Determinants of Understanding of Labor Laws:

Evidence from Japanese University Students

Tomotaka HIRAO

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Determinants of Understanding of Labor Laws:
Evidence from Japanese University Students[†]

Tomotaka Hirao

Department of Economics, Setsunan University, Japan

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Abstract

This study attempts to investigate Japanese university students' knowledge of labor laws using latent rank theory and also attempts to analyze the determinants of understanding of labor laws. Because the hierarchy between employer and employee exist automatically in capitalist societies, labor laws have to be enacted in order to protect workers. Understanding of labor laws, therefore, builds core safety nets for workers in the labor market.

At the same time, the college enrollment rate in recent years in Japan is over 50% of secondary education graduates, and as a result, college graduates are no longer considered elite employees, rather, almost all graduates are merely ordinary workers. For that reason, students need to learn about their employment rights before obtaining initial employment in order to protect themselves and their future careers. However, there are few studies regarding Japanese university students' knowledge of labor laws. This study, therefore, investigates the understanding of labor laws based on latent rank theory and analyzes the determinants by exploratory data analysis.

Empirical results show that the average of correctly answered questions regarding Japanese labor laws is about 50%. We can view this record as less than positive because subjects start their job hunting process with less than an ideal amount of legal knowledge. This research also confirms that there are positive correlations between some dependent variables (for example, gender, higher GPA in high school, the number of credits acquired regarding career education, and experience with exploitive labor) and the rank of labor law knowledge. This implies that education and experience regarding career development while enrolled in university correlates with better understanding of labor laws.

Keywords: Labor Law, Latent Rank Theory, Career Education, Safety Net

1. Introduction

This study attempts to investigate Japanese university students' knowledge of labor laws using latent rank theory (LRT) and also attempts to analyze the determinants of understanding of labor laws. To what degree do career education, internships and interactions with adults play a role as determinants?

In the Japanese labor market, the number of temporary workers has increased since the collapse of the bubble economy in the early 1990s, the ratio of these non-regular workers in the labor force in 2020 are 54.5% for females and 22.2% for males (Gender Equality Bureau 2021, p.102). In addition, there is significant stagnation of real wage growth in Japan over the last few decades (Chun et al., 2021). Realistically speaking, the Japanese employment system (for example, long-term employment, seniority based wage system and enterprise-based unions) can no longer be expected to support employees' career development. Since the 1970s, moreover, trade union density rate (the share of employees who are union members) has decreased, dropping to under 20% in recent years (Kato, 2006). Individualization of industrial relations continue to develop. Because almost all enterprise-based unions consist of regular workers, the relationship between management and labor is not adversarial under the Japanese employment system. Thus, unions have little power to resolve disputes over working conditions for workers in Japan.

Understanding of labor laws builds core safety nets for vulnerable workers in the

labor market under these circumstances. Because the hierarchy between employer and employee exist automatically in capitalist societies, labor laws have to be enacted in order to protect workers. In order to protect themselves and their future careers, students need to learn employment rights before obtaining initial employment. Since college enrollment rate in recent years in Japan is over 50% for secondary school graduates, college graduates are no longer thought of as elite employees, and almost all graduates are considered merely ordinary workers.

On the other hand, the promotion of individual employment rights continues to develop. Since the 2008 financial crisis ("Lehman shock"), exploitative companies that flout labor standards have become a significant social problem in Japan. Exploitative companies called "Burakku Kigyo" in Japan force harsh working conditions with long working hours, low wages, no overtime pay and other undue negative pressures on employees. Therefore, promoting individual employment rights creates momentum to protect workers from such exploitative companies, and improved labor law education is important as one solution to this issue. In response to this gain of momentum, the Labour Lawyers Association of Japan (LLAJ) issued a statement to promote legal education with regard to employment rights in 2013, and later the Japanese government has a formal obligation to propagate basic knowledge of labor laws in high school and college education by Act Partially Amending the Working Youth Welfare Act in 2015. The Japan Federation of Bar Associations

(JFBA), moreover, submitted a written statement concerning labor laws education to the Ministry of Education, Ministry of Labor and Ministry of Justice in 2017. Although this kind of promoting individual employment rights creates momentum for change, there is little evidence regarding the understanding of labor laws and its determinants in Japan.

