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A Descriptive and Econometric Analysis of Annual Salaries, Gender, Experience, and Peer-Reviewed Publication Histories within Top-Ranked Agricultural Economics Programs

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Abstract:
Utilizing an original data set containing annual salaries and peer-reviewed publication histories for 328 faculty members we examine the labor market for academic agricultural economists. Our descriptive analysis shows that while the profession remains male-dominated, females are making significant inroads at the lower academic ranks, the profession is relatively top-heavy, with nearly two-thirds of the faculty in our data set currently holding the rank of full professor, differences in annual salary exist primarily for faculty at Top 6 programs, and then primarily for full professors. Our regression analysis suggests that controlling for publication history there are neither statistically significant negative returns to increased tenure nor statistically significant negative returns to gender, holding all else constant.

Key words: labor market, salaries, research productivity

Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Montreal, Canada, July 27-30, 2003

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Introduction

How much do we make? How productive are we? These questions are certainly of interest to the members of a professional labor market. As such, an extensive literature has developed examining the labor markets for many different types of professionals. Most of these studies, however, have been conducted for professional sports teams (for example Idson and Kahane 2000; Kahn and Scherer 1988; Kahn 1992; Sommers and Quniton 1982; Scully 1974). As Susan Offutt stated in her November/December 2002 presidential column in *the Exchange*, "it must fairly be said that pro sports teams are good subjects for empirical study, with player's salaries known publicly and performance and outcomes relatively straightforward to measure." Nonetheless, professional academics are likely as interested in the above questions as professional athletes. Consequently, we might expect a literature examining earnings and productivity to develop within the different academic disciplines.[1] Within the academe, agricultural economics departments are among the most analogous to professional sports teams as they are almost exclusively housed within public land-grant institutions and thus their annual salaries are public record and are readily available for nearly all departments. Likewise, research output is easily accessed the through *Journal of Economic Literature*'s bibliographic database. Despite this, surprisingly little research has addressed the labor market for agricultural economists. Indeed, Dr. Offutt laments that "as a professional society we have not devoted much attention to the systematic collection of data about the market for agricultural economists."

This article starts to fill this gap by constructing an original data set containing the annual salaries, academic ranks, Ph.D. granting institution and years since Ph.D. receipt, genders, and peer-reviewed publication histories of faculty members with primary teaching/research appointments at 20 of Perry's (1999) top 22 Ph.D.-granting U. S. agricultural economics

departments. The very rich nature of this data set allows us to examine several interesting aspects of the labor market for academic agricultural economists in the U.S. We start by examining the age profile and gender composition within our sample. We then compare AY2000 annual salaries across academic ranks, program reputation tiers, and gender. Turning to the publications data, we make similar comparisons in both overall peer-reviewed publications and publications broken down by journal quality and type. Combining those data, we are able to examine the economic returns to tenure, gender, and different aspects of an individual's publication record. Finally, we update previous program rankings by examining current job placement and lifetime productivity per year since Ph.D. receipt, both by current program affiliation and by the program from which a faculty member received his or her Ph.D.

The results provide valuable insight into the current state of the agricultural economics profession within top Ph.D.-Granting programs. First, we find that while the profession remains male-dominated, females are making significant inroads at the lower academic ranks. This is especially true for assistant professors at elite programs, among which the gender composition is nearly 50-50. At the same time, controlling for other observable factors, our regression results find no statistically significant earnings difference between males and females. Second, we find that the profession is relatively top-heavy, with nearly two-thirds of the faculty in our data set currently holding the rank of full professor. Further, the median number of years since Ph.D. receipt within the sample is 20 which, assuming a relatively young age of 30 at Ph.D. receipt, suggests that the median age of the profession exceeds the median age of 48 years in 1995 across all academic departments (Ashenfelter and Card, 2002). Third, we find that differences in annual salary exist mainly for faculty at Top 6 programs, and then mainly for full professors. Likewise, we find that faculty at those programs publish significantly more articles, both overall

and within each of the higher quality classifications, than faculty in the remaining programs. Our regression analysis suggests that controlling for publication history there are neither statistically significant negative returns to increased tenure nor statistically significant negative returns to gender, holding all else constant. At the same time, we find that the highest economic return exists for articles published in one of the Top 36 economics journal, followed by articles published in regional and top agriculture journals. Finally, we find that for the top 6 programs average publications per year since Ph.D. receipt in both top agricultural and top 36 economics journals closely mimic the results of Perry's (1999) reputation survey suggesting that such programs have elite reputations because their faculty are actively publishing in leading journals. Likewise, we find that students receiving Ph.D.s from those same elite programs, in general, average more articles per year in top journals than graduates from lower ranked programs.

Empirical Model

As discussed above, in addition to providing a summary analysis of annual salary, age and gender composition, and peer-reviewed publication productivity, we would like to conduct an empirical analysis of the economic return to journal quality. Journal quality can be a controversial issue, primarily due to the fact that no strict ordinal ranking of journals exists. To address differences in journal quality, the literature examining publications in economics journals generally accepts Scott and Mitias' (1996) listing of the Top 36 economics journals (Liner 2002; Mein 2002; Moore, Newman, and Turnbull 2001; Dusansky and Vernon 1998).[2] Agricultural economists obviously might find it important to publish in their own field journals rather than economics journals. According to Perry (1999) the four highest quality agricultural economics journals are the *American Journal of Agricultural Economics*, the *Journal of Environmental Economics and Management*, *Land Economics,* and the *Journal of Agricultural*

Economics.[3] At the same time, Beilock and Polopolus (1988) suggest the importance of regional agricultural journal citations for agricultural economists.[4] We might therefore expect articles published in those journals to be more prestigious than articles published in other economics and agricultural economics journals. Based on these facts, we control for journal quality by dividing articles into five separate categories: top agricultural economics articles (AJAE, JEEM, Land, and JAE), regional agricultural economics articles, other agricultural economics articles, Top 36 economics articles, and other economics articles. Further, we exclude replies, comments, and other errata from our publication counts, as we only want to account for original research. Finally, because we have an uneven-aged sample of males and females belonging to numerous different departments we might expect tenure, gender, and current department affiliation to influence a faculty member's annual salary. Combining these factors, the econometric model to be estimated for examining the return to journal quality can be written as

$$\log W_i = \delta_1 A_i + \delta_2 OA_i + \delta_3 RA_i + \delta_4 T36_i + \delta_5 OE_i + \delta_6 Y_i + \beta_7 Y_i^2 + \delta_8 G_i + \delta_9 D_i + \varepsilon_i$$

where W_i represents individual i's annual salary for AY2000, A_i, RA_i, and OA_i are the number of peer-reviewed articles in Perry's top four, regional, and all other agricultural economics journals, $T36_i$ is the number of peer-reviewed articles in Scott and Mitias' top 36 economics journals, and OE_i is of peer-reviewed articles in all other economics journals, Y_i is the number of years since i received his or her Ph.D., R_i is i's academic rank, G_i is the i's sex, D_i is the department to which i belongs, and ε_i is a normally distributed error term. To allow for quadratic effects that might be associated with experience, we also include the term Y_i^2. Parameters of interest are δ_1-δ_9, which represent the economic returns to the different independent variables, holding all else constant.

Descriptive Analysis

We recognize the importance of the three-part mission of the land-grant institution. Presumably, a faculty member's salary is a reflection of his or her relative appointment and subsequent success within the different missions. To minimize distortions that might be caused by faculty members focusing on missions other than research, we limit our sample to faculty members in agricultural economics departments who had majority research/teaching positions and thus were not classified as extension economists. Salary data for this article are collected from published annual salary lists for the 2000 academic year. These lists were obtained by contacting the appropriate administrative agency within each institution or in a few cases, relying on faculty contacts at the institution to obtain the list for us.

