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

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Abstract

With the use of data 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 they graduate or finish 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, the GDP per capita gap and unemployment rate gap between the home countries and Japan 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 data from a survey conducted by the Japan Student Services Organization and binary outcome models to investigate these determinants.

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- ✧ The analysis results revealed that a strong motivation to live in Japan has a significant impact on international students' decisions to remain in Japan.
- ✧ 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

The number of international students in Japan continues to grow; it increased by more than twofold—from 123,829 to 298,980 students—between 2008 and 2018 (Fig. 1). In the context of the insufficient labor force in Japan, these students are making an important contribution to the labor force through their part-time work.¹ International students can also be expected to become a valuable 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 foreign-born higher-education students who consider remaining in Japan as a first choice 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 2017) (Fig. 2), with an approx. 90% 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 to work as a whole, but there is a large

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 (Japan Ministry of Health, Labor and Welfare 2019).

² To attract foreign talent via education, Japan's government adopted the “Plan to Accept 300,000 Foreign Students” in 2008. The “Career Development Program for Foreign Students in Japan” (Ministry of Economy, Trade and Industry 2007) had placed greater importance on student migration as a crucial strategy. The “New Growth Strategy” (Cabinet Office 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).

gap between the percentage of international students wishing to remain (approx. 65%) and the percentage of such students who actually remain to work in Japan (approx. 32%). In addition, among the international students who remain in Japan, many face culture shock due to major differences between their home country's working style and the Japanese working style (Moriya 2011; Disco 2017).

It is therefore important to increase the percentage of international students remaining in Japan to work, and to help them establish a stable life in Japan. 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 2012 and 2016 papers, which focused on students' intention to remain based on a survey of international students in Japan's Kansai region, our analysis divides the students' decisions to remain into two groups depending on the purpose for remaining (to work or to continue their studies). Second, in comparison with Shiho's 2009 and 2013 papers 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.

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 is presented in Section 2, and 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 1964) posits that education is considered an investment in future earnings and employment. 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 increase in the present value of the future income is greater than the cost of migrating (as well as other education costs), students will move to the country yielding the highest net present value.

Rosenzweig (2006) later presented two models explaining how migration takes place: the school-constrained model and the migration model. The school-constrained model refers to a lack of educational facilities in the home country. The migration model refers to the 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. It is also worth noting the research by School (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, School (2000) 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 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).

Regarding prior analyses of the mobility and migration decisions of international students, there is some research on European countries and the U.S. For example, Hazen (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, Karaca (2018) showed that the average rate of students intending to stay in the U.S. after receiving a doctorate degree from a U.S. institution was approx. 71% among the students from all of the countries and regions examined. 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). 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 (2012, 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 (2012, 2016) conducted empirical research based on a survey conducted by the Asia Pacific Institute of Research in 2012 regarding the work plans of international students in the Kansai region of Japan. 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 their 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 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 (which was defined as

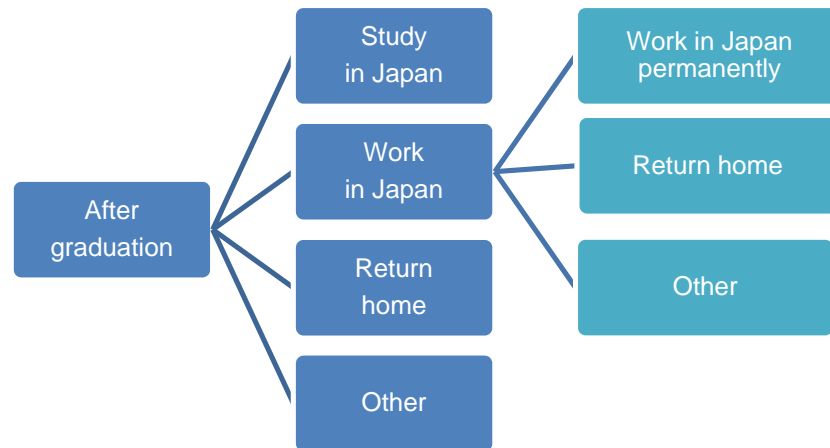
completing the two-step immigration process³), I focused on the students who wanted to stay in Japan to determine how long they intended to work in Japan. The findings of this research will contribute to the emerging literature on the mobility of foreign students as well as to the literature on immigration in Japan.

