Natural Science and Female Wage Premium

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Abstract

This study compares the effect of education–occupation matching on wages between the social sciences and natural sciences using Japanese micro data. Recent research suggests that university students majoring in natural sciences have an advantage compared to those majoring in social sciences after graduation. We reconsider this argument on the basis of educational matching theory using an original matching index. Japanese male workers with majors in natural sciences have a slight wage premium compared to those with majors in social sciences. While more than half of this premium is explained by education–occupation matching, the rest is due to qualifications being higher than the bachelor's degree. On the other hand, Japanese female workers with majors in natural sciences have a wage premium over those with majors in social sciences; however, this is explained by neither education–occupation matching nor qualifications being higher than the bachelor's degree.

Keywords: Natural Science, Wage Premium, Education–Occupation Matching

JEL Classification: I23, J16, J24, J31

1. Introduction

It is noteworthy that in Japanese university departments, the ratio of female students majoring in the natural sciences is very low. The proportion of female engineering students is less than 10%, which is extremely low compared to the standard in major Organisation for Economic Co-operation and Development (OECD) countries. The primary fields of theoretical study of the natural sciences include physics, chemistry, biology, earth sciences, and astronomy in a narrow sense. In addition, this study includes mathematics in the narrow definition of the natural sciences. Broadly, the technological fields of study of the natural sciences include medicine, agriculture, and engineering. Meanwhile, the social sciences include anthropology, archeology, communications, economics, geography, history, international studies, law, linguistics, and political science; sometimes, psychology is also included in this field.

Studies on technology conducted by Japan's Ministry of Internal Affairs and Communications define the natural sciences as those that conduct research mainly in the fields of science, engineering, agriculture, and health. In 2012, funding totaling 17.32 million yen was devoted to technology research in Japan, representing 3.67% of gross domestic product (GDP). Of these funds, 92.1% were allocated to the natural sciences, representing 15.94 million yen. It may be said that the natural sciences are beginning to play an influential role in driving progress and innovation in Japan. With regard to allocations of funds in specific research areas, 55.96 million yen was devoted to research in the transportation and postal industry. Within the manufacturing industry, research for pharmaceutical product manufacturing received 57.66 million yen and that for machine appliance manufacturing received 35.68 million yen. With regard to the percentage of female university students in each field, despite the fact that female students comprised more than half of all students in humanities and education in all universities and graduate schools in 2012 and more than half of pharmacy students are female, the ratio of female students ranges from 30% to 45% in agriculture, medicine, and dentistry. Furthermore, the fields of engineering and science have very low ratios of female students—around 10% and 20%, respectively—although the female student ratio varies considerably by specialization in these fields and there are further differences in specialization according to subjects. When university departments and graduate schools are considered simultaneously, the female student ratio in all the sciences rises to 25%. The ratio is relatively high in biology, at 39.5%, whereas it is 12.9% in physics.

In addition, while the overall ratio of female students in engineering is 11.7%, there are very low ratios for mechanical engineering (3.4%) and telecommunications engineering (6.7%), whereas higher ratios are found in applied chemistry (20.3%) and fiber engineering (20.4%). According to a technology survey by the Ministry of Internal Affairs and Communication (2013), among researchers, the ratio of females is 14.4% and the proportion of female researchers is particularly low in private enterprises, at 7.9%. In this context, the Japanese government's "Fourth Basic Technology Plan" (Cabinet Decision, 2011a) and "Development of Talented Individuals in Technology" (Cabinet Decision, 2011b) include the early establishment of a numerical target for the ratio of all female researchers. In addition, efforts to develop more women engineers and improve working conditions for them were included in the "Japan Revival Strategy Revision" (Cabinet Decision, 2014). Within this social context, this study examines the connection between the post-graduate wages and occupations of women, particularly those majoring in the natural sciences. In particular, this research considers the problem of developing more women researchers in the field of natural science. The rest of the paper is organized as follows. Section 2 reviews the literature on professional education levels and wages. Section 3 outlines the methodology of the study. Section 4 presents and discusses the results. Section 5 concludes and provides recommendations.

