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Report of the Commission on Graduate Education in Economics

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Report of the Commission on Graduate Education in Economics

The Commission on Graduate Education in Economics (COGEE) was appointed by the then-President of the American Economic Association, Professor Robert Eisner, in the summer of 1988. The Commission's charge was to "take stock of what is being done [in graduate education] and, as far as possible, what results we are getting . . . In all of this . . . the concern is, of course, very largely with the direction of research and the focus of resources."*

The members of the Commission were: Anne O. Krueger, Duke University, Chair; Kenneth J. Arrow, Stanford University; Olivier Jean Blanchard, M.I.T.; Alan S. Blinder, Princeton University; Claudia Goldin, Harvard University; Edward E. Leamer, UCLA; Robert Lucas, University of Chicago; John Panzar, Northwestern University; Rudolph G. Penner, Urban Institute; T. Paul Schultz, Yale University; Joseph E. Stiglitz, Stanford University and Lawrence H. Summers, Harvard University.

Who are the graduate students in economics? What do they do when they get their Ph.D.'s? How well do their experiences in graduate school equip them for their careers? To what extent do the re-

search and other skills that are learned mesh with the demands placed upon them in their jobs? These, and related, questions were posed to the members of COGEE.

* W. Lee Hansen, University of Wisconsin, served as Executive Secretary of the Commission, and prepared the analysis of findings that is a companion piece to our recommendations. He covers the major features of graduate education as reported by departments of economics, and the perceptions of various groups in the profession—graduate students, faculty, recent Ph.D.'s—as revealed by surveys. A selection of Hansen's findings appears in the article immediately following; citations refer to it unless otherwise noted. The paper by Hirschel Kasper referenced in the Commission's Report is also published in this issue of the *Journal*.

We are grateful to the National Science Foundation, the Mellon Foundation and the Sloan Foundation for their generous support of the activities of the Commission and its Executive Secretary and his associates and assistants. We also wish to thank the many individuals who responded quickly and carefully to our questionnaires.

The Commission was formed in response to what seemed like a growing chorus of complaints about the nature of economic research and training in economics departments at most universities. At a symposium on the state of economics held late in 1986, sponsored by the National Science Foundation, many participants put forth the view that economics as taught in graduate school had become too divorced from real world questions. This viewpoint seemed to be shared by a sufficiently large number of people inside and outside the profession that it merited careful scrutiny. In response to these concerns, the idea of a commission

of the American Economic Association took shape.¹

As part of the background work in preparing our report, the Commission attempted to inform itself on the current state of graduate education and the market for economists. This included fact-finding activities undertaken under the auspices of the Executive Secretary: examining syllabi, examinations, the content of core and field courses, and other aspects of graduate education. The Executive Secretary also oversaw a series of surveys which provided the Commission with information about attitudes of current department chairs, faculty, current graduate students, graduating seniors with economics majors, economists who received their Ph.D.'s five and ten years ago, and of employers of new Ph.D.'s.² A Committee of College Faculty, organized by Hirschel Kasper, traced trends among undergraduate economics majors in choosing among competing alterna-

tives for graduate school.³ Finally, a series of studies on various aspects of the profession were commissioned. These included an analysis of economists' compensation contrasted with other disciplines,⁴ a report on the results of interviews with nonacademic employers in the New York and Washington areas,⁵ and papers providing analyses of the relation between economics and industrial relations,⁶ economics and agricultural economics,⁷ law and economics,⁸ business schools and economics,⁹ health economics¹⁰ and public policy and economics.¹¹ Earlier analyses of aspects of graduate education were also read and discussed.¹²

The Commission was urged to provide its judgments, based on the experience of its members as well as on the surveys and other data collected and analyzed by the Executive Secretary and his assistants. In this report, we provide such a set of judgments. When the background material prepared by the Executive Secretary has been particularly striking in influencing our judgments, we have cited

¹ To our knowledge, the idea of a "self-critical" survey of an academic field seems to be relatively new. While there have been earlier assessments of the state of economics (Howard R. Bowen 1953; Nancy D. Ruggles 1970), COGEE appears to be the first group charged with making such an assessment by a major professional association. We are unaware of comparable self-evaluations in other academic fields.

² We recognized that the opinions as represented in surveys, while helpful, could not substitute for our own judgments. In part, this is because those who do obtain Ph.D.'s in economics are clearly "acculturated" to the values of the profession; those who are less enamored of the present state of the discipline may well choose alternative careers. This problem is discussed to some degree later in our report. We did go to some lengths to ascertain the nature of our "competition" on the demand and supply side of the market, focusing on enrollment trends in schools of public policy, business economics graduate programs, and elsewhere. We were also fortunate in that a group of professors from liberal arts schools, which have traditionally supplied a significant number of economics graduate students, provided an analysis of trends among their economics majors. Their views and data on trends in the behavior of graduating economics majors, are contained in Hirschel Kasper (1990).

³ Hirschel Kasper, 1990.

⁴ June O'Neill, Baruch College, CUNY and Nachum Sicherman, Rutgers University.

⁵ Laurie Bassie of Georgetown University, and Matthew Lynde, Baruch College, CUNY. An effort to gather comparable information via a survey of non-U.S. employers of U.S. trained economics Ph.D.'s did not prove fruitful because of difficulties in developing a sample frame and obtaining responses from those employers who were surveyed.

⁶ By Paula Voos, University of Wisconsin-Madison.

⁷ By Richard E. Just, the University of Maryland and Gordon C. Rausser, the University of California at Berkeley.

⁸ Michael Meurer, Duke University.

⁹ Richard N. Rosett, Washington University.

¹⁰ Roger Feldman, University of Minnesota-Minneapolis and Michael A. Morrisey, University of Alabama at Birmingham.

¹¹ Lee S. Friedman, University of California at Berkeley.

¹² This included the earlier Bowen (1953) and Ruggles (1970) studies, and the recent paper, of David Colander and Arjo Klamer (1987), and Arjo Klamer and David Colander (1990). A notice soliciting views and evidence was also placed in the *American Economic Review*, but there were very few responses.

those findings, or referenced Hansen's report.

