

Wage Differentiation Among University Professors: Evidence from UNI's College of Business Administration

Christine Bergeth

ABSTRACT. Previous research has found that professor salaries are greatly influenced by the external labor market, but are also affected by the mobility and seniority of the professors. Using data from the College of Business Administration at the University of Northern Iowa, this study tries to determine what factors affect professor salaries, when holding everything else constant. It was found that department, rank, achieving the status of department head, ratings from RateMyProfessor.com, and summer money were significant in trying to explain the wage variation.

I. Introduction

In a time of ever increasing tuition, it makes sense to scrutinize where the money is going. The most reasonable place to start is where universities spend a significant portion of their money, i.e. professor salaries [Zoghi, 2001, 45]. The academic labor market, however, is unique. There are many factors in play, including external markets and academia's internal values, that create conflicting effects. Demand and perceived value of particular fields also influence wages and cause wage differentials.

Economics departments show this subjective difference. Economics professors as a group are paid more if the economics department is in a college of business as opposed to a social science college, creating a "business school premium" [Formby, 2002, 521]. Economics professors may receive a larger salary in the college of business, but on average are paid less than other professors in the business college [AACSB, 2003, 3-4]. The following paper attempts to determine the factors that influence professor salaries within a business college. It will also analyze whether there are wage differentials between departments, controlling for other factors. A model for the salary of professors in the College of Business Administration (CBA) at the University of Northern Iowa is constructed to test which factors have an effect.

The topic is important, as all wage equations are, to show if there is any discrimination for gender, rank, department, etc. If there is a significant difference in salaries between the departments it will show

that the same professor is paid more or less depending on which area he or she chose to study, not because of education or any other credentials. Incentives and motivations for professors' productivity and involvement in research and teaching could also be altered by showing how the different factors affect salaries.

II. Theoretical Perspectives and Literature Review

Academic salary structures violate two of labor economics' basic theories: equity theory and neoclassical labor market theory. Equity theory states that salaries should be the same for those of equal rank and should increase for higher ranks, based on the organizational structure. Academic salaries violate the theory because professors' salaries depend on when they are hired and do not yield equal salaries for equal ranks, which defies horizontal and vertical equity. Neoclassical theory relates salary to the marginal productivity of labor, a measure of contribution to the organization. Traditionally, if similar tasks are performed, the compensation should be the same. This is not the case. The academic world has its own unique labor market [Hearn, 1999, 397-8].

One of the biggest factors affecting professor salaries is the external labor market. It determines the market valuation of professors' skills [Tuckerman, 1977, 692]. It also is a measure of the professor's opportunity cost. If a particular field has many nonacademic opportunities, then professors with those skills will be in higher demand and will consequently be able to command higher salaries. Market conditions at the time of hire also have a significant influence. The pressure creates salary differences within fields and across fields that are continuing to grow [Hearn, 1999, 394]. The salary differences between fields are actually less in academia than they would be in external markets. It seems that the differences are "muted by academe's internal values and norms" [Hearn, 1999, 400]. Nonetheless, when comparing salaries between academia and the external market, most professors are actually paid less than the lowest paid in their profession in the external market [Hearn, 1999, 394].

Many of the salary differences originate at the department level. Salary differences between departments could be due to differences in the departments' overall academic rating. Departments with a higher academic rating could have higher salaries than departments with lower

rating [Ehrenberg, 2004, 236]. There is also more pressure to have comparable salaries within departments than across departments, especially for public universities, because salary information is public [Ehrenberg, 2006, 242].

Each department has a budget constraint that will affect salary differentials, because it determines how much money can be spent on professors. Universities with smaller budgets often have larger salary differences than universities with larger budgets [Ehrenberg, 2006, 242]. If the budget is tight, universities will have to use more of its money for the high demand fields, in order to compete with the external market forces, and will consequently create a wider range of salaries. Departments often have to hire top candidates, or professors in high demand fields, at a salary that is above its existing salary scale in order to get the professor to accept the position [Bereman, 1994, 470]. The budget constraint also affects current professors' salary increases. In a tight budget, their salaries will only be increased by the amount needed to retain them and no more [Brown, 1998, 788].

Another cause of different salaries across fields is that each department might focus on different areas of the professors' job [Tuckman, 1977, 694]. Departments could reward professors for factors like research, publishing, teaching quality, or service. Thus professors' actions will depend on how the department sets incentives [Hilmer, 2005, 510]. Professors will allocate their time in order to yield their greatest utility; if departments reward publishing journal articles then the professors will make that their top priority. It is often the case that departments will reward publishing and research more than teaching quality, because good teachers are known locally, but it is hard to gain national reputation for it [Tuckman, 1977, 693].

