What Interests Environmental and Resource Economists? A Comparison of Research Output in Agricultural Economics versus Environmental Economics

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We compare the research productivity of faculties housed in departments offering doctoral degrees in agricultural economics (AgEcon) with faculties housed in departments offering doctoral degrees in economics (Econ) that specialize in environmental and resource economics. Rankings are based on faculty publications in *EconLit* between 1985 and 2010. We find that AgEcon departments publish more papers and rate higher overall on productivity measures than Econ departments but that average productivity is greater for Econ departments. AgEcon publications dominate the *Journal of Economic Literature*'s (JEL's) agriculture (Q1) subdiscipline while Econ and AgEcon departments publish evenly in the other Q subdisciplines.

Key Words: agricultural economics, department rankings, environmental and natural resource economics, research output

Economists and other academicians have demonstrated enormous interest in studying their own disciplines. The primary justifications for such research are information to improve employer/employee matching, an aid in setting benchmarks for research productivity, and satisfaction of a natural curiosity about our profession. As an indicator of the popularity of this research, the American Economic Association cites published research on department productivity as a resource for graduate students. Furthermore, peer-reviewed studies of rankings and productivity are fascinating to members of the profession. As Dusansky and Vernon (1988, p. 157) put it, "Many academics publicly claim to hate rankings, even while they privately pore over them. Whatever one's reactions to rankings, they are an undeniable part of modern academic life."

Initially, research on ranking economics (Econ) and agricultural economics (AgEcon) departments tended to focus on the overall publication productivity of departments in a select set of journals (Holland and Redman 1974, Dusansky and Vernon 1998, Willis, Willis, and Shea 1993). More meaningful measures of such research patterns have examined productivity based on subdisciplines. In the field of agricultural and resource economics, for example, Tschirhart (1989) and Grijalva and Nowell (2008) provided rankings for faculties of

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Econ departments based on research productivity in JEL (*Journal of Economic Literature*) category Q, which covers agricultural, resource, and environmental economics. In addition, a number of studies have provided rankings for departments of agricultural economics (Beilock, Polopolus, and Correal 1986, Kinnucan and Traxler 1994, Perry 2004, Hilmer and Hilmer 2007, Dridi, Adamowicz, and Weersink 2010).

Early studies of agricultural and resource subdisciplines within Econ departments led to questions about how AgEcon departments fare in JEL category Q relative to Econ departments that specialize in the category. One example of the concern is identified in a popular online resource related to environmental economics that is coordinated by Tim Haab and John Whitehead (2008) (see *www.env-econ.net/2008/05/where-should-yo.html*).

The interest in comparing the two types of departments motivated our study, which compares the research productivity of departments that offer doctoral degrees (PhDs) in AgEcon to the research productivity of departments that offer PhDs in Econ that specialize in environmental and resource economics. We are aware of no prior research in ranking departments in the subdiscipline of agricultural and resource economics that has included both types of departments (AgEcon and Econ). This study extends our prior work in agricultural economics (Grijalva and Nowell 2008), which recognized that both AgEcon and Econ departments produce research in that discipline.

Our rankings are based on citations between 1985 and 2010. In addition, we directly compare overall research productivity in Econ and AgEcon departments using rankings provided by Grijalva and Nowell (2008).

Attempts to rank departments are fraught with danger. Thursby (2000), for example, noted that single measures of department productivity may highlight meaningless differences between departments, a concern that is reiterated in our results when using only aggregate measures of performance. Therefore, to complement information on rankings, we also compare AgEcon and Econ departments by analyzing the subfields in JEL category Q, thus highlighting some differences that aggregate measures of productivity might gloss over. Thursby (2000) also cautioned that department rankings are most telling for departments at the high and low ends of the spectrum and less meaningful for mid-level departments. He recognized that rankings that use population data render the concept of statistical significance less relevant but do not eliminate the need to focus on meaningful differences. We examine rankings for top Econ and AgEcon departments as identified by past research and obtained comprehensive publication records for faculty members in those departments who had published research in JEL category Q. We focus our discussion on meaningful differences rather than statistical differences because of the use of population data.

Identifying differences in the research patterns of AgEcon and Econ departments is important for several reasons. First, as departments assess their performance, benchmarks are invaluable. If, for example, a department has a goal of becoming a top-ten program in a specific field, the department needs to know where it currently ranks and what is required to move up in the rankings. Second, we demonstrate overlaps in research conducted by environmental and resource economists in AgEcon and Econ departments. The resulting information will enable more accurate matching of academic employers with PhD job candidates. In many cases, the best candidate for an academic position in an AgEcon department may be a graduate from an Econ department. Likewise,

an Econ department looking for an environmental economist may find that the best candidate is a graduate from an AgEcon program. Our research will provide information regarding when this cross-over is most beneficial. Finally, since graduates of relatively highly ranked programs tend to publish their research in relatively prestigious journals (Coupe 2003, Siegfried and Stock 2004, Hilmer and Hilmer 2007), identification of top programs is paramount for academic employers, an assertion supported by Stock and Alston (2000), who showed that schools prefer to interview job candidates from highly ranked programs and are willing to pay candidates from highly ranked programs more even when they controlled for observed differences in research qualifications. Identification of highly ranked programs thus is valuable to both employers and candidates from top-ranked programs.

