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Attempting Salary Equity for Higher Education in North Dakota

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The State of North Dakota supports eight institutions of higher education: two universities, four state colleges and two two-year institutions. There has been a long history of disagreement over the average faculty salary figure used in the state formula to allocate salary monies to the three kinds of institutions. The State Board of Higher Education has, in the past, supported the philosophy of retaining a differential, e.g., \$2,000 difference between the two-year institutions and the universities and \$1,500 difference between the state colleges and the universities. A 6% salary increase plus implementing a differential would give larger percentage salary appropriations to the state colleges and the two-year institutions.

For the 1977-79 biennium it was the Governor's desire to stop the controversy of the differential and give "equal pay for equal work." The amount for the biennium that would normally establish the differential was \$228,776. House Bill 1005 contained an appropriation of \$228,776 to be used by the State Board of Higher Education for the purpose of creating more equitable salary authorizations to the institutions and addressing primarily the aforementioned objectives.

The Statewide Faculty Salary Equity Committee was appointed by the Board Office in consultation with the Council of Presidents on February 18, 1977. The committee was made up of a representative of each of the eight institutions and a technical advisor, and was charged with allocating the \$228,776 to faculty members, regardless of institution, on the basis of "equal pay for equal work."

Committee Procedure

The committee met a total of four times. At the first meeting the State Budget Director and the State Board of Higher Education Budget Director were present to clarify the task of allocating "equal pay for equal work." At this meeting it was decided that the approach of a regression analysis be explored, and the technical advisor was asked to develop a model. This model (described in detail under Research Design) was reviewed at the second meeting of the committee. It was decided to make a preliminary run with 1976-77 salary data for review and discussion at the next meeting. Some minor modifications were made to redefine the sample and the committee agreed to adopt the regression analysis method for the 1977-78 data at the third meeting. The committee's last meeting helped finalize the report to the President's Council and State Board of Higher Education. While full agreement was reached on the adoption of the statistical approach, there was dissension on the distribution of monies resulting from the regression analysis.

Research Design

All full-time tenured or tenure-track faculty wholly funded on 1977-78 appropriated monies were included in the sample. The independent variables together with their regression coefficients are shown in Table 1.

Table 1

VARIABLES AND REGRESSION COEFFICIENTS FOR EQUITY STUDY (N=984)

| Variable | Degree Level | Regression Coefficient |
|---|------------------|------------------------|
| 1. Doctorate | (1 if, 0 if not) | 1359.33 |
| 2. Master's | (1 if, 0 if not) | - 178.15 |
| 3. Bachelor's | (1 if, 0 if not) | -1020.59 |
| Years Experience at Current Institution | | |
| 4. 0-2 years experience | (1 if, 0 if not) | -1406.36 |
| 5. 3-7 years experience | (1 if, 0 if not) | -1039.85 |
| 6. 8-12 years experience | (1 if, 0 if not) | - 691.83 |
| 7. 13-17 years experience | (1 if, 0 if not) | - 662.95 |
| 8. 18-22 years experience | (1 if, 0 if not) | - 196.43 |
| Highest Level of Departmental Program | | |
| 9. Graduate Program | (1 if, 0 if not) | 798.06 |
| 10. Undergraduate Program | (1 if, 0 if not) | 606.75 |
| Discipline, Higher Education General Information Survey (HEGIS) Classification | | |
| 11. Agriculture and Natural Resources | (1 if, 0 if not) | 938.84 |
| 12. Architecture and Environmental Design | (1 if, 0 if not) | 1823.40 |
| 13. Biological Sciences | (1 if, 0 if not) | 95.40 |
| 14. Business and Management | (1 if, 0 if not) | 1389.40 |
| 15. Communications | (1 if, 0 if not) | 556.21 |
| 16. Computer and Information Sciences | (1 if, 0 if not) | 2713.86 |
| 17. Education | (1 if, 0 if not) | 670.20 |
| 18. Engineering | (1 if, 0 if not) | 1803.84 |
| 19. Fine and Applied Arts | (1 if, 0 if not) | 15.33 |
| 20. Foreign Languages | (1 if, 0 if not) | - 633.11 |
| 21. Health Professions | (1 if, 0 if not) | 1263.49 |
| 22. Home Economics | (1 if, 0 if not) | 1184.83 |
| 23. Law | (1 if, 0 if not) | 7420.19 |
| 24. Letters | (1 if, 0 if not) | - 89.23 |
| 25. Mathematics | (1 if, 0 if not) | 301.88 |
| 26. Physical Sciences | (1 if, 0 if not) | 662.62 |
| 27. Psychology | (1 if, 0 if not) | 454.75 |
| 28. Social Sciences | (1 if, 0 if not) | 408.00 |
| 29. Business and Commerce Technology | (1 if, 0 if not) | 252.12 |
| 30. Data Processing Technology | (1 if, 0 if not) | - 46.00 |
| Rank | | |
| 31. Professor | (1 if, 0 if not) | 5979.97 |
| 32. Associate Professor | (1 if, 0 if not) | 3506.40 |
| 33. Assistant Professor | (1 if, 0 if not) | 1547.59 |
| R = .858. | Constant | 13155.64 |

