

The Implementation of a Terminal Master's Program in Applied Economics*

The Committee on Graduate Education in Economics [COGEE] (Hansen et al., 1991; Krueger et al., 1991) was created to assess graduate training in economics and to make recommendations that would strengthen graduate programming. The assessment component of the committee's work has been a clear success as the framework it established in 1991 has regularly been employed since then to measure what graduate students learn, how they value what they learn, and the impact that the training has on their postgraduate employment experiences (see Stock and Siegfried 2004, 2006 and their references). The committee's recommendations have been less successful, on the other hand, in stimulating modifications to the structure and content of actual graduate programs.¹ In this paper we describe how the master's degree program at The University of North Carolina Greensboro was redesigned in 1996-97 to place greater emphasis on application, computational skill and communications as the COGEE had recommended. These curricular innovations were assessed with a survey of M.A. alumni who were asked to compare the quality of the training they had received to its usefulness in their careers both before and after the new curriculum was introduced. Besides providing an unusual opportunity to assess specific programmatic innovations in a graduate economics program, the survey results also shed light for the first time on how graduates from a master's program, rather than Ph.D.s, view advanced training in economics.

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¹ Colander (1998) argues that had been "essentially no response" (p. 600) to the COGEE report in the profession by 1998. Colander also reported (2005, p. 192) that his 2003-03 survey of Ph.D. students indicated that "almost none of the COGEE commission recommendations ...were adopted." McCoy and Milkman (2006, p. 476) conclude that "master's in economics programs had not dramatically changed" between 1992 and 2002.

The results of the surveys suggest that master's programs which balance a rigorous core in theory and econometrics with an emphasis on applied research, computational skill and communication can make a unique contribution by providing terminal degree-seeking students with skills that are highly valued in non-academic research environments while at the same time offering prospective doctoral students training that is not emphasized in most Ph.D. programs. Similar types of professionally-oriented master's programs to the one examined here may well represent effective alternatives to traditional master's programs that are strikingly uniform in structure and focus regardless of differences in stated educational mission and goals (McCoy and Milkman 2006). To make this point we briefly place master's programming in economics in a broader historical perspective before presenting and interpreting the results of the alumni survey for the particular programmatic innovation examined here.

The Role of the Master's in Graduate Economics Education

The difficulties that appeared in the traditional master's program at UNC Greensboro during the early 1990s emerged after a period of broad decline in the relative attractiveness of graduate education in economics. Between 1975 and 1990 a striking gap opened between interest in economics among undergraduates and the number of students who completed graduate training in the field. As shown in Figure 1, the annual production of both master's and doctorate degrees actually declined (by less than 1 percent in each case) over this fifteen year period at the same time that the number of undergraduate economics majors increased from 14,000 to 24,000, an increase of over 70 percent).²

The forces that lay behind these disparate trends, at least for doctoral programs, came into sharper focus during the early 1990s. Kaspar (1991) examined the declining interest among

² MA degrees awarded fell from 2127 to 1951 (8 percent) between 1974 and 1990, while Ph.D. degrees awarded were essentially unchanged from 815 to 806.

economics majors in pursuing doctoral training in the field. He found that many of the students at the liberal arts colleges that he surveyed had been attracted to economics as a means of examining policy and institutional issues but were deterred from pursuing graduate training when they learned of the emphasis on mathematics and technical modeling within doctoral programs. The same trend created a different set of problems for students who completed doctoral programs, but then took up careers in the non-academic sector. Hansen (1991, pp. 1083-6) interviewed both academic and non-academic employers of newly-minted Ph.D.s to get their views of the strengths and weaknesses of graduate training in economics. A striking pattern emerged—academic employers had generally positive views of the quality and relevance of doctoral training while nearly every non-academic employer reported that new doctorates were generally unprepared to conduct empirical research, uninterested in policy-relevant questions and unable to effectively communicate their knowledge of economics or the results of their research. While acknowledging that economists received excellent theoretical and analytic training, nearly all non-academic employers recommended that graduate students in economics receive more training in writing and speaking, be given more opportunities to participate in empirical research, and become more familiar with real world data.

