Is Peer Review in Decline?

Glenn Ellison[1]
MIT and NBER

December 2006

[1]I would like to thank the National Science Foundation (SES-0550897), the Institute for Advanced Study, and the Toulouse Network for Information Technology for their support. Tom Chang and Brandon Lehr provided valuable research assistance. I thank Markus Möbius for providing data.

Abstract

Over the past decade there has been a decline in the fraction of papers in top economics journals written by economists from the highest-ranked economics departments. This paper documents this fact and uses additional data on publications and citations to assess various potential explanations. Several observations are consistent with the hypothesis that the Internet improves the ability of high-profile authors to disseminate their research without going through the traditional peer-review process.

JEL Classification No.: A14

1 Introduction

For the past half-century or more peer-reviewed journals have played a central role in the evaluation and dissemination of scientific research. The Internet has enhanced scientific communication in many ways and there is considerable excitement around new institutions for disseminating research.[1] A more sobering thought, however, is that improvements in communication could imperil the entire peer-review system: high-profile researchers may be increasingly able to disseminate work without subjecting it to peer-review and this could have cascading effects on the whole journal system.

In this paper I note that one trend visible in economics journals over the past decade is that economists at the top-ranked departments have been publishing fewer papers in many of the top economics journals. This could be an early sign of a decline in peer review, but could also be reflect of other welcome changes. This paper examines a number of data sources to develop a more complete picture of the changes that are taking place and to assess potential explanations.

Most issues of top field journals now contain few or no articles by professors in the very best departments. For example, in 2003 no faculty member from a "top five" economics department published a paper in the *Journal of Urban Economics* and the *Journal of Development Economics* and the *Journal of International Economics* each had just two articles with a top-five coauthor. This reflects the first of two recent trends on which I focus:

> 1. Comparing the early 1990's with the early 2000's, there is a decline in the share of papers in the top field journals (and the absolute number) written by faculty members from the top-ranked economics departments.

My second fact concerns the top five general interest economics journals:

> 2. Comparing the early 1990's with the early 2000's, there is a decline in the share of papers in the top general-interest journals (and the absolute number)

[1] Among the new institutions in the economics profession are the working paper archives like RePEc and SSRN, new electronic only journals like *Economics Bulletin*, *Theoretical Economics*, and the BEPress journals, and *NAJ Economics*, which aims to provide peer review without publication. Similar institutions have arisen in many other disciplines. New institutions that aim to change scientific communication within many fields include Google Scholar and MSN Live Academic.

written by faculty members from the Harvard economics department.

Although the second fact is just about one department, I see it as potentially important to understanding what is happening because it comes at a time when Harvard is widely regarded (I believe correctly) as having ascended to the top position in the profession.

The "decline of peer review" theory I allude to in the title is that the necessity of going through the peer-review process has lessened for high status authors: in the old days peer-reviewed journals were by far the most effective means of reaching readers, whereas with the growth of the Internet high-status authors can now post papers online and exploit their reputation to attract readers.

The facts could alternately be explained in many less troubling ways. I'll focus on three such explanations. (1) One is that the trends could be a consequence of top-school authors' being crowded out of the top journals by other researchers. A number of such stories have an optimistic message, e.g. there is more talent entering the profession, more schools are encouraging faculty to do cutting-edge research, or the Internet is enabling more cutting-edge research by breaking down informational barriers that had hampered researchers outside the top schools.[2] (2) A second explanation (without clear welfare implications) is that the trends could simply reflect that field journals have declined in quality and become a less attractive place to publish. (3) A third (somewhat pessimistic) explanation is that the trends could be a consequence of the growth of revisions at economics journals discussed in Ellison (2002a, 2002b): highly productive researchers may abandon some projects and/or seek out faster outlets in order to conserve the time that is now required to publish their most important works.

The majority of this paper is devoted to examining various data sources that provide additional details about how economics publishing has changed over the past decade. These are intended both to sharpen understanding of what are the facts to be explained and to provide tests of auxiliary predictions of the theories. Two main sources of information are used: data on publications and data on citations.

The publication data include department-level counts of publications in various additional journals, an individual-level dataset containing records of publications in a subset of

[2]Kim, Morse and Zingales (2006) argue for the latter hypothesis and provide empirical evidence.

journals for thousands of economists, and a very small dataset containing complete data on a few authors publication records. An observation that bolsters the decline-of-peer-review and growth-of-revisions theories are that top-department authors do not appear to be publishing fewer papers in several outlets provide substantial exposure for papers without subjecting authors to ordeals like those at many of the top peer-reviewed journals. A similar observation that both bolsters these theories and seems inconsistent with the decline-of-field-journals theory is that top-department authors also do not appear to be cutting back on their publications in special issues of field journals. The primary observation from the author-level database is that the two main facts appear to be facts about economists in top deparmentments rather than facts about highly productive economists.

The analyses of citation data include department-level citation counts, journal-level citation counts, and regression analyses on a paper-level database. One important observation of this section is that Harvard's economics department is doing quite well according to various citation measures. This argues against the strengthening-of-other-departments theory and bolsters the decline-of-peer-review theory in that many of the citations are not to papers in top journals. At other top departments, however, we do see something of a decline in citations, which obviously has the reverse implications. A second intriguing observation is that the citation gap between top general interest journal publications and field journal publications appears to have narrowed for authors in top departments.

This paper belongs to a growing literature on publication processes and academic productivity.[3] Ellison (2002a) develops a theoretical model of journals' screening papers in which quality standards are endogenously determined. McCabe and Snyder (2005) develop a model of journals as certification intermediaries. Ellison (2002b) documents the increased time costs of going through the peer-review process and notes several other trends. Azar (2007) discusses incentive effects of these time costs. Kim, Morse, and Zingales (2006) examines whether being in a top economics department provides a productivity benefit reflected in increased published output in good journals. It exploits the movement of faculty across universities to estimate a publication productivity model with individual- and department-decade fixed effects and finds that the productivity benefit of being in a top department declined from the 1970's to the 1990's and had disappeared by the latter decade.

[3]Colander (1989) and Gans (2000) contain nice surveys of the literature at different points in time.

Oyer (2006) is related: it uses initial-year job-market tightness as an instrument for obtaining an intial placement in a top department, and finds that there is a causal effect of better initial placement on published output (and on long-term placement). It does not explicitly consider changes over time, but can be regarded as obtaining a somewhat contrasting conclusion because its sample is largely from the 1990's.

The basic facts about the two trends are presented in Section 2. Section 3 discusses potential explanations for the facts. Section 4 contains additional analyses of publication records. Section 5 contains the citation analyses. I review the various findings and attempt to bring them together in Section 6. I conclude that the decline-of-peer-review theory is probably the most important, and that the growth-of-revisions and relative-decline-of-top-departments theories may also play some role.

2 Two Trends

In this section I present some basic data on the two trends highlighted in the introduction. Throughout the paper when I discuss "trends" in publishing, I am refering to differences between the contents of journals in 2000-2003 and the contents of the same journals in 1990-1993. Another loose term I used at several points in the introduction was "top-ranked economics departments". I use this term simply as a shorthand for the set of six economics departments for which I gathered data: Chicago, Harvard, MIT, Princeton, Stanford, and School X.[4] The publication counts I present are always for regular faculty in the economics departments at these universities. They do not include publications by graduate students or visitors to these departments, nor publications by faculty members whose primary affiliation is in some unit other than the economics department. Another convention is that the counts always assign each author partial credit for coauthored papers, e.g. a three-authored paper with one author who is a faculty member at Princeton will count as one-third of one paper by Princeton.

[4]The selection of schools was influenced both by traditional rankings and by ease of data gathering. My use of phrases like "top-ranked departments" or "top six departments" should not be taken to imply that these are the top six departments in any ranking. To reduce the risk of offending anyone who doesn't read my comment about the choice being influenced by ease of data gathering and thinks another school should have been included, I have chosen to withold the identity of School X.

2.1 Field journal publications

In this section I discuss Fact 1:

> **Fact 1** *Comparing the early 1990's with the early 2000's, there is a decline in the share of papers in the top field journals (and the absolute number) written by faculty members from the top-ranked economics departments.*

Table 1 presents counts of publications in thirteen field journals. The set of journals was chosen to include the most widely-cited field journals and to include at least one journal from most of the major fields of economics. The counts omit papers in special issues of the journals and papers that are three or fewer pages in length. The left columns present counts of 1990-1993 publications and the right columns present 2000-2003 publications.