The dependent variable was the 1977-78 contracted salary. The zero coded variables were: instructor, other degree or professional certificate, 23 + years of experience, vocational or professional degree offered in home department and public service related technologies.

Regression Equation

Table 1 contains the regression coefficients resulting from the use of previously mentioned variables in the regression analysis. Several points should be made in relationship to the model. First, a prediction equation can be formed using the regression coefficients as follows:

$$Y = 13155.64 + 1359.33X_1 - 178.15X_2 + \dots + 1547.59X_{33}. \quad (1)$$

to find the predicted salary for an associate professor in psychology with a doctorate and eight years of experience whose department offers a graduate program would be as follows:

$$Y = 13155.64 + 1359.33(1) - 691.83(1) + 798.06 (1) + 454.75(1) + 3506.40(1) = \$18,582$$

It should be stressed that the use of an equation such as (1) uses only demographic information and does not assess production criteria. No measure of teaching (or teaching success) is included, nor is any measure of research/publication activity or service activity in any way addressed. One could conjecture that two individuals might be assigned a similar predicted salary because of similar demographic backgrounds but have highly dissimilar productivities. Returning to the case of the associate professor in psychology with a doctorate and eight years of experience whose department offers a graduate program, let us also look at productivity measures. Perhaps two different people in the same department have identical demographic information as determined in equation 1. Suppose individual A has only recently

received the doctorate and only recently been promoted to associate professor. Suppose also that A's research/publication activity does not extend beyond the dissertation, service activity does not extend beyond the usual university committee work and, due to the recency of the doctorate, service on graduate committees is at a minimum. The person may in fact not chair any graduate committees. Consider person B with the identical demographic information, but grossly different productivity data. Suppose that person B is not only considered to be an excellent teacher but has also been highly productive as a researcher with numerous articles in refereed journals, has authored several books and read papers at national conventions. In addition to serving on many graduate committees, person B has served as the advisor to several doctoral candidates. Also, person B has attracted large grants from external funding agencies. Yet, according to equation 1, if both A and B were paid \$18,582 no inequity would be seen to exist. Persons arguing from a meritocratic base would probably opt for a considerably higher salary for individual B.

Equation 1 was used as a basis of assessing equity for all (N = 984) faculty employees at public institutions in North Dakota. The equation was run so that for each employee a residual was found. Those residuals that were negative were summed separately by institution.

Recommendations

In developing its recommendations, the committee kept the following points in mind.

- 1) While the committee is certainly grateful that \$228,776 is available for equity purposes, its analysis* reveals that approximately \$620,000 would be needed to bring average salaries in the system as a whole up to the system's own norms. (It should be kept in mind that the committee used only North Dakota data and North Dakota norms in its analysis, and that this report makes no reference to generally higher regional or national faculty salary norms.) Thus, the limited funding that is available must necessarily be distributed on a selective and partial basis relative to actual need.
- 2) It follows from the above that no fully satisfactory method of allocating the available funding can be formulated. More just claims exist than can be met, and therefore the committee could seek to formulate only a "least unsatisfactory" kind of solution to the problem of allocating equity adjustments.
- 3) Faculty whose salaries have a positive relation to the predicted norms in the committee's study are not "overpaid." They are only relatively better off within the North Dakota system than those whose salaries have a negative relation to the norms.

