広島大学高等教育研究開発センター

# The Impact of Graduate Education on Initial Careers (Revised)

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RIHE Advancement of Higher Education Research
Monograph Series
No.5

# The Impact of Graduate Education on Initial Careers (Revised)[†]

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April 2022

**Abstract**

This paper replicates models developed by our previous research to study the effects of graduate education on initial employment after graduation in the Japanese labor market, with respect to new graduates. If education is the best investment for an individual's economic success, then graduate degrees are expected to provide an individual with higher-earning job opportunities. In spite of this economic premise, however, our previous study showed that master's degrees in the humanities or social sciences in Japan have, in fact, a greater negative impact on obtaining initial employment than is the case of having only a bachelor's degree in the humanities or social sciences.

However, that pervious research could not overcome omitted variable bias because of data limitations. Omitted variable bias is a key problem for research on education; therefore, this study uses new longitudinal data to overcome omitted variable bias and clearly demonstrate the robustness of our previous research.

Empirical results confirm our earlier work, showing that master's degrees in the humanities or social sciences do not provide graduate students with an advantage in obtaining initial employment, after controlling for potential bias. At the same time, this research also confirms that natural science majors lead to an increase in the probability of obtaining initial employment in comparison with humanities or social science majors. In other words, this paper is able to replicate our previous research. This shows that the Japanese labor market structure for graduate student has in essence remained the same since our previous research was completed.

Keywords: Graduate Education, New Graduates, Initial Employment

JEL classification: I23, J24

[†] This study was supported by JSPS KAKENHI Grant Numbers JP19H00619, JP19H00621, JP20H01643, JP18K18651, JP20J14673. I would like to thank Mynabi Corporation and Research Institute for Higher Education, Hiroshima University, for permission to use the data. I am grateful to Hisakazu Matsushige, Yuko Okajima, Shizue Igawa, Seira Iida and Midori Otani for their helpful comments. I would like to thank the participants of RIHE Open Seminar for comments and suggestions. All the remaining errors are mine.

## 1. Introduction

This paper replicates models developed by our previous research (Hirao et al., 2015) studying the effects of graduate education on initial employment after graduation in the Japanese labor market with respect to new graduates. Although the number of enrollments in master's courses has reached a plateau in recent years, that number has increased by more than double over the last few decades. The number of enrollments in master's courses in 1990 was 30733, which increased to 71954 in 2020 (see Figure 1). This expanding of graduate education was the result of educational reforms by MEXT (The Ministry of Education, Culture, Sports, Science and Technology) through the 1990's. When graduate students were relatively few before the 1990's, obtaining initial employment after graduation for graduate students was not a significant social problem. As the overall level of education in society became higher, however, initial employment for graduate students began to develop into a social issue.

The labor market for graduates with master's degrees and graduates with bachelor's degrees is competitive because almost all Japanese private sector enterprises do not distinguish between the recruitment of master' degree holders and bachelor's degree holders. In other words, graduates with master's degrees and graduates with bachelor's degrees must all compete with each other within the same labor market. Human Capital Theory posits that individuals are able to increase their

productivity through education and training (Becker, 1964). According to Human Capital Theory, education is the best investment for an individual's economic success, and thus graduate degree holders should obtain higher-earning job opportunities than bachelor's degree holders.

On the other hand, Kariya (2011) pointed out that as the overall level of education in the Japanese society became higher, it did not mean there was a greater employment of master's degree holders compared to bachelor's degree holders, but there was an indication of a rising of the cut-off point for undergraduate university rank as a function of recruitment in the labor market, with respect to new graduates (except for that of natural science majors). This implies that there is either a non or negative impact of graduate education in the humanities or social sciences on obtaining initial employment in the Japanese labor market, thus Kariya (2011) may call the validity of Human Capital Theory into question.

Therefore, in order to elucidate this issue, our research focuses on the effects of master's education on obtaining initial employment after graduation in the Japanese labor market, with respect to new graduates (Hirao et al., 2015). Our previous study showed that master's degrees in the natural sciences lead to an increase in the probability of obtaining initial employment than was the case for bachelor's degree holders in any field. In contrast, master's degrees in the humanities or social sciences had a negative impact on obtaining initial employment than was the case of

bachelor's degree holders in any field. As a result, we explicated some evidence regarding the negative impact of master's education on obtaining initial employment. As mentioned above, if education is in fact the best investment for an individual's economic success, then graduate degrees would be expected to provide individuals with higher-earning job opportunities; however, the transition from graduate education to the workplace in Japan does not match this economic premise. Japanese master's degree level education in the humanities or social sciences was, rather, a disadvantageous investment for Japanese students.