Fact 1 comes through clearly in the top row of the table. It indicates that members of the six economics departments studied published 100.4 papers in these journals in 1990-1993 and 82.4 papers in 2000-2003, an 18% decrease. Moreover, this decline in publication counts came during a period when many of the journals were substantially increasing the number of papers they published. If one looks at the share of papers in these journals by top six departments, the decline is more dramatic: the 3.1% share in 2000-2003 is about one-third less than the 4.7% share of 1990-1993.

The next six rows provide a breakdown by school. The trend is fairly similar across departments. The shares decrease at all six departments. The publication counts increase slightly for Stanford and MIT and decrease for the other four departments.

The final thirteen rows provide a breakdown by journal. At five of the journals, the share of papers by authors from the six schools has declined by more than 50%: *Journal of Development Economics*, *Journal of Econometrics*, *Journal of International Economics*, *Journal of Law and Economics*, and *Journal of Monetary Economics*. The share of papers by the six departments increases at only three journals.

2.2 Top general interest journal publications

In this section I discuss Fact 2:

> **Fact 2** *Comparing the early 1990's with the early 2000's, there is a decline in the share of papers in the top general-interest journals (and the absolute number)*

	1990-1993			2000-2003		
Journal/school	"Top" dept. count	"Top" dept. as %	Total pubs.	"Top" dept. count	"Top" dept. as %	Total pubs.
	Totals for all 6 departments in all 13 journals					
All 13 field/6 top departments	100.6	4.7%	2148	82.8	3.1%	2643
	Breakdown by school					
Chicago	8.7	0.4%	2148	3.5	0.1%	2643
Harvard	20.8	1.0%	2148	18.1	0.7%	2643
MIT	21.0	1.0%	2148	21.3	0.8%	2643
Princeton	23.8	1.1%	2148	13.7	0.5%	2643
Stanford	12.2	0.6%	2148	13.6	0.5%	2643
School X	14.2	0.7%	2148	12.7	0.5%	2643
	Breakdown by journal					
Games and Economic Behavior	1.8	2.1%	88	4.3	1.8%	237
Journal of Development Economics	5.2	2.7%	193	1.5	0.6%	241
Journal of Econometrics	12.0	7.2%	167	7.8	3.6%	220
Journal of Economic Theory	21.7	8.0%	271	14.6	4.2%	344
Journal of Finance	3.9	1.3%	293	9.1	2.9%	310
Journal of International Economics	8.0	4.9%	162	2.5	1.3%	197
Journal of Labor Economics	4.5	5.6%	80	8.2	6.4%	128
Journal of Law and Economics	6.0	8.7%	69	3.0	3.3%	90
Journal of Law, Ec., and Organization	3.7	4.6%	80	2.5	3.2%	79
Journal of Monetary Economics	9.5	5.2%	181	4.0	2.1%	190
Journal of Public Economics	7.5	3.3%	225	11.5	4.1%	281
Journal of Urban Economics	3.5	1.9%	183	3.8	1.9%	203
RAND Journal of Economics	13.3	8.5%	156	10.0	8.1%	123

Table 1: Publications by members of six highly-ranked departments in 13 field journals

written by faculty members from the Harvard economics department.

Table 2 presents publication counts for the "top five" general-interest journals.[5] The first row of Table 2 looks very different from the first row of Table 1. One big difference is that there is no substantial decline in publications by the six departments studied. The total number of papers published by these journals has declined, so the share of papers by the six departments has actually increased from 15.5% to 16.6%. A second striking difference is that the counts and shares in Table 2 are much larger than in Table 1. The six departments publish more than twice as many papers in the five general interest journals as they do in the thirteen field journals. Their share is more than five times as large in the general interest journals.

The next six rows provide a breakdown by department. Fact 2 is apparent here. In the early 1990's the Harvard economics department was (along with Princeton) well ahead of the other departments. Between the early 1990's and the early 2000's, its top 5 publications had declined by about one-third (or by 28% if one uses the share measures). Publication counts are roughly constant at most of the other departments. All of them have at least a small increase in publications when measured as shares of the top five journals. Stanford shows a large increase from a low initial level.

The journal breakdown shows that publications are decreasing somewhat in the more technical journals (*Econometrica* and *Review of Economic Studies*), and increasing in the other journals, especially at the *Quarterly Journal of Economics*.

To provide more insight into what is going on at Harvard I also report a journal-by-journal breakdown of Harvard's publications. They are down by more than 50% at *Econometrica*, *Journal of Political Economy*, and *Review of Economic Studies*. Whereas in the early 1990's Harvard's publication counts were above average in every journal, Harvard is now substantially below average in these three journals. Publications in the *Quarterly Journal of Economics* are approximately the same (in the count measure) in the two periods. *QJE* publications now account for more than 45% of Harvard's top 5 publications.

[5]The counts omit special articles like presidential addresses and also omit all papers in the *Papers and Proceedings* issues of the *American Economic Review*.

Journal/school	1990-1993 "Top" dept. count	1990-1993 "Top" dept. as %	1990-1993 Total pubs.	2000-2003 "Top" dept. count	2000-2003 "Top" dept. as %	2000-2003 Total pubs.
	Totals for all 6 departments in all 13 journals					
All top 5/6 "top" departments	193.2	15.5%	1248	189.7	16.6%	1141
	Breakdown by school					
Chicago	21.3	1.7%	1248	22.5	2.0%	1141
Harvard	49.0	3.9%	1248	32.1	2.8%	1141
MIT	36.3	2.9%	1248	38.5	3.4%	1141
Princeton	49.1	3.9%	1248	47.3	4.1%	1141
Stanford	12.2	1.0%	1248	24.9	2.2%	1141
School X	25.3	2.0%	1248	24.3	2.1%	1141
Harvard	49.0	3.9%	1248	32.1	2.8%	1141
Avg. other "top"depts.	28.8	2.3%	1248	31.5	2.8%	1141
	Breakdown by journal					
American Economic Review	36.3	9.7%	375	39.1	10.4%	377
Econometrica	46.8	19.2%	244	40.2	15.4%	261
Journal of Political Economy	32.3	14.3%	226	33.8	17.8%	190
Quarterly Journal of Economics	40.7	19.1%	213	51.9	31.5%	165
Review of Economic Studies	37.1	19.5%	190	23.8	16.0%	148
	Breakdown by journal: Harvard					
American Economic Review	10.8	2.9%	375	8.1	2.1%	377
Econometrica	8.7	3.6%	244	4.0	1.5%	261
Journal of Political Economy	5.5	2.4%	226	2.5	1.3%	190
Quarterly Journal of Economics	14.8	7.0%	213	14.9	9.0%	165
Review of Economic Studies	9.2	4.8%	190	2.6	1.7%	148

Table 2: Publications by members of six highly-ranked departments in five top general-interest journals

3 Potential Explanations

In the introduction I mentioned four theories that one might give to account for the two facts. In this section I describe each mechanism in a little more detail and comment on how it comports with the facts described above.

3.1 Decline in the Importance of Peer Review

Journals have traditionally served two roles: they disseminate papers and provide quality certification. The Internet aids dissemination on many ways: papers are posted to author websites and working paper archives; e-mail is used to inform potential readers about papers; Internet search tools help readers find papers; journals have been made more accessible; etc. Although some of these changes raise the dissemination benefit of having a paper appear in a journal, many others allow unpublished papers to be disseminated more effectively. Hence, the primary output of journals may increasinging be quality certification.

Such a shift would be expected to lead authors from top schools to withdraw from publishing in many journals for two reasons. First, highly-regarded and highly-visible authors will be able to make their work widely known (and widely read) without publishing it in journals. Such authors will perceive the dissemination benefits of journal publishing as having decreased by a greater extent than they have less for well-known authors. Second, consider questions of the form:

> Which do you think is of higher quality: a paper by Author X that just appeared in Journal Y or the same author's most recent working paper that has yet to be submitted for publication?

If the answer to this question is not clear, then Journal Y is providing little in the way of quality certification benefits to Author X. Historically the primary reason why Author X did publish in Journal Y may have been that he or she was attracted by the dissemination benefits.

This story can naturally fit each of the main facts described in the previous section. For many faculty in top departments, the fact that a paper is published in a top field journal may only have a small impact on potential readers' beliefs about the quality of the paper, nor will there be substantial career-concerns benefits. Hence, it is natural that we

would see a relative decline in these authors' propensities to publish in field journals. My impression is that even the most highly regarded economists in the profession still receive a reputational benefit (which helps both with disseminating the particular paper and for career-concerns reasons) from publishing in the top general interest journals. However, even in this case, certification benefits are likely smaller for high-status authors and again the dissemination benefits may be smaller for authors who can make their work widely known without publishing it in a top journal. The decline in Harvard's general-interest publication could reflect that it has a disproportionate number of very-high-status economists and that its faculty are uniquely visible.

