the 10th field overall with a correlation of 0.61, and 3rd field when I only look at fields with at least 20 universities.
- **R-ranking** [Table 2, panel (b)]: When I use the simple average of the 5th and 95th percentile values for the R-ranking, the correlations I get are slightly smaller than those with the overall rankings. Economics achieve a correlation of 0.67. It is ranked as 4th overall and 1st among fields with at least 20 universities.
- **S-ranking** [Table 2, panel (c)]: I use the simple average of the 5th and 95th percentile values for the S-ranking, and I get slightly larger correlations than with the overall rankings. The correlation of the ranking of Economics with ranking of the university is 0.73. It is ranked ranked 4th overall and 1st among fields with at least 20 universities.
- **Top 60 Universities** [Table 2, panel (d)]: I expand the sample to include all universities ranked in the top 60 in the U.S. News Rankings.¹⁴ Economics ranks as the 15th field in this sample with a correlation of 0.61 and 9th if I restrict the analysis to those programs with at least 30 universities. One should note, though, the close link in the subject matter of the fields ranked 3rd – 6th, as well as the almost identical correlations, indicating that the rankings of these fields are highly correlated. Also, the essence of the hypothesis I am testing in this note relates to “top” departments and as we include more and more departments it is not surprising that results get noisier.
- **Universities with Economics Field Only** [Table 2, panel (e)]: I exclude universities that do not have any Economics related program. Economics is ranked as 6th overall and 2nd among fields with at least 20 universities.
- **Economics Program:** Using only the Economics programs (and not the other programs under the Economics field) yields a correlation of 0.68, which is virtually identical to the number in Table 1.

5 Conclusion

The results in this short note show that there is a large correlation between being a good university and having a good Economics department – more so than having a good department in a large fraction of other fields. How should one interpret this? In particular, is there causation in some direction?¹⁵ I would argue it does not matter. If the causation goes from having a good Economics department to being a good university, this means a university should invest in its Economics department if it wants to improve its rankings. If the causation is in the opposite direction, then this means whatever it is that makes universities good, it inherently involves having a good Economics department. In other words, I don't claim that a better economics department will increase the university's ranking; I simply note that it is hard to be considered a top university without having a top economics department.

Notes

¹<http://nymag.com/nymetro/urban/education/features/14642/>

²The data is available on my webpage at boraganaruoba.com.

³These rankings are available here: <http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/national-universities/data>.

⁴The measures that go in to the calculation are: undergraduate academic reputation (survey of academic peers and high school counselors, total weight of 22.5 percent), retention (six-year graduation rate and first-year retention rate, total weight of 22.5 percent), faculty resources (class size, faculty salary, proportion of professors with the highest degree in their fields, student-faculty ratio, and the proportion of faculty who are full time, total weight of 20 percent), student selectivity (admissions test scores, proportion of students that graduated in the top quarter of their high school class, and acceptance rate, total weight of 12.5 percent), financial resources (average spending per student, 10 percent), graduation rate performance (difference between predicted and actual graduation rate, 7.5 percent), and alumni giving rate (5 percent). See <http://www.usnews.com/education/best-colleges/articles/how-us-news-calculated-the-rankings> for more details.

⁵For example, things that make a department good, the quality of its faculty as measured by, say, total citations, or its placements of PhD students does not directly influence the underlying components of the rankings.

⁶The raw data is available at <http://www.nap.edu/rdp/>.

⁷These characteristics are: publications per faculty member, citations per publication, percent faculty with grants, awards per faculty member, percent interdisciplinary faculty, percent non-Asian minority faculty, percent female faculty, average GRE scores, percent 1st-yr. students with full support, percent 1st-yr. students with external funding, percent non-Asian minority students, percent female students, percent international students, average PhDs, 2002 to 2006, average completion percentage, median time to degree, percent students with academic plans, student work space, student health insurance, and number of student activities offered

⁸There is a hierarchy: there are 6 broad fields, 62 fields and within fields there are different programs. For the most part there is only one Economics program within the Economics field for a university. (Harvard University has three programs: Economics, Business Economics and Political Economy and Government) Whenever there are multiple programs I take the simple average over the programs. It is important to note that NRC decides how a particular program in a university is assigned to a particular field.

⁹These rankings differ on how the 20 characteristics are weighted. The S-rankings (survey-based rankings) use weights as reported by faculty in a particular field. To get the weights for the R-rankings (regression-based rankings) the researchers ask the same faculty to instead directly rank randomly selected programs in their field. From their responses the researchers determine weights that these faculty are implicitly using by running regressions. See more details here http://www.nap.edu/rdp/docs/report_brief.pdf.

¹⁰The 5th and 95th percentiles and their average yield virtually the same rank ordering. For example for the Economics field the Spearman (rank) correlation between these two percentiles and their averages are over 0.99.

¹¹There are some programs that are listed as “Not Ranked”, which I take to mean they exist but NRC did not rank them, and some programs that do not exist in the raw data for a particular university. I treat both of these cases as missing data, even though “Not Ranked” presumably means not good enough to be ranked.