This report represents a consensus view of the members of COGEE. No one would endorse every sentence, and in many instances some members of COGEE have strong views that are not expressed in this document. But we have sought to provide a coherent statement to which all could subscribe. Further it was made clear from the outset that our judgments would be ours alone, and would not in any way be the responsibility of the American Economic Association.

The report is organized as follows. First, we provide an overall summary of trends in the profession. We then turn to graduate education specifically, and focus on the areas in which improvements seem possible. The discussion follows a student through the graduate program, beginning with entrance requirements and other entry barriers. We then consider the first year core program and then the fields. Thereafter we address some perceived deficiencies of coursework as a whole: a lack of creativity on the part of students, and a lack of focus on writing abilities and communication skills. Next, the process of selecting a dissertation topic and preparing the dissertation is considered. Finally, we turn attention to the mix of graduate schools. The report concludes with a brief summary of our recommendations.

In setting forth our conclusions, we are mindful that each department of economics is responsible for its own graduate program and curriculum. Indeed, it will be evident later that one of our concerns is the apparent uniformity, and lack of product differentiation, across departments. We all believe that no group can or should dictate the content of graduate education in economics. We believe that we are posing important questions and hope that our views might be one useful

input into the deliberations of individual departments.

The Current State of the Profession: The Positive Side

COGEE was charged with reaching judgments as to ways in which graduate education might be improved. The focus of our recommendations, therefore, is not on what is right with economics, but on what might be done better. Nevertheless, it is appropriate to mention some of the profession's "successes" before focusing upon areas where we perceive scope for improvement.

Among academic disciplines, economics has fared relatively well over the past two difficult decades. In many disciplines, real earnings declined sharply, graduate student enrollment plummeted, and many new Ph.D.'s were unable to find jobs in their chosen fields of concentration.

By contrast, earnings of economists kept pace with those of other science fields within academia. While economists' earnings grew sluggishly in the 1980s, economics was tied with engineering in 1986 as the most highly paid of the scientific and engineering doctorate fields (see Hansen Table 2, p. 1060). Moreover, the number of economics Ph.D.'s awarded each year has held steady, again in contrast to declines in many disciplines.¹³

The constancy in the number of doctorates awarded has been achieved by increasing the proportion of foreign students among our graduate students.¹⁴ An

¹³ Economics doctorate recipients have totalled 2835, 4416, and 4102 during the years 1963-67, 1973-77 and 1983-87 respectively. See Hansen 1991, Appendix Table A-1.

¹⁴ While doctoral recipients who were U.S. citizens have totalled 2,069 and 2,280 during 1963-67 and 1983-87 respectively, temporary and permanent Visa holders have increased from 688 to 1,599 over the same time periods (Hansen 1991, Appendix Table A-1).

obvious question is whether this reflected an upward shift in the supply of qualified foreign students (reflecting American comparative advantage in graduate economics education) or an attempt to compensate for declining enrollments of U.S. citizens by "filling places" through lower admissions standards. The evidence strongly supports the proposition that there has been an upward shift in the supply of qualified foreign students, and that this does indeed reflect well upon the quality of graduate education (Hansen 1991, Appendix Tables B-2, B-3, and B-4). The downside, of course, is that economics (like most other disciplines) was less attractive to American graduate students in the 1980s.

In addition to enrollment and earnings data indicating the relatively good performance of economists, evidence from the surveys suggests that most recent Ph.D.'s, most faculty, and most graduate students are, if not reasonably satisfied with the state of graduate economics education and with the discipline, at least not terribly disgruntled.

Some economists, to be sure, are concerned with what they see as "empty formalism" in the profession today. However, others are concerned with improving standards of analysis. Some believe that relevant problems are being neglected; but others are excited by the progress made possible by new methods.

The State of Graduate Education in Economics: Basis for Disquiet

To affirm that the current state of the profession is healthy, however, is not to say that all is well. There is some evidence that raises questions as to whether the current relative standing and performance of economics will continue.

We already noted that academic earnings of economists in the 1980s were tied with engineering at the top of academia.

However, outside academia, the earnings of economists increased very slowly in real terms, while the salaries of other science professionals and engineers grew more rapidly (Hansen Table 2, p. 1060).

In itself, this finding might not be noteworthy. But one of the apparent reasons for the continued strength in the market for economists in the 1970s and 1980s was that nonacademic demands increased enough to compensate for relatively sluggish academic demands: the proportion of new economics doctorates taking their first job in academia declined from 68 percent in 1968-72 to 56 percent in 1978-87 during the contraction in academic hiring (Hansen 1991, Appendix Table A-2).

Our unease on this score is intensified by two additional sources. First, interviews with nonacademic employers generally revealed fairly deep dissatisfaction with the training of new economics Ph.D.'s employed by them.¹⁵ Since the growth in the demand from nonacademic employers has sustained the marketplace for economists, there is cause for concern about their dissatisfaction. Although 58 percent of new Ph.D.'s initially take academic positions teaching graduates or undergraduates, the Commission believes that this discontent should be taken seriously. We believe that we should be serving the nonacademic, as well as the academic, market and fear that if changes are not made, nonacademic employers will cut back on hiring new economics Ph.D.'s.

Some view it as a concern that the supply of new Ph.D.'s from "competitor" disciplines appears to be increasing rapidly and may be replacing economics Ph.D.'s. Contrasted with a relatively constant 800-850 new Ph.D. economists annually, business schools have ex-

¹⁵ See Bassie and Lynde, see footnote 5 for particulars.

panded their Ph.D. production, awarding more than 800 Ph.D.'s per year since 1970, and are currently granting more than 1000 Ph.D.'s annually.¹⁶ Moreover, while about 2000 economics masters' degrees were awarded in 1986, there were 67,173 M.B.A.'s and about 4,700 masters awarded in public administration and public policy. Business schools have been a major source of demand for Ph.D. economists within academia.

Yet another basis for disquiet regarding competitors emerged in our consideration of undergraduate majors in economics. A major determinant of demand for Ph.D. economists still is the "market" to instruct undergraduates, and the number of economics B.A.'s awarded each year has grown slowly since the 1970s, reaching 21,602 in 1986. Business undergraduates are, however, ten times more numerous.

