An Empirical Guide to Choosing a Graduate Program and Hiring Assistant Professors in Economics[1]

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Abstract

We study the research productivity of new graduates from the top North American Ph.D. programs in economics from 1986 to 2000. We find that research productivity drops off very quickly with class rank at all departments, and that the rank of the graduate departments themselves provides a surprisingly poor prediction of future research success. For example, at the top ten departments as a group, the median graduate has fewer than 0.03 American Economic Review (AER) equivalent publications at year six after graduation, an untenurable record at almost any department. We also find that the most productive graduates from lower ranked departments outperform most of the graduates from higher ranked departments. For example the best graduate from UIUC or Toronto in a typical year will have roughly the same number of AER equivalent publications at year six after graduation as the number three graduate from Berkeley, U. Penn or Yale. These results provide guidance on how much weight to give place of graduation relative to class standing when hiring new assistant professors. They also suggest that even the top departments are not doing a very good job of training the great majority of their students to be successful research economists. Finally, these results provide a useful new perspective to undergraduates considering graduate school and an academic career in economics.

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1. Introduction

Top departments in economics are able to choose their new assistant professors from among the top graduates of other top departments. At lesser departments, there is always a debate about whether it is better to hire lower ranked graduates from top departments, or the best graduates from lower ranked departments. Surely the worst Ph.D. out of Harvard or Chicago in a given year should be avoided, but what about the tenth best? On the other hand, even if we believe the recommendations claiming that a job candidate out of Ohio State or Duke is the best they have produced in five years, is this enough to make it likely that we will be able to grant tenure after six years?

We present evidence suggesting that recruiting committees should reduce their focus on the ranking of the department from which a candidate graduates and balance this more with the candidate's rank within his graduating class. Graduates of programs ranked between 10 and 30 often are quite successful in establishing a tenurable record by the end of their sixth year. On the other hand, the data show that not only should one avoid the worst graduates out of Harvard or Chicago, but also the median and even much higher ranked candidates depending upon what one's department sees as a tenureable research record.

It turns out that research productivity of new Ph.D.'s from even top departments drops off very rapidly with class rank. To the extent that the mission of top graduate programs is to traim their students to be the next generation of research economists[2], it would seem that they are largely failing except perhaps for the top 10-20% of each graduating class. Given the high quality of applicants and the intense competition to gain admission to top programs, one has to wonder why the great majority of these promising young students ultimately do not seem to benefit from the training they receive.

Undergraduates thinking about applying to graduate school in economics should also find these results of interest. The bottom-line is that applying to graduate school with the idea of becoming a tenured professor at a well-ranked department is probably not a good business plan for the great majority of students. Economics programs typically get several hundred applications for entering classes that generally number between 10 and 30. Many of those fortunate enough to be admitted to a graduate program will ultimately fail to complete their degree.[3] Even for those who do manage to graduate, the likelihood of ultimately accumulating a research record that might gain one tenure at a top 100 department (much less a top 30 or top 10 department) is not very great. Thus, students thinking about applying to Ph.D. programs in economics would be well advised to have "plan B's" for every stage of the journey (and we hasten to add on the positive side that there are many very worthwhile non-research and non-academic career paths open to those who obtain masters or doctorate degrees in economics).

Perhaps the most striking finding from the data is that graduating from a top department is neither necessary nor sufficient to become a successful research economist. Top researchers come from everywhere, while most of the graduates of even the very best departments produce little, if anything. For undergraduates applying to graduate school, this suggests the following: If you think you are likely to be at

2 Siegfried and Stock (1999) point out that economics Ph.D. programs lack "product differentiation" in the sense that they are all designed primarily to produce research economists and give little, if any, attention to training students to suit the needs of business or industry.

3 Stock, Siegfried, Finegan. (2011) find that graduation rates are on the order of 30% by the fifth year after admission, going up to around 60% by the eighth year. There is wide variability, however, but the better programs seem to have higher graduation rates in general.

the top of the class at Chicago or Harvard, then by all means, go to Chicago or Harvard. However, if you are risk averse or have a less exalted estimation of your abilities, you might be better off choosing a lower ranked Ph.D. program with a view to ending up as a higher ranked student within that program rather than taking the chance of being lost in the middle of the pack at one of the best programs. Finally, if you are even more modest, you might choose to avoid programs that seem to focus on only the very top students in favor of those with a more egalitarian distribution of ex-post research success.

2. Data

This study follows up on Conley, Crucini, Driskill, and Önder (2013) in which we examined recent trends in publication rates of young scholars in economics. To carry out this analysis, we constructed a panel dataset consisting of two parts: a census of Ph.D. recipients from academic institutions in the US and Canada who received their economics Ph.D.'s between 1986 and 2000, and a complete record of the journal publications of these individuals for the years 1985 to 2006 in EconLit listed journals. Pooling all years, the panel contains 14,271 economics Ph.D.'s and 368,672 peer-reviewed papers. We refer the reader to Conley et al. (2013) for more details regarding the nature and origin of these data.