Another reason to reward publishing rather than teaching quality is that it is difficult to accurately measure teaching quality. Student assessments are an imperfect measure of quality because students do not know what or how they should be taught. In addition, universities should not *only* be concerned with teaching, or communication of knowledge, but also with scholarship, or professors' knowledge. The concern with professors' knowledge reinforces the emphasis on publishing, since it is evidence of current knowledge in the field, implying that the professors' knowledge is not obsolete. Since teaching is hard to measure, universities may be more focused on publications to further ensure the knowledge and quality of their professors [Perri, 2005, 4].

One of the most desirable objectives for professors is tenure. Because it is desirable, they are willing to pay for it with lower salaries [Ehrenberg, 1998, 503]. If the probability of tenure is high, professors will accept lower salaries in exchange for the stability and future financial security. If the probability of tenure is low, then a higher salary would be necessary to accept the position. Future financial security is almost guaranteed for tenured professors. Universities are not allowed to reduce salaries of tenured faculty “without due process guaranteed by tenure.” Reduction in tenured salaries is not common, but if attempted it is usually abandoned before a change is actually executed due to “lengthy hearings and appeals” [Hearn, 1999, 404].

Geographical separation of universities reduces professor mobility, especially for tenured faculty, and has an effect on professor salaries. Universities are often located in their own separate “university town,” and if professors want to find a different job they would have to move. The separation reduces mobility over time and decreases the desire to move for higher salaries [Ransom, 1993, 232]. Professors hired from other academic institutions receive higher salaries for the same reason, because they have higher mobility and psychological costs [Ehrenberg, 1998, 504]. University administrators are aware of the mobility issue and use it to their advantage because they do not need to increase salaries of senior professors to retain them. By doing this the universities also increase its monopsony power over professors and their salaries [Bratsberg, 2003, 309].

Mobility along with external market forces creates intriguing returns to seniority in the academic labor market. These conditions have produced a U-shaped “relative earnings” profile, which “suggests that faculty with low levels of seniority can expect their earnings to fall, or invert, relative to the salaries of new hires” [Duncan, 2004, 1]. The U-shape is created by looking at years of seniority against salaries as a percentage of starting salaries in that particular field. The shape indicates that the gap in salaries between recently hired professors and professors with high seniority has compressed over time. The compression is increasing especially for high demand fields, which often creates faculty dissatisfaction [Bereman, 1994, 470]. These results could also be a product of market conditions at the time of hire of the professors. Those at the bottom of the U could have entered at a time when salaries were low [Duncan, 2004, 296]. The fact that the professors’ relative earnings may decline as years of experience increase is a phenomenon that is

unique to academia. In most other areas, salaries grow and have a positive linear relationship with seniority [Ransom, 1993, 221].

Basic supply and demand concepts also have a great effect on universities and professor salaries. Salaries are greatly affected by decreases in the supply of professors. If supply is low, given normal faculty turnover, the starting salary necessary to acquire professors rises [Brown, 1998, 785]. Universities can easily increase demand for a particular field, but are often unable to adjust to decreases in demand, especially when tenure is high [Zoghi, 1999, 56].

All of these factors are helpful, but cannot be generalized across universities, for each university has its own reward structures and basis for professor salaries [Ragan, 1998, 356]. In this study the salaries for the College of Business Administration (CBA) at the University of Northern Iowa (UNI) will be examined to try to estimate variables that affect professor salaries there.

III. Model

The following regression equation was estimated:

$$\begin{aligned} \text{Salary} = & B_0 + B_1 (\text{Accounting}) + B_2 (\text{Finance}) + B_3 (\text{Marketing}) \\ & + B_4 (\text{Management}) + B_5 (\text{Assistant}) + B_6 (\text{Associate}) + B_7 (\text{Male}) \\ & + B_8 (\text{Head}) + B_9 (\text{Top 25 School}) + B_{10} (\text{Years at UNI}) \\ & + B_{11} (\text{Research}) + B_{12} (\text{Summer Money}) \\ & + B_{13} (\text{International}) + B_{14} (\text{Rate My Prof}) \end{aligned}$$

It is hypothesized that all of the department variables (*Accounting, Finance, Marketing, and Management*) will be positive. That result is expected because *Economics* is the omitted variable and therefore all the rest of the departments' salaries will be relative to *Economics*. If shown to be true, it will indicate that *Economics* professors are the lowest paid department in the CBA.

