

## **How Broad Liberal Arts Training Produces PhD Economists: Carleton's Story**

Jenny Bourne  
Professor of Economics  
Carleton College  
(507) 222-4007  
Department of Economics  
Carleton College  
Northfield, MN 55057  
[jbourne@carleton.edu](mailto:jbourne@carleton.edu)

and

Nathan D. Grawe  
Professor of Economics  
Carleton College  
(507) 222-5239  
Department of Economics  
Carleton College  
Northfield, MN 55057  
[ngrawe@carleton.edu](mailto:ngrawe@carleton.edu)

The authors thank participants at the American Economic Association meetings for helpful comments and feedback. Correspondence may be directed to Dr. Grawe.

## *Abstract*

Several recent studies point to strong performance of liberal arts colleges graduates in economics PhD programs. While every undergraduate program is unique and the likelihood of selection bias combines with small sample sizes to caution against drawing strong conclusions, we reflect on our experience at Carleton College to identify potentially generalizable principles. We believe our curriculum's openness to non-majors, intense faculty supervision in student-driven research, intimate advising, and careful programming contribute to a part of our recent success in producing PhDs. While some of these programmatic choices can be easily adapted, we note large opportunity costs associated with many of these practices

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Stock et al. (2009a and 2009b) note the success of graduates from liberal arts colleges in navigating economics PhD programs. Although we do not propose a complete explanation of why this occurs, we offer Carleton's story as an illustrative example of how we prepare our students for life after college.

## **THE QUESTION OF VALUE ADDED**

Any discussion of how Carleton generates economics PhD recipients must begin by acknowledging that our department works with high-quality inputs in a campus environment that nurtures academic pursuits. A highly selective liberal arts college, Carleton serves a small community of approximately 2,000 students with a faculty numbering just over 200. The 25<sup>th</sup> and 75<sup>th</sup> percentile scores on the SAT math and writing exams are 680/770 and 660/750, respectively; the interquartile range for the ACT composite score is 29/33; and almost 75 percent of our students are ranked in the first decile of their high school class. While we are surely not

alone in the privilege of teaching academically strong undergraduates, we have little doubt that the excellence of our students plays a significant role in our placement of alumni in graduate programs.

Another factor that no doubt turns students' minds to the possibility of graduate school in economics and other disciplines is that they are surrounded by like-minded peers. Carleton ranks first among all baccalaureate colleges in generating PhDs in geosciences, second in life and physical sciences, and fifth in math/computer science and social sciences.<sup>1</sup> This peer effect is amplified across generations by an easily accessible alumni network. Our IT group and alumni office have teamed up to create a data base of alums searchable by major and current occupation, among other things. In our experience, Carleton alums are remarkably willing to talk with current students and to advise them about potential graduate study and careers.

What is more, we likely benefit from intergenerational transmission of occupations. Siegfried and Getz (2006) compare data from tuition remission programs at 25 selective private colleges and universities to college-choice patterns in a representative sample from the National Education Longitudinal Survey. They report that faculty at liberal arts colleges are 10 times as likely as professionals in general to send their children to liberal arts colleges. Similarly, faculty members at research universities are 5 times as likely as professionals in general to send their children to a college like Carleton. This group of research faculty is only twice as likely to send children to a research university as professional parents in general. As a consequence, Carleton classes are disproportionately filled with the children of academics who can appreciate the benefits of pursuing a doctoral degree.

While all of this is true, the Carleton economics department makes a concerted effort -- as we describe below -- to ensure that our program encourages and prepares our students to enter

PhD programs. Many of these choices are expensive enough in dollars and time such that we would not make the investment if we did not believe we were adding significant value. That said, the sample size of PhD-bound Carleton students is far too small to make any formal attempt to disentangle our contribution from selection effects. In the last 20 years the maximum number of Carleton graduates earning a doctorate in economics in a single year was 8, achieved once. In two other years, we produced 7 PhD's. On average, 3.35 Carleton graduates per year have earned doctorates in economics. With caveats, then, we offer some thoughts on what Carleton does that fosters the production of PhD economists.

## **DEPARTMENTAL STRUCTURE AND CONTRIBUTIONS**

### ***CURRICULUM***

Like most undergraduate economics programs, ours requires majors to take principles, field courses, and core theory courses. But we differ from the mainstream in three ways: we have two full terms of principles that take less than an academic year to complete, we permit students to take field courses directly after the principles sequence, and we require all students to complete a senior integrative exercise which, for most of them, means an advanced seminar followed by a term doing significant primary research and data analysis that culminates in a 30- to 50-page paper and a poster presentation.