Raw counts of publications are imperfect measures of the research productivity of individual scholars, of course, because of the variation in the quality of those publications. We therefore use journal quality indexes from Kalaitzidakis, Mamuenas and Stengos (2003) to convert each raw publication into a number of American Economic Review (AER) equivalent papers. We also discount this by the number of coauthors on a given paper. Thus, if a graduate in our sample publishes a paper with C coauthors in a journal with a quality index of Q relative to the AER, then the graduate is credited with Q/C AER equivalent publications.

Finally, we focus on graduates of the top 30 ranked departments. We use a department ranking developed by Coupé (2003) based on faculty research productivity to choose this top 30 group. Which departments are "top 30" is open to debate, of course, and regardless of how the ranking is established, many departments are likely to have moved in and out of this group over the fifteen year interval we study. Given this, it would be better to think of our "top 30" departments as representative of "top departments" in general. The non-top 30 departments we use for comparison are a set of 30 Ph.D. granting departments not in the top group.

3. Results

One of the major findings of Conley, et al. (2013) was that research productivity drops off very quickly with the top 1% of publishing research economists across the whole sample producing 13% of the AER equivalent papers, and the top 20% producing 80%. This leaves unanswered exactly who these most productive scholars are. Does this group contain only graduates of top programs or does it include many graduates from lesser departments? Are most graduates of top programs likely to become one of these highly productive scholars, or will most join the other 80% who produce comparatively little research? To address this, we took each top 30 department, combined all their graduates from 1986 to 2000 into a single sample, and looked at total research productivity at the end of the sixth year after graduation. We did the same for graduates of non-top 30 departments as one combined group.

Table 1 shows the number of AER equivalent publications that appear on the (constructed) CV's of graduates of each department at the end of their sixth year after graduation by productivity percentile[4]. For example, Harvard graduates in the 95th percentile of research productivity relative to their classmates published the equivalent of 2.36 AER papers in this period.

It should be noted that this table identifies the ex-post top graduates as determined by actual measured productivity. This may not necessarily agree with the ex-ante top graduates as rated by the faculties of their home departments as they entered the job market. Unfortunately, we have no way of ascertaining such ex-ante rankings. While it would be interesting to know whether or not students fulfilled the expectations of their supervisors, our data does not allow us to explore this question. However, we would expect that our colleagues make their best, though somewhat noisy, estimates of the relative quality of the candidates they are sending to market in a given year, and that recruiting committees, in turn, read application packets and conduct interviews to make their own judgments and guesses. Thus, while it is unlikely that the winners will be perfectly identified ex-ante, hiring the person that you guess is the third best graduate of MIT this year should give something similar to the outcome in the table below at least in expectation.

That said, there is other evidence that suggests that we may in fact not be very good at forming these ex ante guesses of quality. Smeets, Warzynski, and Coupé (2006) explore the efficiency of the academic job market in matching students to positions. They study the 1992 and 1993 cohorts and discover that the matching of quality students to quality first jobs is not as tight as one might hope. There is substantial, mostly downward, movement from the first to the final job these graduates hold, and that overall, the research productivity of students who get first jobs of various qualities does not differ as starkly as we see in Table 1. This suggests that the students who are identified as top graduates in a given year (and get top jobs as result) might not line up with the students who end up being the most productive ex-post. It may simply be that it is difficult to identify winners ex-ante and that the clear advantages that a good first placement conveys do not fully offset the relatively lower quality (or perhaps, bad luck in publishing) of such misidentified candidates.

4 Departments are ordered following department rankings reported in Coupé (2003). All cohorts from 1986 to 2000 are pooled together in this table.