Although we succeeded in providing evidence regarding to null effect of master's education, our previous research could not overcome omitted variable bias because of data limitations. Omitted variable bias is a key problem for research on education. This can occur when important control variables are omitted from the estimation models. One of the most common omitted variables is innate ability[1]. If a researcher cannot observe individual specific effects, they are unable to adequately account for the following:

1. Because graduate students' personal abilities are already high regardless of any graduate education, they are better able to obtain higher earning potential in their initial employment.

[1] Consequently, the unobserved differences in innate abilities are contained in the error term. Then important independent variables (for example, year of schooling) are correlated with the error term in the estimation model, and this makes regression estimates biased and inconsistent.

2. Because graduate education is productive, graduate students are better able to obtain a higher level of initial employment.
3. Because graduate students have higher abilities, they are able to go to graduate school and can thus obtain more promising initial employment.

Therefore, this study uses new longitudinal data to overcome omitted variable bias and clearly demonstrate the robustness of our previous research. The rest of this paper is organized as follows: the next section reviews recent relevant empirical studies regarding the effects of graduate education on the Japanese labor market; the following section introduces our new data and variables; the fourth and fifth section introduces our empirical models and results; and the final section presents conclusions.

## 2. Review of Literature

The data used in our previous research was gathered in 2011. Therefore, I will confine this summary of previous literatures to a narrow time frame. In this section, I summarize relevant literature that deals with the effects of graduate education in Japan after 2011; however, there are few empirical studies regarding the effects of graduate education on the Japanese labor market besides Hirao et al. (2015).

Using micro data from The 2012 Employment Status Survey, Kakizawa et al. (2014) estimate the private internal rate of return for graduate education and assess

the postgraduate wage premium in Japan[2]. This study revealed that the internal rates of return for master's degrees are 11.4% for males and 10.1% for females, while those for PhDs are 5.9% for males and 5.7% for females. Similarly, Morikawa (2015) provides evidence on the relationship between graduate education and labor market outcomes. Morikawa (2015, p.499) notes that the postgraduate wage premium relative to undergraduates is approximately 30-40 percent, which is similar in magnitude for male and female workers. Those two studies use Heckman's two-step estimation method to deal with sample selection bias (Heckman, 1979). However, Kakizawa et al. (2014) and Morikawa (2015) could not take omitted variable bias into account because of data limitations.

Using the instrumental variables method to overcome this problem, Suga (2020) estimates the returns for graduate education in Japan. Suga (2020, p.571) notes that the postgraduate wage premium remains positive and significant, ranging from 16.5-23.7% for men and 13.5-26.4% for women.

Data used by these studies, however, do not contain information on the subject of graduate majors. These studies do not estimate postgraduate wage premiums according to major, nor do they assess the effects of graduate education on initial employment. There are few studies about the effects of postgraduate major on labor

[2] The Employment Status Survey conducted by Statistics Bureau of Japan is a national representative survey. This survey aims to obtain basic information on actual employment conditions in Japan and includes a very large sample set (about one million).

market outcomes in Japan[3]. This study analyzes the effects of graduate education with regard to major on initial employment after graduation in the Japanese labor market, with respect to new graduates.

## 3. Data

There are three data sets available for this study. I combined the three sets in order to estimate the effects of graduate education. The first and second data sets are the web monitoring surveys that were respectively conducted in April and May of 2021 by the Mynavi Corporation, which is a renowned Japanese college student recruitment agency. These are original surveys regarding postgraduate students' and undergraduate students' job search processes and results[4]. Subjects were Japanese university students (forth year students) and master's degree students (second year students). The number of returned surveys was 8408 in April and 7252 in May, for a total of 15060 submitted surveys.

These surveys were not planned to be coordinated in any longitudinal surveys; however, because these data included personal ID numbers as common information, it was possible to merge the data to be able to create longitudinal data. Bias caused

[3] Yasui (2019) estimate the postgraduate wage premium between eight different majors.
[4] Data used in our previous study were also gathered by the Mynavi Corporation in the same manner. The Mynavi Corporation mainly deals with job recruitment in the private sector. Therefore, our previous study and this study target students seeking employment in the private sector.

attrition will be managed in the appropriate way using inverse probability weighting (Wooldridge, 2002).