The principles sequence flows from our odd trimester calendar. With three 10-week terms per year, students can take full terms of foundational study in both macro and micro in less than one academic year. The principles courses, which can be taken in any order, have no pre-requisites and are often chosen by students to fulfill the college-wide "social inquiry" graduation requirement. As a result of these low barriers to entry, in recent years approximately 60 to 70 percent of all Carleton students have taken at least one of the principles courses.

Because students who have completed the principles sequence have taken the equivalent of two semesters of foundational theory work, we are able to teach field courses without requiring completion of the core theory classes of Intermediate Price Theory, Intermediate Macroeconomics, and Econometrics. The lack of core theory, statistics, and calculus prerequisites is not as restrictive as it may sound – many of us do a “greatest hits of econometrics” lecture so that students can read journal articles in the field course, for example. The principles-only approach also encourages us to develop in our students intuitive methods of problem solving. Moreover, by structuring the curriculum in this way, we open access to the discipline to a wide range of students. (Approximately one-third of students in field courses are non-majors.) While our own majors compose a majority of our PhD tally, non-majors often “catch the economics bug” late in their undergraduate careers on their way to a doctorate.

Recent examples prove the point. Carleton math majors recently completed PhDs at Princeton and Cornell, a history major is ABD at Michigan, and an alum who majored in political science and classics is currently working at the Board of Governors and contemplating graduate school in economics. All of these students took courses in our department and forged deep relationships with our faculty, but they did not major in economics.

Most students delay taking the core classes until after they have a few field courses (and, for many, additional work in mathematics and statistics) under their belts. This further allows us to increase the rigor of our theory sequence. We teach price theory nearly at a first-year graduate-student level, for instance, and the course is regarded as one of the most difficult on campus. (Last year, our students created the slogan “In the Long Run, We All Pass Price Theory” for the departmental T-shirt.) Econometrics typically requires students to do

substantial data work; the short time frame of the trimester means that students concentrate primarily on cross-sectional analysis.

The only post-core requirement for the major is the senior integrative exercise (“comps”). For most of our majors, this is the experience that most directly prepares them for graduate study in economics. About 80 percent of our majors choose to take an advanced seminar in the fall term of their senior year, followed by a term in which they work independently on a topic of their choice and write an empirical paper. (The remaining 20 percent sit for a 4-part comprehensive exam; these are often double majors who cannot fit two comprehensive papers into their course schedule or students who take an off-campus program in the fall of their senior year.) The best comps papers are comparable to M.A. theses, and our students routinely win the thesis competition sponsored by the Minneapolis Fed. Some of them also present their work at undergraduate conferences or place their research in undergraduate journals.

Intense faculty supervision pervades the comps paper-writing process. The fall-term senior seminar covers advanced topics in economics (and econometrics) while it guides students toward their own topics and the requisite literature and potential data sets. In their seminar, students write a five-page prospectus that is endorsed by the department before they proceed with their research, and we are quick to reject proposals that do not contain a well-formed thesis statement, grounding in the relevant literature, clearly identified data sources, and a well-articulated plan for completion in a timely fashion. In the term following the senior seminar, students execute their research project with weekly, one-on-one meetings with their faculty advisor. All comps papers include empirical analysis, and many students experience the joys and woes of messy data for the first time. The comps process is humbling for most of them, but it is also a source of great pride. Although the end product is a pale shadow of a good dissertation,

the comps experience nonetheless gives our students a taste of doing the sort of research they will encounter in graduate school.

### ***STAFFING***

Our staffing resembles that of many liberal arts colleges in that all department members teach in the principles sequence and classes are small (caps of 25 for field courses and 30 for principles). This democratic approach to teaching foundational coursework means that students' first experiences in the discipline are often with a senior member of the department who is a seasoned teacher. The class sizes offer advantages as well. They permit us to expand assignment types beyond problem sets and exams to include writing projects. This augments the appeal of the major to rhetorically inclined students and prepares them to approach the comps paper in a way that mimics the professional research process. Small section sizes also lead to close relationships that make it possible to single out students for encouragement toward graduate work.

Some of these relationships lead to practical training as well: student prefects provide additional evening sessions for each principles section. Much like a graduate-student teaching assistant, the prefect leads students through problem sets and works with students on an individual basis as needed. This certainly helps novice principles students, but it pays off for the prefects as well: they learn the theory more deeply for having to teach it and they get a taste of academic life which often inspires them to pursue graduate study. We discuss the prefect program more fully below in the section on the college's role.