Table 1. Number of AER-Equivalent Publications of Graduating Classes from 1986 to 2000								
Department	*Percentiles of Graduates' AER-Equivalent Publications 6 years after Ph.D.*							
	95th	90th	85th	80th	75th	70th	60th	50th
Harvard	2.36	1.47	1.04	0.71	0.41	0.30	0.12	0.04
Chicago	1.71	1.04	0.72	0.51	0.33	0.19	0.06	0.01
U Penn	1.52	1.01	0.60	0.40	0.27	0.22	0.06	0.02
Stanford	1.58	1.02	0.67	0.50	0.33	0.23	0.08	0.03
MIT	2.87	1.66	1.24	0.83	0.64	0.48	0.20	0.07
UC Berkeley	1.08	0.55	0.35	0.20	0.13	0.08	0.04	0.02
Northwestern	1.92	1.15	0.93	0.61	0.47	0.30	0.14	0.06
Yale	2.15	1.22	0.83	0.57	0.39	0.19	0.08	0.03
UM Ann Arbor	0.77	0.48	0.29	0.17	0.09	0.05	0.02	0.01
Columbia	1.15	0.62	0.34	0.17	0.10	0.06	0.01	0.01
Princeton	2.17	1.79	1.23	1.01	0.82	0.60	0.36	0.19
UCLA	0.89	0.49	0.26	0.14	0.06	0.04	0.02	0
NYU	0.89	0.34	0.20	0.07	0.03	0.02	0.01	0
Cornell	0.65	0.40	0.23	0.12	0.07	0.05	0.02	0.01
UW Madison	0.89	0.51	0.31	0.20	0.11	0.06	0.03	0.01
Duke	1.03	0.59	0.49	0.23	0.19	0.11	0.05	0.02
Ohio State	0.41	0.13	0.07	0.04	0.02	0.02	0.01	0
Maryland	0.37	0.23	0.10	0.07	0.05	0.03	0.01	0.01
Rochester	1.94	1.56	1.21	1.14	0.98	0.70	0.34	0.17
UT Austin	0.53	0.21	0.06	0.05	0.02	0.01	0	0
Minnesota	1.20	0.68	0.46	0.29	0.21	0.12	0.04	0.01
UIUC	0.38	0.21	0.10	0.06	0.04	0.03	0.01	0.01
UC Davis	0.66	0.42	0.27	0.12	0.08	0.05	0.02	0.01
Toronto	1.85	0.80	0.61	0.29	0.19	0.15	0.07	0.03
UBC	1.05	0.71	0.60	0.52	0.45	0.26	0.22	0.11
UCSD	1.69	1.17	0.88	0.74	0.60	0.46	0.30	0.18
USC	0.34	0.14	0.09	0.03	0.02	0.02	0.01	0
Boston U	0.49	0.21	0.08	0.05	0.02	0.02	0	0
Penn State	0.59	0.25	0.12	0.08	0.06	0.02	0.01	0.01
CMU	1.27	1.00	0.86	0.71	0.57	0.52	0.21	0.09
Non-top 30	0.31	0.12	0.06	0.04	0.02	0.01	0	0

Table 1 makes it clear that there is a rapid drop off in research productivity of graduates regardless of department as class rank decreases. Even at Harvard, a student has to be in the 85th percentile or above to be likely to publish even a single AER equivalent paper in six years. The median Harvard graduate publishes only .04 AER papers. On the other hand, the 90th percentile of graduates of CMU, UCSD and the 80th percentile of Rochester graduates can also be expected to have one AER paper or more by year six. Going farther down this table, we see that one would be better off hiring a 95th percentile graduate of a typical non-top 30 department than the 70th percentile graduate of Harvard, Chicago, U Penn, Stanford or Yale, or an 80th percentile graduate of Berkeley, Michigan, NYU, UCLA, or Columbia.

At this point it might be useful to spend a few lines on how a department's tenure standard translates into AER equivalent papers. These targets should also be of interest to graduate students and newly hired assistant professors. The following is a list of possible publication records that are all roughly equivalent to one AER paper (based on journals' quality weights that we use in our analysis). Obviously, this can be scaled up or down depending of a particular department's standards.

- One paper in the *American Economic Review* or *Econometrica*
- Two papers in the *Journal of Econometrics*, *Econometric Theory*, or *Journal of Economic Theory*
- Three papers in the *Journal of Monetary Economics* or *Games and Economic Behavior*
- Four papers in the *European Economic Review, Review of Economic and Statistics*, *International Economic Review* or *Economic Theory*
- Five papers in the *Economic Journal*, *Journal of Public Economics*, or *Economics Letters*
- Six to ten papers in high quality field journals

Different departments produce different numbers of new Ph.D.'s every year. This makes the percentiles in Table 1 a bit difficult to understand. What recruiting committees really need to know is how far down in class rank at a given department they should consider given their own tenure standards. Table 2 addresses this directly. The table gives the average number of new Ph.D.'s coming out of a given department each year that achieve a research record of at least a given number of AER equivalent papers by the end of year six. Thus, if your department's tenure standard is one AER paper, you should not hire below the five best people out of MIT, the two best from Berkeley, Yale or U. Penn., or the top candidates from Columbia or UCLA in an average year.