*The earliest report showed \$670,000 total inequity; as coding errors were eliminated, the inequity was reduced. The original equation, differing somewhat from equation 1, was the basis of the committee's deliberations. The original equation and equation 1 generate predicted values that correlate $r = .98$. Complete details can be found in Williams and Mary (1977).

- 4) When applying the principle of "equal pay for equal work" to a group of professional employees, three separate factors must be taken into account. First, the equality or comparability of a given position to other positions must be established. Second, the equality or comparability of the professional qualifications and experience of the incumbents must be established. Finally, the equality or comparability of the performance of the incumbents must be established. Only when all three of these factors are evaluated in a given situation can the issue of equity be fully addressed. The committee quickly recognized that while it could hope to measure the first two of these factors, it could not measure the last. The latter is and must remain an on-site, institutional matter.

A correlative to the last observation is that the simple fact that an individual is paid at a level below his or her predicted norm does not necessarily mean that that person deserves a higher salary. The salary may be low for good and sufficient reasons. Again, only those who actually work with and evaluate such individuals are competent to judge their claims through performance to equity adjustments. This and the other matters discussed above are implicit in the following recommendations of the Statewide Faculty Salary Equity Committee.

Recommendation One: Equity funding should be distributed as soon as possible so as to minimize the eroding effects of inflation on the purchasing power of the amount available.

Recommendation Two: The committee's regression analysis is adequate to the task of developing aggregate figures to allocate to the several institutions. With respect to deciding individual allocations, however, the committee's analysis is less useful. At the campus level, the committee's analytic printout should be used primarily as a device to identify individual cases which should be considered for equity adjustment. In no case should the committee's analysis be thought

of as a prescriptive, binding document either with respect to dollar amounts or individual eligibility or ineligibility for salary adjustments.

Recommendation Three: Available equity funding should be allocated to each campus according to one of the following three rationales. Taken together, these three alternatives embody the irreducible diversity of perspective and institutional interest that characterized the committee and its deliberations. The committee could not resolve its differences in this regard, although it did agree on the present form of presenting those differences to the Council of Presidents and the Board for final resolution.

- a) Alternative One: As the committee's report indicates, salary inequity is evident throughout the system at roughly the same rate at each institution. Therefore, available equity funding should be prorated to each institution on the basis of a straightforward construction of the committee's regression analysis as follows:

| | 48.5% <u>First Year</u> | 48.5% x 1.06 <u>Second Year</u> | <u>Total</u> |
|------------------|----------------------------|------------------------------------|--------------|
| Dickinson State | \$ 6012 | \$ 6384 | \$ 12396 |
| Mayville State | 4872 | 5174 | 10046 |
| Minot State | 10337 | 10976 | 21313 |
| NDSSS | 19101 | 20282 | 39383 |
| NDSU | 28484 | 30245 | 58729 |
| NDSU - Bottineau | 3599 | 3822 | 7421 |
| UND | 33391 | 35456 | 68847 |
| Valley City | 5161 | 5480 | 10641 |
| Total | \$110956 | \$117820 | \$228776 |

- b) Alternative Two: While a substantial frequency of salary inequity is characteristic of all the institutions in the system, the two universities have historically had the benefit of a salary differential formula to help them address their salary inequity problems. Also, the larger formula-supported budgets and the availability of extramural funding give the two universities considerably more budgeting flexibility than the other institutions in the system. Therefore, it would be just if the proportion of the equity funding applicable to UND and NDSU according to the committee's report were discounted by a significant percent. This discount could be distributed on a pro rata basis to the other institutions in the system as a special supplement to their regular allocation.