The third data set is the University Ranking published by Asahi Shimbun Publications, Inc. for commercial use[5]. Because this data includes university names as common information, it is possible to merge the data of this set with the first and second data sets (see Figure 2).

The dependent variable in the estimation model is the number of job offers a given student received (from 0 to 7) at the time the survey was conducted. Because the dependent variable is nonnegative count data (see Figure 3), this study requires a Poisson regression model. The independent variable is a dummy variable consisting of individuals' degrees and majors. There is currently a categorical variable which can take on four different values: 1) master's degree in the natural sciences; 2) master's degree in the humanities or social sciences; 3) bachelor's degree in the natural sciences; and 4) bachelor's degree in the humanities or social sciences. If the baseline value is a bachelor's degree in the humanities or social sciences (bachelor's degree in the HSS), then the three following dummy variables are constructed:

Master's degree in the NS=1 if individuals hold master's degrees in the natural sciences and 0 otherwise;

[5] Japanese universities are ranked based on a practice examination conducted by *Juku*. This test score is called *hensachi* (similar to standardized test scores in America, for example) and a score of 50 is the mean. Top universities have higher *hensachi* scores.

Master's degree in the HSS=1 if individuals hold master's degree in the humanities or social sciences and 0 otherwise;

Bachelor's degree in the NS=1 if individuals hold bachelor's degree in the natural sciences and 0 otherwise.

The control variables are time dummy (May=1), gender (female=1), the number of applications submitted during job search, resident area (prefecture) dummy and university rank. The descriptive statistics summarized in Table 1 show that the average number of job offers a given student received at the time the survey was conducted was smaller than 1. The number of applications submitted during job search was about 13 on average.

## 4. Estimation Methods

Although the empirical model of this study follows the strategy set forth in Hirao et al. (2015), this study requires new regression models because of the use of longitudinal data. First, I will outline a simple random-effects Poisson model in order to control individual specific effects:

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 Z_i + \upsilon_{it} \quad (1)$$

$$\upsilon_{it} = \gamma_i + \varepsilon_{it} \quad (2)$$

where $Y_{it}$ is the number of job offers of individual *i* at the time *t*, $\alpha$ is an intercept term, $X_{it}$ stands for the independent variables whose values can vary across time

(time-varying variables), e.g. the number of applications submitted, and $Z_i$ is the vector of other independent variables whose values do not change across time (time-invariant values), e.g. gender. Dummy variables consisting of individuals' degrees and majors are included in $Z_i$. Now, $\upsilon_{it}$ in equation (1) is replaced by equation (2) for $\upsilon_{it}$:

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 Z_i + \gamma_i + \varepsilon_{it} \quad (3)$$

$\gamma_i$ and $\varepsilon_{it}$ are both error terms. While $\gamma_i$ only varies across individuals and not across time, $\varepsilon_{it}$ is different for each individual at each point in time. If $\gamma_i$ is uncorrelated with the independent variables, then a random effects model can provide unbiased estimates of both $\beta_1$ and $\beta_2$.

Second, to calculate the effects of graduate education differently, I outline a simple multilevel mixed-effects Poisson regression in order to control the innate ability:

$$Y_{ij} = \beta_{0j} + \beta_3 X_{ij} + \varepsilon_{ij} \quad (4)$$

$$\beta_{0j} = M_{00} + \upsilon_{0j} \quad (5)$$

where $Y_{ij}$ is the number of job offers of individual $j$ at the time $i$, $X_{ij}$ is an important independent variable. If there are differences from individual to individual, the intercept $\beta_{0j}$ can be broken down into two parts: $M_{00}$ is an average value of the intercept (random), and $\upsilon_{0j}$ is a group dependent part of the intercept (fixed). Now, $\beta_{0j}$ in the level 1 model (equation [4]) is replaced by the level 2 model (equation [5]) for $\beta_{0j}$:

$$Y_{ij} = M_{00} + \upsilon_{0j} + \beta_3 X_{ij} + \varepsilon_{ij} \quad (6)$$

Because the intercept is different from individual to individual, this is called a random-intercept model. The slope of the regression line for each individual, however, is fixed at $\beta_3$.