Table 2: The Number of Graduates each Year for each Department who Publish at Least a Given Number of AER Equivalent Papers within 6 Years									
AER Papers	2.5	2	1.5	1	0.75	0.5	0.25	0.1	**Av. Cohort Size**
Harvard	1.3	2.1	2.9	4.6	5.8	7.2	10.1	12.5	30.5
Chicago	0.5	0.9	1.7	3.1	4.0	5.6	7.5	9.5	27.3
U Penn	0.4	0.7	1.1	1.9	2.3	3.5	5.5	7.1	19.3
Stanford	0.7	0.9	1.4	2.7	3.4	5.0	7.4	9.3	24.7
MIT	1.5	2.0	3.1	4.7	5.4	7.5	9.9	11.9	25.5
Berkeley	0.3	0.5	0.9	1.8	2.1	3.1	5.2	7.9	28.0
Northwestern	0.3	0.5	0.8	1.3	2.0	2.5	3.3	4.5	10.1
Yale	0.7	0.9	1.3	1.9	2.5	3.5	4.5	5.9	15.7
UM Ann Arbor	0.0	0.1	0.4	0.7	1.0	1.8	3.3	4.7	19.1
Columbia	0.3	0.3	0.5	1.1	1.6	2.3	3.1	4.3	17.4
Princeton	0.7	1.2	2.0	3.3	4.4	5.4	7.6	9.4	16.2
UCLA	0.2	0.2	0.5	0.8	1.1	1.7	2.7	3.9	17.9
NYU	0.0	0.1	0.1	0.4	0.6	1.0	1.6	2.1	11.7
Cornell	0.1	0.1	0.3	0.4	0.7	1.3	2.4	3.8	17.3
UW Madison	0.0	0.3	0.5	1.1	1.7	2.6	4.3	6.4	25.0
Duke	0.0	0.0	0.0	0.4	0.6	1.1	1.5	2.4	7.8
Ohio State	0.0	0.0	0.0	0.1	0.1	0.5	1.1	1.7	15.9
Maryland	0.0	0.1	0.1	0.3	0.3	0.4	1.3	2.2	13.5
Rochester	0.1	0.3	1.0	2.1	2.5	3.1	4.1	4.9	8.7
UT Austin	0.0	0.0	0.0	0.1	0.2	0.6	0.9	1.4	10.3
Minnesota	0.4	0.6	0.8	1.4	1.9	2.9	4.8	7.1	22.2
UIUC	0.0	0.0	0.1	0.3	0.4	1.1	2.2	3.9	26.4
UC Davis	0.0	0.0	0.1	0.1	0.2	0.5	1.0	1.3	6.2
Toronto	0.1	0.2	0.3	0.5	0.7	1.1	1.5	2.3	6.4
UBC	0.0	0.0	0.1	0.3	0.4	0.9	1.5	2.3	4.5
UCSD	0.0	0.1	0.5	0.7	1.2	1.8	2.5	3.4	6.1
USC	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.7	4.9
Boston U	0.0	0.1	0.1	0.2	0.3	0.5	1.1	1.8	12.5
Penn State	0.0	0.0	0.0	0.1	0.3	0.5	0.8	1.2	7.1
CMU	0.0	0.1	0.1	0.2	0.4	0.6	0.8	0.9	2.0
Non-top 30	0.0	0.0	0.1	0.2	0.3	0.5	1.0	1.8	16.8

This table should also be of use to top departments. Suppose a department only wants to hire superstars (which we define as having published 2.5 or more AER papers at year six), Then the set of potential job candidates is restricted to the top one or two graduates from Harvard, or MIT and the top graduate from Stanford, Yale or Princeton, if these departments are having a good year. In addition, once every other year Chicago, U Penn. and Minnesota should produce a superstar. Other departments will do so with less frequency. We should note that many people may become stars later in their careers, but only seven or eight in a given graduation cohort are likely to reveal themselves as such by the sixth year after receiving their Ph.D.

Although only a few departments are good at producing superstars, most departments show a very steep drop-off in quality thereafter. For example, if one considers the 80th percentile of students and sets a tenure standard of .6 AER papers, only graduates of Harvard, MIT, Northwestern, Yale, Princeton, Rochester, UCSD, and CMU are likely to achieve this level of productivity. In other words 80% or more of the graduates of Chicago, U Penn, Stanford, UC Berkeley, UM Ann Arbor, Columbia, UCLA, NYU, Cornell, UW Madison, Duke, Ohio State, U Maryland, UT Austin, Minnesota, UIUC, Toronto, UBC, USC, Boston U, and Penn State will not have .6 AER papers at the end of six years.

On the other hand, there are a few schools that do relatively better at training students who are not in the top percentiles. Table 3 gives a set of departmental rankings based on the productivity of different percentiles of the graduating class. Thus, at the 95th percentile of students, MIT graduates are more productive at year six than those of any other department. If we look at students in the 70th percentile, however, MIT's ranking drops to four. For comparison, the second column gives the departmental ranking according to Coupé (2003).

