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SENIORITY AND PRODUCTIVITY IN THE ACADEMIC
LABOR MARKET

Christopher B. Barrett and Dee Von Bailey

Abstract

Following the recent exchange between Ransom and Hallock, we examine the determinants of faculty salaries and find that once one controls for productivity indicators, seniority appears to have a significant effect on faculty salaries. Simply put, productivity pays and there is no evidence of university monopsony power. Faculty salaries are almost solely determined by academic discipline, rank, and productivity, as manifest by grantsmanship activity and the elicitation of competing offers from other universities. Perhaps surprisingly, once one controls for grants won and rank, both of which appear to be influenced by a faculty member’s publication rate, published research appears to offer little or no salary returns.
SENIORITY AND PRODUCTIVITY IN THE ACADEMIC LABOR MARKET

Understanding the determinants of university faculty salaries is important both to academic career planning and to possible legal and institutional issues like discrimination, the incentive effects of the tenure system, or the exercise of oligopsony power by universities that might prompt faculty unionization. Recent work by Michael Ransom in the March 1993 issue of *American Economic Review* reports that, while most professions reward employee seniority with increased salaries, seniority at large research universities seems to have a negative marginal effect on faculty salaries. Ransom interprets his evidence as being consistent with monopsonistic salary discrimination by universities, wherein individuals with high (unobservable) moving costs receive lower salaries and accumulate greater seniority at a university than do individuals with low moving costs. In a comment on Ransom’s paper, Kevin Hallock (1995) employs a different data set, from the University of Massachusetts (UMASS), and finds, contrary to Ransom’s results, that seniority seems to bring positive salary returns, as seems an empirical regularity in many other industries. Hallock acknowledges, however, that these results might be attributable to the faculty union at UMASS; the faculty are not unionized at the University of Arizona, from which Ransom’s key comparable data come.

This brief paper extends the Ransom-Hallock debate. We examine the determinants of salaries for the faculty with research appointments in the agricultural experiment station (AES)

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1Assistant Professor and Professor, respectively, Department of Economics, Utah State University, Logan, UT 84322-3530. Seniority of authorship is shared equally. We thank Chris Fawson for comments and Mike Ransom for helpful comments and for providing supplementary results from his own work. Some of the data used were provided by the Utah Agricultural Experiment Station (UAES). The opinions expressed in this paper are solely our own and do not represent either the UAES or Utah State University.
at Utah State University, a land-grant university and, like Arizona and Massachusetts, a Carnegie Research University. Like Arizona, Utah State’s faculty are not organized into a union. In this data set, we find that once one controls for productivity indicators, seniority appears to have an insignificant effect on faculty salaries. Simply put, productivity pays and there is no evidence of university monopsony power.

There are three primary reasons to pursue this issue further. First, the suggestion that universities exercise monopsonistic control over faculty colors the tone of faculty-administration relations on campus and therefore demands careful scrutiny. The appearance of monopsony power exerted by a university over individual faculty members may elicit calls for unionization to achieve bargaining power and thus a potentially more efficient bilateral monopoly equilibrium. Faculty unionization is an active topic on several major research university campuses; the debate over seniority and monopsony in the academic labor market speaks directly to this topic. Second, the institution of tenure is being carefully scrutinized by many institutions, perhaps especially in public universities, because of a public perception that salary and job security are unrelated to faculty productivity. The regression specifications employed by Hallock and Ransom feed such perceptions by assuming faculty salary is unrelated to productivity. We feel that issue deserves more careful review. Third, an understanding of which activities generally raise salary levels can aid faculty members in optimally allocating time and effort among competing time demands and in making strategic career decisions. Such information is too often lacking in mentoring of graduate students and junior faculty. Hallock and Ransom both overlook this dimension of the empirical evidence despite its clear importance to members of the academy.
The Effects of Seniority on Salary

Ransom examines several different data sets and, after correcting for rank, discipline, gender, race, quality of Ph.D.-granting institution, and the length of contract, concludes that (1) experience has a strong but decreasing marginal effect on faculty salaries, (2) seniority has a negative marginal effect on faculty salaries, and (3) changing employers increases annual faculty salaries by between 5%-16%, depending on the data set analyzed and the amount of seniority. Drawing on models that relate worker productivity and seniority (Harris and Holmstrom 1982; Lazear 1986), Ransom then tries to control for worker quality by also including professional publications as a regressor. He finds publication activity has a positive and statistically significant effect on salaries, but the strong negative correlation between salaries and seniority persists. On that basis, Ransom concludes that the negative seniority profile observed in faculty salaries cannot be attributed to quality differentiation. He then proceeds to develop a “heterogeneity” model of monopsonistic discrimination wherein moving costs drive a wedge between the market wage and the wage the employing university must pay to retain a faculty member.