³ 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 2014).

3. Analytical Framework and Data

3.1 Framework of the analysis and hypothesis development estimation models

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 university 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.

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 0 if the student does not want to remain to work and 1 if the student does want to remain.⁴ Second, the probit model with a selected sample is used to assess the influence of a student's personal characteristics, his or her

⁴For the reason that the choices (outcome) of each student are multivariate, we can apply the multinomial model instead. However, in order to investigate the students' intention to remain, we decided to use the binary outcome model. In fact, the empirical results of the multinomial model and the logit model are not very different. These issues are discussed more in the Robustness check section.

motivation to study in Japan, and some “push-pull” factors regarding the probability of remaining to work 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

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

$$\begin{aligned} \text{Prob}(WORK_i = 1) \\ &= \Lambda(\beta_0 + \beta_1' \text{studentcharacteristics}_i + \beta_2' \text{motivation}_i \\ &\quad + \beta_3' \text{pushpullfactors}_i) \end{aligned}$$

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

$$\begin{aligned} \text{Prob}(PERMANNT_i = 1) \\ &= \alpha_0 + \alpha_1' \text{studentcharacteristics}_i \\ &\quad + \alpha_2' \text{motivation}_i + \alpha_3' \text{pushpullfactors}_i + u_i \end{aligned}$$

We use Model 2 only when $WORK_i > 0$

In the above formulas, “i” represents the student concerned, and “ $\Lambda(\cdot)$ ” 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 in Japan permanently after working (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, the amount of time the student has lived in Japan, the course of study (e.g., doctoral course, masters course), Japanese language proficiency (qualifications for Japanese language), study major (e.g., human sciences, social sciences, natural sciences), and living area (Kanto region, Kansai region). The second 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 to remain in Japan to work. This group contains two variables.

The first variable 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 represents whether the student is interested in Japanese society and wants to live in Japan when deciding to study in Japan. Because this is a multiple-choice questionnaire and students can choose one of four responses in order from least to most appropriate, I treat these variables as a category with values ranging from 0 to 3. A value of 0 represents a response of Not Interested, a value of 1 represents Slightly Interested, 2 represents Somewhat Interested, and 3 means Very Interested.

I also added some variables associated with the pull-push factors: the student's perception of the geographic distance between his/her home country and Japan (a proxy for travel costs), the gap between the GDP per capita in the student's home country and that of Japan (a proxy for the wage differential), and 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. To our knowledge, the dataset from the JASSO "Lifestyle Survey of Privately Financed International Students in Japan" is the only dataset that was distributed to international students all over Japan. 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 survey conducted in January 2015. In this survey, a questionnaire was sent randomly to 7,000 privately funded international students. There were 6,036 valid responses, making the response rate 86.2%. 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.⁵ After cleaning the data, I obtained the cross section data shown in Table 1.

Table 1 summarizes the descriptive statistics for all of the variables included in the international students' survey and the macro-economic factors. I performed a correlation test 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.

4. Empirical results

The estimation results are summarized in Table 2. 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 in the students' desire to remain in Japan for work, such proficiency also reduced the possibility the student's 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 are more likely to remain than those living in other regions.

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

The results showed that the purpose of studying has a significant positive impact on the intentions of students after graduation. To be more specific, students for whom the

⁵ The unemployment rate in Taiwan was obtained from Taiwan national statistics (<https://eng.stat.gov.tw>), based on the annual Manpower survey results.

purpose of studying in Japan is to work in Japan are more likely to remain in Japan to work compared with students who are studying in Japan for other reasons. Moreover, the former students are 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 students like the life in Japan and desire to live in Japan, they are more likely to remain to work after graduation, and more likely to intend to work permanently in Japan. In other words, the students' motivation(s) to study in Japan are the most important determinants, with positive effects on the students' decisions.

