

Learning with your spouse: Does the similarity of spouse's occupation affect individual's earnings?

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Background: Starting from an intuition to explore the interaction between individuals' behavior and their intra-household situation, this paper focuses on a specific aspect of this interaction: whether individuals will benefit (in terms of work performance/individual earnings) from having a spouse who has similar occupation when they first start their career. Looking at the labor supply from individual level and take household into account, this might give out a new perspective for the relationship between household and labor market. More specifically, this paper uses PSID (2017) to look at over 14,000 individuals living in the United States, covering their employment, income, wealth, marriage, age, education and other information in a relatively long period of time, to examine the influence of their spouse's career on their personal earnings.

Computation Methods	Methodology	Results																																																																																
<p>Measuring the distance between any two occupations</p> <p>The measure of distance between any two occupations I use comes from the O*Net 21.2 Database, which is under the sponsorship of the US Department of Labor/Employment and Training Administration (USDOL/ETA). I use the O*Net Content Model in this study. The activities, abilities, knowledge and skills files contain the variables I use to measure distance between occupations. More specifically, for each occupation, there're 52 dimensions for abilities, 35 dimensions for skills, 33 dimensions for knowledge, and 41 dimensions for Activities. And for each dimension, there're two elements to describe its "meaning" to the occupation: level (0 to 7) and importance (1 to 7). The idea of using this model comes from Kammann and Adams (2014), my calculation of distance between each pair of occupations would follow their methods and adjust for my research purpose: For every occupation, I can generate a 4×1 vector for its four characteristics.</p> $\text{occ}_i = \begin{bmatrix} \text{ability}_i \\ \text{knowledge}_i \\ \text{skill}_i \\ \text{activity}_i \end{bmatrix}$ <p>And for each entry in this vector (use ability as an example):</p> $\text{ability}_i = \frac{\begin{bmatrix} \text{ability}_{i,1,\text{level}} & \text{ability}_{i,1,\text{importance}} \\ \text{ability}_{i,2,\text{level}} & \text{ability}_{i,2,\text{importance}} \\ \dots & \dots \\ \text{ability}_{i,52,\text{level}} & \text{ability}_{i,52,\text{importance}} \end{bmatrix}^T}{\sum_{m=1}^{52} \text{ability}_{i,m,\text{importance}}}$ <p>Thus the ability distance between two occupations are:</p> $\text{abilitydist}_{i,j} = \text{ability}_i - \text{ability}_j _2$	<p>Model</p> <p>As an empirical analysis, this paper follows the classical wage model proposed by Mincer(1958).</p> $\ln(W_{j,t}) = \ln(W_{j,0}) + \beta_{s,j} S_{j,0} + \beta_{e1} \text{experience} + \beta_{e2} \text{experience}^2 + \vec{\beta}_{\text{spouse}} \vec{V}_{\text{OccSim}}$ <p>Where j is individual j, W and S means wage and years of schooling respectively. And experience here is actually $(t - S)$, time after schooling. And \vec{V}_{spouse} is a 4×1 vector of variables showing the four dimensions of spouses' occupation similarity.</p> <p>Data</p> <p>Aside from O*Net Database, this paper mainly uses Panel Study of Income Dynamics (PSID) data. Only considering cross-sectional national sample, known as the SRC (Survey Research Center) sample, the dataset has about 14277 observations. The key variables I used are: Years of Completed Education, Hourly Wages, Work Experience in Month, Distance bw Spouses' Occupations 'Abilities' File, Distance bw Spouses' Occupations 'Skills' File, Distance bw Spouses' Occupations 'Knowledge' File, Distance bw Spouses' Occupations 'Activities' File etc.</p> <p>Descriptive statistics</p> <table border="1"> <thead> <tr> <th>Statistic</th> <th>N</th> <th>Mean</th> <th>St. Dev.</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Log Wages</td> <td>176,722</td> <td>1.9400</td> <td>0.9040</td> <td>-3.0000</td> <td>6.9100</td> </tr> <tr> <td>Experience (Months)</td> <td>313,014</td> <td>72.7000</td> <td>98.1000</td> <td>0</td> <td>960</td> </tr> <tr> <td>Square of Experience</td> <td>313,014</td> <td>414,915.0000</td> <td>34,860.0000</td> <td>0</td> <td>921,600</td> </tr> <tr> <td>Years of Completed Education</td> <td>191,343</td> <td>12.8000</td> <td>2.6600</td> <td>1</td> <td>17</td> </tr> <tr> <td>Abilities Distance</td> <td>47,300</td> <td>0.2130</td> <td>0.0799</td> <td>0.0584</td> <td>0.5150</td> </tr> <tr> <td>Skills Distance</td> <td>47,300</td> <td>0.2520</td> <td>0.0828</td> <td>0.0644</td> <td>0.5180</td> </tr> <tr> <td>Knowledge Distance</td> <td>47,300</td> <td>0.4560</td> <td>0.1240</td> <td>0.1130</td> <td>0.8940</td> </tr> <tr> <td>Activities Distance</td> <td>47,300</td> <td>0.3260</td> <td>0.0874</td> <td>0.0992</td> <td>0.6810</td> </tr> </tbody> </table>	Statistic	N	Mean	St. Dev.	Min	Max	Log Wages	176,722	1.9400	0.9040	-3.0000	6.9100	Experience (Months)	313,014	72.7000	98.1000	0	960	Square of Experience	313,014	414,915.0000	34,860.0000	0	921,600	Years of Completed Education	191,343	12.8000	2.6600	1	17	Abilities Distance	47,300	0.2130	0.0799	0.0584	0.5150	Skills Distance	47,300	0.2520	0.0828	0.0644	0.5180	Knowledge Distance	47,300	0.4560	0.1240	0.1130	0.8940	Activities Distance	47,300	0.3260	0.0874	0.0992	0.6810	<p>I adopted three models to capture the effect, pooled OLS model, fixed effect model and random effect model. Among these three, Hausman test for random effect model says one model is inconsistent, suggesting fixed effect model should be used. Here I presents the result for pooled OLS model.</p> <table border="1"> <thead> <tr> <th></th> <th>Dependent variable: lwage</th> </tr> </thead> <tbody> <tr> <td>exp</td> <td>0.004*** (0.002)</td> </tr> <tr> <td>exp2</td> <td>-0.00001*** (0.00000)</td> </tr> <tr> <td>educyrs</td> <td>0.095*** (0.004)</td> </tr> <tr> <td>abilityscore</td> <td>-0.776*** (0.161)</td> </tr> <tr> <td>skillscore</td> <td>1.380*** (0.159)</td> </tr> <tr> <td>knowledgescore</td> <td>0.164* (0.090)</td> </tr> <tr> <td>activityscore</td> <td>-0.668*** (0.151)</td> </tr> <tr> <td>Constant</td> <td>1.110*** (0.061)</td> </tr> <tr> <td>Observations</td> <td>11,541</td> </tr> <tr> <td>R²</td> <td>0.113</td> </tr> <tr> <td>Adjusted R²</td> <td>0.112</td> </tr> <tr> <td>F Statistic</td> <td>209.000*** (df = 7; 11533)</td> </tr> </tbody> </table> <p>Note: p<0.1; p<0.05; p<0.01</p> <p>Without taking self selection and other influencing effects into account, this results are very interesting. All four dimensions of occupation similarity are significant, while they influence individual earnings in different ways. Knowledge and Skill have positive effect while Ability and Activity have negative effect. This does support my hypothesis that couples may be learning together and thus improve their knowledge and skill together. On the other hand, abilities, which contains cognitive abilities, physical abilities, sensory abilities and psychomotor abilities, are less likely to be learnt together during adulthood and thus shows less sensitivity to couples occupational similarity. And the effect of work activities might be an evidence for specialization in household. These are all interesting topic to further study. However, adding interactive terms like whether having children to take care of have limited effect to the change of results.</p>		Dependent variable: lwage	exp	0.004*** (0.002)	exp2	-0.00001*** (0.00000)	educyrs	0.095*** (0.004)	abilityscore	-0.776*** (0.161)	skillscore	1.380*** (0.159)	knowledgescore	0.164* (0.090)	activityscore	-0.668*** (0.151)	Constant	1.110*** (0.061)	Observations	11,541	R ²	0.113	Adjusted R ²	0.112	F Statistic	209.000*** (df = 7; 11533)
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Fig. 1: Principal Component Analysis on the Four Dimensions of 648 Occupations

