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# The Status of Agricultural Economics Profession: Evidence from Graduate Education

Michael R. Reed

Presidential addresses are normally forward-looking papers about the profession and where it is headed. It might be focused on the research agenda for the coming decade or the importance of connecting with the clientele base to assure that we are helping the public. It should bring insights into a topic that are not available through journal writings, maybe not as rigorous, but nonetheless thought-provoking and significant.

A fundamental factor shaping the future of our profession, as agricultural economists, is the structure of our Ph.D. programs. The Ph.D. is the “license” for an agricultural economist. It implies that the individual has a certain skill set that allows analysis that is scientific, rigorous, thorough, and insightful. This paper looks at the present structure of agricultural economics Ph.D. programs and how they have changed in recent years.

Ph.D. programs are a shared activity in that presumably all faculty members assist in their development, administration, and implementation. These programs have not only been passed by the departments, but have also survived the scrutiny of faculty members and administrators outside the department. Thus, there is normally quite a bit of thought, logic, and justification involved in their structure. These programs should reflect a shared vision of what is needed to be a full-fledged agricultural economist.

A crucial part of the Ph.D. program is the dissertation; it is probably the most important part. Yet I will not talk about the dissertation, but will instead focus on all the requirements that a student must meet before embarking on the dissertation. The predissertation requirements are what make a United States Ph.D. distinct from the Ph.D. from other countries.

Agricultural economics is an application of economics to agriculture, food, and natural resources; our root discipline is economics, so we must be quite cognizant of the expectations for a Ph.D. in economics. Our Ph.D. students normally take many courses taught in economics and our graduates compete with economics Ph.D. graduates on the job market. As the economics profession changes, agricultural economics usually changes too. So let’s begin by looking at economics education.

## Pressures to Change Economics Education at the Ph.D. Level

The last significant investigation of graduate programs in economics came from the Commission on Graduate Education in Economics in the late 1980s and early 1990s (their report was released in January 1991). That Commission, appointed by the President of the American Economic Association, stemmed from a National Sciences Foundation-sponsored symposium that focused on how economic education was too distant from real world problems. Hence, a Commission was formed that was chaired by Anne Krueger. The major

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findings of the Commission are presented by Krueger (1991) in an article in the *Journal of Economic Literature*. Many of the findings will sound familiar to you.

The Commission found that nonacademic employers of economists were dissatisfied with the training of their new Ph.D. hires. Economics Ph.D. programs, especially the core courses in macroeconomics and microeconomics, were too concerned with tools and theory; there was little in their programs dealing with creativity and problem-solving. Thus, there was no linkage between the theory and tools and the real world. Lee Hansen (1991), the Executive Secretary of the Commission, who had an article in the same issue of the *Journal of Economic Literature*, said that there was too much formalism and technique to the exclusion of studying real world problems. These structural deficiencies in economics programs were exacerbated because there was little diversity among the top Ph.D.-granting schools. All of them had uniform offerings and little differentiation.

The Commission was concerned with the ratcheting up of mathematical requirements: "as each successive generation of economists becomes more skilled at mathematics, each demands more of the next" and programs "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" (Krueger, 1991, p. 1041).

They found that this strong emphasis in mathematics leads to a "selection (of graduate students) toward good technicians, rather than good potential economists" (Krueger, 1991, p. 1042). They also feared that "insistence on ever higher levels of mathematics has actually led to shallower understanding of basic economic processes" (Krueger, 1991, p. 1044). The Commission did not conclude that the mathematical content in the economics courses was the problem, but instead the trouble came from courses that lacked application of economic concepts. However, Hansen (1991) disagreed and stated that mathematics is overemphasized in Ph.D. programs; especially since students don't use it in their dissertation or later work as professional economists.

The Commission concluded that the best economic theory courses include a blend of tools, concepts, and models that address real world issues and problems. The Commission encouraged strong seminar series within departments so that students could understand the linkages between theory and practice. They applauded the field courses in most departments because of their application focus. Yet, they did posit that students needed to write more term papers and produce other research during their first 2 years.

Does this sound familiar? Remember this was in the early 1990s; how things have changed and yet remain the same. I am the director of graduate studies at the University of Kentucky and I know these problems haven't gone away. The core sequence in microeconomics and macroeconomics at my university (which we require our Ph.D. students to take) is highly mathematical. The mathematical prerequisites necessary for a smooth transition into our Ph.D. program continues to increase. It is at least a year in calculus, a semester in matrix algebra, and some experience in higher level calculus. Some departments encourage a course in real analysis.