Methods

As in Tschirhart (1989) and Grijalva and Nowell (2008), the data gathering stage in this study consisted of four steps: (i) identifying the top-ranked PhD-granting institutions in Econ departments that specialize in JEL category Q and in AgEcon departments; (ii) identifying all tenure-track and tenured faculty members at those departments (late-winter and early-spring of 2010) who had published at least one article in JEL category Q; (iii) acquiring a comprehensive list of faculty publications from the *EconLit* database; and (iv) determining the quality of the publications that each author contributed.

We limit our study to the top fifteen AgEcon departments identified by Perry (2004) and the top fifteen Econ departments publishing in JEL category Q identified by Grijalva and Nowell (2008).[1] Two of the universities identified, Iowa State and North Carolina State, are joint Econ and AgEcon programs so we identify them as joint programs rather than including them in both AgEcon and Econ listings. Thus, we use 28 schools in the analysis. The selected AgEcon programs expand the perspective of the Econ rankings (in JEL category Q) published by Grijalva and Nowell (2008) by ensuring that top-recognized AgEcon programs are included. While the selection of fifteen schools eliminates many departments, studies by Perry (2004) and Hilmer and Hilmer (2007) used twenty-two AgEcon schools and Dridi, Adamowicz, and Weersink (2010) included three U.S. AgEcon programs to compare to five Canadian AgEcon programs.

We exclude lower-ranked Econ and AgEcon schools for two primary reasons. Prior studies (Brookshire and Scrogin 2000, Hilmer and Hilmer 2007, Grijalva and Nowell 2008) have shown that the number of scholarly contributions from top-tier departments in agricultural, resource, and environmental economics dwarfs the number from lower-ranked schools. In addition, prior studies that ranked Econ or AgEcon departments (Beilock, Polopolus, and Correal 1986, Dusansky and Vernon 1998, Hilmer and Hilmer 2007, Grijalva and Nowell 2008, Tschirhart 1989) found that differences in productivity decline as rankings decline. While our sample of programs does not represent all programs that award PhDs in agricultural, resource, and environmental economics, it provides the best method by which to examine research done in PhD-granting Econ and AgEcon institutions.

[1] Hilmer and Hilmer (2007) similarly used a prior working paper by Perry (1999) on productivity in AgEcon departments.

Table 1. Schools

Departments of Economics	Ranking Nowell and Grijalva 2008	Departments of Agricultural Economics	Ranking Perry 2004	1999
Iowa State University[a]	1	Univ. of California Berkeley	1	1
North Carolina State University[a]	2	Univ. of California Davis	2	2
University of Wyoming	3	University of Maryland	3	3
Harvard University	4	Iowa State University[a]	4	4
Yale University	5	North Carolina State[a]	5	5
UC Santa Barbara	6	Cornell University	6	9
MIT	7	University of Minnesota	7	6
University of Rhode Island	8	Ohio State University	8	13
Georgetown University	9	Purdue University	9	8
State Univ. of New York Binghamton	10	University of Wisconsin	10	7
Stanford University	11	University of Illinois	11	12
University of Colorado Boulder	12	Texas A&M University	12	10
Utah State University[b]	13	Michigan State University	13	11
Rensselaer Polytechnic Institute	14	Oregon State University	14	14
University of Connecticut	15	Washington State Univ.[a]	15	21

[a] The department offers both an economics and an agricultural economics PhD.

[b] In 2008, Utah State University's Department of Economics split into two departments: (i) Economics and Finance in the College of Business and (ii) Applied Economics in the College of Agriculture. A doctorate is offered in applied economics.

The programs considered for the analysis are shown in Table 1. Econ departments are defined as departments that offer PhDs only in economics, AgEcon programs are departments that offer PhDs only in agricultural economics, and joint departments offer PhDs in both.

We identified all full-time faculty members for each university using department websites. One minor shortcoming of this approach is the lag that sometimes occurs in updates to such lists. In addition, we recognize that some faculty members who are part of other departments may contribute to the general mission of an Econ or AgEcon department. The challenges associated with identifying such faculty members made their inclusion impractical. Faculty members who were identified as adjunct, visiting, extension, and clinical also were excluded.

We next acquired a list of all journal publications in JEL category Q for each faculty member from the *EconLit* database. Faculty members were dropped from the analysis when no category-Q publications were listed under their names. Our resulting sample consisted of 505 subjects, and those subjects collectively had published papers in 242 journals that were included in the Social Science Citation Index (SSCI) or the Research Papers in Economics (RPE) database found at *http://ideas.repec.org/top/top.journals.simple.html*. Publications that had neither an SSCI nor an RPE score were dropped from the analysis. The 505 faculty members represent 56 percent of the entire number of faculty

members identified for the 28 departments. From 1985 through 2010, the average number of publications per faculty member in our sample was 24.85, and 49 percent of the articles were published in category Q. The average annual publication rate for the sample is 2.13 articles per year, which is significantly higher than the rate noted by Hilmer and Hilmer (2007) for students graduating from top-tier programs.[2] Table 2 provides a list of the journals in which the faculty members most frequently published in JEL category Q with associated SSCI and RPE impact factors. The *American Journal of Agricultural Economics* (AJAE) dominates the list at 1,186 papers. Second on the list, far behind AJAE, is the *Journal of Environmental Economics and Management* at 250 publications. We include 242 journals in our analysis, but the number of articles published

[2] Hilmer and Hilmer (2007) estimated that recent graduates from top-tier AgEcon programs produced an average of 4.37 articles over a period of approximately ten years ending in December of 2004.

