U.S. undergraduate economics education

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Abstract

This briefing is intended to identify and highlight potential points of debate for INET's economics curriculum committee, and to solicit comments and suggestions to help establish the terms of discussion in advance of the joint (with the U.K. team) committee meeting scheduled for Nov. 12.

Contents

1 Introduction

20 years ago, at the initiative of the Association of American Colleges, a task force completed a study of the economics major, concerned that its depth was not sufficient to foster habits of intellectual inquiry (Siegfried et al., 1991). It is somewhat disheartening that, two decades on, so much of their discussion applies unchanged. Though the undergraduate major would indeed seem to have deepened in the intervening years, it is not the same "depth" that the task force sought, which they describe as

> the capacity to master complexity, the abilities required to undertake independent work, and the achievement of critical sophistication through sequential learning experiences. (p. 197)

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What has changed in economics programs, if anything, is an increase in mathematical and technical sophistication that does not necessarily serve students' ability to "grasp the assumptions, arguments, approaches, and controversies that have shaped particular claims and findings" (p. 197)

Because of the group's thorough and thoughtful work, and its close coincidence with the aims of this committee, it seems helpful to let their recommendations serve as an introduction to this briefing. The group's recommendations for the economics major are (p. 218):

- A strong introductory sequence stressing the application of economic tools to a variety of problems.
- Rigorous intermediate theory courses, typically taught in relatively small classes (20–25 students) that actively engage students in doing economic analysis.
- Background courses in mathematics and quantitative methods stressing the application of techniques *used* in economics.
- A minimum of five (three-credit-hour) economics electives, three of which provide breadth to the major in terms of a contextual, international, and public-economics perspective. These courses should emphasize writing, oral presentations, research projects, argumentation, and feedback.
- A capstone experience that synthesizes the applications, encourages students to integrate economics with the rest of their college learning experience, and accords opportunities for creative writing.

2 Other work

Siegfried et al. are not the only ones to have studied the economics major. At around the same time, Kasper et al. (1991) studied economics education at liberal-arts colleges, beginning from the observation that graduates of such programs represented a declining share of economics Ph.D. candidates, despite increasing enrollment in economics undergraduate programs. The transition from the B.A. to the first year of graduate study was identified as a key hurdle. In particular, they found the gap in technical demands to be widening despite the colleges' efforts to raise the mathematical demands of their programs. Among other findings, they noted that graduate study in economics failed to meet the expectations of many talented economics B.A.s, who saw the field as a way to effect positive change on society.

Becker and Watts (1996) study classroom techniques of economics professors, finding a preponderance of the so-called chalk-and-talk lecturing style. They recommend adoption of a variety of classroom approaches to engage different learning styles. This work is representative of a number of articles looking at specific pedagogical techniques as applied to economics teaching.

As a source of background information, the AEA surveys economics departments annually on faculty characteristics and compensation, degrees awarded and a limited number of student characteristics. Scott and Siegfried (2009), for example, report that some 24,000 economics B.A.s were awarded in 2009–10 by the surveyed departments, of which 31% went to women.

In addition, a handful of journals take the teaching of economics as their primary focus: the *Journal of Economic Education*, the *Journal of Economics and Economic Education Research*, and the *International Journal of Pluralism and Economics Education* are three examples. While the research published in these journals is in some cases significant and relevant to the ECC's work, it rarely takes on the totality of the economics major as Siegfried et al. do.

3 Economics education in equilibrium

As an expositional metaphor, undergraduate economics education can be meaningfully thought of as resting in a locally stable equilibrium determined by a number of market and institutional conditions.

These conditions include demand for economics classes, the supply of economics professors and the specifics of their teaching capacity, the supply of TAs and their capacity, supply of and demand for economics textbooks, demand on the labor market for economics graduates the structure and admission standards of Econ Ph.D. programs, and the dominant research paradigms of the discipline as a whole. Equilibrium outcomes of the interaction of these factors include the number and identities of degree candidates and the content and structure of degree programs.

As the purpose of the INET Economics Curriculum Committee (ECC) is initially to propose (and ultimately to prepare) a revised undergraduate economics curriculum, several key preliminary decisions must be made. First, which of the factors listed above are to be taken as constraints, and which are to be considered as points for discussion and proposals by the committee? Second, what type of new locally stable equilibrium does the committee wish to create? Third, is it possible to envision a pragmatic trajectory, feasible given the constraints, by which a significant number of institutions and students could be moved to the new equilibrium?

