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Determinants of the decision of international students to remain to work in Japan after graduation

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Abstract

Using microdata from a survey conducted by the Japan Student Services Organization, I applied binary outcome models to investigate the determinants of international students' decisions to remain in Japan to work after graduating or finishing their studies. The empirical results showed that having a strong motivation to live in Japan before moving to Japan to study had a significant impact on the decision to remain and to work in Japan indefinitely. It was also observed that the longer a student stayed in Japan, the more likely he or she was to remain there to work permanently. Moreover, Moreover, a high GDP per capita gap between the home countries and Japan, and a high unemployment rate in the home countries were found to be were found to be significant push factors. The results of the present analyses suggest that to more efficiently attract international students to Japan, policy-makers should carefully consider international students' motivation to come to and stay in Japan and work to ensure that international students enjoy their lives in Japan while studying.

JEL Classification Codes: F22, F66, J24

Keywords: international student, student mobility, foreign labor, immigration

Research Highlights

- ✧ I investigated the determinants of international students' decisions regarding whether to remain in Japan to work after finishing their studies.
- ✧ I used microdata from a survey conducted by the Japan Student Services Organization and binary outcome models to investigate these determinants.
- ✧ The analysis results revealed that a strong motivation to live in Japan has a significant impact on international students' decisions to remain in Japan.

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- ✧ The analysis results also revealed that the longer the students stay in Japan, the more likely they are to remain permanently.
- ✧ Japanese policy-makers should consider international students' motivations to study in Japan and should promote their living conditions in Japan in order to attract these students more effectively.

1. Introduction

In recent years, the number of international students coming to Japan has been growing continuously. It increased by more than twofold—from 123,829 to 298,980 students—between 2008 and 2018 (Fig. 1). In the context of the aging society in Japan, these students are making an important contribution to the labor force through their part-time work.[1] Moreover, international students can be expected to become a source of high-skilled labor due to their understanding of the Japanese language and culture as well as the knowledge they have gained at Japanese universities. For these reasons, Japanese policy-makers are trying to attract more international students to come to study at Japanese universities and then remain in order to work in Japan after they complete their studies.[2] As a result of past efforts, the percentage of international students who consider remaining in Japan after graduation increased from 56% in 2005 to 64.6% in 2017 (Japan Student Services Organization [JASSO] 2018). In a similar vein, the number of students changing their visa status from a student visa to a work visa grew from 10,969 (>11,698 applicants) in 2012 to 25,942 (>30,924 applicants) in 2018 (Ministry of Justice 2019) (Fig. 2), with an approx. 88% acceptance rate for students who applied for this residence change.

[1] Japan allows international students to work 28 hours/week, and the number of international students doing such part-time work was 298,461 in October 2017, accounting for 20.4% of the total foreign labor in Japan (Ministry of Health, Labour and Welfare 2019).

[2] For example, the Japan Business Federation (Keidanren) in 2004 announced "Proposals on the issue of accepting foreigners" with the aim to promote employment of international students as excellent foreign human resources in Japan. In 2007, The "Career Development Program for Foreign Students in Japan" was provided by the Ministry of Economy, Trade and Industry to support international students in their job hunting in Japan. In 2008, the "300,000 International Students Plan" was implemented to attract more international students and to retain excellent students strategically. The "New Growth Strategy" by the Cabinet Office in 2010 identified the incorporation of foreign talent as a key policy goal. This subsequently led to various measures, such as a point-based system, to further facilitate the entry and the retention of skilled foreign workers (Ministry of Justice, 2012). With the "Japan Revitalization Strategy 2016", the government sought to improve the employment rate of international students in Japan from the current rate of about 30% to 50% by 2020. These policies have marked a major shift from a focus on the education of foreign students to a focus on retaining graduated foreign students as human resources in Japan instead of returning them to their home countries (Sato, 2018).

There is a positive correlation between the flow of international students entering Japan and the number of those students remaining to work as a whole, but there is a large gap between the percentage of international students who wish to remain and the percentage of such students who actually remain to work in Japan. The recent data show that only half of the students who wish to remain to work are successful in achieving this goal. For instance, the percentage of students wishing to remain was about 64% in 2015, but the percentage of students who succeeded in remaining was only 32%. In 2017, these numbers were 65% and 35.1% (JASSO 2006, 2019). These facts reveal that international students have been facing many obstacles in their job-hunting in Japan. Among these obstacles, the existence of a labor market for new graduates and the unique job-hunting requirements in Japan are proposed to be the key factors. Specifically, according to JASSO's Job Hunting Guide for International Students, Japanese companies will hire graduates up to one year before their actual graduation. This means that the students must prepare to hunt for a job in Japan at least one year before graduation. This process seems to be unfamiliar to international students, and they do not invest a significant amount of time to prepare for it. In addition, Japanese companies use potentiality-based recruitment, a process by which the potential capabilities and future prospects of students—rather than their current level of knowledge and skills—are evaluated at the point of recruitment. In another words, Japanese companies prefer to recruit students to train and then place them in a suitable position after a certain amount of time. In this style of employment, people are evaluated by their ability to perform all duties as generalists rather than being recruited directly for a specific position (JASSO, 2021). This style of recruitment is quite different from that in Western and many Asian countries, where the companies define their job descriptions clearly and evaluate candidates according to their skill levels as specialists (Moriya, 2011). Moreover, the hiring system in Japan is characterized by a lifetime employment system (a person is employed by the same company from graduation until retirement), as well as a seniority-based system (employees are assigned positions and pay increases in accordance with the number of years they have worked for the company and their age). In contrast, international students seem to be more familiar with the performance-based systems in their home countries, and this is considered to be the key factor leading them to quit their jobs within three years to five years after being employed (Moriya 2016, Disco 2017).