Our principal concern about Ransom’s heterogeneity model is that it relies on moving costs which his regression results imply are extraordinarily (and in our view implausibly) large in order to inhibit faculty from changing universities. Unless faculty systematically fail to consider the future salary effects of changing their seniority, one would expect faculty to

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2 The table reporting these results was inadvertently omitted from the published paper, but Professor Ransom kindly provided us with the unpublished results.

3 While individuals might face high idiosyncratically high-moving costs due to geographic preferences or family circumstances, it is unlikely that this is a characteristic of the full faculty population whose salaries are estimated in the regressions.
compare the net present value of the compensation stream available from an alternative potential employer with that from the incumbent university. Even using a conservative annual discount rate of 10%, Ransom’s results imply that switching research universities offers considerable net present added value, for instance 10%-78% of annual salary over a ten-year horizon for a faculty member with ten years’ seniority.\footnote{We assume universities are engaged in limit pricing—setting wages equal to market wage less moving costs.} We doubt such large estimates accurately represent the central tendency of frictions caused by moving costs in the faculty labor market. The empirical evidence Ransom marshalls to demonstrate a negative unconditional seniority profile in the academic labor market is impressive, but we find his explanation of the phenomenon unconvincing.

Hallock (1995) challenges Ransom’s conclusions with results obtained using a 1989 data set for faculty salaries from the University of Massachusetts. Hallock uses several model specifications, in general finding a positive but declining return to seniority for faculty during the first 15 or so years of employment. Hallock’s results are robust to several alternative specifications, but none that include measures of faculty productivity. While acknowledging that the unionization of UMASS faculty might account for the positive returns to seniority at that institution, Hallock interprets his results as calling into question Ransom’s findings.

There are reasons to discount Hallock’s challenge to Ransom. Not only is Hallock’s, like ours, a study of just one university’s faculty, as compared to Ransom’s use of data sets from two different universities as well as national faculty survey data, but we suspect that unionization at UMASS exerts considerable influence over the relationship between faculty seniority and salaries. As Hallock acknowledges, Barbezat (1989) has found that collective bargaining
arrangements in higher education increase the returns to seniority. Moreover, Hallock's empirical results suffer the same logical flaw as Ransom's. The magnitude of the statistically significant parameter estimates on the seniority coefficients imply faculty systematically fail to consider the net present value effects on salary that come from either resetting or maintaining their seniority clocks. Years of casual conversation with colleagues considering moving to other universities suggest to us that this is incredible. While Ransom's estimates imply extraordinarily large moving costs to justify faculty remaining at the incumbent university, Hallock's estimates imply faculty utility that is decreasing in income to justify any faculty leaving UMASS and thereby not only incurring moving costs but also forsaking the seniority premium Hallock seems to find. For instance, the stylized faculty member with ten years' seniority and an annual discount rate of 10% considered earlier would reap 10%-54% of annual salary in net present value added over the next ten years from staying at UMASS versus leaving for another research university. While we have not any empirical evidence on this point, we doubt UMASS has the exceptionally high faculty retention rates such a forecast would suggest.5

Whether negative or positive, the existence of a significant relationship between seniority and faculty salary, as found by both Hallock and Ransom, is most likely due to omission of variables that relate to both seniority and salary. A productive and, therefore, marketable faculty member can choose whether or not to reset her seniority clock by changing universities and thereby enjoy (bear) whatever net present value gain (loss) accrues purely through that one

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5The apparently positive seniority-salary relationship at universities with collective bargaining agreements raises the question of whether there is a significantly lower rate of voluntary resignations (i.e., of tenured faculty) from unionized campuses, as compared to nonunionized campuses. This is a good topic for future research that would convey significant information about how unionization affects universities' ability to adjust tenured faculty size to external shocks.
strategic choice. Therefore, if seniority truly exerts significant influence over faculty salaries, one should observe either (1) extraordinary faculty turnover rates (if moving costs are low and there is a negative seniority-salary relationship), (2) extraordinary moving costs associated with changing universities (if there is a negative seniority-salary relationship and faculty turnover rates are low), or (3) remarkably low faculty turnover rates (if there is a positive seniority-salary relationship). Given the absence of empirical evidence supporting any of these three options, we are strongly inclined to believe the empirical findings of Hallock and Ransom mask a more intuitive relationship between faculty productivity and salaries.