The following sections aim to inform such considerations. The generic economics curriculum (Section 4) will be familiar to the the committee members, but a brief summary will serve to orient and coordinate discussion. The principal textbooks (Section 5) used in the core classes are drawn from a fairly small set, which is likely to form one of the committee's main topics of discussion. Three sections (Sections 6, 7, and 8) on issues related to the current equilibrium of economics education offer may point toward issues of wider consideration.

4 Curriculum survey

Six leading economics departments were surveyed: two private universities (Harvard and Princeton), two private liberal-arts colleges (Williams and Amherst), and two public universities (Berkeley and UMass Amherst). These institutions are among the most prominent in their respective categories, and serve as models for other institutions. Thus while the sample may not be representative statistically, it is nonetheless an adequate starting point for understanding the state of undergraduate economics education.

The requirements for the economics major are quite consistent across the colleges and universities surveyed. A prototypical program is

- First year: one- or two-semester principles course, calculus and introductory statistics.
- Second and third years: intermediate microeconomics, macroeconomics, and econometrics. These are often offered in a high-math track, which requires multivariate calculus.
- Third and fourth years: three to five electives. A thesis is typically required for an honors degree.

The thesis requirement is not typical of economics programs at large. Siegfried et al. (1991) found that only 7% of programs required such a culminating experience, almost all among the selective liberal-arts colleges. I am not aware of any trend since that time that would have dramatically changed this figure.

Where departments deviate from this program, it is typically on a small number of points:

- no high-math track;
- a sophomore or junior research project;
- no thesis or compulsory thesis;
- an honors exam.

Appendix A summarizes the programs surveyed.

At most U.S. undergraduate institutions, students complete the economics major while also satisfying a number of distribution requirements. At Princeton, for example, the general-education program could be expected to take about 11 semester-long courses in addition to the major requirements (the economics and mathematics classes fulfill some of the distribution requirements).

Since the lack of historical perspective is one of the more frequently cited flaws in economics

formation, I collected some information about such offerings. No surveyed program requires any courses in the history of economic thought or in economic history. Elective offerings for 2010–11 are listed in Appendix A.7.

Further, I did not survey interdisciplinary programs in fields such as political economy or public and international affairs; these programs, however, could offer valuable guidance for the reform of the economics curriculum more generally. Nonetheless, the goal of the ECC is to affect the teaching of economics *per se*.

5 Course materials

Course material is likely to be a main subject of discussion for the ECC. The following list is incomplete, but is sufficient to give an idea of the principal textbooks used in the core courses of the surveyed programs.

5.1 Principles

- Case, Fair, and Oster, *Principles of Economics*.
- Frank and Bernanke, *Principles of Macroeconomics*.
- Goodwin, Nelson, Ackerman, and Weisskopf, *Microeconomics in Context*.
- Mankiw, *Principles of Economics*.
- Mankiw, *Principles of Microeconomics*.

5.2 Macroeconomics

- Blanchard, *Macroeconomics*.
- DeLong and Olney, *Macroeconomics*.
- Mankiw, *Macroeconomics*.

5.3 Microeconomics

- Binger and Hoffman, *Microeconomics with Calculus*.
- Katz and Rosen, *Microeconomics*.
- Mansfield and Yohe, *Microeconomics*.
- McAfee, *Introduction to Economic Analysis*.
- Nicholson and Snyder, *Intermediate Microeconomics and its Applications*.
- Pindyck and Rubinfeld, *Microeconomics*.
- Varian, *Intermediate Microeconomics*.

6 Entry and self-selection into economics programs

An important institutional feature distinguishes U.S. economics programs from those in the U.K., and will need to be borne in mind as the two committees develop recommendations. In the U.S., students apply to a college or university and select their major field or fields of study during their second year of study. A significant number of credit-hours are devoted to the fulfillment of general-education requirements in fields other than the major. This is in contrast to the situation in the U.K., where students apply for admission directly into a program of study. Students in the U.S., then, are getting a certain type of breadth in their education—they are taking classes in many departments. Yet these other classes likely involve no economics, and the project of making connections among them is left, implicitly, to the student.

Thus, an additional set of variables is potentially at play for the U.S. committee. First, what is the process by which students elect to become economics majors? What about the introductory-level classes induces them to select economics over their other interests? What other factors contribute to the selection of economics as a major, and should these be taken up by the ECC? To the extent that something about this process exerts a selection effect on the body of economics majors, it can have far-reaching effects.

Second, introductory economics classes are a common elective for students who do not eventually become economics majors. Siegfried et al. (1991) note that "with over a million students enrolled annually in introductory economics courses and only 32,000 majors, students enrolled in the introductory are primarily nonmajors." Should the teaching of these classes reflect this fact?