One can view the increase in the number of the graduates that are learning some economics as a favorable development and as evidence of the increased importance of economics in an ever-increasing range of problems. But it would be a great mistake to conclude that the training of applied economists should be left entirely to our sister disciplines. Economics graduate programs need to take this competition seriously. While economics departments should not necessarily try to maintain a monopoly in the education of economists, we believe that the broader focus and analytical framework of economics is good for students and that economics departments should have a comparative advantage in teaching it.

To date, programs such as public policy competing with economics in teaching undergraduates have relied predominantly on economics departments to supply most of the Ph.D. economists teaching in these programs. There is some

evidence, however, that the applied schools are increasingly producing their own Ph. D. economists (see Hansen 1991, Table 28). Should this trend continue it would not be good for economics departments, and it would probably also be undesirable for applied schools, as they run the danger of having their economic analysis become less and less rigorous.

In part because of the attitudes of nonacademic employers and the growth of competitor programs and training of Ph. D.'s to teach in them, in part because of responses to surveys, but in part because of our own observations, our major concern focuses on the extent to which graduate education in economics may have become too removed from real economic problems. We believe that much of the discontent that has been expressed in the course of our work originates in this distancing. Much of our report and many of our recommendations are addressed to that central concern.

COGEE's Central Concerns

Survey results indicated that faculty and graduate students alike agreed that tools and theory were emphasized in graduate school, while much less emphasis was placed on "creativity" and problem solving (Hansen Tables 5-8, pp. 1069-71). The reported disaffection of top economics undergraduate majors with graduate school in economics appears to be based in part on similar concerns (Kasper 1990, pp. 28, 32). COGEE members from their own experience shared the perception that it is an underemphasis on the "linkages" between tools, both theory and econometric, and "real world problems" that is the weakness of graduate education in economics. The weakness is *not* an excessive use of mathematics. If there is a central theme to our concerns, it is that we believe

¹⁶ See Rosett, footnote 9.

there is considerable scope for improvement in ensuring that students' knowledge of economic problems and institutions enables them to use their tools and techniques on important problems.

We believe that we do a better job of teaching new Ph.D.'s theory and tools than we do teaching their use. Although we recognize that graduate education has a comparative advantage relative to on-the-job training in teaching theory and technique, we believe that students need more training in the relevance and application of the tools. We fear that the way graduate education is currently structured may be excluding some potentially creative and insightful economists from economics Ph.D.'s. Likewise, we are concerned that some graduate students who come to economics from other fields can obtain Ph.D.'s with little or no knowledge of economic problems and institutions.

Achieving the appropriate balance between teaching the tools of theory and econometrics, and teaching their applications is difficult at best. We suspect that, in an ideal world, not all departments would strive for the same balance. Nonetheless, we believe that the profession as a whole could increase emphasis on learning how to use tools while sacrificing little, if anything, in terms of learning the tools themselves. Furthermore, we respect that this refocusing could go far to address some of the concerns that we have expressed.

Admission to Graduate School

Are we getting lower quality—or at least *different*—students than we did 10–20 years ago?

As already pointed out, there has been a significant shift toward a larger fraction of foreign students entering graduate school. Today's entering classes are probably less than one-half U.S. citizens. Interestingly, only U.S. engineering

schools (the other most highly compensated academic field) graduate a larger fraction of foreign students (National Research Council 1989).

The proportion of women entering graduate school has also increased: whereas only 19 percent of entering graduate students and 8.7 percent of recipients of Ph.D.'s were women in 1977, 26 percent of new entrants were women in 1986 and 19 percent of doctorates were awarded to women.¹⁷

The evidence on the quality of entering graduate students is limited, but what there is suggests little change in overall quality. ETS data indicate that the average GRE scores of students stating that they intend to major in economics in graduate school fell from 527 to 504 on the Verbal test, and rose slightly, from 607 to 612, on the rest of Quantitative skills from 1974–77 to 1984–87 (Hansen 1991, Appendix Table B-1). Based on COGEE survey responses for 1988–89, which include only those actually enrolled in graduate schools, the mean verbal score of new entrants was 567, while the Quantitative was 711.¹⁸

The GRE scores suggest that there may have been a shift in the applicant pool towards those with more background in mathematics and somewhat less in verbal abilities. In part, this may reflect the shift toward foreign students. There is also some evidence that the nature of the core curriculum and the preliminary exams that follow play a role in shaping the applicant pool. Faculty members from top liberal arts colleges told the Commission that some of their best students have decided against going to graduate school in economics, or have

¹⁷ These, and other statistics reported here, are documented in Hansen, Table 1, p. 1057.

¹⁸ Hansen Table 3, p. 1064. It is to be expected that the mean score of all those taking the GREs would be below the mean of those accepted into, and entering, graduate schools. However, the only data we could obtain indicative of trends over time were the ETS data.

dropped out during their first year, because of the abstract, technical nature of the core curriculum (Kasper, p. 1094). It is not *economics* as they know it.

Whereas the group of major liberal arts colleges covered by the Kasper report used to send an average of 9 to 12 majors a year on to graduate schools, that number has diminished to 2 to 3. Perhaps even more discouraging is the report of the chairmen of the undergraduate departments concerning disaffection of economics students with graduate work in economics (Kasper, Table 1, p. 1092).

One might be inclined to dismiss this complaint on the grounds that the elite liberal arts colleges constitute a small and unrepresentative segment of the total college population. But these colleges have traditionally been a major source of future Ph.D.'s in economics (see Kasper, Table 2, p. 1095). Moreover, it is not obvious that—at least in this respect—undergraduate students at Amherst and Oberlin are so different from students at Harvard and Princeton. Evidence regarding the career choices of those undergraduates could not be obtained by the Commission.

These findings, as well as our concern with the ability of new Ph.D.'s to apply economics to the problems they confront, led naturally to a second question: Are we posting the right prerequisites for graduate school? An increasing fraction of new graduate students have majored in fields other than economics as undergraduates (Hansen, Table 3, p. 1064). Yet, economics departments typically assume their graduate students have already learned about real world problems and institutions in their undergraduate curricula. Two issues arise in this regard: how much preparatory work should be required for economics graduate enrollment in mathematics and statistics? and how much preparatory work should be in economics?

