The effect of job income on job satisfaction in Taiwan.

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May 7, 2021

Contents

1 Abstract

The aim of this paper is to investigate the relationship between job satisfaction and job income. The data comes from The Panel Study of the Family Dynamics (PSFD) in Taiwan. First, we examined the multicollinearity and their correlation between variables. Second, we compared the results from pooled OLS, fixed effects and random effects and examined its heteroskedasitity. Finally, we chose random effects model in this research. Our study shows that logarithm of monthly income, which is job income has a positive relationship with job satisfaction. Moreover, the logarithm of working hours has a negative relationship with job satisfaction.

key words: Job satisfaction, job income, working hours.

2 Introduction

Job satisfaction, as an important issue in this modern society, have highly connection with the happiness of life and the willingness to work, as we know that people spend their most of the time on work each day. Job satisfaction as a comprehensive evaluation, can be influenced by different aspects, such as personal ability, tasks in daily work, the way management in an organization.

On the other hand, job income, as our main independent variables, always plays an important role in our life. As the evidence from Boyce CJ, Brown GD, Moore SC (2010), they found general life satisfaction could be predicted by the ranked position of an individual's income. Furthermore, an empirical study from Bakan (2013) show that there is a significant relationship between income level and job satisfaction. Both results gives us highly support on our expectation that job income have close connect with job satisfaction as well as satisfaction.

One of the similar investigate from the Minnesota Satisfaction Questionnaire (MSQ) in the USA studied by Maharjan, R. (2019). In this research, for the salary and job satisfaction, male were both have higher score than male. In addition, salary have positive correlation with job satisfaction. This conclusion match as assumption in our study. Compared with this study, our data comes form Taiwan and only focus on job income with other controls, we may expect that we will get the same results even there are some different working culture between eastern and western countries.

3 Data

The The Panel Study of the Family Dynamics (PSFD) is the main data source used in our research analyses. The PSFD starts from 1999 in Taiwan and continues each year until 2012. After 2012, it collects data each two years. Therefore, due to the limitation of the data, we decide to choose 2012, 2014 and 2016 data for this study. The PSFD data is mainly used to collect panel survey data on families and to investigate the patterns and changes of families in Chinese societies. In fact, the variables can be used for the research are not too many. However, it concludes two variables that can be used to test the hypothesis of this study: job satisfaction and job income.

3.1 Job satisfaction

Job satisfaction constitutes the dependent variable of this study and it is the basis for the statistical tests. According to the questionnaire, job satisfaction is captured by the following survey question: "How satisfied are you with your current job?" It is assessed on a scale from 1 (very dissatisfied) to 4 (very satisfied). Finally, job satisfaction was collected in the 2012, 2014, and 2016 surveys.

3.2 Job income

Job income is the central independent variable in this research and captured by the following survey question: "How much is your monthly work income? " The same as job satisfaction, this variable also was collected in the 2012, 2014, and 2016 surveys.

3.3 Other control variables

Except above two variables, we also utilize working hours per week, age, schooling, and sex in our model. These variables are included to act as control variables and to explain job satisfaction that cannot be solely explained by work income.

One things we should notice is that we excludes monthly work incomes of those who are lower than NT$18780, because NT$18780 is monthly minimum wage in 2012 in Taiwan. Furthermore, we also drop those who have missing value on working hours per week, age, schooling, and sex. The final sample size is 2051.

4 Model

4.1 Analytical Framework

The analytical framework for this paper builds upon the theoretical framework presented in the previous section, where we are interesting in testing the hypothesis regarding the relationship between job income and job satisfaction. From the hypothesis, we expect that job income has positive influence on job satisfaction. In this research, ordinary Least Square (OLS) is a suitable statistical technique. This study has deployed the OLS regression model comprising with pooled regression, fixed effect and random effect regression analysis done by R studio.

The model specification of the regression model is described below:
$job\_satisfaction_{it} = \beta_0 + \beta_l(ln(job\_income)_{1it}) + \beta_2(ln(working\_hours)_{2it}) + \beta_3 age_{3it} + \beta_4 sex_{4it} + \beta_5 schoiling_{5it} + \varepsilon_{it}$

In this model,β_0 is the unknown intercept. β_i is regression coefficient (i = 1,..,5). ε_{it} is the error term capturing the "idiosyncratic errors" or "idiosyncratic disturbances". Furthermore, We follow Schwarze and Wunder's specification of model (Schwarze Wunder, 2006), using logarithm of monthly work income and logarithm of working hours per week in our model.

