Journal of Asian Economics 82 (2022) 101529

Contents lists available at ScienceDirect

Journal of Asian Economics

journal homepage: www.elsevier.com/locate/asieco

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

Nguyet Thi Khanh Cao [1]

Faculty of Economics and Business Administration, Kyoto University of Advanced Science (KUAS), 18 Gotanda-cho, Yamanouchi, Ukyo-ku, Kyoto 615-8577, Japan

ARTICLE INFO

JEL Classification:
F22
F66
J24

Keywords:
International student
Student mobility
Foreign labor
Immigration

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' decision to remain in Japan to work after graduation. The empirical results showed that the most significant determinants of the students' decision to permanently work in Japan were the initial motivation of the students before moving to Japan, the impression of Japanese people after moving to Japan, and the length of time spent living in Japan. Moreover, the GDP gap between Japan and the home country, having a part-time job, and Japanese proficiency were found to be significant determinants of deciding to remain to work. The results of the present analyses suggest that to attract international students more efficiently to Japan, policymakers should carefully consider international students' motivation before moving to Japan and should ensure that international students enjoy their time in Japan.

1. Introduction

Faced with an aging society, Japan has adopted many policies to increase its labor force. Among these policies, attracting more international students is thought to be one of the best solutions. These students make an important contribution to the labor force through their part-time work.[2] Moreover, international students can be expected to become a source of highly skilled labor due to their understanding of the Japanese language and culture, as well as the knowledge they have gained at Japanese universities. Therefore, the Japanese government has tried to attract more international students to study at Japanese universities (for example, the "300,000 international student plan" which aims to accept 300,000 international students by 2020) and then provide wide-ranging services to

E-mail address: kinokina@hotmail.co.jp.

[1] Affiliated Associate Professor, the Center for Southeast Asian Area Studies, Kyoto University

[2] Japan allows international students to work 28 h per week during the semester and 40 h during holidays. 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 & Welfare, 2019).

https://doi.org/10.1016/j.asieco.2022.101529
Received 24 August 2020; Received in revised form 25 July 2022; Accepted 2 August 2022
Available online 8 August 2022

help them remain to work in Japan after they complete their studies.[3] As a result of past efforts, the number of international students coming to Japan has grown continuously. It increased by more than 2.5 times—from 123,829 to 312,214 students—between 2008 and 2019 (Fig. 1).

The percentage of international students who considered remaining in Japan after graduation increased from 56 % in 2005 to 65 % in 2017 (Japan Student Services Organization [JASSO] 2018). Similarly, the number of students changing their visa status from a student visa to a work visa grew from 10,969 (< 11,698 applicants) in 2012–25,942 (<30,924 applicants) in 2018 (Ministry of Justice, 2019) (Fig. 2), with an approximate 88 % acceptance rate for students who applied for this residence change.

There is a positive correlation between the flow of international students entering Japan and the number of those students remaining in the country to work. However, there is a large gap between the percentage of international students who wish to remain and the percentage who actually remain to work in Japan. 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 %, respectively (JASSO, 2016a, 2019a). This reveals that international students face many obstacles in their job search in Japan. Among these obstacles, the existence of the labor market for new graduates and the unique job search requirements in Japan are proposed as 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 students must prepare to search for a job in Japan for at least one year before graduation. This process is unfamiliar to international students, and as such, they do not invest a significant amount of time preparing 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. Thus, 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 companies clearly define their job descriptions 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 performance-based systems in their home countries; this is a key factor in students quitting their jobs within three to five years of employment (Moriya, 2016; Disco, 2017).

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, finding out what determines students' remaining to work and what kinds of support are required are becoming significant concerns. With these goals in mind, I first investigated factors that contribute to or determine international students' decision to stay in Japan to work after finishing 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 study is based on the economic theories about human capital theory, student mobility, and migration of Becker (1994), Rosenzweig (2006), Gregory (2015), and others. In addition, the present study is related to earlier studies devoted to international students' migration in Japan. The most prominent being Liu (2016) research on students' intention to remain based on a survey of international students in Japan's Kansai region, and Shiho (2009) and 2013 research on international students (especially Chinese students) in Japan's Kyushu region. However, unlike previous research, this study divides the students into two groups depending on their purpose for remaining (to work or continue their studies) to conduct 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 graduation. This was conducted in three steps. I first established an empirical model capturing the main driving forces for students who were eager to remain in Japan, and an empirical model investigating the determinants of remaining 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 desire to live in Japan before moving had a significant impact on the decision to remain and work in Japan indefinitely. It was also observed that the longer a student stayed in Japan, the more likely they were to remain there permanently to work. Moreover, a high GDP per capita gap between Japan and the home country, 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

[3] For example, the Japan Business Federation (Keidanren) in 2004 announced "Proposals on the issue of accepting foreigners" with the aim of promoting the 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 search in Japan. In 2008, the "300,000 International Students Plan" was implemented to attract more international students and to strategically retain excellent students. 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 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 30–50% by 2020. These policies have marked a major shift from a focus on the education of foreign students to retaining graduated foreign students as human resources in Japan instead of returning them to their home countries (Sato, 2018).

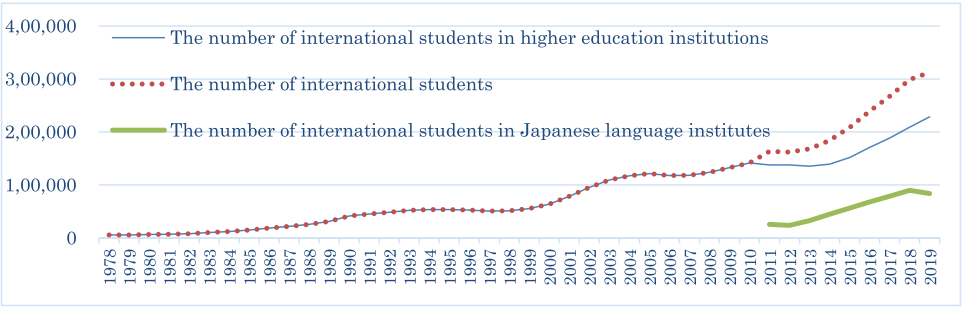

Fig. 1. Trends in the number of international students in Japan as of May 1, 2020. Note: Since 2011, the number of international students has included those enrolled in Japanese language institutes in accordance with the unification of student visas.
Source: JASSO.

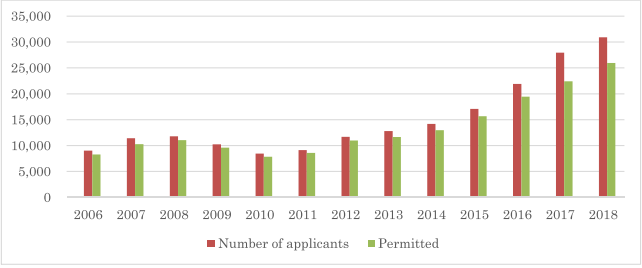

Fig. 2. Trends in the number of international students changing their residence status from a student visa to a work visa in Japan.
Source: Ministry of Justice.

policymakers 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 policymakers should implement policies aimed at helping international students enjoy their lives and studies in Japan to encourage students to stay after they have graduated.

