



## Scholarly Activity among Economists at Liberal Arts Colleges: A Life Cycle Analysis

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***Scholarly Activity among Economists  
at Liberal Arts Colleges: A Life Cycle Analysis***

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A Life Cycle Analysis**

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## **Introduction**

Most existing research on scholarship within the field of economics understandably focuses on work done at research-oriented institutions. Research on the scholarly activities of economics faculty at liberal arts colleges (LACs) is far sparser. LACs account for fewer than 5 percent of undergraduate enrollments and produce no PhDs. Despite their modest enrollment footprint, LAC economics departments generate an outsized impact on the discipline through their disproportionate impact on preparation for graduate school. Consequently, economists at top universities will appreciate knowing more about the research environment to which their new graduate students were exposed.

Much of the analysis of LAC economists' contributions has focused on ranking departments. Studies examining individual-level production have either reported output among superstars or have provided averages for all LAC economists. No studies provide a full description of the distribution of scholarly output or consider differences across sub-parts of the universe of LACs. As a result, existing work offers little to a senior faculty member attempting to situate a junior colleague's tenure file within the context of relevant peers. Moreover, the work that has been done has relied on cross-sectional data, which inherently impedes an understanding of life cycle patterns in output. So, based on existing literature, senior faculty members have little direct evidence suggesting that pre-tenure scholarship well predicts subsequent work. Information about the historical pattern of research achieved at LACs will therefore help current faculty evaluate tenure and promotion files. Naturally, research output is only part of the story at LACS; teaching prowess and service-related contributions are important elements as well.

After examining the literature in detail in the section that follows, we describe how we collected data on economics professors at the 162 LACs listed in the 2020 *U.S. News and World Report*. Our data include 613 individuals and 8,878 publications.<sup>1</sup>

Analysis of these data offers important insights about LAC scholarship. First, claims of increasing research expectations seem largely overstated. While the left tail of the distribution has shifted upward slightly, consistent with a modest increase in the research portion of the tenure bar, the distribution of scholarship has been relatively stable over successive PhD cohorts. Moreover, longitudinal analysis confirms that pre-tenure levels of scholarship strongly predict output in middle- and late-career. While levels of output have not increased much over time, the data point to a shift in composition toward greater co-authored work. While some have worried that the increasingly technical nature of macroeconomics diminishes publication opportunities for LAC faculty and threatens the viability of the subfield, we find that macro- and microeconomists have published at very similar rates in recent cohorts. Finally, we examine the connection between publications within and outside the scope of ECONLIT indexing. The analysis finds that scholars who produce more of the former also produce more of the latter. We conclude the paper with a discussion of the implications of these results.

## **Literature Review**

A relatively robust literature examines research productivity of economists at research universities in general and top departments in particular. Not surprisingly, significant attention has been paid to pre-tenure activity. Studies find that early-career economists at research universities (and in the profession as a whole) appear to have produced fewer publications than

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<sup>1</sup> This work was completed after approval from the Carleton College Institutional Review Board (IRB 19-20 063 ngrawe). The IRB determined that the project fell within the federal exemption 45 CFR 46.101(b), category 2(i, ii).

did young economists from earlier cohorts. This change may be attributable in part to a slowdown in the publication process. Ellison (2002) notes that the review process in the 1970s took six to nine months, whereas three decades later editorial decisions consumed almost two years. He speculates as to the cause, attributing it partly to longer papers and more competition for top journals. Conley et al. (2013) similarly find evidence of declining publication counts in a study of academic economists who received PhDs from U.S. and Canadian programs between 1986 and 2000. They find that, through the sixth career year, economists from older cohorts produced more publications than those from younger cohorts.

But why has competition for the top journals increased? Heckman and Moktan (2020) note that faculty members at the top 35 U.S. economics departments in research universities are disproportionately rewarded at tenure time for publications in the top five (T5) economics journals (*American Economic Review*, *Econometrica*, *Journal of Political Economy*, *Quarterly Journal of Economics*, and *Review of Economic Studies*). In addition to incentives of tenure and promotion, publication in a leading journal also enhances an author's reputation. Unfortunately for those pursuing a T5 path to tenure and renown, although the number of submissions to the T5 nearly doubled between 1990 and 2021, the number of published articles fell from 400 annually in the late 1970s to 300 in 2012 (Card and DellaVigna 2013).

Despite the intense focus on the narrow T5 scholarly outlets, a substantial number of influential articles appear outside these journals. Heckman and Moktan (2020) and others (for example, Galiani and Panizza 2020) worry that using T5 publications as a measure of scholarly work incentivizes young economists to seek particular outlets for their work as opposed to focusing on innovative research. Sylvia and Rozelle (2021) echo this concern, noting that the emphasis on publication in top journals leads to detailed examination of important but relatively

small issues rather than helping people understand the world and make policy choices that will enhance wellbeing. Pedroni and Sheppard (2008) and Hamermesh (2014) suggest that economists should place greater emphasis on citations and less on T5 publications when, for example, making salary and promotion decisions.

Moving from questions of early- to mid-career scholarship, research shows that the productivity of academic economists at top graduate programs appears to decline after tenure. Once freed from fear of failing in the tenure process, mid-career economists do not “swing for the fences” but rather publish less and produce lower-quality work than they did before tenure (Brogard et al. 2018). Conley et al. (2013) similarly finds that peak research production occurs between four and six years after PhD completion, regardless of the quality of the doctoral program.

Productivity among economists appears highly skewed. Conley et al. (2013) find that, regardless of the cohort of PhD recipients, the top 1 percent produces about 13 percent of AER-equivalent pages, the top 10 percent about 57 percent, and the top 20 percent about 78 percent. Moreover, pre-tenure research output appears highly positively correlated with post-tenure productivity (Hutchinson and Zivney 1995; Hartley et al. 2001)

Economists have also noted an increased propensity to write with coauthors. Barnett et al. (1988) looks at articles in the AER published between 1960 and 1985 and suggests that increased co-authorship is due to higher opportunity cost of time and added uncertainty about the editorial review process. More recent research using much larger and broader datasets documents increasing rates of coauthorship (Henrikson 2016; Rath and Wohlrabe 2016; and Sommer and Wohlrabe 2017).

The relationships among co-authorship, rewards, and productivity are unclear. Sauer (1988) determines that, for economists at top-40 universities, the salary reward to a co-authored paper with  $n$  authors is approximately  $1/n$ , but Kuld and O'Hagen (2017) find that the discount factor associated with co-authored research is ambiguous. They do suggest that a discount exists because top economists receiving PhDs between 1996 and 1999 were much more likely to produce solo-authored papers in the first five years of their career, turning to coauthorship only after tenure. Hollis (2001) uses panel data to conclude that more co-authorship means higher quality and quantity of publications for a given author, but the relationship between co-authorship and output of the individual is negative after discounting for the number of authors. In other work, however, Ductor (2015) and Besancenot et al. (2017) find that co-authorship tends to enhance productivity.

The work described above focuses on academic economists who work at top research universities or in academia more generally. We know far less about research by economists at LACs.<sup>2</sup> Although the missions of LACs clearly emphasize teaching, in recent decades institutions have increasingly recognized the importance of scholarly engagement in support of excellence in the classroom. McCaughey (1994) argues that these values can be seen in standards for LACs that demand a combination of effective teaching and published research as a basis for promotion and tenure whereas teaching was formerly the primary evaluation tool.