3.2 Top Department Quality/Productivity

The share of papers in top journals written by faculty in a given department is a measure of the output of that department relative to the profession as a whole. Hence, our facts could be explained as a consequence of a (relative) decline of the departments considered. Several plausible mechanisms could account for such a decline.

First, the "top six" departments may have been less successful in attracting and retaining the most productive economists. This could be due to relative increases in salaries (and working conditions) at economics departments that are close competitors to the top six, at top business schools, and at other institutions (e.g. foreign schools) that are attractive to particular faculty members. Anecdotally, I know that MIT has seen a large share of its top new Ph.D's take jobs in business schools over the last decade, and has lost several faculty to and failed to entice many more faculty away from other departments.

Second, the top six departments could have been as successful as ever in assembling the most productive economists, but still had their share of output decline because of changes in the productivity distribution. For example, this would be the case if the number of economists trying to publish in top journals has increased or if there is a flattening of the productivity distribution.

Third, the top six could be as strong as ever in their productivity share, but still see a decline in their output share because of changes in the distribution of resources. For example, Kim, Morse and Zingales (2006) argue that improvements in communication technology have reduced barriers that made it more difficult for faculty outside the top

schools to do cutting-edge research. Another potential source of resource reallocations is increased attention paid, for example, by the United Kingdom, to top-journal publications. This might increase resources allocated to producing top-journal publications either via direct shifts in resource allocations, or indirectly as faculty increase the share of their effort devoted to publishing in top journals.

These stories are all plausible, but I regard the decline-in-top-department-quality theory as not fitting the facts outlined in the previous section as neatly as the other theories. It fits reasonably well with the observation that the sum of general interest and field journal publications has declined at the top six departments, but is harder to reconcile with the fact at most schools it is only the field journal publications that have declined. One could hypothesize that economists at the top six have reacted to increased competition by concentrating more on general interest publications or that barriers to doing field journal work have come down more than barriers to doing general interest work, but it is not obvious why this should be so. The theory also seems hard to reconcile with the largest decline in publications occurring at Harvard. Harvard hired a large number of highly regarded and highly productive faculty between 1993 and 2001, and is commonly perceived to have ascended to the top position in the profession during this period.[6]

3.3 The Slowdown

The title of Ellison (2002b) emphasizes the "slowdown" of the publication process. Publication does not just take longer, however, the process also requires more effort from authors. Prior to 1970 it was not unusual for papers to be accepted without requiring any substantive revisions. By 2000, the norm was to require two or more rounds of revisions. The slowdown continued through the 1990's at both general interest and field journals. Hence, it is relevant to why behavior might have changed between the early 1990's and the early 2000's.

The increased burdens of publishing in top journals should affect economists' submission strategies for two reasons analogous the substitution and income effects of consumer theory. First, economists would be expected to substitute away from journals at which the process

[6]Harvard's hires in this period include Drew Fudenberg, Oliver Hart, John Campbell, Ariel Pakes, Philippe Aghion, Ken Rogoff, Elhanan Helpman, Jim Stock, Jeremy Stein, and Michael Kremer.

became more arduous toward journals (or nonjournals) where this did not occur. Second, aggregate time constraints may lead economists to publish fewer papers in peer-reviewed outlets. The papers they choose not to publish (or not to write) would presumably be those for which the benefit to publication (per unit time required) is low.

Table 1 of Ellison (2002a) indicates that the 1990's slowdown was most severe at the top general interest journals (other than the *QJE*). Mean submit-accept times at the top non-*QJE* general interest journals increased from 17.5 months in 1990 to 24.1 months in 1999.[7] The *QJE*'s mean submit-accept time was reduced from 22 months to 13 months. Mean submit-accept times at the seven top field journals for which data is available show a smaller increase: from 14.8 months in 1990 to 16.4 months in 1999.

The publication counts for the top general interest journals is clearly consistent with the hypothesis that the slowdown is an important determinant of the observed changes. There is a shift in publications away from the other general interest journals toward the *QJE*. The decline in field journal publications relative to general interest publications could be attributed to the income effect. Economists at top schools publish a nontrivial fraction of their papers in top general interest journals, so it is plausible that increases in the time-cost of publishing in general interest journals could lead them to spend less time trying to publish papers in field journals. The decline of Harvard's general interest publications is a little harder to fit into this theory. The direction of the change makes sense – it's plausible that the department that had been publishing the most in top journals should be most affected and that income effects might require a reduction in top general interest publications – but it is harder to argue that the slowdown alone should result in Harvard dropping below some other departments in general interest publications.

3.4 Field Journal Quality

Journals provide two main benefits to authors: they disseminate research; and they provide a quality certification that can bolster the author's reputation. Each of them will naturally be reduced if the average quality of papers in a journal declines.

It is plausible that field journals suffered a relative decrease in quality over the period studied for a few reasons. First, Ellison (2002b) notes that citations to articles in field

[7] These are unweighted means across journals.

journals did not grow as rapidly as citations to articles in general interest journals. Recent articles in nine top field journals received only 30% as many citations as articles in the top general interest journals in 1998, down from 52% in 1990. Second, many top journals are for-profit operations that have raised prices substantially in recent years. This has reduced their availablility and led to discontent that may be affecting submissions.[8]

The decline-in-field-journal-quality hypothesis fits well with the observation that most top departments are reducing publications in field journals, but not in the general interest journals. A separate explanation would be needed to account for the reduction in Harvard's general interest publications.

3.5 Summary

Throughout this paper I'll try to organize my discussion of the coherence between the various theories and the evidence by referring to Table 3. Each column of the table corresponds to one of the theories discussed in this section. The rows corresponds to the various pieces of evidence considered. The first row in concerned with Facts 1 and 2. Here, my summary is that each of the theories could explain the facts, but that the decline-in-top-department-quality is somewhat problematic.

	Theories			
	Decline in Top Dept. Quality	Slowdown of Publication Process	Decline in Fld. Jrnl. Quality	Decrease in Peer Review Necessity
Facts 1 and 2	+/–	+	+	+
More pub. counts	+/–	+	–	
Author CV data	–	+		+
Author pub. data		–	–	+
Jrnl. citation counts			+	
Dept. citation counts	–/+			+/–
Paper citation data	+/–		–	+/–

Table 3: Summary of fit of theories to evidence

The remaining rows of the table summarize the coherence between the theories and the various data items presented in sections 4 and 5. I will refer back to this table and discuss

[8]See, for example, Bergstrom (2001) and McCabe, Nevo, and Rubinfeld (2005). The 2001 launch of the BE Press's macroeconomics and theory journals may be a tangible consequence of this discontent.

these summaries at the end of each subsection.

4 More Publication Data

In this section I present additional analyses of trends in publishing to provide a more detailed view of the changes that have occurred and which theories might be most important.

4.1 Departmental publication counts

4.1.1 Journal-specific declines and the slowdown

If top authors are withdrawing from publishing in top journals due to the slowdown of the publication process, then one would expect that there would be a greater decrease in top-school publications at journals that have experienced more severe slowdowns. Figure 1 shows how these variables are related across journals: the difference between the journal's 1999 and 1990 submit-accept time (in months) is on the x-axis and the change the share of papers by authors in the six economics departments is on the y-axis.[9]

The top general interest journals are marked by solid boxes. The *QJE* obviously stands out in both dimensions: it has sped up rather than slowing down; and the share of papers by authors at the top six departments has increased dramatically. The two general interest journals that lost top-school authors, *Econometrica* and *Review of Economic Studies*, do not stand out in the figures for having slowing down more than the others during the 1990's. It may be relevant, however, that they are the two slowest journals in 1999.

The field journals are marked by outlined boxes. *Journal of Public Economics* and *Journal of Urban Economics* have sped up over the course of the 1990's (and were the two fastest journals in 1999). Neither shows a decline in its top-school share. Six field journals slowed down by more than three months and five of the six show substantial declines in their top-school shares. The *Journal of Finance* is an exception to this pattern.

Overall, I would conclude that the cross-journal pattern appears to be consistent with the slowdown being a factor contributing to the observed declines in top-school publications.

[9]The submit-accept time data is from Table 1 of Ellison (2002a). In three cases (*JIntE*, *JLE*, and *JF*) data on 1990 are missing in Ellison (2002a) and the graph instead uses one half of the 1980-1999 difference as the x variable.

