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Gender **Discrimination** in the Workplace: A Literature Review

Data collected from a wide array of sources reveal the following pattern with regard to gender discrimination in the U.S. workplace. In general, the proportion of women employed as computer scientists appears to reflect the proportion of women graduating with degrees in that area. However, when women are hired, they tend to start at lower positions and/or earn lower starting salaries than men. Over time, the gap between men's and women's salaries and promotion rates grows at an increasing rate. The salary gap is found even in studies that equate years of experience, level of education, and industry.

This survey was prepared for an industry task force report on women in software engineering. It was intended to supplement that report by providing context on gender discrimination in the workplace with a focus on software engineers.

Hiring

There is some evidence that the proportion of women computer and mathematical scientists hired into industry jobs reflects the proportion of women graduating with degrees in

those areas. Data from different sources indicate that women made up about 30% to 35% of all computer and mathematical scientists between 1988 and 1990 [2]. This figure is somewhat higher than the proportion of women graduating with computer science (CS) degrees over the past 10 to 20 years. According to the U.S. Department of Education, women earned between 30% and 37% of the bachelor's degrees in CS during the 1980s, up from 14% to 28% in the 1970s [11-13]. As for higher degrees, women earned between 21% and 30% of the CS master's degrees in the U.S. between 1980 and 1989 [2], and they earned between 9% and 14% of the CS Ph.D.s in the U.S. and Canada between 1978 and 1990 [3].

Promotion

In almost every industry, women occupy a very small proportion of the higher-level positions. For example, a 1988 study found only three chief executive officers among the Fortune 1,000 were women, and only 1.7% of the chief operating officers, chief financial officers, and executive vice presidents were women [14]. In a 1993 study of Stanford MBAs, gradu-

ates from the class of 1982 were tracked over time. It was found that 71% of the men are currently in the top four rungs of management, whereas only 34% of women had reached those positions [10]. A study of the 10 largest makers of weapons found that women made up 5.3% of the senior management positions [9]. *Business Week* did a report in 1987 in which they tracked 100 women executives who were on the fast track from as far back as 1976. They found that none of those 100 women had made it to the top position in a public corporation unless they started the business or inherited the position [14].

Data from the computer industry in particular were not available, but the same pattern appears in the academic world. Women make up 10% of both assistant and associate CS professors but only 4% of the full professors, a rank that generally takes about 10 years to achieve [3]. (Recall that women have been earning between 9% and 14% of computer science Ph.D.s since 1978.)

As discussed earlier, the problem is not that larger proportions of trained women are not available. Women are not represented at the highest ranks of companies and academia because, for some reason, their rate of progression is halted somewhere along the way to the top.

Salaries

The salary picture for women is even more inequitable than that for promotion. Women consistently make less money than men in almost every industry, even when they first start their jobs [5, 8]. An American Demographics study found that women working full time with two or fewer years of experience earn 72% of what men with the same experience earn [8]. In the computer and mathematical sciences, women's wages as a percentage of men's has fluctuated between 74% and 86% between 1983 and 1992, although on the whole it has grown from 75% to 85% (U.S. Department of Labor statistics).

As women get older, they make less as a proportion of men's salaries. Although the gap has narrowed somewhat in the past 14 years, this trend is due to a drop in men's inflation-adjusted salaries, not a rise in women's [6, 7]. And the gap has not been steadily decreasing. In 1955, women earned more of a percentage of men's salaries than they did in 1987, 63.9 cents vs. 63.7 cents [5].

Part of the reason for the wage gap is that women do not get promoted as quickly as men. However, even when equating for rank, a gap appears. A 1993 *ComputerWorld* survey of information systems (IS) managers' salaries showed the wage gap

widened as the management level increased [1]. For example, among programming managers, women made 98% of men's salaries, but among IS directors or managers, women made 82% of men's salaries.

Other common explanations for the increasing wage gap are that women choose professions that pay less, and they have less experience than men of the same age because they take time off to raise children. However, *Business Week* reported on a study that compared the salaries of single white men and women between the ages of 20 and 40 [4]. When they factored out schooling, industry, skill level, and work experience, the women still earned 91% of men's salaries. (Without factoring these out, women earned 86% of men's salaries.)

Another researcher analyzed the credentials of 194 corporate managers randomly chosen from 800 people who took a leadership course. He found that "if women were men with the same credentials, they would earn about 18% more" [7]. These figures are the closest estimate we have of the wage gap that can be explained only by discrimination.

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