The importance of scholarship to teaching quality of LAC faculty is suggested by the baccalaureate origins of PhD students. In the early part of this century, 18 of the 25 American undergraduate institutions that sent the largest percentage of their graduating classes on to earn a

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<sup>2</sup> An LAC typically consists of undergraduates only and the curriculum usually requires students to take classes from a broad range of arts and humanities, social sciences, and sciences rather than to focus on technical or occupation-specific coursework. Classes are relatively small and aim to foster critical thinking. Most LACs, particularly selective ones, are residential.



PhD in economics were LACs (Siegfried and Stock, 2007). Bourne and Grawe (2015) suggest that a carefully crafted and rigorous curriculum coupled with intense faculty supervision of student research and in-depth advising--all informed by faculty engagement in scholarship--help prepare undergraduates at their LAC for doctoral programs. This fits with others' findings about LACs generally, including Bourque (1999) and Lemke (2009). These arguments are supported by Hartley and Robinson (1997), who find that publications by LAC faculty are highly positively correlated with the number of graduates who go on to earn PhDs in economics.

Studies examining output among LAC economists generally report average overall or by departments. Hartley and Robinson (1997) find that faculty in the best LAC departments produce at least one publication annually in a top-50 journal. But a few decades ago faculty at most LACs published little and rarely in top journals. In a comparison of LAC and research university faculty, Hartley et al. (2001) report that 81 percent of the former published five or fewer refereed articles over their career whereas the figure for the latter was only 26 percent. The percentages publishing more than 10 were 9.5 and 54, respectively. Among the top 51 LACs, the average annual number of papers between 1991 and 2007 was two to three per department; among the 10 most productive schools, the average was four to seven (Winkler et al., 2014). Bodenhorn (1997) found that, generally, LACs associated with high-quality teaching also generate more research. Compared to the profession as a whole, LAC economists in the past did not publish as much in highly technical journals.

Evaluating the research productivity of LAC economics faculty via conventional measures such as number of pages or publications (potentially adjusted by quality) may not tell the whole story. Pedroni and Sheppard (2008) find that, measured by citations, four LAC departments fare very well in comparison to those at four research universities. Bodenhorn (2003) inspects

citations for 439 economists employed at the top 50 LACs and discovers that a small number of institutions produce most of the citations and a few individuals are cited particularly often.

Moreover, as Hartley and Robinson (1997) note, with the exception of their study, the literature that exists focuses on work done at the most prestigious LACs, excluding important variation across the field.

For all of the statistics reported at the department level, information on individual faculty members is relatively sparse and focuses primarily on the performance of superstars in the far right tail. For example, Harley and Robinson (1997) report that, over the six years examined in their study, only 30 LAC economists produced six or more publications in JEL-cataloged journals. Similarly, Bodenhorn (1997; 2001) reports the productivity of the fifteen most active scholars at each academic rank. For those interested in whether the tenure bar has shifted, what level of engagement is reasonable to expect for a marginal tenure file, or how exposed new graduate students have been to research at their undergraduate institution, however, information on the top of the distribution is largely uninformative.

Moreover, the literature provides extremely limited information on the LAC economist's scholarly life cycle. The exception to this rule is Hartley et al. (2001), who report average number of publications by years of experience. But because the study uses data from a narrow time period it cannot distinguish life cycle from cohort effects. The current literature does not contain any studies based on longitudinal analysis of productivity by several PhD cohorts over several decades.

## **Data**

We examine scholarly activity of tenured and tenure-track economics faculty at the 162 institutions included on *US News & World Report's* 2020 list of national liberal arts colleges. We identified faculty members by searching department webpages and institutional directories during the summer of 2020.<sup>3</sup> Those listed as emeritus professors are excluded from the population; however, those moved to emeritus status following the 2019–20 academic year remain.

We began our data collection by searching faculty webpages for CVs or similar professional records. We then emailed all faculty with a list of scholarly records we had found and requested an updated list of publications or CV, along with the year of their PhD completion. When the year of degree was not available elsewhere, we searched for the faculty member's name and doctoral institution in lists of "Doctoral Dissertations in Economics" (or "Political Economy") published by the American Economic Association (AEA), and LinkedIn. These methods identified the year of degree in all but 25 cases.

To avoid selection bias, we limited our focus to faculty members who earned their degrees in or before 2012, who would reach a typical tenure decision by 2019 (the last full year for which we have publication data). Similarly, to circumvent selection bias due to retirement decisions correlated with scholarly output, we included only faculty members who earned their degrees in or after 1983. The result is a set of 613 professors; of these we found or received CVs from 385 (63 percent).

We recorded all journal articles, book chapters, books, and book reviews listed on available CVs. (Scholars who edited a volume were not credited with "writing a book" although, if they

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<sup>3</sup> Some departments combine economics with business, management, or accounting. Because disciplines vary in scholarly practices, we include only those who appear to be economists based on field of PhD and title (i.e., "associate professor of economics").

contributed one or more chapters to the volume, those contributions were included among authored chapters.) We then matched professors to records in ECONLIT.<sup>4</sup> In total, our database includes 8,878 publication records including 6,094 ECONLIT-indexed publications. Not surprisingly, more than 85 percent of the ECONLIT publications in our sample are journal articles. Another 14 percent are chapters in edited volumes while 2 and 1 percent are books and book reviews, respectively. (Sum exceeds unity due to rounding.) Of the 613 faculty members in the study, 94 percent had at least one ECONLIT entry. Restricting our view to ECONLIT records, 93 percent produced at least one journal article, 40 percent published at least one chapter in an edited volume, and 11 and 6 percent wrote at least one book and book review, respectively.

The database includes an additional 2,784 records of non-ECONLIT publications written by 397 faculty members. Non-ECONLIT publications were less likely to be journal articles (54 percent) and more likely to be chapters of edited volumes (29 percent), books (4 percent), and book reviews (13 percent). If we restrict the sample to those for whom we have CVs, more than one in six publications are in outlets not captured by ECONLIT indexing. The fact that non-ECONLIT publications look so different from those captured by the economics discipline's indexing suggests that studies of faculty research which only use the index miss important aspects of scholarship performed by LAC economists.

Following the literature, we examine publications adjusted for the number of coauthors and quality of publication in addition to studying publication counts. The weight of a coauthor-adjusted publication is defined as the inverse of the total number of authors of the piece. To adjust for quality, we weight publications using the 10-year *H* index of the journal in

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<sup>4</sup> To make sure we collected complete records from ECONLIT, we studied CVs and faculty webpages for alternative names under which a faculty member may have published.

which the publication appeared, as reported by IDEAS on April 9, 2021.<sup>5</sup> An article published in a journal with an  $H$  index value of 21 would be equivalent to three publications in an outlet with an  $H$  index value of seven, for example. Finally, we multiply these quality weights to create a third, coauthor- $H$ -adjusted weight.

Our primary outcomes of interest are cumulative simple and weighted publication counts through career year  $t$ , where  $t$  is defined as the number of years since PhD completion. Given typical hiring and promotion schedules, scholarly work published through year 7 would likely be considered at the time of standard tenure decision. Work completed by year 13 likely was available at the time of subsequent promotion deliberations. Of course, not all institutions use the same evaluation schedule, and some faculty take atypical career paths. We attempted to use the first year in the rank of associate professor as an alternative reference point for tenure, but this measure was available for only 51 percent of faculty members.