In order to sustainably retain a highly skilled labor force in Japan, it is important to increase the percentage of international students remaining in Japan to work, and to help them establish a

stable life in Japan. Therefore, determining what kinds of students are in need of help, and what kinds of support are required, is becoming a major concern. With these goals in mind, I first investigated factors that contribute to or determine international students' decisions to stay in Japan to work after they finish their studies. I then investigated factors that may determine whether international students decide to stay in Japan permanently. Knowledge of the determinants of these decisions will shed some light on policies that could be implemented to attract more foreign students who are eager to remain as permanent highly skilled workers.

This paper is related to earlier studies that were devoted to international students' migration in Japan. First, unlike in Liu's 2016 research, which focused on students' intention to remain based on a survey of international students in Japan's Kansai region, our analysis divides the students into two groups depending on their purpose for remaining (to work or to continue their studies). Second, in comparison with Shiho's 2009 and 2013 research focusing on international students (especially Chinese students) in Japan's Kyushu region, I conducted a more detailed analysis based on a larger-scale survey. Using the results of a JASSO survey entitled the "Lifestyle Survey of Privately Financed International Students in Japan," I sought to identify the most important factors affecting international students' intentions and plans after their graduation. This was done in two steps. I first established an empirical model capturing the main driving forces for students who were keen to remain in Japan to work. Then, focusing on the students who wanted to remain to work, I examined the factors that impacted their decision regarding whether to work in Japan permanently.

The empirical results reveal that having a strong motivation to live in Japan before moving to Japan to study had a significant impact on the decision to remain and to work in Japan indefinitely. It was also observed that the longer a student stayed in Japan, the more likely he or she was to remain there to work permanently. Moreover, a high GDP per capita gap between the home countries and Japan, and a high unemployment rate in the home countries were found to be significant push factors. Based on the empirical results, I suggest that Japanese policy-makers should make efforts to attract international students who genuinely like the Japanese lifestyle and want to live in Japan rather than trying to increase the number of international students in general. The findings also indicate that Japanese policy-makers should implement policies aimed at helping international students enjoy their lives and their studies in Japan in order to encourage the students to stay after they have finished their studies.

The remainder of this paper is organized as follows. A brief literature review and previous research are presented in Section 2. The empirical model and data description are provided in Section 3. The empirical results are presented in Section 4, and the assessments of the significant determinants are offered in Section 5 along with some policy implications.

2. Theoretical background and previous research on international students in Japan

To investigate the impact of potential determinants on the international students' decisions to remain in Japan to work for a certain period and their decisions to remain permanently, I reviewed some economic theories that have been proposed to explain the mobility and immigration choices of international students after graduation. The human capital theory (Becker 1994) posits that education is considered an investment in future earnings. From this point of view, it is thought that the quality of education may affect students' expected returns when they compare the present value of future earnings obtained from studying in their home countries to the present value of future earnings obtained from studying abroad. If the present value of the future income is greater than the cost of education, students will move to the country yielding the highest net present value. In many theoretical researches on migration, the wage differential, incomes, and returns in the home countries and countries of destination were proved to be the key factors. In addition, other immigration costs such as the distance, policy restrictions (Shields and Shields 1989), earnings variance (Borjas 1989), and distributions of skill levels (Clark, Hatton, and Williamson 2007) have been raised[3].

It is also worth noting the research by Schoorl et al. (2000), which describes factors related to the so-called push-pull model. The "push" factor refers to a number of negative factors in the country of origin that cause people to move away, and the "pull" factor refers to a number of positive factors that attract migrants to the host country. By reviewing major economic theories, Schoorl et al. summarized the main explanatory variables through a neoclassical economic model based on both macro and micro aspects. In particular, neoclassical macro-economic theory emphasizes that the wage differential between two countries is the main explanatory variable that

[3] For a further review of the literature, the research of O¨.B. Bodvarsson and H. Van den Berg (2013) is recommended.

induces workers from low-wage countries to migrate to countries with high wages. In contrast, neoclassical micro-economic models assume that individuals make rational cost-benefit calculations. The benefits of expected higher wages are weighed against the travel costs, the costs of looking for a job, and the costs of adapting to the host country (including the psychological costs of leaving friends and family). Rosenzweig (2006) later presented two models explaining how migration takes place: the school-constrained model and the migration model. The school-constrained model attributes migration to a lack of educational facilities in the home country. The migration model examines migration based on an expectation of a higher income in the host country, as the gap in wages between, for example, the U.S. and developing countries motivates people to study abroad in another country.

Regarding prior analyses of the mobility and migration decisions of international students, there is some research on European countries, Australia and the U.S. For example, Hazen and Alberts (2006) reported that only 7.5% of international students arrive in the U.S. with the intention of migrating there permanently. Economic and professional factors act as strong incentives to stay, whereas personal and societal factors (e.g., alienation from U.S. culture, racism in the U.S.) tend to draw students back to their home countries. However, Han (2015) showed that the average rate of Science, Technology, Engineering and Mathematics (STEM) students intending to stay in the U.S. after graduation was approx. 48%, while only 12% of STEM students wanted to leave. The high rate of staying in the U.S was largely attributable to more favorable employment opportunities and further study plans in the U.S. In the case of Australia, the economic and social forces in the students' home countries served to push the students abroad, but a student's prior knowledge and awareness of a host country or institution as well as the family's recommendations were also important (Mazzarol and Soutar 2002). Also relevant in this regard is the paper of Gregory (2015) describing the two-step immigration process in Australia, in which immigrants come first on a temporary basis to work or study, and then move to permanent resident status. Gregory (2015) found that the Non-English-Speaking (NES) group is increasingly entering on student visas, accepting part-time employment while studying, and increasing the time gap between arrival in Australia and full-time employment. In the EU, career-related factors comprised the main motivation in international students' decisions to remain, and factors related to personal relationships or lifestyle were of relatively less importance (Sykes 2011).