The remainder of this paper is organized as follows. A brief literature review and previous research are presented in Section 2. The empirical models and data descriptions are provided in Section 3. The empirical results are presented in Section 4, and the assessments of the significant determinants are presented 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 international students' decision to remain in Japan to work for a certain period and their decision to remain permanently, I reviewed some proposed economic theories to explain the mobility and immigration choices of international students after graduation.

To explain why students choose to study abroad, a lack of educational facilities in their home country (so-called "school-constrained" (Rosenzweig, 2006), economic and social factors, a student's prior knowledge and awareness of the host country or institution, and the family's recommendations are important (Mazzarol & Soutar, 2002).

To explain students' decision to remain in the host countries or return to their home countries, previous research has revealed that economic factors such as wages and income differentials between home and host countries are the most influential factors. For example, 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 with the present value of future earnings obtained from studying abroad. If the present value of future income is greater than the cost of education, students will move to the country that yields the highest net present value. This implies that students will remain in the host countries if they think that their future income there can compensate enough for their education costs. It is also worth noting the research by Schoorl et al. (2000), which describes factors related to the 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. 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 induces workers from low-wage countries to migrate to countries with high wages. In contrast, neoclassical micro-economic models assume that individuals perform rational cost–benefit calculations. The benefits of expected higher wages are weighed against the costs of travel, looking for a job, and adapting to the host country. In addition, other immigration costs such as the distance, policy restrictions

(Shields & Shields, 1989), earnings variance (Borjas, 1989), and the distributions of skill levels (Clark et al., 2007) have been raised.[4]

Regarding prior empirical analyses of the mobility and migration decisions of international students, there is some research on the U.S., Australia, and European countries. In the case of the U.S., 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 and racism in the U.S.) tend to draw students back to their home countries. However, Han et al. (2015) showed that the average rate of science, technology, engineering, and mathematics (STEM) students intending to stay in the U.S. after graduation was approximately 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. Gregory (2015) describes the two-step immigration process in Australia, in which immigrants first move to Australia 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 for international students to remain; factors related to personal relationships or lifestyle were of relatively less importance (Sykes, 2011).

Although there is little empirical research on international students' intention 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 impact of international students' characteristics on their desire to stay in Japan after their studies. An empirical model was built based on the survey results, and the results revealed that the factors that had a significant positive impact on staying were male gender, 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 students from provinces with higher growth, higher incomes, and more inbound foreign capital were less likely to stay in Japan after graduation.

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

There are two major limitations to 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 Liu's study 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 to study further, work, or stay in the country indefinitely. I attempted to overcome these limitation by using the bigger data set and using more detailed analysis to clarify why students remained in Japan to work permanently. The details are presented in the next section.

3. Empirical models and data

3.1. Framework of the analysis and empirical models

I used the JASSO dataset from the "Lifestyle Survey of Privately Financed International Students in Japan" to establish the post-graduate intentions of international students in Japan. In addition, to address the limitation of previous research, I used a more detailed analysis to clarify why students remained in Japan. First, based on the 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 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, I focused on the students who wanted to work in Japan to determine how long they intended to do so.

The flowchart below depicts the process used to analyze international students' post-graduation plans in the present study. Fig. 3.

As shown in the chart, there are three stages that a student can go through after completing their studies when they decide to stay: (1) remain in Japan after the completion of their studies; (2) remain to work; and (3) after spending some time working, remain in Japan permanently to work or return home.

To analyze the details of this process, this study proposes three empirical models. The first model investigates the determinants of whether international students plan to remain in Japan after graduation. The dependent variable of this model is binary, taking the value of 1 if the student does want to remain, and 0 if otherwise. The second model investigates the determinants of whether students who want to remain intend to remain to work. In this model, the probit model with a selected sample (the students who want to remain) is used with the dependent variable being binary, taking the value of 1 if the student does want to remain to work, and 0 if otherwise. The third model investigates the determinants of whether students want to work in Japan permanently after spending some

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

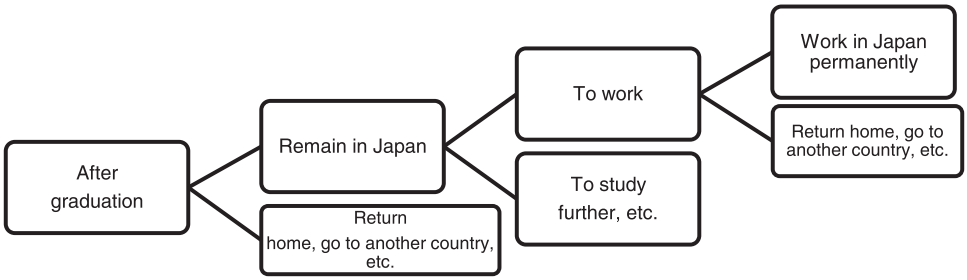

Fig. 3. The process of International Students' Post-graduation planning.
Source: Author.

time working. In this model, the probit model with a selected sample (the students who want to remain to work) is used with the dependent variable being binary, taking the value of 1 if the student wants to remain to work permanently, and 0 if otherwise.

In these analysis, dependent variables represent whether students desire to remain, whether students desire to remain to work, and whether they desire to remain in Japan permanently to work. All dependent variables are binary, taking the value of 1 if the student wants to, and 0 if otherwise.

To investigate the determinants of international students' decisions, I divided the explanatory variables into four groups: variables expressing push-pull economic factors, variables associated with the students' initial motivations before moving to Japan, variables associated with the students' living experience in Japan, variables referring to being familiar with Japanese society, and the control variables as below.

3.1.1. Push–pull economic factors

The first explanatory group consists of several variables associated with the push–pull factors. The first variable in this group is the gap between the GDP per capita in the student's home country and that of Japan ("GDP per capita gap" is a proxy for the income differential). I use this variable to test the hypothesis that if the gap in income is large, the probability of remaining is high because students may remain to earn a higher income rather than return to their home country. The second variable is the "unemployment rate," which is defined as the four-year average unemployment rate in the student's home country before they moved to Japan. I use this variable to test the hypothesis that if the unemployment rate in the home country is high, students may remain to have more favorable job opportunities.

3.1.2. Students' initial motivation for studying in Japan

The second explanatory group contains variables associated with students' motivations to study in Japan before travelling to Japan. These variables are used 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 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 the student wants to work in Japan or find a job in a Japanese company. The second variable, "interested in Japanese society and wants 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.

3.1.3. Students' living experience in Japan

The third explanatory group consists of several variables associated with their living experiences in Japan. I use this variable to express the students' feelings about their life after moving to Japan to test the hypothesis that if students have a good experience in Japan, they may remain after graduation. The second variable is related to financial factors (such as allowance income, income from part-time jobs, scholarships, etc.) to test the hypothesis that students may remain in Japan if they have income from a part-time job or scholarship. In contrast, if they have to rely on an allowance from their families at home instead of being able to manage their life in Japan on their own, they may return to their home countries.

3.1.4. Familiarity with Japanese society

The next group contains the length of time the student has lived in Japan and their Japanese language proficiency (based on their certifications of Japanese language acquirement), which are added to test the hypothesis that living in Japan for a longer period of time and good Japanese language proficiency will increase the probability of remaining in Japan.