Some observers conclude that the situation has improved in economics programs since the Commission's report. Stock and Hansen (2004) did a survey of two sets of Ph.D. economists (one was of new economists and the other was a resurvey of those polled in a previous study). They found that 50% of the respondents report too little emphasis on applying economic theory to real world problems, understanding economic institutions and history, and understanding the history of economic ideas. The respondents also reported that application, communication, and instruction were more important to their job situation, while mathematics was the least important. However, the authors found that there had been some improvement between 1996–1997 (the first respondents) and 2001–2002 (the second respondents).

### **Ph.D. Programs in Agricultural Economics**

These problems in economics instruction have impacted agricultural economics (AEC) Ph.D.

programs and our departments have dealt with them in different ways. I believe that most agricultural economics Ph.D. programs have struggled with the increased mathematics requirements in economics core courses. This struggle has resulted in various changes to AEC Ph.D. programs that I will investigate.

I have a great advantage over authors of earlier analyses of graduate programs because all departments list their requirements on the web. I have chosen 30 Ph.D. programs in agricultural economics listed in Table 1, which constitutes all of the Ph.D. programs included in other analyses that haven't been disbanded. I have also chosen to analyze the top 13 departments to gauge whether the higher-rated departments are acting differently than the other departments.<sup>1</sup> Six of the 30 programs are housed within economics departments and one of those is a top 13 program.

Of course all agricultural economics programs require economic theory at the beginning. Most departments get some or all of that economic theory from courses offered by a department of economics. Other departments get a great deal of economic theory from their required core in AEC. It is difficult to know how much economic theory is covered in the AEC core, so a simple reporting of economics courses that are required will likely understate the theoretical content of the curriculum, but I report the numbers as economics courses required and core AEC courses required.

Microeconomic theory is an important part of all agricultural economics programs. Most departments (22 of 30) require two microeconomic theory courses from economics;<sup>2</sup> five require three courses and three require one

**Table 1.** Ph.D. Programs Included in the Analysis

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Top 13 Programs

University of California, Berkeley  
 University of California, Davis  
 Cornell University  
 University of Illinois  
 Iowa State University  
 University of Maryland  
 Michigan State University  
 University of Minnesota  
 North Carolina State University  
 Ohio State University  
 Purdue University  
 Texas A&M University  
 University of Wisconsin

Other Programs Included

University of Arizona  
 Auburn University  
 Clemson University  
 Colorado State University  
 University of Connecticut  
 University of Florida  
 University of Georgia  
 Kansas State University  
 University of Kentucky  
 Louisiana State University  
 University of Missouri  
 University of Nebraska  
 Oklahoma State University  
 Oregon State University  
 Penn State University  
 Virginia Tech  
 Washington State University

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course. Of the top 13 programs, 11 require two microeconomic theory courses, one requires one course, and one requires three courses (Table 2). There is not much difference between all programs and the top 13 programs in microeconomic theory. Whether the students are required to pass a microeconomic theory prelim doesn't differ much either. Overall 21 programs unequivocally require students to pass a microeconomic theory prelim, while nine of the top 13 programs have that requirement. There are three programs that require some students to pass the microeconomics prelim and one of those is a top 13 program.

As stated earlier, it is difficult to gauge the amount of microeconomic theory that is

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<sup>1</sup> I cannot fully justify those 13 programs and I am sure that others would have a different number to highlight and a different ranking. These are generally the highest ranked departments from the various studies that have presented such a list.

<sup>2</sup> It is difficult to compare courses across universities that involve differing systems (quarter versus semester) and different credit hours. I have tried to adjust all courses into three credit hour courses that meet for a semester. I am sure that there are some misinterpretations in this process, so these results should be viewed as a rough guide.