Assistant and *Associate* variables are hypothesized to be negative because they are relative to the omitted variable, which is the rank of *Full* professor. If that is shown it would imply that as professors' rank increases so does their salary. If *Male* is significantly positive it will suggest that there is discrimination based on gender. *Head* is expected to be positive; there should be extra compensation for being the head of a department, because it is an administrative position.

Top 25 School is based on *U.S. News and World Report's* Top Business Schools of 2008 rankings. These rankings are a reasonable proxy of quality of education. Obtaining a degree from a top school should positively affect salary. *Years at UNI* should be positive if salaries increase along with seniority. The variable, however, could prove to be insignificant or negative given previous research on seniority in the academic labor market. *Research* consists of PRJ (Peer Reviewed Journals) and OIC (Other Intellectual Contributions). It is a simple number count of how many each professor has generated in the last three years. *Summer Money* represents involvement in Summer Fellowship and Summer Teaching. *Research* and *Summer Money* should both positively affect salaries because they are measures of productivity. Race is often an included variable for wage equations, but with the make up of the faculty in the CBA it was felt that an international variable might be a better indicator. If it yields a statistically significant positive coefficient it would show that being from a country other than the U.S. is a more desired trait and therefore yields a higher salary. If *International* is significant it will be a measure of discrimination.

Finally, ratings from RateMyProfessor.com are included. It would have been ideal to include a variable on teacher assessments but the information was confidential and therefore not available. Ratings from Rate My Professor are not from a random sample of students and are most likely to have extreme biases. Even with these weaknesses, if it is positive it will show that there is a relationship between teaching ability/merit and salaries. Better teachers get paid more, all else equal.

IV. Data

All of the data analyzed were obtained from four sources. The salaries are from The Des Moines Register's *State Salary Database*, which gives the salaries of all state employees based on the 2006 fiscal year that ended June 30, 2006 [State, 2006]. The salaries are Total Earnings and do not include Travel and Subsistence. The ratings for the professors are from RateMyProfessor.com under the University of Northern Iowa [Rate, 2007]. *Top 25 School* is from *U.S. News and World Report's* Top Business Schools of 2008 rankings [America's, 2008]. The rest of the information was obtained from CBA's *About UNIBusiness: Faculty and Staff* webpage, or from college administrators [About, 2006]. Information on 51 CBA professors from the five departments was collected and

analyzed. The variables describe specific characteristics of each professor that could affect their salary.

Dependent Variable:

Salary = Salary received for the 2006 fiscal year

Independent Variables:

Dummy Variables

Accounting = Accounting Professor

Finance = Finance Professor

Marketing = Marketing Professor

Management = Management Professor

Economics = Economics Professor (omitted dummy variable)

Assistant = Assistant Professor

Associate = Associate Professor

Full = Full Professor (omitted dummy variable)

Male = 1 is Male, 0 otherwise

Head = Current or Former Head of the department

Top 25 School = Terminal Degree from Top 25 Schools

International = 1 is International, 0 otherwise

Summer Money = 1 for summer fellowship and/or 1 for summer teaching, 0 otherwise during May or June 2006 before the fiscal year ended

Years at UNI = 2006- Year Started

Research = Number of PRJ and OIC within the last three years

Rate My Prof = Rating from Ratemyprofessor.com out of 5

The data yielded some important descriptive statistics before the regression analysis had even begun. The number of professors in each department was comparable (eight to twelve), giving equal representation of each department. Females are somewhat scarce in the college, as only ten of the 51 professors are female. Lastly, only five professors have not received a Ph.D. A variable for Ph.D. was not included for that reason, and because the majority of those without Ph.D.s have overcome the disadvantage through seniority or administrative positions.

V. Results

There were only some slight problems while developing the regression

analysis. When dealing with professors' personal history and characteristics, public information is severely limited. If full access were available, factors such as all publications, further extracurricular programs, and teaching assessments should be included and analyzed. Although not perfect, these factors are to some extent represented within the other independent variables.

In the original Ordinary Least Squares (OLS), *Assistant* was the omitted variable for rank to show a positive relationship as one increased in rank, but there was a high correlation present between *Associate* and *Full* professor. To fix the possible multicollinearity problem, *Full* became the omitted variable. The correlation would then not affect the model, and thus yield negative coefficients for *Assistant* and *Associate*. One final thing that had to be fixed was discrepancies between professors' rank and title on the CBA website and the Salary Database. The CBA's titles are for the 2007 fiscal year while the Salary Database is for the 2006 fiscal year. All the titles and ranks were then changed to match the 2006 fiscal year data and salaries.