2. Literature Review

With regard to educational levels required by different professions, there has been much research thus far on over- and under-education, including that of Battu, Belfield, and Sloane (1999), Bourdet and Persson (2008), Dolton and Vignoles (2000), Hartog (2000), and Rubb (2003). Over-education is considered to lower productivity by approximately one-half to two-thirds of the appropriate educational level and Hartog (2000) reports that the damage of over-education to productivity is greater than that of under-education. Sloane, Battu, and Seaman (1999) and Van Smoorenburg and Van der Velden (2000) point out that there is a possible substitution between education and experience, and so, overe-ducated workers seem to have less occupational experience. On the other hand, although the effective accumulation of human capital conventionally is thought to be important for productivity among occupations that require specialized skills, there are few among these studies that analyze the effects of horizontal education–occupation mismatching on wages. Robst (2008) examines occupational matching according to specialized study at university level using US data and finds that wages decreased by approximately 11% when the specialization was not suitable for the occupation, suggesting that horizontal matching is more important than vertical matching. Furthermore, Nordin, Persson, and Rooth (2010) note the importance of horizontal matching using data from Sweden. Their study shows that in the case of mismatch, workers do not recover their lost wages even after several years of work experience. In addition, Sattinger (1993) points out that horizontal matching influences worker productivity through workers' specific skills and Robst (2007) shows that the wage effects of horizontal mismatch vary considerably across the different reasons for accepting the position.

A specialized skill is expected to be used only by each specialized profession whereas a general skill is expected to be provided through the basic education of each department and graduate school. In addition, it is assumed that students choose their specializations based on the requirements of future particular occupational positions. Furthermore, with regard to the cause of horizontal mismatch, both supply- and demand-side factors are important. In the case of demand-side factors, workers are expected to change jobs to resolve any mismatch. However, when it comes to supply-side factors, in addition to individual skills, the choice of occupation, enthusiasm for the occupation, and other factors related to the working environment also affect matching.

Thus, in considering the indications of Nordin et al. (2010), this research uses an original index as a variable to examine demand-side factors, with a particular focus on specific occupations and wage matching, and analyzes the influence of horizontal matching. In particular, this study focus on the effect of the major or field of study itself, education–occupation horizontal matching, academic degree, and the length of occupational experience on the wages of workers because these issues would be important for working as researchers.

3. Methodology

The purpose of this study is to clarify the actual situation and awareness of employees, mainly those in metropolitan areas, after the year 2000. The micro-level data used for this analysis are taken from the "Working Person Survey 2012" by the Recruit Works Research Institute. The survey was conducted in August 2010 within 50 km of several metropolitan areas (Tokyo, Kanagawa, Chiba, and Saitama prefectures).

It targeted men and women between the ages of 18 and 59 years who were regular employees, contract employees, and part-time employees who worked at least 1 day in the last week in August; however, the sample excluded students. The sample comprised 9,790 people: 5,631 men and 4,159 women. An internet monitor was used for the investigation method.

This research estimated Mincer-type wage functions and used the logarithm of hourly wage as the dependent variable:

$$LnW_i = X_i\beta + Z_i\alpha + Index_i\delta + Degree_i\mu + Experience_i\nu + \varepsilon_i$$

Where *X* includes a vector of demographic variables for a person, and *Z*, *Index*, *Degree*, and *Experience* denote the degree field, matching index, whether the person has a graduate degree, and months of vocational experience, respectively.