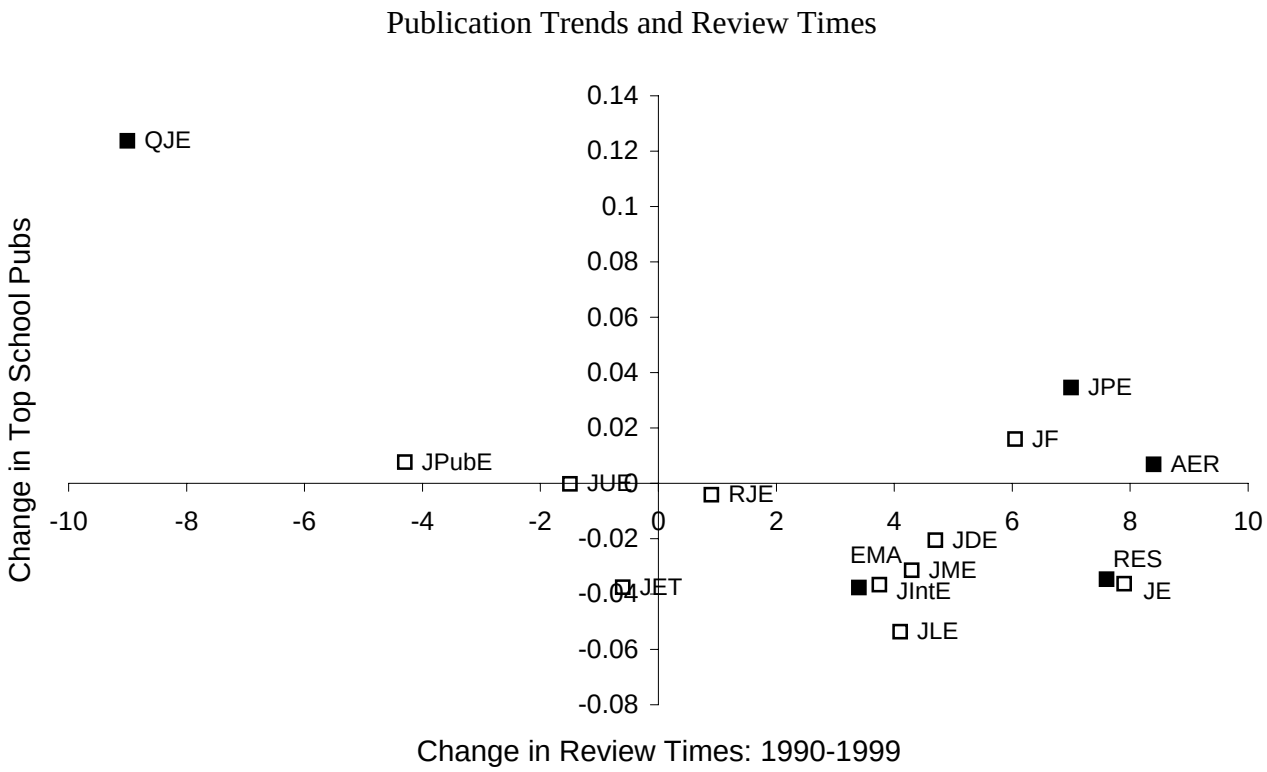


Figure 1: Cross-journal heterogeneity: Change in top school publications (early 90's-early 00's) vs. Change in review times (1990-1999)

	1990-1993			2000-2003		
Journal	"Top" dept. count	"Top" dept. as %	Total pubs.	"Top" dept. count	"Top" dept. as %	Total pubs.
AEA Papers & Proceedings	71.5	21.9%	326	69.3	20.4%	340
Brookings Papers	40.8	40.8%	100	15.0	28.3%	53
Carnegie-Rochester Conf. Series	5.5	9.5%	58	6.6	13.4%	49
Journal of Economic Literature	16.5	22.0%	75	13.5	17.1%	79
Journal of Economic Perspectives	30.0	14.8%	203	32.3	17.7%	182
NBER Macroeconomics Annual	8.0	36.4%	22	9.5	39.6%	24

Table 4: Publication counts for "invited" journals

4.1.2 Publication counts for other outlets

Table 4 presents aggregate top-six publication counts for six widely-read journals that publish many invited papers and/or have streamlined review processes that are substantially less burdensome than those at standard journals. Top-school shares are quite large for all of these journals. The *NBER Macroeconomics Annual*'s top-school share is larger than the *QJE*'s. The other journals' top-school shares are comparable to or larger than those of the top general interest journals (and much larger than field journals' top-school shares.) Looking across decades within each journal, there is a large decline in the number and share of *Brookings Papers* by economists in top departments.[10] Beyond this, however, the general pattern appears to be that publication counts are rougly constant across the decades. The right panel of Table 5 illustrates that the pattern at Harvard is not different from the pattern at other schools.

Twelve of the thirteen field journals published at least one special issue between 2000 and 2003.[11] Most often, these are a collection of papers presented at a conference. The review process usually differs from the procedure for regular issues: authors are often contacted personally and invited to submit papers; and the review and revision process must fit within a tighter time frame. Invariably, journals state that papers in special issues were peer-reviewed and subject to the same standards that the journal applies to all papers.

[10]The large decline in the number of published articles in part reflects the discontinuance of the journal's microeconomics series.

[11]This includes cases where a journal publishes a set of "special" papers and some regular papers in the same issue. To maintian consistency across time the Carnegie-Rochester Conference Series is treated as a separate journal throughout the period and not counted as part of the *Journal of Monetary Economics*.

	Field Journal Special				Six Invited Journals			
	1990-1993		2000-2003		1990-1993		2000-2003	
Harvard	6.0	1.5%	8.0	1.7%	40.9	5.2%	33.3	4.6%
Other Top 6	6.9	1.7%	7.2	1.5%	26.3	3.4%	22.6	3.1%
All Schools	408	100%	464	100%	784	100%	727	100%

Table 5: Publication counts for special issues of field journals and invited journals

Whether standards are really the same is subject to debate.

The left panel of Table 5 reports counts of "special" articles in the thirteen field journals. The final row lists the total number of special articles in each decade. The first row gives counts for Harvard economics faculty. The second reports averages for the other top six departments. The main observation I'd emphasize is that special issues of field journals don't look like regular field journal issues: the top-department share is approximately three times as large and there is no substantial decline across decades.

I see the data in this section as problematic for the decline-in-top-department-quality theory in a couple ways: economists in top departments appear to be as strong as ever in their ability to garner slots in invited journals and special issues of field journals; and there is nothing to suggest that that Harvard's decline in general interest publications is due to its having a more severe dropoff in productivity. The data seem supportive of the slowdown theory in that we are seeing economists from top departments publishing as they always have in outlets that have not been subject to the slowdown. The data are also somewhat at odds with the decline-in-field-journal-quality story in that there is no evidence that economists who have the opportunity to publish in special issues are dissuaded by a reduction in dissemination and prestige benefits.

4.1.3 Business school publication counts

One reason that could be given for why top economics departments may have declined relative to the profession as a whole is that more top economists may now be working in business schools. Anecdotally, I know that a substantial share of MIT's top graduates in recent years have taken jobs in business schools. One piece of quantitative evidence I can present relative to this question is publication counts for the Graduate School of Business at the University of Chicago. Its top-general-interest count increased from 29.8 in 1990-1993

to 39.3 in 2000-2003. Its 13-field-journal count increased from 24.2 to 27.2 in the same period (although this also is a slight decline in share terms).[12]

I regard this as providing one piece of evidence in support of the decline-in-top-department-quality theory. For this reason, I summarize the publication counts evidence in Table 3 by putting a +/– in the top-department-quality column. The + in the slowdown column and the – in the field-journal-quality column reflect the evidence discussed in the previous subsections.

4.2 Author CV data

An obvious question to ask about the decline in top-journal publications is where the papers are going: Are economists in top departments publishing fewer papers? Or in other outlets? If so, where are they publishing? Answering such questions is difficult, however. Complete publication lists can only be obtained by gathering CVs. It is hard to do this historically for all faculty members in a department.

For this paper, I present a smaller analysis of the setting that I thought would potentially be most informative – Harvard. I collected CVs for those faculty members who were both (a) tenured and (b) less than forty years old in the fall of 1993 and the fall of 2003. Table 6 summarizes the publication records. Each row gives publication counts for a four-year period for a single economist. The top part contains 1990-1993 counts for the 1993 young senior faculty. The bottom part gives 2000-2003 counts for 2003 faculty. The second column gives a simple publication count for the four year period. The other columns show the location of the publications and (as in the rest of this paper) only give partial credit for coauthored papers.