Table 2. Most Popular Publication Outlets

Journal	Number of Unique Publications	SSCI Impact Factor	RPE Impact Factor
American Journal of Agricultural Economics	1,186	0.97	3.33
Journal of Environmental Econ. and Management	250	1.73	6.84
Review of Agricultural Economics	224	0.71	0.92
Journal of Agricultural and Resource Economics	193	0.41	2.06
Land Economics	185	1.02	2.41
Journal of Applied and Agricultural Economics	181	0.19*	0.85
Canadian Journal of Agricultural Economics	158	0.62	0.77
Agricultural Economics	133	0.48	1.82
Environmental and Resource Economics	119	1.08	2.28
Agricultural and Resource Economics Review	118	0.19*	0.83
Ecological Economics	111	1.92	1.22
Agribusiness	100	0.18*	0.81
Marine Resource Economics	74	0.20*	0.87
Agricultural Finance Review	70	0.05*	0.24
Environment and Development Economics	63	0.81	1.72
Southern Journal of Agricultural Economics	63	0.10*	0.43
European Review of Agricultural Economics	62	1.02	1.42
Choices	61	0.06*	0.28
Resource and Energy Economics	61	1.06	2.03
Journal of Agricultural Economics	61	1.27	1.85
Western Journal of Agricultural Economics	60	0.23*	1.03
World Development	59	1.39	2.26
Food Policy	58	1.35	0.67
AgBioForum	52	—	—
Applied Economics	49	0.43	1.54
Review of Economics and Statistics	40	2.23	15.05
American Economic Review	26	2.29	15.46

Note: * denotes a predicted SSCI impact factor.

per title declines rapidly. Only 66 journals had published ten or more papers, and more than 60 percent of the 242 articles appeared in the ten most popular journals.

The *EconLit* database provides four pieces of information that are essential for our analysis—each article's source, number of pages, number of authors, and assigned JEL codes. We used the article's source to assess its quality. The credit each author received for a publication is weighted by the number of authors and number of pages of the article. Thus, a larger number of coauthors reduced the credit received while a greater number of pages increased the credit received. The subject codes were used to sort the articles by field of expertise.

We next assigned a quality index, Q_j, to each journal. We used both the impact factors published by SSCI in 2008 and recent simplified impact factors reported by RPE. Of the 242 journals, 123 had an SSCI and an RPE score, 38 had only an SSCI score, and 81 had only an RPE score.

To provide the largest number of journals possible, we used the 123 journals that had both impact scores to estimate a regression equation: $SSCI\ Score = \beta_0 + \beta_1\, RPE\ Score$. From this regression, we obtained predicted SSCI scores for the journals that had RPE scores only.[3] Our rankings and the associated analysis are based on the actual SSCI scores when available and on the predicted SSCI scores otherwise. Using a different functional form to obtain estimated SSCI scores had no significant impact on our analysis. Eliminating the journals that lacked an SSCI score tended to reduce the rankings of AgEcon departments relative to rankings of Econ departments while using only the RPE scores tended to reduce the rankings of Econ departments relative to AgEcon departments. In both cases, the rankings of the top departments were not significantly different from the rankings generated with our predicted SSCI scores.

Following Grijalva and Nowell (2008) and Tschirhart (1989), we adjusted the scores for each article by the number of authors and number of pages to account for the relative contribution of the research conducted by each author; more coauthors reduced the credit received while a greater number of pages increased credit received. First, we divided the number of pages in article i, $pages_i$, by the number of authors (n), thus ensuring that each author received $1/n$ credit times the number of pages. We then took the value from the first calculation and divided it by the average length of all of the articles in our sample that were published in that journal, j ($\overline{p}_j$). Each coauthor of article i in publication j thus receives the following credit or weight, W_{ij}:

$$W_{ij} = \frac{pages_i \,/\, n_i}{\overline{p}_j}. \tag{1}$$

This weighting scheme facilitates a comparison of the results from this study with those of prior studies.

The final step was to calculate a weighted quality value for each article of author i by multiplying Q_j by W_{ij}, yielding a productivity value, P_{ij}. These productivity values were summed by school and used to determine department rankings.

[3] The estimated values were 0.03 for β_0 and 0.22 for β_1. The correlation between the estimated SSCI ranking and the RPE ranking was 0.83.

Table 3. Statistics for JEL Category Q

Subdiscipline	(a) No. of Unique Articles	(b) Average Journal Quality	(a)×(b) Total Value of Articles	(c) Average No. of Authors per Article	(b)÷(c) Average Author Contribution per Article
Q1: agriculture	3,632	0.72	2,615	2.33	0.31
Q2: renewable energy and conservation	1,498	1.06	1,588	2.13	0.50
Q3: nonrenewable energy and conservation	266	1.08	287	1.85	0.58
Q4: energy	185	0.98	181	2.24	0.41
Q5: environmental economics	642	1.00	641	2.38	0.42

Results

Table 3 reports statistics for the articles in our sample by category Q subdiscipline. Most were published in Q1, agriculture. The articles in Q1 were, on average, published in journals of significantly lower quality than articles in the other subcategories.[4] The articles with the highest average value scores were published in Q2, renewable resources and conservation, and Q3, nonrenewable resources and conservation. Articles in these categories were published in journals of significantly higher quality than articles published in other areas. In addition, the average number of authors per article was smallest in category Q3. As a result, the average productivity value an individual author received for articles was greatest for Q2 and Q3 and least for Q1.