These three models need to be analyzed to determine the most appropriate model in predicting job satisfaction. In other words, we have to select the best model via the following test. The most proper model test is done by F/Chow test, Hausman Test as well as Lagrange Multiplier Test (LM Test). F test is used to choose between fixed effects model and pooled OLS model. Its null hypothesis is pooled OLS model better than fixed effects model. If the p-value is < 0.05 then the fixed effects model is a better choice. On the other hand, the Hausman test is applied to select whether the Fixed Effect or Random Effect model is most appropriately used. The null hypothesis is random effects model better than fixed effects model. Similarly, if the p-value is less than 0.05 then the fixed effects model is better than random effects model. Eventually, LM test helps us decide between random effects regression and a simple OLS regression. The null hypothesis in the LM test is that variances across entities is zero. This is, there is no significant difference across units (i.e. no panel effect), therefore pooled OLS is better. If the p-value is less than our criteria, 0.05, then the random effects model is better than pooled OLS model.

4.2 Results

4.2.1 Multicollinearity

It is important to examine the potential presence of multicollinearity for OLS regression model before we start running the regression. To do this, a matrix accounting for the correlation between each independent variable has been established. If the independent variables are too highly correlated, revealing that they may largely explain the same concept and could conceivably be redundant to include in the models. Table 1 presents the results of the correlation matrix. Generally, the correlation between variables should not exceed 0.8 to avoid inappropriate levels of multicollinearity. According to the table 1, the correlation between variables are between -0.373 and 0.313, indicating multicollinearity is not a problem in this study.

Table 1. Correlation matrix for the independent variables

variable	Sex	Schooling	Age	Log of monthly Income	Log of Working hours	Job satisfaction
Sex	1.000					
Schooling	0.1***	1.000				
Age	-0.029*	-0.373***	1.000			
Log of monthly Income	-0.216***	0.313***	0.147***	1.000		
Log of Working hours	-0.183***	-0.097***	-0.064***	0.057***	1.000	

4.2.2 Descriptive statistics

Table 2 presents descriptive statistics over each variable used in the analysis for this study. These variables comprise data from 6153 observations. The panel is balanced since for those who are missing were deleted from the dataset. Therefore, these variables have the same number of observations. In our setting, job satisfaction acts as the dependent variable and job income is a central variable for answering the underlying research question.

Showing in the table 2, the mean of job satisfaction is 3.027, with a standard deviation of 0.557. The scores could vary from 1 to 4, and they set 1 as a minimum score and 4 as a maximum score. The mean of monthly income (job income) is 50,949.529, with a standard deviation of 53,721.924. The minimum income is NT$19,000 since we select those who had minimum wage in 2012 in Taiwan, and the maximum is NT$1500,000. The minimal score for working hours per week is 1 and the maximum score is 130. We can find that there are an obvious differences among individuals in working hours per week. The mean years of schooling is 10.478, with a standard deviation of 2.945. The minimal years of schooling are 3 and the maximum years of schooling are 15. The mean of age is 37.563, with a standard deviation of 8.391. The minimal age is 26 and the maximum age is 77. For sex, there are 3783 males and 2370 females.

Table 2 Descriptive statistics of study variables

	n	mean	s.d.	min	max
years of schooling	6153	10.478	2.945	3	15
age	6153	37.563	8.391	26	77
Income per month	6153	52,816.600	53,721.924	19,000	1500,000
Working hours per week	6153	47.647	12.076	1	130
Job satisfaction	6153	3.027	0.557	1	4

4.2.3 Model selection

Table 3 reveals the summary of pooled OLS, fixed effects, and random effects model. The results obtained in Table 3 tells us to reject the null hypothesis of pooled OLS model that all, are zero ($F(5, 6147) = 24.802$, $p<0.001$). Considering fixed effect model, the null hypothesis is also rejected ($F(3, 4099) = 6.469$, $p<0.01$). The null hypothesis of random effects model is also rejected ($= 85.137$, $df = 5$, $p<0.001$). The results shows that these three models could be used to analyzed our data. But, we still have to test which one is best. F test in Table 3 tells us that Fixed effects model is better than pooled OLS model ($F = 2.467$, $p<0.001$). LM test shows that random effects model is better than pooled OLS model ($= 660.43$, $p<0.001$). Hausman test presents that random effects model is better than fixed effects model($= 2.795$, $p<0.05$). As as results, depends on these comparisons, we finally decide that random effects model is best for this study.