Turning to mathematics first, we do

not doubt the usefulness of theory and mathematics for organizing and even creating knowledge. We believe the theoretical tools of economics to be central to the discipline and that mathematics is essential for grasping them. Our concern is that, as each successive generation of economists becomes more skilled at mathematics, each demands more of the next. If this trend continues indefinitely without a matching improvement in the technical skills of our entering students, there surely would have to be a major diversion of teaching resources from economics to mathematics. Some might worry that this would lead to a fundamental change in the character of academic economists, as teaching shifted more and more to passing on the tools and not the questions. We might teach the language of mathematics but not the logic of economics, and end up valuing the grammar of the discipline, rather than its substance.

Whether and how much increased mathematical requirements have already diminished the substance of economics is a matter of conflicting opinion. Many economists perceive the shift already to have been substantial. Fifty percent of faculty with Ph.D.'s awarded in 1977–78 agreed with the statement that “graduate training in economics overemphasizes mathematical and statistical tools.” Thirty-eight percent of the 1982–83 vintage shared this assessment, as did fifty percent of the 1987–88 cohort group (Hansen 1991, Table 13).

That the mathematical skills of entering graduate students do not match the levels now required in the curriculum is shown by the small increment in average GRE math scores already mentioned, and also in responses to survey questions (Hansen 1991, Table 12). Our data also indicate that the economics applicant pool performs substantially less well on the quantitative test than does the applicant pool for some other techni-

cal disciplines (Hansen 1991, Appendix Table B-1). Although the technical requirements in many core courses in economics are probably as great as in engineering or physics, the GRE scores are substantially lower.¹⁹ While this might result partly from differing mixes of needs and aptitudes in different disciplines, the fact is that aptitudes do not appear to have kept pace with increasing technical content.

The survey responses from graduate students provided a substantial amount of evidence that the level of mathematics at entry has a large effect on student morale. The proportion of students believing that the structure and content of their graduate program in economics should be changed increased as mathematical preparation decreased: It was 73 percent for those with the most mathematics and rose to 100 percent among those with the least. Student dissatisfaction with the quality of instruction also decreased as the level of mathematical attainment at entry increased.

One simple way to state our concern is that the screening process poses substantial barriers for students who find elementary topology difficult but few barriers for students who cannot handle elementary undergraduate applied exercises in economics.²⁰ The resulting Darwinian process may therefore bias the se-

lection toward good technicians, rather than good potential economists, thus contributing to some of the dissatisfaction that has been voiced.²¹

There are two ways to correct an imbalance between the mathematical skills demanded and those possessed by students. Actions could aim at improving the technical skills of entering students or they could aim at slowing down or even reversing the tendency for increased technical requirements in our programs. We recommend some of each.

Undergraduates who are expecting to pursue graduate training in economics need to understand that the undergraduate coursework offered by most economics departments is in itself insufficient preparation for graduate work. These students need to become adequately skilled in mathematics before they enter graduate programs. If students enroll without mathematical background sufficient to follow the core courses fairly readily, too many scarce intellectual resources will be devoted to learning the tools and language of mathematics, and too little attention will be paid to learning the economic content of the courses.²² Remedial courses offered in the summer preceding entrance into graduate school may be helpful, but in our opinion these programs tend to offer too little, too late.

However, it is not enough merely to insist on better entry levels of mathematics. The graduate coursework offered by economics departments also needs careful monitoring and in some cases some

¹⁹ The quantitative GRE average score by field of intended major for 1986–87 was 698 for physics, 688 for engineering, 679 for mathematics, and 612 for economics. Interestingly, would-be physicists averaged 545 and mathematicians 521 on the verbal GRE, compared to 504 for economists. See Hansen (1991, Appendix Table B-1).

²⁰ Comment by Robert Lucas “I read this statement as saying that we require our students to take, say, an undergraduate topology course. Since this is not true in any doctoral program in Economics, I objected. But I am assured that it should be understood only as meaning that many students know about open and closed sets and can understand the statement (not the proof) of a fixed point theorem. Then why didn’t we say this? And why is it regarded as a concern?”

²¹ The best thing, of course, is to train good economists with good technique. We do know, however, that there are always tradeoffs, and fear that, at the margin, there has been too much emphasis upon technical aptitude relative to aptitude in economics, broadly defined.

²² This is not to say that some departments might not choose a market niche that concentrates on, e.g., mathematical theory or econometrics. But we believe it would be a mistake for the profession as a whole to create core courses which preclude all but the most mathematically inclined students.

adjustment. The language that is used in the classroom needs to be understandable to the majority of students.²³ We would not wish to dissuade all economics undergraduate majors from enrolling.

The same considerations apply to econometrics as to economics. On the one hand, there is need for emphasis on applications of technique in course work, as we will discuss further later. Simultaneously, the level of mathematical expertise that is expected in the basic econometrics course cannot be so low that the central technical ideas of econometrics are not adequately communicated. Entering graduate students should be clearly and forcefully informed that the absence of an adequate background in basic probability, statistics, and calculus is a serious impediment to success in any graduate program in economics.

Some members of the Commission were struck by the coincidence of increased enrollment of graduate students whose native language was not English and the increased emphasis on the use of mathematics in graduate courses in economics. Some wondered whether the change in the composition of the student body might have contributed to the change in emphasis. We were unable to devise means for shedding light on this issue, however.

The second question—how to deal with students who have not had very much economics as undergraduates—is more difficult. One solution, which we reject, is to post stiffer entry requirements in economics. Economics is a broad subject to which those with a variety of skills and backgrounds can contribute. We should not seek to erect barriers

to entry, but rather seek to use most effectively the variety of talents of those who wish to pursue careers in economics. All of us have encountered excellent students who came to economics late, but whose native ability enabled them to catch up quickly. We certainly do not want to exclude such students from our profession.

A second solution is that departments could extend the period during which students take courses, a practice that has already started in some places. However, any substantial extension of the time to complete course work seems an unattractive option, given another of our concerns that the Ph.D. program is already too long.