Although there is little empirical research on international students' intentions to stay in Japan, the papers by Shiho (2009, 2013) and Liu (2016) are prominent. Using a survey of international students in Japan's Kyushu region, Shiho (2009) evaluated the impacts of international students' characteristics on their desire to stay in Japan after they finished their studies. An empirical model was built based on the survey results, and the empirical results revealed that the factors that had a significant positive impact on staying were being male, the duration of study in Japan, and Japanese language proficiency. Using the same approach and dataset, Shiho (2013) investigated the effect of the economic circumstances in the home regions of Chinese students and the students' intentions to work in Japan. The results demonstrated that the students from provinces with higher growth, higher incomes, and more inbound foreign capital were less likely to intend to stay in Japan after graduating.

Liu (2016) conducted empirical research based on a survey conducted by the Asia Pacific Institute of Research (APIR) in 2012 regarding the work plans of international students in the Kansai region of Japan (APIR, 2012). The survey asked whether or not individual students intended to remain in Japan after graduation, and the results led Liu to conclude that international students who want to remain in Japan are more likely to stay in Japan indefinitely. In addition, the determinants of the students' decisions were not economic factors; rather, they were cultural and language factors.

There are two major limitations of the above-cited studies. First, these studies did not provide a complete picture of all foreign students in Japan due to the lack of significant data. The studies of Shiho only covered the Kyushu region and Chinese students, while the paper of Liu was restricted to the Kansai area. Second, these studies did not fully investigate the purpose of remaining after graduation, although there appear to be many factors that can motivate students to stay in a host country. That is, students may remain in the host country in order to study further, or to work, or to stay in the country indefinitely. I attempted to overcome the first limitation by using a larger survey. To address the second limitation, I used a more detailed analysis that could clarify students' purposes for remaining in Japan.

In this paper, I describe the methods that I used to establish the post-graduate intentions of international students in Japan using the JASSO dataset from the survey "Lifestyle Survey of Privately Financed International Students in Japan." First, based on the direct information gleaned

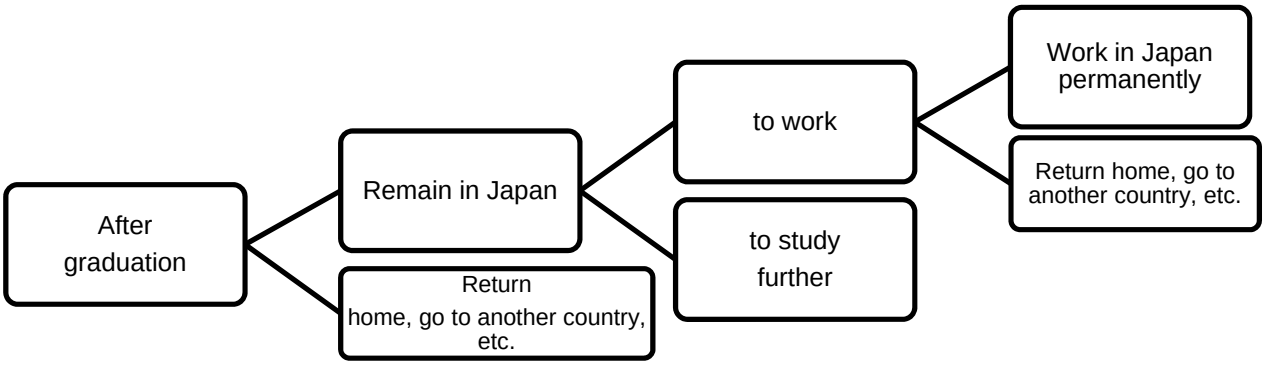
from the survey, I divided the students into two groups: a Remain-in-Japan Group and a Return-Home Group. I then further divided the Remain-in-Japan group into two groups according to their reasons for wanting to remain in Japan: those who wished to remain in Japan to work and those who wished to remain in Japan to study further. Then, to clarify whether the students' stays were intended to be temporary or permanent, with a permanent stay defined as completing the two-step immigration process[4]), I focused on the students who wanted to stay in Japan to determine how long they intended to work in Japan. The findings of this research will contribute to the emerging literature on the mobility of foreign students as well as to the literature on immigration in Japan.

[4] The two-step immigration process refers to the cases in which immigrants come first as a temporary immigrant to work or study, and then move to permanent resident status (Gregory 2015). In Japan, the term "educationally channeled migration" is used (Liu-Farrer 2009).

3. Analytical Framework and Data

3.1 Framework of the analysis

The flowchart below depicts the process used to analyze international students' post-graduation plans in the present study:



Source: Author.

As shown in the chart, there are two stages that a student can go through after completing studies when he or she decides to stay: (1) remaining in Japan to work or study after the completion of studies, and (2) after spending some time working, remaining permanently in Japan to work or returning home.