Peer-reviewed publication data are collected from *Econlit*, which is the American Economic Association's bibliography of economics literature throughout the world. The database contains information on articles published in more than 712 journals, including all the major field and regional agricultural economics journals.[5] In other words, while some publications may not be contained in *Econlit*, they are likely published in more obscure, less-respected journals. Hence, we are confident that our data set contains information on the most relevant publications.

Individual background data is collected from a variety of sources. In addition to annual salary and term of appointment (9 month or 12 month), the published salary lists contained the AY2000 academic rank of each faculty member. For the remaining background data, we turned to modern technology. The internet age has greatly facilitated the collection of individual data for members of the academe, as every agricultural economics department currently has an active website. From those we were able to download curriculum vitae or more limited biographical

information for all faculty members. We then cross-checked self-reported year of Ph.D. receipt with information contained in the *Dissertation Abstracts* database.[6]

Program quality is a potentially contentious concept. Efforts have been made to quantify program quality on the basis of such metrics as peer reputation, journal output of department members, and journal output of program graduates, among others (Perry 1994; Kinnucan and Traxler 1994; Beilock and Polopolus 1988; Tauer and Tauer 1984). The approach used here is to follow the most recent analysis by Perry (1999), which develops a reputation ranking based on surveys of 62 of the most prominent members within the profession.[7] Table 1 reprints the results from Perry's reputation survey. Peterson's Guide to Graduate Programs in the Humanities, Arts & Social Sciences (2001), claims that 32 different departments in the U.S. offer Ph.D. degrees in agricultural economics. According to Perry, however, only 22 of those Ph.D. programs were included on more than 16 percent of the responses and thus merited a reputation ranking. As we want to focus on research productivity, we limit our sample to only those 22 programs earning a reputation ranking. Those reputation rankings are based on a five point scale, where "a ranking of 5 indicated an excellent program, 4 corresponded to an above average program, 3 being average, 2 below average, and 1 being a poor program." We therefore categorize programs by whether they earn an average rating above four, an average rating between three and four, or an average rating below three. The resulting school groupings correspond to programs 1-6, 7-14, and 15-22. Overall, we were able to collect AY2000 annual salary data for all but two of these programs. As such, our data set includes observations on 328 faculty members belonging to all 6 of the highest ranked programs and 7 of the 8 programs belonging to each of the other ranking groups.

While estimating the above empirical equation is our primary goal, the unique nature of our data set allows for an interesting descriptive analysis of the agricultural economics profession. Before starting this discussion, it is important to note that these data represent an individual's reported standing at the beginning of the fall semester 2000. Hence, changes in academic rank that may have become official in the interim will not be reflected in these data. Likewise, new assistant professors who accepted positions beginning fall semester 2000 or later will not be included as their salaries were not included in the published salary lists. Finally, it should again be stressed that we are only examining the subset of faculty that we were able to identify as having primary research/teaching positions.

Table 2 provides a summary analysis of the overall composition of faculty members in our data set by academic rank and institutional quality tiers. Within our data, a clear plurality of 40 percent of all faculty belong to programs 7-14, while roughly 30 percent belong to each of the other two quality tiers. Looking across academic ranks, the profession appears to be heavily weighted towards full professors, as only 13 and 23 percent of all faculty members are assistant and associate professors, respectively, while roughly 64 percent are full professors. The percentages of assistant professors are amazingly equal at between 12 and 13 percent across the reputation tiers. For the more advanced ranks, however, programs ranked 7-14 are disproportionately weighted toward associate professors and away from full professors. The reason for the difference is not readily apparent and could be due to a variety of factors ranging from differences in retirement rates and/or promotion policies to some unknown statistical anomaly.

Figure 1 extends our analysis of the age composition within our sample by presenting the cumulative distribution for the years since Ph.D. receipt variable. As mentioned above, the

median value for our sample is 20, which likely means that the median age of the profession exceeds the minimum age of 48 cited by Ashenfelter and Card (2002) for the academe as a whole. The cumulative distribution indicates that the number of years since Ph.D. receipt ticks up sharply in the mid-teens. Specifically, roughly 9 percent of all faculty have had their degree less than 6 years while roughly 22 percent have had theirs less than 12 years. At the same time, nearly 65 percent have had their degrees less than 24 years and roughly 95 percent have had theirs less than 33 years. The age composition demonstrated in Figure 2 suggests the continuation of the aging trend for the entire profession previously noted by Zepeda and Marchant (1998).

Table 3 examines the gender composition of faculty members across reputation tiers by academic rank. Overall, only 12 percent of the faculty members in our data set are female. This overall gender composition is fairly constant across the three reputation tiers. The cross-rank comparison paints a more interesting picture of the profession. Overall, roughly 33 percent of assistant professors, 16 percent of associate professors, and 6 percent of full professors are female. The relative lack of female associate and especially full professors is not surprising given the evidence that females are less likely than males to reach the higher academic within the broader economics profession (Ward 2001; McDowell, Singell, and Ziliak 2001). These overall numbers suggest that while the agricultural economics profession remains male-dominated, women have been making significant inroads in the past decade. Indeed, the fact that there are nearly equal numbers of females within all three academic ranks might suggest that it is an increasing supply of female agricultural economics Ph.D.s that is leading to the increased gender integration of the field. The increased gender integration in the agricultural economics profession within the last decade follows the general trend observed within many other academic

disciplines (Rich 1999; Toutkoushian 1999). The cross-ranking comparisons are additionally enlightening. Nearly 46 percent of assistant professors at programs ranked 1-6 are female while only 29 and 25 percent of assistant professors at programs 7-14 and 15-22, respectively, are female. While it runs counter to Koplin and Singell's (1996) finding that the highest ranked economics programs are the least likely to hire female faculty, this fact could suggest that top agricultural economics programs are more successful in attracting the best candidates from what is still an underrepresented gender within graduate programs.

Table 4 presents summary information on the annual salaries paid to faculty members in AY2000. Overall, the average salary is roughly $91,850. Salary clearly depends upon academic rank, with the average assistant professor earning roughly $64,000, the average associate professor earning roughly $73,400, and the average full professor earning roughly $104,300. Comparing across reputation tiers suggests that, as might be expected, a sizable average earnings premium exists for faculty within top ranked departments. Assistant and associate professors in programs 1-6 average somewhere between $5,800 and $9,600 more than their peers in the lower two reputation tiers, while program 1-6 full professors average roughly $18,000 and $24,000 more than their program 7-13 and 15-22 peers. Turning to the length of contract, it appears that programs are becoming far more likely to hire faculty into 9 month positions, as roughly 26 percent of assistant professors are currently paid over 9 months while roughly 8 and 5 percent of associate and full professors are paid likewise. Looking across academic rank, senior faculty within top 6 programs are more than three times as likely to currently be on 9 month contracts as senior faculty within lower ranked programs. Hence, it appears that programs in our sample may be using 9 month contracts as a way to increase pay for valued faculty members in order to either attract them or keep them from leaving for competing programs.