The rest of this paper is organized as follows: the next section reviews recent relevant empirical studies regarding the understanding of labor laws in Japan; the following section introduces data and variables; the fourth section explains empirical methods; the fifth section introduces empirical results; and the final section presents conclusions.

2. Review of Literature

This section summarizes relevant literature that deals with the understanding of labor laws in Japan. Takahashi (2008) analyzes the effects of legal knowledge regarding paid leave. This author reveals that employees of small companies have less legal knowledge regarding paid leave than employees of large companies, and they imply that vulnerable workers in the labor market are not thoroughly educated. This author also points out that if working environments are good, legal knowledge regarding paid leave facilitates the taking of paid leave. Takahashi's study, however, only analyzes the legal knowledge of paid leave and does not investigate other aspects

of labor laws.

Uenishi et al. (2014) and Umezaki et al. (2015) analyze the effects of Japanese university students' understanding of labor laws on obtaining initial employment. These studies reveal that knowledge of labor laws correlates with likability for labor unions, and that understanding of labor laws takes a facilitating role for obtaining employment at a company that has unions. The authors, however, could not elucidate a causal relationship between the knowledge of labor laws and likability for labor unions because of data limitations.

Uenishi et al. (2016) and Nagumo et al. (2019) investigate the changing of individual's labor law knowledge using longitudinal data in order to elucidate the problem of causal inference. The first survey was conducted when subjects were university students (third or fourth year students), and the second survey was conducted two years after the first survey. These studies reveal that on average subjects' knowledge of labor laws did not improve during the time between university and workplace. While some knowledge did improve, other knowledge worsened rather than maintain previous amounts. The authors point out that one possible reason for this result may be a changing of required knowledge according to their individual work experience.

Hayashi (2014) also analyzes the effects of Japanese university students' understanding of labor laws on obtaining initial employment. This author points out

that although knowledge of labor laws does not increase the probability of obtaining initial employment directly, understanding of labor laws affects obtaining initial employment through the number of applications submitted during the job search process.

In summary, although direct effects of understanding labor laws on labor market outcomes are not necessarily clearly perceived, there is at least a mediating effect that knowledge of labor laws affects labor market outcomes through the likability for labor unions or the number of applications submitted. There is, however, little literature regarding the determinants of understanding of labor laws in Japan. This study hopes to be unique and valuable research on the understanding of labor laws in Japan.

3. Data

The data set used in this study was collected in December of 2021 by the Mynavi Corporation, which is a well-known Japanese college student recruitment agency that generously cooperated with this research. Mynavi collected original data regarding postgraduate and undergraduate students' lifestyles. Subjects of this survey were Japanese university students (third year students) and master's degree students (first year students). The number of returned surveys was 3756.

In this survey, data regarding knowledge of labor laws were collected. There were

six questions in total, regarding job offers, working hours, overtime pay, paid leave, workplace accidents, and labor unions (see Table 1). There were three answer options for each question, namely: 1) Correct; 2) Incorrect; and 3) I don't know. Although there were exceptions, as a general rule the correct answer to each question was "2) Incorrect." There is currently a categorical variable which can take on three different values. Both "correct" and "I do not know" are considered not correct answers. If the baseline value is not the correct answer, then the following dummy variable may be constructed:

Correct answer=1 if individuals choose "incorrect" and 0 otherwise.