To examine changes in output across generations, we divide the dataset into three roughly equally-sized cohorts based on year of PhD completion: those earning PhDs in 1983–1994 (cohort one), 1995–2005 (cohort two), and 2006–2012 (cohort three). What is more, we recognize that LACs differ widely in terms of resources, institutional missions, teaching loads, service expectations, and other features, all of which might affect research productivity. Although our data set is not large enough to control for all possible differences among LACs, we capture some distinctions by dividing institutions into three tiers according to the 2020 *US News* National Liberal Arts Colleges rankings. Tier one includes institutions ranked 1 to 25, tier two contains ranks 26 to 70, and tier three encompasses colleges ranked 71 and higher. In tier one, average endowment per student is \$598,566, average spent on instruction per student is \$25,759,

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<sup>5</sup> The IDEAS webpage explains that  $H$  measures “the number of articles or papers with at least [ $H$ ] citations.”

and average student to faculty ratio is 8.4. These figures are \$309,776, \$18,156, and 9.5 for tier two, and \$115,741, \$11,639, and 10.9 for tier three. Approximately one-third of faculty fall into each of the three cohorts and tiers.

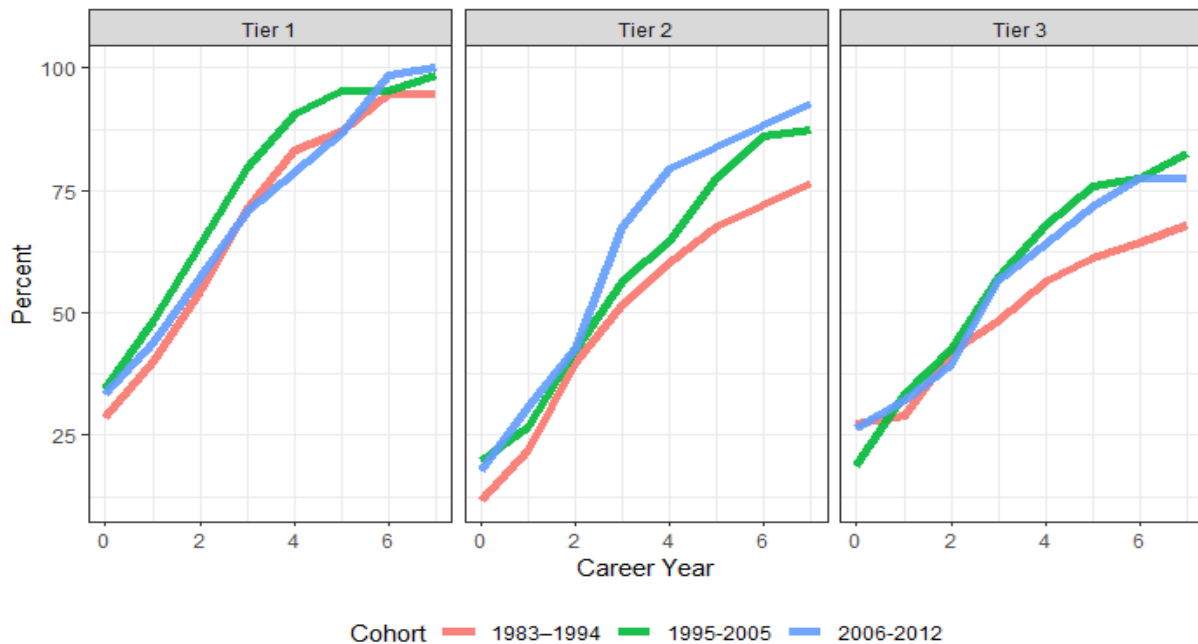
To gain a more nuanced understanding, we also collected data on several covariates. We reviewed publication outlets and titles to categorize each economist as either a microeconomist or macroeconomist. In our population, microeconomists outnumber macroeconomists 2.5-to-1. We also collected information concerning the faculty members' graduate school experiences. Based on CV and AEA records of dissertation titles, we noted whether a thesis was a single entity or a collection of manuscripts (e.g., a title such as "Three Essays in Labor Economics"). We were able to identify thesis titles for 532 (87 percent) of all faculty. Of these, just over two-thirds were compilations of essays.

One-third of our population is female. Thirty-five percent of faculty members in tiers one and two are female whereas 31 percent are female in tier three. The youngest cohort has a slightly higher proportion of female faculty (37 percent). Perhaps most striking, 40 percent of microeconomists but only 20 percent of macroeconomists are female. Substantial scholarship (for example Ginther and Kahn 2004, Abrevaya and Hamermesh 2012, Ceci et al. 2014, Chari and Goldsmith-Pinkham 2017, Lundberg and Stearns 2019, Card et al. 2020, Hengel and Moon 2020, and Huang et al. 2020) has been devoted to gender differences. Although we certainly consider this topic worthy of study, we do not explore it in detail in this paper.

## **Results**

### *Pre-Tenure Scholarship*

Pressure to publish early in the career might play out as faster time to first publication or larger bodies of pre-tenure scholarship. The experiences of liberal arts economists show a trend toward earlier scholarly output. As depicted in Figure 1, particularly in institutional tiers two and three, more recent PhD cohorts have generally been faster to first publication. Interestingly, faculty at tier-one and tier-two institutions are somewhat more likely to publish by career year 0, indicating a movement toward hiring candidates with accepted (if not published) pieces. The trend toward faster publication isn't overwhelming. In the second- and third-tier institutions, the probability of faculty having ever published was very similar across cohorts for the first three career years. In career years four and beyond, members of the 2006–2012 PhD cohort were almost 15 percent more likely than the 1983–94 cohort to have put out at least one article.



**Figure 1. Percent of faculty members with at least one ECONLIT publication by institutional tier and PhD cohort: Career years 1 through 7.**

While average time to first publication and the share of early-career faculty with no publications have both decreased modestly, changes to the distribution of scholarly output create

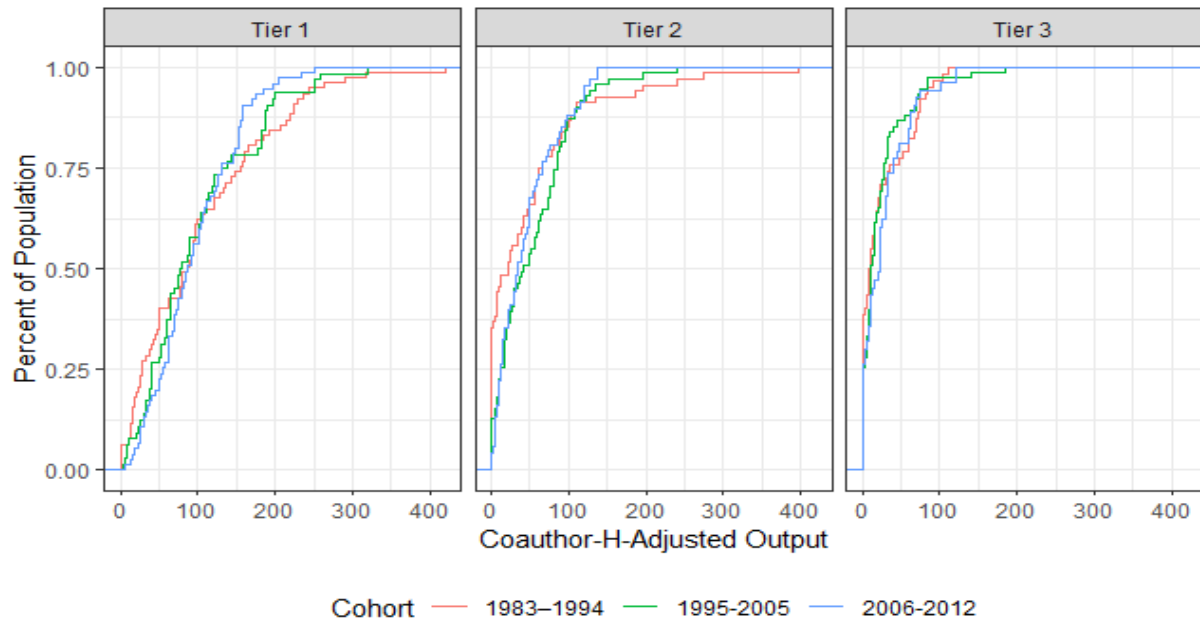
a more nuanced picture of pre-tenure scholarship. Figure 2 plots cumulative distributions of coauthor- $H$ -adjusted publications in career year 7.<sup>6</sup> To give context, the top-ranked journal (the *American Economic Review*) has an  $H$  score of 87 while the 25th-, 50th-, 100th-, and 200th-ranked journals have scores of 53, 41, 29, and 20. So, for example, the 25th percentile level of career year-7 output at a tier-one institution (not quite 50) might represent one sole-authored piece in the 50th-ranked journal or three co-authored pieces in a journal ranked a little lower than 200th. As another example, top producers with scores near 400 might report a collection of articles composed of two sole-authored pieces in the *AER*, three more at roughly 25th-ranked journals, plus two co-authored pieces in journals ranked around position 50.