A third alternative is for departments to establish standards for undergraduate economic knowledge that they expect all entering graduate students to meet, and then to offer “remedial” education in economics to those who need it—just as they now offer remedial education in mathematics and econometrics. Such policies would make teaching core courses easier and would also send an important message that economics is important in graduate programs. It is unrealistic, of course, to think that a short remedial program can replace a good undergraduate background in economics. Nonetheless, requiring some remedial work for students entering without undergraduate study in economics would provide a partial solution to the problem.²⁴

The Core Curriculum

The core curriculum plays a central role in the training of graduate students. Ideally, it transmits the common core of knowledge that defines what it means to

²³ We are *not* recommending eliminating courses with a great deal of technical content. If there are powerful new tools that some individuals find helpful, we should offer new courses. The question is, what are the requirements to be expected of all economists?

²⁴ Concerns about students who have had little exposure to economics prior to graduate school are another reason for urging that the core curriculum have more emphasis on applications.

be an economist, prepares students for field courses taken in the second year, and acquaints students with theoretical and statistical tools that will be used in dissertation writing and in their subsequent professional careers.

The attitudes and values conveyed during the first year are central in initiating students into the economists' "culture." While young men and women entering graduate school do not come in with a tabula rasa, there is little doubt that their perceptions of economics are heavily influenced by the first-year courses in micro and macro theory. A core curriculum that lacks breadth or balance will create an excessively narrow image of what it means to be an economist. On the other hand, a core that does not transmit enough mathematical and statistical technique may leave students ill-prepared to do research.

Is there a problem in the core curriculum? If so, it is not *how well* we teach. Student respondents to the COGEE survey gave their teachers generally high marks.²⁵ Rather, the problem seems to lie in *what* we teach—what we demand from students if they are to jump the hurdle of the first year, a prerequisite for admission to the fraternity of professional economists.

*Technique versus Substance*²⁶

What should be taught in the core? One critical issue is the relative emphasis

²⁵ In our graduate student survey, 66 percent of students rated the quality of instruction in their core theory courses as "good" or "excellent." Only eight percent rated it as poor. See Hansen 1991, Table 15.

²⁶ Comment by Robert Lucas "I think improved technique helps us to do better substantive economics, so I do not share the view that technique and substance are opposed. In any event, I do not see how one can conclude anything about the appropriateness of the current balance in first-year courses on the basis of two anecdotes and a wisecrack. But all the evidence that COGEE obtained that economics training has become excessively technical is contained in this section, so perhaps it serves a useful purpose in the report."

given to mathematical technique versus economic substance. It is here that many members of the Commission, like many respondents to our surveys, feel that the core curriculum could often be improved.

We think all economists would agree that students must develop a keen understanding of the functions of markets and prices. But some critics of graduate education, including many respondents to the COGEE surveys, argue that our insistence on ever higher levels of mathematics has actually led to shallower understanding of basic economic processes. One member of the Commission observed that bright students who have no difficulty following complex mathematical arguments nonetheless stumble over standard undergraduate microeconomic questions—such as when to cut down a tree. Another member cited students at a leading department who could not figure out why barbers' wages have risen over time even though haircutting has exhibited virtually no productivity improvement for over a century. (But these same students could solve a two-sector general equilibrium model with disembodied technical progress in one sector.) It appears that mastery of technique has supplanted mastery of the kind of intuitive economic analysis that was once called "Chicago-style micro."

Similar comments apply to the core econometrics courses. Econometrics should not be taught as if it were just technical statistical theory, totally divorced from data analysis. Particularly in the first year, econometrics classes should make frequent reference to real empirical issues in economics. When econometric tools are integrated with the substantive concerns of economics, they become the powerful research tools that they are supposed to be.

The Commission's fear is that graduate programs may be turning out a generation with too many *idiots savants*, skilled

in technique but innocent of real economic issues. At the margin, increased attention to applications of technique to economic problems would improve their productivity. The concern is not whether technical advances are necessary for scientific progress in our discipline, nor whether aspiring research economists need to master certain techniques. Of course they are; and of course they do. The question is, rather, one of priorities, balance, and timing. We feel that the balance is not quite right at present.

Breadth versus Depth. A second major issue in the design of the core curriculum is the tradeoff between breadth and depth in selecting topics to be covered. No one believes that we can truly transmit the “core” of microeconomics, macroeconomics, and econometrics in a single year, even if we confine ourselves to theory. There is no choice but to be selective. But selectivity can easily degenerate into idiosyncrasy.

The Commission believes that the best core courses provide both a broad-brush survey of tools, concepts, and models and an in-depth treatment of a selected few. On the one hand, we do not want pure survey courses, which are liable to be superficial. On the other hand, students must be made aware that the few topics covered in depth do not represent the breadth of economics. We believe that a core curriculum can be designed which has breadth and yet maintains appropriate depth. A student need not know the technical details of a model to appreciate the insights it provides. It is more important, we believe, to be familiar with a portfolio of models and techniques to consider when writing a thesis and again in one’s later research. There is, after all, life after the preliminary exams; and one important objective of the core is to prepare students to learn on their own.

Some of the syllabi we examined seemed to balance breadth and depth

fairly successfully; but others fell far short of the ideal.²⁷ In particular, most members of the Commission found some of the syllabi disturbingly idiosyncratic. Furthermore, the content of the core curriculum in some institutions seems to vary widely from year to year, depending on who is teaching it. That is a worrisome feature of courses that are supposed to provide basic economic literacy to every student.²⁸

We do not oppose diversity, either across departments or over time. Indeed, one of our other recommendations explicitly calls for more specialization by some departments. But the diversity we encountered in several course syllabi more closely resembled faculty members indulging their own pet interests than conscious and well-considered decisions by departments to specialize. Too often, it seems, faculty members ignore the fact that the core curriculum has aspects of a public good.

We recommend that those departments that do not already do so consider taking some collective responsibility for the core curriculum. One way to do this is to establish curriculum committees to oversee the contents of the core; separate committees for macroeconomics, microeconomics, and econometrics seem advisable. Such committees can, and probably should, be small, unbureaucratic, and unobtrusive. Something as simple and innocuous as an annual meeting to set the broad outlines of the core curriculum might serve the purpose without in-

²⁷ See Hansen for particulars of the evaluation of syllabi, p. 1061.