The question with the highest percentage of correct answers is Q2 (regarding working hours) with a result of 64.6%, whereas the question with the lowest percentage of correct answers is Q5 (regarding industrial accident) with a result of 38.2% (see Table 2). One of the possible reasons for these results may be that while students are familiar with and have practical knowledge about working hours through part-time employment, students are unfamiliar with workplace accidents because of the generally low incidence of workplace injuries. The average of correctly answered questions is about 50%.

This study only uses the data of undergraduate students in order to analyze understanding of labor laws using a relatively homogeneous subject group. The dependent variable in the estimation is the ordinal scale of knowledge regarding labor

laws based on the information obtained from LRT. The independent variables are as

follows: 1) the number of credit regarding career education; 2) internship experience;

3) experience with exploitive labor; and 4) the number of friends who are older than a

given subject. The control variables are gender, college major, university rank, socio-

economic status, and GPA in high school as a proxy for innate ability. The descriptive

statistics are summarized in Table 3.

4. Estimation Methods

4.1. Latent Rank Theory

LRT is a test theory for grading academic achievement not on a continuous scale

but on an ordinal measurement scale[1]. Shojima (2007) published important research

on origin of LRT. This author doubts that the ability of student A is higher than that of

student B if the test score of student A is 80 and that of student B is 79[2]. In fact,

although there is small difference in the academic achievement between the two

students, this difference is a strong possibility within the margin of error. Therefore,

Shojima (2008, p.1) may call the validity of a continuous scale as an evaluating tool

for academic achievements into question and point out that scores on a continuous

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[1] LRT is also a statistical model based on the mechanism of a self-organizing map or generative
topographic map (Shojima, 2008, p.1).
[2] An introduction to LRT is included in Shojima's website
(http://shojima.starfree.jp/ntt/index.htm). This website was referred to in order to explain LRT in
this section. See Shojima (2022) for more detail.

scale are an undesirable measure for evaluating academic achievements. This author

said that a test is at best capable of classifying academic ability into 5–20 levels. In

fact, professors give students their grades as follows: A+ (excellent); A (good); B

(average); C (passing); and F (failure).

Empirical analysis of LRT can be easily accomplished using the *Exametrika*

software developed by the afore mentioned Kojiro Shojima[3]. This study analyzes the

understanding of labor laws using *Exametrika* in order to sort subject groups' legal

knowledge.

4.2. Ordered Probit Regression

Because the dependent variable is an ordinal measurement scale created by LRT,

this study requires an ordered probit regression model. I assume $y_i = j(1, 2, 3, 4, 5)$

for (poor, average, good, very good, excellent). The numbers from 1 to 5 do not have

meaning in terms of these values, rather are just ordered from lowest to highest in the

statistics. These categories are not equally spaced. For example, the difference

between categories "poor" and "average" may not be the same as the difference

between categories "average" and "good".

Define y^* as a latent continuous variable. The latent variable model is considered

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[3] *Exametrika* can be downloaded from Shojima's website
(http://shojima.starfree.jp/exmk/index.htm).

as follows:

$$y_i^* = \alpha + \beta x_i + e_i \qquad (1)$$

$$y_i^* = j \text{ if } u_{j-1} < y^* \leq u_j \qquad (2)$$

where α is an intercept term, x_i stands for the independent variables, e_i is the error term, and u is the cut-off point. As explained above, y^* is an unobserved variable (the latent continuous variable y^* can not be observed), we can, however, observe y_i when it crosses thresholds.

Although the latent continuous variable y^* can not be observed, we can observe y_i when y^* crosses thresholds. The choice rule, therefore, is as follows:

$$y_i = 1 \text{ if } y^* \leq u_1$$

$$y_i = 2 \text{ if } u_1 < y^* \leq u_2$$

$$y_i = 3 \text{ if } u_2 < y^* \leq u_3$$

$$y_i = 4 \text{ if } u_3 < y^* \leq u_4$$

$$y_i = 5 \text{ if } y^* > u_4$$

Incidentally, a rearrangement of the equations (1) and (2) is as follows:

$$u_{j-1} - \alpha - \beta x_i \leq e_i < u_j - \alpha - \beta x_i$$

The probability that observation i will select alternative j is:

$$Pr(y_i = j) = Pr(u_{j-1} < y^* \leq u_j) = F(u_j - \alpha - \beta x) - F(u_{j-1} - \alpha - \beta x)$$

where F( ) is the standard normal cumulative distribution function.