With regard to the degree field, respondents were given options to answer from a multiple-choice question: architecture, art, humanities, natural sciences, physical education, social sciences, and other. Art and physical education are included for "other" specializations in our analysis and architecture was included for "natural sciences." In most previous research, students' specialization is divided into many fields; many researchers in Japan deal with specialization within a large framework because there are many faculties that have integrated fields and the precise borders of each specialization are very ambiguous. Therefore, our analysis measures each wage effect of "social science" and "natural science" based on the "humanities." In addition, we estimate the wage effect for the "humanities" and "other" for the base category, but the results are not influenced by this manipulation. Thus, we do not deal with "other" specializations in our estimations.

For other important explanatory variables, an occupation-matching index is incorporated to evaluate the degree of specialization in each occupation based on the horizontal matching theory. Furthermore, a dummy variable for whether respondents completed graduate school and a numerical variable for the length of vocational experience are included, based on human capital theory. In addition, numerical variables are included for age and length of tenure, and dummy variables are included for employee type, industry, and corporate scale. Finally, family-related variables are included to measure whether workers are married or have children. To control demand-side and supply-side factors, I develop the matching index, first, by making the total ratios of the graduates of each field equal 100, and then, by modifying the total of each ratio in each occupation to 100. That is, the index of occupation matching represents the ratio of workers in each field for each occupation.

4. Results and Discussion

Tables 1-1 and 1-2 show the descriptive statistics for men and women in each specialized field. Annual incomes are highest for employees in the natural sciences for both men and women, followed by those working in the social sciences and the humanities. As seen in Table 1-1, male workers in the social sciences are approximately 1 year older than those in the natural sciences, who are, in turn, an average of 1 year older than those in the humanities. The field of natural science has the highest average matching index of 38.02 for occupations (in the case of 100, employees in the field occupy 100%). Furthermore, the natural sciences have the highest ratio of regular staff and the proportion of married employees. In addition, 31.6% of employees completed graduate school and 46.9% of those are in large companies. Moreover, many work in the manufacturing or information and communication technology (ICT) industries. The field of humanities has the lowest matching index of 23.48. By contrast, in the case of female employees, as shown in Table 1-2, women who majored in the natural sciences have the highest average yearly incomes and matching index and the highest ratio of graduate degrees in the three fields. In addition, they are characteristically more likely to be married and most likely to have children. There are many female employees working in the manufacturing industry, but the ratio of females in the ICT sector is low. Meanwhile, 21.4% of all women in this field are in the medical care and welfare industries.

Figures 1-1 and 1-2 show the relationship between the degree of the matching index and degree of natural sciences. The matching index is divided into quartile deviations. From these figures, women in the natural sciences fare worse in occupational matching and there are fewer women with graduate degrees in the natural sciences than men with the same degrees. The occupations of researchers or engineers are dominated by high ratios of workers who have natural science degrees; these occupations are in the fourth quartile. Thus, these figures show that graduate degrees in the natural sciences seem to be important to gain more specialized occupations after graduation.

Tables 2 and 3 show the results of the empirical analysis using each sample of men and women. Estimation (1) is the basic analysis. We incrementally add variables, namely, matching index, graduate degree, months of occupational experience, industry, and corporate size, to each estimation, (2), (3), (4), and (5), respectively to prove correlation between these variables and specialization dummies. Estimation (1) in Table 2 shows that the coefficient of the natural sciences dummy is 0.065, whereas that of the social sciences dummy is 0.055 when the humanities is the base category. This result shows that employees who majored in the natural sciences earn the highest wages of these specializations. Estimation (2) includes the occupation-matching index results for the explanatory variables. When this index is added, the coefficient of the social sciences dummy increases by 0.010 points, which is 0.005 points more than the coefficient of the natural sciences. This inverse result means that the wage premium of the natural sciences in estimation (1) is interpreted possibly as better occupational matching in the natural sciences. As for estimation (3), after including a dummy variable for graduate school completion, for the natural sciences, the field of the university degree is not significant. By contrast, the dummy variable of the graduate degree is 0.205, which is relatively high. Therefore, it is confirmed that both occupational matching and the completion of graduate study in this field generates the whole wage premium of estimation (1). In estimation (4), it is confirmed that the natural sciences dummy is continuously not significant after taking into account the numerical scale of occupational years of experience. Finally in estimation (5), we confirm these results after adding the dummy variables of industry and corporate scale. So, the ability of specialization of the natural sciences would be recognized practically by specialized working abilities in the workplace more than other fields. On the other hand, the dummy variable of social sciences is continuously significant. This means that social science workers have higher wage premiums than those of humanities after controlling for other conditions.