We have no similar evidence that indicates how students, graduates or employers assessed the quality or relevance of graduate training in economics at the master's level between 1975 and 1990. Other information suggests, however, that master's programs shared some of the same strengths and weaknesses as their doctoral counterparts. The similarity was obvious for master's degrees that were awarded as "consolation prize" in doctoral programs—students often received these degrees after completing technical and abstract doctoral core courses which certainly did not prepare them for applied research positions. Thornton and Innes (1988) argue that the increased use of the master's degree as an exit from doctoral programs in the 1970s and

1980s hurt its average quality and reputation. But Thornton and Innes also reported problems in stand-alone master's programs on the basis of their survey of graduate directors. Most important was the absence of a distinctive and coherent structure as most terminal programs required only completion of a required core and a set of unfocussed elective courses. Moreover, only half of all master's programs held mandatory comprehensive examinations and only 24 percent required a master's thesis (Thornton and Innes, 1988, pp. 174-177). In light of this pessimistic appraisal of the content and structure of master's programs in 1988, the relatively flat trend in master's degrees awarded between 1970 and the early 1990s shown in Figure 1 might well obscure a more negative reality—if an increasing percentage of these degrees were awarded as consolation prizes the number of students who sought and completed a terminal master's degree in economics would have actually decreased over this period.

McCoy and Milkman (1995) conducted their own survey of 123 graduate directors in institutions that offered master's degrees in economics or agricultural economics.³ The survey was conducted in 1992 and was intended to serve as a complement to the COGEE report that had focused on doctoral programs. McCoy and Milkman reported that the master's programs they surveyed enforced stricter admission standards and maintained a thesis requirement more frequently than those that surveyed by Thornton and Innes (1988). But their primary focus was to examine differences among stand-alone master's programs and those at doctoral-granting institutions, and across programs with different educational missions. Many of the patterns were unsurprising; master's programs at doctoral institutions set higher admission requirements, enrolled more full-time students, offered more financial support, and sent fewer students away to doctoral programs than did their stand-alone counterparts. McCoy and Milkman's important finding, on the other hand, was that curricular content and structure was virtually identical across

³ 76% of the respondents were in economics departments.

all types of master's programs—those that prepared students for the Ph.D., those that provided training for careers in government, business and research organizations, those located at doctoral-granting institutions, and those that stood alone.

The COGEE concluded that the marked similarity in the curriculum across doctoral programs was a weakness of graduate education given that Ph.D. economists pursue a range of academic and non-academic career paths (Krueger et al., 1991, pp. 1051-52). McCoy and Milkman (1995, p. 172) echoed this concern for master's programs when they noted that the “remarkable degree of [curricular] similarity indicated that either the skills and tools necessary for careers and doctoral work were the same or that programs were falling to recognize the different skills necessary and/or adjust their programs accordingly.” They favored the latter explanation and speculated that several factors were responsible for the reluctance to connect the structure of a master's program to its mission—concern that entering students had not yet decided their career paths, the threat of lower or more variable enrollments in a more specialized program, and faculty preferences and institutional constraints that favored the traditional broad-based approach to master's programming. The strength of such forces was underscored when McCoy and Milkman (2006) reported the results of a follow-up survey that was conducted a decade later. They concluded that “[a]lthough some differences had evolved in the past decade, we conclude that . . . master's in economics programs ha[ve] not dramatically changed in the past 10 years, and they remain remarkably similar regardless of stated primary mission.

The Transition to a Professional Master's Program

The terminal Master's in Economics at UNC Greensboro was established in 1970 under a traditional academic model. Students were required to take a one-year core sequence in mathematical economics, economic theory and econometrics and in their second year to

complete a set of elective field courses while they wrote a required thesis project. The program was established to train students for careers as research economists in business and government, but some students chose to enter doctoral programs. Economics departments like UNCG that sought national recognition for their terminal master's programs by serving both sets of students during the 1970s and 1980s considered their programs to be integral to attracting and retaining faculty with research profiles comparable to those found in lower-tiered doctoral granting departments. The design and delivery of the M.A. curriculum reflected this emphasis as master's students in terminal master's programs were exposed to the similar themes and issues that were covered in Ph.D. programs, but at a lower level of theoretical and mathematical rigor.