One can interpret the results shown in Table 3 as reflecting what economists view as important in agricultural, resource, and environmental economics. The vast majority of research conducted falls under agriculture, and, although the average value of an article published in that area is the lowest of any of the subdisciplines, the total value of the articles far outweighs the total contribution of any other subdiscipline.

Prior to addressing specific research conducted by faculties in agricultural, resource, and environmental economics, we compare the AgEcon departments included in this study with all Econ departments included in Grijalva and Nowell (2008).[5] As shown in Table 4, the AgEcon program that tops the rankings between 1985 and 2004, University of California (UC) Berkeley, would have ranked between 31st and 32nd in the Grijalva and Nowell study. (In Table 4, refer to the square brackets to see where the AgEcon department would have ranked.) In general, AgEcon programs fall in the middle of the rankings of the 129 programs studied by Grijalva and Nowell (2008).

[4] Significance is based on a two-sample t-test comparing the noted category with all other categories using p = 0.05. Because our data are drawn from a select sample of faculty at top-tier departments, caution should be used in extending conclusions to a larger group.

[5] To make an accurate comparison, we obtained a list of faculty members in each AgEcon department in 2004 and a full list of their publications from *EconLit*.

Table 4. Rankings of the Departments Included in This Study Compared to Grijalva and Nowell's 2008 Rankings

School	Rank Position	School	Rank Position
Harvard University	1	University Wyoming	61
MIT	4	University of Minnesota	[61, 62]
Yale University	5	Purdue University	[64, 65]
Stanford University	9	University of Wisconsin	[65, 66]
North Carolina State University	30	University of Connecticut	68
Iowa State University	31	Oregon State University	[73, 74]
Univ. of California Berkeley	[31, 32][a]	State Univ. of New York Binghamton	77
Univ. of California Davis	[34, 35]	Ohio State University	[80, 81]
Georgetown University	36	Texas A&M University	[83, 84]
University of Maryland	[40, 41]	Rensselaer Polytechnic Institute	84
University of Colorado Boulder	42	Michigan State University	[88, 89]
UC Santa Barbara	51	Washington State University	[97, 98]
University of Illinois	[53, 54]	University of Rhode Island	117
Cornell University	[58, 59]	Utah State University	119

[a] The brackets indicate the ranking location of the AgEcon department. For example, UC Berkeley's AgEcon department would have ranked between the 31st and 32nd Econ department ranked by Grijalva and Nowell (2008).

In Table 5 we report the total research productivity, based on publications in all JEL categories, of faculty that publish in agricultural, resource, and environmental economics for the 28 schools included in the analysis for 1985 through 2010. Two top-ranked Econ programs lead the rankings, Harvard University and MIT. Following those programs, both Econ and AgEcon programs are found in the top ten. As expected, differences in productivity among departments are large at the top of the list. Harvard has a total productivity z-score of 3.54 and Yale University, which is ranked fifth, has a z-score of 0.59, a difference of 2.95 standard deviations. The program ranked 28th, Utah State University, has a z-score of –0.99. The difference between Yale University and Utah State University is only 1.58 standard deviations. Thus, differences in productivity clearly diminish as ranking declines. In terms of average productivity measures, Econ departments predominate with nine of the top ten.

Table 6 reports the results of ranking of departments by productivity in category Q. In these rankings, the AgEcon schools and the two combined programs dominate the top ten with only one Econ program, University of Wyoming, included. The average productivity rankings, on the other hand, are mainly Econ departments with a single AgEcon department, University of Maryland, in the top ten. The number of category Q publications from AgEcon schools between 1985 and 2010 varies from 659 by UC Davis to 117 by Oregon State University with an average of 344.69. The number of category Q publications from Econ schools varies from 281 by University of Wyoming to 23 by Georgetown University with an average of 71.69, approximately 20 percent of the output by AgEcon schools.[6] Econ departments are producing

[6] The averages for both AgEcon and Econ include Iowa State University and North Carolina State University publications.

Table 5. Rankings Based on Overall Research Productivity of Faculty Publishing in Agricultural, Resource, and Environmental Economics