Table 3. Department Rankings Based on Graduating Cohorts' Publication Performance (1986-2000)

Department	Coupé	Ranking at Percentile:							
Percentile		95th	90th	85th	80th	75th	70th	60th	50th
Harvard	1	2	4	4	5	8	6	8	8
Chicago	2	8	8	9	10	10	12	12	17
U Penn	3	11	10	13	12	12	10	13	14
Stanford	4	10	9	10	11	11	9	9	10
MIT	5	1	2	1	3	3	4	6	6
UC Berkeley	6	15	17	16	17	16	16	15	13
Northwestern	7	6	7	5	7	6	7	7	7
Yale	8	4	5	8	8	9	11	10	11
UM Ann Arbor	9	21	20	19	18	19	21	20	23
Columbia	10	14	15	17	19	18	18	22	20
Princeton	11	3	1	2	2	2	2	1	1
UCLA	12	19	19	21	20	22	22	21	26
NYU	13	20	23	23	24	26	26	27	30
Cornell	14	23	22	22	21	21	19	19	15
UW Madison	15	18	18	18	16	17	17	17	19
Duke	16	17	16	14	15	15	15	14	12
Ohio State	17	27	30	29	29	27	27	24	28
U Maryland	18	29	25	25	25	24	23	25	21
Rochester	19	5	3	3	1	1	1	2	3
UT Austin	20	25	27	31	27	29	31	31	27
Minnesota	21	13	14	15	14	13	14	16	18
UIUC	22	28	26	26	26	25	24	26	24
UC Davis	23	22	21	20	22	20	20	18	16
Toronto	24	7	12	11	13	14	13	11	9
UBC	25	16	13	12	9	7	8	4	4
UCSD	26	9	6	6	4	4	5	3	2
USC	27	30	29	27	31	28	28	28	25
Boston U	28	26	28	28	28	30	29	30	29
Penn State	29	24	24	24	23	23	25	23	22
CMU	30	12	11	7	6	5	3	5	5
Non-top 30		31	31	30	30	31	30	29	31

Table 3 shows that some departments like Harvard, MIT, Yale and to a smaller extent Chicago and U Penn follow a downward trend in these rankings. That is, they do better at training top students than middle or lower level students in a relative sense. Other departments, such as Rochester, UBC, UCSD and CMU do not compete with the top departments in producing the very top research scholars, but are able to turn out lower ranked students who dominate the similarly ranked graduates at better ranked departments. For example, Rochester is third best at producing students at the 90^{th} and 85^{th} percentile, and thereafter mostly trades the one and two spots with Princeton. For students trying to decide where to attend graduate school, the relative success of different programs at training students closer to the median should be an important consideration.

4. Conclusion

The main conclusions are that class rank matters a great deal and quickly out-weighs the ranking of the department from which a job candidate graduates, assuming that ex-ante (or perceived) class ranking at time of graduation is (however incomplete) an indicator of ex-post class ranking based on productivity several years after graduation. It is indeed worthwhile to look at non-top ranked departments for new hires, though only at their very top students in general. On the other hand, if a department is only willing to hire superstars in the making, then only the top candidates from the very top departments should be considered. It is very rare for a non-top 10 departments to produce a superstar, at least one who stands out as such at the time when tenure is granted.

For graduate students and potential graduate students the message is that being a successful research economist is difficult. The good news is that one does not have to go a top department in order to become one (although it helps, on the average.) The bad news is that wherever one goes, only the very best of each class is likely to find academic success.

Perhaps a more interesting question is how it is that the median Harvard (or any top school's) graduate can be so bad. To get to Harvard, an applicant has to have great grades, perfect test scores, strong and credible recommendations, and know how to package all this to stand out to the admission committee. Thus, successful candidates must be hardworking, intelligent, well-trained, savvy and ambitious. Why is it that the majority of these successful applicants, who were winners and did all the right things up to the time they arrived at graduate school, become so unimpressive after they are trained? Are we failing the students, or are the students failing us?

Three possible answers suggest themselves. First, it might be that what makes a successful research economist is not well measured by tests and grades. Being hardworking, well-trained and intelligent might be necessary for success, but is by no means sufficient. Perhaps it has more to do with being creative, self-motivated, or thick-skinned. Unfortunately, we do not have good ways of measuring these attributes so it may be that the admissions system currently used by all departments (even outside of economics) is not gathering the right information. Second, it might be that nothing succeeds like success. If a new graduate (regardless of fundamental quality) gets a good first job[5], is well mentored and fostered by his new colleagues, and has early success in publishing, he may be more likely to have more papers accepted by good journals in the future. After all, editors and referees will know that a new submission was written by a bright young person; everyone says so; look at his first publication[6]. There is a kind of virtuous circle in success and a vicious one in failure. Luck may also play a role in who starts their careers on the high road. Students who happen to choose to work on a topic that is in vogue at the time they graduate are more likely to get good offers and to publish more easily. In other words, publication success may be tied to first jobs and good luck. Since there is only so much of each to go around and success breeds success, the distribution of sixth year publications is inevitably very skewed and not proportional to either the innate quality of the new graduate or the quality of his or her training. If this is the case, the outcomes we document derive from the sociology of the profession and there is little to be done to change it. Success is more of a lottery. Recruiting committees should hire in trendy topics, but otherwise, graduates hired by good departments will simply be more successful regardless of their quality. Finally, it might be that there is a kind of positional game going on that affects both students and professors. The faculty will generally identify the top students in an entering class and this in turn generates raised expectations and higher confidence in those singled out (and perhaps the opposite for the rest of the class). Being number six is much like being number sixteen, but if a student is number one or two, he wants to hold on to his status and will work harder to do so. Faculty, on the other hand, seek the best students out, give them more time and attention, and suggest better projects to them. Thus, it might be better to be the top student in a second tier program than a second tier student in a top program.[7]