For the baseline estimation, the pooled Poisson regression is estimated by focusing on a dummy variable consisting of individuals' degrees and majors. Taking omitted variable bias into account, equation (3) is also estimated using the random-effects Poisson model intended for all samples. Furthermore, equation (6) is also estimated using the multilevel mixed-effects Poisson regression with inverse probability weighting[6].

If attrition takes place systematically in the panel data, then it may create a sample selection bias. Generally speaking, if students obtain employment, they might not use the services of a recruitment agency. In other words, it is assumed that a sample of this study is dropped systematically from the longitudinal survey. If equation (6) is estimated with no weighting, the estimated coefficient $\beta_3$ will be underestimated because subjects who do not obtain employment remained over time.

I require an inverse probability weighting approach to correct this sample selection bias. The dependent variable of attrition selection equation is a dummy variable that a sample is dropped or not (do not drop=1). The independent variables are the number

[6] There are three types of subjects. The first are subjects who only completed the survey in April. The second are subjects who only completed the survey in May. The last are subjects who completed both surveys for both months. When equation (6) is estimated using inverse probability weighting, I drop the second subjects from the sample to correct bias caused attrition.

of job offers of an individual, attendance at national or private university (national university=1), gender (female=1), and major (natural science=1). First, I estimate the attrition selection equation and obtain a predicted probability. Second, I use $1/\hat{P}_{it}$ as the weight in the equation (6).

## 5. Empirical Results

All results are presented in Table 2. Estimated coefficients can be displayed as marginal effects (dy/dx). The result of pooled Poisson regression is provided in the first column. As explained above, random-effects models and multilevel mixed-effects models are more accurate to control for unobserved innate ability. For that reason, it is possible that this result may contain bias.

The second column shows the result of random-effects models. Master's degree holders in the natural sciences obtain 28.6% more job offers than bachelor's degree holders in the humanities or social sciences do, whereas master's degree holders in the humanities and social sciences obtain 71.5% fewer job offers than do bachelor's degree holders in the humanities or social sciences.

The third column shows the result of mixed-effects models, and the fourth column lists the result of mixed-effects models using inverse probability weighting. Looking at the difference in the marginal effect on independent variables between the third and fourth columns, I find that absolute value of column 3 is lower than absolute value of

column 4. In other words, the estimated coefficient $\beta_3$ by mixed-effects models using no inverse probability weighting is biased downward in this sample.

Mixed-effects regression using inverse probability weighting estimates suggest that although master's degree holders in the natural sciences obtain 37.4% more job offers than bachelor's degree holders in the humanities or social sciences do, master's degree holders in the humanities or social sciences obtain 81.4% fewer offers than do bachelor's degree holders in the humanities or social sciences.

Thus, master's degrees in the natural sciences lead to an increase in the probability of obtaining initial employment than was the case for bachelor's degrees in the humanities or social sciences. In contrast, master's degrees in the humanities or social sciences have a negative impact on obtaining initial employment than is the case of bachelor's degree holders in the humanities or social sciences. These results support the results of our previous research (Hirao et al., 2015).

## 6. Conclusion

This study attempts to analyze the effects of graduate education on initial employment after graduation in the Japanese labor market in order to replicates models developed by our previous research. The empirical results of this study confirm the earlier studies, showing that master's degrees in the humanities and social sciences do not provide graduate students with an advantage in obtaining initial

employment, after controlling for potential bias. At the same time, this research also confirms that majoring in natural sciences leads to an increase in the probability of obtaining initial employment, compared humanities or social science majors. In other words, this paper is able to replicate our previous research. Although the previous research could not overcome omitted variable bias, if the previous research has validity, this study also shows that the Japanese labor market structure for graduate students has, in essence, remained the same since our previous research was completed.

Why then do master's degrees in the humanities or social sciences not increase the probability of obtaining initial employment in the Japanese labor market? Although the number of enrollments in master's courses has increased since the 1990's, the number of enrollments in undergraduate courses has also expanded. In addition, there are relatively few master's degree holders in the private sector. Hamanaka (2015, p.69) notes that there are few interviewers who can evaluate the quality of graduate education in private Japanese companies. Human resource management in the Japanese private sector exacerbates the negative effects of educational mismatch (Yoshida, 2020, p.154).