School	Total Productivity Rank	Total Productivity Z-score	Average Productivity Rank	Total No. of Publ'ns	Dept. Type
Harvard University	1	3.54	3	968	Econ
MIT	2	2.52	1	608	Econ
UC Davis	3	0.88	14	962	AgEcon
Iowa State University	4	0.59	15	836	Combined
Yale University	5	0.59	2	331	Econ
North Carolina State	6	0.29	12	667	Combined
UC Berkeley	7	0.24	11	631	AgEcon
University of Maryland	8	0.22	9	576	AgEcon
Stanford University	9	0.18	4	278	Econ
Cornell University	10	0.16	23	775	AgEcon
University of Wyoming	11	0.16	10	556	Econ
Purdue University	12	–0.15	27	645	AgEcon
University of Illinois	13	–0.20	19	533	AgEcon
University of Minnesota	14	–0.23	13	421	AgEcon
University of Colorado Boulder	15	–0.26	8	338	Econ
Michigan State University	16	–0.38	26	492	AgEcon
University of Wisconsin	17	–0.38	17	379	AgEcon
Ohio State University	18	–0.38	21	432	AgEcon
UC Santa Barbara	19	–0.49	5	150	Econ
State Univ. of New York Binghamton	20	–0.53	7	209	Econ
Texas A&M University	21	–0.56	28	534	AgEcon
Washington State University	22	–0.63	24	303	AgEcon
Oregon State University	23	–0.75	16	183	AgEcon
University of Connecticut	24	–0.75	22	218	Econ
Georgetown University	25	–0.87	6	71	Econ
University of Rhode Island	26	–0.89	18	128	Econ
Rensselaer Polytechnic Institute	27	–0.94	20	105	Econ
Utah State University	28	–0.99	25	84	Econ

Notes: The z-score represents the distance between the total-productivity raw score and the population mean in units of the standard deviation (rounded to the nearest hundredth). The average productivity ranks are based on the average productivity scores.

Table 6. Rankings Based on Category Q Productivity

School	Productivity Rank	Productivity Z-score	Average Productivity Rank	No. of Publications	Dept. Type
UC Davis	1	2.61	17	659	AgEcon
Iowa State University	2	1.90	15	522	Combined
University of Maryland	3	1.50	10	376	AgEcon
UC Berkeley	4	1.08	14	382	AgEcon
University of Wyoming	5	0.96	9	281	Econ
Cornell University	6	0.95	22	454	AgEcon
North Carolina State	7	0.88	18	378	Combined
Purdue University	8	0.55	27	441	AgEcon
University of Illinois	9	0.47	25	380	AgEcon
University of Minnesota	10	0.37	19	297	AgEcon
Michigan State University	11	0.35	24	353	AgEcon
University of Wisconsin	12	0.03	16	233	AgEcon
Ohio State University	13	–0.19	23	244	AgEcon
Texas A&M University	14	–0.28	28	383	AgEcon
Yale University	15	–0.40	1	51	Econ
Harvard University	16	–0.47	3	64	Econ
UC Santa Barbara	17	–0.48	6	70	Econ
Oregon State University	18	–0.57	13	117	AgEcon
Washington State University	19	–0.66	26	159	AgEcon
State Univ. of New York Binghamton	20	–0.72	7	64	Econ
University of Rhode Island	21	–0.85	21	106	Econ
MIT	22	–0.85	2	32	Econ
Stanford University	23	–0.85	5	41	Econ
University of Colorado Boulder	24	–0.92	8	55	Econ
University of Connecticut	25	–1.04	11	50	Econ
Utah State University	26	–1.09	20	57	Econ
Georgetown University	27	–1.10	4	23	Econ
Rensselaer Polytechnic Institute	28	–1.14	12	38	Econ

fewer articles but publishing them in more highly ranked journals. AgEcon departments may be more likely to have a dual mission of pure research and applied research, which is less frequently cited by academics and more likely to be used by Cooperative Extension agents and other practitioners in the field.

To further investigate differences in publication patterns between Econ and AgEcon departments, we focus on the subdisciplines of JEL category Q. Tables 7 through 11 report our results for the distribution of publications for the subcategories. As shown in Table 7, AgEcon schools dominate the agriculture subcategory (Q1). UC Davis and Iowa State University are the top-ranked programs, and UC Davis' publications are heavily concentrated in that category (73 percent) (also see Table 12). Among the Econ departments, Yale University ranks highest for productivity in subcategory Q1 but ranks only 14th among all Econ and AgEcon departments. Once again, in terms of average productivity, Econ departments are at the top with Harvard ranked first and Yale ranked second.

In other JEL categories, there is a more even mix of Econ and AgEcon departments. University of Wyoming ranks first in terms of overall productivity in Q2 (renewable resources and conservation), Q4 (energy), and Q5 (environmental economics). UC Berkeley ranks first in Q3 (nonrenewable resources and conservation). Several departments rank in the top ten for both average and total productivity in Q2 through Q5: UC Santa Barbara (Q3, Q4, and Q5), University of Wyoming (Q2, Q3, Q4, and Q5), University of Minnesota (Q3 and Q4), University of Colorado Boulder (Q3), University of Illinois (Q2), UC Davis and Harvard University (Q4), and Oregon State University (Q5).

Table 12 presents the proportion of each department's publications, P_{ij}, in each subdiscipline and demonstrates the dispersion of each department's research efforts. Based on a chi-square test of multiple proportions, we can say that the publication patterns of AgEcon and Econ schools are significantly different. Harvard University and MIT have the most balanced research portfolio. Harvard's primary research concentration is in Q2, renewable resources and conservation (37 percent of its productivity); its faculty has the smallest impact (12 percent) in Q4, energy. Purdue University, on the other hand, is the most specialized department analyzed; 85 percent of its total publication productivity falls under Q1 and just 1 percent falls under Q3. In general, research by Econ departments in category Q is much more diverse than research by AgEcon departments.

