WAGES AND THE INFLUENCE OF JOB CHARACTERISTICS

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Introduction

One of the most well-trafficked areas in labor economics is the identification and measurement of the determinants of wages. Many research papers have shown that a higher level of education leads to higher wages than others. Labor economists have built a sturdy framework to address this question. For instance, in 1999, the U.S. Census Bureau developed the O*NET database, which lists 450 characteristics of jobs. By analyzing the wages and other characteristics for each job, economists have been able to identify the influence of these characteristics on wages.

Data on O*NET characteristics is collected using large surveys of workers conducted by the U.S. Census Bureau. We sub-divided people by gender and race and tried three different approaches; eventually chose to focus on Hierarchical Cluster Analysis. We used a standard economic model first developed by Jack Mira that relates characteristics of a job and a worker to the natural logarithm of their wage rate. The model can be written mathematically as shown below, where each $i$ represents a characteristic of the job or person.

\[ \ln(wage) = \beta_0 + \sum \beta_i x_i + \epsilon \]

where $wage$ is the natural logarithm of the wage rate, $x_i$ are the characteristics of the job or person, and $\epsilon$ is the error term.

For the coefficients on Education, the t-statistics were $2.0$ for all categories except Black Males; for all workers other than O*NET and Education, the t-statistics were $0.012$ for White Females, $0.5$ for Black Males, $9.59$ for White Women, $9.79$ for Black Men, $9.62$ for White Men, $10.7$ for Black Women, $0.012$ for Black Females, $0.5$ for White Males, $9.59$ for White Women, $9.79$ for Black Men, $9.62$ for White Men, $10.7$ for Black Women.

Two Data Sets Used

- Annual demographic and labor market data from the March Current Population Survey (CPS) from 2003 to 2013, developed by the U.S. Census Bureau.
- O*NET data on 450 characteristics of about 900 occupations from the Occupational Information Network (O*NET), developed by the U.S. Census Bureau.

We included in our sample only observations where all of the questions, one about the “Importance” (IM) and one about the “Level” (L) of each group, used these as a measure of the influence of each group, and the correlation between the two variables was at least 0.6. The wage for one group was 8% higher than that for another. The wage effect of a one standard deviation increase in the job characteristic was $4.9\%$.

We included in our sample only observations where all of the “Importance” and Level pairs tended to have similar magnitude and $4.8\%$ of O*NET characteristics are statistically significant for White Women.

- For all four demographic groups, “Independent Worker Job Characteristics” ranked among the top three characteristics for positive wage effects; for white men and white women the wage effect of a one standard deviation increase in the job characteristic was $4.9\%$ to $5.3\%$.

- For all of the demographics other than white men, “Office and Information Recording Job Characteristics” ranked as the single top characteristic for positive wage effects; for black women the wage effect of a one standard deviation increase in the job characteristic was $2.6\%$; for white women it was $4.8\%$.

- For all of the demographics other than black females, “Analytical and Thinking Job Characteristics” ranked among the top three characteristics for positive wage effects; for white women the wage effect of a one standard deviation increase in the job characteristic was $4.5\%$.

- For all of the demographics other than black females, “Writing and Language Job Characteristics” had a 3.6% positive wage effect for white females.

- For all workers, but not men, “Synchrony and Spatial Skills” had the highest negative wage effects, decreasing the wage by 2.0% to 2.6%.

- For all workers, but not women, “Vehicle and Equipment Operating Job Characteristics” had the highest negative wage effects, decreasing the wage by 1.0% to 1.5%.

- It is also notable that high-profile characteristics “Medical and Health Job Characteristics” and “High Technology Job Characteristics” had only small positive or negative wage effects.

General Conclusions

The results are complex and we will continue to explore them as we refine our techniques. There is much more work to be done.

We tried different aggregation methods; general linear models of job characteristics. The analysis both hierarchical and 68 percent of workers, and fully for the factor analysis of characteristics and 12 percent of non-white groups. While some of the results were similar, many were not.

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