After two decades of successful operation evidence began to appear in the early 1990s that the M.A. program was no longer serving its two student audiences with equal success. Graduates who chose to continue their training at the doctoral level reported being well-prepared for the experience while the vast majority of students who used the master's as a terminal degree had increasing difficulty completing the program on time (structured as a four semester program) and then reported being not well-trained in the applied research skills that were highly valued in the workplace.⁴ In light of these developments, the economics department undertook a thorough evaluation of its traditional master's program in 1996 and 1997 and decided to introduce a new professionally oriented M.A. in Applied Economics program from which students began to graduate in 1998.⁵

⁴ Between 1990 and 1994 only 47% of master's students who entered the second year of the traditional master's program graduated "on time" or within 24 months of entering the program, while 21% of these students never finished. The remaining 32% of students who successfully completed the first year courses took more than an additional year to graduate.

⁵ Peterson's Online guide to graduate programs listed 47 master's programs in applied economics programs in October 2007. Sixteen of these were in departments of agricultural economics or other disciplines, eighteen as a degree program in an economics department, and only nine (including the one at University X) that were classified as "programs in Applied Economics".

The M.A. program in Applied Economics at UNC Greensboro was designed with the recommendations of the COGEE in mind (Krueger et al. 1991, pp. 1053-4). Its primary mission was defined as training applied research economists within a terminal master's degree program. A three-semester, lock-step curriculum was adopted to provide both program coherence and cost efficiency; a traditional core in the first semester, an emphasis on the tools of applied research in the second semester, and a concentration on advanced data management skills and independent research in the third semester. Overlaying this basic structure were three broader principles: that theory and application would be integrated into courses wherever useful and practical, that every econometric and empirical course (six in all) would have a weekly laboratory component, and that each student would be required to write course-based papers, and a substantial (25 page) literature review. Besides responding to the COGEE's recommendations concerning program specialization and focus, the program was also designed to establish strength in applied research, computational skill and communications because of the emphasis that non-academic employers placed on these areas in their critical assessment of doctoral training in economics.

The Survey of Alumni

During the review of the curriculum in 1997, alumni of the traditional master's program were asked to give feedback regarding the quality of the training they had received and the importance that the training had played in their post-graduate careers. The same survey was administered to alumni of the new applied master's program in 2006 to assess how well it was working. Response to both surveys was substantial—59 out of the 177 alumni who graduated between 1973 and 1997 responded to the 1997 survey, while 42 out of the 75 students who graduated between 1998 and 2005 participated in 2006. Besides providing information regarding the effectiveness of modifications to the program, the two surveys provide valuable

perspective into how the market for master's students has changed over the past three decades, and the impact that the implementation of a professionally-oriented program as it was assessed by students after they had graduated. To highlight these developments the survey respondents are divided into four groups below—21 alumni who graduated from the program in its first fifteen years (1973-1987), 19 alumni who graduated from the original program after it had established a national reputation (1988 - 1994), 19 alumni who graduated from the program while it was in transition (1995-1997), and 42 alumni who graduated from the new applied program between 1998 and 2005.

There have been several important surveys of doctoral students since Colander and Klamer (1987) first used this technique to examine the orientation and effectiveness of graduate education in economics. Over that period there has been no similar survey, however, focused on students from terminal master's degree programs.⁶ The results presented below clearly do not represent all master's students since the survey was undertaken to assess program innovation at one institution. We note, however, that the content and focus of this survey closely resembles the one that Stock and Hansen (2004) used to examine the match between the proficiencies and skills emphasized in Ph.D. programs and the demands that employers subsequently placed on graduates from these programs. The survey also provides information about changes over time in the sectoral pattern of employment among master's degree recipients from UNCG comparable to that reported for Ph.D. alumni in Stock and Siegfried (2004, 2006).