To expand on the mean-based analysis, Figure 2 presents histograms detailing AY2000 annual salaries for the members of our data set across the different academic ranks. The histograms suggest that overall the majority of faculty members, roughly 68 percent, earn between $60,000 and $110,000 annually. The right skewness of the distribution appears to result from the relatively small number of faculty, roughly 8 percent, who earn in excess of $130,000 per year. Turning to assistant professors, roughly three-fourths had an AY20001 annual salary between $60,000 and $70,000, while only 2 of the 42 faculty members earned more than $80,000 annually. Among associate professors, roughly ninety percent earn between $60,000 and $90,000. Finally, among full professors, nearly 80 percent receive AY2000 annual salaries between $70,000 and $120,000, while only 4 percent earn annual salaries above $150,000.

It is interesting to note the increasing salary dispersion across academic ranks. This potentially results from the increased information that department's receive as to a faculty members' value over his or her working lifetime. Presumably, productivity differences are not well known for newly-minted Ph.D.s and thus their salaries are much more similar than for senior faculty who have had many years to prove their worth and potentially elicit outside offers.[8]

Table 5 extends the previous analysis by considering cross-gender differences in average annual salaries within the different academic ranks and quality tiers. When making the within-rank comparisons the reader should be reminded of the small cell sizes for females within some of the higher ranks across the different academic ranks. Nonetheless, this simple measure of earnings suggests that men overall receive an average annual salary of roughly $16,500 more than women. This aggregate differential of 20 percent is similar to the 15 percent aggregate differential for academic economists found in Ward (2001). On closer inspection, however, it

appears that there are likely not large differences in annual earnings between men and women at the assistant and associate professor levels. This is not that surprising given evidence in other disciplines suggesting no statistically significant cross-gender difference in starting salaries (Formby, Gunter, and Sakano 1993; Broder 1993; Raymond, Sesnowitz, and Williams 1988). Instead, the major cross-gender differences appear to fall within the ranks of full professors at programs 7-14 and 15-22. Consequently, it appears that the drastically skewed nature of the gender composition at full professor level is driving the large difference in average overall annual salary.

In order to complete our goal of examining the returns to different types of research publications, we have to merge the salary data with individual-specific publications data collected from *Econlit*. Table 6 starts our summary analysis of the research publication data by presenting the average number of peer-reviewed articles overall and by journal type as of the fall semester 2001.[9] Looking first at the overall numbers, current faculty members in the sample have published an average of 15.90 peer-reviewed articles during their careers. The clear plurality of these articles, roughly 5.69 or 36 percent, were published in top agricultural economics journals, with other economic journals being the next most likely article type at an average of 3.41 or 22 percent. At the same time, regional and other agricultural journals comprise 15 and 16 percent of all articles while top 36 economics journals comprise only 12 percent of total peer-reviewed publications. Comparing the median numbers of publications to the mean suggests that the overall distributions are likely non-symmetric. The fact that the median number of publications is three-fourths of the mean or less across all publication types suggests that the distributions are heavily skewed to the right. Interestingly, there appear to be significant differences in publication patterns across reputation tier. Current faculty members at

programs 1-6 average nearly 1.6 times as many total articles as current faculty members at programs 7-14 and nearly twice as many total publications as current faculty members at programs 15-22. Comparing across journal type, faculty members at programs 1-6 are somewhat more likely to publish in top agricultural journals and are nearly three times more likely to publish in top 36 economics journals. At the same time faculty members at programs 7-14 and 15-22 are significantly more likely to publish in other agricultural journals and nearly twice as likely to publish in regional journals as faculty members in programs 1-6. In fact, faculty members within both lower reputation tiers average more total regional publications while those in programs 7-14 also average more total other agricultural publications.

To make the summary analysis more concrete, Figure 4 presents an individual-level histogram reflecting the total number of articles published overall by each faculty member in our data set. The most telling feature of this histogram is that the distribution is skewed towards relatively lower levels of output. Specifically, 21 percent of the faculty in our sample have published four or fewer articles in their career while nearly 50 percent have published ten or fewer articles. At the same time, the higher mean numbers of publications appear to be driven by a relatively small number of "superstars" who are highly productive. Specifically, the subset of 14 faculty members, or roughly 4 percent of the sample, who have published more than 50 articles in their careers account for roughly 21 percent of the 5,216 total publications within our sample. While not presented here for the sake of brevity, similar heavily right-skewed patterns are observed across the journal specific histograms. Overall, the right-skewness is most extreme for top 36 economics publications, as the 14 faculty members publishing the most in those journals account for nearly 46 percent of the total number of top 36 economic journal publications. At the opposite extreme, the 14 faculty members publishing the most in other

agricultural economics journals account for roughly 22 percent of the total other agricultural economics articles.

Econometric Analysis

The goal of this article is to estimate the economic return to various aspects of a faculty member's publication history. Table 6 presents the results of estimating the annual salary function spelled out in equation (1). The first three columns present results for the entire sample that adds successively complex controls for each faculty member's publication. Taken as a whole, the results suggest that the number of years since a faculty member received his or her Ph.D. is the most significant factor in determining his or her current salary, with each additional years accounting for a 2-3 percent increase in current annual salary. Turning more specific, the first column is similar to the baseline model estimated in previous examinations of the return to academic seniority and gender (Moore, et al 1998; Ransom 1993) and suggests a statistically significant negative return to seniority and a statistically significant earnings penalty for being a female, all else equal. However, column 2 suggests that adding simple controls for the total number of publications reduces has several profound effects on the estimated results. First, controlling for the total number of publications reduces the earnings penalty for females to statistical insignificance. These results add to the literature suggesting the lack of a gender-based earnings penalty for females in academic labor markets when tenure and productivity are controlled for (Ward 2001; Formby, Gunther, and Sakano 1993; Lindley, Fish, Jackson 1992). Second, adding that control greatly increases the explanatory power of the model and reduces the measured effect of experience on earnings by roughly 21 percent. Third, as with Moore et al. (1998) and Ransom (1993) we estimate that the quadratic experience term still has a statistically significant negative effect on earnings. Proceeding to column 3 which adds more complex

controls for publication history our results once again mimic Moore et al. as we now find that the estimated negative return to seniority reduced to statistical insignificance.

Looking closer at the journal quality results in column 3 suggests that different economic returns exist for journal publication of differing qualities. Namely, we only estimate statistically significant economic returns to articles published in top agricultural, regional agricultural, and top 36 economic journals. Among these journal types, each additional article published in top 36 economics and regional agricultural journals is estimated to increase current annual salary by roughly 8 tenths of one percent while each additional top agricultural journal is estimated to increase current annual salary by roughly one half of one percent. It is interesting to note that these estimated effects are roughly one-third or less than estimated effect of each additional year since Ph.D.-receipt.

The final column in Table 7 attempts to attenuate any potential biases caused by "superstar" publishers by following Sauer (1988) and eliminating those with extraordinarily high levels of publications, in this case those 14 with more than 50 career publications. The results suggest that including the "superstars" understates the return to top agricultural articles and overstates the return to regional agricultural articles. Specifically, the estimated return to top agricultural articles nearly doubles while the return to regional agricultural articles falls from 5 percent to 10 percent significance.

A potential concern when comparing salaries across Ph.D. programs is that some programs may be forced to offer higher salaries, all else equal, due to higher costs of living in their surrounding communities. The several cost of living indices available on the internet suggest that this effect should be most pronounced for the two California programs in our data set and the University of Maryland, as the estimated costs of living in Berkeley, Davis and the

DC area are significantly higher than those for any other program. The fact that these programs offer higher salaries, ceteris paribus, tends to be confirmed by the fact that the program specific dummy variables for those programs have significant, positive estimated coefficients relative to all other programs except Illinois and Iowa State. In other words, we estimate that those five programs offer a significant salary premium above and beyond any salary differences that can be explained by measurable productivity factors and individual characteristics.