In all three institutional tiers, the lower tail of the career year-7 publication distribution shifted rightward in later PhD cohorts. At the top end of the productivity distribution, however, career year-7 output moved lower in the top two tiers of institutions and remained steady in the third. The result is less variance across the distribution overall. The median level of year-7 output has remained very nearly unchanged among faculty in the first and third tier of institutions and increased slightly among faculty at second-tier schools.

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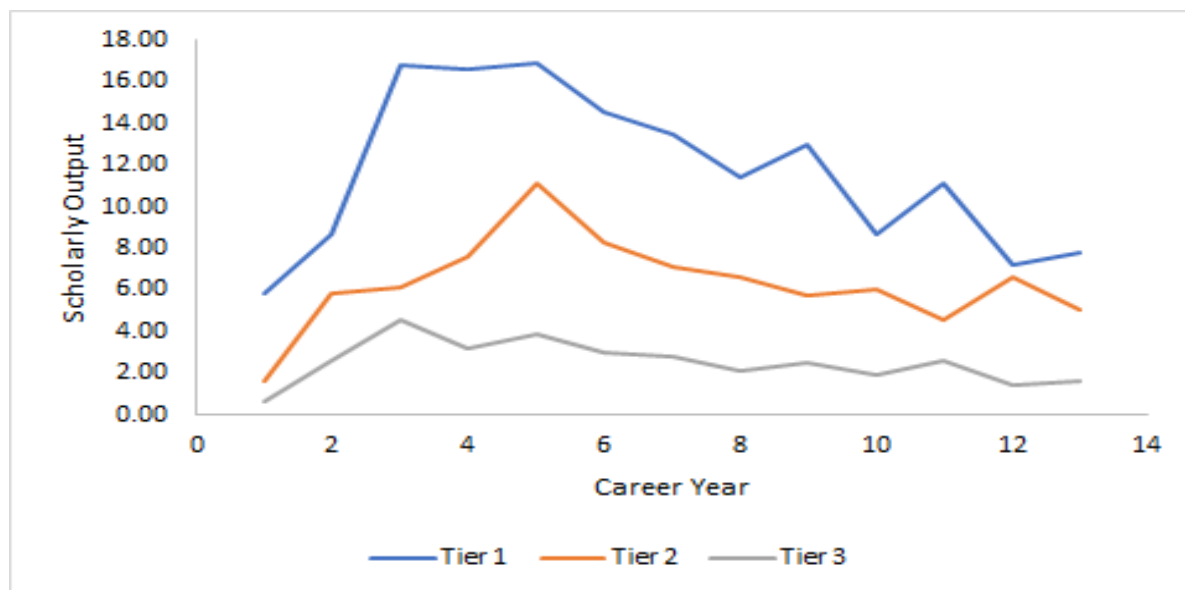
<sup>6</sup> We have repeated the analysis with alternative specifications of scholarly output including raw publication count, coauthor-adjusted publications, and  $H$ -adjusted publications. Results are qualitatively similar to those presented here.





**Figure 2. Cumulative density functions of career year-7, coauthor-*H*-adjusted publication by institutional tier and PhD cohort.**

While the level of output clearly varies across institutional tiers and the shape of the scholarly distribution has shifted somewhat across PhD cohorts, patterns of scholarly production over the life cycle remain quite similar across both institutional tier and cohort. Figure 3 plots, by institutional tier, the average coauthor-*H*-adjusted output across career years 1 through 13 among those who earned PhDs between 1983 and 2005. In all three tiers, the rate of annual production rises in early career years before peaking prior to tenure and falling thereafter. Productivity appears to peak a little sooner for those at tier-three institutions than at tier-one and tier-two institutions. But, in general, the data suggest similar life cycle patterns regardless of institutional tier. While the data do not point to a cessation of scholarship post-tenure, in all three tiers it appears that output diminishes once research expectations of tenure have been met.



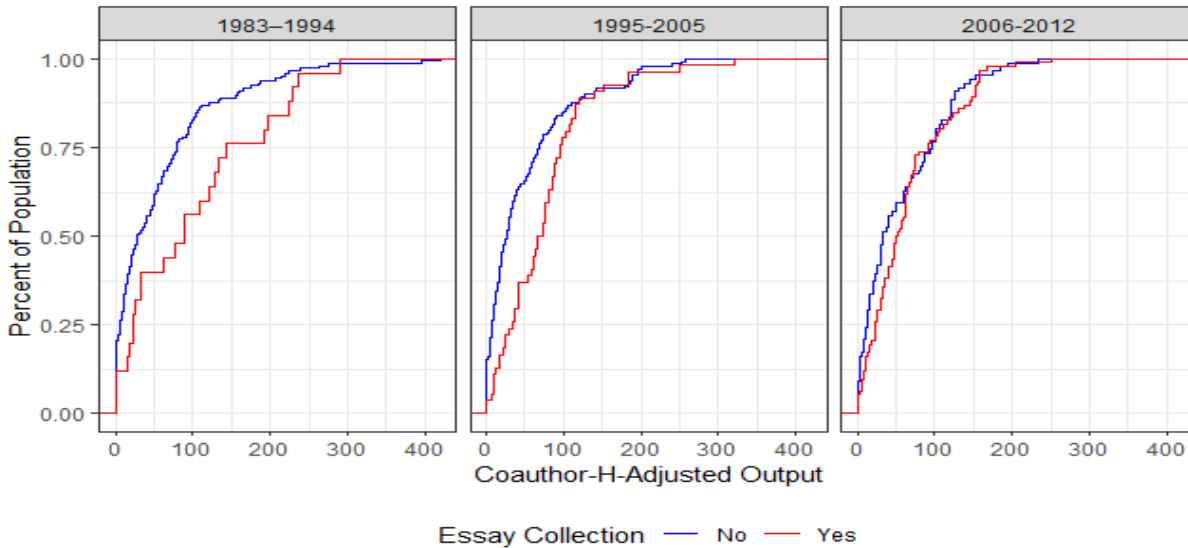
**Figure 3. Average coauthor-*H*-adjusted output by career year among those earning PhDs in 1983–2005 by institutional tier.**

**Essay-Based Theses and Early Scholarship.** Stock and Siegfried (2013) document the trend toward dissertations composed of discrete essays related to a field rather than a single, longer manuscript. We find very comparable trends among LAC economists. Whereas less than 15 percent of cohort-one theses fell in the “essay collection” genre, 30 percent of cohort-two and just over half of cohort-three theses did so. Among several arguments in favor of essay-based theses, Stock and Siegfried suggest that such collections might be more easily turned into publications. On the other hand, Stock and Siegfried point to the value of learning to create a larger research agenda with complementary parts--a lesson potentially taught by a comprehensive manuscript. In a sample of economists earning PhDs between 1996 and 2002, the authors find that, when compared with economists who wrote manuscript theses, those who wrote collections of essays produced one or two more publications in the first five career years.