The Postgraduate Experiences of the Master's Students

The first bar shown in Figure 2 for each of the four alumni cohorts displays the percentage of respondents that pursued doctoral training after completing their master's

⁶ The analysis of master's programs in economics by Thornton and Innes (1988) and McCoy and Milkman (1995, 2006) were based on surveys of graduate directors.

program.⁷ One out of five respondents who graduated in the program's first fifteen years of operation went on to pursue a Ph.D. in economics and that share increased to one-third for alumni respondents who graduated between 1988 and 1994. The percent of alumni who earned their Ph.D. only increased from 13% to 16% during these two periods.⁸ Only ten percent of respondents who graduated while the department was transitioning to an applied program (between 1995 and 1997) moved on into doctoral programs, and the share of respondent has remained at that lower level during the new program's first six years (1998-2004). This shift in post-graduate profiles could reflect the fact that prospective students responded to changes in the program's mission and orientation and to job market opportunities.⁹

A surprising development was that average student quality did not decrease after the professionally-oriented applied curriculum was implemented. In fact, average GRE scores for students who entered the new program were actually higher than they had been under the academically-oriented traditional program.¹⁰ The economics faculty had been concerned that an applied focus might attract a weaker pool of students, but it appears, instead, that there is a pool of talented students who will choose to be trained as applied research economists, but in a terminal master's degree rather than a doctoral program. We underscore this point because of its possible relevance to explanations of the marked absolute decline over the past three decades in

⁷ Thirteen of the 98 alumni who graduated between 1975 and 1987 completed Ph.D. degrees, while fourteen of the 85 graduates between 1988-1998 completed their doctoral studies (two in finance).

⁸ Thornton and Innes (1988, 177) found that one-quarter of the master's programs they surveyed identified pursuit of the Ph.D. as the "most typical" post-graduate path chosen by their students; University X, therefore, was not as devoted to pre-doctoral training as some other master's programs.

⁹ The recruitment materials describing the new program emphasized that the program was structured to be completed in three semesters, the specific types of jobs students could expect after completing the program, and the department's alumni network as an important source of placement.

¹⁰ Average combined GRE scores of incoming students who entered the traditional program between 1990 and 1993 was 1143. After the new program was fully implemented, average GREs a decade later (2000-2003) was 1186.

the number of American-trained undergraduates who pursue the Ph.D. in economics (Siegfried and Stock, 2006).¹¹

The remaining bars in Figure 2 present the sectoral distribution of employment for each alumni cohort at the time they completed the survey.¹² These distributions include both the alumni respondents who attended doctoral programs and those who did not. The most important employer for graduates from the traditional master's program (the 1973-87 and 1988-94 cohorts) was the education sector—including students who pursued doctoral training and some who used their master's training to teach economics in community colleges.¹³ Private economic research organizations was the second largest employer of the two early cohorts of alumni in 1997 and together with education these two groups accounted for more than sixty percent of all respondents who were working as economists (i.e., excluding the "other" category). The remaining third of the responding alumni who graduated in the first twenty-five years of the program's existence worked in financial institutions, retail and manufacturing firms and health-related enterprises.

The sectoral distribution of employment changed between 1995 and 1997 as the department was developing and implementing its new applied program structure. About one-third of the responding alumni who graduated from the traditional program before 1995 reported working in financial, retail, manufacturing and health enterprises; that share increased to around 60 percent during and after the implementation of the new program. The shares of the latter

¹¹ The number of new Ph.D.s in economics who received their undergraduate degree in the U.S. has fallen from about 800 in 1972 to about 400 in 2003. Siegfried and Stock (2006, pp. 1-4) identify several factors that might be connected—the increased time-to-completion to complete doctorate in economics and the mismatch between program focus and post-graduate labor market demands. A professionally-oriented applied master's might be a good alternative to student's who are concerned such factors. International students, by the way, represent only 26% (10% were American trained as undergraduates) of the students admitted to the new applied program between 1998 and 2004.

¹² The 1997 respondents were not re-interviewed in 2006, so the figure compares the sectoral distribution of employment for different cohorts at two different times.