In addition, gender (male or female), course of study (e.g., graduate courses, including doctoral and master's courses, undergraduate degree courses, junior college students, etc.), study major (e.g., human sciences, social sciences, natural sciences, etc.), and home country (top five countries such as China, Korea, Taiwan, Vietnam, Nepal, etc.) are added as control variables. In previous studies, these factors were found to have an impact on decisions, such as majors and courses, since highly skilled migrants may have a lower cost of admission, which leads to the decision to remain; the home country is the proxy of travel cost, and kinship and migrant network factors may increase the probability of remaining.

The explanatory variables and their expected impacts are summarized in Table 1.

3.2. Data description

The data used in this study are the "Lifestyle Survey of Privately Financed International Students in Japan" from the JASSO.[5] To my knowledge, this is the only dataset collected from international students throughout Japan through their institutions. It is a bi-annual survey that consists of 44 questions. Students are asked to answer each question and then submit the survey to their school. The dataset used in this study 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, accounting for 93.8 % of the total (JASSO, 2016a). In this survey, a questionnaire was sent to the institutions and then randomly passed to 7000 privately funded international students, covering 3.6% of the population in general. There were 6036 valid responses, with a response rate of 86.2 % (JASSO, 2016b). Table 2 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 categorized by citizenship, degree-seeking program, and gender were similar enough to the national-level population. This indicates that, overall, the sample population was representative of the national-level population. For analysis, I used information related to the students' characteristics, their post-graduation plans, their purposes and motivations for studying in Japan, their impressions of their lives after moving to Japan, and so forth. 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 the GDP per capita and unemployment rates of the host countries. Table 3 explains the variables and its related questions in the questionnaire. Table 4 summarizes the descriptive statistics for all the variables in the analysis.

Regarding the dependent variables, there were three dependent variables for the two analyses, as described in Section 3.2. The first dependent variable, "Plan to remain," is binary, taking the value of 1 if the student does want to remain, and 0 if otherwise. The second dependent variable, "Plan to remain to work," is binary, taking the value of 1 if the student does want to remain to work, and 0 if otherwise. From the survey, approximately 84.5 % (5100 students) of the students wished to remain after their current studies. Among them, approximately 38 % (2285 students) responded that their first choice was to remain to work in Japan after finishing their current study program; 46.5 % (2807 students) planned to study further in Japan, 8.8 % (530 students) planned to return to their home countries, and 6.7 % (406 students) had other plans. Therefore, in the first analysis, 84.5 % of students who wanted to remain had a value of 1, and the rest took the value of 0. In the second analysis, 38% of students who responded that their first choice was to remain to work take a value of 1, and the rest take a value of 0. The third dependent variable was "want to work in Japan permanently," and it takes the value of 1 if the student wants to work in Japan permanently after employment, and 0 if otherwise. 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 return home, 9.5 % wanted to go to another country, and 20 % had not yet decided. Therefore, 33.8% of students who wanted to work in Japan permanently after employment took the value of 1, and the rest took the value of 0. In the group of variables related to "push–pull" economic factors, the World Development Indicators was selected as the data source for 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 Japan's GDP per capita ($34,513) from it to obtain the GDP per capita gap. With the exception of a small percentage of students from countries with a higher GDP per capita than Japan, such as the U.S. ($56,175), Germany ($41,197), and Singapore ($53,625), most of the students in the survey were from countries with a lower GDP per capita than Japan, such as China ($8167), Korea ($27,195), Taiwan ($22,358), Vietnam ($2086), and Nepal ($747). 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's 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.

Regarding the students' initial motivations, I considered two factors: what is students' purpose of their study, and why they decided to study in Japan. This was a multiple-choice questionnaire, In these questions, students could choose one of four responses from least to most appropriate. If they chose "Not Interested", the scored was 0; if they chose "Slightly Interested", the score was 1; If they chose "Somewhat Interested", the score w as 2; and if they chose "Very Interested", the score was 3.

Regarding students' personal factors related to their living experiences in Japan, I used some factors expressing students' impressions of Japanese people after coming to Japan. If they said that "It has been good and the same as before," the score was 1; if the answer was "It was good before and got even better," the score was 2; and if the answer was "It was bad before, but it improved," the score was 3. The average score was 1.44, implying that half of the students have a good impression of Japanese people after coming to study in Japan. Regarding the financial status of life in Japan, 72 % of students have a part-time job with an average income of 120 thousand yen (around 1200 US dollars); 68 % of them rely on an allowance from their home country with an average amount of about 170 thousand yen (around 1700 US dollars), while 39 % receive some kind of scholarship, with an average amount of 21 thousand yen (around 210 US dollars). Thus, international students in Japan must rely heavily on allowances and part-time jobs.

Regarding familiarity with Japanese society, the average time students had spent in Japan was 3.2 years, and the average level of

[5] JASSO is 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 mutual international understanding by providing scholarships and offering employment information (JASSO, 2020).

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

Table 1
The explanatory variables and their expected impacts.

Factors	Variables	Expected impact on the decision to remain
Push–pull economic factors	Big difference of GDP per capita between the home country and Japan	+
	High unemployment rate in the home country	+
Motivation factors	Choose to study in Japan to work in Japan after graduation	+
	Choose to study in Japan because of an interest in Japanese life and society	
Living experience factors	Good impression of Japanese people after moving to Japan	+
	To have part-time job	+
	Obtaining a scholarship	+
	Relying on an allowance	–
Familiarity with Japanese society	The length of living in Japan	+
	Japanese fluency	+

Table 2
Total population versus the sample demographics.

	In total population	%	Survey sample size	%
Total international students	208,379 (Privately funded students: 195,419)	100%	6036	100%
From China	94,111	45.2 %	2985	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	7314	3.5 %	217	3.6 %
From Asian countries	193,172	92.7 %	5738	95.1 %
Male	116,360	55.8 %	3012	49.9 %
Japanese language school	56,317	27 %	1533	25.4 %
University preparatory course	2607	1.3 %	70	1.2 %
Professional training college	38,654	18.5 %	1038	17.2 %
Junior college	1414	0.7 %	54	0.9 %
Undergraduate course	67,472	32.4 %	1806	29.9 %
Graduate course	41,396	19.9 %	1113	18.4 %

Source: Calculation based on JASSO (2016a) & JASSO (2016b)

their Japanese language proficiency was 3.3 over 5. Thus, most students have spent enough time in the country and have sufficient Japanese language proficiency to become familiar with Japanese society.

Regarding the control variables, in the sample size of 6036 students, 49.9 % of the students were male, 20.1 % were in graduate courses, 30.8 % were in undergraduate courses, 18.1 % were in junior or training college, and 31 % were in university preparatory courses or Japanese language institutions. Regarding their study major, 44 % of the students were in human sciences programs, and 31 % were in engineering. About 49 % of the students in the survey were from China, 9 % from Korea, 4% from Taiwan, 13 % from Vietnam, and 7 % from Nepal.

A correlation test was performed to determine the strength of the association between each pair of variables. The results showed that “part-time” and “allowance” had a significant strong association; thus, I decided to use dummy variables instead. There was no significant strong relationship (> 0.6) between the remaining pairs of variables.[7]

4. Empirical results

The estimation results are summarized in Table 5.