²⁸ The preliminary (general, comprehensive) exams surveyed by the Commission exhibited fewer idiosyncracies than did the course syllabi, though there were certainly still marked differences in coverage. The exams, however, heightened our concern about technique’s preeminence over substance. While it is admittedly easier to grade and evaluate mathematical problems, the message conveyed by many of the exams about the relative importance of technique may well be questioned.

fringing unduly on the prerogatives of individual teachers.

While we have no objection to the current practice in some departments in which microeconomic, macroeconomic, and econometric theorists play dominant roles in teaching the core courses, we believe that the contents of these courses should not be defined solely by the preferences of those faculty members. One way to accomplish this would be to have representatives of the second-year fields serve on the micro, macro, and econometrics curriculum committees, perhaps on a rotating basis.

We have no desire to specify procedural details—which will, in any event, vary from department to department. Rather, the important thing is that departments recognize the public-good nature of the core curriculum and make certain that their students acquire the essentials of a basic economic education. This entails core courses that are taught by persons who are skilled in the techniques of economics who also communicate their relevance for addressing economics problems.

Reform of the core curriculum along the lines suggested here would certainly enforce a minimum level of proficiency in mathematics. It might better communicate the full scope of what economics is about and develop a common basis for economic discourse—in a way that does not place major impediments on students with different backgrounds.

The Fields

Fields serve various roles in the graduate curriculum.²⁹ They allow exploration of a particular set of facts and issues, and they enable an expanded teaching of the-

²⁹ For our discussion, we consider “fields” to include, for example, labor, international trade, industrial organization, development, public finance, and economic history. We are not discussing advanced econometrics and mathematical economics as fields, which are tool-making and not tool-using.

ory and econometrics. They often provide a place to balance the core’s concentration on theory and technique with one motivated by real-world problems and grounded in data and facts. Although the Commission believes that even the core sequence should include real-world applications, it is the field courses that carry the primary responsibility for linking theory and empirical techniques with real-world applications.

Students who encounter a lack of real-world connectedness in the core theory courses should find it remedied in the fields. Yet the responses to the questionnaires indicate that most students do not find the fields serve this function. Concerns about the absence of an empirical and applied basis in the entire economics curriculum were expressed in the open-ended responses to the questionnaires. Students and faculty both noted the absence of facts, institutional information, data, real-world issues, applications, and policy problems (see also Hansen 1991, Table 18). In the COGEE survey, the majority of students responded that their field courses did not apply the theory they had learned in the core to real-world problems or to empirical analysis. Yet a majority claimed that their field courses were successful in teaching theory.

Almost 70 percent of the students above their second year and in tier 1, 2, and 3 schools, thought many or all of their field courses provided rigorous training in theory and derived implications of mathematical models (the percentage declines to about 40 percent for tier 4 and 5 schools).³⁰ But when the same group was asked whether their field courses applied theory to real-world problems and used theory in empirical applications, about 57 percent of the students in tier 1 schools and only 40 per-

³⁰ See Hansen footnote 5, p. 1055 for a definition of tiers.

cent of the students in schools outside tier 1 answered that most or all of their fields did. Thus, students, by and large, believe their field courses extend and expand theory but that these courses are less successful in applying and using theory. The implication is that field courses are more effective as extensions of theory courses in terms of tool development than they are in terms of tool use.

For complex reasons, some fields have remained applied while others have drifted farther away from real-world economic problems, data, and institutions. It should be emphasized that it is normal and to be expected that fields change over time. Advances in theory, for example, might precede those in empirical work. We note that labor economics has retained its grounding in economic facts. Its literature attempts to understand the evolution of institutions, such as labor unions, and to explain long-term trends, such as the decrease in the age of retirement and the rise in women's labor force participation. Labor economics has also evolved along theoretical lines, as in the search-theory and implicit contract literature, and along econometric lines, as in the work on sample-selection bias and duration-of-unemployment models. It is thus a field whose practitioners effectively migrate between the theoretical and empirical worlds, adding more substance in the process to each. By contrast, the focus of the field of industrial organization has changed dramatically over the past twenty years, becoming much more theoretical. The theoretical insights of the new industrial organization are only just beginning to be tested and integrated into our understanding of real-world firms and industries.

Our mission has been to assess the curriculum of economics and not the discipline. But there is a clear relationship between one's ability to teach economics in an informed and relevant manner and

the literature that economists produce. The Commission hopes to see more courses, and more content in existing courses, that apply and use theory, and that mediate between the theoretical and empirical realms in a manner that makes both better off. We have no easy long-run solution to this problem. We can only state that efforts to bring good applied research results pertaining to real-world issues into the classroom will significantly strengthen graduate education in the fields.

One short-run possibility for strengthening the link between tools and applications is to encourage department-wide student faculty seminars on issues of importance where the skills from a number of fields are useful. These would be on subjects such as technological change or the economic implications of an aging population, which command the interest of scholars from a number of fields and from theorists as well. Participation would be predominantly of third year students. Faculty from several fields, as well as those in theory and econometrics, could be assigned to it. Such a seminar would be a general research forum in which faculty would, through their own example, attempt to teach or at least display the creative process.

Another possibility is to have students take more courses that are empirical and applied. Some departments demand one of two required fields to be empirically oriented; others do not. Commission members urge departments to review their requirements and course content to see that their students obtain a good grounding in the facts of economics and a curiosity about the real world. It would also be desirable if several of these courses included a term paper to encourage students to learn to apply their tools, to encourage creativity, and as preparation for the dissertation process as discussed below.

Shortcomings of Coursework in General

While there are clearly identifiable roles for the core and for field work, there are some aspects of graduate education that are obviously important, and for which all course work, as well as subsequent work on the dissertation, should bear some responsibility.

Two of these—creativity and communication (especially writing) skills—surfaced repeatedly as concerns of employers of new Ph.D.'s, of graduate faculties, and of students themselves.

Creativity. Everyone wishes graduate programs fostered more creativity; but everyone also recognizes that we know little about how to teach it. Faculty and graduate students alike agreed that creativity was not emphasized in graduate programs. The worry is that current forms of graduate education may actually be *stifling* creativity. As graduate programs are now structured, students are often asked to put their creative potential "on hold" during their first two years while they accumulate knowledge and acquire technical skills. Only later, at the dissertation stage, is their creative potential to be called upon and developed. Some people, including many members of this Commission, worry that this dichotomous approach to education may kill students' creativity before it gets a chance to bloom. Who among us has not been frustrated by students who, after two hard years of coursework, have no idea what they want to write a thesis about?