Consequently, master's degrees are in less demand when a candidate seeks work as a professional in a Japanese enterprise; moreover, master's degree holders in the humanities or social sciences often do not seek initial employment in private sector

enterprises. Instead, they may probably hope to obtain initial employment as a government official, lawyer, accountant, entrepreneur, teacher, etc.

There is a limitation to both this study and our previous study, namely that the sample consists of students who are seeking employment in the private sector. Our findings, therefore, are generalizable only to these students and need to be carefully interpreted with this limitation in mind.

**References**

Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Columbia University Press.

Hamanaka, J. (2015). Barriers to Graduate School Reform in Japan. *Japanese Journal of Higher Education Research*, *18*, 69–87. [in Japanese]

Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, *47*(1), 153-161. https://doi.org/https://doi.org/10.2307/1912352

Hirao, T., Umezaki, O., & Tazawa, M. (2015). The Impact of Graduate Education on Initial Careers: Evidence from the Japanese Youth Labor Market. *Japan Journal of Human Resource Management*, *16*(1), 21-38. [in Japanese]

Kakizawa, H., Hirao, T., Matsushige, H., Yamazaki, I., & Inui, T. (2014). The Postgraduate Wage Premium: Estimating the Age-Wage Profiles Using 2007 Employment Status Survey. *ESRI Discussion Paper*, *310*, 1-32. [in Japanese]

Kariya, T. (2011). The Japanese Forms of Credential Inflation and Their Effects on University Education: How Has the Value of Degrees Changed in the Era of 'Universal Access' to University Education? *University of Tokyo, Institute of Social Science, Panel Survey Discussion Paper*, *48*, 1-18. [in Japanese]

Morikawa, M. (2015). Postgraduate Education and Labor Market Outcome: An Empirical Analysis Using Micro Data from Japan. *Industrial Relations*, *54*(3), 499-520. https://doi.org/https://doi.org/10.1111/irel.12100

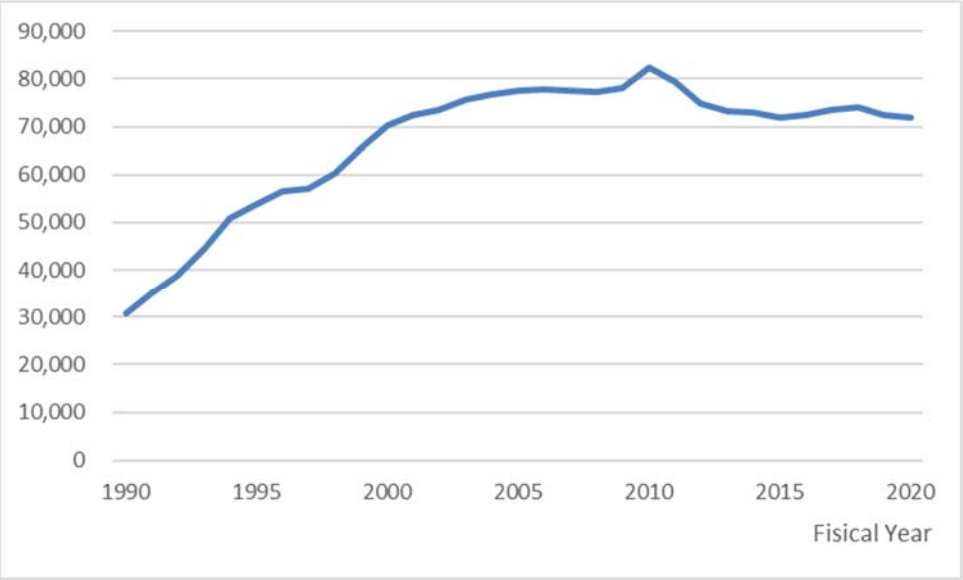
Suga, F. (2020). The Returns to Postgraduate Education in Japan. *Japanese Economic Review*, *71*, 571–596. https://doi.org/10.1111/jere.12227

Wooldridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data*. MIT Press.