Among LAC economists, it isn't clear that essay-based theses necessarily promote speed to first publication, but the data do suggest greater cumulative output by career year 7. In the 1983–1994 cohort, producing an essay-based thesis was associated with a 10-point increase in

the probability of publication by career year 0, consistent with Stock and Siegfried's prediction. But this gap disappeared in career year 1 and subsequent years. The experience of the 1995–2005 cohort provides clearer evidence of an early launch among essay writers. By career year 2, essay writers were 25 percentage points more likely to have a publication than manuscript-writing peers. The publication probability advantage of essay-writers was persistently 10 to 15 points through year 7. In the most recent cohort (2006–2012), the probability of publication among essay writers was all but indistinguishable from that of manuscript writers, suggesting that the middle cohort is an outlier.

Of course, the ultimate goal is not merely a single publication but a body of scholarship by the time of tenure evaluation. Figure 4 presents cumulative distributions of year-7 scholarly output. Among faculty in the 1983–1994 PhD cohorts, output was generally higher among those who wrote essay-based theses. At the median, the difference was around 75 coauthor-*H*-adjusted units of output--equivalent to a sole-authored publication in a top-10 journal. The 1995–2005 cohort also saw essay-writers outperform, though the median gap fell to 50 coauthor-*H*-adjusted units--equivalent to a sole-authored publication in the 25th-ranked journal. By the time the 2006–2012 PhD cohort arrived, little systematic difference remained. Stock and Siegfried (2013) note that graduates of top PhD programs were more likely to have written collections of essays, a pattern we also find among LAC economists. With an ever larger number of LAC scholars producing essay-based theses over these cohorts, the diminishing difference in production may simply reflect a larger share of lower-productivity scholars opting to produce an essay-based thesis.



**Figure 4. Cumulative distributions of career year-7, coauthor-*H*-adjusted publication by PhD cohort and thesis type.**

#### **Differences between Macro- and Microeconomics in Early-Career Scholarship.**

Colander (2016) argues that the nature of macroeconomic scholarship makes it inherently more difficult to complete in the context of the heavier teaching obligations of liberal arts colleges. Specifically, he contends that the mismatch between graduate and undergraduate macroeconomic methods demands greater time in early years as young professors develop new courses. In addition to this direct cost, rapid change in macroeconomics techniques may make it difficult to divide attention between pedagogy and scholarship. Colander believes these unique challenges to macroeconomic scholarship explain why microeconomists outnumber their macro colleagues 2-to-1 at liberal arts colleges; in his view, greater difficulty among macroeconomists in combining teaching and scholarship has led to lower success in achieving tenure. (As mentioned, microeconomists outnumber macroeconomists in our database 2.5-to-1.) In response to the perceived threat to the existence of macroeconomics in LAC programs, Colander suggests that departments make meaningful adjustments such as hiring from non-traditional macro pathways,

altering tenure standards to reflect “the macro problem,” and encouraging junior macroeconomists to fundamentally reshape their research agendas.

To inform this important policy question, we explore how levels of early scholarly activity compare between macro- and microeconomists, and how this relative performance has changed over PhD cohorts. In the 1983–1994 cohort, macroeconomists were more likely to publish. In career years 0 through 3, their probability of having published was about 5 points higher than micro peers, a gap which grew to about 10 points in career years 4 through 7. By contrast, no systematic differences were seen between macro- and microeconomists in the 1995–2005 or 2006–2012 cohorts. If we shift focus from the probability of publication to coauthor-*H*-adjusted output in career year 7, macroeconomists perform well. In the 1983–1994 PhD cohort, macroeconomists at all points of the distribution outproduced their microeconomic peers. For most of the distribution, the difference was modest--about 25 units, equivalent to a sole-authored publication in a 100th-ranked outlet. A more pronounced gap appeared among those in the upper 20 percent--nearly 100 units at the 90th percentile, equivalent to a sole-authored piece in a top-5 journal. In the two subsequent cohorts, differences across subfields are indistinguishable.

Of course, the results presented above might be affected by a selection bias generated by higher tenure standards applied to macroeconomists. In particular, if Colander is right that macroeconomic scholarship is inherently more difficult than its microeconomic counterpart, then equally-applied standards for publication output would lead to the non-reappointment of a larger share of macroeconomists than microeconomists. Our data, restricted to those who earned PhDs in or before 2012 and still held appointments in the 2019–2020 academic year, would reflect greater selection in the distribution of macro- than microeconomists. In other words, the

selection process of tenure would assure equal post-tenure distributions of output despite very different pre-tenure distributions.

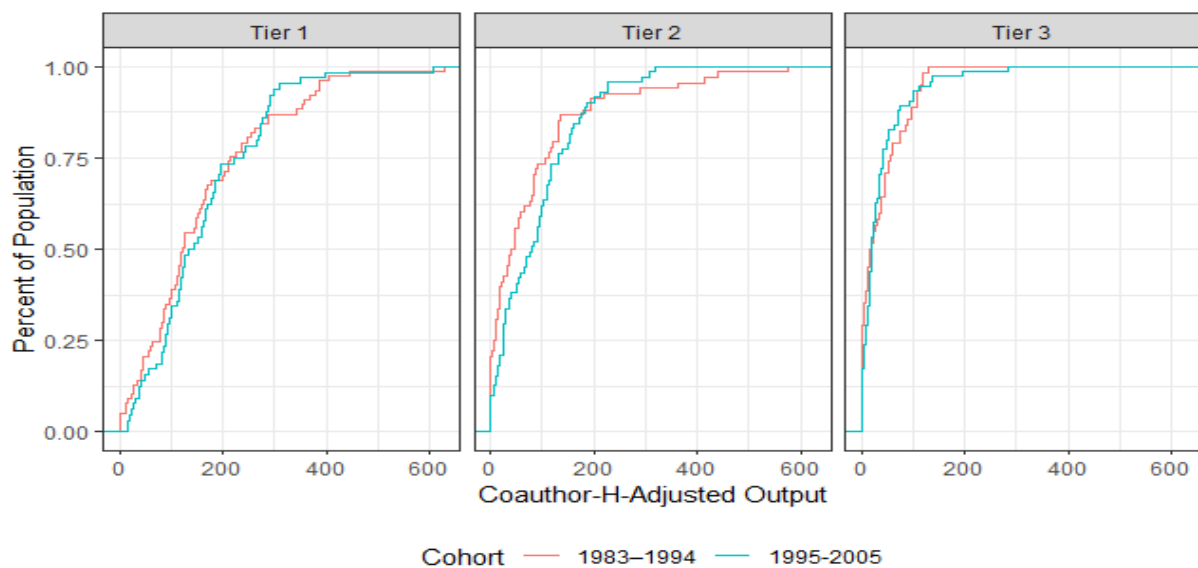
We find limited evidence supporting this conjecture. Colander points to the fact that microeconomists substantially outnumber macroeconomists as evidence that liberal arts macroeconomists are “an endangered species.” Looking across cohorts, in the 1983–1994 cohort, microeconomists outnumber macro colleagues 1.7-to-1. In the subsequent cohorts, this ratio rises to 3.1- and 2.9-to-1. This ratio alone does not support claims of a disadvantage facing macroeconomists. While it could result from selection at tenure, it would also be consistent with different preferences for LACs or with a discipline in which a large and growing majority of economists choose micro subfields. A recent survey of Canadian and American graduate students found 2,996 claimed primary fields in micro while 1,286 identified subfields in macro--a ratio of 2.3-to-1 (Fortin et al. 2021).<sup>7</sup> While this is a smaller disparity than seen in recent cohorts of LAC economists, the difference is relatively modest and we question whether it calls for the substantial policy changes Colander suggests.