Impact of variables related to “push-pull” factors

The geographic distance between the home country and Japan was found not to have significant impact on the students' decisions. However, the GDP per capita gap did have a slight but significant impact. This means that the higher income in Japan could be a push factor that encourages students to work in Japan after their graduation. However, this factor is not strong enough to make students decide to work there permanently. In addition, the unemployment rate in the home country, another 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 is higher than the unemployment rate in Japan, students may choose to work permanently in the host country in order to have a better working opportunity instead of coming back home.

I obtained essentially the same results as Shiho (2009) in terms of the length of time the students had lived in Japan, the students' biological sex, and the Japanese language proficiency increasing the probability of staying in Japan to work. Much like Liu (2012), I observed that a strong interest in Japanese culture motivates many students to remain.

However, the present findings are also associated with some studies that used pull-push models. In particular, the GDP per capita gap (a proxy for the wage differential) was shown to have a significant impact on the international students' decisions 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 a country's development, which could be a push factor encouraging students to remain. The geographic distance between the students' home countries and Japan also showed no significant impact;

the fact that our sample included a large percentage of students from Asian countries might be the reason for this result.

5. Conclusions and some policy implications

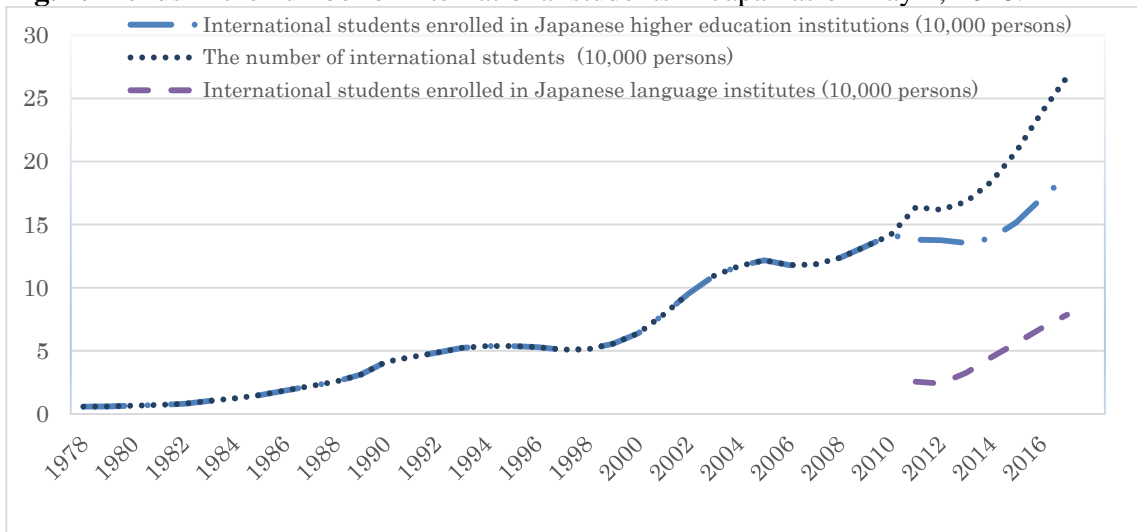
The resolution of labor shortages is an important policy issue in Japan, and recent policies addressing this matter have focused on high-skilled labor. In this context, how to encourage international students to remain in Japan to work after they complete their studies is becoming increasingly important. 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 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 meet not only the students' desires but also 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 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 objectionable (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 at the N5 Japanese language proficiency level to work only 10 hours/week, N3-level students to work 20

hours/week, and N2-level students to work 28 hours/week.⁶ 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.

⁶ Information about the Japanese language proficiency test:
<https://www.jlpt.jp/about/levelsummary.html>