¹³ "Other" in the first period included two government economists, a lawyer, an elementary school teacher and two alumni who had left the labor market

three sectors all showed modest increases once the applied program was fully implemented, but employment in financial institutions experienced the largest increase. This increase in the share of financial sector employment could have been due to unique conditions in North Carolina where financial institutions grew rapidly during the 1990s and early 2000s while the traditional manufacturing base contracted.¹⁴ If so, these employment patterns underscore that professionally-oriented master's programs tend to have stronger connections to local and regional development and employment patterns than the traditional academic model.

The pattern of post-graduate employment changed with the implementation of an applied economics program, but it is important to recognize that approximately one-quarter of alumni from all four cohorts reported being employed in private economic research organizations in both 1997 and 2006. In fact, there was surprisingly modest change in the overall sectoral distribution of employment between the high-water mark era of the traditional master's program (1988-1994) and the period when the applied program was fully implemented (1998-2005). In essence, about one-quarter of students sifted out of the Ph.D. career track under the new program in favor of careers as terminal master's degree holders in private research organizations and businesses. The post-graduate employment patterns for the remaining three-quarters of alumni changed hardly at all. What had changed, of course, was the training they received and we now turn to their assessment of its quality and usefulness.

The Quality and Usefulness of Training Received by Master's Students

The alumni survey was designed to help assess the quality of the training students had received in the master's programs at UNC Greensboro and the relevance that training played in

¹⁴ North Carolina is home to three of the largest fifteen U.S. banks (Bank of America, Wachovia and BB&T, and four of the nation's six major private mortgage insurance companies. Three of the latter (United Guaranty, Republic Mortgage and Triad Mortgage) are in Greensboro's SMSA.

their postgraduate careers. The results of the survey taken in 1997 were used to shape the new applied master's program; those in 2006 are now being employed to assess how well the new program had delivered. The survey asked alumni to consider the training they had received in the four broad elements of their programs—mathematical economics and economic theory, econometrics, computational and data management skills and communication. As noted earlier, the new curriculum incorporated specific components to address each of these elements and respondents were asked to rank the quality of the training they had received in each one (1=Excellent to 5=Unsatisfactory) and the relevance that element had played in their career (1=Very Useful to 5=Not Important). The average of alumni responses to these questions are shown in Figure 3.

The instruction received in core economic theory and econometrics was rated highly by all four alumni cohorts. The faculty was particularly concerned that the ratings for these two elements remained high after the implementation of the new program because the core courses within the lock-step, three semester sequence are offered in an intense first semester sequence in which students complete a pre-fall mathematical economics camp followed by a four courses in theory and econometrics. The survey results indicate that alumni did not perceive a noticeable difference in the quality of the training as a result of this innovation in course sequencing.¹⁵ The survey result also indicated that the new program brought improvements in the quality of training in computational skills and communication as it had been designed to do. In fact, the ratings by alumni who graduated between 1998 and 2005, after the new program had been fully

¹⁵ The new fifteen hour core sequence involves a mathematical boot camp course two week prior to the official start of the fall semester followed by a fall semester that is divided into two eight week modules with micro theory and econometrics taught first and macro theory and a second econometrics course taught in the second eight weeks. With this core sequence in place applied courses could be offered during either the second or third semester of a student's residence.

implemented, indicate that the curricular innovations succeeded in delivering well-balanced, as well as high-quality, graduate training.

The relevance of the training students receive in an applied, professionally-oriented master's program is as important as its quality. Figure 3 reveals that the traditional program failed in this dimension during its first fifteen years (1973-1987), and in a pattern similar to the one that that non-academic employers described for doctoral students (Hansen, 1991)—the high quality training they received in theory and econometrics turned out to be much less important to their careers than the lower quality training they had received in computational and communication skills. The 1988-1994 alumni cohort had the highest share of graduates who pursued doctoral training, and this group, not surprisingly, found the high quality instruction they received in both economic theory and econometrics to be very useful in their post-graduate careers. But this same group also rated computational and communication skills to be very useful in their careers, and rated the quality of the instruction in those areas to have been substantially weaker. It was after the new program was fully implemented in 1998, in fact, that the quality of instruction outside the technical core areas reached concordance with the importance that alumni placed on these elements in their career.