For the analysis of the details of this process, this study proposes two empirical models. The first model investigates the determinants of whether or not international students plan to remain in Japan to work after graduation. The second model investigates the determinants of whether or not students want to work in Japan permanently. The dependent variable of each model is binary, taking the value of 1 if the student does want to remain to work, 0 if the student does not want to remain to work. Second, the probit model with a selected sample is used to assess the influence of a student's personal characteristics, his or her motivation to study in Japan, and some "push-pull" factors regarding the probability of planning to work in Japan permanently.

I divide the explanatory variables into three groups: variables expressing students' characteristics, variables associated with the students' motivations, and variables associated with

the "push-pull" factors. The explanatory variables are described in detail in the next section, which presents the empirical models used in this investigation.

3.2 Empirical models

Analysis 1: Estimation of the probability of working in Japan after graduation

$$\begin{aligned}\text{Prob}(WORK_i = 1) &= \Lambda(\beta_0 + \beta_1' studentcharacteristics_i + \beta_2' motivation_i \\ &+ \beta_3' pushpullfactors_i)\end{aligned}$$

Analysis 2: Estimation of the probability of working in Japan permanently

$$\begin{aligned}\text{Prob}(PERMANNT_i = 1) &= \alpha_0 + \alpha_1' studentcharacteristics_i \\ &+ \alpha_2' motivation_i + \alpha_3' pushpullfactors_i + u_i\end{aligned}$$

I use Analysis 2 under the assumption that $WORK_i > 0$.

In the above formulas, "i" represents the student concerned, and "Λ(·)" represents the cumulative distribution function of this logistic distribution. Dependent variables represent whether or not students desire to remain to work (using a dummy variable), and whether or not they desire to remain to work in Japan permanently after employment (also using a dummy variable). Explanatory variables and parameters in these formulas are expressed as vectors.

To investigate whether or not international students desire to remain to work, I use three explanatory groups of variables. The first group contains the student characteristics: gender (male or female); time living in Japan (i.e., the length of time the student has lived in Japan); course of study (e.g., graduate courses, including doctoral and master's courses, undergraduate degree courses and junior college students etc.); Japanese language proficiency (certifications of Japanese language); study major (e.g., human sciences, social sciences, natural sciences, etc.); and living area (Kanto region, Kansai region[5]).

The second explanatory group contains variables associated with the students' purposes and motivations to study in Japan, to test the hypothesis that if they have a strong desire to work in Japan or if they are interested in Japanese society and want to live in Japan, they are more likely

[5] The Kanto region includes the Greater Tokyo Area and encompasses seven prefectures: Gunma, Tochigi, Ibaraki, Saitama, Tokyo, Chiba and Kanagawa. The Kansai region includes the prefectures of Nara, Wakayama, Kyoto, Osaka, Hyōgo and Shiga.

to remain in Japan to work. This group contains two variables. The first variable, designated "to work in Japan", represents the purpose of studying: whether or not the student wants to work in Japan or to find a job in a Japanese company. The second variable, "interested in Japanese society and want to live in Japan" represents whether the student is interested in Japanese society and wants to live in Japan when deciding to study in Japan.

The third explanatory group consists of several variables associated with the pull-push factors. The first variable in this group, "geographically close to Japan", is the student's perception of the geographic distance between his/her home country and Japan, and is a proxy for travel costs. The remaining variables are the gap between the GDP per capita in the student's home country and that of Japan ("GDP per capita gap", a proxy for the wage differential), and the "unemployment rate" (defined as the four-year average unemployment rate in the student's home country before he or she moved to Japan).

3.3 Data description

For the prior investigations of the post-graduation intentions of international students, several surveys were compiled and analyzed as mentioned above in Section 2. Luckily, I was able to obtain the data from JASSO, an independent administrative agency supervised by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The purpose of JASSO is to support the promotion of international mutual understanding by providing scholarships and offering employment information (JASSO, 2020). To my knowledge, the dataset from the JASSO "Lifestyle Survey of Privately Financed International Students in Japan" is the only dataset that was collected from international students all over Japan through their institutions. It is a bi-annual survey with 44 questions, and the students are asked to answer each question and then submit the survey to their school. The dataset I used herein is the Fiscal Year 2015 version which was conducted in January 2016. According to JASSO, in 2015, the number of international students in Japan was 208,379. Among them, the number of privately funded graduate students was 195,419 students, accounting for 93.8% of the total (JASSOa, 2016). In this survey, a questionnaire was sent to the institutions, and was then randomly passed to 7,000 privately funded international students, covering 3.6% of the population in general. There were 6,036 valid responses, making the response rate 86.2% (JASSOb, 2016). Table 1 displays information about the number of international students, the population structure of international students, and the structure of the

students in the survey to examine the representativeness of the sample. Although there were slight differences between them, the sample demographics as categorized by citizenship, degree-seeking program, and gender were all within six percentage points of the national population, indicating that, overall, the sample population was representative of the national population. For analysis, I used some information related to the students' characteristics, their post-graduation plans, and their purposes and motivations for studying in Japan. In addition, to test some factors related to the macro-economic environment in their home countries, I took advantage of World Development Indicators to obtain data regarding GDP per capita and unemployment rates in the students' home countries.

Table 2 summarizes the descriptive statistics for all of the variables included in the international students' survey and the macro-economic factors. Regarding the variables expressing student attributes, in the sample size of 6,036 students, 49.9% of the students were male, and the average time they had spent in Japan was 3.2 years. A total of 20.1% of the students in the survey were in graduate courses, 30.8% were in undergraduate courses, 18.1% were in junior college, training college, and 31% of the students were in university preparatory courses or Japanese language institutions. The average level of their Japanese language proficiency was 3.3 over 5. In regard to their study major, 44% of students in the survey were in human sciences programs, and 31% were in engineering. More than half of the students were living in the Kanto region, while 14% were living in the Kansai region.