While creativity cannot be taught by any simple formula, a few modest curricular changes might help. Most obviously, encouraging or requiring students to write more papers during their first two years of graduate study would give them more opportunities to develop and demonstrate creativity. It might also be help-

ful if students spent less time using specific techniques to solve the well-formulated problems used in courses and on prelims and more time pondering less structured questions for which they must select, or even formulate, appropriate models. As teachers, we need to stress more the role of asking the right questions. Being able to use the right techniques to answer tightly-specified problems posed by professors is good training; but it is not enough.

We must also recognize that the creativity relevant to economic research is multidimensional. It can be manifested by posing a new question, by reformulating an existing problem, by finding new data sources with which to test a proposition, by developing a new model, or by extending mathematical or statistical techniques. Each of these contributions has validity; each is necessary for the progress of economics. Finally, course work should also convey to students a broad sense of the questions with which the discipline has been concerned, and how successful it has been at addressing those questions.³¹

Writing and Communications Skills. Nonacademic employers were especially vocal in their criticisms of the writing and communications abilities of new economics Ph.D.'s.³² The complaint was also voiced by academic employers, and is frequently heard from journal editors and readers and (we suspect) the students of new Ph.D.'s.

Dissatisfaction seems to stem in part from the perception that too much jargon is used, and in part from the conviction that many students lack basic expository skills at the time they receive their Ph.D.'s. While complaints about jargon

³¹ Many of the respondents to the questionnaires lamented the absence of history of thought in the curriculum.

³² See Bassie and Lynde, footnote 5.

are perhaps manifestations of concerns about the technical orientation of economic training, complaints about basic expository skills touch on a real issue for economics Ph.D. programs.

It is our impression that most Ph.D. programs devote little or no attention to teaching or encouraging the development of expository skills. Where seminars or courses are directed at helping students develop “research skills” rather than teaching new material, there is usually little emphasis placed on the process of writing or presenting a paper. Instead emphasis is on the earlier stages in the research process—choosing a topic, gathering data, and so forth. When students do write papers, or begin the process of working on a thesis, faculty comments are usually directed at substantive issues rather than matters of exposition.

We suspect the lack of emphasis on communication in most Ph.D. programs reflects partly the scarcity of teaching time, partly instructors’ lack of confidence in their ability to teach communications skills, and partly a judgment that the appropriate style of professional communication is something students can figure out for themselves by watching their teachers. The fact that average GRE verbal scores have declined over the past decade may have sorely increased the need for attention to writing skills in graduate programs.

Whatever the reason for poor writing skills, we suspect that improved communication skills would help academically-oriented students accelerate the publication of journal articles based on their dissertations, and help students who take nonacademic jobs to function more effectively.

The payoffs for good writing skills no doubt come somewhat later in the career than the rewards for mastering other

economists’ skills. Nonetheless, the evidence that economists are losing in the nonacademic marketplace because of poor writing is too important to ignore.

Members of the Commission, therefore, believe that some room in the typical graduate program should be found for training in writing and communication.³³ There are a number of possible steps toward this goal. Some have already been mentioned, including increasing the number of term papers in graduate course work. It might also be useful if an expectation could be developed that thesis advisers would comment on students’ exposition as well as substance, and help students convert their research into publishable articles. In courses, comments about why particular articles did or did not have an impact might be offered. In cases where writing skills appear seriously deficient, students might be urged to take courses in technical writing, enroll in special summer programs, or find other means to improve their abilities prior to the time they write their dissertations.³⁴

Choice of Dissertation and Dissertation

A finding that disturbed many members of the Commission was the increasing length of time for completion of dissertation. The median time to complete an economics Ph.D. program has increased by more than a year over the last two decades. It now stands at 6.4 years. In most programs, the required course work and associated qualifying examinations can still be largely completed in the first two years. It is clear, there-

³³ It might also be worthwhile to consider raising the entrance requirements to graduate school to some minimum level of verbal proficiency.

³⁴ This problem has increased in severity as the fraction of foreign students with a need to improve their English has increased in economics graduate programs.

fore, that the increase is at the dissertation stage.³⁵

Part of the lengthened time to completion appears to have resulted from the looser job market conditions that prevail throughout academia. Twenty-five years ago, in a tighter academic market, a promising graduate school record and an interesting thesis topic may have been sufficient for the job market. But in the last decade students have learned that to obtain better jobs they must already have completed one or two papers from their thesis and related research. This new market-determined requirement is at least partly responsible for an extra year in graduate school. As such, part of the added time to receipt of doctorate in economics may be associated with increased value added. Some of us, however, believe that there may be multiple equilibria in the length of time to completion of the Ph.D. and that the profession's agreement on a shorter expected time might speed up the process.

A second cause for the lengthening time to completion may be the decline in the number of available research assistantships. Graduate students generally responded that teaching assistantships had not been helpful in preparing them for dissertation research, whereas those having held research assistantships felt the experience had been useful.³⁶

The decline in research assistantship availability has both direct and indirect effects. Research assistantships have always played an important role in prepar-

ing students for dissertation research. The availability of fewer research assistantships directly reduces this sort of "on the job" training. Indirectly, the financial need to teach and ultimately to take a job before finishing the thesis may be a growing problem as the supply of research assistantships and fellowships diminishes.

There is little that economists can do to stem increases in time to completion resulting from changes in the general academic job market. It is even doubtful whether much can be done about the decline in the availability of research assistantships, except to search for possibilities for additional assistantships.

But we believe that several of the apparent deficiencies of graduate programs, already noted, may also be contributing to the lengthened time for the dissertation. The absence of application to real-world problems in the core courses and in the fields is one such factor. Only 49 percent of graduate students responding to the COGEE survey thought core courses prepared them "well" or "very well" for dissertation work. By contrast, 75 percent of students in the 1977-78 Ph.D. cohort felt that way. The lack of emphasis on writing and communications skills perceived by students, faculty, and prospective employers, and discussed above, surely also contributes. Moreover, the fact that less than 40 percent of students had written a prior research paper on the subject of their dissertation,³⁷ and that only 50 percent had presented a seminar on their own work by the end of their third year is also evidence of a major deficiency in preparation for the dissertation writing phase.