**Table 2.** Microeconomic, Macroeconomic, and Quantitative Methods Requirements for Ph.D. Programs in Agricultural Economics

Courses	Microeconomic Theory		Macroeconomic Theory		Quantitative Method	
	All 30	Top 13	All 30	Top 13	All 30	Top 13
0	0	0	10	6	2	1
1	3	1	12	5	0	0
2	22	11	7	2	17	9
3	5	1	1	0	11	3

covered in the core agricultural economics courses (or in the agricultural economics field courses) and I could find no publication on microeconomic theory requirements in AEC programs in the 1980s or 1990s. Foltz (1991) reported that 93% of the 30 AEC programs required the microeconomic theory prelim in the late 1980s, which is higher than the 70% that require the exam now. I would guess that many AEC Ph.D. programs have incorporated the microeconomic theory that relates most to their fields in their own courses and that those courses are structured in a way that stresses application. There is a trend away from written preliminary examinations, which will be discussed later, and this appears to be the case for microeconomic prelim requirements too.

Macroeconomics is the second core component in economics programs. However, it has definitely diminished in its importance for agricultural economics Ph.D. programs over the years. Currently, 33% of AEC programs require no macroeconomics and six of those are in the top 13 (Table 2). Twelve programs require one macroeconomics course (five of them top 13), seven programs require two macroeconomics courses (two in the top 13), and one program requires three macroeconomics courses. Only six programs (or 20%) require a macroeconomics prelim and only two of them are in the top 13. This contrasts with the late 1980s when 73% of the AEC programs required a macroeconomic prelim (Foltz, 1991). One program requires a macroeconomics prelim for those students whose performance is subpar.<sup>3</sup>

<sup>3</sup>Two programs require an economic theory exam that covers microeconomic and macroeconomic theory. Neither of these programs is in the top 13.

It is doubtful that much of the AEC core courses cover traditional macroeconomics, so it is safe to say that macroeconomics has been de-emphasized in many AEC Ph.D. programs. This means that agricultural economists have a different core theory sequence than economics students in many programs, which bothers Hallam (1998). He feels that if agricultural economics is a subdiscipline of economics, it should have the same core requirements as economics. He also believes that macroeconomics is fundamental to understanding many agricultural economics issues. Perry (1998) argues that macroeconomics is a subdiscipline in economics and should not be required of all agricultural economists. It seems that our profession is voting in favor of Perry’s ideas when it comes to program structure.

Part of the problem with AEC departments requiring macroeconomics might be that one never quite knows what will be covered in these courses from year to year. In contrast to microeconomics, which has a basic foundation that has been built over the years, macroeconomics at the Ph.D. level is more diverse. Another problem is the level of mathematics used in macroeconomics. I agree with Hallam (1998), though, that macroeconomics is fundamental to understanding economic development and growth, international trade, and inflation. He further states that concepts and tools used in macroeconomics, such as dynamic optimization, overlapping generations, and market imperfections are important to agricultural economists.

I feel it is important because we never know where our students will ultimately be employed. Fifteen of my 29 Ph.D. students are employed outside of agriculture, so they benefit

when I can say in a letter of reference that our students take the same core economic theory classes as economics Ph.D. students. However, I can no longer say that they are required to pass the same economics prelims because our students can opt out of the macroeconomics prelim if they get a “B” or better in both macro courses.

One area that has increased in importance for agricultural economics is quantitative methods. Seventeen programs require two quantitative methods courses (9 in the top 13) and 11 require three quantitative methods courses (3 in the top 13) (Table 2). Two programs require no quantitative methods courses and one of those is in the top 13 (interestingly, no program requires only one quantitative methods course). Again, some quantitative methods are also likely covered in other agricultural economics courses within the core or special field courses. Seven programs require a quantitative methods prelim (2 in the top 13) and one program requires the exam in some circumstances. Despite the higher number of courses required, there are fewer programs that require a preliminary examination in quantitative methods, again evidence that programs have moved away from comprehensive written exams. Foltz (1991) found that nine programs required a quantitative methods or econometrics prelim.

The agricultural economics classes and preliminary exams that are required for the Ph.D. differ widely by program (Table 3). It is quickly obvious that in contrast to economics, agricultural economics programs are much

more diversified. Sixteen programs have a set of AEC courses that all students must take. This varies from one to four courses and it is clear that the content of those courses differs by program. Some involve coverage of a few agricultural economics fields, while others are applied microeconomic theory or even research methods and methodology. Nine of the top 13 programs have a core in AEC, so a higher percentage of the top programs have an AEC core.