Finally, and perhaps most critically, how should breadth within economics be built into the design of the major, and how should it relate to the distribution requirements?

7 Tracking in B.A. programs

The current state of the field of economics and certain features of undergraduate education within that field are mutually reinforcing. The following quote is representative of advice given to economics majors:

> Graduate study in economics requires special preparation and advanced planning, starting as early as the freshman year. [...] Preparation for graduate school should include the following: the more mathematical versions of the core courses ([Micro], [Macro], and [Econometrics]), two years of calculus (up through [Linear Algebra with Applications], [Adv. Linear Algebra with Applications], or [Analysis in Several Variables]), two or more upper level mathematics courses such as [Differential Equations], [Mathematical Programming], [Probability and Stochastic Systems], [Mathematical Statistics], [Introduction to Real Analysis], or [Topology], and an advanced econometrics or theory course such as [Econometric Applications] or [Decisions under Risk]. Students may find the Program in Applied and Computational Mathematics or the Program in Engineering and Management Systems an interesting option. It is not necessary to be an Economics concentrator to enter a graduate economics program, but the Economics courses listed above are highly recommended. The graduate courses in Economics (500 level) are open to qualified undergraduates. These courses are very demanding and must be started in the fall term. Taking one of these courses can be useful for students who intend to enter an economics graduate program, because it begins the student's advanced training, gives the student a flavor of graduate school, and provides evidence during the admissions process of the ability to do advanced work in economics.[1]

Such advice is likely to have both selection and substitution effects. As to the former, a clear message is sent about who should consider graduate study in economics (those who would feel comfortable registering for Probability and Stochastic Systems). As to the latter, simply following these recommendations, along with satisfying major and distribution requirements, would leave little time for other non-quantitative classes. The identities and training of economics Ph.D.s are shaped by these effects. These Ph.D.s go on to become teachers of economics, and the training of the next generation of economists is affected in turn.

8 The labor market for holders of economics B.A.s

One framing issue is what economics B.A.s go on to do after earning their degrees. Data on this issue is surprisingly sparse, apparently due to the difficulty in keeping track of students' paths after

[1] `http://www.princeton.edu/economics/undergraduate/requirements/`

graduating. Some institutions have detailed data, but the only aggregate study I was able to find draws on a panel of 12,000 undergraduates who began college study in 1995–96 and were followed until 2001.[2]

The data, unfortunately, are limited in their use by the coarseness of the outcome variable: we observe only employment industry, not the type of job that the individual was doing. Moreover, the predominance of the "transportation" industry does not readily accord with anecdotal data on students' career paths. These figures, then, are intended to prompt further discussion, but additional research may be needed if the committee wishes to pursue this line of thought.