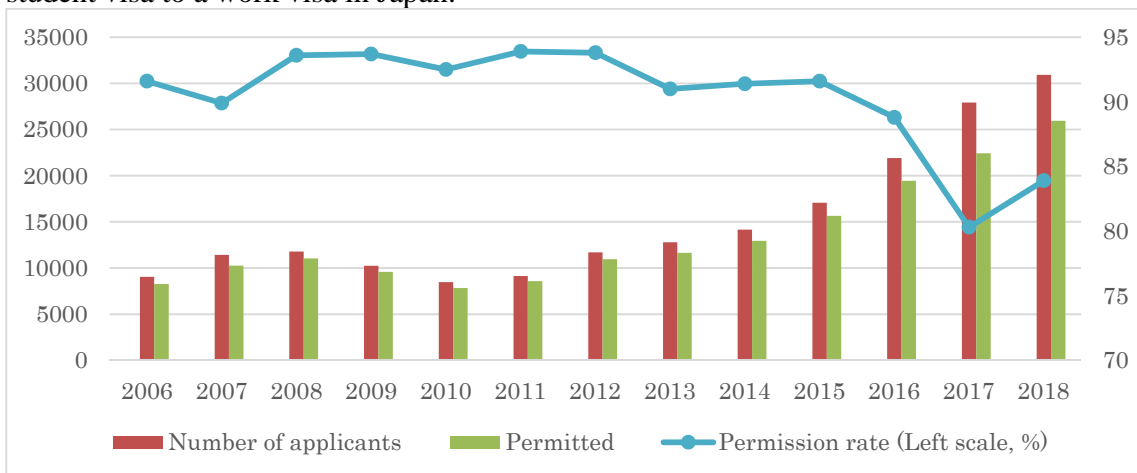
Fig. 1. Trends in the number of international students in Japan as of May 1, 2018.



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

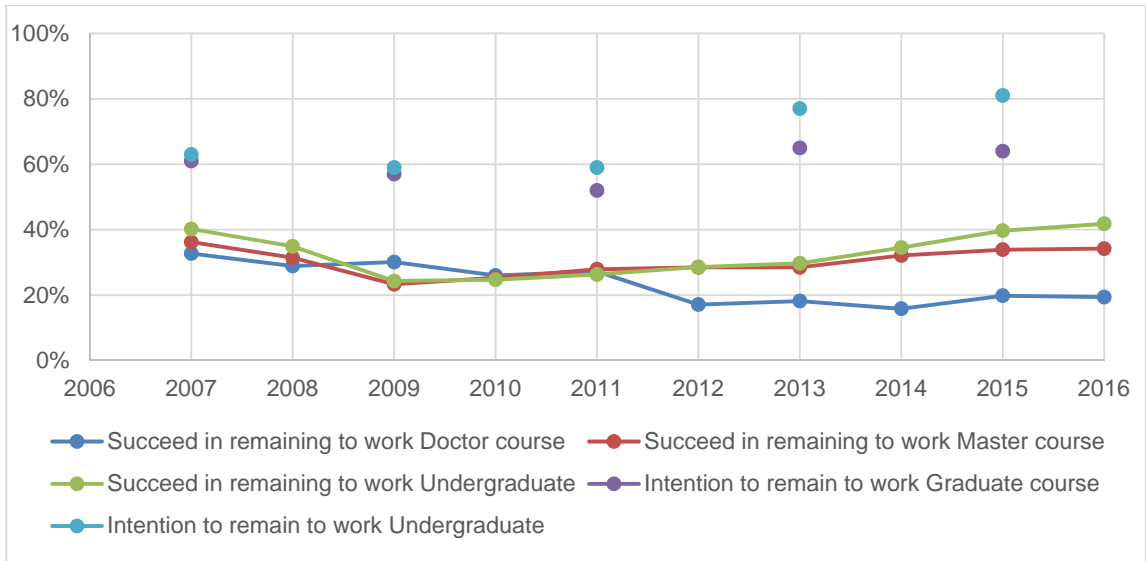
Source: https://www.jasso.go.jp/about/statistics/intl_student_e/2018/index.html

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



Source: <http://www.moj.go.jp>

Fig. 3. The gap in the percentage of international students who intend to remain in Japan to work and the percentage of international students who succeed in remaining.



Source: Author's calculations using the dataset from the JASSO survey.