According to estimation (1) in Table 3, the wages of female employees in the natural sciences are significantly high, like male employees. This effect becomes stronger when an occupation-matching index is included in estimation (2); likewise, the field of social sciences has the same tendency. Therefore, it is thought that the educational background effect is not offset by the matching effect. Furthermore, the coefficient of the matching index is greater than that of male employees. The matching would be more important to wages among women than among men. In estimation (3), the wages of females in the natural sciences are relatively high even if the completion of graduate study is considered; the coefficient of the degree itself is significant at 0,237, which is relatively higher than that of men. After controlling for the occupational matching and the graduate degree, we could establish that women who have more than a university degree in the field of natural sciences have wage premiums. As for estimations (4), and (5), the natural sciences dummy is constantly significant and its coefficient is greater than that of the social science dummy. Females in the natural sciences could obtain a higher wage premium than females in the social sciences or humanities, everything else being equal. In other words, women’s general ability as well as specialized ability would be recognized more in the workplace than other fields, regardless of occupation and graduate degree. The estimation results confirm that this type of wage premium occurs only in the case of women.

5. Conclusions

This research estimated the wage function of male and female employees based on horizontal education–occupation matching theory using recent individual data. From the descriptive statistics, we first confirmed that both men and women who majored in the natural sciences have the highest average of annual incomes and points of matching index and the highest ratio of graduate degrees in the three fields by gender. However, we also confirmed that women have lower incomes, smaller points of matching index, and lower ratios of graduate degrees than men. From the empirical analysis, the results confirmed that both male and female employees who graduated with degrees in the natural sciences receive significant wage premiums. In the case of men, this wage premium could be explained by both education–occupation matching and the completion of graduate studies of the natural sciences. By contrast, we found that women who have degrees in the field of natural sciences have wage premiums after controlling for occupational matching and graduate degree. That is, this study confirmed the possibility that the possession of both general and specialized abilities increases the valuation in the workplace of women in the natural sciences. We can say that women in the natural sciences have excellent abilites and it is important that we foster more young women in the field of natural sciences by supporting their enrolment in graduate schools and finding jobs for women as researchers.

References

Battu, H., Belfield, C., & Sloane, P. (1999). Over-education among graduates: A cohort view. Education Economics, 7, 21-38.

Bourdet, Y., & Persson, I. (2008). Over-education among Swedish youth: Background, incidence and effects. Department of Economics working papers 2008, Lund University, 8

Cabinet Decision. (2011a) "Fourth Basic Technology Plan."

Cabinet Decision. (2011b) "Development of Talented Individuals in Technology."

Cabinet Decision (2014) "Japan Revival Strategy Revision."

Dolton, P., & Vignoles, A. (2000). The incidence and effects of over-education in the UK graduate labour market. Economics of Education Review, 19, 179-198.

Hartog, J. (2000). Overeducation and earnings. Where are we, where should we go? Economics of Education Review, 19(2), 131-147.

Ministry of Internal Affairs and Communication (2013) "Summary of Science and Technology Survey."

Nordin, M., Persson, I., & Rooth, D.-O. (2010). Education-occupation mismatch: Is there an income penalty? Economics of Education Review, 29, 1047-1059.

Robst, J. (2007). Education, college major, and job match: Gender differences in reasons for mismatch. Education Economics, 15, 159-175.

Robst, J. (2008). Over-education and college major: Expanding the definition of mismatch between schooling and jobs. The Manchester School, 76, 349-368.