Yasui, K. (2019). Wage Premiums by College and Postgraduate Major. *Economic Analysis*, *199*, 42–67. [in Japanese]

Yoshida, A. (Ed.) (2020). *The Trilemma over Graduate Schools in Humanities and Social Sciences: An International Study on the Relationships between Graduate Schools, Graduates, and the Labor Market*. Tamagawa University Press. [in Japanese]

**Figure 1: The number of enrollments in master's courses in Japan**




(Source) School Basic Survey, MEXT

**Figure 2: Data set**

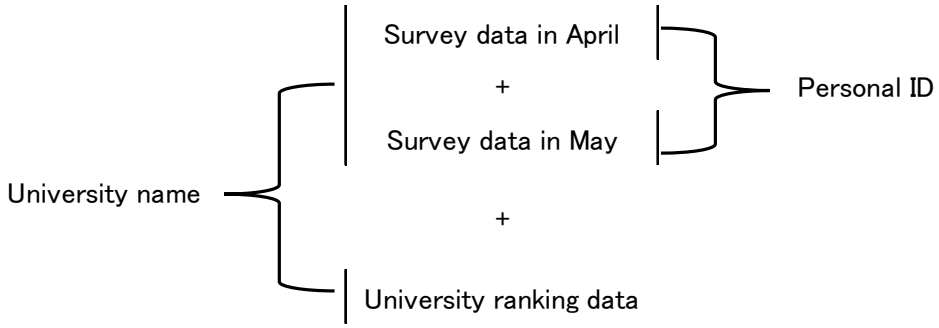
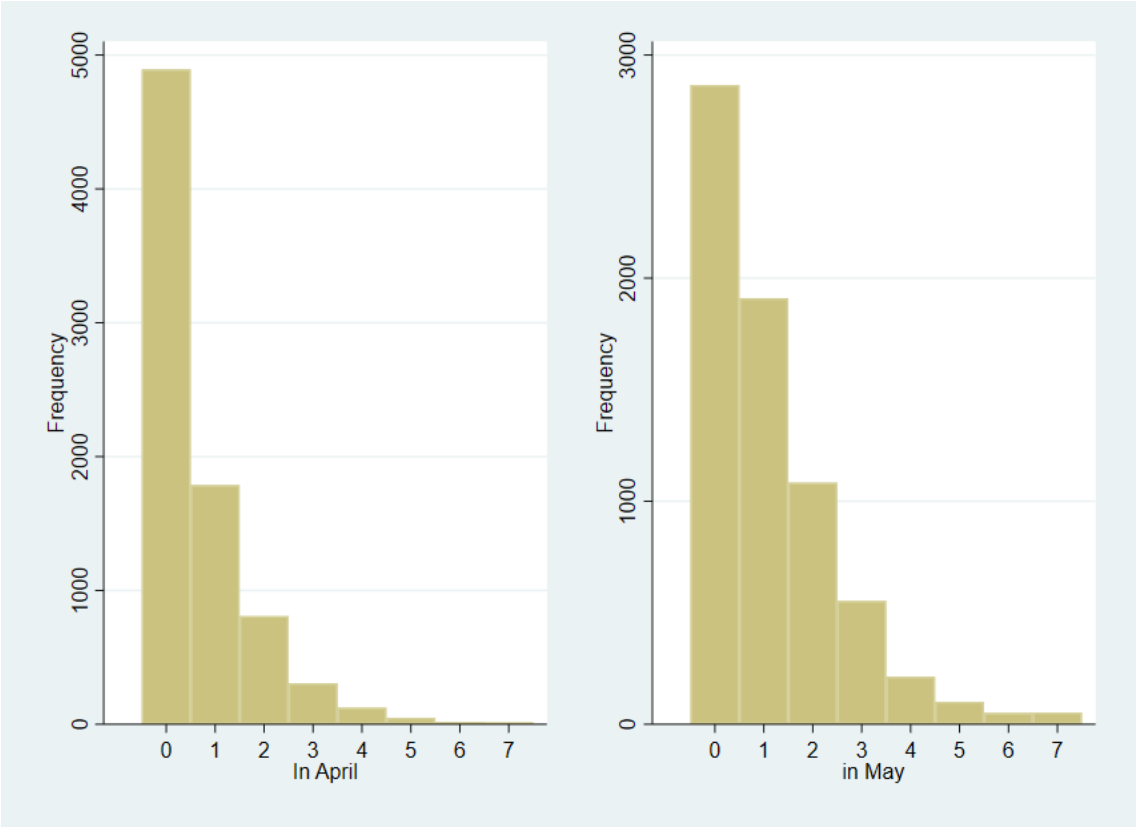