The total of any such reduction should be derived at the rate of 54% from UND and 46% from NDSU, i.e., each University's portion of the all-system total of available equity funding. For example, if the two universities' joint allocation were reduced by 25% this would free up \$31,894 for redistribution to other institutions (\$17,223, or 54%, from UND's equity allocation and \$14,671, or 46%, from NDSU). This would leave UND with an equity allocation of \$51,624, and NDSU with an allocation of \$44,058.

| | 48.5% <u>First Year</u> | 48.5% x 1.06 ^y <u>Second Year</u> | <u>Total*</u> |
|------------------|----------------------------|---|---------------|
| Dickinson State | 7869 | 8355 | 16224 |
| Mayville State | 6420 | 6816 | 13236 |
| Minot State | 13585 | 14424 | 28009 |
| NDSSS | 25134 | 26688 | 51822 |
| NDSU | 21368 | 22690 | 44058 |
| NDSU - Bottineau | 4683 | 4972 | 9655 |
| UND | 25037 | 26587 | 51624 |
| Valley City | 6862 | 7285 | 14147 |

| | | | |
|-------|----------------|----------------|----------------|
| Total | 95493 + | 101391 + | 196981 + |
| | 15465 discount | 16426 discount | 31895 discount |

*First year \$ + second year \$ approximate total \$ due to rounding

- c) Alternative Three: Positive relations of faculty salaries to predicted norms as well as negative relations at each institution ought to be taken into account. If the sum of the amounts faculty salaries are below predicted norms is greater at a given institution than the sum of the amounts above predicted norms, then that institution should receive the difference. Otherwise the institution should receive nothing. This allocation of funds is summarized below:

| | |
|------------------|--------------|
| Dickinson | \$ 8,662 |
| Mayville | \$16,286 |
| Minot | \$ -0- |
| Wahpeton (NDSSS) | \$39,956 |
| NDSU | \$ -0- |
| Bottineau | \$12,850 |
| UND | \$ -0- |
| Valley City | \$ 5,337 |
| TOTAL | \$83,091 |

Since this alternative uses only approximately 36% of the \$228,776 available, it is recommended that another regression analysis

be run after these adjustments have been made and after all teaching positions have been filled for the 1977-78 academic year.

Recommendation Four: Whatever the rationale chosen for determining the lump sum to be allocated to the several institutions, the actual distribution and method of distribution of salary increments to individuals should be a matter for each institution to decide for itself according to its own needs, priorities, and on-site analysis of the salary equity/in-equity patterns that characterize its faculty.

Recommendation Five: Whatever the distribution system developed by each campus, provision should be made for significant faculty participation in the distribution process.

Recommendation Six: In addition, each institution should establish a means whereby individuals who are not given equity adjustments can find out the reasons why if they so request.

Recommendation Seven: The Board should further refine and amplify the committee's analytic model, and should apply it at appropriate intervals in future years in order to monitor the salary equity patterns of the system in an on-going way, and to provide information to the system which may serve as a basis for considerations of salary and related matters in the future.

It should be noted that the distribution of monies was done under alternative two with slight modifications. The Board did amend the recommendation to add that "all monies be distributed among the faculty on the negative side of the mean." The Board interpreted the total action to require the following:

1. You will commit 48.5% of your allocation the first year of the biennium.
2. Distribution will only be made to those with negative residuals.
3. No individual will receive more than his or her negative residual.

4. Faculty representation is necessary in the distribution process.

Table 2 contains information regarding inequities as determined by the use of the negative residuals.

Table 2

MEAN NEGATIVE RESIDUAL, MEAN PRORATED NEGATIVE RESIDUAL FOR 1977-78 WITH AVAILABLE MONIES AND ACTUAL AUTHORIZED MEAN ALLOTMENTS FOR FIRST YEAR

| | Mean Negative Residual | Prorated Mean Negative Residual | Actual Authorized Mean Allotments |
|-------------------|------------------------|---------------------------------|-----------------------------------|
| Dickinson State | \$ 562 | \$101 | \$133 |
| Mayville State | 778 | 140 | 169 |
| Minot State | 467 | 84 | 114 |
| NDSSS | 652 | 117 | 172 |
| NDSU | 669 | 120 | 90 |
| NSDU-BOT | 1029 | 185 | 234 |
| UND | 604 | 109 | 78 |
| Valley City State | 725 | 130 | 149 |
| Total | \$ 629 | \$113 | \$113 |

Discussion

Throughout this paper, inequity has been empirically defined as the negative residual as determined by a multiple regression equation. Without question, many professors would find fault with such a system. It could be argued that if the system were used to any significant degree in the future the effect of the system would be to adopt an elaborate salary scale. It could also be argued that the present application may have several built-in inequities. The concept of rank undoubtedly differs from institution to institution. The functions of the individual differ; no account was made of this probable difference in missions. The regression coefficients associated with the various HEGIS categories might cause criticisms from many corners.