Rubb, S. (2003). Over-education in the labor market: A comment and re-analysis of a meta-analysis. Economics of Education Review, 22, 621-629.

Sattinger, M. (1993). Assignment models of the distribution of earnings. Journal of Economic Literature, 31, 831-880.

Sloane, P. J., Battu, H., & Seaman, P. T. (1999). Over-education, under-education and the British labour market. Applied Economics, 31, 1437-1453.

Van Smoorenburg, M., & Van der Velden, R. (2000). The training of school-leavers: Complementarity or substitution? Economics of Education Review, 19, 207-217.

Table 1-1: Summary of Statistics (Male)

	Natural Science			Social Science			Humanities		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Income	1400	647.840	310.824	1612	627.950	360.977	460	537.454	306.511
Hourly Wage	1400	-1.136	0.654	1612	-1.171	0.716	460	-1.318	0.715
Social Science	1423	0.000	0.000	1636	1.000	0.000	466	0.000	0.000
Natural Science	1423	1.000	0.000	1636	0.000	0.000	466	0.000	0.000
Tenure	1411	12.731	10.475	1616	11.791	10.166	461	10.729	9.924
Age	1423	40.926	10.233	1636	41.075	10.214	466	39.273	9.952
Regular Employee	1423	0.930	0.255	1636	0.895	0.306	466	0.843	0.364
Contracted Employee	1423	0.033	0.179	1636	0.039	0.192	466	0.054	0.226
Temporary Employee	1423	0.011	0.105	1636	0.013	0.113	466	0.015	0.122
Part-time Employee	1423	0.004	0.059	1636	0.013	0.113	466	0.009	0.092
Married	1423	0.652	0.476	1636	0.632	0.482	466	0.543	0.499
Children	1423	0.510	0.500	1636	0.506	0.500	466	0.412	0.493
Matching Index	1423	38.022	22.852	1636	29.434	13.672	466	23.482	10.242
Graduate School	1423	0.316	0.465	1636	0.047	0.212	466	0.071	0.257
Months of Experience	1423	118.869	106.021	1635	104.713	98.682	465	109.256	105.371
Small Business	1423	0.044	0.206	1636	0.054	0.226	466	0.056	0.230
Small Company	1423	0.143	0.351	1636	0.209	0.407	466	0.266	0.442
Mid-sized Company	1423	0.284	0.451	1636	0.296	0.457	466	0.307	0.462
Large Company	1423	0.469	0.499	1636	0.368	0.482	466	0.268	0.444
Government Office	1423	0.060	0.237	1636	0.073	0.261	466	0.103	0.304
Agriculture and Forestry	1423	0.000	0.000	1636	0.000	0.000	466	0.000	0.000
Mining Industry	1423	0.001	0.037	1636	0.001	0.035	466	0.000	0.000
Construction Industry	1423	0.054	0.226	1636	0.023	0.151	466	0.009	0.092
Manufacturing Industry	1423	0.387	0.487	1636	0.181	0.385	466	0.120	0.326
Electricity, Gas, Heat	1423	0.016	0.126	1636	0.009	0.095	466	0.004	0.065
Information and Communication	1423	0.207	0.405	1636	0.143	0.350	466	0.148	0.356
Transportation Industry	1423	0.039	0.193	1636	0.062	0.241	466	0.079	0.271
Wholesale, Retail Trade	1423	0.032	0.175	1636	0.110	0.313	466	0.099	0.299
Finance and Insurance	1423	0.018	0.134	1636	0.123	0.328	466	0.058	0.234
Property Industry	1423	0.014	0.118	1636	0.036	0.187	466	0.030	0.171
Restaurant, Hotel	1423	0.006	0.075	1636	0.018	0.134	466	0.019	0.138
Medical Care and Welfare	1423	0.030	0.169	1636	0.026	0.160	466	0.047	0.212
Service Industry	1423	0.044	0.206	1636	0.036	0.187	466	0.159	0.366
Public	1423	0.051	0.219	1636	0.070	0.255	466	0.077	0.267
Other	1423	0.039	0.195	1636	0.054	0.226	466	0.049	0.217