Regarding the students' motivations, I considered two variables: the purpose of studying and the motivation for studying. According to JASSO's report of the survey, when asked about the purpose of studying in Japan, 44.3% of students (2,676 students) said that they wanted to work in Japan or find a job in a Japanese company. When asked why they decided to study in Japan, 59.5% (3,591 students) responded that they were interested in Japanese society and wanted to live in Japan (JASSOb, 2016). Because this was a multiple-choice questionnaire, students could choose one of four responses in order from least to most appropriate: Not Interested (scored as 0 for purposes of this research), Slightly Interested (scored as 1), Somewhat Interested (scored as 2), and Very Interested (scored as 3). The mean of the responses to the statement "wanted to work in Japan or find a job in a Japanese company" was 0.87, and the mean of the responses to the statement "interested in Japanese society and wanted to live in Japan" was 1.59.

In the group of variables related to pull-push factors, the first variable was designated "Geographically close to Japan" and was related to the questionnaire item "Why did you decide to study in Japan?" If students selected "Geographically close to Japan" as the most appropriate response, a value of 3 was assigned to this variable; if they selected it as the second most appropriate response, a value of 2 was assigned, and so on. The remaining variables were the gap between the GDP per capita in the student's home country and that of Japan (the "GDP per capita gap", a proxy for the wage differential), and the "unemployment rate", which was the four-year average unemployment rate in the student's home country before he or she moved to Japan. The World Development Indicators was selected as the source of data regarding GDP per capita (current USD in 2015) and unemployment rates in the students' home countries. After determining the GDP per capita in the student's home country, I subtracted it from Japan's GDP per capita ($34,513) to get the GDP per capita gap. With the exception of a small percentage of students from countries that had higher GDP per capita than Japan, such as the United States ($56,175), Germany ($41,197) and Singapore ($53,625), most of the students in the survey were from countries with lower GDPs per capita than Japan, such as China ($8,167), Korea ($27,195), Taiwan ($22,358), Vietnam ($2,086), and Nepal ($747). Finally, the "unemployment rate" was defined as the four-year average unemployment rate (2011–2014) in the student's home country calculated from the World Development Indicators. The unemployment rate in Taiwan was obtained from Taiwan national statistics based on the annual Manpower survey results.[6] The average unemployment rates of the main countries in the survey were 4.49% for China, 1.90% for Vietnam, 2.93% for Nepal, 3.32% for Korea, and 4.19% for Taiwan, whereas the average unemployment rate in Japan was 4.13%.

Regarding the dependent variables, there were two dependent variables for the two analyses as described above in section 3.2. The first dependent variable, "Plan to remain to work," is binary, taking the value of 1 if the student does want to remain to work, 0 if the student does not want to remain to work. From the survey, approx. 38% of the students (2,285 students) responded that their first choice was to remain to work in Japan after finishing their current school program; 46.5% planned to study further in Japan, 8.8% planned to return to their home countries, and 6.7% had other plans. Therefore, the 38% of students who responded that their first choice

[6] The unemployment rate in Taiwan was obtained from https://eng.stat.gov.tw.

was to remain to work take the value 1, and the rest take the value 0. The second dependent variable was "want to work in Japan permanently," and it takes the value of 1 if the student stated that he/she wants to work in Japan permanently after employment, and 0 if the student does not want to work in Japan permanently. Among the students who planned to remain in Japan to work, 33.8% wanted to work in Japan permanently after employment, 33.6% wanted to go back home, 9.5% wanted to go to another country, and 20% had not decided yet. Therefore, the 33.8% of students who wanted to work in Japan permanently after employment take the value 1, and the rest take the value 0.

A correlation test was performed to determine the strength of the association between each pair of variables, and the results showed that there was no significant relationship between any pair of variables [7].

4. Empirical results

The estimation results are summarized in Table 3. For analysis 1 estimating what determines students' plan to work in Japan, the results of the binary logistic regression are presented in (1). For analysis 2 estimating what determines students' plan to work in Japan permanently after employment, with the selected sample (i.e., $WORK_i > 0$), the results of the 1st stage estimate of what determines students' plan to work in Japan are presented in (2). The results of the 2nd stage estimating what determines students' plan to work in Japan permanently after employment are presented in (4). The results of the binary logistic regression with the condition that students plan to work in Japan (i.e., $WORK_i = 1$) are presented in (3) to ensure the significance of the explanatory variables. The empirical results of our analyses revealed the following.

Impact of variables related to the student characteristics

The empirical results of our analyses revealed that the length of time the student had been living in Japan had a significant effect on the student's desire to remain. Unexpectedly, although our analyses also indicated that Japanese language proficiency was a statistically significant factor

[7] The correlation matrix table is available upon request.

in the students' desire to remain in Japan for work, such proficiency also reduced the possibility that the student would desire to work permanently in Japan. This may reflect the existence of opportunities for students to use their Japanese language skills while working in their home country, where Japanese companies have been establishing branches or subsidiaries. The Japanese language proficiency gained by working in Japan for a certain time may help students find a job more easily in their home country. Regarding the student majors, I found that students who were pursuing degrees in the natural sciences, agriculture, or medicine/dentistry were less likely to remain in Japan. Students living in the Kanto area were more likely to remain than those living in other regions.