Using generic representation, the respective probabilities for each category are

described as follows:

$$Pr(y_i = 1) = F(u_1 - \alpha - \beta x)$$

$$Pr(y_i = 2) = F(u_2 - \alpha - \beta x) - F(u_1 - \alpha - \beta x)$$

$$Pr(y_i = 3) = F(u_3 - \alpha - \beta x) - F(u_2 - \alpha - \beta x)$$

$$Pr(y_i = 4) = F(u_4 - \alpha - \beta x) - F(u_3 - \alpha - \beta x)$$

$$Pr(y_i = 5) = F(\alpha + \beta x - u_4)$$

This study attempts to analyze the determinants of the understanding of labor laws using ordered probit regression[4].

5. Estimation Results

The number of latent ranks needs to be decided. There are six questions in total, the highest score value is 6, and the lowest score value is zero. In short, there are seven possible scores from zero to six in the understanding of labor laws in this study. Therefore, there are a few candidate options for the number of latent ranks, namely 2, 3, 4, or 5. The number of the latent ranks was determined using fit indices, such as root mean square error of approximation (RMSEA), conditional Akaike information criterion (CAIC) and Bayesian information criterion (BIC).

CAIC and BIC provide a basis for model selection. Information criterion scores can be used to determine which model is more likely to be appropriate for the same

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[4] For more detail on ordered probit regression, for example, see Greene (2017, chap.18).

given data set. CAIC and BIC evaluate models relatively. As is well known, a lower

CAIC and BIC score is better (Akaike, 1973; Bozdogan, 1987; Schwarz, 1978). As

per the results, students were divided into five ordinal groups (see Table 4). Although

weakly ordinal alignment condition (WOAC) is a prerequisite for LRT, the WOAC of

all models was satisfied.

Item reference profile (IRP) calculated by *Exametrika* is used for interpreting the

behaviors of the correct answer rate. IRP is a plot of the probability that a test item is

answered correctly (see Table 5 and Figure 1). Rank 1 consists of students who would

likely not choose the correct answer for all questions. Rank 2 is composed of students

who would likely not choose the correct answer for all questions, excepting Q2

(regarding working hours). Rank 3 is made up of students who choose the correct

answer for Q2 and chose the correct answer for other questions on average, excepting

Q5 (regarding workplace accidents). Rank 4 is comprised of students who were likely

choose the correct answer for all questions, excepting Q5. Rank 5 consists of students

who were likely to choose the correct answer for all questions.

Estimation results of ordered probit regression are presented in Table 6. Empirical

results show that there are positive correlations between some dependent variables

(gender, the number of credits regarding career education, experience with exploitive

labor, and the number of friends who are older than a given subject) and the rank of

labor laws knowledge. Higher GPA in high school also correlates with students

having an advantage in having a higher ranking. In contrast, university rank, college

major, socio-economic status and internship experience are not statistically

significant.

6. Conclusions

First, this study attempts to investigate Japanese university students' knowledge of

labor laws using LRT. In order for this, students are divided into five ordinal groups.

The average of correctly answered questions is about 50%. We can view this record as

less than positive because subjects start their job hunting process with less than an

ideal amount of legal knowledge. The question regarding working hours was easily

answerable for students, whereas the question regarding industrial accidents proved to

be significantly more difficult for the test subjects. Part of the reason for this

difference seems to stem from variance among subjects' prior workplace experiences.