The most important pattern in Figure 3 for understanding the role of master's programs in graduate economics education, however, may be a striking similarity in the way that the 1988-1994 and 1998-2005 alumni cohorts rated the importance of the four curricular elements in their careers. The doctoral-heavy earlier cohort placed a higher weight on economic theory, quite naturally, but both groups rated each of the other three elements—econometrics, computational skills and communication—as being very important in their careers. This pattern suggests that the transition to a professionally-oriented master's program does not necessarily entail abandoning the traditional role master's programs have played in preparing some students for

doctoral training. Instead, a well-balanced master's curriculum can offer prospective doctoral students excellent preparation for the technical rigors of a doctoral program *and* the applied research skills that are often required for academic success, but not often taught effectively in doctoral programs. As a result, high-quality, applied master's program in economics should be viewed not only as professionally-oriented terminal degrees, but also as potentially valuable complements to doctoral training.

Conclusion

In the early 1990s master's programming in economics shared at least one important attribute with the Ph.D.—remarkable uniformity in curricular structure across degree programs that served different types of students (McCoy and Milkman 1995, Krueger 1991). McCoy and Milkman (1995, p. 175) conjectured that the lack of differentiation at the master's level could have been resulted from a variety of influences—uncertainty about ultimate career trajectories among students, concern about enrollments among administrators, or an adherence to traditional curricular and academic norms among faculty. Whatever the cause, we have seen that by the early 1990s the generic master's programs in economics designed to serve both pre-doctoral and terminal degree-seeking students had been losing prestige and total enrollments for more than a decade. Although the decline in enrollments reversed in the 1990s, McCoy and Milkman (2006, p. 476) found that master's programs in economics in 2002 still “remained remarkably similar regardless of stated primary mission.”

Given the slow speed of innovation within economics graduate education, it becomes important to document its impacts when it is attempted. This paper has examined the transformation of the traditional master's program in economics at University X into a professionally-oriented, terminal applied economics program. We are reluctant to draw broad

conclusions from a single case study, but we believe that four of our results deserve attention from those considering programmatic innovation at the master's level. First, student response to the development of the new applied program was rapid as the post-graduate experience of alumni changed even before the new program was fully implemented (decreases in the shares of alumni pursuing the Ph.D. and working in education). Second, student quality as measured by average GRE scores actually increased after the implementation of the professional, terminal degree program. We conjectured from this experience that there could be a pool of talented, quantitatively-oriented students who will not pursue a Ph.D. in economics but who will consider a clearly structured, professional master's program. Third, curricular innovation that is designed to provide specific proficiencies and skills—such as the applied research and communications skills built into this program—are recognized and considered to be valuable by alumni years after graduation. Finally, applied economics programs can serve as effective complements to doctoral training for students who pursue the Ph.D. at the same time they serve the needs of terminal degree-seeking students. This is, in a sense, not surprising since it is the converse of the observations the COGEE and others have been making for nearly a decade—doctoral programs in economics in the U.S. are relatively weak in providing a full array of applied research skills and proficiencies.