Program Rankings

As a final exercise, our data allow us to update some previous rankings of Ph.D. granting agricultural economics programs. An obvious metric of program quality is the publication history of current faculty members within a given department (Perry 1999, 1994; Dusansky and Vernon 1998; Scott & Mitias 1996; Tauer and Tauer 1984). A potential bias inclusive to such metrics is that lifetime publication statistics are highly dependent on the length of time that a given faculty member has had his or her Ph.D. To control for this bias, Table 8 reports average publications per years since Ph.D. receipt for the 20 programs represented in our sample. The results suggest that the reputation rankings in Perry (1999) tend to closely mimic the average productivity of a program's faculty, at least for the top 6 programs. Indeed, the only top 6 Perry program to fall outside the top 6 according to our overall productivity measure is Minnesota, which ranks 15th in average total publications per year since Ph.D. receipt. Looking at programs with lower reputation ranks, the biggest disagreements are for Oregon State, Kansas State, and Washington State, which we find to have the 5th, 7th and 9th highest average total publication values. Comparing across different publication types, it is interesting to note that the highest reputation programs are generally most likely to publish in both top agricultural and top 36 economics journals while lower ranked programs are relatively more likely to publish in regional

and other agricultural journals. Specifically, the top 4 ranked programs in terms of Perry's reputation measure all fall within in the top 6 in terms of top agricultural and top 36 economics journals. At the same time, lower ranked programs like Kansas State, Oklahoma State, Washington State, and Georgia fall within the top 6 in terms of regional agricultural journals. Overall, perhaps the biggest anomaly is Oregon State, which falls within the top 6 in nearly all of our average productivity metrics despite having a reputation rank of only 13.

In addition to current affiliation, we also observe the program from which an individual received his or her Ph.D. Table 9 presents data on a faculty member's current affiliation as a function of his or her Ph.D. program. The entries suggest that Ph.D. graduates are most likely to be currently placed at similar or lower, but not higher quality programs. Specifically, nearly 47 percent of current program 1-6 faculty received their degrees from top 6 programs while nearly 48 percent of current program 7-14 faculty received their degrees from programs ranked 7-14. At the same time, the highest ranked programs are the most likely to hire graduates from economics Ph.D. programs, as roughly 24 percent of program 1-6 faculty received Ph.D.s from economics programs. It is interesting to note that current faculty within programs 15-22 are most likely to have received their Ph.D.s from top institutions, as roughly 39 percent graduated from programs 1-6 while roughly 36 percent graduated from programs 7-14. Both of these percentages are more than double the 16 percent who graduated from programs 15-22. While the percentages for the lowest ranked programs appear to be top heavy, the entries in Table 6 suggest that the high quality graduates currently employed within programs 15-22 are likely the least productive of graduates from the highest quality programs.

Our final table presents average current placement and lifetime productivity per year since Ph.D. receipt by program of Ph.D. receipt for members of our sample. Overall, as might be

expected, the programs with the best reputations are the most likely to supply current faculty members to the highest ranked programs. Specifically, with the exception of Iowa State, at least 1/3 of all graduates from top 6 programs are currently on faulty within the top 6 programs. Among lower ranked programs, Michigan State, Missouri, and Washington State all exceed the 20 percent of Iowa State graduates currently affiliated with top 6 programs. At the same time, most of the lower ranked programs place no current faculty within the top 6 programs but do place larger percentages within the lower ranked programs. Turning to our different productivity measures, it is perhaps surprising that Texas A&M and Missouri follow NC State with the highest average total publications per year since Ph.D. Looking across the other productivity measures, however, suggests that A&Ms relativity high ranking is due to their graduates' high propensity to publish in regional agricultural and other economic journals. Indeed, if we confine ourselves only to top agricultural and top 36 economics journals, the top programs are at the top of the rankings. The primary exception is for Missouri graduates who average the second highest of these elite journal publications.

Conclusion

This article examines a unique data set for teaching/research faculty in 20 of the top 22 ranked Ph.D.-granting agricultural economics programs in the United States. A descriptive analysis suggests that the profession is heavily skewed towards full professors and away from females, especially at the higher academic ranks. The largest salary differentials exist for faculty within the highest ranked programs and then primarily for those attaining the highest academic rank. Faculty members at the highest ranked programs have published substantially more articles, on average, and are significantly more likely to place those articles in the highest quality journals. At the same time, the estimated return to each additional year since Ph.D.-receipt

dwarfs the estimated return to each additional article published in any type of journal. Across journals, the estimated return additional articles are only statistically significant for articles published in the more important agricultural and economics journals and not for lesser articles published in those fields. Finally, both those faculty currently affiliated with top 6 reputation programs and those who graduated from those elite institutions average substantially more articles per year since Ph.D. receipt in leading economics and agricultural economics journals.

Notes

[1] Indeed, disciplines such as economics have developed a well-defined literature examining their own labor market Stock and Siegfried 2001; Ward 2001; McDowell, Singell, and Ziliak 2001; Krueger and Wu 2000; Krueger 1999; Koplin and Singell 1996; Formby, Gunther, and Sakano 1993; Broder 1993; Raymond, Sesnowitz, and Williams 1988; among many, many others.

[2] The Top 5 are American Economic Review, Journal of Political Economy, Quarterly Journal of economics, Review of economics and Statistics, and Econometrica. The rest of the Top 36 are Economic Inquiry, Economic Journal, Economica, Industrial and Labor Relations Review, International Economic Review, Journal of Business, Journal of Business and Economic Statistics, Journal of Development Economics, Journal of Econometrics, Journal of Economic Dynamics and Control, Journal of Economic History, Journal of Economic Theory, Journal of Finance, Journal of Financial Economics, Journal of Human Resources, Journal of International economics, Journal of International Money and Finance, Journal of Labor Economics, Journal of Law and Economics, Journal of Law, Economics and Organization, Journal of Legal Studies, Journal of Monetary Economics, Journal of Money Credit and Banking, Journal of Public Economics, Journal of Regional Science, Journal of Urban Economics, National Tax Journal, Public Choice, Rand Journal of Economics, Review of Economic Studies, and Southern Economic Journal.

[3] Perry chooses these four journals because according to the Social Science Citation Index (SSCI) they are the only journals to have citation rates close to or higher than the citation rate for the AJAE.

[4] In their study, Beilock and Polopolus identify as regional journals the Western Journal of Agricultural Economics (now the Journal of Agricultural and Resource Economics), the Southern Journal of Agricultural Economics (now the Journal of Agricultural and Applied Economics), the Northeastern Journal of Agricultural Economics (now the Agricultural and Resource Economics Review), the Northcentral Journal of Agricultural Economics, and the Canadian Journal of Agricultural Economics.

[5] *Econlit* includes such agricultural journals as Agricultural and Resource Economics Review, Agricultural Economics, Agriculture and Human Values, Agriculture and Resources Quarterly, Australian Journal of Agricultural and Resource Economics, Australian Journal of Agricultural Economics, Canadian Journal of Agricultural Economics, European Review of Agricultural Economics, Journal of Agricultural and Applied Economics, Journal of Agricultural and Resource Economics, Journal of Agricultural Economics, Marine Resource Economics, Natural Resource Modeling, Natural Resources Journal, and Review of Marketing and Agricultural Economics.