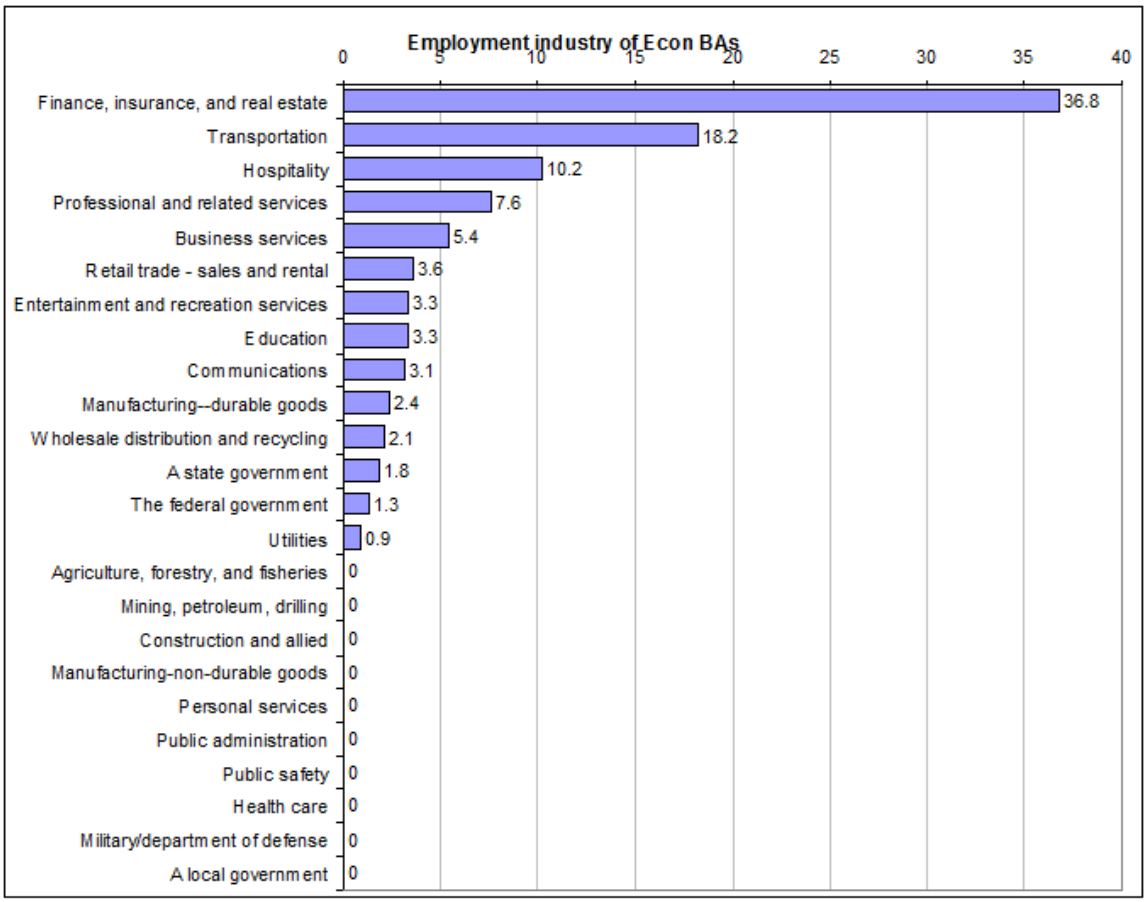

Figure 1: The employment industry in 2001 of economics majors who first enrolled in 1995–1996.

[2] `http://nces.ed.gov/surveys/bps/`.

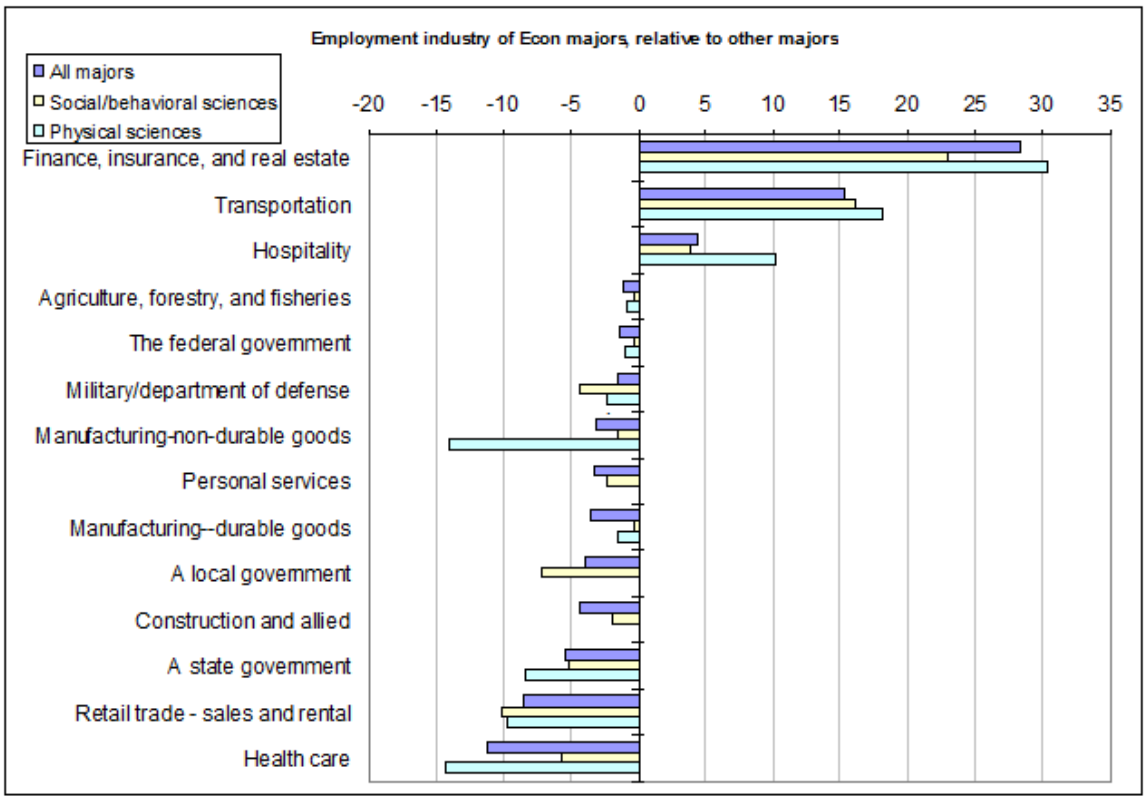

Figure 2: The employment industry in 2001 of economics majors who first enrolled in 1995-1996, relative to other segments of the student population. The first bar shows, for example, that the share of all econ majors entering the FIRE sector is some 27 percentage points greater than the share of all graduates entering the same sector. Sectors with all observations close to zero were omitted from this graph.