The OLS regression analysis yielded the results in Table I. As expected, all of the department variables are positive, showing that Economics is the least paid of all the departments. *Accounting*, *Finance*, *Marketing*, and *Management* are statistically different from *Economics* at a less than a five percent significance level, meaning that professors in these departments earn statistically more than Economics professors, when controlling for all other factors. *Assistant* and *Associate* are negative as predicted, and are statistically different at the five percent significance level. Full professors' salaries are statistically higher than both of the lesser ranks. Being the head of a department, current or former, is statistically significant, resulting in an increase in salary for holding that position. *Summer Money* is also statistically significant and positive, showing that salaries are significantly increased when doing Summer Fellowship and/or Summer Teaching.

Surprisingly, Rate My Professor ratings were statistically significant at a 3.02 percent confidence level. The results suggest that even though it is not the ideal measurement of teaching merit or a representative sample, there is some explanatory value in it. There is a positive relationship between rating and salary, therefore implying that the better teachers are paid more.

The rest of the variables were not statistically significant. *International* and *Male* were positive but insignificant. It is good that

International and *Male* are not significant because that means that the results do not suggest discrimination. Males and international professors are not paid more just for being international or male. *Years at UNI* was insignificant and negative showing that seniority does not statistically affect salaries. External market forces could be the cause, but trying to figure that out is beyond the scope of this article.

Top 25 School was also negative and insignificant. The variable is not the best indicator of quality of professors' education for a few reasons. It is an overall ranking of business schools and does not go further into individual fields of study. Each field or department may have different top schools. These rankings are also the current rankings of each school, which could dramatically change overtime. It then is not a very good indicator of quality of education for professors who obtained their degrees up to forty years ago. The ranking, however, was a reasonable proxy to use for this study and would be changed in the event of future research.

The number of articles written (PRJ and OIC) for the *Research* variable was also statistically insignificant. The numbers of articles does not help explain any of the variation in salary. A problem with the variable is that it is only for the last three years, which is too short of a time frame. In addition, a simple count of articles does not reflect the quality of the article or the quality of the journal that published it. Nor does it take into consideration how many times the article has been cited in other published works. Unexpectedly, *Research* yielded a negative coefficient implying that the number of articles written is negatively related to salary. These unusual results could show further disparity between departments within the college. Accounting and Finance are the two highest paid departments, yet within the last three years they are the least published of all the departments. Management and Economics are heavily published, but still are not rewarded in the same manner as the other departments. If an increased sample could be obtained it would be interesting to see whether articles are significant and valued within each department.

Research is not a very good monetary incentive at UNI for it only accounts for twelve percent of the salary increase, resulting in a marginal effect of only approximately \$100 per article. In fact the main incentive for research may be for assistant professors striving for tenure. That could explain the negative coefficient of research because the assistant professors are the ones doing the most research, yet they are also the least paid because of the lower rank and seniority.

The regression shows an Adjusted R-squared of 0.6819 which is reasonable for a wage equation and shows a fairly good fit for the data. There are often many other variables that are working in determining salaries that are hard to perfectly measure. Even though some of the variables are not significant they should still be included because theory suggests that they should have an effect.

Appendix 1 shows the basic statistical findings by department. Average salaries show Finance to be the highest paid with an average salary of \$116,374.38. Accounting has the most variation with the highest standard deviation of \$36,097.61. Overall the CBA has an average salary of \$100,960.48 and a standard deviation of \$27,094.69. Accounting also has some interesting occurrences with its salaries. It has the highest and the lowest salary of the CBA. The large range is likely related to the number of Non-Ph.D.s Accounting has in its department. It has a very high average number of years at UNI for its Assistants - 23.25 years. In the past an MBA or CPA designation was all that was required to be an accounting professor, also suggesting that requirements have changed and only those with the highest seniority remain without that qualification. Many of the assistant professors do not have Ph.D.s, yet have been at UNI for a great many years. When taking out the professors without a Ph.D. the average salary in Accounting increases to \$119,678.95 and the standard deviation decreases to \$21,963.17. Even so, Accounting has the highest starting salary of the college and the least number of full professors. All of these statistics show that there is more going on in the Accounting department than the numbers show. Perhaps it is the external labor markets effects or internal values.

Finally there is a table included that provides the average salaries for each department by rank according to AACSB (*The Association to Advance Collegiate Schools of Business*) International's 36th annual Salary Survey. When comparing these salaries to UNI's, overall UNI has higher salaries than the international average. The AACSB's salaries, however, are much more compressed than UNI's, as illustrated by the highest range between full and assistant (\$31,800) in the Economics department. The AACSB's salaries for the Finance department actually show a decrease in salary between Assistant (\$101,100.00) and Associate (\$97,300.00) professors, suggesting that there have been some external market factors affecting the salaries of recent hires causing them to be higher than the associates'. That trend, however, is not found within CBA's Finance department.