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<sup>7</sup> Microeconomic subfields include: Microeconomics; Public/Law and Econ; Health, Education, Welfare; Labor and Demographic Econ; Industrial Organization; Econ Development; Agriculture and Environment; and Urban, Rural, Transportation. Macroeconomic subfields include: Macro and Monetary Econ; International Econ; Financial Econ; Econ History/Thought; and Special/Econ Systems. Math and Quant Methods; Business; and Misc/General, Teaching were counted as neither micro nor macro.

### *Mid-Career Scholarship*

While the timing of promotion evaluation is less uniform than is tenure evaluation, for many institutions promotion to full professor is considered around career year 13. The 1983–94 and 1995–2005 cohorts are observed through this point in the life cycle and so provide evidence of scholarship in the years following tenure. Comparing the two cohorts reveals patterns similar to those seen in career year 7 (Figure 5 vs. Figure 2). In the top two tiers of institutions, the left portion of the scholarship distribution has shifted up across the two PhD cohorts while the right portion has shifted down. As a result, the variance in output diminished. (The scholarship distribution of faculty at institutions in the third tier remained more or less fixed across cohorts.)



**Figure 5. Cumulative density functions of career year-13, coauthor-*H*-adjusted publication by institutional tier and PhD Cohort.**

### *Intertemporal Correlation in Scholarly Production*

At the point of tenure evaluation, most institutions use early-career scholarship as an indicator for expected future output. But to what degree does publication in years 0 through 7 predict middle- and late-career production? To examine this question, using observations of

faculty in the 1983–94 and 1995–05 PhD cohorts, Table 1 reports regressions of output in career years 8 through 13 on those observed through year 7. A tobit regression (regression 1) shows that each additional unit of coauthor-*H*-adjusted output through year 7 predicts 0.52 additional units of output during the subsequent 6 years. This effect does not simply reflect differences in output by institutional tier or PhD cohort; the addition of controls for these variables reduces the effect size only slightly to 0.45 (regression 2).

Regressand Method	Regression		
	(1) Output years 8 – 13 Tobit	(2) Output years 8 – 13 Tobit	(3) Output > 0 years 8 – 13 Logit
Yr-7 Output	0.52 (0.03)	0.45 (0.03)	0.04 (0.01)
Intercept 1	-3.89 (3.05)	10.33 (5.22)	0.10 (0.30)
Intercept 2	3.75 (0.04)	3.72 (0.04)	
Institution controls	No	Yes	Yes
Cohort controls	No	Yes	Yes

**Table 1: Predictive power of career year-7 output on scholarship in years 8 through 13.**

*Note: Standard errors in parentheses.*

Many are particularly concerned about the possibility that a junior colleague, having achieved tenure, may then cease scholarly engagement. Among those earning PhDs between 1983 and 2005, 29 percent produced coauthor-*H*-adjusted output of zero in years 8 through 13 (one-third and one-fourth of the 1983-1994 and 1995-2005 cohorts, respectively; one-eighth, one-quarter, and one-half of those at first-, second-, and third-tier institutions, respectively). Output in career year 7 strongly predicts whether an individual will publish zero economics journal articles in the six subsequent years (regression 3)--a one-standard deviation increase in



publication through year 7 predicts a decrease in the probability of no publication of about 10 to 15 percentage points for a faculty member at the 50th-ranked institution. (The implied effect of a one-standard deviation increase in year-7 output is just under 10 percentage points for those with output at top-ranked institutions and around 20 percentage points for those at institutions near the bottom of tier three.)

Alternatively, we can study intertemporal patterns through a transition matrix. As with absolute measures of performance, relative performance prior to tenure strongly predicts relative performance post-tenure.<sup>8</sup> Among those whose output through career year 7 fell in the bottom quartile, almost 60 percent also produced bottom-quartile publication in years 8–13. Less than 20 percent rose to the top half of the post-tenure distribution. Similarly, top-quartile pre-tenure scholars remained in the top quartile with probability greater than 50 percent and five-sixths remained in the top half of the distribution in career years 8–13.

Publication patterns later in the life cycle--career years 14–19 and 20–25--can be examined using data from the 1983–1994 PhD cohort (Table 2). Conditional on institutional tier, output in career year 7 is strongly associated with output later in the life cycle. A one-unit increase in coauthor-*H*-adjusted output at year 7 predicts an increase in output in years 14–19 (regression 1) and 20–25 (regression 3) of 0.34 and 0.30 units, respectively. Not surprisingly, when subsequent intervening years of output are added to the analysis, the effect of a one-unit change in year-7 output falls and, in the case of output in years 20 to 25, becomes statistically insignificant. In all, the data support treating pre-tenure scholarly production as a meaningful predictor of work later in the life cycle.

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<sup>8</sup> Transition matrices for both cohorts were very similar and so only the matrix combining cohorts is reported here. Cohort-specific transition matrices are available from the authors upon request.

Regressand	Regression			
	(1) Output years 14–19	(2) Output years 14–19	(3) Output years 20–25	(4) Output years 20–25
Output through year 7	0.34 (0.05)	0.15 (0.05)	0.30 (0.05)	0.05 (0.05)
Output years 8–13		0.49 (0.08)		0.20 (0.09)
Output years 14–19				0.57 (0.11)
Intercept 1	0.91 (7.39)	-6.65 (6.66)	-13.84 (8.54)	-22.74 (7.41)
Intercept 2	3.80 (0.07)	3.67 (0.07)	3.88 (0.08)	3.68 (0.08)
institutional tier controls	Yes	Yes	Yes	Yes