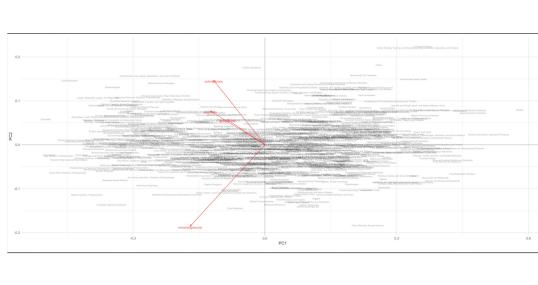
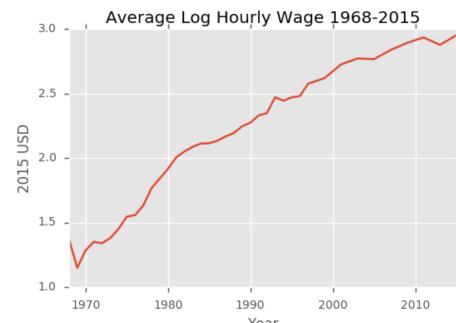


Fig. 2: Change of Log-Wage over time



References

- Mincer, Jacob. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy* 66 (4). The University of Chicago Press: 281–302.
- Panel Study of Income Dynamics. 2017. Produced and Distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.
- Van Kammen, Ben, and Scott J Adams. 2014. "Dissimilar Occupations and Marital Stability." *IZA Journal of Labor Economics* 3 (1). Springer: 1–18.