Table 1-2: Summary of Statistics (Female)

	Natural Science			Social Science			Humanities		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Income	312	344.381	207.965	442	332.170	211.186	693	283.660	185.401
Hourly Wage	312	-1.415	0.634	442	-1.528	0.632	693	-1.604	0.647
Social Science	322	0.000	0.000	462	1.000	0.000	712	0.000	0.000
Natural Science	322	1.000	0.000	462	0.000	0.000	712	0.000	0.000
Tenure	321	6.268	6.520	461	5.655	6.457	706	6.341	7.358
Age	322	36.326	10.039	462	34.703	9.815	712	38.347	11.157
Regular Employee	322	0.621	0.486	462	0.639	0.481	712	0.527	0.500
Contracted Employee	322	0.081	0.273	462	0.082	0.275	712	0.124	0.329
Temporary Employee	322	0.056	0.230	462	0.067	0.250	712	0.069	0.253
Part-time Employee	322	0.211	0.409	462	0.149	0.357	712	0.211	0.408
Married	322	0.509	0.501	462	0.431	0.496	712	0.487	0.500
Children	322	0.388	0.488	462	0.247	0.432	712	0.367	0.482
Matching Index	322	31.845	24.872	462	23.917	9.887	712	26.433	7.326
Graduat School	322	0.171	0.377	462	0.048	0.213	712	0.032	0.177
Months of Experience	321	84.408	81.834	461	70.078	76.242	712	84.430	89.517
Small Business	322	0.106	0.308	462	0.108	0.311	712	0.142	0.349
Small Company	322	0.230	0.421	462	0.232	0.422	712	0.264	0.441
Mid-sized Company	322	0.311	0.463	462	0.281	0.450	712	0.254	0.436
Large Company	322	0.323	0.468	462	0.335	0.473	712	0.274	0.446
Government Office	322	0.031	0.174	462	0.043	0.204	712	0.066	0.248
Agriculture and Forestry	322	0.003	0.056	462	0.000	0.000	712	0.000	0.000
Mining Industry	322	0.000	0.000	462	0.002	0.047	712	0.000	0.000
Construction Industry	322	0.037	0.190	462	0.024	0.153	712	0.020	0.139
Manufacturing Industry	322	0.220	0.415	462	0.106	0.308	712	0.077	0.267
Electricity, Gas, Heat	322	0.006	0.079	462	0.004	0.066	712	0.006	0.075
Information and Communication	322	0.096	0.295	462	0.130	0.337	712	0.083	0.276
Transportation Industry	322	0.012	0.111	462	0.035	0.183	712	0.038	0.191
Wholesale, Retail Trade	322	0.034	0.182	462	0.117	0.322	712	0.107	0.309
Finance and Insurance	322	0.034	0.182	462	0.145	0.353	712	0.084	0.278
Property Industry	322	0.025	0.156	462	0.032	0.177	712	0.022	0.148
Restaurant, Hotel	322	0.022	0.146	462	0.043	0.204	712	0.053	0.225
Medical Care and Welfare	322	0.214	0.411	462	0.056	0.231	712	0.096	0.294
Service Industry	322	0.081	0.273	462	0.043	0.204	712	0.150	0.358
Public	322	0.028	0.165	462	0.043	0.204	712	0.053	0.225
Other	322	0.099	0.300	462	0.076	0.265	712	0.079	0.269