[6] According to its description, this database contains information on "dissertations on all academic topics accepted at accredited institutions since 1861. More than 1.2 million citations (with abstracts since 1980) to doctoral degree dissertations by accredited North American educational institutions and more than 200 institutions elsewhere. Dissertation Abstracts represents original academic research from over 1,000 universities throughout the world. It is the most comprehensive information resource covering doctoral dissertations and master's theses, including content from a number of ProQuest dissertation print publications, including: Comprehensive Dissertation Index; Dissertation Abstracts International; Masters Abstracts International; American Doctoral Dissertations. Records include abstracts, authors, advisors, titles, institutions, degrees, dates, author-assigned subjects and descriptors, number pages and availability information. Subjects covered include agriculture & food science, architecture, art, bioscience and biotechnology, business, chemistry, economics, education, history, geoscience, law and political science, mathematics, music, pharmaceuticals, psychology, social science, veterinary sciences, zoology and more."

[7] This methodology is similar to the methodology used to generate the well-known U.S. News and World Reports rankings of graduate programs in Economics. According to their stated methodology, those rankings are calculated by "Rankings of doctoral programs in the social sciences and humanities are based on the results of surveys sent to academics in each discipline. Each school (or, in the case of psychology, each institutional unit) offering a doctoral program was sent two surveys. The questionnaires asked respondents to rate the quality of the program at each institution as distinguished (5); strong (4); good (3); adequate (2); or marginal (1).

[8] We would obviously like to be able to control for the number of outside offers that an individual has received. This proves quite difficult, however, as such data are not readily available from our published data sources and would therefore require an extensive survey and the willingness of respondent to divulge such information.

[9] This time lag in publication data is allowed in an attempt to pick up articles that were accepted for publication and therefore likely included in the determination of the individual's AY 2000 salary but were not yet published and included in Econlit at the beginning of AY2000.

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Table 1

1999 Reputation Survey Rankings (Source: Perry 1999, Table 1)

Ranking	Ph.D. Program	Average Rank	Standard Deviation	Included
1	UC-Berkeley	4.85	0.35	*
2	UC-Davis	4.77	0.52	*
3	Maryland	4.50	0.56	*
4	Iowa State	4.34	0.65	*
5	North Carolina St.	4.12	0.72	*
6	Minnesota	4.10	0.76	*
7	Wisconsin	3.90	0.69	*
8	Purdue	3.72	0.79	*
9	Cornell	3.69	0.79	
10	Texas A&M	3.48	0.80	*
11	Michigan State	3.43	0.90	*
12	Illinois	3.42	0.90	*
13	Ohio State	3.31	0.79	*
14	Oregon State	3.20	0.72	*
15	VPI	2.99	0.80	*
16	Penn State	2.95	0.73	
17	Kansas State	2.94	0.94	*
18	Florida	2.90	0.72	*
19	Missouri	2.89	0.56	*
20	Oklahoma State	2.84	0.73	*
21	Washington State	2.81	0.69	*
22	Georgia	2.75	0.73	*

Table 2
Summary Academic Rank Profile Across Reputation Tiers

	All Faculty	Assistant Professors	Associate Professors	Full Professors
All Programs:				
Total Faculty	328	42	77	209
Percentage	100.00	12.80	23.48	63.72
Programs 1-6				
Total Faculty	98	13	18	67
Percentage	29.88	13.27	18.37	68.37
Programs 7-14				
Total Faculty	132	17	36	79
Percentage	40.24	12.88	27.27	59.85
Programs 15-22				
Total Faculty	98	12	23	63
Percentage	29.88	12.24	23.47	64.29

Figure 1
Cumulative Years Since Ph.D. Receipt Distribution

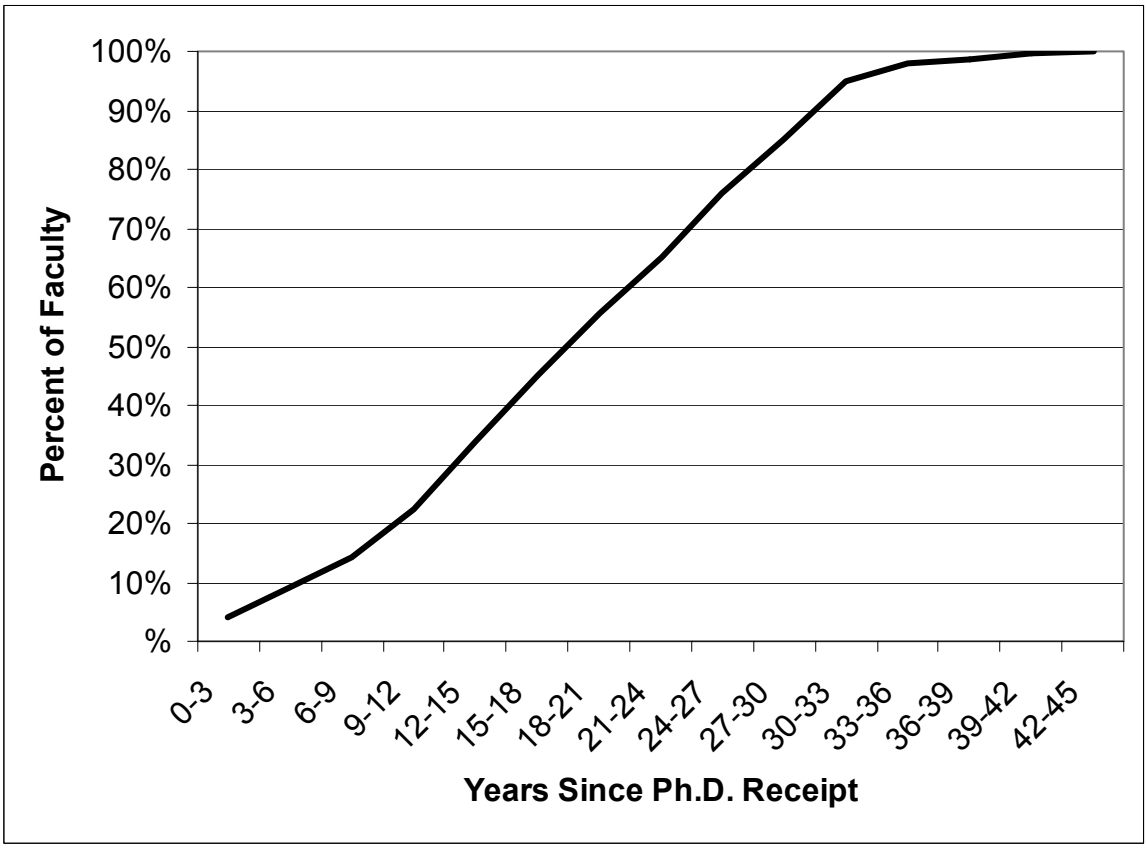


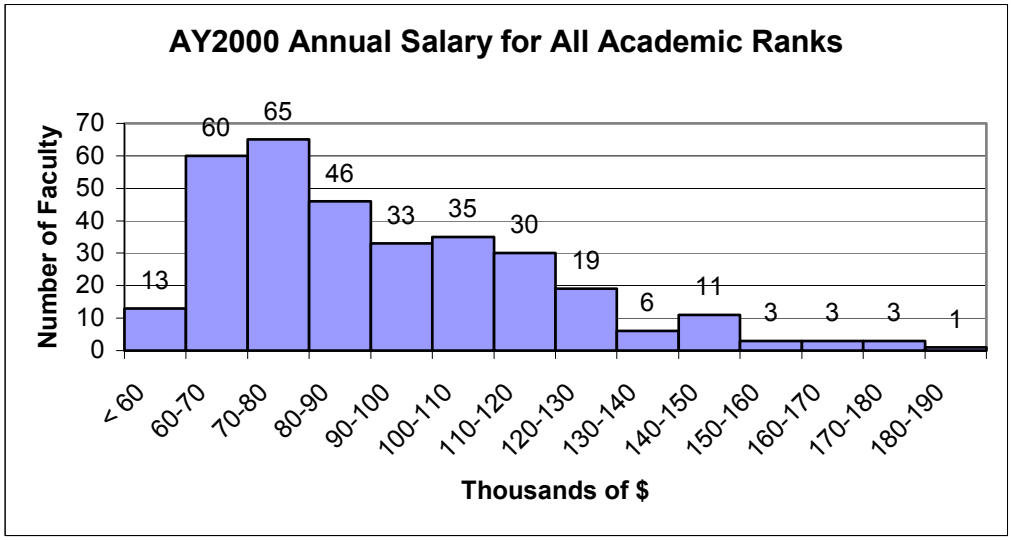
Table 3
Summary Academic Rank Profile Across Reputation Tiers By Gender

