PRODUCTION SYSTEMS INC.

Development of a Salary Model

INTRODUCTION
Sally Parsons, president of Production Systems Inc., has asked you to assist in analyzing the company’s salary data. She has recently received a series of complaints that women employees are receiving lower wages for comparable jobs. The complaints came as a surprise to Sally because she thought salary increases were based on experience and performance. Sally was aware that the average wages of women staff were less overall than those of men. However, she also knew that women staff had less experience and thus would be expected to have lower wages. Given the complaints Sally understands that she must have objective information.

Production Systems Inc. is a regional computer systems development company that specializes in work with banks and insurance companies. The company started as a service department for a regional accounting company in the 1960s. A few of the current employees actually came from the accounting company. In the early 1970s, Production Systems Inc. became an independent company. The company has been quite successful, experiencing steady growth over its entire life. Employment has not grown as rapidly as have the company’s total billings because of productivity innovations introduced during the past ten years.

The company has tended to hire experienced professionals with masters degrees in technical fields including business, management science, computer science, engineering, economics, and mathematics. Most of the employees have come with significant experience. The youngest employee in the professional group is 29, and the most senior is 65. Experience with Production Systems varies over a wide range, with one-fourth having less than seven years and one-fourth having more than 22 years. Most of the women employees have less experience with the company.

The professional staff has only three levels: systems analyst, team systems analyst, and project systems analyst. Salary ranges are quite wide within each of the levels. Project systems analyst is the highest level, followed by team systems analyst. Promotion to the higher ranks is awarded by a committee of project systems analysts, and advancement to each level usually requires a minimum of six years experience and significant project work. In general, persons at the higher levels are more productive and tend to direct projects. It is possible, however, for a group that includes several project systems analysts to be directed by a team systems analyst. For every
project under contract, a team of the best available people is created to carry out the work. It is also well known that some persons at the highest level are less productive than others at lower levels. Thus higher status and salary is a reward for past performance and not a reliable measure of present contribution.

Salary adjustments are sometimes made to recognize certain specialty skills that demand a high price in the labor market. Persons who work in database systems programming have unique skills that are highly sought by other companies. Another special category is technical systems developers—people who prepare specialized high-performance software for key parts of large systems. People with either of these skills are in great demand, so they must be paid a premium if they are to be retained. Such specialists work at all three professional staff levels, depending on their experience with the company, but the company has not provided premium salaries merely by promoting the specialists. The personnel policy has been to base promotion on a wide range of work and project management skills. Special skills are compensated by a separate adjustment. Because promotions to higher levels are related to experience, the company has sought to avoid confusing levels and specialized skills that have a market premium.

**PROBLEM ANALYSIS**

Your project analysis begins with a series of meetings you have with Sally Parsons and the director of human resources, Gilbert Chatfield. Both Sally and Gilbert indicate that wages tend to increase with experience in the company. The managers conduct an annual employee review, which relies heavily on input from project leaders who are directing teams at various remote locations. Project leaders shift as projects are completed and new teams are assigned. Thus, obtaining consistent information to provide the basis for the high-quality employee evaluation is difficult. Most of the employees at Production Systems enjoy the independence and challenging work; salary levels have not been a major concern for most employees. Certain people are recognized as strong performers, and their increases and promotions are generally accepted by the professional staff.

In recent years, however, concerns have been raised about the fairness of the system of awarding salary increases. The complaint by women employees is the most serious, but other complaints have been made over the past several years. In view of these concerns, you recommend that a salary prediction model be developed. This model would use data based on the current salaries paid to professional staff and important variables that define the experience and skill levels of the staff. Such a model would indicate the effect of various factors that contribute to salary level, and it would identify persons whose salaries are above and below the predicted average salary. The model could also be used to determine whether an employee’s gender predicts a salary that is higher or lower than would be expected on the basis of
Table 1. Variable Names in the ProdSys Data file

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>No. of Obs.</th>
<th>Variable Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>150</td>
<td>Age of the employee</td>
</tr>
<tr>
<td>YearsExp</td>
<td>150</td>
<td>Years of experience with Production Systems</td>
</tr>
<tr>
<td>YearsLv2</td>
<td>150</td>
<td>Number of years as a team systems analyst</td>
</tr>
<tr>
<td>YearsLv3</td>
<td>150</td>
<td>Number of years as a project systems analyst</td>
</tr>
<tr>
<td>Female</td>
<td>150</td>
<td>Gender: 1 = female; 0 = male</td>
</tr>
<tr>
<td>Salary</td>
<td>150</td>
<td>Annual salary (in dollars)</td>
</tr>
<tr>
<td>Specialty1</td>
<td>150</td>
<td>Specialty: 1 = Database systems development skill; 0 = else</td>
</tr>
<tr>
<td>Specialty2</td>
<td>150</td>
<td>Specialty: 1 = Technical systems development skill; 0 = else</td>
</tr>
</tbody>
</table>

experience and qualifications.

After some discussion, Sally and Gilbert agree that this model should be developed. It would be useful for answering the present complaint, and it would provide a tool for reviewing the complete professional staff salary structure. After reviewing the employee data records, you select a candidate set of variables for the model development. These variables, which are contained in a file named Prodsys, are described in Table 1. To protect the confidentiality of each employee’s salary record, there is no variable to identify individual employees in this file. At the completion of the study, you will provide Gilbert with a list of employees who are substantially below or above the standard predicted by the model. Since he has the identification key for each employee and has access to other performance information, he can decide whether certain persons’ salaries should actually be above or below the standard.

Your final discussion concludes with your agreeing to include the following tasks in your study:

1. Load the data from the Prodsys file into your local computer system.
2. Prepare descriptive statistics and graphs for the variables in the data file. Is the average compensation paid to all women less than that paid to all men?
3. Specify the variables and functional form for the salary prediction model. Provide a short discussion of the rationale for including these variables.
4. Use multiple regression analysis to develop a salary prediction model for Production System’s Professional staff.
5. Use the preceding model to determine whether gender discrimination exists in the salary
structure.

6 Prepare a written report presenting the salary prediction model and indicating its strengths and weaknesses. Then discuss the wage discrimination complaint and your conclusion regarding its validity.

Include appropriate summary data and graphs to help communicate your conclusion.