The counts in the second column indicate that there has not been a decline in total number of publications.[13] Young senior faculty at Harvard are still publishing an astounding number of papers! The third and fourth columns count *QJE* and other top general interest publications. The aggregate decline in non-*QJE* general interest publications is apparent here.

[12] If one omits publications in the *Journal of Finance* the Chicago GSB's field journal count goes from 10.2 to 14.5, which is an increase in share terms as well.

[13] This is defined roughly as all items on the authors' vitae that are not very short (< 4 pages), comment-like, or published in the popular press (or other outlets that do not publish academic research).

Author	Total	*QJE*	Other top 5	13 Fld jrnls	Other ref'd	Invt'd jrnls	Other
1990-1993 Data							
A	18	0.5	2.3	0.0	3.8	0.0	1.7
B	16	0.0	2.8	3.8	0.0	0.5	1.0
C	19	1.3	0.5	1.0	1.0	1.5	3.6
D	10	0.3	0.3	0.0	3.3	1.5	0.0
E	28	1.2	0.5	2.8	2.8	3.3	0.0
F	6	0.0	1.5	1.0	0.5	0.5	0.0
Average	16	0.6	1.3	1.4	1.9	1.2	1.1
2000-2003 Data							
G	31	0.0	0.0	0.5	1.1	3.3	10.6
H	41	1.1	1.0	1.8	6.4	1.2	10.2
I	13	2.0	1.0	0.0	1.0	0.0	9.0
J	13	0.0	0.9	0.0	1.0	2.3	5.0
K	14	1.3	0.5	0.0	0.3	1.5	2.6
Average	22	0.9	0.7	0.5	2.0	1.7	7.5

Table 6: Publications by young senior faculty at Harvard

The fifth column shows that there is a very large decline in top field journal publications in this cross-cohort analysis. A natural question is whether this is simply due to the new generation's having shifted to other field journals or to general interest journals like *Review of Economics and Statistics* and *Journal of the European Economic Association*. The answer to this appears to be no. The sixth column reports counts of articles published in other peer-reviewed economics journals.[14] The average is approximately constant. Moreover, the breakdown suggests that one outlier may be obscuring a similar downward trend on these publications: economist H is responsible for most of the "other" peer-reviewed publications (and also for most of the top field journal publications). Looking at the sums of the fifth and sixth columns we see that four of the six 1993 young senior faculty published at least 3.3 articles in non-top 5 peer-reviewed journals in 1990-1993 and the lowest total is 1.5. In 2000-2003, the median is 1.0.

Publications in invited journals are higher in the latter period. The final column illustrates the most dramatic change: per capita publications in outlets that are not traditional peer-reviewed economics journals jump from 1.1 to 7.5! The majority of these "other"

[14]This is defined roughly as all articles published in journals listed in Econlit other than those in my top five, 13 field, and invited sets.

publications are article-like items in conference volumes or other edited volumes. Some are articles in policy-oriented journals in other fields, and some are survey-like articles in traditional economic outlets, e.g. Econometric Society World Congress volumes.

The main impression I take away from this analysis is that faculty at Harvard appear to be spending an increasing fraction of their time writing articles that they are not being published in peer-reviewed journals. I see this as bolstering the decline-in-peer-review and slowdown theories relative the decline-in-top-department-quality theory. It suggests that the Harvard faculty could publish more in peer-reviewed journals if they decided to redirect their efforts to (a) perform/write more of their research in a way that would make it publishable in peer-reviewed journals and/or (b) spend less time doing research and more time navigating the peer-review process.

4.3 Author-level publication database

Another natural question to ask about the two basic facts is whether they are facts about departments or individuals: are the declines in publications by the top departments a reflection of a more widespread decline in publications by highly-regarded economists, or is there something about the departments themselves that is important? In this section, I develop some evidence on this question by analyzing a database containining information on individual authors' publication records.

I collected partial publication records for all authors who published a paper in a top general-interest journals in the 1980's or the 1990's. For each author-decade the data include: (1) the number of top general-interest papers published in the decade; (2) the number of top general-interest papers published in the first four years of the next decade; and (3) the number of top field-journal papers published in the first four years of the next decade.[15] I think of the number of general-interest publications in a decade as a proxy for the author's status/productivity at the end of the decade. I use the other variables to examine whether high status/high productivity authors are now publishing less in top journals.

The data suggest that Facts 1 and 2 are facts about top departments. Figure 2 presents a

[15]The data on general interest publications do not include short papers and special papers such as presidential addresses. The field-journal counts do not include articles in special issues.

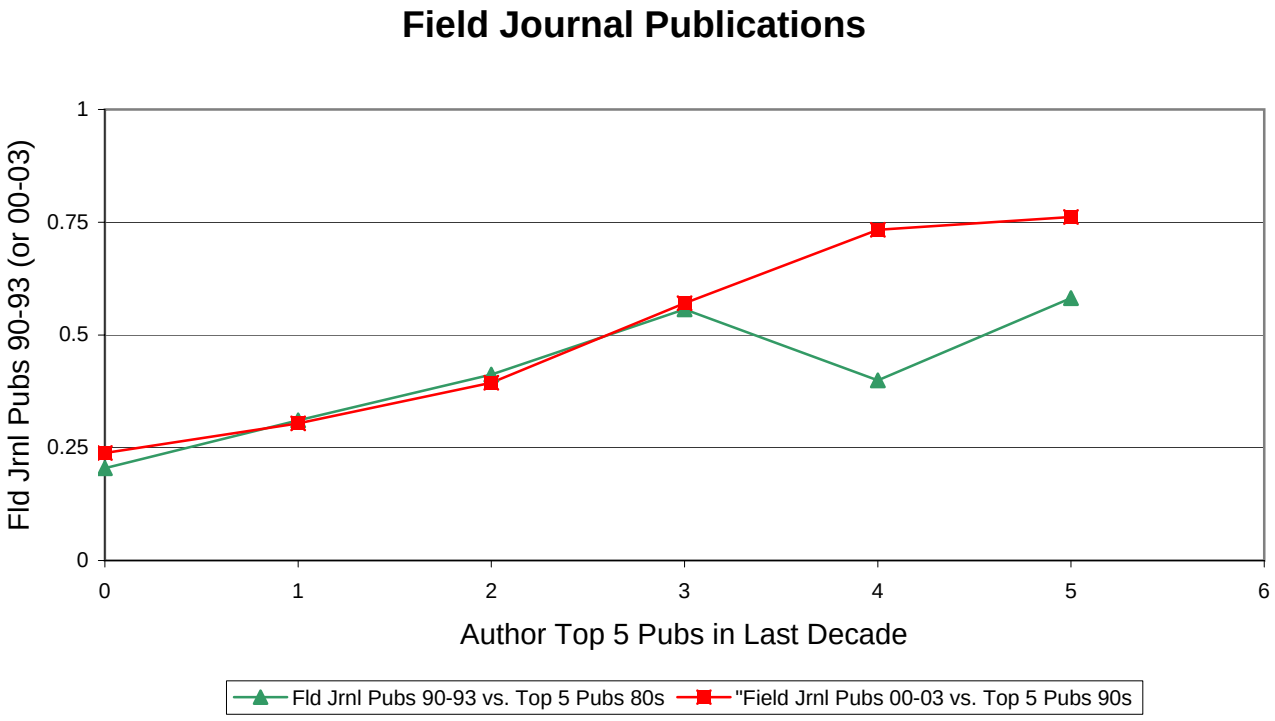
simple illustration. Authors with a nonzero number of (coauthorship-adjusted) top general-interest publication in each decade were divided into six bins on the basis of decade-specific top general-interest publication counts: (0,1), [1,2), [2,3), [3,4), [4,5), and [5, ∞). The top panel of the figure examines field journal publications: the squares give the mean number of 2000-2003 field journal publications for authors whose 1990-1999 general intest publications fall into each bin; and the triangles give 1990-1993 field journal publications as a function of 1980-1989 general interest publications. The data indicate that the top departments' decline in field journal publications is not attributable to broader decline in field journal publications by high status/highly productive economists. The top two bins show higher field journal output in the 2000's. The means for the other bins are very similar.[16]

The bottom panel presents corresponding data on general-interest publications. Fact 2 is that these were lower in the early 2000's for economists at Harvard. One could imagine that this was attributable to Harvard having a disproportionate share of the very, very high-status economists. Again, the figure indicates that this does not appear to be the case, at least if status is adequately proxied by prior-decade general interest publications. Means are similar for all bins except for the highest one, and the highest bin has higher output in the later decade.[17]

This evidence is problematic for both the slowdown and decline-in-field-journal-quality theories. Under the slowdown theory, one probably would have expected that the authors who were publishing the largest number of general-interest papers would have been most affected by the slowdown and experienced the largest decline in field journal publications. In the decline-in-field-journal-quality theory one would probably have expected that authors with the strongest publication records would be most likely to regard diminished field journals as not worth publishing in. The data are consistent with a version of the decline-in-peer-review theory in which it is being in a top department, rather than having a strong publication record, that enables an author to attract attention for his or her work without publishing it in a top journal.