### ***FACULTY ADVISING ASIDE FROM COMPS***

While senior-thesis advising represents the highest-profile version of one-on-one faculty-student contact, we build intense interaction into everything we do. As academic advisors we

meet with each major individually every term to plan their remaining coursework, and we typically spend 4 or 5 days of every week during the term on campus and usually hold official office hours 3 to 4 days per week. We also write innumerable recommendation letters, and we connect students with outside contacts at other universities, government agencies, Federal Reserve branch banks, consulting groups, and think tanks so that they can acquire additional skills before going on to graduate school. What is more, we maintain close ties with our alums and grad-school classmates so we can match them up with like-minded current students.

Informal advising constitutes a large part of our out-of-classroom interaction with our majors. When we are not holding class, most of us are in our offices with doors open and one or more students chatting with us – sometimes about course work, sometimes about future plans, sometimes just about whatever is on their minds. Most of us host dinners for our classes and take individual students to lunch a few times each term, as well as attend sporting events, plays, performances, and the like. This sort of casual contact means that we know our students well and can offer them good advice about whether graduate school is right for them, what schools might be an appropriate match, and how they can best prepare for graduate school. Many department members attended a liberal arts college, so Carleton students can easily envision taking a similar path. (This is not true for all of us – co-author Jenny attended a very large state school for her undergraduate work.)

### ***PROGRAMMING***

We host several formal events to expose our students to the possibilities of graduate study. Each year, we ask our students to a panel discussion staffed by department professors about graduate work in economics. With our Veblen-Clark lecture series, we invite an eminent economist to spend two days on campus, giving an open formal lecture and spending several

hours informally with economics majors. Our Lamson lecture series hosts a Carleton alum who has received a doctorate and is working in academia or public policy. The Lamson lecturer holds informal sessions with students as well as offering a public talk. We invite students to the Minnesota Economic Association annual meeting (where one or more of them often win a thesis prize) and to present their work at an undergraduate session held during the Midwest Economic Association annual meeting. These gatherings introduce our students to professional economists and the work they do.

Students also take an active role in the hiring process. Due to retirements and departures of our faculty to become college presidents elsewhere, we have been on the market for most of the last several years. We ask students to host job candidates for meals, and we encourage them to attend job talks – and ask tough questions, which they eagerly do. This exposure to new PhDs can be eye-opening; more than one of our majors decided that graduate school might be part of their future after they participated in departmental hiring.

### **THE COLLEGE'S ROLE AS INCUBATOR**

While we believe that all of these department-specific choices and programs contribute to our success in placing students in graduate programs, we think that Carleton's liberal arts mission also plays a crucial role. We note the finding by Stock et al. (2009a and 2009b) that those who attend liberal arts colleges are more likely to complete PhD economics programs and to do so in a timely manner. Specifically, attending a top-60 U.S. liberal arts college increased the probability of completing a PhD in economics in 5 years by 27 percent when compared with attending other non-PhD-granting institutions. Even when compared to the PhD-granting institutions, attending a top liberal arts college increased the probability of on-time completion by 9 percent. In like fashion, drop-out rates are 16 percent lower for students from top liberal

arts colleges than for those from other non-PhD-granting institutions, and 6 percent lower than for undergraduates from PhD-granting institutions. We think it unlikely that these achievement gaps are due solely to differences in curriculum quality or program design. Rather, we believe that the educational philosophy of select liberal arts colleges also contributes to our students' success.

Carleton faculty members are fiercely committed to the liberal arts. To us and to our colleagues, this means much more than requiring students to spread their course-taking across many departments. We genuinely believe in the value of learning multiple disciplinary “ways of knowing.” We explicitly encourage students--majors in particular-- to seek classes beyond the economics department so as to comprehend how intellectual encounters in other fields can deepen understanding of questions in our own department, and to understand what economics is (and is not). We believe that by studying the methods and questions of other disciplines our students will be better economists, despite failing to maximize the time spent in economics classrooms.

In addition to this genuine commitment to multi-disciplinary exploration, we embrace opportunities in our courses to support broad, holistic learning outcomes. Carleton expects its graduates to think critically, write fluidly, and use evidence effectively. The college deploys its resources to help students obtain these skills and evaluates faculty and staff on the success of their contributions to achieving this goal.

We believe this approach rewards our graduates who seek additional education. Alums report that Carleton's close attention to cross-cutting learning goals like student writing and quantitative reasoning pays off, particularly for those undertaking advanced study. But what is likely of greater importance is that students who have been encouraged to test ideas against those

from other disciplines are empowered to ask questions. Thinking back on our own graduate-school compatriots, we can see the importance of the ability to frame questions in avoiding the pitfalls of the middle years of graduate school -- from which some students never emerge.