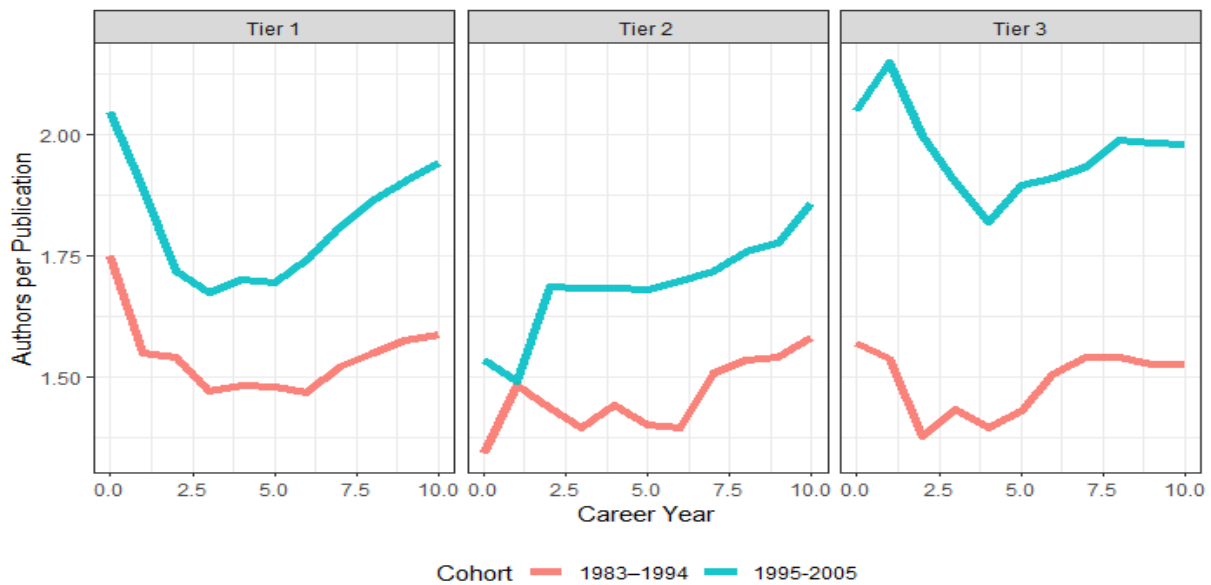
**Table 2: Tobit regressions of later-career production on early- and mid-career production**

*Note: Standard errors in parentheses.*

### *Co-authorship*

A number of forces might nudge faculty toward greater coauthorship. If young faculty perceive a rising tenure bar (whether this is in fact the case or not), they may increasingly view co-authorship with graduate school advisors or colleagues as an important tool for building a *vita*. Moreover, insofar as the economics profession has become more technical, over time scholars may see higher returns to specialization. Improvements in communication technology have certainly reduced the potential costs of co-authorship. Finally, some argue the world's most pressing problems are inherently interdisciplinary (as judged by either authors or administrators who set salaries)--both across disciplines and within the field of economics, increasing returns to coauthorship. Are the data consistent with these hypotheses?

Figure 6 plots the average number of authors per ECONLIT publication in our database by career year. While the figure is restricted to PhD cohorts 1983–1994 and 1995–2005 so that we can examine behaviors through career-year 13, trends of those in the 2006–2012 cohort are similar through career year 7. We see a general increase in co-authorship experience across cohorts. While cohorts differ in the level of co-authorship activity, they share a common life cycle pattern. Very early in the career co-authorship tends to be higher, presumably reflecting relationships with graduate program advisers and peers. This initial wave of co-authorship diminishes before a second, slightly smaller wave, begun just before tenure, initiates a return to greater collaborative work.



**Figure 6. Average number of authors per ECONLIT publication by institutional tier and PhD cohort.**

### *Non-ECONLIT Scholarly Contributions*

The work of faculty for whom we have CVs demonstrates the importance of scholarship outside ECONLIT-indexed outlets. Through career years 7 and 13, about one-third of all coauthor-adjusted publications by LAC economists landed outside ECONLIT’s scope. The prominence of extra-disciplinary work seen here is consistent with publication patterns Hartley et

al. (2001) find for the economics discipline as a whole. When the data are divided by institutional tiers, the share of publications outside ECONLIT is relatively lower for scholars at tier-one institutions (about one-quarter) than for those at second- or third-tier institutions (33 percent and 44 percent, respectively). With so much work done beyond the traditional boundaries of economics indexing, it is key to understand such scholarly contributions.

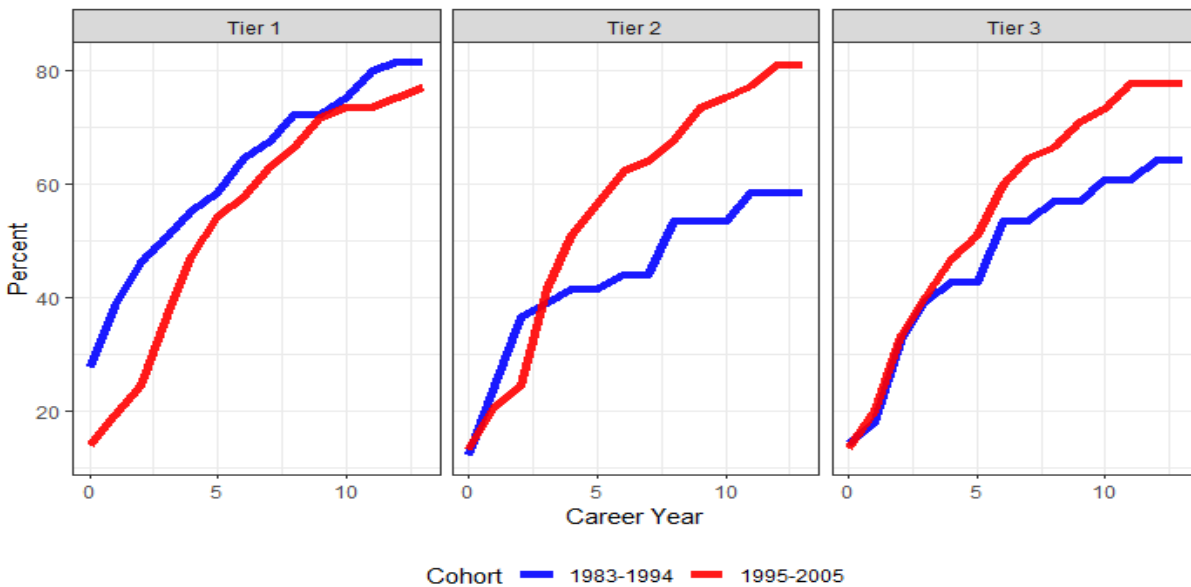
Before we look closely at the non-ECONLIT publications, however, we must address the question of selection bias. In all prior analysis (based on ECONLIT publications), we observe the entire population. Our sources of non-ECONLIT work are CVs made available by approximately two-thirds of LAC economists. This raises an important question: are the economists for whom we have CVs representative of the population as a whole?

Unfortunately, it is clear that the economists for whom we have CV records are not a random sample from the population. Among all LAC economists, those with available CVs produced almost three times as much output as those without. Some of this difference reflects the fact that CVs are more likely to be found among economists in tier-one institutions, which also tend to produce larger scholarly collections. But even when controlling for institutional tier, those with available CVs produce about twice as much ECONLIT output as those without.

**Life cycle Patterns of Non-ECONLIT Publication.** If tenure promotes academic freedom, one might expect to see greater rates of publication outside the ECONLIT scope in career years 8 and beyond. Figure 7 plots, by career year, the share of LAC economists in the 1983–1994 and 1995–2005 PhD cohorts who record at least one non-ECONLIT publication. Both cohorts exhibit a persistent upward trend over the life cycle, but neither provide clear evidence that tenure promotes a substantively new approach to scholarship. Similarly, we see no meaningful

break in trend just prior to tenure. Apparently, as tenure evaluation looms, faculty don't newly turn to outlets outside the field to bolster review packets.

Interestingly, among economists at tier-one LACs, the 1995–2005 cohort was less likely than the 1983–1994 cohort to have published outside ECONLIT while that pattern is reversed among economics at tier-two and -three institutions. In total, the field has seen greater engagement with non-ECONLIT outlets with growth driven entirely by the work of scholars at tier-two and -three institutions. If we shift focus from the probability of publication to coauthor-adjusted output in career years 7 and 13, we find similar patterns. Among economists at institutions in tier one, successive PhD cohorts have generated fewer coauthor-adjusted non-ECONLIT publications. By contrast, such publication activity became more common among later PhD cohorts at institutions in tiers two and three.