Second, this study also attempts to analyze the determinants of understanding of

labor laws. Exploratory data analysis shows that variables such as gender, GPA in

high school, the number of credits regarding career education, experience with

exploitive labor, and number of friends who are older than a given subject are

statistically significant. In contrast, university rank, college major, socio-economic

status and internship experience are not statistically significant. This implies that

education and experience regarding career development while enrolled in university

correlates with better understanding of labor laws.

We do not able at this time to reach anything beyond a tentative conclusion. Further research is needed to inspect the unsolved issues of where and when should students learn about Japanese labor laws and how could they more effectively learn about those laws. There are limitations to this study, namely that the results of this research are not interpreted as a causal relationship because of data limitations. The findings of this study, therefore, need to be carefully interpreted with this limitation in mind.

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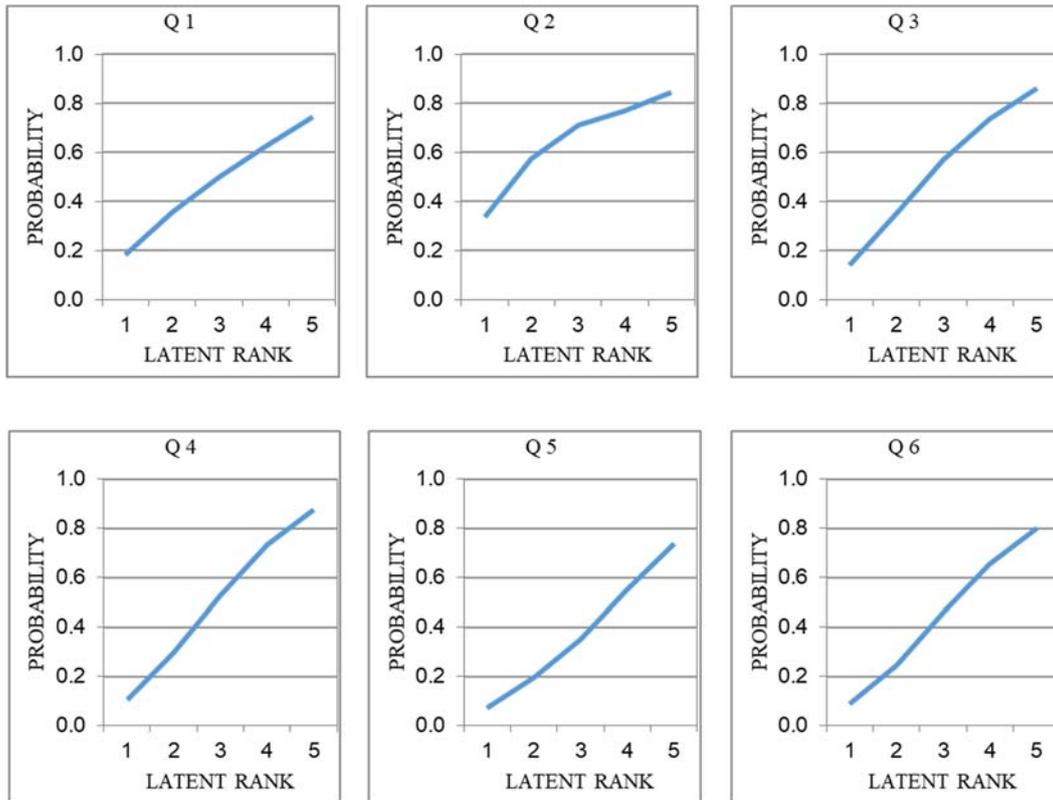**Figure 1. Item Reference Profile Graphs**