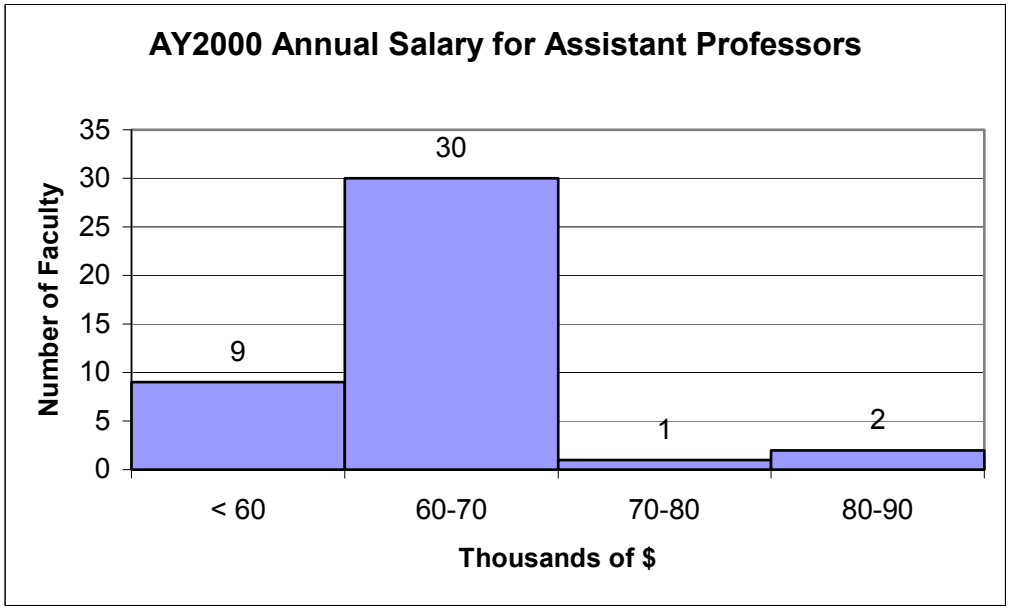
	All Faculty	Assistant Professors	Associate Professors	Full Professors
All Programs:				
Female	39	14	12	13
Male	289	28	65	196
% Female	11.89	33.33	15.58	6.22
% Male	88.11	66.67	84.42	93.78
Programs 1-6				
Female	12	6	2	4
Male	86	7	16	63
% Female	12.24	46.15	11.11	5.97
% Male	87.76	53.85	88.89	94.03
Programs 7-14				
Female	17	5	4	8
Male	115	12	32	71
% Female	12.88	29.41	11.11	10.13
% Male	87.12	70.59	88.89	89.87
Programs 15-22				
Female	10	3	6	1
Male	88	9	17	62
% Female	10.20	25.00	26.09	1.59
% Male	89.80	75.00	73.91	98.41

Table 4
Summary AY2000 Annual Salary Statistics Across Reputation Tier

	All Faculty	Assistant Professors	Associate Professors	Full Professors
All Programs:				
Annual Salary	91,846.67 (26,134.30)	63,953.81 (6,026.04)	73,375.83 (9,088.63)	104,257.00 (24,459.43)
Median	84,886	63,250	73,000	102,000.0
9 Month (percent)	8.23	26.19	7.79	4.78
12 Month (percent)	91.77	73.81	92.21	95.22
Programs 1-6:				
Annual Salary	104,300.60 (29,904.00)	68,353.77 (6,874.96)	78,998.61 (11,780.65)	118,073.00 (25,461.06)
Median	104,080	67,000	77,950	115,305
9 Month (percent)	14.29	30.77	16.67	10.45
12 Month (percent)	85.71	69.23	83.33	89.55
Programs 7-14:				
Annual Salary	87,834.63 (22,042.05)	62,168.12 (4,043.20)	73,134.50 (7,917.72)	100,056.60 (19,745.71)
Median	81,744	61,200	74,006	95,932
9 Month (percent)	4.55	11.76	5.56	2.53
12 Month (percent)	95.45	88.24	94.44	97.47
Programs 15-22:				
Annual Salary	84,796.66 (22,875.12)	61,716.92 (5,171.35)	69,353.13 (5,958.15)	94,830.92 (22,526.42)
Median	76,779	61,959.5	69,369	91,100
9 Month (percent)	7.14	41.67	4.35	1.59
12 Month (percent)	92.86	58.33	95.65	98.41

Figure 2
AY2000 Annual Salary Histograms By Academic Rank





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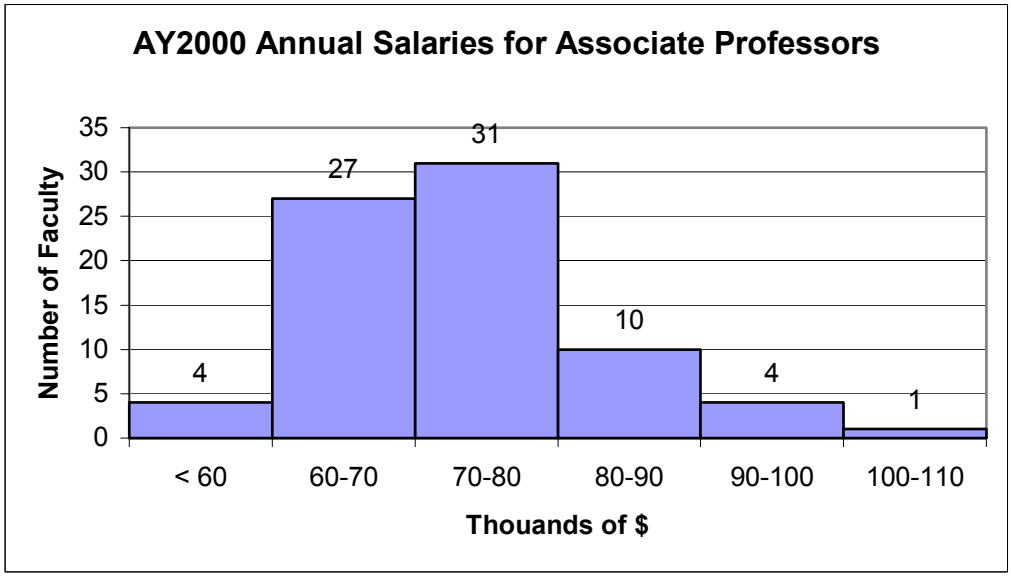

