**The Relationship between Wages and Work Experience**

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**Abstract**

This paper investigates the relationship between work experiences and wages. Based on the data from Chapter 8 of Microeconometrics Using Stata, Revised Edition, we find that wages increase with experience until a peak and then decline.

**Introduction**

A growing number of empirical research study the influential factors of wages. In this study, we examine the relationship between wages and work experience. Based on the data from the Panel Study of Income Dynamics (PSID) (Cameron and Trivedi, 2010), we find that wages increase with experience until a peak and then decline.

**Data**

Data for the main analysis comes from the Panel Study of Income Dynamics (PSID) (Cameron and Trivedi, 2010). The sample consists of 4,165 individual–year pair observations.

**Summary Statistics**

Table 1 displays summary statistics, the variables take on values that are within the expected ranges. The average log-transformed hourly wage in cents in our sample is 6.68, which translates into around $7.96 per hour. The average years of full-time word experience is 19.85.

Table 1 Summary Statistics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VarName | Obs | Mean | SD | Min | Median | Max |
| exp | 4165 | 19.85 | 10.97 | 1.00 | 18.00 | 51.00 |
| wks | 4165 | 46.81 | 5.13 | 5.00 | 48.00 | 52.00 |
| occ | 4165 | 0.51 | 0.50 | 0.00 | 1.00 | 1.00 |
| ind | 4165 | 0.40 | 0.49 | 0.00 | 0.00 | 1.00 |
| south | 4165 | 0.29 | 0.45 | 0.00 | 0.00 | 1.00 |
| smsa | 4165 | 0.65 | 0.48 | 0.00 | 1.00 | 1.00 |
| ms | 4165 | 0.81 | 0.39 | 0.00 | 1.00 | 1.00 |
| fem | 4165 | 0.11 | 0.32 | 0.00 | 0.00 | 1.00 |
| union | 4165 | 0.36 | 0.48 | 0.00 | 0.00 | 1.00 |
| ed | 4165 | 12.85 | 2.79 | 4.00 | 12.00 | 17.00 |
| blk | 4165 | 0.07 | 0.26 | 0.00 | 0.00 | 1.00 |
| lwage | 4165 | 6.68 | 0.46 | 4.61 | 6.68 | 8.54 |

**Correlation Matrix**

Table 2 shows correlation matrix, the upper triangular is spearman correlation matrix and the lower triangular reports pearson correlation coefficients. As we can see, there is a positive correlation between wages and work experience.

Table 2 Correlation Coefficient

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | exp | wks | occ | ind | south | smsa | ms | fem | union | ed | blk | lwage |
| exp | 1 | -0.1432\*\*\* | 0.0776\*\*\* | 0.1631\*\*\* | -0.0532\*\*\* | 0.0480\*\*\* | 0.1637\*\*\* | -0.0913\*\*\* | 0.0635\*\*\* | -0.2135\*\*\* | 0.0383\*\* | 0.2262\*\*\* |
| wks | -0.0337\*\* | 1 | 0.0334\*\* | -0.0209 | 0.0823\*\*\* | -0.0388\*\* | 0.0285\* | -0.0580\*\*\* | -0.1978\*\*\* | -0.0300\* | -0.0113 | -0.1002\*\*\* |
| occ | 0.0822\*\*\* | -0.0038 | 1 | 0.2260\*\*\* | 0.0413\*\*\* | -0.2018\*\*\* | 0.0706\*\*\* | -0.0847\*\*\* | 0.3784\*\*\* | -0.6309\*\*\* | 0.0837\*\*\* | -0.3043\*\*\* |
| ind | 0.1591\*\*\* | 0.0404\*\*\* | 0.2260\*\*\* | 1 | -0.0769\*\*\* | -0.0689\*\*\* | 0.1701\*\*\* | -0.1778\*\*\* | 0.1465\*\*\* | -0.2381\*\*\* | -0.0475\*\*\* | 0.0230 |
| south | -0.0527\*\*\* | 0.0292\* | 0.0413\*\*\* | -0.0769\*\*\* | 1 | -0.1350\*\*\* | -0.0403\*\*\* | 0.0516\*\*\* | -0.1628\*\*\* | -0.1191\*\*\* | 0.1218\*\*\* | -0.1810\*\*\* |
| smsa | 0.0526\*\*\* | 0.0180 | -0.2018\*\*\* | -0.0689\*\*\* | -0.1350\*\*\* | 1 | -0.1060\*\*\* | 0.1044\*\*\* | 0.0271\* | 0.1670\*\*\* | 0.1154\*\*\* | 0.2216\*\*\* |
| ms | 0.1606\*\*\* | 0.0625\*\*\* | 0.0706\*\*\* | 0.1701\*\*\* | -0.0403\*\*\* | -0.1060\*\*\* | 1 | -0.7228\*\*\* | 0.1147\*\*\* | -0.0044 | -0.2150\*\*\* | 0.2660\*\*\* |
| fem | -0.0922\*\*\* | -0.0833\*\*\* | -0.0847\*\*\* | -0.1778\*\*\* | 0.0516\*\*\* | 0.1044\*\*\* | -0.7228\*\*\* | 1 | -0.1132\*\*\* | -0.0141 | 0.2086\*\*\* | -0.3103\*\*\* |
| union | 0.0591\*\*\* | -0.1548\*\*\* | 0.3784\*\*\* | 0.1465\*\*\* | -0.1628\*\*\* | 0.0271\* | 0.1147\*\*\* | -0.1132\*\*\* | 1 | -0.2813\*\*\* | 0.0471\*\*\* | 0.0094 |
| ed | -0.2182\*\*\* | -0.0067 | -0.6194\*\*\* | -0.2365\*\*\* | -0.1216\*\*\* | 0.1843\*\*\* | -0.0083 | -0.0012 | -0.2695\*\*\* | 1 | -0.1276\*\*\* | 0.3743\*\*\* |
| blk | 0.0404\*\*\* | -0.0319\*\* | 0.0837\*\*\* | -0.0475\*\*\* | 0.1218\*\*\* | 0.1154\*\*\* | -0.2150\*\*\* | 0.2086\*\*\* | 0.0471\*\*\* | -0.1196\*\*\* | 1 | -0.1783\*\*\* |
| lwage | 0.2093\*\*\* | 0.0585\*\*\* | -0.3176\*\*\* | 0.0458\*\*\* | -0.1804\*\*\* | 0.2240\*\*\* | 0.2875\*\*\* | -0.3250\*\*\* | 0.0087 | 0.3939\*\*\* | -0.1895\*\*\* | 1 |