Impact of variables related to the purpose of study and motivation of students

The results showed that the purpose of studying had a significant positive impact on the intentions of students after graduation. To be more specific, students for whom the purpose of studying in Japan was to work in Japan were more likely to remain in Japan to work compared with students who were studying in Japan for other reasons. Moreover, the former students were more likely to work permanently in Japan after finishing their post-graduation employment. In regard to students' motivations for studying, the results showed that if the reason students gave for deciding to study in Japan was that they were interested in Japanese society and wished to live in Japan, then they were more likely to remain to work after graduation, and more likely to intend to work permanently in Japan. In other words, the students' motivations to study in Japan were the most important determinants, and positively affected their decisions.

Impact of variables related to "push-pull" factors

As explained in Section 2, the "push" factor refers to a number of negative factors in the country of origin that cause people to move away, and the "pull" factor refers to a number of positive factors that attract migrants to the host country. The GDP per capita gap did have a slight but significant impact. This means that a higher income in Japan in comparison with the income in their home countries could be a pull factor that encouraged students to work in Japan after their graduation. However, this factor was not strong enough to make students decide to work in Japan permanently. In addition, the unemployment rate in the home country, a proxy push factor, had a positive impact on the decision to remain in Japan to work. This means that if the unemployment rate in the home country was high, students may have chosen to work permanently in the host

country in order to have a better working opportunity rather than returning home. However, the geographic distance between the home country and Japan was found not to have a significant impact on the students' decisions.

The findings of the research showed that wage differential was an important factor that pushed students to remain, as posited in Becker (1994) and Schoorl et al. (2000). In particular, the GDP per capita gap (a proxy for the wage differential) was shown to have a significant impact on the decision of the international students regarding whether to remain in Japan. This result may be explained as follows: although the GDP per capita is not a good indicator of the wage differential between two countries, it can represent the level of a country's development, which could be a push factor encouraging students to remain. However, the geographic distance between the students' home countries and Japan was found to have no significant impact; the fact that our sample included a large percentage of students from Asian countries might be the reason for this result.

In comparison with previous researches, I obtained essentially the same results as Shiho (2009) in terms of the variables that increased the probability of staying in Japan to work—namely, the length of time the students had lived in Japan, the students' biological sex, and the Japanese language proficiency. Much like Liu (2016), I observed that a strong interest in Japanese culture motivated many students to remain.

5. Conclusions and some policy implications

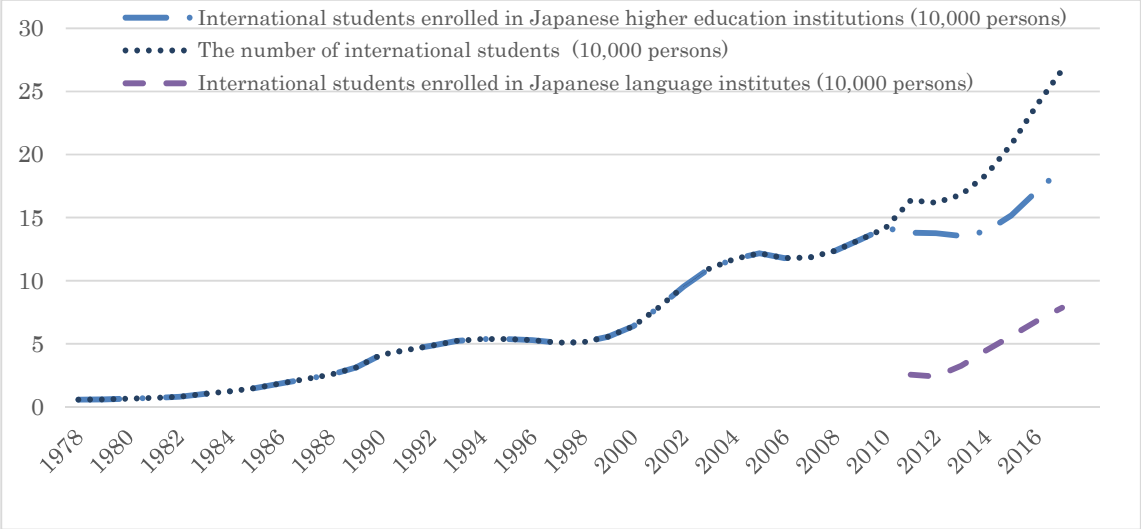
The resolution of labor shortages is an important policy issue in Japan, and recent policies addressing this matter have focused on high-skilled labor. In this context, the question of how best to encourage international students to remain in Japan to work after they complete their studies is becoming increasingly important. In this paper, I investigated the determinants of over 6,000 international students' decisions and plans after they finished their studies in Japan. I found that the main determinants of the students' decisions to work permanently in Japan were the length of time spent living in Japan and the initial motivation of the students before moving to Japan. Moreover, the GDP gap between Japan and the home country and the high unemployment rate in the home country were also found to be significant determinants.

The analysis highlighted that an attraction to Japanese culture and a desire to work in Japan have a significant impact on foreign students' decisions to remain in Japan to work. Japanese policy-makers should therefore focus on attracting such students in order to fulfill the students' wishes while also meeting Japan's labor demand. The policy-makers can rely on the student-recruiting companies in the students' home countries using methods including thorough interviews and the assignment of essays about the student applicant's motivations for studying in Japan. To support the students who have a strong motivation and a good academic background, Japanese firms should provide scholarships under the condition that the recipient is eligible to work for the company after graduation. To reduce the number of students whose motivation to come to Japan is less than ideal (e.g., to simply earn money from a part-time job), policy-makers should impose some limitations on part-time jobs, with a special focus on encouraging students to enroll in a Japanese language school after they come to Japan. For example, it might be reasonable to allow students to work 10 hours/week if they are able understand only some basic Japanese (the N5 Japanese language proficiency level), to work 20 hours/week if they are able to understand Japanese used in everyday situations (the N3-level), and to work 28 hours/week if they are able to understand Japanese used in everyday situations and in a variety of circumstances (the N2-level).[8] Last and certainly not least, the time spent living in Japan appears to have a significant impact on encouraging international students to stay in Japan permanently to work. Japan's policy-makers should thus contribute to efforts to make life enjoyable for international students. In other words, helping students enjoy their time studying and living in Japan is a good strategy to further increase the country's supply of educated employees.