The Model

We therefore build on the analyses by Ransom and Hallock by paying greater attention to how faculty productivity might influence salary levels. Besides measuring the effects of traditional demographic variables (gender, race, seniority, and experience) on faculty compensation, we also control for the university matching a competitive external offer and examine the impact of scholarly publications and grant activity on salary levels. We assume that universities raid other campuses in an attempt to poach highly productive faculty members. In particular, anecdotal evidence suggests that raids are often related not only to historical research productivity, which would be captured in measures of publications and grants won, but also to a faculty member's prospective administrative abilities, teaching excellence, or prominence in a field of growing importance. While it is a crude method, the existence of a matching offer thus conveys information on faculty quality that is otherwise unmeasurable. We find in our data that matches of competitive offers and grantsmanship activity have large, positive, and statistically significant effects on salary levels. Moreover, when one controls for these effects, seniority
effects become statistically insignificant. The implication is that the negative seniority profile one commonly finds in faculty salary data, as reported by Ransom, seems to fit the Harris and Holmstrom or Lazear models in which the imperfect information prevailing at the time of initial faculty hire drives a negative relationship between seniority and productivity and thus between seniority and salaries.

Following Ransom and Hallock, we define seniority in this paper as the number of years the faculty member has been employed by the university. Experience is defined as the number of years since completion of the terminal degree. We modify Ransom and Hallock’s model to include detail on the number of quality publications the faculty member had and their grant activity, measured in thousands of dollars, during the most recent five-year period, as well as a dummy variable to represent whether the faculty member’s salary was increased to match an external competitive offer. Thus, the basic model is as follows:

\[
\ln S_i = \beta_0 + \beta_1 \text{EXP}_i + \beta_2 \text{EXP}_i^2 + \beta_3 \text{SEN}_i + \beta_4 \text{SEN}_i^2 + \beta_5 \text{ASC} + \beta_6 \text{FULL} + \theta_1 \text{GRANTS}_i \\
+ \theta_2 \text{PUB}_i + \theta_3 \text{MATCH}_i + \phi_1 \text{RACE}_i + \phi_2 \text{FEMALE}_i + \sum_j \phi_j \text{DEPT}_{ij} + \epsilon_i
\]

where \( S_i \) is the 1996 salary of the \( i \)th faculty member; \( \text{EX} \) is years of experience since the terminal degree was awarded; \( \text{SEN} \) is years of seniority at the institution; \( \text{ASC} \) is a dummy variable for associate professor rank; \( \text{FULL} \) is a dummy variable for full professor rank; \( \text{GRANTS} \) is thousands of dollars from grants awarded between 1991 and 1995 inclusive; \( \text{PUB} \) is the number of “Type I” publications (this includes refereed journal articles, books, and chapters in books) between 1991 and 1995 inclusive;\(^6\) \( \text{MATCH} \) is a dummy variable taking unit value if

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\(^6\)We initially treated sole- and joint-authored publications separately, but found they had basically the same impact on salary levels. Consequently, they are combined here to conserve degrees of freedom. We also estimated this relationship including nonrefereed publications and presentations as a separate regressor to capture service-oriented research publications. This had no significant impact on salaries for any of the specifications.
the university matched a competitive external offer for the faculty member in the past five years; DEPT are binary variables representing the ith faculty member’s department, with the Department of Sociology, Social Work, and Anthropology as the base; RACE is a binary variable equal to 1 for non-Caucasians and 0 otherwise; FEMALE is 1 for females and 0 for males; and εi is the iid, normal disturbance term. The squared terms for experience and seniority (EXP2 and SEN2) are included, as in Ransom and Hallock, to permit a nonlinear effect on salaries and are scaled by dividing by 100. A White (1980) test revealed no significant heteroscedasticity, so we estimate the model using ordinary least squares. The single-log specification permits interpretation of the parameter estimates as percentages.