**T-test**

We then divide our sample into high-wage and low-wage groups using the median of the hourly wages as a benchmark. So the differences in the identical of other variables between the groups are compared. Table 3 reports the t-test result. It is shown that employees with higher wages have more years of work experience and education; they are less likely to be females; blue-collar workers or live in the southern area. The results also show that, married people and those who live in the standard metropolitan statistical areas earn more.

Table 3 T-test Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| varname | obs(0) | mean(0) | obs(1) | mean(1) | mean-diff | t |
| exp | 2024 | 18.00 | 2141 | 21.61 | -3.61\*\*\* | -10.77 |
| wks | 2024 | 46.69 | 2141 | 46.92 | -0.23 | -1.43 |
| occ | 2024 | 0.63 | 2141 | 0.39 | 0.24\*\*\* | 16.00 |
| ind | 2024 | 0.40 | 2141 | 0.39 | 0.00 | 0.29 |
| south | 2024 | 0.37 | 2141 | 0.22 | 0.15\*\*\* | 10.55 |
| smsa | 2024 | 0.56 | 2141 | 0.74 | -0.18\*\*\* | -12.56 |
| ms | 2024 | 0.74 | 2141 | 0.89 | -0.15\*\*\* | -12.87 |
| fem | 2024 | 0.19 | 2141 | 0.04 | 0.15\*\*\* | 16.29 |
| union | 2024 | 0.36 | 2141 | 0.37 | -0.01 | -0.43 |
| ed | 2024 | 11.96 | 2141 | 13.68 | -1.71\*\*\* | -20.83 |
| blk | 2024 | 0.11 | 2141 | 0.04 | 0.07\*\*\* | 9.40 |

**Empirical Results**

We test the quadratic relation using regression analysis. We regress log wages(lwage) on years of full-time work experience(exp) and the quadratic term of exp(exp2) while controlling other variables. The regression results were reported in Table 4. We report pooled OLS results in the first two columns and use cluster-robust standard errors in the second column. In the last two columns, we use fixed effect and cluster-robust standard errors. In the first and third columns, we also control the time fixed effect. The estimates imply an inverted U-shaped relationship between wages and work experience.

Table 4 Regression Results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) |
|  | lwage | lwage | lwage | lwage |
| exp | 0.040\*\*\* | 0.031\*\*\* | 0.113\*\*\* | 0.111\*\*\* |
|  | (18.56) | (7.74) | (27.95) | (26.95) |
| exp2 | -0.001\*\*\* | -0.001\*\*\* | -0.000\*\*\* | -0.000\*\*\* |
|  | (-14.04) | (-6.10) | (-5.07) | (-4.78) |
| \_cons | 5.251\*\*\* | 5.108\*\*\* | 4.649\*\*\* | 4.667\*\*\* |
|  | (70.52) | (40.92) | (59.60) | (60.30) |
| Time FE | No | Yes | No | Yes |
| Individual FE | No | No | Yes | Yes |
| N | 4165 | 4165 | 4165 | 4165 |
| Adj. R2 | 0.43 | 0.56 | 0.66 | 0.66 |
| \* p<0.1, \*\* p<0.05, \*\*\* p<0.01 | | | | |

**Conclusion**

This paper investigates the relationship between work experiences and wages. Using the data from the Chapter 8 of Microeconometrics Using Stata, Revised Edition, we find a quadric relationship between wages and work experience, wages increase with experience until a peak and then decline.