For analysis 1, which estimates what determines students’ plans to remain in Japan, the results of the binary logistic regression are presented in (1). For analysis 2, which estimates what determines students’ plans to work in Japan with the selected sample (the students who want to remain), the results of the first stage estimate of what determines students plans to remain are presented in (2), and the results of the second stage estimating what determines students’ plans to work are presented in (3). The Wald test of independent equations (rho = 0)[8] is chi2(1) = 7.63, Prob > chi2 = 0.0057, which indicates that the correlation is significant; therefore, I use a sample selection model for this analysis instead of logit regression. However, the results of the binary logistic regression are presented in (4) to ensure the impact of dependent variables. Moreover, a multinomial logistic regression model is added to analysis 2, with the base outcome is studying in Japan to see how the independent variables affect planning to work compared with planning to study further. The results of this model are presented in (5).

For analysis 3, which estimates what determines students’ plans to work in Japan permanently after employment, with the selected

[7] The correlation matrix table is available upon request.
[8] Rho indicates the correlation coefficient between error terms in analyses 1 (selection equation) and 2 (outcome equation).

Table 3
Variables and related questions the questionnaire.

Variables' name	The related questions in the questionnaire
Gap in GDP per capita between Japan and the home country (2015 data)	Author calculated from World Development Indicators (Home country's GDP per capita - Japan's GDP per capita)
Unemployment rate in the home country (average unemployment rate 2011–2014)	Author calculated from World Development Indicators
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
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
Impression of Japanese people after moving to Japan "It has been good and same as before"= 1 "It was good before and got even better"= 2 "It was bad before, but it got better"= 3	Q22: Has your impression of Japanese people changed after studying in Japan?
Income from part-time job	Q27: How much is your monthly average income?
Do part-time job or not	
Income from scholarship	
Receive scholarship or not	
Income from allowance	
Receive allowance or not	
The time living in Japan (number of years)	Q8. How many years have passed after arriving at Japan?
Japanese language proficiency No qualification = 0; N5, J4, J5 = 1; N4, J3 = 2; N3, J2 = 3; N2, J1 = 4; N1, J1 + =5	Q14. Please select your qualifications for Japanese language.
Gender, (Male=1)	Q1. Please select your gender.
Major	Q16. Please select your major.
Human science	
Social science	
Natural science	
Engineering	
Agriculture	
Medicine/dentistry	
Studying course	Q12. Please select your course.
Graduate course (Doctoral course, Master's course, professional graduate school, research student at graduate level)	
Undergraduate degree course (including research student at undergraduate level)	
College student (Junior college, professional training college)	
Under college student (University preparatory course, Japanese language institution)	
Home country	Q2: Please select your home country or region.
China	
Korea	
Taiwan	
Vietnam	
Nepal	

sample (the students who want to remain to work), the results of the first-stage estimate of what determines students' plans to work in Japan are presented in (6). The results of the second stage estimating what determines students' plans to work in Japan permanently after employment are presented in (7). The Wald test of independent equations (rho = 0) is chi2(1) = 0.38, Prob > chi2 = 0.5371, which indicates that the correlation is insignificant, showing that there is no significant correlation between the equations of analyses 2 and 3. Hence, I adopted the results of the logit and conditional models. The results of logit model and conditional model are presented in (8) and (9).

For students who want to continue to study further and want to remain to work after their next study period, it is necessary to compare the students who want to work in Japan with those who want to leave Japan by removing the students who want to study further in Japan from the sample. Table 6 presents the estimation results to ensure the significance of the explanatory variables. The results in Tables 5 and 6 reveal that the results are not so different in terms of sign and significance of dependent variables.

4.1. The empirical results of our analyses revealed the following

4.1.1. Impact of variables related to "push–pull" economic 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. Our results reveal that GDP per capita gap had a significant impact on deciding whether to remain to work. This means that a higher income in Japan in

Table 4
Descriptive statistics.

Variable name		Obs	Mean	Std. Dev.	Min	Max
Dependent Variables						
Analysis 1	Plan to remain in Japan after finishing their current studies	6036	0.845	0.362	0	1
Analysis 2	Plan to remain to work after finishing their current studies	6036	0.380	0.485	0	1
Analysis 3	Want to work in Japan permanently after employment in Japan	6036	0.202	0.401	0	1
Independent Variables						
Push-Pull Macro economic factors	Gap in GDP per capita between Japan and the home country (2015 data)	6036	-25,129	9050	-34,513	21,662
	Unemployment rate in the home country (average unemployment rate 2011–2014)	6036	3.893	1.290	0	12.68
Motivation to study in Japan	To work in Japan "Not Interested" = 0 "Slightly Interested" = 1 "Somewhat Interested" = 2 "Very Interested" = 3	6036	0.871	1.091	0	3
	Interested in Japanese society and want to live in Japan "Not Interested" = 0 "Slightly Interested" = 1 "Somewhat Interested" = 2 "Very Interested" = 3	6036	1.594	1.408	0	3
Living experience	Impression of Japanese people after moving to Japan "It has been good and same as before" = 1 "It was good before and got even better" = 2 "It was bad before, but it got better" = 3	6036	1.441	0.839	0	3
	Income from part-time job	6036	1,20,069	51,48,157	0	40,00,00,000
	Do part-time job or not	6036	0.723	0.447	0	1
	Income from scholarship	6036	21,401	38,673	0	10,00,000
	Receive scholarship or not	6036	0.390	0.488	0	1
	Income from allowance	6036	1,71,115	90,09,512	0	70,00,00,000
	Receive allowance or not	6036	0.685	0.465	0	1
Familiarity with Japanese society	The time living in Japan (number of years)	6021	3.185	1.717	1	7
	Japanese language proficiency No qualification = 0; N5, J4, J5 = 1; N4, J3 = 2; N3, J2 = 3; N2, J1 = 4; N1, J1 + =5	6036	3.275	1.916	0	5
Control variables	Gender, (Male=1)	6036	0.499	0.500	0	1
	Major					
	Human science	6036	0.079	0.269	0	1
	Social science	6036	0.251	0.434	0	1
	Natural science	6036	0.029	0.168	0	1
	Engineering	6036	0.111	0.314	0	1
	Agriculture	6036	0.017	0.131	0	1
	Medicine/dentistry	6036	0.013	0.115	0	1
	Studying course					
	Graduate course (Doctoral course, Master's course, professional graduate school, research student at graduate level)	6036	0.201	0.401	0	1
	Undergraduate degree course (including research student at undergraduate level)	6036	0.308	0.462	0	1
	College student (Junior college, professional training college)	6036	0.181	0.385	0	1
	Under college student (University preparatory course, Japanese language institution)	6036	0.310	0.462	0	1
	Home country					
	China	6036	0.495	0.500	0	1
	Korea	6036	0.088	0.284	0	1
	Taiwan	6036	0.036	0.186	0	1
	Vietnam	6036	0.129	0.336	0	1
	Nepal	6036	0.073	0.259	0	1

comparison with the income in their home countries could be a pull factor that encouraged students to work in Japan after graduation. The findings of this research showed that wage differential was an important factor that pushed students to remain to work, as posited in Becker (1994) and Schoorl et al. (2000). However, this factor was not strong enough to force students to decide to permanently work in Japan. In addition, the high unemployment rate in the home country, a proxy push factor, had a positive impact on the decision to permanently work in Japan. This means that if the unemployment rate in the home country was high, students may have chosen to work permanently in the host country to have better job opportunities rather than returning home.

Table 5
Empirical results.