Conclusion

This study aimed to rank AgEcon and Econ departments by examining research conducted in JEL category Q and to compare the types of research most often conducted by AgEcon and Econ departments. In terms of overall publications by the departments' faculties, Econ and AgEcon departments both appear in the top five and top ten departments. On average, AgEcon faculties produce a much larger number of papers than Econ faculties, but the quality of the contribution of the Econ department papers is greater. In general, Econ department faculties are more often publishing in journals that have higher quality indexes. When basing productivity solely on JEL category Q, AgEcon departments rank higher than Econ departments. Within category Q, AgEcon departments dominate the rankings in the agriculture subcategory (Q1) while rankings in the other subcategories are relatively well dispersed among Econ and AgEcon

Table 7. Rankings Based on Publications in Subcategory Q1: Agriculture

School	Rank	Z-score	Number of Publishing Faculty	Average Productivity Rank	Number of Publications	Dept. Type
UC Davis	1	2.70	27	14	528	AgEcon
Iowa State University	2	2.11	26	12	416	Combined
Purdue University	3	1.18	36	23	410	AgEcon
Cornell University	4	1.15	24	20	357	AgEcon
North Carolina State	5	1.09	28	15	307	Combined
UC Berkeley	6	0.85	12	11	247	AgEcon
University of Illinois	7	0.64	28	24	319	AgEcon
University of Maryland	8	0.60	18	10	181	AgEcon
Michigan State University	9	0.47	32	21	261	AgEcon
University of Minnesota	10	0.41	23	18	217	AgEcon
University of Wisconsin	11	0.35	14	13	193	AgEcon
Texas A&M University	12	–0.05	42	26	301	AgEcon
Ohio State University	13	–0.12	19	22	166	AgEcon
Yale University	14	–0.36	7	2	31	Econ
Washington State University	15	–0.39	13	25	128	AgEcon
Oregon State University	16	–0.50	9	19	82	Econ
University of Wyoming	17	–0.52	11	9	54	Econ
State Univ. of New York Binghamton	18	–0.72	2	7	22	Econ
Harvard University	19	–0.75	8	1	13	Econ
UC Santa Barbara	20	–0.79	4	6	15	Econ
MIT	21	–0.80	5	3	11	Econ
Stanford University	22	–0.82	6	5	13	Econ
University of Colorado Boulder	23	–0.88	3	4	8	Econ
University of Rhode Island	24	–0.91	4	16	17	Econ
University of Connecticut	25	–0.94	4	17	14	Econ
Utah State University	26	–0.97	6	27	17	Econ
Georgetown	27	–1.01	2	8	2	Econ
Rensselaer Polytechnic	28	–1.02	3	28	4	Econ

Table 8. Rankings Based on Publications in Subcategory Q2: Renewable Resources and Conservation

School	Rank	Z-score	Number of Publishing Faculty	Average Productivity Rank	Number of Publications	Dept. Type
University of Wyoming	1	2.87	12	11	164	Econ
University of Maryland	2	2.85	19	14	170	AgEcon
UC Davis	3	1.25	19	20	127	AgEcon
UC Berkeley	4	1.03	13	22	121	Combined
Iowa State University	5	0.85	14	17	101	AgEcon
North Carolina State University	6	0.30	18	16	74	AgEcon
University of Illinois	7	0.17	13	9	53	AgEcon
Cornell University	8	0.15	17	21	79	Combined
University of Minnesota	9	0.14	12	23	84	AgEcon
Ohio State University	10	0.03	10	24	79	AgEcon
UC Santa Barbara	11	0.02	5	7	38	AgEcon
Michigan State University	12	−0.03	14	25	82	Econ
Harvard University	13	−0.10	11	6	29	AgEcon
University of Rhode Island	14	−0.16	8	27	83	Econ
Yale University	15	−0.20	5	1	19	AgEcon
University of Wisconsin	16	−0.43	12	13	43	Econ
University of Colorado Boulder	17	−0.46	7	10	38	Econ
Texas A&M University	18	−0.48	18	28	94	Econ
Stanford University	19	−0.49	7	3	20	AgEcon
Oregon State University	20	−0.62	10	8	28	Econ
MIT	21	−0.63	5	2	15	Econ
Purdue University	22	−0.70	10	19	37	AgEcon
University of Connecticut	23	−0.71	2	12	32	Econ
State Univ. of New York Binghamton	24	−0.76	3	4	15	Econ
Washington State University	25	−0.82	8	15	29	Econ
Georgetown University	26	−0.87	2	5	13	Econ
Utah State University	27	−1.02	6	26	30	Econ
Rensselaer Polytechnic Institute	28	−1.16	3	18	17	AgEcon

Table 9. Rankings Based on Publications in Subcategory Q3: Nonrenewable Resources and Conservation