VI. Conclusion

This paper set out to analyze what factors influence professor salaries and whether there are wage differentials in the College of Business Administration at the University of Northern Iowa. The research provided insights into what could be happening and the model tried to test and verify these. If there were more time and better information it would be ideal to gather data from other colleges to see if there are significant differences between colleges and different fields. It would also be beneficial to analyze professors' previous career accomplishments, specifically the number and quality of articles published. Even though the given factors explain some of the salary variations, there are still many other factors that are influential and unable to measure.

TABLE I—OLS Regression Analysis

R-Squared	0.7710	Adjusted R-Squared	0.6819
Variable	Estimated Coefficient	T-Stat	P-Value
Intercept	71,072.58	4.1816	0.0002
Accounting	20,351.99	2.8305	0.0076*
Finance	28,619.02	3.1827	0.0030*
Marketing	16,703.83	2.2155	0.0331*
Management	22,900.34	3.3863	0.0017*
Assistant	-41,914.89	-5.5971	0.0000*
Associate	-20,589.86	-3.4173	0.0016*
Male	8,242.11	1.3235	0.1940
Head	22,049.25	3.1824	0.0030*
Top 25 School	-2,239.86	-0.3004	0.7656
Years at UNI	-378.03	-1.4121	0.1665
Rate My Prof	7,505.18	2.2571	0.0302*
International	2,480.14	0.4012	0.6907
Summer Money	10,683.31	2.3145	0.0265*
Research	-1,381.13	-1.6101	0.1161

* Significant at the 5% level

Appendix 1Average Salaries

		Standard Deviation	For CBA:	
Accounting	\$101,162.52	\$36,097.61	Average	\$100,960.48
Finance	\$116,374.38	\$27,764.80	Std Deviation	\$ 27,094.69
Marketing	\$ 99,930.11	\$17,341.40		
Economics	\$ 87,661.88	\$25,009.00		
Management	\$105,646.51	\$22,307.54		

Range in Salaries:

	Lowest	Highest	Range	Highest without Heads
Accounting	\$44,506.00	\$161,982.00	\$117,476.00	\$122,115.54
Finance	\$86,227.50	\$155,387.50	\$ 69,160.00	\$155,318.60
Marketing	\$84,445.00	\$136,411.06	\$ 51,966.06	\$109,352.06
Economics	\$65,040.10	\$146,035.50	\$ 80,995.40	\$119,269.10
Management	\$70,223.12	\$154,935.48	\$ 84,712.36	\$126,685.04

Range in Salaries Based on Seniority:

	Lowest Seniority	Years at UNI	Highest Seniority	Years at UNI
Accounting	\$ 110,834.00	1	\$ 81,440.50	32
Finance	\$ 86,227.50	3	\$ 96,775.62	26
Marketing	\$ 84,445.00	1	\$ 107,814.00	31
Economics	\$ 66,500.00	1	\$ 146,035.50	33
Management	\$ 79,389.00	1	\$ 110,407.82	32

Average Salaries by Rank:

	Assistant	# of Assistants	Associate	# of Associates	Full	# of Full
Accounting	\$66,920.77	4	\$114,961.15	4	\$142,048.77	2
Finance	\$95,199.25	2	\$114,432.48	2	\$127,932.91	4
Marketing	\$86,325.93	2	\$96,175.80	3	\$112,753.87	3
Economics	\$66,500.00	1	\$74,377.33	6	\$112,879.18	4
Management	\$88,827.04	2	\$92,798.47	6	\$124,101.05	6

Average Years at UNI for each Rank:

	Assistant	Associate	Full	<u>Average Years in Dept.</u>
Accounting	23.25	6.25	14.5	14.70
Finance	3	21.5	15	13.63
Marketing	2	22.67	16	15.00
Economics	1	9.33	21.75	13.09
Management	2	14.67	17.67	14.14

AACSB International Average Salaries 2003

	Full	Associate	Assistant
Accounting	\$109,000.00	\$89,700.00	\$89,400.00
Economics	\$100,300.00	\$72,900.00	\$68,500.00
Finance	\$124,300.00	\$97,300.00	\$101,100.00
Management	\$108,100.00	\$84,800.00	\$81,600.00
Marketing	\$109,900.00	\$86,600.00	\$84,700.00

[AACSB, 2003]

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