[16] None of the differences are statistically significant. In the lower bins this is because the differences are very small (standard errors on each estimate are approximately 0.02). In the two highest bins this is because the bins contain few economists: 48 and 51 in the earlier decade and 35 and 22 in the later decade. The relative paucity of economists in the later decade could also affect the interpretation of the gap if it were significant.

[17] Here, the difference in means is significant in the highest bin.



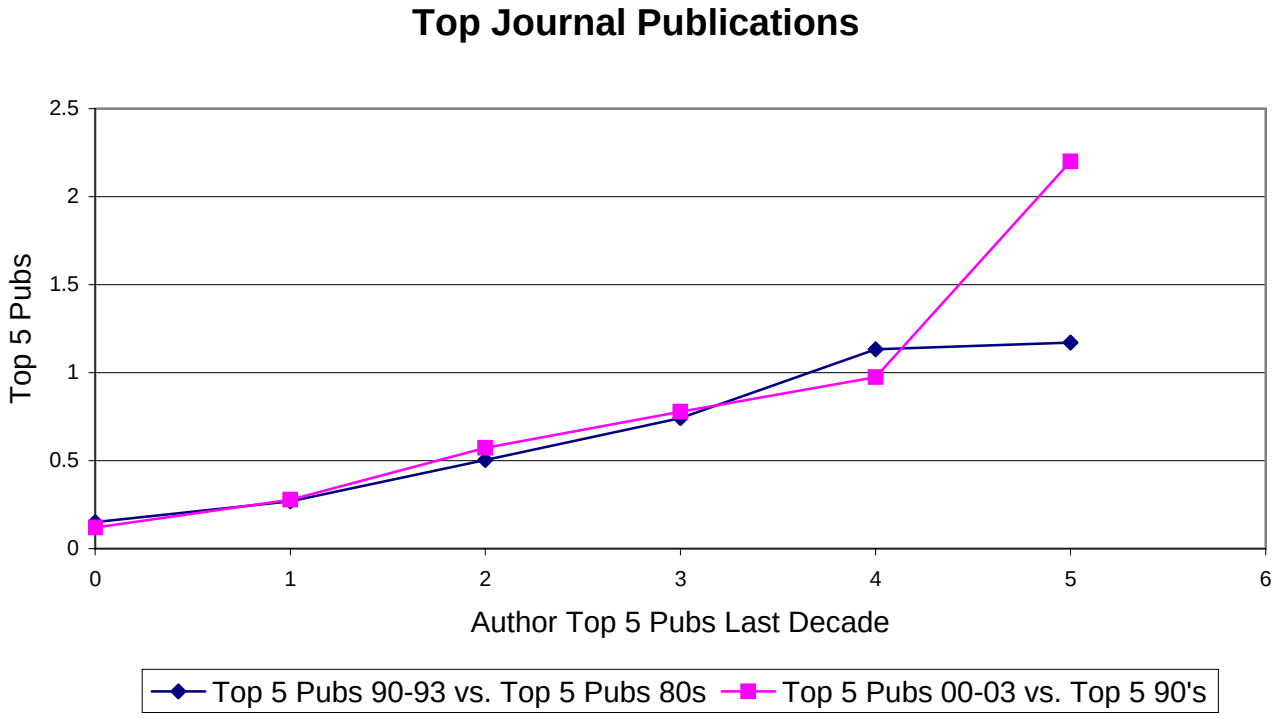


Figure 2: Publications as a function of authors' prior publication records: early 2000's vs. early 1990's

5 Citation Data

Citations are an obvious source of information on the dissemination of research. They are also used as a quality metric. The citation data discussed below was compiled by collecting all citations made in 1994 and 2004 by twenty-one journals: the five top general interest journals; the thirteen field journals; and three of the "invited" journals (*Journal of Economic Perspectives*, *Journal of Economic Literature*, and the *Papers and Proceedings* issue of the *AER*. This has several benefits relative to relying on ISI citation counts: it avoids some of the problems with intertemporal comparability caused by the proliferation of journals; it provides some focus on important citations; and it allows me to construct measures of citations to unpublished as well as published works. Obviously, a number of limitations remain and new limitatins are introduced.[18]

5.1 Journal citation counts

Journal-level citation counts are obviously relevant to the decline-in-field-journal-quality theory. The top panel of Table 7 reports per-article citation counts for recent articles from 1994 and 2004. More precisely, the entry for Journal X in the 1994 column is the number of times that 1994 articles in the 21 journal set cited an article published in Journal X in 1984 or later, divided by the total number of articles Journal X published in 1984-1993.[19]

There is heterogeneity within each category of journals. The *QJE* had a huge increase in citations and became the most-cited general-interest journal. *REStud* and *AER* also made substantial gains to achieve near-parity with *Econometrica* and *JPE*. All six "invited" journals show gains from 1994 to 2004. The heterogeneity here is that whereas most of the gains are relatively small, the *NBER Macroeconomics Annual* shows a large increase. It is more cited on a per-article basis than any general iterest journal. There is no consistent trend in the field journal category: five journals gain and eight journals lose citations.

[18] Most prominently, the raw data from which citations are tabulated only includes the last name and initials of the first author. I deal with this differently in different parts of the analysis, but many of the "counts" reported below should in no way be thought of as aggregations of accurate counts of individual's citations.

[19] The raw data do not distinguish between regular *AER* articles and those in the *Papers and Proceedings* issues, nor do they distinguish between citations to articles in the *Carnegie-Rochester* series and articles in the *Journal of Monetary Economics* after the former's incorporation into the latter. In each case, I apportion all references between the two components by using the relative frequencies for articles that can be definitively matched to an article in one of the two components.

Journal	Cites/art 1994	2004	Journal	Cites/art 1994	2004
Top 5 Journals			Field Journals		
QJE	0.79	1.75	J Monetary Ec	0.69	0.59
Econometrica	1.28	1.06	J Finance	0.41	0.56
REStud	0.68	0.98	J Intern'l Ec	0.33	0.48
JPE	1.02	0.88	RAND J Ec	0.66	0.45
AER	0.63	0.87	J Labor Ec	0.32	0.40
			Games Ec Behav	0.62	0.37
Invited Journals			J Econometrics	0.36	0.33
NBER Macro Ann.	1.33	1.94	J Public Ec	0.28	0.33
JEL	0.75	0.88	J Econ Theory	0.43	0.31
Brookings	0.63	0.62	JLEO	0.34	0.30
JEP	0.33	0.39	J Law and Ec	0.31	0.27
AEA P&P	0.25	0.32	J Urban Ec	0.17	0.27
Carnegie-Rochester	0.20	0.22	J Development Ec	0.09	0.20

Journal set	21 journal cites 1994	2004	Top 5 cites 1994	2004
Top 5	0.88	1.11	0.32	0.39
Field 13	0.39	0.37	0.07	0.08
Invited	0.58	0.73	0.17	0.17

Table 7: Per article citation counts for recent articles in various journals: 1994 and 2004

The bottom panel of Table 7 summarizes this data by reporting means for each journal category, and also provides comparable figures that only count citations that appear in one of the top five journals. The 21-journal counts portray the field journals as declining in influence relative to both the top general interest journals and the invited journals. This is not a very robust result, however. In the 5-journal counts the field journals are gaining slightly on the invited journals and falling only slightly farther behind the general interest journals.

I've recorded this section as providing support for the decline-in-field-journals theory in Table 3, but it should be understood that the ssupport is quite weak.

5.2 Departmental citation counts

Departmental citation counts were tabulated in a two-step process. I first produced counts of all citations to each last name-initial pair. I then computed each department counts as the sum over all last name-initial pairs that corresponded to the last name-initial of one of their faculty members. This has several obvious limitations.[20] My hope, however, is that measurement errors are largely orthogonal to the comparisons I will be making across departments and over time.