Table 3 the summary of pooled OLS, fixed effects, and random effects regression

	Pooled OLS		FE		RE	
	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.
Log of monthly income	0.142***	0.017	0.103***	0.029	0.133***	0.019
Log of working hours	-0.105***	0.027	-0.064^{+}	0.036	-0.091**	0.028
age	0.003**	0.001	0.004	0.004	0.003*	0.001
sex: male	0.038*	0.015			0.037^{+}	0.019
schooling	-0.007*	0.003			-0.006	0.004
intercept	1.816***	0.195			1.849***	0.216
F value	24.802***		6.469**			
χ^2					85.137***	
DF	(5, 6147)		(3, 4099)		5	
F test			2.467***(p < 0.001)			
Hausman test			2.795 (P = 0.424)			
LM test			660.43***(p < 0.001)			

$^{+}$ p < 0.10; * p < 0.05; **p < 0.01; ***p < 0.001

4.2.4 Heteroskedasticity

The Breusch-Pagan test was performed to investigate if there is heteroskedasticity in the random effects model. The null hypothesis for the Breusch-Pagan test is that the variance of the regression errors is constant, that is, homoscedasticity exists. According to the Table 4, the high BP value generated a low p-value of 2.2e-16 which is by far enough to reject the null hypothesis. Consequently, by rejecting the null hypothesis, it can be concluded that the random effects model is affected by heteroskedasticity. This will be adjusted for by including robust covariance matrix estimation to estimate robust standard errors.

Table 4 Breusch-Pagan test for heteroskedasticity

Breusch-Pagan test	
BP(2053)	6948.1
p	2.2e-16

Adjusting the model for heteroskedasticity did not affect the results tremendously. The robust random effects model shows that logarithm of monthly income has a significant positive relationship with job satisfaction while controlling for logarithm of working hours, sex, age, and schooling. Our research hypothesis was supported.

Table 5 Robust estimates of Random effects Model

	Estimate	Std. Error	t value	Pr(>|t|)
Log of monthly income	0.133***	0.019	6.915	5.14E-12
Log of working hours	-0.091**	0.032	-2.834	0.004618
age	0.003**	0.001	2.584	0.009786
sex:male	0.037^{+}	0.020	1.895	0.058185
schooling	-0.006	0.004	-1.525	0.127201
intercept	1.849***	0.221	8.365	7.34E-17

5 Conclusion

In conclusion, our research shows that our central independent variables logarithm of monthly income, which is job income has a positive relationship with job satisfaction. These results meet our expectations without a doubt. In addition, the logarithm of working hours has a negative relationship with job satisfaction. In most situations, this phenomenon fits our intuition. Age also has a slightly positive effect on job satisfaction. Although sex and schooling are not statistically significant, they have positive and negative effects on job satisfaction, respectively.

We may still consider more controls in our model although it has limitations from our data. The problem is that we only have three years, which are 2012, 2014, and 2016. If we could have further years, the results may differ for other controls such as age and schooling. On the other hand, there are a lot of variables that have possibilities to connect with job satisfaction we can consider. For example, the distance from home to the company, the benefits, and the environments from a company, for those who are hard to quantity could also play a crucial role in job satisfaction. Returning to our subject, in summary, the job income still has a positive and important influence on job satisfaction, namely, the leader of the company can not ignore this factor and should pay more attention to it.

6 Reference

Boyce CJ, Brown GD, Moore SC. Money and happiness: rank of income, not income, affects life satisfaction. Psychol Sci. 2010 Apr;21(4):471-5. doi: 10.1177/0956797610362671. Epub 2010 Feb 18. PMID: 20424085.

Bakan, Ismail and Tuba Buyukbese. "The Relationship between Employees' Income Level and Employee Job Satisfaction: An Empirical Study." (2013).

Fallahi, Aida Mehrad Bahare. "The Effect of Income on Job Satisfaction and Residential Satisfaction: A Literature Review." Journal of Educational, Health and Community Psychology 4 (2015): 48-55.

Maharjan, R. (2019). Job Satisfaction, Gender and Salary: A Study on Correlation. The Batuk, 5(1), 59-69. https://doi.org/10.3126/batuk.v5i1.27942

Howell, R. T., Kurai, M. Tam, L. (2013). Money buys financial security and psychological need satisfaction: Testing need theory in affluence. Social Indicators Research: an international and interdisciplinary journal for quality-of-life measurement, 110 (1), 17-29.

Schwarze, J., Wunder, C. (2006). Income Inequality and Job Satisfaction of Full-Time Employees in Germany. The Institute for the Study of Labor (IZA), Discussion Paper, (2084).

Knotzer, Hans Traweger, Christian Lederer, Wolfgang Heidegger, Thomas Benzer, Arnulf. (2005). Influence of working conditions on job satisfaction in anaesthetists. British journal of anaesthesia. 94. 211-5. 10.1093/bja/aei035.