Figure 1-1: Number of Male Workers by Degree in Each Quantile of Matching Index

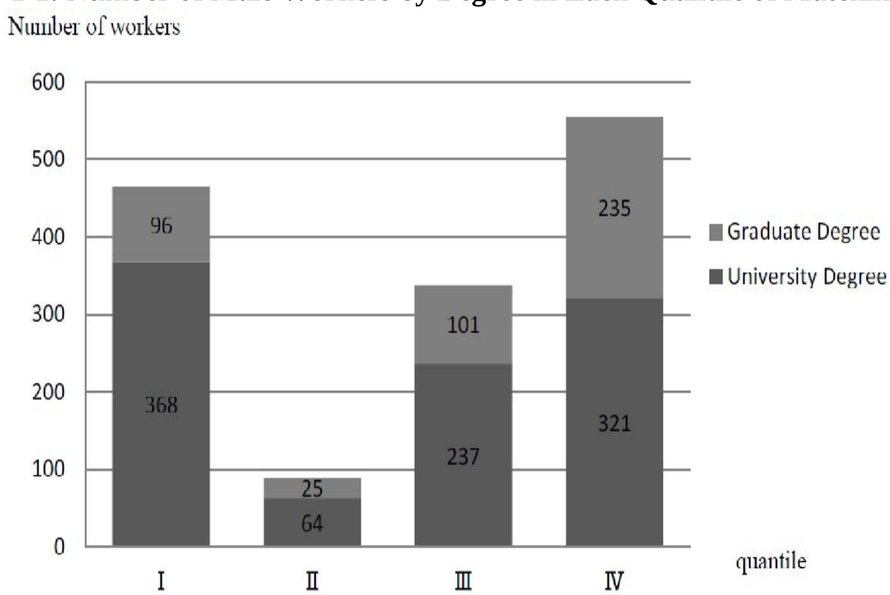

Figure 1-2:

Figure 1-2: Number of Female Workers by Degree in Each Quantile of Matching Index