The most common requirement among all the 30 programs is that the students take courses to constitute a field in agricultural economics—only four programs do not require a special field (one of them is a top 13 program). Seventeen programs require an AEC prelim (8 of the top 13), and many of these are field prelims. I could only find one program that clearly stated that two AEC prelims were required and that was for two fields. Two programs required that students take an AEC prelim under certain circumstances. This has stayed constant relative to what Foltz (1991) found in the late 1980s, when 50% of the programs required a prelim in the student’s major field.

As noted earlier, the Commission’s report suggested that economics students get more writing experience in their first 2 years. I feel that many agricultural economics programs have substantially increased their student writing requirements over the years through term papers and other projects. Eight programs (7 of the top 13) require their students to complete a research paper during their second year to show their research skills. There are specific criteria for the paper and the students are required to pass in order to continue in the Ph.D. program. This is a relatively new requirement and it seems that the top programs are leading the way. Two other programs allow a research paper in lieu of a preliminary exam.

The increased emphasis on writing and research during the first 2 years of the Ph.D. program addresses some of the Commission’s concerns nicely and it makes sense. One of our Ph.D. program’s learning outcomes is for the student to “possess strong research, teaching/outreach, and presentation skills” and we are required by our assessment office to measure

**Table 3.** Various Requirements for Ph.D. Programs in Agricultural Economics

	All 30 Programs	Top 13 Programs
Microeconomic Prelim	21 (3)	9 (1)
Macroeconomic Prelim	6	2
Quantitative Method Prelim	7 (1)	2
AEC Core	16	9
AEC Fields	26	12
AEC Prelim	17	8
Research Paper	8 (2)	7

whether we are meeting this outcome. The research paper during the second year is a reasonable way to assess the student's independent research capability earlier in their program (rather than waiting on the dissertation research).

The research paper route also makes sense because it models a situation that most Ph.D. students will face continually in their professional career, whereas after the student's last written prelim is completed, they will likely never face that situation again. The research paper should help students compete on the job market by giving them another research product that can be on their CV and presented at a professional meeting or published in a journal. It is a win-win adaptation.

**Funding and Placement of Agricultural Economics Ph.D. Students**

Program structure is very important, but usually Ph.D. students need funds to support their time in the program and they need a job when they graduate. Some would argue that the ultimate measure of a program's success is its placement of graduates. For that reason, I constructed a survey of graduate programs and sent it electronically to the 30 graduate directors. I had 21 surveys returned (10 by top 13 programs). I appreciate the help that those directors and their staff provided to assist this work. Among the questions asked was graduate student funding.<sup>4</sup>

With state government budgets constrained and formula funding from United States Department of Agriculture remaining flat for most years, hard-money allocations for research assistantships have been reduced for most departments over the years. Research assistantships are the second area to be cut in our department (after current expenses) as budgets are tightened. These tighter hard-dollar budgets have required departments to diversify funding sources for their Ph.D. students.

**Table 4.** Funding of Ph.D. Students in Agricultural Economics

	All 30 Programs	Top 13 Programs
State or Federal	37.0	32.3
Grants	32.2	35.1
Other University Funds	17.1	18.4
Private	13.7	14.2

The largest source of funds for Ph.D. students among the 30 programs is still hard money through the state or federal government (Table 4). Programs reported that 37.0% of their Ph.D. students were funded through hard money sources while 32.2% were from grants. A surprisingly 13.7% of the students received money from private sources. The Top 13 programs had a higher percentage of their students on grants (35.1%) and a lower percentage on hard money (32.3%). The balance of funding comes from various fellowships through the department/university or government/international organizations (accounting for 17.1% of the students from the 30 programs and 18.4% from the top 13).

From my discussions with colleagues over the years, I thought that the number of hard-funded assistantships had been falling markedly throughout time; and maybe they have. I think that some departments have lost money for research assistantships but have gained money through teaching assistantships (particularly those programs that have merged with economics departments). Yet, these hard funds are still an important part of the package for Ph.D. students in most programs.

Despite funding constraints that seem to have tightened over the years, the average program size has remained about the same. I asked about where these Ph.D. students were placed for two different periods: 2003–2005 and 2006–2008. Programs averaged 18.1 graduates during both the early period and later period (Tables 5 and 6), which is almost seven graduates per year, much more than the minimum efficient size of two per year estimated by Scott and Anstine (1997) for economics programs. The Top 13 programs averaged 21.4

<sup>4</sup>The survey was about Ph.D. students, but it is possible that some programs answered the funding and placement questions based on all graduate students.