A Appendix: Content of economics B.A. programs

This appendix summarizes the programs of the six surveyed economics programs. I outline Princeton's program in detail, then describe the other programs with reference to Princeton. As noted above, the differences are along fairly narrow lines.

I have, to the extent possible, also noted the textbooks used by each program for its Principles, Micro, and Macro classes. This was limited by the public availability of syllabuses—courses for which none could be found are not listed. In all cases, the text was drawn from one or at most two instantiations of the class, so there may be variation from semester to semester or instructor to instructor in which texts are used.

A.1 Princeton University

Prerequisites Economics prerequisites are

- Principles of Microeconomics;
- Principles of Macroeconomics;
- Advanced Principles (if the student places out of Micro and Macro); and
- Statistics.

Mathematics prerequisites are
- Univariate Calculus; or
- Linear Algebra and Multivariate Calculus.

Core courses The core is offered in a "more-math-track", requiring linear algebra and multivariate calculus and a "less-math-track", requiring only univariate calculus. The courses are
- Microeconomics;
- Macroeconomics; and
- Econometrics.

Electives Five classes at the 300 level or higher.

Research
- junior project and
- senior thesis.

Texts
- Principles (micro): Mankiw, *Principles of Microeconomics.*
- Macro (low-math): Blanchard, *Macroeconomics.*
- Micro (high-math): Nicholson and Snyder, *Intermediate Microeconomics and its Applications.*

A.2 Harvard University

As at Princeton, except
- one-semester Principles;
- Sophomore Tutorial replaces junior Project;
- thesis is limited to the honors degree; and
- general exam is required for honors degrees.

Texts
- Principles: Mankiw, *Principles of Economics.*
- Macro (low- and high-math): Mankiw, *Macroeconomics.*
- Micro (high-math): McAfee, *Introduction to Economic Analysis.*
- Micro (low-math): Varian, *Intermediate Microeconomics.*
- Econometrics: Stock and Watson, *Introduction to Econometrics.*

A.3 Amherst College

As at Princeton, except:
- one-semester Principles;
- no junior project; and
- thesis is limited to the honors degree.

Texts
- Principles: Mankiw, *Principles of Economics.*
- Macro (low-math): Mankiw, *Macroeconomics.*
- Micro (low-math): Varian, *Intermediate Microeconomics.*
- Micro (high-math): Nicholson and Snyder, *Intermediate Microeconomics and its Applications.*

A.4 Williams College

As at Princeton, except:

- no core classes require multivariate calculus or linear algebra;
- no junior project; and
- thesis is limited to the honors degree.

Texts

- Principles (micro): Mankiw, *Principles of Microeconomics*.
- Principles (macro): Frank and Bernanke, *Principles of Macroeconomics*.
- Macro: Mankiw, *Macroeconomics*.
- Micro: Mansfield and Yohe, *Microeconomics*.

A.5 University of California, Berkeley

As at Princeton, except:

- one-semester Principles;
- upper-level macro theory course does not offer a high-math track (though the upper-level micro theory and econometrics courses do);
- no junior project; and
- thesis is limited to the honors degree.

Texts

- Principles: Case, Fair, and Oster, *Principles of Economics*. DeLong, Reich, and Tyson (forthcoming).
- Macro: DeLong and Olney, *Macroeconomics*.
- Micro: Pindyck and Rubinfeld, *Microeconomics*.

A.6 University of Massachusetts Amherst

As at Princeton, except:

- no core classes require multivariate calculus or linear algebra and
- no senior thesis.

Texts

- Principles (micro): Goodwin, Nelson, Ackerman, and Weisskopf, *Microeconomics in Context*.
- Micro: Katz and Rosen, *Microeconomics*.
- Macro: Blanchard, *Macroeconomics*.

A.7 Electives in HET/economic history

- Princeton: European Econ. Hist.
- Harvard: Hist. Perspectives on Economic Ascendancy, Comparative Hist. Econ. Development
- Amherst: Ec. Hist. of the U.S., 1600–1860
- Williams Am. Econ. Hist.
- Berkeley. Fall 2010: American Economic History. Spring 2011: The world economy in the Twentieth Century.
- UMass Amherst: None

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