There are two distinct stages at which there appears to be "wasted" time and program changes might be useful in re-

³⁵ The trend toward increased time to completion of degree seems to be widespread among academic disciplines. In his recent book on universities, Henry Rosovsky states that the average length of time to Ph.D. across all disciplines is ten years (Rosovsky 1990, pp. 149-50).

³⁶ Of current graduate students (3rd year and above), 77 percent of those holding research assistantships responded that they found them useful in developing and writing their dissertation. See Hansen 1991, Table 18.

³⁷ See Hansen 1991, Tables 19-20. However, this figure seems to have been even lower in the past.

ducing it: between passing prelim exams and finding a workable thesis topic; and between embarking on thesis research and going on the job market. Most students have completed their preliminary and field examinations by the beginning of their third year in graduate school, yet most do not venture on to the academic job market until the beginning of their fifth year.

Having students write papers as an integral part of field course work and introducing more empirical work and applications into core and field works should be useful both in helping students to identify thesis topics more rapidly and in progressing toward their dissertations. Even such simple exercises as literature summaries should help develop skills that are useful in thesis topic selection and preparation. But the major effort to facilitate students' progress toward formulating a dissertation topic and completing a thesis should be focused on graduate student workshops.

Students should be encouraged to attend research workshops during their second year and be *required* to make presentations during their third year. Each student could select a faculty advisor at the end of the second year, who could be changed from time to time and would talk to the student about thesis topics. The faculty advisor would then report periodically to the department on the student's progress toward a dissertation. Some faculty should monitor this research process of each graduate student.

For some programs with well-funded seminar series, it may be desirable to establish one or more separate workshops wholly reserved for graduate students. It may be unreasonable to expect a graduate student to present the first preliminary results of his research in a regular seminar in which a travelling superstar had presented a paper the previous week.

Unfortunately, a key ingredient in all of these proposals is additional faculty time. Hopefully increased effort on our part, invested during the crucial third year of a graduate student's career, will result in better, more swiftly completed theses and fewer dropouts and burnouts.

The Mix of Graduate Schools

Our view of graduate education in economics is focused on the nature of doctoral programs in general and on changes that might improve the quality of graduate training on average. There should be no presumption, however, that the quality of research and teaching in the profession as a whole would improve if all departments were to adopt a common program, whatever that program might be. It seems desirable that there be enough common material, perhaps one year's worth, in graduate economics curricula to give economists a common language and set of basic ideas. Beyond this, specialization is inevitable, and surely not undesirable, both within and across departments.

Despite the difference in the nature of the markets different departments serve, the formal curricula appear largely similar across tiers (see Hansen pp. 1059–61). The surveys, prelims, and syllabi paint a picture of departments with similar goals and similar priorities across tiers. We believe that the focus on developing skills required for applied research should be stronger, the more so the larger the proportion of Ph.D.'s taking applied research positions.

A large part of the problem, we believe, lies with the training given in the top tier departments. Those departments have excellent applied economists. But if those departments do not train their Ph.D.'s to do applied research, it is unlikely that those Ph.D.'s, when they join

other academic departments, will know how to train their own students in applied research. New Ph.D.'s are more likely to teach and train in the manner in which they were taught and trained; this is indeed what the survey evidence suggests. Thus, even those departments that sell mostly to the academic market must make sure that they train Ph.D.'s who can in turn train others to do applied research.

A general focus on developing the skills required to do applied research, however, is only a necessary condition for change. The evaluation structure of economics departments and promotion structure of faculty within them is such that there are strong incentives for emulation rather than diversification. Departments should not be discouraged from finding market niches, developing a faculty which can cover core courses as well as a few fields of specialization.

There is an additional reason for concern about the similarity of departments. Economic research is a social activity that typically progresses most rapidly in the hands of small groups of like-minded specialists who are not at all troubled if they are out of step with the profession as a whole. At any time, frontier research in any specific area tends to take place in a very limited number of highly-focused centers. Berkeley in general equilibrium theory, U.C. San Diego in time-series econometrics, Michigan in survey research, and Pennsylvania in macroeconomic forecasting all come to mind. While each of these departments has always had a diversified faculty, each also has had a concentration of suitably specialized faculty that has attracted and trained some specialized students.

The achievements of such concentrations speak for themselves. They suggest that from the viewpoint of the progress of economics as a whole, it may well be the case that too few departments

are sharply enough focused, or that too many are attempting to do too many things.

Summary of Recommendations

In brief, we believe that graduate education can be improved if relatively more emphasis is given to providing students with applications of the tools of economics to economic problems. To do this does not require a complete overhaul of graduate education in economics. It would, in our judgment, improve the overall quality of our profession, if steps were taken in the following directions:

—Reasonable requirements in mathematics, statistics, *and* economics were established and required as prerequisites for entry into core courses.

—Remedial courses were offered to those desiring to enter graduate economics programs who had deficiencies in economics, mathematics, or statistics.

—Core courses were taught so that those having the prerequisites could focus on the economics being taught and with a view to balancing breadth and depth, with sufficient attention to applications and real-world linkages to encourage students to start applying the concepts themselves.

—The core should be regarded as the basic unit in which those things common to all economists should be taught. It should be in part regarded as a departmental "public good" and its content should be the concern of the entire department.

—Field courses should attempt to include more empirical applications, using empirical findings and economic puzzles to spur students. Papers should be required where possible, so that students begin using their tools and gaining experience in writing prior to the dissertation stage.

—Greater attention to writing and

communication skills should be signalled by faculty attention, and by alerting students who are seriously deficient to opportunities for technical writing courses and other means of improving their skills.

—Efforts should be made, through department-wide seminars, increased effectiveness of workshops, and other means, to ease the transition from coursework to dissertation.

—Most graduate programs are so similar that the return to intellectual product differentiation seems worth the risk for many departments. Departments should consider identifying their comparative advantages and be willing to concentrate their resources in several fields, rather than believing they must cover all fields.

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