**Table 5.** Job Placements of Ph.D. Students in Agricultural Economics, 2003–2005

	All 30 Programs	Top 13 Programs
U.S. Academic	35.7	38.6
Foreign Academic	16.8	17.3
U.S. Government	9.4	7.6
Foreign Government	10.2	12.7
Private Sector	28.0	23.9
Total Placements	18.1	21.4

graduates during the early period and 22.6 during the later period, so they were averaging over seven graduates per year.

I had a feeling, from my two tours of duty as a director of graduate studies at the University of Kentucky that a large percentage of the Ph.D. students were going into the private sector these days. It turns out that we had the highest such percentage for the early period and we were the third highest for the later period, so our experience was definitely misleading (Tables 5 and 6). Among the 21 programs that reported, in the early period 35.7% of the placements were in U.S. academic positions, while the private sector accounted for 28.0%. Foreign academic institutions accounted for 16.8% of the placements, foreign governments 10.2%, and the U.S. government 9.4%.

The 2006–2008 period had a higher percentage of United States and foreign academic placements (40.6% and 19.7%, respectively), and a lower percentage of placements in governments and the private sector. This was surprising to me and indicates that universities were able to hire more faculty members just

**Table 6.** Job Placements of Ph.D. Students in Agricultural Economics, 2006–2008

	All 30 Programs	Top 13 Programs
U.S. Academic	40.7	45.6
Foreign Academic	19.7	18.4
U.S. Government	8.1	7.0
Foreign Government	7.7	7.1
Private Sector	23.8	21.9
Total Placements	18.1	22.6

before the recession, which is good news. The Top 13 programs had a slightly higher percentage of placements in U.S. academic institutions for both periods, and for foreign academic institutions and governments in the early period. They had lower percentages in all the other categories. They also average more graduates than the overall programs.

## Conclusions

I think that the Commission on Graduate Education in Economics might be relatively pleased with the changes that have been made in agricultural economics Ph.D. programs in the last two decades. Our programs are quite diverse with differing course and examining requirements; probably much more diverse than economics programs. Many programs have increased their predissertation writing and research requirements and some require a research paper before entry into candidacy. Differences in the existence or constitution of a core in AEC are a major factor. Other requirements that differ widely among programs are macroeconomic requirements, quantitative methods requirements, and all of the written preliminary requirements. This diversity is within the top 13 programs, too.

The Commission would likely applaud the problem-solving focus of most programs and the requirements to write about current topics. Yet, I think they would observe that this applied focus has taken us away from the core discipline more than they would like. The reduction in macroeconomic theory requirements would definitely bother them. They would wonder why agricultural economics, which has focused so much on economic development, commodity and land values, and inflation's effects, has reduced its macroeconomic course and preliminary examination requirements. They would also be concerned with programs that have incorporated macroeconomics and microeconomics into their core and wonder whether this has diminished the theoretical content.

What does the future hold for our Ph.D. programs? I am optimistic because agricultural economics programs seem more willing to experiment and change in order to survive. There

have been a number of programs that have merged with economics in order to keep producing Ph.D. students with expertise in agricultural economics. Many have stream-lined their Ph.D. examining process to get students through faster and have developed research paper requirements that help students become more adept at research early in their program. I think that our programs are more creative and adaptable. However, I believe our Ph.D. programs, particularly the top programs, will move back toward a stronger focus with economics programs.

The strong emphasis on quantitative methods in most departments will enable Ph.D. graduates from those departments to take private sector jobs that require great skills in data management, analysis, and reporting. The information technology revolution has enabled firms to collect reams of data, and our Ph.D. graduates are not only able to manage vast quantities of economic data, but also analyze it with statistical structures that conform to basic microeconomic and macroeconomic theory. This gives them a great advantage over other disciplines. Yet we must continue to have our students well grounded in economic theory before they analyze all these data.

I don't know that we will continue to need 30 Ph.D. programs in the future. We will likely see more programs merged with economics to the benefit of both sides (strengthening the

core theory of AEC graduates and bringing more diversity to economics programs) and there will be other programs that disappear. Nonetheless, I am sure that our Ph.D. programs will continue to provide the world with highly skilled technicians that can make the world a better place.

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