Due to limitations of the dataset, I was able to investigate the determinants of students' decisions only before their graduation. However, their decisions may change after their graduation and after working in Japan for a certain time. Therefore, the results do not fully capture the reality of the modelled environment. Future research should overcome this issue by using data from the employees of foreigners in Japan.

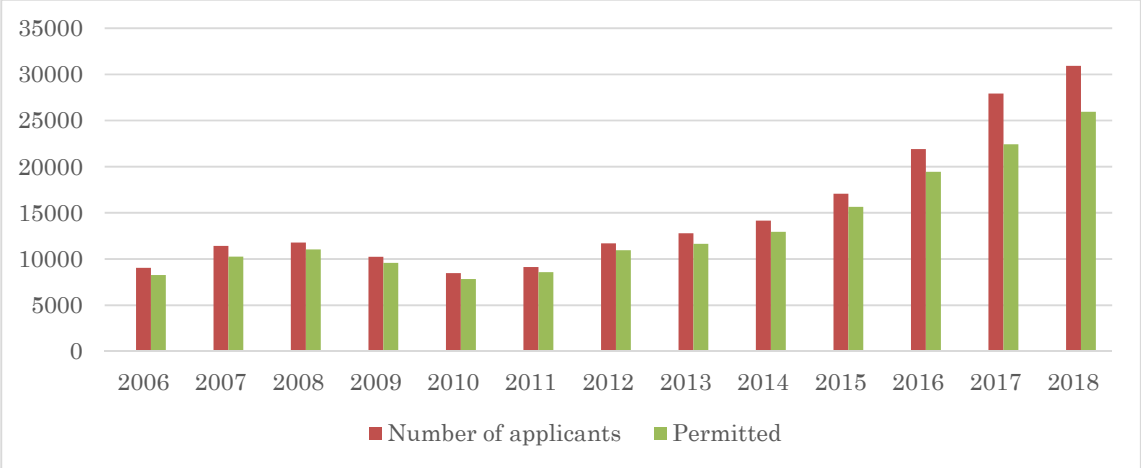
[8] Information about the Japanese language proficiency test: https://www.jlpt.jp/about/levelsummary.html

Fig. 1. Trends in the number of international students in Japan as of May 1, 2019.



Note: Since 2011, the number of international students has included those enrolled in Japanese language institutes in accord with the unification of student visas.
Source: JASSO

Fig. 2. Trends in the number of international students changing their residence status from a student visa to a work visa in Japan.



Source: Ministry of Justice.

Table 1. Total population versus the sample demographics

	In total population	Survey sample size
Total international students	208,379 (privately funded students: 152,062)	6,036
From China	94,111 45.2%	2,985 49.5%
From Vietnam	38,882 18.7%	781 12.9%
From Nepal	16,250 7.8%	439 7.3%
From Korea	15,279 7.3%	533 8.8%
From Taiwan	7,314 3.5%	217 3.6%
From Asian countries	193,172 92.7%	5,738 95.1%
Male	116,360 55.8%	3,012 49.9%
Seeking a Degree from a Japanese School	56,317 27%	1,533 25.4%
University preparatory course	2,607 1.3%	70 1.2%
Professional training college	38,654 18.5%	1,038 17.2%
Junior college	1,414 0.7%	54 0.9%
Undergraduate course	67,472 32.4%	1,806 29.9%
Graduate course	41,396 19.9%	1,113 18.4%

Source: Calculation based on the "Result of an Annual survey of International Students in Japan 2015" (JASSO 2016) and on the "Lifestyle Survey of Privately Financed International Students in Japan 2015" survey.