In any event, what these data show is that if the objective of graduate training in top ranked departments is to produce successful research economists, then we, as a profession, are largely failing. Even at the top five departments it would be hard to argue that the bottom half of their students are successful in terms of academic research. The number of AER publications at year six is below 0.1 in all cases and is in fact zero in most. At the majority of the top 10 departments 60% of their students fail to meet this .1 standard, and for the majority of the top 30 departments, 70% fail. A tenure standard of 0.1 AER publication is equivalent to publishing one paper in second tier field journal over six years. It is doubtful that this would pass for research active in many departments, much less, result in tenure. This suggests that: (i) we are failing to identify the characteristics leading to future success in the admissions process; (ii) our graduate programs are set up in a way that serves only the best students in general; or (iii) that the nature of the economics profession is to create only a few winners and many losers. Whichever is correct, it is largely beyond the powers of individual departments to fix. We conclude that the best thing a department that wishes to hire people who are likely to get tenure and contribute to their research ranking can do is to focus on candidates who are working in trendy areas and are near the top of their respective classes, but not to be overly impressed by the place from which job candidates receive their degree.

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5 Oyer (2006) discusses learning-on-the-job aspects in academic careers and establishes a causal relationship between landing a research-oriented first job after Ph.D. and life cycle publication productivity.

6 However, a quick data investigation of the relationship between publishing a paper before graduation and productivity over the six year probationary period shows them to be uncorrelated. That is, publishing a paper before graduation is a bird in hand, and is an addition to total expected publications at year six. However, it does not predict that a graduate will publish at a higher rate over the next six years. Also note that the findings of Smeets, Warzynski, and Coupé. (2006) seem to suggest that this effect is not highly significant

7 See Gladwell (2013) for some interesting speculations in this regard.

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Appendix (Not for publication, but to be posted with the paper)

The tables in the body of the paper all report statistics based on pooling all of any given departments' Ph.D.'s from 1986 to 2000 and comparing their AER-equivalent number of publications at six years after graduation. In this appendix we take a different approach. We consider each cohort of each department's graduates separately. This allows us to see how many publications Ph.D.'s at a given productivity percentile *within* their respective department and cohort end up with at the end of the sixth year after graduation. This in turn allows us to find the average performance over thirteen years in our dataset[8] of each productivity percentile of each department's graduates. We also report the 95% confidence intervals associated with these mean values in order to establish the significance of these differences across departments.

In Table A.1, we provide information on how Ph.D.'s ranking at 95th, 80th, and 50th percentiles in their cohorts perform on average. For example, Harvard Ph.D.'s who rank at 95th percentile in their respective cohorts publish an average of 8.21 (non-quality discounted) papers at the sixth year after graduation. Thus, there is 95% probability that a randomly chosen Harvard Ph.D. who is ranked at his cohort's 95th percentile will end up with a publication record of between 6.55 and 9.87 papers.

Table A.1. Cohorts' Performance at Various Percentiles

Department		TOTAL Publications				AER-Equivalent Publications		
		Mean	95% Conf. Int.			Mean	95% Conf. Int.	
Harvard	95th	8.21	6.55	9.87		2.083	1.484	2.683
	80th	4.08	3.28	4.88		0.657	0.483	0.831
	50th	1.00	0.75	1.25		0.038	0.019	0.057
Chicago	95th	6.14	4.89	7.39		1.697	1.327	2.068
	80th	3.51	2.49	4.52		0.480	0.294	0.666
	50th	1.04	0.60	1.48		0.037	0.011	0.063
U Penn	95th	6.21	5.33	7.09		1.453	0.873	2.033
	80th	3.29	2.55	4.03		0.575	0.279	0.872
	50th	0.86	0.54	1.17		0.033	0.008	0.058
Stanford	95th	7.87	6.54	9.19		1.834	1.211	2.457
	80th	3.90	3.16	4.65		0.491	0.326	0.656
	50th	1.21	0.98	1.43		0.038	0.023	0.053
MIT	95th	7.90	6.30	9.49		2.545	1.883	3.206
	80th	4.28	3.41	5.14		0.930	0.638	1.222
	50th	1.45	0.96	1.94		0.091	0.044	0.138

8 We drop 1986 and 1987 cohorts in the analysis presented in tables A.1 and A.2 due to low number of department-cohort observations in these two years.