		Analysis 1 REMAIN (Plan to remain in Japan or not)	Analysis 2 WORK (Plan to remain to work in Japan or not)				Analysis 3 PERMANENT (Plan to work permanently in Japan or not)			
		(1) Binary Logistic Regression	(2) Selected model (in 1st stage)	(3) Probit model with sample selection (in 2nd stage)	(4) Binary Logistic Regression	(5) Multilogit	(6) Selected model (in 1st stage)	(7) Probit model with sample selection (in 2nd stage)	(8) Binary Logistic Regression	(9) Logit with Work> 0 condition
Push-Pull Macro economic factors	Gap in GDP per capita between Japan and home country	0.00000206	0.00000103	0.0000133 **	0.0000201 **	0.0000261 ***	0.0000123 ***	0.00000773	0.0000137 *	0.00000967
		(0.33)	(0.28)	(3.08)	(3.28)	(3.32)	(3.43)	(1.20)	(2.29)	(0.95)
	Unemployment rate in the home country	-0.0736	-0.0453	-0.0244	-0.0691	-0.0549	-0.0419	0.0835	0.126 **	0.150 *
		(−1.76)	(−1.85)	(−0.92)	(−1.72)	(−1.19)	(−1.79)	(1.94)	(3.25)	(2.12)
Motivation to study in Japan	To work in Japan	0.654 ***	0.323 ***	0.211 ***	0.548 ***	0.446 ***	0.323 ***	0.249 ***	0.480 ***	0.338 ***
		(11.74)	(12.16)	(8.22)	(18.18)	(14.04)	(18.44)	(3.73)	(15.85)	(8.02)
	Interested in Japanese society and want to live in Japan	0.0679 *	0.0384 *	0.0297 *	0.0786 * **	0.0651 **	0.0463 * **	0.0934 ***	0.193 ***	0.148 ***
		(2.44)	(2.50)	(2.06)	(3.55)	(2.73)	(3.53)	(4.39)	(7.73)	(4.28)
Living experience	Impression of Japanese people after moving to Japan	0.140 **	0.0745 **	-0.0468	-0.00348	-0.0522	-0.00175	0.133 ***	0.195 ***	0.230 ***
		(2.78)	(2.73)	(−1.96)	(−0.09)	(−1.30)	(−0.08)	(3.76)	(4.64)	(3.94)
	Do part-time job	0.409 ***	0.227 ***	0.211 ***	0.514 ***	0.446 ***	0.299 ***	0.0658	0.182 *	0.0330
		(4.92)	(4.85)	(4.05)	(6.97)	(5.56)	(6.88)	(0.66)	(2.22)	(0.28)
	Receive scholarship	0.0170	0.0131	0.0206	0.00823	0.0113	0.0103	0.0508	0.0712	0.0865
		(0.21)	(0.30)	(0.50)	(0.13)	(0.16)	(0.27)	(0.89)	(0.98)	(0.90)
	Receive allowance	0.0277	0.0130	-0.0446	-0.0634	-0.0884	-0.0455	-0.0933	-0.188 *	-0.157
		(0.32)	(0.27)	(−1.00)	(−0.91)	(−1.16)	(−1.10)	(−1.52)	(−2.47)	(−1.52)
Familiarity with Japanese society	The time living in Japan	0.0788 **	0.0403 **	0.152 ***	0.253 ***	0.281 ***	0.154 ***	0.0547	0.110 ***	0.0544
		(3.14)	(2.87)	(10.43)	(12.55)	(12.19)	(12.78)	(1.50)	(4.88)	(1.82)
	Japanese language proficiency	0.0707 ***	0.0425 * **	0.0548 * **	0.123 ***	0.113 ***	0.0710 * **	-0.0460	-0.0144	-0.0950 * **
		(3.32)	(3.57)	(4.43)	(6.67)	(5.67)	(6.54)	(−1.65)	(−0.73)	(−3.33)
Gender	Male	0.146	0.0887 *	-0.0673	-0.0553	-0.117	-0.0318	0.186 **	0.298 ***	0.324 ***
		(1.85)	(2.03)	(−1.70)	(−0.88)	(−1.74)	(−0.85)	(3.03)	(4.23)	(3.36)
Major										

(*continued on next page*)

Table 5 (*continued*)

		Analysis 1 REMAIN (Plan to remain in Japan or not)	Analysis 2 WORK (Plan to remain to work in Japan or not)				Analysis 3 PERMANENT (Plan to work permanently in Japan or not)			
		(1) Binary Logistic Regression	(2) Selected model (in 1st stage)	(3) Probit model with sample selection (in 2nd stage)	(4) Binary Logistic Regression	(5) Multilogit	(6) Selected model (in 1st stage)	(7) Probit model with sample selection (in 2nd stage)	(8) Binary Logistic Regression	(9) Logit with Work> 0 condition
	Human science	0.0318	-0.0163	0.0697	0.0643	0.0685	0.0427	0.170	0.178	0.292
		(0.21)	(−0.19)	(0.87)	(0.52)	(0.50)	(0.58)	(1.70)	(1.28)	(1.71)
	Social science	-0.0985	-0.0780	0.145 **	0.132	0.194 *	0.0816	-0.0693	-0.0887	-0.123
		(−0.85)	(−1.23)	(2.60)	(1.47)	(1.98)	(1.53)	(−0.88)	(−0.87)	(−0.99)
	Natural science	-0.00138	-0.0121	-0.415 * **	-0.634 * **	-0.781 * **	-0.385 * **	-0.0318	-0.00967	0.0756
		(−0.01)	(−0.11)	(−3.30)	(−3.29)	(−3.62)	(−3.36)	(−0.16)	(−0.04)	(0.25)
	Engineering	0.361 *	0.182 *	-0.00198	0.134	-0.0193	0.0850	-0.0100	0.0674	-0.0110
		(2.50)	(2.25)	(−0.03)	(1.21)	(−0.16)	(1.27)	(−0.10)	(0.53)	(−0.07)
	Agriculture	-0.0610	-0.0994		-0.555 *	-0.663 *	-0.349 *		-0.258	0.454
		(−0.25)	(−0.70)		(−2.21)	(−2.40)	(−2.35)		(−0.86)	(1.14)
	Medicine/ dentistry	-0.831 ***	-0.549 ***		-0.639 *	-0.0784	-0.395 *		-0.246	0.211
		(−3.35)	(−3.75)		(−2.26)	(−0.21)	(−2.34)		(−0.68)	(0.43)
Studying course	Undergraduate degree course	-1.071 ***	-0.562 ***	0.944 ***	1.306 ***	1.565 ***	0.751 ***	0.0834	0.114	-0.0988
		(−7.34)	(−7.41)	(14.24)	(11.55)	(13.48)	(11.55)	(0.36)	(0.94)	(−0.56)
	Graduate course	-1.592 ***	-0.867 ***	1.390 ***	1.597 ***	2.280 ***	0.919 ***	0.0171	-0.0746	-0.266
		(−10.84)	(−11.08)	(18.25)	(12.91)	(16.58)	(12.84)	(0.06)	(−0.54)	(−1.39)
	College student	-0.421 **	-0.226 **	0.786 ***	1.253 ***	1.343 ***	0.720 ***	0.333	0.520 ***	0.336
		(−2.79)	(−2.91)	(12.98)	(12.13)	(12.71)	(12.03)	(1.55)	(4.97)	(1.95)
Home country	China	0.499 ***	0.295 ***	-0.262 * **	-0.208 *	-0.448 * **	-0.121 *	-0.148	-0.159	-0.209
		(4.66)	(4.91)	(−4.29)	(−2.20)	(−4.32)	(−2.16)	(−1.66)	(−1.56)	(−1.44)
	Korea	-0.0949	-0.0202	-0.0573	-0.149	-0.187	-0.0876	-0.235	-0.319	-0.349
		(−0.48)	(−0.18)	(−0.46)	(−0.82)	(−0.84)	(−0.82)	(−1.46)	(−1.70)	(−1.26)
	Taiwan	-0.112	-0.0391	0.361 **	0.368	0.486 *	0.229 *	0.00842	0.116	-0.0309
		(−0.53)	(−0.32)	(2.62)	-1.84	(2.09)	(1.96)	(0.05)	(0.57)	(−0.11)
	Vietnam	0.382 *	0.210 *	-0.368 * **	-0.502 * **	-0.639 * **	-0.290 * **	-0.214	-0.331 *	-0.309
		(2.03)	(2.03)	(−4.18)	(−3.52)	(−4.19)	(−3.47)	(−1.49)	(−2.10)	(−1.36)
	Nepal	0.626 * *	0.315 * *	-0.522 * **	-0.727 * **	-0.917 * **	-0.424 * **	-0.158	0.0524	-0.154
		(2.77)	(2.67)	(−5.45)	(−4.53)	(−5.50)	(−4.52)	(−0.85)	(0.33)	(−0.59)