Table 8 reports average citations per faculty member for six top departments and for other authors with a recent publication in a top general interest or top field journal. The first two columns tabulate all citations made to each author in 1994 and 2004 (in the set of 21 journals and subject to the caveats above). One fact that stands out is that Harvard is doing extremely well in citations. Its citations are up by 65% from 1994 to 2004.[21] It has moved from fourth on the list to first. The other top departments are not doing as well. Four of the five show a decline in per author citations. This decline occurs despite the fact that the 21 journals considered make more total citations in 2004 than in 1994. This is reflected in the 20% growth in the per-author citations for "other" authors.

One frequent concern that comes up in discussing citation counts is that the usual counts

[20] Three of the main ways in which this calculation departs from the idea are: authors are getting credit for citations made to other economists who share their last name-initial; authors are getting no credit for coauthored papers on which they are not the first author; and the departmental faculty lists only include faculty members who published a paper in one of the five general interest or thirteen field journals in a four-year period and therefore omit citations to faculty members who do not meet this criterion.

[21] A bit less than one-third of the per-author growth is due to the decrease in the denominator. Part of this could be an artifact of omitting nonpublishing authors from the calculation.

	Average citations per author						Number of authors	
	Citing journal/cited paper set:							
	21 jrnls/any		Top 5/any		21/recent			
Econ. Dept.	1994	2004	1994	2004	1994	2004	1994	2004
Harvard	18.9	31.2	6.5	10.1	7.0	7.1	49	43
MIT	23.9	27.9	8.3	9.1	7.9	7.6	30	36
Princeton	19.8	18.4	6.9	5.5	7.8	5.8	36	44
Chicago	34.3	30.8	11.2	9.9	8.1	5.5	20	23
Stanford	15.6	13.9	5.9	3.6	4.4	3.0	28	35
School X	13.4	12.5	4.6	3.9	4.5	3.1	35	29
Other	3.0	3.6	0.7	0.9	1.2	1.2	3767	4408

Table 8: Departmental citation counts: average citations per faculty member

are dominated by citations made in obscure journals. The focus in this paper on citations in 21 journals should alleviate this concern, but I address it further by reporting, in the third and fourth columns, citation counts that only include citations appearing in one of the top five general interest journals. These give a similar picture: Harvard's citations are way up; and citations to most other top deparments are down.

Citations obviously measure lifetime achievement and need not be closely related to recent productivity. To provide something closer to a measure of the impact of authors' recent research, the fifth and sixth columns provide tabulations that only include citations to items written (or published) in the previous four years, e.g. the 1994 column reports 1994 citations to items dated 1990-1993. Here, Harvard is the only department showing a (now small) per capita increase. MIT's figures are similar to Harvard's. The other top departments show sizable declines.

My summary of this data would be that the patterns at Harvard are different from those at the "other top six." Hence, the data lead to conflicting conclusions. The Harvard data are more consistent with a decline in the necessity of peer review than with a decline in relative department quality. The opposite is true of the data on the other departments.

5.3 Paper-level citation database

In this section I use data on citations at the paper level to enrich the above descriptions and address additional questions. I focus on how citations covary with the journal in which a paper is published and with the author's institution, and whether there is a change over

time in these relationships.

My paper-level database includes 1994 citation counts for all papers published in 1990-1993 (in one of the 23 journals studied) and 2004 citation counts for all papers published in 2000-2003. I examine how citations are related to journal- and author-characteristics using negative binomial regressions, e.g.

$$\begin{aligned} Cites_i &\sim \text{Poisson}(\mu_i) \\ \log(\mu_i) &= \beta_0 + \beta_1 AuthorTop6School_i + \beta_2 FieldJoural_i + \beta_3 InvitedJournal_i \\ &\quad + \beta_4 OtherCharacteristics_i + AgeDummies + \epsilon_i, \end{aligned}$$

with ϵ_i is a $\Gamma(\theta, \theta)$-distributed random variable. This can be thought of as similar to estimating a simple regression with $\log(Cites_i)$ as the dependent variable.[22] The dependent variable *Cites* in the 1990's (2000's) regression is the number of citations that each paper published in 1990-1993 (2000-2003) received in 1994 (2004). In the base model, the main explanatory variables are dummy variables for the type of journal (top 5 is the omitted category) and a dummy for whether the author is in a top six economics department. Three paper characteristics (in addition to year dummies) are included as "control" variables: the log of the order in which the paper appears in its issue; the length of the article; and the number of authors.

Coefficient estimates and standard errors for the base model are presented in the first two columns of Table 9 with t-statistics in parentheses. The estimated coefficients on the "control" variables bring out several interesting and potentially relevant facts. First, the order in which a paper appears in its journal issue is a significant predictor of citations.[23] This indicates that editors are able to predict which articles are likely to be more influential and/or that more readers look at articles that are earlier in a journal issue. Second, the coefficient on the *NumAuthor* variable indicates that papers with more authors are more widely cited. One possible interpretation of this result is that citations reflect how extensively authors "market" a paper as well as the paper's inherent quality. The coefficients on the age dummies indicate that knowledge of papers diffuses sufficiently quickly so that three-year old and four-year old papers are cited at about the same rate.

[22] See Hausman, Hall and Griliches (1984) and section 19.9.4 of Greene (1997) for more on this and other models for count data.

[23] The *Order* variable is one for the lead article, two for the second article, etc.

	Dependent Variable: Citations in 1994 or 2004					
	1990-93	2000-03	1990-93	2000-03	1990-93	2000-03
Log(Order)	-0.17	-0.18	-0.17	-0.18	-0.22	-0.25
	(4.7)	(5.6)	(4.7)	(5.7)	(5.6)	(7.4)
Pages	0.03	0.02	0.03	0.02	0.04	0.03
	(10.6)	(9.9)	(10.6)	(9.9)	(12.3)	(9.8)
NumAuthor	0.20	0.14	0.20	0.13	0.19	0.12
	(4.6)	(4.0)	(4.6)	(3.9)	(4.5)	(3.3)
Age 3	0.01	-0.05	0.02	-0.05	0.02	-0.04
	(0.2)	(0.7)	(0.2)	(0.7)	(0.3)	(0.6)
Age 2	-0.16	-0.31	-0.15	-0.31	-0.19	-0.29
	(2.0)	(4.4)	(1.9)	(4.5)	(2.4)	(4.2)
Age 1	-0.78	-0.76	-0.77	-0.76	-0.78	-0.74
	(8.8)	(9.7)	(8.8)	(9.7)	(8.9)	(9.6)
Constant	-0.80	-0.53	-0.80	-0.48	-0.84	-0.19
	(5.7)	(4.2)	(5.6)	(3.7)	(5.0)	(1.3)
AuTop6School	0.58	0.40	0.55	0.17		
	(6.7)	(4.4)	(4.5)	(1.4)		
FieldJournal	-0.89	-0.95				
	(14.0)	(16.3)				
InvitedJournal	-0.74	-0.50				
	(8.0)	(5.9)				
FldJrnl × *AuTop6*			-0.89	-0.27	-0.05	0.81
			(4.7)	(4.7)	(0.2)	(3.9)
FldJrnl × *Other*			-0.90	-1.03		
			(13.0)	(16.4)		
InvtdJrnl × *AuTop6*			-0.65	-0.45	0.31	0.08
			(3.5)	(2.2)	(1.5)	(0.4)
InvtdJrnl × *Other*			-0.78	-0.51		
			(7.2)	(5.3)		
Chicago					0.64	0.35
					(2.6)	(1.4)
Harvard					0.69	0.21
					(3.7)	(1.0)
MIT					0.53	0.22
					(2.5)	(1.1)
Princeton					0.40	0.35
					(2.0)	(1.8)
Stanford					0.42	-0.45
					(1.4)	(1.7)
School X					0.29	-0.54
					(1.2)	(1.8)
Journal Dummies	No	No	No	No	Yes	Yes
Pseudo R^2	0.07	0.07	0.08	0.07	0.10	0.09
Number of Obs.	4580	4970	4580	4970	4580	4970

T-statistics in parentheses.

Table 9: Paper-level citation regressions

AuTop6School is the fraction of a paper's authors who are faculty members in a top six economics department. Papers by authors in the top departments are more widely cited in each decade. This could be attributed to authors in top departments' having an advantage in marketing papers or to differences in average quality (that are not fully reflected in how journals order papers within an issue). The point estimate is that the relative advantage is smaller in the early 2000's, but the difference is not significant.