School	Rank	Z-score	Number of Publishing Faculty	Average Productivity Rank	Number of Publications	Dept. Type
UC Berkeley	1	2.27	8	15	36	AgEcon
University of Maryland	2	2.13	9	18	40	AgEcon
UC Santa Barbara	3	1.96	3	3	15	Econ
University of Wyoming	4	1.72	8	9	23	Econ
UC Davis	5	0.90	12	12	20	AgEcon
University of Minnesota	6	0.70	2	4	9	AgEcon
University of Wisconsin	7	0.63	6	13	18	AgEcon
Cornell University	8	0.31	5	16	16	AgEcon
Purdue University	9	0.00	5	14	12	AgEcon
University of Colorado Boulder	10	–0.16	4	6	6	Econ
Iowa State University	11	–0.18	5	17	11	Combined
University of Rhode Island	12	–0.28	4	19	11	Econ
Texas A&M University	13	–0.29	10	23	16	AgEcon
University of Connecticut	14	–0.31	1	11	8	Econ
State Univ. of New York Binghamton	15	–0.46	2	5	4	Econ
Harvard University	16	–0.49	2	2	3	Econ
MIT	17	–0.51	2	1	2	Econ
North Carolina State University	18	–0.57	4	10	5	Combined
University of Illinois	19	–0.59	4	20	8	AgEcon
Washington State University	20	–0.62	3	8	4	AgEcon
Oregon State University	21	–0.69	2	7	3	AgEcon
Stanford University	22	–0.76	3	21	6	Econ
Michigan State University	23	–0.81	3	25	7	AgEcon
Ohio State University	24	–0.90	3	26	6	AgEcon
Yale University	25	–0.97	3	22	3	Econ
Rensselaer Polytechnic Institute	26	–1.03	1	27	3	Econ
Utah State University	27	–1.04	1	24	2	Econ

Table 10. Rankings Based on Publications in Subcategory Q4: Energy

School	Rank	Z-score	Number of Publishing Faculty	Average Productivity Rank	Number of Publications	Dept. Type
University of Wyoming	1	2.62	6	6	15	Econ
Cornell University	2	1.86	8	18	26	AgEcon
Iowa State University	3	1.19	10	22	25	Combined
UC Davis	4	1.15	6	5	9	AgEcon
Harvard University	5	1.01	3	7	9	Econ
University of Minnesota	6	1.01	5	4	8	AgEcon
UC Berkeley	7	0.91	4	13	14	AgEcon
Purdue University	8	0.81	6	19	18	AgEcon
UC Santa Barbara	9	0.69	4	3	6	Econ
Texas A&M University	10	0.58	17	25	28	AgEcon
University of Illinois	11	0.04	4	16	9	AgEcon
Yale University	12	−0.20	2	2	3	Econ
State Univ. of New York Binghamton	13	−0.22	2	10	5	Econ
MIT	14	−0.28	3	9	4	Econ
Michigan State University	15	−0.40	5	20	7	AgEcon
University of Wisconsin	16	−0.56	2	14	4	AgEcon
North Carolina State University	17	−0.62	4	11	4	Combined
University of Rhode Island	18	−0.63	2	21	5	Econ
Rensselaer Polytechnic Institute	19	−0.64	1	12	3	Econ
University of Colorado Boulder	20	−0.77	3	23	4	Econ
Ohio State University	21	−0.80	5	26	7	AgEcon
University of Connecticut	22	−0.82	1	1	1	AgEcon
University of Maryland	23	−0.89	2	24	3	AgEcon
Oregon State University	24	−0.90	2	17	2	Econ
Georgetown University	25	−0.92	1	8	1	Econ
Stanford University	26	−0.99	1	15	1	AgEcon
Utah State University	27	−1.10	1	27	1	Econ
Washington State University	28	−1.12	3	28	4	Econ

Table 11. Rankings Based on Publications in Subcategory Q5: Environmental Economics

School	Rank	Z-score	Number of Publishing Faculty	Average Productivity Rank	Number of Publications	Dept. Type
University of Wyoming	1	3.76	11	10	101	Econ
University of Maryland	2	2.10	15	12	73	AgEcon
UC Santa Barbara	3	0.84	7	2	26	Econ
Michigan State University	4	0.76	14	22	59	AgEcon
UC Berkeley	5	0.74	12	18	50	AgEcon
University of Illinois	6	0.49	9	16	40	AgEcon
Iowa State University	7	0.29	13	21	41	Combined
UC Davis	8	0.28	17	20	40	AgEcon
Oregon State University	9	0.10	8	5	21	AgEcon
Cornell University	10	–0.05	11	24	38	AgEcon
State Univ. of New York Binghamton	11	–0.10	5	11	23	Econ
Harvard University	12	–0.14	10	3	16	Econ
University of Wisconsin	13	–0.20	6	6	17	AgEcon
University of Minnesota	14	–0.22	7	14	23	AgEcon
Utah State University	15	–0.29	5	8	18	Econ
North Carolina State University	16	–0.31	11	17	22	Combined
Ohio State University	17	–0.35	9	26	29	AgEcon
Washington State University	18	–0.40	9	9	16	AgEcon
Yale University	19	–0.41	1	1	8	Econ
Texas A&M University	20	–0.53	11	28	25	AgEcon
University of Rhode Island	21	–0.57	6	27	22	Econ
Rensselaer Polytechnic Institute	22	–0.64	2	19	15	Econ
Georgetown University	23	–0.77	2	4	7	Econ
Purdue University	24	–0.81	5	23	13	AgEcon
Stanford University	25	–0.82	3	7	7	Econ
University of Connecticut	26	–0.82	2	13	9	Econ
MIT	27	–0.95	3	15	6	Econ
University of Colorado Boulder	28	–0.97	5	25	8	Econ