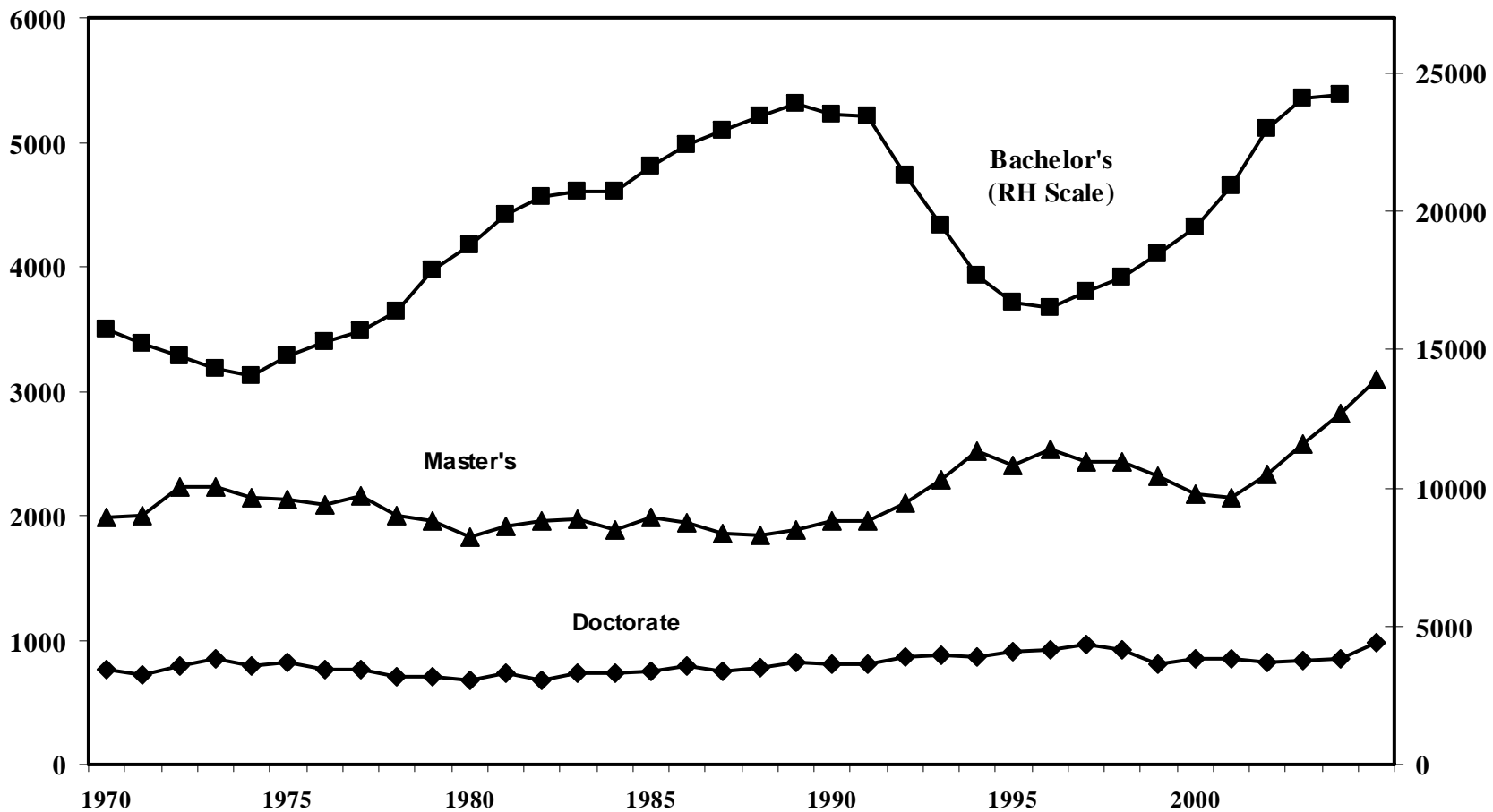
The final point just discussed is closely connected to two unanticipated impacts of the new applied economics program at UNC Greensboro that were not revealed by the alumni surveys. First, the structured, lock-step nature of the program narrowed and clarified graduate teaching needs; as a result, the department was freed to build a stronger research core in its area of greatest strength, applied microeconomics. Second, this improvement in the faculty research profile, along with the complementarities with doctoral training that was provided by the new applied master's program, led to the development some seven years later of a new, innovative

doctoral program in economics could not have been implemented had the traditional master's degree program been retained.

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Figure 1
Number of Economics Degrees Awarded in the U.S., 1970-2004



Source: U.S. Dept. of Education, National Center for Education Statistics. *Digest of Education Statistics 2006*, p. 447.