Table 2. Descriptive statistics

	Variable name	Question description	Sample size	Mean	S.D.	Min	Max
	Dependent Variables						
Analyse 1	Plan to remain to work after finishing the current school	Q42. What will you do after finishing your current school in Japan? A: Employment in Japan	6,036	0.380	0.485	0	1
Analyse 2	Want to work in Japan permanently after employment in Japan	Q44(2) What is your plan after employment in Japan? A: Want to work in Japan permanently	6,036	0.202	0.401	0	1
	Independent Variable						
Student's attribute	Gender, Male	Q1. Please select your gender.	6,036	0.499	0.500	0	1
	The time living in Japan (number of years)	Q8. How many years have passed after arriving at Japan?	6,021	3.185	1.717	1	7
	Studying course	Q12. Please select your course.					
	Graduate course (Doctoral course, Master course, professional graduate school, research student at graduate level)		6,036	0.201	0.401	0	1
	Undergraduate degree course (including research student at undergraduate level)		6,036	0.308	0.462	0	1
	College student (Junior college, professioanl training college)		6,036	0.181	0.385	0	1
	Under colledge student (University preparatory course, Japanese language		6,036	0.310	0.462	0	1
	Japanese language proficiency (lowes to highest)	Q14. Please select your qualifications for Japanese language.	6,036	3.275	1.916	0	5
	Studying major	Q16. Please select your major.					
	Human science		6,036	0.079	0.269	0	1
	Social science		6,036	0.251	0.434	0	1
	Natural science		6,036	0.029	0.168	0	1
	Engineering		6,036	0.111	0.314	0	1
	Agriculture		6,036	0.017	0.131	0	1
	Medicine/ dentistry		6,036	0.013	0.115	0	1
	Living area	Q32. Where do you live in?					
	Kanto area		6,036	0.540	0.498	0	1
	Kansai area		6,036	0.138	0.345	0	1
Studying in Japan's motivation	To work in Japan	Q3. What is the purpose of your study? (You can give the multiple answers to three. Please fill in three answers in order from most appropriate.) To work in Japan or to find a Job in a Japanese company	6,036	0.871	1.091	0	3
	Interested in Japanese society and want to live in Japan	Q4. Why did you decide to study in Japan? (You can give the multiple answers to three. Please fill in three answers in order from most appropriate.) Interested in Japanese society and wanted to live in Japan	6,036	1.594	1.408	0	3
Push-Pull factors	Geographically close to Japan	Q4. Why did you decide to study in Japan? (You can give the multiple answers to three. Please fill in three answers in order from most appropriate.) Geographically close to Japan	6,036	0.397	0.870	0	3
	Gap in GDP per capita between Japan and home country (2015 data)	Author calculated from World Development Indicators. (Home country's GDP per capita − Japan's GDP per capita)	6,036	−25129	9050	−34513	21662
	Unemployment rate in the home country (average unemployment rate 2011-2014)	Author calculated from World Development Indicators.	6,036	3.893	1.290	0	12.68

Table 3. Empirical results

		Analyse 1 (Plan to work in Japan or not)		Analyse 2 (Want to work in Japan permanently after employment)	
	Variables	(1) Binary Logistic Regression	(2) Selected model (in 1st stage)	(3) Binary Logistic Regression	(4) Probit regression (in 2nd stage)
		Coefficient / (S.E.)	Coefficient / (S.E.)	Coefficient / (S.E.)	Coefficient / (S.E.)
Student's attribute	Gender, Male	−0.0893 (−1.44)	−0.0516 (−1.40)	0.328*** (3.43)	0.172*** (2.74)
	The time living in Japan	0.262*** (13.01)	0.158*** (13.35)	0.0774*** (2.64)	0.0807** (2.57)
	Course				
	Graduate course	1.678*** (13.45)	0.964*** (13.86)	−0.273 (−1.44)	0.111 (0.43)
	Undergraduate degree course	1.334*** (11.83)	0.763*** (12.16)	−0.176 (−1.03)	0.121 (0.56)
	College student	1.189*** (11.68)	0.682*** (11.63)	0.285* (1.69)	0.372** (2.04)
	Japanese language proficiency (at the highest level)	0.539*** (5.92)	0.313*** (5.88)	−0.603*** (−4.25)	−0.266** (−2.02)
	Study major				
	Human science	0.113 (0.93)	0.0699 (0.98)	0.308* (1.82)	0.195** (1.97)
	Social science	0.141 (1.59)	0.0910* (1.76)	−0.115 (−0.93)	−0.0423 (−0.55)
	Natural science	−0.662*** (−3.40)	−0.394*** (−3.45)	0.0956 (0.30)	−0.0444 (−0.22)
	Engineering	0.102 (0.93)	0.0677 (1.02)	−0.00971 (−0.06)	0.0111 (0.12)
	Agriculture	−0.500** (−2.01)	−0.299** (−2.08)	0.450 (1.11)	0.179 (0.71)
	Medicine/ dentistry	−0.615** (−2.15)	−0.372** (−2.17)	0.281 (0.52)	0.0574 (0.18)
	Living area				
	Kanto area	0.158** (2.19)	0.0896** (2.10)	−0.101 (−0.91)	−0.0349 (−0.51)
	Kansai area	0.0653 (0.69)	0.0365 (0.63)	0.0636 (0.43)	0.0573 (0.67)
Studying in Japan's motivation	To work in Japan 1	1.138*** (12.72)	0.666*** (11.89)	0.622*** (4.54)	0.523*** (4.04)
	To work in Japan 2	1.207*** (14.83)	0.709*** (15.01)	0.786*** (6.59)	0.630*** (5.12)
	To work in Japan 3	1.552*** (15.21)	0.916*** (15.16)	0.989*** (7.12)	0.795*** (5.14)
	Interested in Japanese society and want to live in Japan 1	0.294** (2.28)	0.164** (2.12)	0.345* (1.76)	0.236** (2.06)
	Interested in Japanese society and want to live in Japan 2	0.231* (1.83)	0.134* (1.77)	0.0559 (0.29)	0.0661 (0.58)
	Interested in Japanese society and want to live in Japan 3	0.244*** (3.52)	0.144*** (3.53)	0.465*** (4.23)	0.302*** (4.77)
Studying in Japan's motivation	Geographically close to Japan	0.195 (1.43)	0.116 (1.46)	0.0615 (0.29)	0.0650 (0.53)
	GDPpercapita_gap	0.0000245*** (6.57)	0.0000150*** (6.95)	0.00000672 (1.27)	0.00000746* (1.87)
	unemploymentrate	−0.0391 (−1.45)	−0.0249 (−1.59)	0.182*** (4.40)	0.0985*** (3.54)
	_cons	−2.868*** (−13.46)	−1.660*** (−13.88)	−1.987*** (−6.24)	−1.927*** (−3.38)
	N	6021	6021	6021	2285

***, **, * denote significance at the 0.01, 0.05, and 0.10 leve;s, respectively.

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