The notation on the parameter estimates reveals our strategy in researching this question. The β parameters relate to longevity (experience and seniority), the θ parameters are associated with indicators of productivity, and the ϕ parameters relate to demographic conditioning variables beyond the faculty member’s control. Previous studies have excluded the θ parameters (with partial exception noted above of Ransom’s work). We are concerned that this omission leads to mistaken inference about the nature of the labor market for research university faculty.

The Data

The data are taken from salary information for 1995 provided by the Utah Agricultural Experiment Station, adjusted when necessary to place all on a comparable twelve-month basis. Administrators and nontenure track appointments are excluded; only those designated as professor, associate professor, or assistant professor are considered. Table 1 presents descriptive estimated, so we use only Type I publications as a proxy for all research activities. Finally, we also estimated a quadratic relation between research publications and faculty salaries but found this had no significant effect on the regression results, so we report only the simpler specification.
statistics on salaries by rank and gender. Table 2 provides gender specific information regarding age, experience, seniority, quality of terminal degree-granting institution, grant activity, and publications. Mean salaries for women are less than men, but women also tend to be younger, have fewer years of experience and seniority, have won fewer grant dollars, and have fewer publications than their male counterparts (Table 2).

Table 1. Average Salaries for Male and Female Faculty Members by Academic Rank

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of Observations</th>
<th>Average Salary</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female assistant professors</td>
<td>10</td>
<td>$50,764</td>
<td>$63,632</td>
<td>$43,908</td>
</tr>
<tr>
<td>Male assistant professors</td>
<td>19</td>
<td>50,817</td>
<td>65,864</td>
<td>38,322</td>
</tr>
<tr>
<td>Female associate professors</td>
<td>5</td>
<td>53,519</td>
<td>62,592</td>
<td>48,590</td>
</tr>
<tr>
<td>Male associate professors</td>
<td>34</td>
<td>57,482</td>
<td>72,000</td>
<td>40,619</td>
</tr>
<tr>
<td>Female professors</td>
<td>3</td>
<td>64,323</td>
<td>71,684</td>
<td>58,811</td>
</tr>
<tr>
<td>Male professors</td>
<td>52</td>
<td>70,938</td>
<td>94,515</td>
<td>49,890</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
<td>$61,601</td>
<td>$94,515</td>
<td>$38,322</td>
</tr>
</tbody>
</table>

Table 2. Personal Characteristic and Productivity Measures by Gender

<table>
<thead>
<tr>
<th>Item</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>42.9 years</td>
<td>49.2 years</td>
</tr>
<tr>
<td>Mean experience</td>
<td>10.5 years</td>
<td>18.7 years</td>
</tr>
<tr>
<td>Mean seniority</td>
<td>8.1 years</td>
<td>16.0 years</td>
</tr>
<tr>
<td>Proportion of terminal degrees from Carnegie I research universities</td>
<td>82.0%</td>
<td>90.0%</td>
</tr>
<tr>
<td>Mean dollars in grants during the study period</td>
<td>$16,228</td>
<td>$23,672</td>
</tr>
<tr>
<td>Mean number of type I publications during the study period</td>
<td>10.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Mean salary</td>
<td>$53,789</td>
<td>$62,831</td>
</tr>
</tbody>
</table>
Productivity Drives Faculty Salaries

We first estimate the model in equation (1) using the specifications found in Ransom and Hallock. These results are reported in Table 3. Our specification 1 replicates Ransom’s Table 6 and Hallock’s equation (5), omitting productivity indicators and faculty rank. As Hoffman (1976) points out, omitting rank captures any indirect effects race or gender might have on salary through their influence on the unobserved rate of promotion. Our coefficient estimates then have the same sign as Hallock’s, with positive linear terms and negative quadratic terms, but the statistically significant estimates reveal salaries to be linearly increasing in experience and