(*continued on next page*)

Table 5 (*continued*)

	Analysis 1 REMAIN (Plan to remain in Japan or not)	Analysis 2 WORK (Plan to remain to work in Japan or not)				Analysis 3 PERMANENT (Plan to work permanently in Japan or not)			
	(1) Binary Logistic Regression	(2) Selected model (in 1st stage)	(3) Probit model with sample selection (in 2nd stage)	(4) Binary Logistic Regression	(5) Multilogit	(6) Selected model (in 1st stage)	(7) Probit model with sample selection (in 2nd stage)	(8) Binary Logistic Regression	(9) Logit with Work> 0 condition
_cons	1.050 ** (3.11)	0.645 *** (3.30)	-1.067 * ** (−4.60)	-2.749 * ** (−8.66)	-2.137 * ** (−5.65)	-1.597 * ** (−8.64)	-1.556 * (−2.18)	-3.150 * ** (−9.88)	-1.843 *** (−3.39)
athrho		-0.515 ** (−2.76)				0.262 (0.62)			
N	6021 Wald chi2(25)= 547.72 Prob > chi2 = 0.0000	6021 Number of obs = 6021 Selected = 5087 Nonselected = 934 Wald chi2(23) = 1187.10 Prob > chi2 = 0.0000	5087	6021 Wald chi2(25)= 1079.42 Prob > chi2 = 0.0000	6021 Wald chi2(75)= 1816.04 Prob > chi2 = 0.0000	6021 Number of obs = 6021 Selected = 2285 Nonselected = 3736 Wald chi2(23) = 206.98 Prob > chi2 = 0.0000	2285	6021 Wald chi2(25) = 536.86 Prob > chi2 = 0.0000	2285 Wald chi2(25)= 188.51 Prob > chi2 = 0.0000
Log pseudolikelihood	-2208.6352	-4895.927		-3224.8431	-5451.4649	-4582.129		-2737.4456	-1355.2923
Pseudo R2	0.1499			0.1932	0.1908			0.0967	0.0722

*** , **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
z-values in parentheses

4.1.2. Impact of variables relating to students' initial motivation for studying in Japan

The results showed that the students' initial motivations to study in Japan proved to be significant determinants and positively affected their decisions. More specifically, 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 after finishing their post-graduation employment. Regarding students' motivation to study, 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; they were also more likely to intend to permanently work in Japan. This result is consistent with that of Liu (2016), who stated that a strong interest in Japanese culture motivated many students to remain.

4.1.3. Impact of variables relating to students' living experience in Japan

The estimation results showed that if students have a good impression of Japanese people after moving to Japan, the probability of deciding to remain after graduation and working permanently in Japan is higher, although the significance of remaining to work is not observed in Table 5. Moreover, if the student has a part-time job, the probability of remaining to work is significantly higher. However, other financial factors, such as having allowance income or receiving a scholarship, have no significant effect.

4.1.4. Familiarity with Japanese society

The empirical results of our analyses revealed that the length of time a student lived in Japan had a significant effect on the student's desire to remain and remain to work permanently. Unexpectedly, although our analyses also indicated that Japanese language proficiency was a statistically significant factor in students' desire to remain in Japan for work, such proficiency also reduced the possibility that the student would desire to permanently work 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 period of time may help students find a job more easily in their home country. 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 and Japanese language proficiency.

Regarding control variables, male students had a higher tendency of remaining to work permanently compared to female students. About student majors, I found that students who were pursuing degrees in the natural sciences, and medicine/dentistry were less likely to remain in Japan to work. In comparison with under college student, the students in college course, graduate course, undergraduate degree course are found to be more likely to work in Japan after graduation. Students from China, Vietnam, Nepal had a high tendency to remain but not work in Japan after graduation. Students from Taiwan had a high tendency to work. However, the five main countries in the survey didn't have a significant impact on Table 6.

5. Conclusions and policy implications

The resolution of labor shortages is an important policy issue in Japan. Recent policies addressing this matter have focused on highly 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 study, I investigated the determinants of over 6000 international students' decisions and plans after they finished their studies in Japan. I found that the most significant determinants of the students' decision to permanently work in Japan were the initial motivation of the students before moving to Japan, the impression of Japanese people after moving to Japan, and the length of time spent living in Japan. Moreover, the GDP gap between Japan and the home country, having a part-time job, and Japanese proficiency were found to be significant determinants of deciding to remain to work.

The analysis highlighted that an attraction to Japanese culture and a desire to work in Japan have a significant impact on foreign students' decision to permanently remain in Japan to work. Japanese policymakers should therefore focus on attracting such students to fulfill the students' wishes while also meeting Japan's labor demand. Policymakers can rely on student recruiting companies in students' home countries using methods including thorough interviews and essays about applicants' motivations for studying in Japan. To support 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.

The analysis highlighted that the economic factors such as GDP gap between Japan and the home country, and having a part-time job after moving to Japan are significant determinants of deciding to remain to work. This fact reveals that earning from a part-time job in Japan will increase the probability of remaining to work. However, this may raise a question about whether international students may spend much time in doing part-time job than concentrating on studying. 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), policymakers 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 h per week if they are able to understand only some basic Japanese (the N5 Japanese language proficiency level), to work 20 h per week if they are able to understand Japanese used in everyday situations (the N3 level), and to work 28 h per week if they are able to understand Japanese used in everyday situations and in a variety of circumstances (the N2 level).[9]

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

Table 6
Empirical results (Analysis excluding students who plan to study further out of the sample).