Finally one might ask (particularly if the faculty member had a positive residual) if the equity study was of any value. Did the final results yield "equal pay for equal work"? Should a continuous monitoring of state faculty salaries continue? To answer the questions: The study was of value; the jury is still out on the effect of allotting the "equity" adjustments. Undoubtedly, disagreements would occur on whether or not the adjustments have had a positive effect on higher education in North Dakota. One point of view would hold that the net effect has been to raise the cost of higher education by \$228,776 for the biennium. Another cynical view would be that any special interest group of faculty could be sidetracked in their attempts to win concessions from the state legislature by saying, "Look, you got your equity pay last time around." Perhaps some enterprising doctoral student will write a dissertation on the cost efficiency of faculty equity pay; the crux of the matter lies in the individual decisions made separately at each institution. Were the adjustments made to "productive but underpaid" faculty or was some simplistic or even invidious method employed in allocating the monies? Assessing equal pay for equal work in the area of personal services is like a "fool walking in where angels fear to tread." Rather than to say we can't

do it, it seems more productive to admit that we have both done poorly and have done our best this time around. Hopefully, the process can be refined, and even some logic introduced. Clearly, outcome variables need to be included. Measures of teaching success, hours taught per week, weighted student credit hours produced, cost per student, publication, research and other legitimate scholarly activity as well as a host of service measures are candidates for inclusion in future studies. Refining the variables in the present study would be helpful. Including years in rank and year of last degree together with some interaction variables would probably be of use. However, every regression equation has to be inspected for inappropriate outcomes. If variable #1, holding a doctoral degree, had a negative regression coefficient in Table 1, this finding would be a possible indication of inappropriate salary decisions on a system-wide basis which would warrant an extensive investigation into such an anomalous outcome. A case in point can be made from Table 1. Rounded to the nearest dollar, the regression coefficient associated with home economics is \$1,181; the corresponding coefficient for a faculty member in biology is \$92. Presumably equity is served if, when all other things are equal, home economists are paid approximately \$1,100 more than biologists. While this finding might accurately reflect some institutions, there is neither an a priori nor an a posteriori reason to explain this result for North Dakota.

Perhaps another relevant point should be made regarding the use of regression to define inequity. Does the fact that some institutions have larger residuals than others mean they suffer any inequity? Clearly, the size of the residuals could be minimized by increasing the size of the R^2 value. The R^2 value can be increased in a variety of ways; if variables are added, such as weighted student credit hours produced and publication activity, perhaps the remaining variability would be significantly reduced. There is another way to reduce the size of the residuals, and that is to slavishly use the equation in future salary decisions until differences between actual and

predicted salaries are considerably diminished. The latter alternative would be an excellent example of the cart pulling the horse; the equation would have been used originally to get a least squares estimate; the equation in the latter implementation would become the decision base rather than provide a statistical estimation of previous decisions.

Finally, a point could be made in regard to the several equity studies which are likely to be taking place or will take place in the near future: there are more good questions than there are good answers. In providing answers, a necessary feature is good information (data). While complex systems have their dangers, simplistic systems have yet another danger; when the number of variables used to determine equity is severely limited, the process of choosing the variables becomes a political decision. Suggestions made in a recent publication (Scott, 1977) distributed to local chapters of the American Association of University Professors could be criticized for taking a simplistic view to remove inequities in salaries. While the intent of Scott's system of excluding such variables as years in rank and year doctorate obtained is to remove salary differentials between caucasian males and other groups, a secondary outcome would be to bureaucratize the reward system in higher education; bureaucracies are not well known for enhancing the supposed triumvirate of higher education - teaching, research and service - they are better known for enhancing their own perpetuity.

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