¹²This correlation measure only considers the ordering and not the actual number for the ranking, making it more robust when there are outliers. For example the pairs of observations (1,5), (2,3) and (3,10) or (1,2), (2,1) and (3,3) yields the same Spearman correlation of 0.5, while the simple correlation for the first group of observations is 0.69.

¹³Since I report the number of observations used in calculating the correlation as well, the reader can easily pick an alternative cut-off point.

¹⁴I use 57 of these universities because Pepperdine University (rank 52), Yeshiva University (rank 52) and Worcester Polytechnical Institute (rank 57) do not have ranking information in the NRC data.

¹⁵Given the timing of the rankings I use – NRC rankings precede the U.S. News rankings – one can argue that it is more likely that causation goes from having a good Economics department to being a good university.

Table 1 - Benchmark Results

| Order | Field | Correlation | N |
|----------|---|-------------|-----------|
| | Biology/Integrated Biology/Integrated Biomedical Sciences | 0.79 | 18 |
| | Pharmacology, Toxicology and Environmental Health | 0.74 | 18 |
| | American Studies | 0.74 | 4 |
| 1 | English Language and Literature | 0.72 | 26 |
| | Nursing | 0.71 | 10 |
| 2 | Economics | 0.69 | 27 |
| | Comparative Literature | 0.67 | 18 |
| | Geography | 0.63 | 4 |
| 3 | Cell and Developmental Biology | 0.61 | 24 |
| | Theatre and Performance Studies | 0.60 | 6 |
| | Music (except performance) | 0.60 | 17 |
| 4 | Neuroscience and Neurobiology | 0.58 | 25 |
| 5 | History | 0.58 | 27 |
| 6 | Psychology | 0.57 | 28 |
| | Ecology and Evolutionary Biology | 0.57 | 17 |
| 7 | Biochemistry, Biophysics, and Structural Biology | 0.57 | 21 |
| | Microbiology | 0.56 | 16 |
| 8 | Physics | 0.56 | 29 |
| | Biomedical Engineering and Bioengineering | 0.53 | 17 |
| 9 | French and Francophone Language and Literature | 0.52 | 22 |
| | Communication | 0.50 | 7 |
| 10 | Earth Sciences | 0.50 | 23 |
| | Aerospace Engineering | 0.49 | 8 |
| 11 | Chemistry | 0.49 | 31 |
| 12 | Political Science | 0.48 | 26 |
| 13 | Mathematics | 0.46 | 28 |
| | Immunology and Infectious Disease | 0.46 | 18 |
| 14 | Sociology | 0.46 | 22 |
| | Operations Research, Systems Engineering and Industrial Engineering | 0.44 | 13 |
| | Classics | 0.41 | 16 |
| | Astrophysics and Astronomy | 0.37 | 13 |
| 15 | Electrical and Computer Engineering | 0.36 | 24 |
| | Spanish and Portuguese Language and Literature | 0.36 | 18 |
| | Kinesiology | 0.36 | 5 |
| | Genetics and Genomics | 0.36 | 17 |
| 16 | History of Art, Architecture and Archaeology | 0.36 | 21 |
| | German Language and Literature | 0.35 | 16 |
| 17 | Mechanical Engineering | 0.31 | 23 |
| | Oceanography, Atmospheric Sciences and Meteorology | 0.30 | 5 |
| 18 | Philosophy | 0.29 | 26 |
| | Linguistics | 0.27 | 16 |
| 19 | Chemical Engineering | 0.26 | 22 |
| | Materials Science and Engineering | 0.24 | 18 |
| | Public Affairs, Public Policy and Public Administration | 0.23 | 9 |

Table 1 - Benchmark Results (continued)

| Order | Field | Correlation | N |
|-------|--|-------------|----|
| | Statistics and Probability | 0.22 | 17 |
| 20 | Civil and Environmental Engineering | 0.18 | 21 |
| 21 | Anthropology | 0.09 | 20 |
| | Religion | 0.09 | 16 |
| 22 | Computer Sciences | 0.07 | 26 |
| | Applied Mathematics | 0.03 | 11 |
| | Public Health | 0.02 | 12 |
| | Computer Engineering | 0.00 | 0 |
| | Engineering Science and Materials (not elsewhere classified) | 0.00 | 0 |
| | Languages, Societies and Cultures | 0.00 | 0 |
| | Physiology | -0.11 | 14 |
| | Nutrition | -0.64 | 7 |
| | Plant Sciences | -0.87 | 3 |
| | Agricultural and Resource Economics | -1.00 | 2 |
| | Animal Sciences | | 1 |
| | Entomology | | 1 |
| | Food Science | | 1 |
| | Forestry and Forest Sciences | | 1 |

Notes: Fields are listed in descending order of the correlation of the field's ranking and the university's ranking. Gray shading indicate there are less than 20 universities with a ranking for the field. The first column shows the order of the field in this list once the gray-shaded fields are excluded. Economics is shown in bold.