(Analysis excluding students who plan to study further out of the sample)		Analysis 2 WORK (Plan to remain to work in Japan or not)		Analysis 3 PERMANENT (Plan to work permanently in Japan or not)		
		(4) Binary Logistic Regression	(6) Selected model (in 1st stage)	(7) Probit model with sample selection (in 2nd stage)	(8) Binary Logistic Regression	(9) Logit with Work> 0 condition
Push-Pull Macro economic factors	Gap in GDP per capita between Japan and home country	0.0000164 *	0.0000101 *	0.00000440	0.0000153 *	0.00000967
		(2.14)	(2.28)	(0.72)	(2.02)	(0.95)
	Unemployment rate in the home country	-0.113 *	-0.0695 *	0.0986 *	0.0859	0.150 *
		(−2.01)	(−2.18)	(2.43)	(1.75)	(2.12)
Motivation to study in Japan	To work in Japan	0.868 ***	0.479 ***	0.145	0.508 ***	0.338 ***
		(14.77)	(15.76)	(1.82)	(13.01)	(8.02)
	Interested in Japanese society and want to live in Japan	0.0979 **	0.0603 **	0.0779 **	0.154 ***	0.148 ***
		(3.05)	(3.21)	(3.17)	(4.76)	(4.28)
Living experience	Impression of Japanese people after moving to Japan	0.135 *	0.0741 *	0.125 **	0.248 ***	0.230 ***
		(2.37)	(2.26)	(3.22)	(4.57)	(3.94)
	Do part-time job	0.624 ***	0.376 ***	-0.0356	0.255 *	0.0330
		(6.36)	(6.48)	(−0.38)	(2.38)	(0.28)
	Receive scholarship	0.0342	0.0161	0.0509	0.0966	0.0865
		(0.38)	(0.30)	(0.89)	(1.06)	(0.90)
	Receive allowance	-0.0522	-0.0279	-0.0876	-0.165	-0.157
		(−0.52)	(−0.48)	(−1.42)	(−1.70)	(−1.52)
Familiarity with Japanese society	The time living in Japan	0.201 ***	0.117 ***	0.0186	0.0801 **	0.0544
		(7.15)	(7.20)	(0.74)	(2.88)	(1.82)
	Japanese language proficiency	0.138 ***	0.0839 ***	-0.0696 ***	-0.0367	-0.0950 ***
		(5.31)	(5.46)	(−3.38)	(−1.40)	(−3.33)
Gender	Male	0.0940	0.0483	0.187 **	0.366 ***	0.324 ***
		(1.02)	(0.90)	(3.15)	(4.03)	(3.36)
Major						
	Human science	0.0203	0.00786	0.155	0.295	0.292
		(0.12)	(0.08)	(1.54)	(1.80)	(1.71)
	Social science	-0.0131	-0.00762	-0.0874	-0.112	-0.123
		(−0.11)	(−0.11)	(−1.21)	(−0.93)	(−0.99)
	Natural science	-0.311	-0.179	0.0374	-0.155	0.0756
		(−1.34)	(−1.29)	(0.20)	(−0.56)	(0.25)
	Engineering	0.336 *	0.208 *	-0.0555	0.0556	-0.0110
		(2.15)	(2.27)	(−0.56)	(0.36)	(−0.07)
	Agriculture	-0.252	-0.127		0.159	0.454
		(−0.85)	(−0.68)		(0.46)	(1.14)
	Medicine/ dentistry	-0.769 **	-0.478**		-0.517	0.211
		(−2.61)	(−2.66)		(−1.20)	(0.43)
Studying course						

(*continued on next page*)

Table 6 (*continued*)

(Analysis excluding students who plan to study further out of the sample)		Analysis 2 WORK (Plan to remain to work in Japan or not)		Analysis 3 PERMANENT (Plan to work permanently in Japan or not)		
		(4) Binary Logistic Regression	(6) Selected model (in 1st stage)	(7) Probit model with sample selection (in 2nd stage)	(8) Binary Logistic Regression	(9) Logit with Work> 0 condition
	Undergraduate degree course	0.115	0.0649	-0.0559	-0.0496	-0.0988
		(0.72)	(0.69)	(−0.54)	(−0.30)	(−0.56)
	Graduate course	-0.141	-0.0879	-0.120	-0.296	-0.266
		(−0.85)	(−0.90)	(−1.07)	(−1.65)	(−1.39)
	College student	0.657 ***	0.370 ***	0.162	0.482 **	0.336
		(3.68)	(3.61)	(1.36)	(3.00)	(1.95)
Home country	China	0.210	0.126	-0.146	-0.0511	-0.209
		(1.62)	(1.65)	(−1.66)	(−0.39)	(−1.44)
	Korea	-0.252	-0.143	-0.199	-0.370	-0.349
		(−1.10)	(−1.07)	(−1.23)	(−1.62)	(−1.26)
	Taiwan	0.0315	0.0416	-0.0176	0.0469	-0.0309
		(0.13)	(0.29)	(−0.11)	(0.19)	(−0.11)
	Vietnam	0.138	0.0509	-0.178	-0.257	-0.309
		(0.63)	(0.40)	(−1.34)	(−1.21)	(−1.36)
	Nepal	-0.108	-0.107	-0.0858	-0.0856	-0.154
		(−0.36)	(−0.64)	(−0.55)	(−0.34)	(−0.59)
	_cons	-1.033 *	-0.569 *	-0.780	-2.669 ***	-1.843 ***
		(−2.42)	(−2.32)	(−1.52)	(−6.51)	(−3.39)
	athrho		-0.313			
			(−0.82)			
	N	3219	3219	2285	3219	2285
		Wald chi2(25) = 512.27	Number of obs = 3219		Wald chi2(25) = 352.50	Wald chi2(25) = 188.51
		Prob > chi2 = 0.0000	Selected = 2285		Prob > chi2 = 0.0000	Prob > chi2 = 0.0000
		Pseudo R2 = 0.2011	Nonselected = 934			
			Wald chi2(23) = 121.52			
			Prob > chi2 = 0.0000			
	Log pseudolikelihood	-1548.9438	-2908.812		-1606.5085	-1355.2923
	Pseudo R2	0.2011			0.1099	0.0722

*** , **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
z-values in parentheses

Finally, the impression of Japanese people after moving to Japan and the time spent living in Japan appear to have a significant impact on encouraging international students to remain in Japan permanently to work. Thus, Japan's policymakers should contribute more effort to making life more 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 the limitations of the dataset, I was able to investigate the determinants of students' decisions only before graduation. However, their decisions may change after graduation and after working in Japan for a certain period of time. Therefore, the results do not fully capture the reality of the modelled environment. Future research should overcome this issue by using data from foreign employees in Japan.

Data Availability

Data will be made available on request.

Acknowledgements

I would like to thank Prof. Takenori Inoki, Prof. Hideo Miyahara, Prof. Yukinori Fujihara, and two anonymous referees for their

valuable comments and suggestions. I gratefully acknowledge the invaluable support of the Japan Student Services Organization for the data provision. I would like to thank Editage (www.editage.com) for English language editing. All remaining errors are mine. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

Asia Pacific Institute of Research. (APIR) (2012). Kansai chiikino toshisenryaku: Kodogaikokujinzaino katsuyoniyoru Kasseika [Investment strategy in the Kansai region: Revitalization by utilizing highly-skilled foreign human resources]. https://www.apir.or.jp/wp/wp-content/uploads/toushi_fin_2012.pdf.

Becker, G. S. (1994). Human capital: A theoretical and empirical analysis, with Special reference to education. *National Bureau of Economic Research* (3rd ed.). The University of Chicago Press ⟨https://www.nber.org/books/beck94-1⟩.