Berkeley	95th	6.87	5.96	7.77		1.096	0.757	1.435
	80th	3.04	2.46	3.61		0.249	0.104	0.395
	50th	0.88	0.55	1.21		0.022	0.012	0.033
Northwestern	95th	6.12	4.84	7.39		1.752	1.120	2.383
	80th	3.47	3.01	3.93		0.693	0.417	0.968
	50th	1.22	0.71	1.74		0.068	0.017	0.120
Yale	95th	7.78	5.36	10.20		2.101	1.150	3.052
	80th	3.32	2.45	4.19		0.556	0.336	0.775
	50th	1.21	0.72	1.70		0.048	0.005	0.090
MI, Ann Arbor	95th	6.70	4.37	9.03		0.855	0.531	1.179
	80th	2.94	2.16	3.71		0.220	0.098	0.341
	50th	0.68	0.24	1.13		0.020	0.000	0.041
Columbia	95th	6.62	5.10	8.14		1.035	0.675	1.394
	80th	2.32	1.70	2.94		0.185	0.078	0.292
	50th	0.42	0.15	0.69		0.008	0.003	0.012
Princeton	95th	8.66	6.88	10.44		2.246	1.600	2.892
	80th	5.13	4.43	5.83		0.979	0.734	1.223
	50th	2.08	1.55	2.61		0.195	0.092	0.298
UCLA	95th	5.67	4.44	6.89		0.634	0.379	0.889
	80th	2.01	1.46	2.55		0.200	0.070	0.329
	50th	0.49	0.11	0.88		0.010	0.003	0.016
NYU	95th	4.88	2.82	6.93		0.818	0.380	1.256
	80th	2.28	1.38	3.18		0.197	0.027	0.366
	50th	0.21	0.00	0.43		0.003	0.000	0.008
Cornell	95th	5.68	4.71	6.65		0.659	0.411	0.907
	80th	2.96	2.29	3.64		0.163	0.073	0.254
	50th	0.75	0.39	1.11		0.020	0.008	0.032
WI Madison	95th	5.56	4.39	6.73		1.007	0.561	1.452
	80th	2.96	2.34	3.57		0.368	0.000	0.745
	50th	0.88	0.34	1.43		0.023	0.000	0.045
Duke	95th	5.83	3.97	7.69		0.680	0.403	0.957
	80th	3.25	2.03	4.47		0.341	0.112	0.571
	50th	1.20	0.66	1.73		0.064	0.008	0.120

Ohio State	95th	6.77	3.79	9.74		0.398	0.180	0.616
	80th	1.74	1.27	2.21		0.065	0.008	0.122
	50th	0.23	0.03	0.43		0.004	0.000	0.007
Maryland	95th	5.10	3.71	6.50		0.633	0.300	0.965
	80th	1.88	1.39	2.38		0.094	0.033	0.155
	50th	0.36	0.15	0.58		0.008	0.001	0.014
Rochester	95th	7.21	5.53	8.88		1.808	1.189	2.426
	80th	4.52	3.66	5.38		1.010	0.723	1.297
	50th	1.93	1.03	2.84		0.377	0.087	0.667
TX Austin	95th	3.33	2.38	4.29		0.353	0.158	0.548
	80th	1.85	1.12	2.57		0.092	0.006	0.178
	50th	0.25	0.00	0.53		0.004	0.000	0.009
Minnesota	95th	5.61	4.15	7.07		1.046	0.620	1.472
	80th	3.01	2.30	3.72		0.214	0.135	0.294
	50th	0.77	0.44	1.10		0.022	0.007	0.037
UIUC	95th	4.94	3.68	6.20		0.369	0.244	0.494
	80th	2.15	1.56	2.75		0.052	0.034	0.071
	50th	0.40	0.12	0.67		0.008	0.002	0.014
UC Davis	95th	4.13	2.63	5.63		0.530	0.224	0.835
	80th	2.47	1.43	3.52		0.194	0.084	0.304
	50th	0.66	0.21	1.11		0.021	0.004	0.039
Toronto	95th	6.85	4.91	8.79		1.161	0.585	1.738
	80th	4.49	3.24	5.74		0.612	0.240	0.985
	50th	1.81	1.07	2.56		0.048	0.021	0.075
UBC	95th	5.96	4.18	7.74		0.698	0.421	0.975
	80th	5.22	3.45	6.98		0.544	0.335	0.754
	50th	3.08	1.35	4.80		0.140	0.061	0.220
UCSD	95th	5.14	3.61	6.67		1.109	0.759	1.459
	80th	3.47	2.42	4.53		0.817	0.510	1.123
	50th	2.19	1.11	3.27		0.285	0.023	0.548
USC	95th	2.42	1.67	3.18		0.243	0.064	0.422
	80th	1.70	1.07	2.33		0.091	0.029	0.153
	50th	0.74	0.14	1.35		0.060	0.000	0.127