Table 2 - Robustness

(a) Simple Correlation

| Order | Field | Correlation | Obs |
|----------|---|-------------|-----------|
| | American Studies | 0.82 | 4 |
| | Biology/Integrated Biology/Integrated Biomedical Sciences | 0.79 | 18 |
| | Nursing | 0.69 | 10 |
| | Pharmacology, Toxicology and Environmental Health | 0.67 | 18 |
| 1 | English Language and Literature | 0.64 | 26 |
| | Comparative Literature | 0.64 | 18 |
| 2 | Cell and Developmental Biology | 0.64 | 24 |
| | Geography | 0.63 | 4 |
| | Theatre and Performance Studies | 0.62 | 6 |
| 3 | Economics | 0.61 | 27 |
| 4 | History | 0.57 | 27 |
| 5 | Biochemistry, Biophysics, and Structural Biology | 0.57 | 21 |
| 6 | Physics | 0.56 | 29 |
| 7 | French and Francophone Language and Literature | 0.53 | 22 |
| | Aerospace Engineering | 0.52 | 8 |

(b) R-Ranking

| Order | Field | Correlation | Obs |
|-------|---|-------------|-----------|
| | Biology/Integrated Biology/Integrated Biomedical Sciences | 0.74 | 18 |
| | Aerospace Engineering | 0.73 | 8 |
| | Pharmacology, Toxicology and Environmental Health | 0.69 | 18 |
| 1 | Economics | 0.67 | 27 |
| 2 | Cell and Developmental Biology | 0.66 | 24 |
| | Geography | 0.63 | 4 |
| 3 | English Language and Literature | 0.61 | 26 |
| | American Studies | 0.60 | 4 |
| | Oceanography, Atmospheric Sciences and Meteorology | 0.60 | 5 |
| | Nursing | 0.59 | 10 |
| 4 | Neuroscience and Neurobiology | 0.59 | 25 |
| 5 | Biochemistry, Biophysics, and Structural Biology | 0.59 | 21 |
| 6 | Psychology | 0.56 | 28 |
| 7 | Earth Sciences | 0.56 | 23 |
| | Music (except performance) | 0.54 | 17 |

(c) S-Ranking

| Order | Field | Correlation | Obs |
|-------|---|-------------|-----------|
| | American Studies | 1.00 | 4 |
| | Biology/Integrated Biology/Integrated Biomedical Sciences | 0.84 | 18 |
| | Theatre and Performance Studies | 0.77 | 6 |
| 1 | Economics | 0.73 | 27 |
| 2 | English Language and Literature | 0.70 | 26 |
| | Pharmacology, Toxicology and Environmental Health | 0.69 | 18 |
| | Nursing | 0.69 | 10 |
| | Ecology and Evolutionary Biology | 0.65 | 17 |
| | Comparative Literature | 0.63 | 18 |
| | Geography | 0.63 | 4 |
| | Microbiology | 0.63 | 16 |
| 3 | Physics | 0.60 | 29 |
| 4 | Biochemistry, Biophysics, and Structural Biology | 0.58 | 21 |
| 5 | Psychology | 0.58 | 28 |
| | Music (except performance) | 0.57 | 17 |

Table 2 - Robustness (continued)

(d) Top 60

| Order | Field | Correlation | Obs |
|-------|---|-------------|-----------|
| | American Studies | 0.88 | 10 |
| | Entomology | 0.87 | 8 |
| 1 | Immunology and Infectious Disease | 0.69 | 30 |
| 2 | Cell and Developmental Biology | 0.68 | 40 |
| 3 | Pharmacology, Toxicology and Environmental Health | 0.66 | 32 |
| 4 | Neuroscience and Neurobiology | 0.66 | 45 |
| | Theatre and Performance Studies | 0.66 | 14 |
| 5 | History | 0.65 | 52 |
| 6 | English Language and Literature | 0.64 | 47 |
| | Food Science | 0.64 | 8 |
| | Public Affairs, Public Policy and Public Administration | 0.64 | 18 |
| 7 | Music (except performance) | 0.64 | 30 |
| 8 | Biochemistry, Biophysics, and Structural Biology | 0.63 | 40 |
| | Plant Sciences | 0.62 | 12 |
| 9 | Economics | 0.61 | 47 |

(e) Only Universities with Economics Field

| Order | Field | Correlation | Obs |
|----------|---|-------------|-----------|
| | Biology/Integrated Biology/Integrated Biomedical Sciences (Note: Us | 0.75 | 14 |
| | American Studies | 0.74 | 4 |
| 1 | English Language and Literature | 0.71 | 24 |
| | Nursing | 0.71 | 10 |
| | Pharmacology, Toxicology and Environmental Health | 0.70 | 16 |
| 2 | Economics | 0.69 | 27 |
| | Comparative Literature | 0.67 | 18 |
| | Geography | 0.63 | 4 |
| | Music (except performance) | 0.60 | 17 |
| 3 | Cell and Developmental Biology | 0.59 | 22 |
| | Microbiology | 0.58 | 15 |
| | Ecology and Evolutionary Biology | 0.58 | 16 |
| 4 | History | 0.57 | 25 |
| 5 | Psychology | 0.56 | 25 |
| 6 | Physics | 0.55 | 25 |