Bodvarsson, O.B., & Van den Berg, H. (2013). The determinants of international migration: Theory. In The Economics of Immigration: Theory and Policy. https://doi.org/10.1007/978–1-4614–2116-0_2. Springer Science+ Business Media New York.

Borjas, G. (1989). Economic theory and international migration. *The International Migration Review, 23*, 457–485. https://doi.org/10.2307/2546424

Clark, X., Hatton, T., & Williamson, J. (2007). Explaining U.S. immigration, 1971–1998. *Review of Economics and Statistics, 89*, 359–373.

Disco Career Research (2017). Gaikokujinryūgakusei, kōdo gaikoku jinzai no saiyō ni kansuru kigyō chōsa kekka [Results of a company survey on the recruitment of foreign students and highly-skilled foreign human resources] https://www.disc.co.jp/wp/wp-content/uploads/2019/01/global_kigyouchosa_201812.pdf.

Gregory, R.G. (2015). The two-step Australian immigration policy and its impact on immigrant employment outcomes. In Handbook of the economics of international migration, vol. 1. https://doi.org/10.1016/B978–0-444–53768-3.09977-X.

Han, X., Stocking, G., Gebbie, M. A., & Appelbaum, R. P. (2015). Will they stay or will they go? International graduate students and their decisions to stay or leave the U.S. upon graduation. *PLoS One, 10*(3), Article e0118183. https://doi.org/10.1371/journal.pone.0118183

Hazen, H. D., & Alberts, H. C. (2006). Visitors or immigrants? International students in the United States. *Population, Space and Place, 12*, 201–216. https://doi.org/10.1002/psp.409

JASSO. (2019a). Heisei 29-nendo shihigaikokujinryūgakusei seikatsu jittai chōsa [Lifestyle Survey of Privately Financed International Students in Japan 2017]. https://www.studyinjapan.go.jp/ja/statistics/seikatsu/data/2017.html.

JASSO. (2016a). Result of an annual survey of international students in Japan 2015. https://studyinjapan.go.jp/en/statistics/zaiseki/data/2015.html.

JASSO. (2016b). Heisei 28-nendo shihigaikokujinryūgakusei seikatsu jittai chōsa [Lifestyle Survey of Privately Financed International Students in Japan 2015]. https://www.studyinjapan.go.jp/ja/_mt/2020/08/seikatsu2015.pdf.

JASSO. (2020). JASSO outline 2020–2021. https://www.jasso.go.jp/en/about/organization/index.html.

JASSO. (2021). Job hunting guide for international students 2022. https://www.jasso.go.jp/en/study_j/job/guide.html.

Liu, Y. (2016). To stay or leave? Migration decisions of foreign students in Japan. RIETI Discussion Paper Series 16-E-097. https://www.rieti.go.jp/jp/publications/dp/16e097.pdf.

Mazzarol, T., & Soutar, G. N. (2002). The push–pull factors influencing international student selection of education destination. *International Journal of Educational Management, 16*, 82–90.

Ministry of Health, Labour and Welfare. (2019). Gaikokujinkoyō jōkyō [Employment status of foreigners]. https://www.mhlw.go.jp/stf/newpage_03337.html.

Ministry of Justice. (2012). Points-based system that provides highly skilled foreign professionals with preferential immigration treatment. https://www.moj.go.jp/ENGLISH/m_hisho06_00043.html.

Ministry of Justice. (2019). *Heisei 30-nen ni okeru ryūgakusei no Nihon kigyō-tō e no shūshoku jōkyō ni tsuite* [*The employment status of international students in Japanese companies in 2018*]. http://www.moj.go.jp/nyuukokukanri/kouhou/nyuukokukanri07_00229.html.

Moriya, M. (2011). Nihonno Gaikokujin Ryugakusei-Roudousha to Koyoumondai [Japanese foreign students, workers and employment issues]. Koyoshobo.

Moriya, M. (2016). Nihonniokeru "Global jinzai" ikuseirongito "Gaikokujinkodojinzai" ukeiremondai ['Global human resources' nurturing debate and the problem of accepting 'foreign advanced human resources']. *Social Policy*, *8*. ⟨https://www.jstage.jst.go.jp/article/spls/8/1/8_29/_pdf/-char/ja⟩.

Rosenzweig, M.R. (2006). Higher education and international migration in Asia: Brain circulation. Yale University. https://siteresources.worldbank.org/INTABCDE2007BEI/Resources/MarkRosenzweigConferenceVersion.pdf.

Sato, Y. (2018). International student policy as de facto entry point of immigration and refugee policy in Japan: merits and problems of versatile international student policy. *Migration Policy Review, 10*, 29–43. ⟨https://www.iminseisaku.org/top/pdf/journal/010/010_029.pdf⟩.

Schoorl, J.J., Heering, L., Esveldt, I., Groenewold, G., van der Erf, R., Bosch, A. et al. (2000). Theoretical approaches in migration research. In Push and pull factors of international migration (pp. 3–12). Eurostat. https://edz.bib.uni-mannheim.de/www-edz/pdf/eurostat/00/KS-30–00-908-EN-I-EN.pdf*ctors of International Migration* 2000 3 12.Eurostat. https://edz.bib.uni-mannheim.de/www-edz/pdf/eurostat/00/KS-30-00-908-EN-I-EN.pdf.

Shields, G., & Shields, M. (1989). The emergence of migration theory and a suggested new direction. *Journal of Economic Surveys, 3*, 277–304.

Shiho, K. (2009). Gaikokujinryūgakusei no Nihon ni okeru shūshoku wa sokushin dekiru no ka [Can foreign students find employment in Japan?]. *Works Review, 4*, 208–221. ⟨https://www.works-i.com/research/paper/works-review/item/090601_WR04_18.pdf⟩.

Shiho, K. (2013). Chūgokujin ryūgakusei no Nihon de no shūshoku iyoku to karera no shusshin chiiki no kankei - shusshin chiiki no keizai jōsei no eikyō ni kansuru ichi kenshō - [Chinese students and their intention to work in Japan after completion of studies: The effect of their home regions' economic circumstances]. *Journal of International Studies, 2*, 57–69.

Sykes, B. (2011). Mobile talent? The staying intentions of international students in five EU countries. MPG. https://www.stiftung-mercator.de/media/downloads/3_Publikationen/SVR_Sykes_Chaoimh_Study_Mobile_Talent_April_2012.pdf.

Further reading

JASSO. (2019b). *2018 (Heisei 30) nendo gaikokujinryūgakusei shinro jōkyō gakui juyo jōkyō chōsa kekka* [*2018 survey on the course status and degree conferral status of internat*ional students]. https://www.studyinjapan.go.jp/ja/_mt/2020/09/date2018sg.pdf.

JASSO. (2006). Heisei 17-nendo shihigaikokujinryūgakusei seikatsu jittai chōsa gaiyō [Lifestyle Survey of Privately Financed International Students in Japan 2005]. https://www.studyinjapan.go.jp/ja/statistics/seikatsu/data/2005.html.

Liu-Farrer, G. (2009). Educationally channeled international labor mobility: contemporary student migration from China to Japan. *International Migration Review, 43*, 178–204. https://doi.org/10.1111/j.1747-7379.2008.01152.x