Table 1. Descriptive statistics

Variable name		Sample size	Mean	S.E	Min	Max
Dependent Variables						
Analyse 1	Plan to remain to work after finishing the current school	6,036	0.380	0.485	0	1
Analyse 2	Want to work in Japan permanently after employment in Japan	6,036	0.202	0.401	0	1
Independent Variable						
Student's attribute	Gender, Male	6,036	0.499	0.500	0	1
	The time living in Japan (number of years)	6,021	3.185	1.717	1	7
	Studying 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
	Colledge student (Junior college, professional 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)	6,036	3.275	1.916	0	5
	Studying 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						
	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	6,036	0.871	1.091	0	3
	Interested in Japanese society and want to live in Japan	6,036	1.594	1.408	0	3
Push-Pull factors	Geographically close to Japan	6,036	0.397	0.870	0	3
	Gap in GDP per capita between Japan and home country (2015 data)	6,036	-25129	9049.810	-34513	21662
	Unemployment rate in the home country (average unemployment rate 2011-2014)	6,036	3.893	1.290	0	12.68

Table 2. Correlations between variables

	Plan to remain to work	Gender, Male	The time living in Japan	Undergraduate	Graduate c	College st	Under college	Japanese l	Human sci	Social scie	Natural sci	Engineering	Agriculture	Medicine/	To work in	Interested	Geographical	Kanto area	Kansai area	GDP perca	Unemployr	
Plan to remain to work	1																					
Gender, Male	-0.039	1																				
The time living in Japan	0.1852	0.0396	1																			
Undergraduate degree course	0.0768	-0.0255	0.2689	1																		
Graduate course	0.1998	0.0098	0.1717	-0.3352	1																	
College student	0.0113	0.0135	0.0488	-0.3136	-0.236	1																
Under college student	-0.2595	0.0058	-0.4582	-0.4468	-0.3363	-0.3147	1															
Japanese language proficiency	0.0896	-0.0916	0.1717	0.2024	-0.0378	-0.0796	-0.1031	1														
Human science	0.0628	-0.0741	0.0962	0.1207	0.055	0.0039	-0.1715	0.1206	1													
Social science	0.1109	-0.0099	0.2415	0.359	0.0174	-0.0504	-0.3316	0.1404	-0.1692	1												
Natural science	-0.0045	0.0172	0.0568	-0.002	0.1621	-0.0402	-0.1052	-0.0464	-0.0505	-0.1002	1											
Engineering	0.0683	0.1399	0.1316	0.0258	0.2343	-0.0064	-0.2238	-0.0518	-0.1031	-0.2045	-0.0611	1										
Agriculture	0.025	0.0092	0.0241	-0.0037	0.145	-0.056	-0.0755	-0.0559	-0.0389	-0.0772	-0.023	-0.047	1									
Medicine/ dentistry	0.0953	-0.0214	0.0042	-0.0436	0.1678	-0.0399	-0.0688	-0.0871	-0.0341	-0.0677	-0.0202	-0.0412	-0.0156	1								
To work in Japan	0.0358	0.0378	-0.0002	-0.0411	-0.1516	0.1702	0.0308	-0.0214	-0.0454	0.0111	-0.0485	-0.0118	-0.0448	-0.0695	1							
Interested and want to live in Japan	0.0017	0.0194	-0.0124	0.0273	-0.0884	0.0237	0.0297	0.084	0.0235	0.0172	-0.0345	-0.0766	-0.041	-0.0616	0.0947	1						
Geographically distance	0.0389	0.0161	0.107	0.0837	0.0225	-0.0553	-0.0571	0.0858	0.0314	0.0617	0.0119	0.025	-0.001	0.0113	-0.0781	-0.1699	1					
Kanto area	-0.0917	-0.009	-0.0703	-0.1462	-0.214	0.1381	0.2167	-0.0076	-0.059	-0.1273	-0.0567	-0.0918	-0.0197	-0.0688	0.0799	0.0387	0.0107	1				
Kansai area	0.0595	-0.0294	0.0637	0.1046	0.0878	-0.1008	-0.0966	0.1182	0.0296	0.1261	0.0023	-0.0112	-0.0387	-0.0301	-0.0569	-0.0097	0.0377	-0.4345	1			
GDP percapita gap	0.0977	-0.0022	-0.0177	0.1501	0.0122	-0.1112	-0.068	0.1016	0.067	0.0116	0.0126	-0.0219	-0.0167	-0.003	0.006	0.039	0.0599	0.0336	0.06	1		
Unemployment rate	0.0343	0.0158	0.0378	0.0952	0.1328	-0.1468	-0.0881	0.092	0.0441	0.0341	0.042	0.0142	0.0092	0.0314	-0.134	0.0424	0.096	-0.012	0.0861	0.3759	1	

Source: Author's calculations.