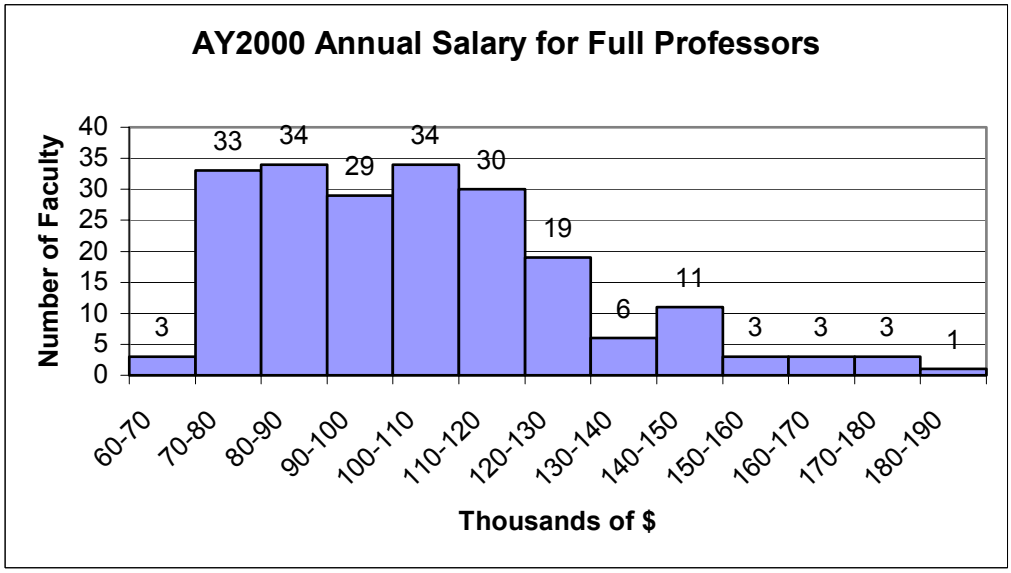

Table 5
Summary AY2000 Annual Salary Statistics Across Reputation Tier By Gender

	All Faculty	Assistant Professors	Associate Professors	Full Professors
All Programs:				
Female	77,331.10 (20,475.12)	63,258.43 (5,632.49)	71,704.00 (8,974.16)	97,680.54 (22,539.99)
Male	93,805.51 (26,225.82)	64,301.50 (6,284.20)	73,684.48 (9,144.85)	104,693.20 (24,572.52)
Programs 1-6				
Female	86,600.92 (23,924.53)	67,147.34 (4,030.47)	84,374.50 (1,308.86)	116,894.50 (9,343.57)
Male	106,770.40 (29,933.66)	69,387.86 (8,848.16)	78,326.63 (12,362.80)	118,147.80 (26,187.21)
Programs 7-14				
Female	78,076.12 (20,278.47)	62,618.80 (4,963.82)	71,160.25 (10,330.57)	91,194.88 (22,032.33)
Male	89,277.19 (22,006.57)	61,980.33 (3,832.43)	73,381.28 (7,738.59)	101,055.10 (19,388.76)
Programs 15-22				
Female	64,940.80 (7,297.64)	56,546.67 (1,534.89)	67,843.00 (5,519.17)	72,710.00 (----)
Male	87,053.01 (22,966.10)	63,440.33 (4,776.68)	69,886.12 (6,175.41)	95,187.71 (22,530.13)

Table 6
Summary Journal Quality Statistics Across Reputation Tier

	Total Articles	Top Ag. Journals	Regional Ag. Journals	Other Ag. Journals	Top 36 Econ. Journals	Other Econ. Journals
Published Articles						
All Programs	15.902 (17.331)	5.689 (7.495)	2.384 (3.276)	2.585 (3.334)	1.832 (4.528)	3.412 (6.400)
Median	11	4	1	2	0	1
Programs 1-6	22.684 (20.673)	8.827 (8.397)	1.684 (2.273)	2.796 (3.434)	4.224 (6.529)	5.153 (7.403)
Median	18	7	1	2	2	2
Programs 7-14	14.235 (14.911)	4.750 (5.339)	2.159 (3.215)	2.871 (3.284)	1.068 (3.227)	3.386 (7.173)
Median	11	3	1	2	0	1
Programs 15-22	11.367 (14.627)	3.816 (8.104)	3.388 (3.934)	1.990 (3.257)	0.469 (1.996)	1.704 (2.793)
Median	7.5	2	2	1	0	1
Percentage of Articles						
All Programs	---	.358	.150	.163	.115	.215
Programs 1-6	---	.389	.074	.123	.186	.227
Programs 7-14	---	.334	.152	.202	.075	.238
Programs 15-22	---	.336	.298	.175	.041	.150

