Assessing Gender Differences in Software Developers Using the Human Capital Model

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ABSTRACT

Previous studies have indicated that discriminatory practices exist in the Information Technology profession. In this paper, we quantify the differences in the current hourly salaries of female software developers with their male counterparts using the human capital model based on economic theory. In addition to the gender factor, the human capital model includes other control variables that may account for the salary differences such as education, experience, and specific skills, such as object-oriented programming and SQL. Our models indicate that gender is still a statistically and practically significant factor in assessing a software developer’s salary.

Keywords: discrimination; gender differences; human capital model; software developers/computer programmers

INTRODUCTION

There is a great deal of interest in regard to gender differences in the Information Technology (IT) profession. Panteli, Stack, and Ramsay (1999) reported that women were underrepresented in all areas of the IT industry and cited several studies that indicate the IT culture is a masculine, engineering type, computing culture. More recently, a special issue of the Communications of the ACM (July 2001) focused on issues regarding the global IT workforce. One key issue that emerged was the underrepresentation of women, minorities, and older workers in the IT workforce (Arnold & Niederman, 2001). Two specific articles in this issue focused mainly on gender issues. Von Hellens and Nielsen (2001) discussed attracting women to the IT profession in Australia. Trauth (2001) focused on two workforce challenges for Ireland relating to gender and socioeconomic class.

Truman and Baroudi (1994) examined the extent to which gender differences exist in ranks of senior IT managers and found that the mean salary for women IT managers was considerably lower than males.
even when controlling for job level, age, education, and work experience. They concluded that this is a problem suggestive of discriminatory practices.

In contrast, the neoclassical economic school has indicated that gender inequalities are likely to decline with industrialization or economic growth. Several studies within the neoclassical economic approach have argued that differences between men and women result primarily from human capital differentials (education, skills, expected length of labor-force participation) that are bound to wither away over time (Forsythe, Korzeniewicz & Durrant, 2000).

Currently, female IT workers still make substantially less than their male counterparts. Recent U.S. Department of Labor (2002) data indicate that currently full-time female computer programmers make $867 per week (median) compared to their male counterparts who make $975 per week (median). Equivalently, female computer programmers make, on average, only 88.92% of what their male counterparts make or, conversely, male computer programmers make, on average, 112.46% of what their female counterparts make. The question addressed in this paper is the extent to which the salary differences between male and female software developers (we prefer using this term rather than computer programmers) can be attributed to human capital differentials. For most professions, the significant human capital factors include work experience (Auster, 1989; England & McCreary, 1987; Hulin & Smith, 1965; Olson & Frieze, 1987) and education (Auster, 1989; England & McCreary, 1987; Forgionne & Peeters, 1982; Weaver, 1978). In addition, specific skills may contribute to the human capital of software developers.

To address this question, we analyze the differences in current salaries between female and male software developers by factoring in the effects of education, experience, and specific skills. We fit the human capital model based on economic theory to provide a quantitative assessment of the salary differences attributed to gender. While the human capital model quantifies the salary differences based on gender, it also controls for the effects of different amounts of technical experience and different levels of education that software developers possess. Further, salary data is adjusted to account for the average number of hours worked per week. In addition, we consider other human capital factors that impact the salaries of software developers. If a set of human capital factors is found that makes the gender factor insignificant, this will provide support to the neoclassical economic school’s viewpoint that human capital differentials are responsible for salary differences. On the other hand, if the gender factor is still significant, the model results will provide a quantitative assessment of salary differences for software developers attributed to gender.

In the next section, the relevant literature on gender inequality and discrimination is reviewed. Then, the human capital model, which we employ to assess potential gender discrimination, and its theoretical rationale, the human capital theory, are detailed. Following this, the nature of our survey is discussed briefly, and some summary statistics are presented. The human capital model results are then presented and discussed. To provide confirmatory evidence for our human capital models, our sample is divided into female and male subsets; then Chow (1960) tests and Oaxaca (1973) decompositions are applied. The paper concludes with a discussion of the results and managerial implications.
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