Another consequence of the liberal arts philosophy is that students become central in their own education. Because our students' course-taking patterns do not fit neat, disciplinary-bound patterns, students are forced to articulate for themselves how the parts add up to a meaningful whole. This philosophy of a student-owned education is also reflected in how we teach. Most Carleton faculty view learning as a collaborative enterprise. Although lectures are still a staple in many classrooms, several professors also use small-group work, interactive discussions, debates, and other techniques to show students that they play a large role in obtaining their own education. This sort of atmosphere may predispose our students to find graduate study attractive, as well as furnish them with useful skills.

We expect our students to contribute toward acquiring their own human capital, and then we ask them to use it! As we mentioned, students act as paid prefects in principles courses, including all economics principles courses. They also serve as teaching assistants and peer tutors in more advanced classes (including the core economic theory classes), as writing assistants, and as classroom observers, particularly for new faculty. Students who take these roles are chosen by faculty members and undergo specialized training by Carleton faculty and staff.<sup>2</sup> This experience, particularly for the core-theory TAs and peer tutors, leads many of them to consider applying to graduate programs. Working closely with faculty and conducting successful review sessions with intelligent and inquisitive peers gives students the (usually) well-deserved confidence that they can thrive in graduate school.

All of this makes a Carleton education intensely personal and demands an equally personal teaching environment. While small class sizes make this possible, a low student-to-faculty ratio is hardly sufficient to nurture students through the process of “learning to learn.” Regular office-hour interaction is the norm rather than the exception. This allows us to get to know our students intimately as we attempt to help them grow into themselves, but it also allows them to get to know us and watch us as we approach problems in class and in our scholarship. This two-way relationship enhances our ability to help students realize challenging goals like completing a graduate program after college.

### **A FEW LAST THOUGHTS**

Part of our students’ success in graduate economics programs stems from our approach: we have a sound curriculum, we offer our students resources and solid advice, and we give good research opportunities to all our majors via the comps process. But it is not just what we do, but how – Carleton faculty invest a significant amount of time in students, and we adopt the liberal arts approach that eschews a professionalized focus on economics alone and instead encourages broad thinking and course taking.

What is more, although we faculty would like to take full credit for our students’ accomplishments in economics graduate programs, in honesty we must settle for something less. We are fortunate to start with a highly selective group of entering students, we have relatively small classes and good institutional resources, and we work in an atmosphere where critical thinking is the shared goal. More than 95 percent of students return to Carleton after their first year: our retention rate reassures us that investing in our students from day one is worth the effort. Carleton’s primary mission is to help students lead an examined life and become

confident, productive, and thoughtful adults. Perhaps it is not surprising that these ingredients make a good recipe for producing successful graduate students in economics.

Insofar as our work creates value-added that others may wish to copy, we would end with a word of caution. What we do is incredibly rewarding and we believe it does contribute to our students' success as professional economists. However, providing the kind of education students find at Carleton has opportunity costs, and we recognize the important and rewarding work that other institutional types offer to the field. Investing time and energy into student relationships comes at an obvious cost to scholarship productivity. We have often heard some version of the claim that teaching improves research. Certainly sharp student questions may help us understand better how a theory works, but these instances are very rare compared to the number of times assisting a student delays progress on our research projects. For those who are interested in adopting some of our practices, our advice is that of all economists for all questions: carefully count the costs and benefits before making the investment.

## NOTES

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<sup>1</sup> National Science Foundation, Survey of Earned Doctorates, Fall 2013. (NSF broad academic fields). Among all colleges and universities, Carleton's rank is (respectively) 13, 90, 40, 67, and 69. Carleton also ranks high in generating PhDs in humanities, art and music, theology, and law (in academia).

<sup>2</sup> The Academic Support Center at Carleton administers the prefect and writing assistant programs and oversees academic tutoring. For details, see <http://apps.carleton.edu/campus/asc/prefect-program/>, <http://apps.carleton.edu/campus/asc/writingcenter/> and <https://apps.carleton.edu/campus/asc/academictutoring/>. The Learning-Teaching Center runs the student-observer program. <http://apps.carleton.edu/campus/ltc/faculty-services/observers/>. The economics department selects and pays core-theory TAs directly; most of them first worked as principles prefects. Faculty members choose and monitor tutors, with assistance from the Academic Support Center. The math skills center hires several of our majors as well as offers a number of services to them, including drop-in tutoring. <https://apps.carleton.edu/campus/asc/msc.>

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