**Figure 7: Percent of faculty members with at least one non-ECONLIT publication by institutional tier and PhD cohort: Career years 1 through 13.**

While we see clear patterns of selection into our sample of CVs with information about non-ECONLIT output, it isn't clear that this selection affects life cycle patterns like those reported here. If our results are driven by a selection mechanism in which low-output faculty

withhold CVs, then one would expect to find a very different result if the sample were trimmed to include only those who have coauthor-*H*-adjusted output below the median--that is, those whose scholarly output looks more like that of missing faculty members. When we reperformed analyses on this sample, we found little change in patterns, which suggests that our findings are not driven by selection bias due to choices of whether to share CVs.

**Relationship between ECONLIT and Non-ECONLIT Production.** Finally, we examine who is doing non-ECONLIT work. Two competing hypotheses come to mind. The first represents an efficient-producer hypothesis: those who are prone to publish do so at higher rates both in and outside the scope of ECONLIT. The second emphasizes comparative advantage and specialization: because the interests and skills relevant to publishing within and outside the traditional boundaries of the field differ, those who produce more scholarship indexed by ECONLIT generate less in non-indexed outlets.

We study this question through Tobit regressions of coauthor-adjusted non-ECONLIT publication on coauthor-*H*-adjusted ECONLIT output. (Results available from authors upon request.) In career year 7, with and without controls for institutional tiers and PhD cohorts, a one-unit increase in ECONLIT output predicts a 0.015-unit rise in coauthor-adjusted publications outside economics indexing. In the subgroup of faculty with available CVs, the standard deviation of coauthor-*H*-adjusted publication through career year 7 is 64.07. So a two-standard deviation increase in indexed publications predicts 1.92 more coauthor-adjusted early-career publications in non-ECONLIT outlets.

In career year 13 (restricting the sample to the 1983–1994 and 1995–2005 PhD cohorts because the 2006–2012 cohort is not observed through year 13), once again we find a strong effect that is robust to controls for institutional tiers and PhD cohorts: a 0.017-unit rise in

coauthor-adjusted publications outside economics indexing. One standard deviation in ECONLIT output represents 95.73 coauthor-*H*-adjusted units in career year 13. So, in career year 13, a two-standard deviation increase in indexed output predicts 3.25 more coauthor-adjusted publications in non-ECONLIT sources.

Again, to look for evidence of selection bias due to missing CVs, we repeated the analysis on a trimmed sample including only those with below-median coauthor-*H*-adjusted scholarly output. In this restricted sample, ECONLIT scholarship remains a very strong predictor of non-ECONLIT output, though the estimated effect size is reduced by about one-third.

## **Discussion**

### *Methodological Limitations*

We limited our sample by year of PhD to avoid a bias caused by selective retirement. If retirement age is correlated positively with scholarly engagement, then cohorts beyond the typical age of retirement will appear more productive than younger cohorts through selection. (The selection mechanism might also operate in the opposite direction.) By limiting the sample to those earning PhDs no earlier than 1983, we reduce the retirement hazard. However, a similar selection bias may remain: mid- and late-career professors moving into administrative roles. If transition is more or less likely for low-output scholars, selection bias may result.

We expect this bias is modest. When LAC economists take on administrative duties within their college, they routinely retain their academic appointment and so remain in our sample. While subsequent publication output inevitably decreases, this change in scholarly engagement is very much real and does not represent a bias. When LAC faculty accept administrative positions such as a deanship or presidency at a different LAC college, common practice grants them an

appointment within the new institution's department of economics. These cases only introduce bias into analyses across institutional tiers and only insofar as some faculty members move into a different tier. Finally, some high-output faculty may take new positions at research institutions outside the scope of our data collection. While relatively uncommon, such a transition removes the faculty member from our dataset and introduces a selection bias in all dimensions of our study.

### *Implications of Results*

These data suggest several important implications about research by LAC economics faculty. Although we see some evidence of earlier publications for more recent cohorts, data on faculty productivity pre-tenure (controlling for quality) indicates that research expectations for receiving tenure at LACs have remained relatively consistent over time. Unsurprisingly, we also observe some modest differences in coauthor-*H*-adjusted output across liberal arts schools, with faculty at tier-one institutions having slightly higher scores than those in tier two, whose scores are slightly higher than those in tier three. This outcome is consistent with the tiers having different levels of overall resources, faculty-specific resources, and teaching loads--all of which are correlated (Taylor et al. 2006). Despite these differences, stability of scholarly activity was observed in all three tiers.

Although tenure standards appear relatively stable over time, LACs may want to pay particular attention to field differences. "The macro problem," as described by Colander, hypothesizes that LACs might need different tenure standards for macroeconomists. Our data do not offer much support for these concerns. Time to first publication and coauthor-*H*-adjusted publication records look very similar for micro- and macroeconomists. More importantly,



distributions of pre- and post-tenure scholarship among micro- and macroeconomists are near indistinguishable. These results suggest that we need to consider hypotheses other than a mismatch between graduate and undergraduate macroeconomic methods for an explanation of the 2:1 ratio of micro to macroeconomists at LACs. Field interests of graduate students and course offerings at LACs seem more likely explanations.

Another natural area of interest for LACs is how well productivity at the time of tenure predicts future faculty output, especially given the relative stability of faculty at smaller schools where many will spend their entire careers. Using regression analysis to follow the career path of individuals, we find that research output at tenure time appears to be a strong predictor of future productivity. The most productive faculty using our coauthor-*H*-adjusted measure continue to be among the most productive in midcareer and into their third decade. Overall, assuming tenure decisions turn, in part, on expectations of future productivity over a lifetime, our data suggest LACs seem to be making good, predictive tenure decisions.

We observe two interesting changes in output as we examine the life cycle of faculty. Co-authorship is relatively common in the early pre-tenure years (likely reflecting grad school connections), dips some toward tenure time, but then rises again post tenure and continues to rise into the mid-career years. In a pattern that possibly also reflects more freedom or flexibility post tenure, faculty tend to broaden their research output beyond ECONLIT publications. This trend is slightly more common at tier-two and -three institutions, but even the more productive scholars in all tiers tend to broaden their research beyond ECONLIT outlets as they advance through the academic life cycle.

One obvious topic of interest to LACs and higher education in general is how gender might affect tenure decisions, research productivity and the professional life cycle of economists. We

do have the gender breakdown for most of the economists in our data set which will allow us to shed light on these topics. We decided, however, that this topic is complex enough to merit a separate analysis, particularly because changes across cohorts may well offer insight into the broader changes in academia over the past several decades.

We anticipate that our findings will interest economists at all types of institutions and LAC faculty members generally. Faculty at research universities can see more clearly what exposure their new graduate students have had to research activity. What is more, they may find that research conducted by LAC faculty is timely and relevant. The data could also provide additional information for graduate students as they go on the job market, particularly those students who do not know much about the LAC model. We also think that our results and the public nature of our data will help inform LACs when it comes to tenure and promotion decisions. Expectations regarding research are fairly well established for universities. Yet those of us at LACs have had less access to information about scholarship across the discipline, often relying on internal networks to establish whether a particular colleague is “above the bar” at times of tenure or promotion. We hope that the data we have collected and the analysis we present will prove useful.

### **Declaration of Interest**

The authors have no conflicts of interest to declare.

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