Boston U	95th	3.68	2.62	4.75		0.499	0.113	0.885
	80th	1.76	1.00	2.52		0.073	0.002	0.144
	50th	0.17	0.00	0.43		0.006	0.000	0.017
Penn State	95th	4.36	2.55	6.18		0.429	0.232	0.626
	80th	2.90	1.25	4.54		0.267	0.059	0.475
	50th	0.47	0.09	0.86		0.013	0.002	0.024
CMU	95th	3.09	1.76	4.42		0.739	0.248	1.229
	80th	2.96	1.68	4.24		0.718	0.236	1.201
	50th	1.77	0.75	2.78		0.222	0.042	0.402
Non Top 30	95th	4.60	4.34	4.86		0.314	0.269	0.358
	80th	1.54	1.37	1.70		0.035	0.032	0.038
	50th	0.00	0.00	0.00		0.000	0.000	0.000

In Table A.2, we use the numbers generated to produce Table A.1 to provide an alternative ranking of departments based on average performance (measured in AER equivalent number of publications) of graduates at 95th and 80th productivity percentiles in a given year. Both rankings differ significantly from the faculty rankings listed in Coupé (2003), and from one another. Thus, not only is it the case that faculty productivity is not closely tied with graduate student productivity, but also that the departments that are best at fostering the very top students are not the same as the departments that do well fostering the merely very good students.

Table A.2. Ranking of Departments based on 95th and 80th Percentiles

	Ranking based on 95th Percentile					Ranking based on 80th Percentile		
	Mean	95% Conf. Int.				Mean	95% Conf. Int.	
MIT	2.545	1.883	3.206		Rochester	1.010	0.723	1.297
Princeton	2.246	1.600	2.892		Princeton	0.979	0.734	1.223
Yale	2.101	1.150	3.052		MIT	0.930	0.638	1.222
Harvard	2.083	1.484	2.683		UCSD	0.817	0.510	1.123
Stanford	1.834	1.211	2.457		CMU	0.718	0.236	1.201
Rochester	1.808	1.189	2.426		Northwestern	0.693	0.417	0.968
Northwestern	1.752	1.120	2.383		Harvard	0.657	0.483	0.831
Chicago	1.697	1.327	2.068		Toronto	0.612	0.240	0.985
U Penn	1.453	0.873	2.033		U Penn	0.575	0.279	0.872
Toronto	1.161	0.585	1.738		Yale	0.556	0.336	0.775
UCSD	1.109	0.759	1.459		UBC	0.544	0.335	0.754
Berkeley	1.096	0.757	1.435		Stanford	0.491	0.326	0.656
Minnesota	1.046	0.620	1.472		Chicago	0.480	0.294	0.666
Columbia	1.035	0.675	1.394		WI Madison	0.368	0.000	0.745
WI Madison	1.007	0.561	1.452		Duke	0.341	0.112	0.571
MI, Ann Arbor	0.855	0.531	1.179		Penn State	0.267	0.059	0.475
NYU	0.818	0.380	1.256		Berkeley	0.249	0.104	0.395
CMU	0.739	0.248	1.229		MI, Ann Arbor	0.220	0.098	0.341
UBC	0.698	0.421	0.975		Minnesota	0.214	0.135	0.294
Duke	0.680	0.403	0.957		UCLA	0.200	0.070	0.329
Cornell	0.659	0.411	0.907		NYU	0.197	0.027	0.366
UCLA	0.634	0.379	0.889		UC Davis	0.194	0.084	0.304
Maryland	0.633	0.300	0.965		Columbia	0.185	0.078	0.292
UC Davis	0.530	0.224	0.835		Cornell	0.163	0.073	0.254
Boston U	0.499	0.113	0.885		Maryland	0.094	0.033	0.155
Penn State	0.429	0.232	0.626		TX Austin	0.092	0.006	0.178
Ohio State	0.398	0.180	0.616		USC	0.091	0.029	0.153
UIUC	0.369	0.244	0.494		Boston U	0.073	0.002	0.144
TX Austin	0.353	0.158	0.548		Ohio State	0.065	0.008	0.122
Non Top 30	0.314	0.269	0.358		UIUC	0.052	0.034	0.071
USC	0.243	0.064	0.422		Non Top 30	0.035	0.032	0.038