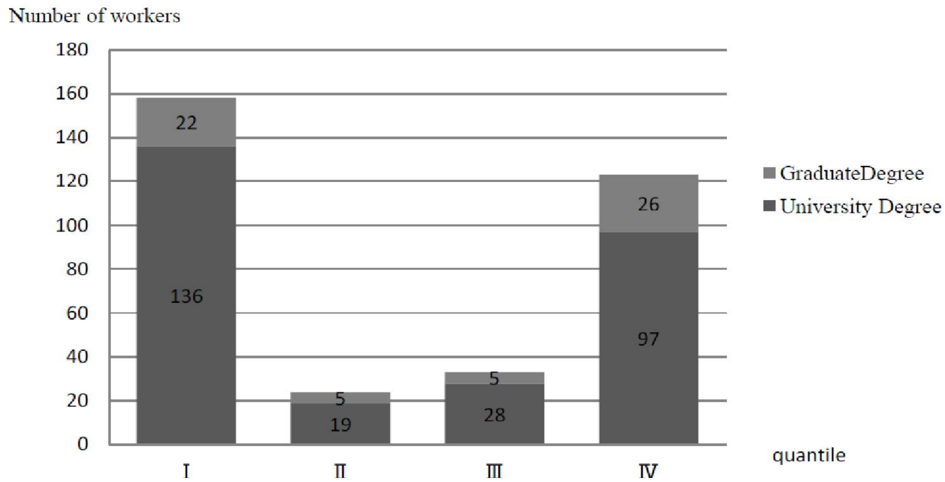

Table 2: Estimation Results of Male Wage Function

	(1)		(2)		(3)		(4)		(5)	
Logarithm of Hourly wa	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Social Science	0.055	0.027 **	0.075	0.031 **	0.081	0.031 ***	0.078	0.031 **	0.063	0.031 **
Natural Science	0.065	0.027 **	0.070	0.033 **	0.024	0.033	0.024	0.033	0.011	0.034
Tenure	0.016	0.001 ***	0.017	0.001 ***	0.017	0.001 ***	0.018	0.001 ***	0.013	0.001 ***
Age	0.013	0.001 ***	0.013	0.001 ***	0.014	0.001 ***	0.014	0.001 ***	0.017	0.001 ***
Regular Employee	0.248	0.053 ***	0.230	0.056 ***	0.215	0.056 ***	0.220	0.056 ***	0.179	0.056 ***
Contracted Employee	-0.053	0.072	-0.072	0.075	-0.080	0.074	-0.080	0.074	-0.162	0.074 **
Temporary Employee	-0.173	0.100 *	-0.177	0.104 *	-0.160	0.103	-0.165	0.103	-0.235	0.103 **
Part-time Employee	-0.099	0.119	-0.220	0.125 *	-0.225	0.124 *	-0.229	0.124 *	-0.261	0.122 **
Married	0.173	0.030 ***	0.154	0.031 ***	0.154	0.031 ***	0.153	0.031 ***	0.136	0.031 ***
Children	0.044	0.029	0.042	0.030	0.050	0.030 *	0.051	0.030 *	0.054	0.029 *
Matching Index			0.001	0.000 ***	0.001	0.000 *	0.001	0.000 **	0.001	0.000
Graduate school					0.205	0.030 ***	0.203	0.030 ***	0.146	0.030 ***
Vocational Experience							0.000	0.000 *	0.000	0.000
Constant Term	-2.322	0.066 ***	-2.376	0.073 ***	-2.376	0.072 ***	-2.393	0.073 ***	-2.652	0.136 ***
Sample Size	3763		3365		3365		3363		3363	
Ajusted R^2	0.276		0.288		0.298		0.299		0.326	

Note: *** 1%, ** 5% , and * 10% significance levels

Table 3: Estimation Results of Female Wage Function

	(1)		(2)		(3)		(4)		(5)	
Logarithm of Hourly wa	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Social Science	0.080	0.035 **	0.135	0.037 ***	0.131	0.037 ***	0.128	0.037 ***	0.128	0.037 ***
Natural Science	0.184	0.039 ***	0.226	0.042 ***	0.190	0.043 ***	0.181	0.043 ***	0.175	0.044 ***
Tenure	0.023	0.003 ***	0.023	0.003 ***	0.023	0.003 ***	0.014	0.004 ***	0.012	0.004 ***
Age	0.011	0.002 ***	0.011	0.002 ***	0.011	0.002 ***	0.008	0.002 ***	0.008	0.002 ***
Regular Employee	-0.064	0.060	-0.076	0.069	-0.088	0.069	-0.093	0.068	-0.152	0.071 **
Contracted Employee	-0.184	0.073 **	-0.183	0.082 **	-0.198	0.082 **	-0.211	0.082 ***	-0.299	0.084 ***
Temporary Employee	-0.212	0.080 ***	-0.196	0.090 **	-0.190	0.090 **	-0.194	0.089 **	-0.258	0.093 ***
Part-time Employee	-0.192	0.069 ***	-0.256	0.079 **	-0.248	0.079 ***	-0.250	0.078 ***	-0.292	0.079 ***
Married	0.156	0.038 ***	0.175	0.042 ***	0.172	0.042 ***	0.176	0.042 ***	0.178	0.041 ***
Children	-0.178	0.042 ***	-0.184	0.046 ***	-0.177	0.046 ***	-0.171	0.046 ***	-0.184	0.046 ***
Matching Index			0.003	0.001 ***	0.003	0.001 ***	0.002	0.001 ***	0.002	0.001 ***
Graduate school					0.237	0.064 ***	0.242	0.064 ***	0.231	0.065 ***
Vocational Experience							0.001	0.000 ***	0.001	0.000 ***
Constant Term	-2.057	0.083 ***	-2.220	0.101 ***	-2.201	0.101 ***	-2.120	0.102 ***	-2.207	0.214 ***
Sample Size	1726		1413		1413		1412		1412	
Ajusted R^2	0.153		0.171		0.178		0.187		0.199	

Note: *** 1%, ** 5%, and * 10% significance levels