Table 1. Questions Regarding Japanese Labor Laws

No.	Question	Legal Evidence
Q1	"If your job offer is rescinded before you start working, you are beholden to the decision of that employer."	Labor Contracts Act, Article 16 "If a dismissal lacks objectively reasonable grounds and is not considered to be appropriate in general societal terms, it is treated as an abuse of rights and is invalid."
Q2	"Working hours a day can be unlimitedly increased if total working hours per week do not exceed 40 hours."	Labor Standards Act, Article 32(2) "An employer must not have workers work more than 8 hours per day for each day of the week, excluding break periods."
Q3	"An employer can establish the overtime pay rate for their employees."	Labor Standards Act, Article 37(1) "If an employer extends the working hours or has a worker work on a day off pursuant to the provisions of Article 33 or paragraph (1) of the preceding Article, it must pay premium wages for work during those hours or on those days at a rate of at least the rate prescribed by Cabinet Order within the range of not less than 25 percent and not more than 50 percent over the normal wage per working hour or working day."
Q4	"If an employer does not approve workers' requests for paid leave, employees cannot take paid leave."	Labor Standards Act, Article 39(5) "An employer must grant paid leave under the provisions of each of the preceding paragraphs at the worker's requested timing."
Q5	"If an employer does not approve workers' requests for paid leave, employees cannot take paid leave."	Industrial Accident Compensation Insurance Act, Article 1 "The purposes of the industrial accident compensation insurance are to pay necessary insurance proceeds to protect workers who are injured, fall ill or are disabled, or die, in a prompt and fair manner, which are caused in the course of their duties or while commuting to or from work…"
Q6	"If employees form a labor union to improve their current work environment, workers need to gain permission from the employer."	Labor Union Act, Article 1 "The purpose of this Act is to elevate the status of workers by promoting their being on equal standing with their employer in their negotiations with the employer; to defend the exercise by workers of voluntary organization and association in labor unions so that they may carry out collective action, including the designation of representatives of their own choosing to negotiate working conditions; and to promote the practice of collective bargaining, and procedures therefore, for the purpose of concluding collective agreements regulating relations between employers and workers."

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Table 2. Percentage of Questions Answered Correctly

	Obs.	Mean	Std. Dev.	Min	Max
Q1	3167	0.482	0.500	0	1
Q2	3167	0.646	0.478	0	1
Q3	3167	0.532	0.499	0	1
Q4	3167	0.507	0.500	0	1
Q5	3167	0.382	0.486	0	1
Q6	3167	0.450	0.498	0	1
ALL	3167	2.999	1.833	0	6

Table3. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
LRT Rank	3167	3.009	1.488	1	5
Female	3167	0.678	0.467	0	1
Natural Science	3167	0.304	0.460	0	1
University Rank	3167	49.294	7.537	35	68
Career Education	3167	2.382	2.769	0	10
Internship	3167	0.836	0.371	0	1
Exploitive Labor	3167	0.400	0.490	0	1
Friends	3167	3.069	4.754	0	50
SES					
Very Low	3167	0.044	0.206	0	1
Below Average	3167	0.135	0.342	0	1
Average	3167	0.153	0.360	0	1
Above Average	3167	0.313	0.464	0	1
Very High	3167	0.296	0.457	0	1
Don't Know	3167	0.059	0.236	0	1
GPA in high School					
Very Low	3167	0.057	0.232	0	1
Below Average	3167	0.186	0.389	0	1
Average	3167	0.313	0.464	0	1
Above Average	3167	0.284	0.451	0	1
Excellent	3167	0.058	0.233	0	1
Don't Know	3167	0.102	0.303	0	1

Table 4. RMP-Based Test Fit Index

Rank	NFI	RFI	IFI	TLI	CFI	RMSEA	AIC	CAIC	BIC
2	0.693	0.693	0.720	0.708	0.720	0.064	1657.21	680.68	818.99
3	0.773	0.773	0.806	0.790	0.806	0.054	1111.80	171.11	304.35
4	0.790	0.790	0.829	0.808	0.828	0.052	970.14	60.94	189.71
5	0.792	0.792	0.836	0.810	0.835	0.052	930.09	47.99	172.93