Figure 3
Number of Peer-Reviewed Articles Histogram

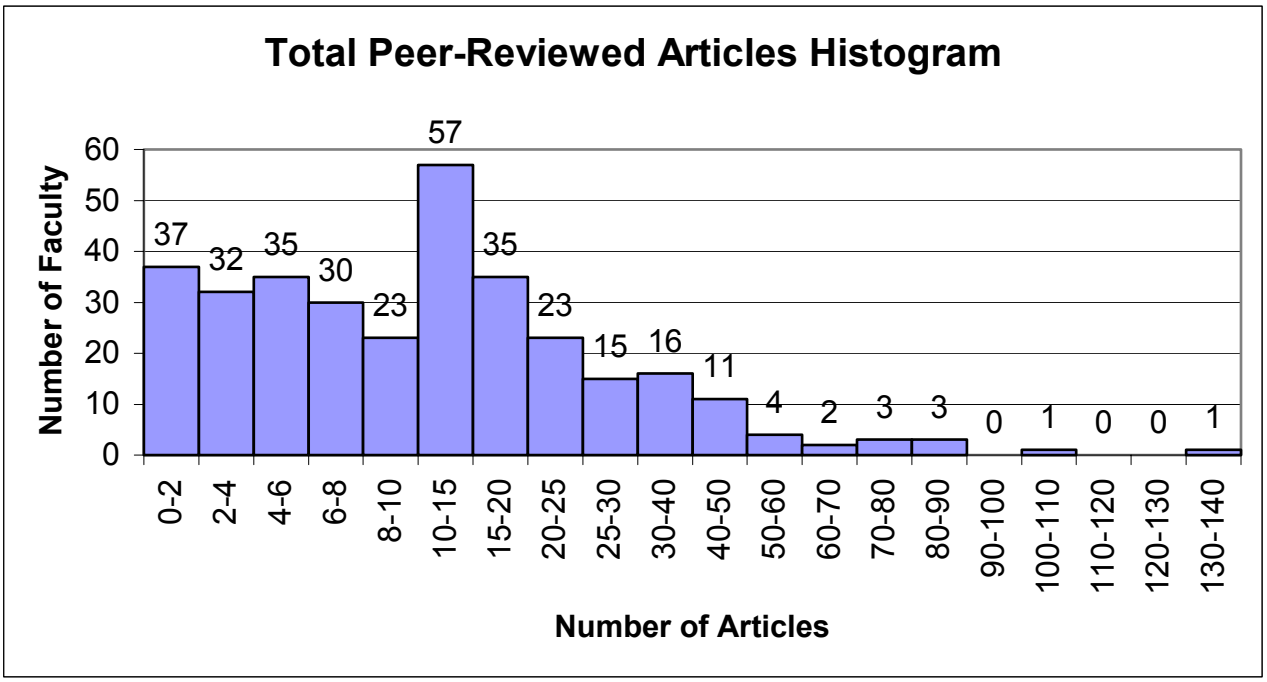

Table 7
Log AY2000 Annual Salary Regressions

	(1)	(2)	(3)	(4)
Years	.0296**	.0235**	.0227**	.0218**
	(.0043)	(.0041)	(.0041)	(.0041)
Years ^ 2	-.0003**	-.00017*	-.00016	-.0001
	(.0001)	(.0001)	(.0001)	(.0001)
Male	.0655*	.0432	.0427	.0355
	(.0326)	(.0301)	(.0301)	(.0297)
Total Articles	---	.0046**	---	
	---	(.0006)	---	
Top Ag. Journals	---	---	.0053**	.0095**
	---	---	(.0018)	(.0030)
Regional Ag. Journals	---	---	.0076**	.0069*
	---	---	(.0037)	(.0039)
Other Ag. Journals	---	---	.0053	.0029
	---	---	(.0034)	(.0044)
Top 36 Econ. Journals	---	---	.0081**	.0076**
	---	---	(.0030)	(.0038)
Other Econ. Journals	---	---	.0003	.0035
	---	---	(.0020)	(.0027)
R-Square	.5739	.6426	.6500	.6374
Observations	328	328	328	314

Notes: Standard errors in parentheses. **, * represent significance at the 5 and 10 percent levels. Regressions also include mutually exclusive dummy variables indicating department to which the faculty member currently belongs.

Table 8
Summary Lifetime Publications Per Year Since Ph.D. Receipt By Current Affiliation

	Perry Rank	Total Articles		Top Ag. Journals		Reg. Ag. Journals		Other Ag. Journals		Top 36 Journals		Other Ec Journals	
Berkeley	1	1.547	1	.518	3	.024	20	.164	8	.398	1	.444	1
Davis	2	1.288	3	.429	5	.125	10	.171	7	.229	3	.335	2
Maryland	3	1.288	4	.580	2	.055	17	.131	13	.243	2	.279	4
Iowa State	4	1.321	2	.712	1	.102	14	.161	9	.145	6	.202	10
NC State	5	1.058	6	.372	7	.118	11	.190	5	.162	4	.216	9
Minnesota	6	.635	15	.222	12	.093	15	.114	15	.093	8	.114	12
Wisconsin	7	.879	11	.292	9	.038	19	.129	14	.120	7	.300	3
Purdue	8	.835	12	.261	11	.137	6	.184	6	.034	11	.219	8
Texas A&M	9	.901	10	.295	8	.248	3	.211	4	.023	14	.123	11
Michigan State	10	.464	18	.197	15	.042	18	.107	17	.017	17	.101	15
Illinois	11	.954	8	.267	10	.107	12	.295	1	.056	10	.229	7
Ohio State	12	.485	17	.195	16	.063	16	.090	18	.025	13	.111	14
Oregon State	13	1.157	5	.415	6	.125	9	.219	3	.146	5	.251	5
Virginia Tech	14	.709	14	.209	14	.128	8	.112	16	.023	15	.237	6
Kansas State	15	1.015	7	.219	13	.445	1	.268	2	.022	16	.061	20
Florida	16	.428	19	.112	19	.129	7	.076	19	.031	12	.081	17
Missouri	17	.425	20	.187	18	.102	13	.055	20	.000	20	.081	18
Oklahoma State	18	.541	16	.067	20	.198	5	.154	10	.009	19	.114	13
Washington St.	19	.902	9	.449	4	.233	4	.146	11	.011	18	.063	19
Georgia	20	.784	13	.194	17	.294	2	.138	12	.060	9	.098	16

Table 9
Summary Current Affiliation By Rank of Program From Which Individual Received Ph.D.

Ph.D. Program	Overall	Current Program: Programs 1-6	Current Program: Programs 7-14	Current Program: Programs 15-22
Programs 1-6	113	46	29	38
Programs 7-14	114	16	63	35
Programs 15-22	27	1	10	16
Unranked Programs	11	3	3	5
Foreign Programs	8	5	3	0
Other Programs	20	4	13	3
Economics Programs	35	23	11	1
Total	328	98	132	98
Percentages:				
Programs 1-6	.345	.469	.220	.388
Programs 7-14	.348	.163	.477	.357
Programs 15-22	.082	.010	.076	.163
Unranked Programs	.034	.031	.023	.051
Foreign Programs	.024	.051	.023	.000
Other Programs	.061	.041	.098	.031
Economics Programs	.107	.235	.083	.010

Table 10
Summary Lifetime Publications Per Year Since Ph.D. Receipt By Program From Which Individual Received Ph.D.

	Programs 1-6	Programs 7-14	Programs 15-22	Total Articles		Top Ag. Journals		Reg. Ag. Journals		Other Ag. Journals		Top 36 Journals		Other Ec. Journals	
Ranked Ag.															
Berkeley	.563	.250	.188	1.130	5	.474	3	.093	16	.166	10	.105	4	.292	3
Davis	.320	.280	.400	1.161	4	.495	2	.192	10	.198	5	.117	2	.158	8
Maryland	.625	.250	.125	1.078	6	.699	1	.054	21	.211	3	.057	7	.057	16
Iowa State	.200	.280	.520	.541	18	.150	17	.099	15	.190	8	.025	14	.055	17
NC State	.625	.125	.250	1.330	1	.446	4	.313	4	.311	2	.072	6	.189	7
Minnesota	.333	.267	.400	.787	13	.328	8	.112	14	.192	6	.023	17	.133	9
Wisconsin	.000	.000	1.000	.813	12	.166	16	.558	1	.069	20	.014	19	.006	21
Purdue	.043	.478	.478	.691	15	.202	15	.166	13	.184	9	.014	20	.126	11
Cornell	.176	.647	.176	.962	7	.270	10	.086	17	.202	4	.092	5	.312	2
Texas A&M	.091	.545	.364	1.220	2	.253	11	.306	5	.332	1	.044	9	.285	4
Mich. State	.238	.381	.381	.364	21	.104	20	.083	18	.085	18	.028	12	.064	15
Illinois	.091	.818	.091	.647	16	.240	12	.176	11	.164	11	.026	13	.041	19
Ohio State	.000	.571	.429	.501	19	.113	18	.169	12	.142	14		21	.076	14
Oregon State	.000	.714	.286	.558	17	.211	14	.063	20	.151	12	.023	16	.110	12
Virginia Tech	.000	.667	.333	.854	11	.289	9	.255	7	.130	16	.049	8	.132	10
Penn. State	.000	.333	.667	.962	8	.392	7	.269	6	.190	7	.017	18	.094	13
Kansas State	.000	1.000	.000	.871	10	.065	21	.355	3	.097	17	.032	11	.323	1
Florida	.000	.250	.750	.458	20	.109	19	.225	8	.046	21	.024	15	.053	18
Missouri	.250	.500	.250	1.172	3	.430	5	.212	9	.137	15	.193	1	.200	5
Ok. State	.000	.333	.667	.745	14	.238	13	.355	2	.085	19	.033	10	.033	20
Wash. State	.294	.529	.176	.921	9	.398	6	.076	19	.144	13	.115	3	.189	6
Unranked Ag.	.273	.273	.455	.771		.319		.090		.191		.022		.149	
Foreign	.625	.375	.000	1.336		.383		.126		.126		.306		.395	
Economics	.657	.314	.029	1.039		.253		.032		.098		.278		.376	
Other	.200	.650	.150	.667		.192		.061		.172		.075		.166	