Table 3. Empirical results

		Analyse 1 (Plan to work in Japan or not)		Analyse 2 (Want to work in Japan permanently after employment in Japan)		
Variables		Binary Logistic	Selected model	Binary Logistic	Probit regression	
		Regression	(in 1st stage)	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)
		Colledge 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)	
	unemploymenttrate	-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.

References

- Asia Pacific Institute of Research (APIR) (2012) Kansai chiikino toshisenryaku: Kodogaikokujinzaino katsuyoniyoru Kasseika (In Japanese)
- Beine M., Noël R., Ragotde L. (2014) Determinants of the international mobility of students. *Economics of Education Review*, 41, 40-54.
<https://doi.org/10.1016/j.econedurev.2014.03.003>.
- Disco Career Research (2017) Gaikokujin ryugakusei, Kodojinzai no katsuyono saiyoukansuru Kigyouchosakekka (In Japanese)
- Gregory R.G. (2014) The two-step Australian immigration policy and its impact on immigrant employment outcomes. IZA DP No. 8061. Available at: <http://anon-ftp.iza.org/dp8061.pdf>. Accessed Nov. 2019.
- Japan Ministry of Health, Labor and Welfare (2019) “Gaikokujin Roudou Jyoukyou”
- Japan Student Services Organization [JASSO] (2018) “Heisei29nendo Shihi gaikokujin ryugakusei seikatsu jittai chosa”
- Liu Y. (2016) To stay or leave? Migration decisions of foreign students in Japan. *RIETI Discussion*. Available at: <https://www.rieti.go.jp/jp/publications/dp/16e097.pdf>. Accessed Nov. 2019.
- Mazzarol T. and Soutar G.N. (2002) The Push-Pull Factors Influencing International Student Selection of Education Destination. *International Journal of Educational Management*, 16(2), 82-90.
- Ministry of Foreign Affairs (MOFA). 2013. “Highly Skilled Professional Visa”. http://www.mofa.go.jp/j_info/visit/visa/long/visa16.html. MOJ – Ministry of Justice, Immigration Bureau. 2012a. “Points-Based System that Provides Highly Skilled Foreign Professionals with Preferential Immigration Treatment”. http://www.immi-moj.go.jp/english/topics/pdf/120502/01_e.pdf. -
- Ministry of Justice (2017) “Heisei28nenniokeru Ryugakuseino Nihonkigyoheno shukatsu jyoukyo nitsuite”
- Moriya Takashi (2011) Nihonno Gaikokujin Ryugakusei-Roudousha to Koyoumondai (In Japanese) Koyoshobo.
- Oishi, Nana. 2012. “The Limits of Immigration Policies: the Challenges of Highly Skilled Migration in Japan”. *American Behavioral Scientist*, Vol. 56, No. 8: pp. 1080-1100.
- Rosenzweig M.R. (2006) Higher Education and International Migration in Asia: Brain Circulation. Yale University. Available at: <https://siteresources.worldbank.org/INTABCDE2007BEI/Resources/MarkRosenzweigConferenceVersion.pdf>. Accessed Nov. 2019.
- Schoorl J.J. (2000) Theoretical approaches in migration research. In: Push and Pull factors of international migration. Luxembourg: Eurostat, 3-12. Available at: <https://edz.bib.uni->

mannheim.de/www-edz/pdf/eurostat/00/KS-30-00-908-EN-I-EN.pdf. Accessed Nov. 2019.

Shiho, Kei (2009) A study on the international students and job market in Japan. (in Japanese). Works Review, 4, 208-221.

Shiho, Kei (2013), Chinese Students and their intention to work in Japan after Completion of studies: The effect of their home regions' economic circumstances. (in Japanese). Kansai Gakuin Daigaku Kokusai Gakken, 2, 1, 57-69.

Sykes B. (2011) Mobile talent? The staying intentions of international students in five EU countries. Berlin: MPG. Available at: https://www.stiftung-mercator.de/media/downloads/3_Publikationen/SVR_Sykes__Chaoimh_Study_Mobile_Talent_April_2012.pdf. Accessed Nov. 2019.