Note: *Exametrika* was used to calculates fit indices to measure the degree of overall fit of a model to data. See Shojima's website (http://shojima.starfree.jp/exmk/index.htm) for more detail. NFI (normed fit index), RFI (relative fit index), IFI (incremental fit index), TLI (Tucker-Lewis index), and CFI (comparative fit index) have a value running from 0 to 1. The higher these numbers are, the more accurate the fit measurement is. RMSEA (root mean square error of approximation) has a value running from 0 to ∞. The lower these numbers are, the more accurate the fit measurement is. AIC (Akaike information criterion), CAIC (consistent AIC), and BIC (Bayesian information criterion) are the statistical tools used for model selection, as per usual. The lower these numbers are, the more accurate the fit measurement is.

Table 5. Item Reference Profile

Item	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Q2	0.335	0.575	0.711	0.770	0.845
Q3	0.140	0.354	0.570	0.736	0.861
Q4	0.106	0.294	0.525	0.732	0.876
Q1	0.182	0.359	0.498	0.624	0.746
Q6	0.086	0.247	0.458	0.656	0.801
Q5	0.072	0.194	0.350	0.551	0.738

Table 6. Estimation Results

	(1)	(2)	(3)	(4)
Female	-0.135 **	-0.142 **	-0.141 **	-0.148 ***
	(0.042)	(0.042)	(0.042)	(0.042)
Natural Science	-0.063	-0.062	-0.071	-0.069
	(0.042)	(0.042)	(0.042)	(0.042)
University Rank	0.008 **	0.007 *	0.004	0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Career Education	0.019 *	0.019 *	0.018 *	0.019 *
	(0.008)	(0.008)	(0.008)	(0.008)
Internship	0.054	0.043	0.051	0.041
	(0.052)	(0.052)	(0.052)	(0.052)
Exploitive Labor	0.200 ***	0.197 ***	0.197 ***	0.195 ***
	(0.039)	(0.039)	(0.039)	(0.039)
Friends	0.009 *	0.009 *	0.009 *	0.008 *
	(0.004)	(0.004)	(0.004)	(0.004)
SES				
Very Low		ref.		ref.
Below Average		0.084		0.078
		(0.112)		(0.113)
Average		0.025		0.016
		(0.111)		(0.111)
Above Average		0.098		0.087
		(0.107)		(0.107)
Very High		0.055		0.051
		(0.107)		(0.108)
Don't Know		-0.180		-0.173
		(0.133)		(0.133)
GPA in High School				
Very Low			ref.	ref.
Below Average			0.115	0.112
			(0.095)	(0.095)
Average			0.169	0.160
			(0.093)	(0.093)
Above Average			0.218 *	0.212 *
			(0.096)	(0.096)
Excellent			0.288 *	0.287 *
			(0.127)	(0.127)
Don't Know			0.026	0.035
			(0.107)	(0.107)
/cut1	-0.253	-0.271	-0.292	-0.315
	(0.148)	(0.178)	(0.171)	(0.198)
/cut2	0.210	0.193	0.172	0.150
	(0.147)	(0.178)	(0.171)	(0.198)
/cut3	0.736	0.719	0.698	0.678
	(0.148)	(0.178)	(0.171)	(0.198)
/cut4	1.198	1.183	1.162	1.142
	(0.148)	(0.179)	(0.171)	(0.198)
Observations	3167	3167	3167	3167
Wald Chi2	61.010 ***	70.580 ***	73.610 ***	82.550 ***
Log pseudolikelihood	-5021.5	-5016.0	-5015.0	-5010.1

Note: Standard errors are in parentheses. *significant at 5%; **significant at 1%; *** significant at 0.1%.

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Determinants of Understanding of Labor Laws:
Evidence from Japanese University Students

執筆者：Tomotaka HIRAO（Setsunan University）

〒739-8512　広島県東広島市鏡山 1-2-2　電話（082)424-6240
https://rihe.hiroshima-u.ac.jp/