FieldJournal and *InvitedJournal* are dummy variables for papers appearing in field and invited journals. Papers in both types of journals are less cited on average than papers appearing in top general interest journals. The coefficient estimates of about -0.9 indicate that papers in field journal receive approximately 60% fewer citations than papers in top general interest journals. This difference appears to be fairly stable over time (again not providing much support for the decline-in-field-journal-quality theory). Invited journals are also well behind top general interest journals, but appear to be gaining somewhat.

The regressions in the third and fourth columns of Table 9 add interactions between the journal (Top 5, Field and Invited) and author (Top6, Other) classifications. The coefficient on *AuTop6School* now measures the extra citations that accrue to authors from top six departments when publishing in the top general interest journals. Papers by authors from top departments were substantially more widely cited than other papers in top general interest journals in the 1990's but this effect has declined in the last decade and is no longer statistically significant. This could reflect a decrease in dissemination advantages or a decrease in relative quality.

A comparison between the coefficients on the *Field Journal* $\times$ *AuTop6School* and the *Field Journal* $\times$ *Other* interactions indicates that papers by authors in top six departments receive many more citations than other papers in the same field journal.[24] This is consistent with the hypothesis that authors from top schools are better able to gain attention for their work without publishing it in top general interest journals.[25] Note, however, that the estimates on the *InvitedJournal* interactions do not follow this pattern.

One aspect of these findings that is a little puzzling, however, is they suggest that citations to papers by economists in top departments are now not very sensitive to where

[24] To make this comparison one also needs to add in the *AuTop6School* coefficient.

[25] Part of the gain in citations could also be due to a selection effect: the decline in field journal publications could be due to top-department authors only publishing their best field-journal papers in those outlets.

the paper is published (the causal effect of publishing the same paper in a field journal must be less than $e^{-0.27}$ if the general interest papers in our sample are of higher quality). This must be reconciled with the finding that authors from top departments are publishing fewer papers in these journals. Two possible lines of argument is that top-six authors may be primarily publishing in top general interest journals for reputation building, and that the citation penalty from publishing in nonjournal outlets may also be getting smaller.

A striking results of the previous section was that Harvard is doing relatively well in citations in a period when it is doing relatively poorly in top journal publications. This naturally raises the question of whether this is due to gains in per-article citations outweighing the drop in top-journal publications, or whether it is due to Harvard garnering more citations on papers that are not in top journals. The fifth and sixth columns of Table 9 address this question by adding dummies for each top six school. The regressions also include (unreported) journal dummies and interactions between top-department and journal-class dummies. Hence, the coefficients on the school dummies reflect the citations accruing to papers the school published in top general interest journals relative to other papers in the same journal, and citations accruing to papers the school published in field- and invited journals relative to papers in those journals by members of other top departments.

The results indicate that Harvard's strong recent citation performance is not due to citations to its top journal publications: the point estimate on the *Harvard* dummy is smaller in the later period than in the earlier period and indicates that Harvard is not gaining relative to MIT, Princeton and Chicago. The standard errors are such that the cross-coefficient comparisons are not statistically significant, but this does not really matter for the above conclusion – the sample here is the full set of papers in the 23 journals in 2000-2003, which was the period for which Harvard was shown to be doing well in the final column of Table 8.) I conclude that Harvard's relatively strong citation record must be attributable to its receiving many citations for papers that are not in top journals

The fifth and sixth columns also provide some evidence that results noted earlier are robust by showing that they hold across departments and do not going away when a full set of journal dummies is included. For example, the regressions again indicate that top departments are receiving many citations for their field journal publications, and show that the pattern of getting fewer citations for top general interest publications appears to be

consistent across schools.

One conclusion of this section seems fairly clear: the data seem inconsistent with the notion that authors in top departments are shunning field journals because these journals are getting worse and no longer provide sufficient dissemination. The other conclusions are less clear. Several observations are consistent with the idea that authors at top schools may increasingly be able to attract attention without publishing in top journals. The significance of the number of authors and the author's institution in the citation regressions provides evidence that nonjournal dissemination has always been important. Both the fact that Harvard's strong recent citation performance appears to be due to citations to papers not published in top journals and the fact that the general interest-field journal citation gap is narrowing for authors at top schools suggest that the importance of publishing in the best journals is declining over time. I put a +/– in the decline in peer review necessity column, however, because the results on relative citations of general interest and field journal publications is awkward to reconcile with top departments' concentrating their effors on publishing in general interest journals. The evidence is also mixed on the decline-in-top-department-quality theory. The citation declines on general interest publications could be taken to suggest a quality decline, but the opposite results on citations to papers in field journal would then have the opposite implication.

6 Conclusions

I started this paper by pointing out two trends: economists in several top departments are publishing fewer papers in the top field journals; and Harvard's economics department is also publishing fewer papers in the top general interest journals.

Several pieces of evidence bolster the view that one factor contributing to these trends is that the role of journals in disseminating research has been reduced. One is that the citation benefit to publishing in a top general interest journal now appears to be fairly small for top-department authors. Another is that Harvard authors appear to be quite successful in garnering citations to papers that are not published in top journals. The fact that the publication declines appear to be a top-department phenomenon (as opposed to a prolific-author phenomenon) suggests that being in a top department may be an important

determinant of an author's ability to sidestep the traditional journal system.

Other potential explanations for the trends also appear to be relevant. The slowdown of the publication process continued through the nineties. It is natural that this would lead authors to cut back on the number of papers they subject to peer review and that the best papers would be given highest priority. The fact that top-department authors continue to publish in special issues of field journals (and that we see many publications in invited journals and nonjournals) suggests that the hassles of the publication process is playing a role in deterring submissions. A few pieces of evidence also suggest that the simple theory that top deparments are not publishing as much because other departments are gaining on them may also have some validity (although some others do not). The prominent ones that do are a relative decline in citations to top department-authored articles in top general interest journals and the strength of business schools.

The changes that have occurred over the past decade are modest in magnitude. Economists at top departments are still spending a great deal of effort publishing in top peer-reviewed journals and publishing many papers there. One could imagine, however, that much larger changes will be seen in the near future. Technologies for disseminating papers will continue to improve. More top economists may realize that the publication hassles they have been enduring are not necessary. The peer-review process may also be subject to unravelling: as more top economists withdraw from the process, the signal that publication in a given journal provides is devalued and this may lead to further withdrawals. Even a partial unravelling could have a significant impact on the course of economic research. For example, if only the top general interest journals maintain their stature, then more economists may concentrate on "general interest" research and decline to make the kinds of incremental contributions to sophisticated literatures that appeal relatively more to those who are experts on a topic.

One could imagine that new institutions may arise and perform many of the same functions as the current peer-review system more efficiently. Given how central peer-review has been to academic research over the past century, however, the thought that the current system might collapse before any successor is clearly established is scary.

References

Azer, Ofer. "The Slowdown in First-Response Times of Economics Journals: Can it Be Beneficial," *Economic Inquiry*, forthcoming, 2007.

Bergstrom, Theodore C., "Free Labor for Costly Journals," *Journal of Economic Perspectives*, 15, 183–198, 2001.

Colander, David. "Research on the Economics Profession." *Journal of Economic Perspectives* 3 (Autumn), 137–148, 1989.

Ellison, Glenn. "Evolving Standards for Academic Publishing: A *q-r* Theory." *Journal of Political Economy* 110 (5), 994–1034, 2002a.

Ellison, Glenn. "The Slowdown of the Economics Publishing Process." *Journal of Political Economy* 110 (5), 947–993, 2002b.

Gans, Joshua *Publishing Economics: An Analysis of the Academic Journal Market in Economics.* London: Edward Elgar, 2000.

Greene, William H. (1997): *Econometric Analysis.* Prentice Hall.

Hausman, Jerry, Bronwyn Hall and Zvi Griliches (1984): "Economic Models for Count Data with an Application to the Patents-R&D Relationip," *Econometrica* 52, 909-938.

Kim, E. Han, Adair Morse, and Luigi Zingales. "Are Elite Universities Losing Their Competitive Edge," mimeo, 2006.

McCabe, Mark J., Aviv Nevo, and Daniel L. Rubinfeld, "Academic Journal Pricing and the Demand of Libraries," *American Economic Review* 95 (2), 447–452, 2005.

McCabe, Mark J. and Christopher M. Snyder, "A Model of Academic Journal Quality with Applications to Open-Access Journals," *American Economic Review* 95 (2), 453–458, 2005.

Oyer, Paul. "Initial Labor Market Conditions and Long-Term Outcomes for Economists," *Journal of Economic Perspectives* 20 (Summer), 143–160, 2006.