Table 3. Returns to Longevity and Productivity at Utah State University

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>0.020**</td>
<td>0.018*</td>
<td>0.009</td>
<td>0.008</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Experience$^2/100$</td>
<td>-0.009</td>
<td>-0.011</td>
<td>0.003</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(0.023)</td>
<td>(0.021)</td>
<td>(0.021)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Seniority</td>
<td>0.016</td>
<td>0.016</td>
<td>-0.001</td>
<td>-0.006</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(0.0010)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Seniority$^2/100$</td>
<td>-0.067**</td>
<td>-0.059*</td>
<td>-0.031</td>
<td>-0.013</td>
<td>-0.013</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.026)</td>
<td>(0.024)</td>
<td>(0.025)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>Associate professor</td>
<td>0.082*</td>
<td>0.098**</td>
<td>0.098**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.049)</td>
<td>(0.050)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full professor</td>
<td>0.301$^T$</td>
<td>0.337$^T$</td>
<td>0.337$^T$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.072)</td>
<td>(0.075)</td>
<td>(0.075)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants ($1000s)</td>
<td>0.003*</td>
<td>0.0005*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications</td>
<td>0.004</td>
<td>0.0004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0016)</td>
<td>(0.0016)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Match outside offer</td>
<td>0.144**</td>
<td>0.144**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.073)</td>
<td>(0.073)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hired with tenure</td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.063)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.574</td>
<td>0.585</td>
<td>0.673</td>
<td>0.691</td>
<td>0.687</td>
</tr>
</tbody>
</table>

The dependent variable in all regressions is the natural logarithm of annual salary on a twelve month basis. Each model also includes an intercept term and dummy variables for the faculty member’s department, gender, and race. Estimated from 123 observations.

*Indicates significantly different than zero at the 10% level.
**Indicates significantly different than zero at the 5% level.
$^T$Indicates significantly different than zero at the 1% level.
quadratically decreasing in seniority. So we have essentially the negative seniority-salary profile Ransom finds in a broad array of empirical evidence. In specification 2, we also include publications, as in Ransom’s unpublished Table 6. Just as in Ransom, we find that research publications have a modest, statistically significantly positive effect on faculty salaries, but one that leaves the estimated relationship between longevity variables and salary essentially unchanged. The statistically significant relationship between seniority and salary is still negative. However, if we modify specification 1 to include faculty rank rather than publications, as Hallock does in his equation (6), we find in our specification 3 that the magnitudes of the coefficient estimates on the longevity variables all diminish considerably and none of the parameter estimates are statistically significant. The estimated coefficients on the rank dummies, in contrast, indicate promotion to associate or full professor brings an 8% or 30% salary gain, respectively, and those estimates are statistically significant. Rank may be endogenous, but it also presumably proxies for some unobservable measures of past and/or present faculty quality—notably service, the quality of research publications, and the faculty member’s reputation in the profession at large. Moreover, the unconditional relationship between rank and either salary or longevity measures (experience and seniority) is less strong than commonly believed. There are many senior associate professors and relatively low paid full professors in our sample, and in research universities more generally.

When we add in all the indicators of faculty productivity—publications, grants won, rank, and matches of outside offers—seniority appears to have no economically or statistically significant influence on salary levels (specification 4). There is a mildly negative seniority profile, but it is not statistically significantly different from zero. The coefficients on rank,
grantsmanship activity, the presence of a matching offer and the faculty member’s discipline (not shown) are the only statistically significant parameter estimates, all of them positive.\(^7\) The clear implication is that the university rewards productivity that earns promotion or elicits raids from other campuses or extramural funding. The coefficient estimates on both the gender and race variables (not shown) are negative but statistically insignificantly different from zero and of quite small magnitude in the case of gender.

Hallock also reports that he introduced a dummy variable (HWT) equal to one for those faculty hired with tenure and equal to zero otherwise, and found that those hired with tenure received 7%-18% more in annual salary than those hired without it. Hallock interprets this result as supporting Ransom’s monopsony argument, although he never explains why this implies the exercise of market power by the hiring university. Indeed, to us HWT seems instead to be an imperfect control for faculty quality, much in the spirit of our MATCH variable. The important difference is that Hallock’s HWT variable may capture quite dated information on a senior faculty member hired with tenure decades earlier, while our MATCH variable captures only more recent market activity. The Harris and Holmstrom model again appears relevant, for when a university hires a faculty member with tenure it is still employing someone of unknown future productivity, albeit with better information than generally exists on hires without tenure. The better indicator of the faculty member’s productivity over time is thus not whether she was hired with tenure \textit{ex ante} but whether other universities bid for her services as that productivity becomes public knowledge \textit{ex post}. Indeed, when we reestimate specification 4 to include the

\(^7\)Faculty in the Departments of Biological Engineering (22.8\%), Economics (22.9\%), and Forestry (14.4\%), and staff scientists in the Agricultural Experiment Station (27.1\%) were the only ones to earn statistically significant salary premiums over the default Department of Sociology, Social Work and Anthropology.
HWT variable, it is positive but statistically insignificantly different from zero, while the other parameter estimates are essentially unchanged. The existence of salary matches of outside offers seems the relevant measure of current faculty productivity.