Table 12. Proportion of Publications in each Q Subdiscipline

School	Percent in Q1	Percent in Q2	Percent in Q3	Percent in Q4	Percent in Q5	Standard Deviation
Cornell University	69	15	3	5	7	0.279
Georgetown University	8	50	12	4	27	0.189
Harvard University	17	37	14	12	21	0.102
Iowa State University	71	17	1	4	7	0.289
Michigan State University	64	20	0	2	14	0.257
MIT	27	37	12	10	15	0.114
North Carolina State	74	18	1	1	5	0.311
Ohio State University	58	28	1	2	10	0.240
Oregon State University	57	19	8	1	14	0.215
Purdue University	85	8	1	4	3	0.366
Rensselaer Polytechnic Institute	9	38	13	7	33	0.145
Stanford University	29	44	9	2	16	0.169
State Univ. of New York Binghamton	27	19	20	6	28	0.089
Texas A&M University	66	21	2	6	5	0.267
University of Colorado Boulder	10	49	26	5	10	0.178
University of Connecticut	22	50	13	2	14	0.183
University of Illinois	69	11	9	2	9	0.277
University of Maryland	42	39	2	1	17	0.195
University of Minnesota	63	24	3	2	7	0.258
University of Rhode Island	12	57	12	3	15	0.213
University of Wisconsin	69	15	8	1	6	0.278
University of Wyoming	16	48	2	4	30	0.193
UC Berkeley	53	26	8	3	11	0.202
UC Davis	73	18	2	1	6	0.306
UC Santa Barbara	17	44	2	7	30	0.170
Utah State University	24	43	6	1	26	0.168
Washington State University	71	16	2	2	9	0.292
Yale University	51	31	0	5	13	0.209

departments. The Econ departments tend to be more balanced in the focus of their faculty's research and the AgEcon departments tend to specialize.

References

Beilock, R.P., L.C. Polopolus, and M. Correal. 1986. "Ranking of Agricultural Economics Department by Citations." *American Journal of Agricultural Economics* 68(3): 595–604.

Brookshire, D.S., and D.O. Scrogin. 2000. "Reflections upon 25 Years of the *Journal of Environmental Economics and Management*." *Journal of Environmental Economics and Management* 39(3): 249–263.

Coupe, T. 2003. "Revealed Performances: Worldwide Rankings of Economists and Economics Departments, 1990–2000." *Journal of the European Economic Association* 1(6): 1309–1345.

Dridi, C., W.L. Adamowicz, and A. Weersink. 2010. "Ranking of Research Output of Agricultural Economics Departments in Canada and Selected U.S. Universities." *Canadian Journal of Agricultural Economics* 58(3): 273–282.

Dusansky, R., and C.J. Vernon. 1998. "Rankings of U.S. Economics Departments." *Journal of Economic Perspectives* 12(1): 157–170.

Grijalva, T.C., and C. Nowell. 2008. "A Guide to Graduate Study in Economics: Ranking Economics Departments by Fields of Expertise." *Southern Economic Journal* 74(4): 971–996.

Hilmer, C.E., and M.J. Hilmer. 2007. "On the Relationship between the Student-Advisor Match and Early Career Research Productivity for Agricultural and Resource Economics PhDs." *American Journal of Agricultural Economics* 89(1): 162–175.

Holland, D.W., and J.C. Redman. 1974. "Institutional Affiliation of Authors of Contributions to the *American Journal of Agricultural Economics*, 1953–1972." *American Journal of Agricultural Economics* 56(4): 784–790.

Kinnucan, H.W., and G. Traxler. 1994. "Ranking Agricultural Economics Departments by AJAE Page Counts: A Reappraisal." *Agricultural and Resource Economics Review* 23(2): 194–199.

Perry, G.M. 1999. "Ranking MS and PhD Programs in Agricultural Economics, Fall 1999." Manuscript, Department of Applied Economics, Oregon State University, Corvallis.

———. 2004. "Ranking MS and PhD Programs in Agricultural Economics, Spring 2004." Manuscript, Department of Applied Economics, Oregon State University, Corvallis.

Siegfried, J.J., and W. Stock. 2004. "The Labor Market for New PhD Economists in 2002." *American Economic Review Papers and Proceedings* 94(2): 272–285.

Stock, W., and R.M. Alston. 2000. "The Effect of Graduate Program Rank on Success in the Job Market." *Journal of Economic Education* 31(4): 389–401.

Thursby, J.G. 2000. "What Do We Say about Ourselves and What Does It Mean? Yet Another Look at Economics Department Research." *Journal of Economic Literature* 38(2): 383–404.

Tschirhart, J. 1989. "Ranking Economics Departments in Areas of Expertise." *Journal of Economic Education* 20(2): 199–222.

Whitehead, J. 2008. "Where Should You Go to Graduate School in Agricultural and Natural Resource Economics?" *Environmental Economics*, *The Cromulent Economics Blog*. www.env-econ.net/2008/05/where-should-yo.html (accessed April 3, 2014).

Willis, C.E., L.M. Willis, and J. Shea. 1993. "Institutional Affiliation of Authors in the *American Journal of Agricultural Economics*, 1988–1992." *Agricultural and Resource Economics Review* 22(2):175–178.