**Figure 3: The number of job offers**



## Table 1: Descriptive statistics

| | Whole sample N=14829 | | | | Drop subjects who only completed the survey in May N=10712 | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | STDV | Min | Max | Mean | STDV | Min | Max |
| The number of job offers | 0.879 | 1.230 | 0 | 7 | 0.831 | 1.186 | 0 | 7 |
| May (time dummy) | 0.461 | 0.498 | 0 | 1 | 0.314 | 0.464 | 0 | 1 |
| Bachelor's degree in the HSS | 0.647 | 0.478 | 0 | 1 | 0.642 | 0.479 | 0 | 1 |
| Bachelor's degree in the NS | 0.243 | 0.429 | 0 | 1 | 0.243 | 0.429 | 0 | 1 |
| Master's degree in the HSS | 0.011 | 0.106 | 0 | 1 | 0.011 | 0.104 | 0 | 1 |
| Master's degree in the NS | 0.099 | 0.298 | 0 | 1 | 0.103 | 0.305 | 0 | 1 |
| University rank | 49.485 | 7.462 | 35 | 68 | 49.458 | 7.474 | 35 | 68 |
| Female | 0.654 | 0.476 | 0 | 1 | 0.654 | 0.476 | 0 | 1 |
| The number of applications submitted | 13.098 | 10.852 | 0 | 41 | 12.913 | 10.762 | 0 | 41 |

Note:The description of the resident area (prefecture) variables are omitted.

## Table 2: Empirical results

| | Pooled | RE | ME | ME with IPW |
|---|---|---|---|---|
| | dy/dx | dy/dx | dy/dx | dy/dx |
| May (time dummy) | 0.378 *** | 0.486 *** | 0.373 *** | 0.398 *** |
| | (0.017) | (0.018) | (0.013) | (0.013) |
| Bachelor's degree in the HSS | ref. | ref. | ref. | ref. |
| Bachelor's degree in the NS | 0.217 *** | 0.295 *** | 0.254 *** | 0.307 *** |
| | (0.021) | (0.029) | (0.029) | (0.032) |
| Master's degree in the HSS | -0.609 *** | -0.715 *** | -0.773 *** | -0.814 *** |
| | (0.126) | (0.178) | (0.181) | (0.194) |
| Master's degree in the NS | 0.205 *** | 0.286 *** | 0.284 *** | 0.374 *** |
| | (0.026) | (0.039) | (0.039) | (0.042) |
| University rank | 0.018 *** | 0.024 *** | 0.019 *** | 0.022 *** |
| | (0.001) | (0.002) | (0.002) | (0.002) |
| Female | -0.129 *** | -0.156 *** | -0.130 *** | -0.130 *** |
| | (0.019) | (0.027) | (0.027) | (0.029) |
| The number of applications submitted | 0.016 *** | 0.023 *** | 0.018 *** | 0.020 *** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Resident area | YES | YES | NO | NO |
| LM test | 2499.1 *** | | — | |
| LR test | — | | 2033.0 *** | — |
| ICC | — | | 0.739 | 0.909 |
| Var (_cons) | — | | 0.778 *** | 1.373 *** |
| | | | (0.031) | (0.048) |
| Observations | 14829 | 14829 | 10712 | 10712 |
| Group | — | 11513 | 7396 | 7396 |
| Wald chi2 | 1992.4 *** | 3078.5 *** | 2011.0 *** | 2125.0 *** |
| Log likelihood | -19003.0 | -17753.4 | -12323.3 | -16040.7 |

Note: S.E. in parenthese. * p<0.05; ** p<0.01; *** p<0.00.

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本稿の元になった公開研究会を進めるにあたり，以下の資金提供を受けた。記して感謝したい。
JSPS 科研費
・JP19H00619（研究代表者：松繁寿和,「社会的能力の特定化とその育成適正期および教育効果の検証」
・JP19H00621（研究代表者：小林信一,「知のオープン化時代の大学・科学相関システムの再構築」）
・JP20H01643（研究代表者：村澤昌崇,「EBPM の批判的検討を通じた高等教育政策・研究の高度化と EIPM への展開可能性」）
・JP18K18651（研究代表者：村澤昌崇,「多様な使命と目的を同時最適化する卓越した大学モデルの探索」）
・JP20J14673（日本学術振興会特別研究員：中尾走,「高等教育政策を事例にした EBPM の批判的検討」

RIHE Advancement of Higher Education Research
Monograph Series No.5

2022（令和 4）年 4 月 1 日　発行

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