The clear implication of our results is that at least this one, nonunionized research university does not seem to discriminate monopsonistically against faculty members based on their heterogeneous moving costs. While the seniority profile does indeed appear negative when one fails to control for faculty productivity, as the mass of evidence presented by Ransom indicates, the salary-seniority profile appears to mask a negative relationship between seniority and productivity that is reasonably captured by the models of Harris and Holmstrom or Lazear. Controlling appropriately for faculty productivity, the academic labor market appears reasonably competitive.

Moreover, these empirical results provide two counterpoints to the increasingly popular argument that faculty pay is unrelated to productivity. First, the biggest effects on salary come from promotion and from competitive bidding that induces universities to match outside offers. As long as a university’s promotion screening process is appropriately rigorous, and unless one believes that universities routinely attempt to hire away their rivals’ mediocre faculty, rather than their best, productivity pays. Moreover, recall that our grants, publications, and MATCH variables count only performance from the past five years. The statistically significant positive coefficient estimates on grants and matching offers suggest that, conditional on the other variables, salary adjusts downward if there is a prolonged, pronounced decrease in faculty productivity. This should somewhat comfort those concerned about the incentives tenure might create.
Implications for Career Planning

The estimated determinants of faculty salaries at research universities are of interest not only for the information they convey about the nature of the academic labor market—is it competitive or monopsonistic?, is faculty pay related to productivity or not?—but also for the guidance they offer young faculty in career planning. The clear implication of the results presented above is that once one has chosen a discipline (and economics appears to be a good choice indeed, see note 7), then there are only a few activities that will ultimately significantly influence one’s salary. If salary maximization is an objective, then one should earn promotion to associate and then full professor, pursue and win grant money, and attract job offers from competing universities.

Publications might help earn a faculty member promotion and extramural grants, as suggested by the positive and statistically significant estimate of \( \theta_2 \) in specification 2, which shrinks in magnitude and becomes insignificant once one controls for rank and grants in specifications 4 and 5. The indirect effects of publications should not be understated, since rank plays a major part in determining faculty salaries. Full professors’ salaries are 30%-34% higher than assistant professors after adjusting for longevity, productivity, and other demographic variables.

But publish-or-perish is not the same as publish-and-richen. Once promoted to full professor, publications themselves seem to have little direct effect on salary levels. The sample mean number of publications (10.6 over five years, or more than four times the average publication rate for Ph.D. economists [Hutchinson and Zivney 1995]) increased annual faculty salary by less than one-tenth of 1%. Forcing one’s university to match a competing outside offer
typically increases annual salary by about 14%. Grantsmanship likewise seems to bring considerable salary returns. A single $100,000 grant in a five-year period increases annual salary by almost 5%. Research universities appear to expect regular publications from their faculty and thus offer no significant rewards to published research. Indeed, we have heard administrators articulate the view that publications are the logical by-product of contract research. It appears that the university engages in a form of revenue sharing with faculty who bring in extramural funds to support the institution and its missions.

Conclusions

Our results contradict recent empirical evidence, offered in this Review by both Ransom and Hallock, which suggests that perhaps research universities exercise monopsonistic control over faculty. This control is supposedly manifest in the widespread negative relationship between faculty seniority and salary, as documented by Ransom, or in the significant salary premium that accrues to faculty hired with tenure by a university, according to Hallock. But neither of those papers makes a serious attempt to control for faculty productivity. Using data from one Carnegie Research University I, we find that seniority has insignificant effects on faculty salary, which is almost solely determined by a faculty member’s academic discipline, her rank, and her productivity, as manifest by grantsmanship activity and the elicitation of competing offers from other universities. Perhaps surprisingly, once one controls for grants won and rank, both of which appear to be influenced by a faculty member’s publication rate, published research appears to offer little or no salary returns.

These results suggest that calls for faculty unionization based on the perception that universities exercise monopsonistic power in the academic labor market may be misinformed or
premature. It likewise challenges the increasingly popular cry that faculty salaries are unrelated to productivity. Our results represent conditions at only one land-grant university and should clearly be checked using data from other institutions. But our evidence suggests that faculty pay is indeed related to productivity, generally along the lines of the well-established models of Harris and Holmstrom or Lazear.
References