Figure 2
Pursuit of PhD and Sectoral Breakdown of Post-Graduate Employment
Alumni of Master's Program, 1975-2005

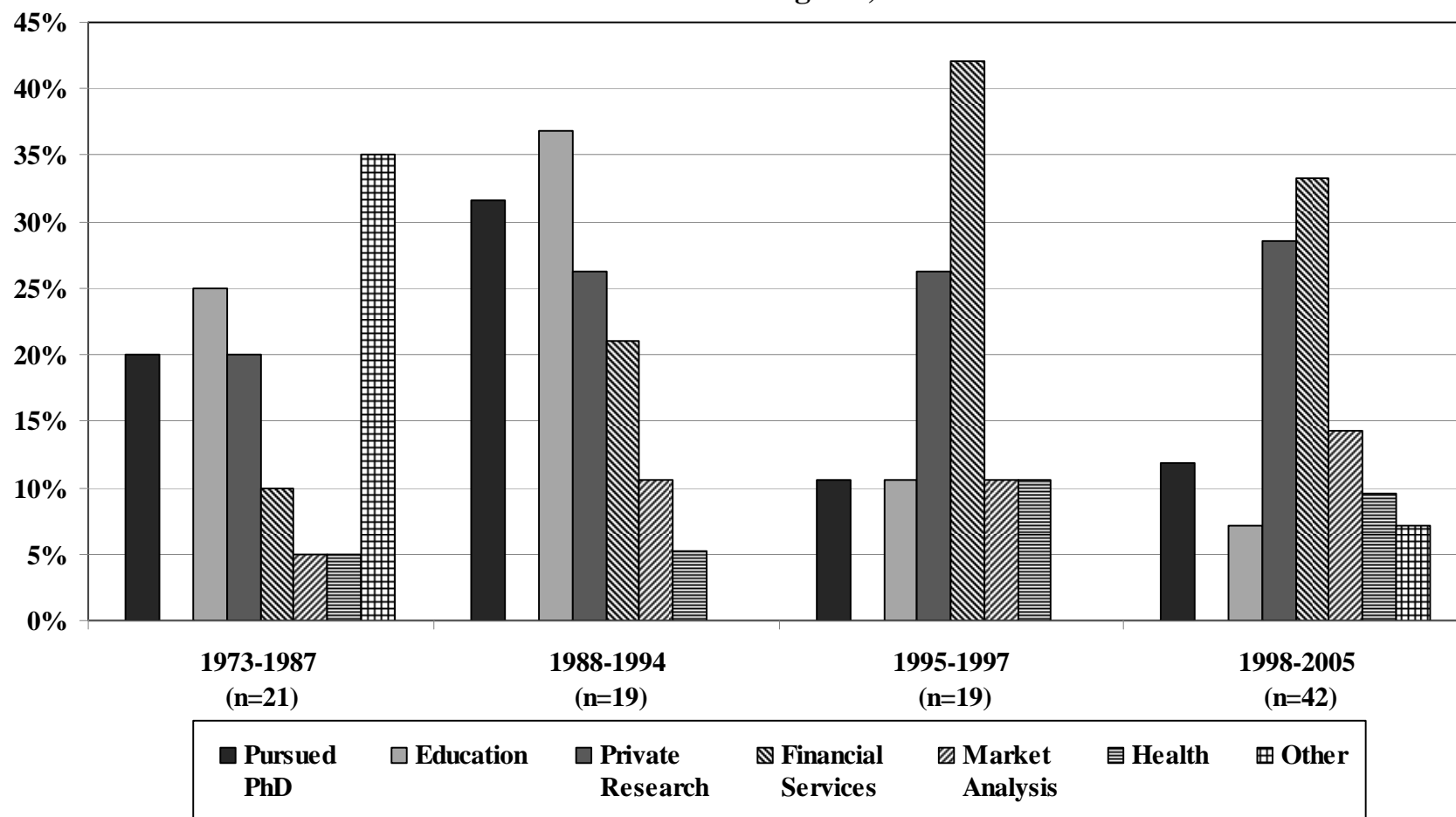


Figure 3
Quality of Instruction and Importance in Career of Components of M.A. Training
Alumni of Master's Program 1975-2005

