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-Empirical Analysis on the Impact of Visa waiver-[*]

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Abstract

In spite of a heated debate over immigration policies in the world, the effects of visa, which is one of the representative tool for immigration control, are uncertain for some aspects. This paper analyzes whether visa relaxation has impacts on both legal foreign visitors and illegally overstayed foreigners focusing on Japanese visa waiver program. The empirical analyses show that visa waiver will increase both legal travelers and illegally overstayed foreigners while it may have a bigger effect on legal visitors than overstayed foreigners.

Keywords: Visa; Immigration policy; Policy evaluation
JEL Classification: F22; F68; H56; K37; L51

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1 Introduction

In many countries, immigration control become a controversial issue of public policy. British government exit the EU because they thought that they cannot afford to receive more immigrant. United states also choose Donald Trump, who insists that illegal immigrants are a threat, as their president. They try to introduce several ways to control the flow of foreign visitors while the effects of these measures are uncertain.

Among them, visa restriction is a typical method to control the flow of foreign visitors. In the international law, all countries have a right to introduce the visa restriction and many countries indeed make a visa requirement against unwelcome visitors. Neumayer (2006), which is the first empirical research to investigate the visa policy, mentions that visa has the pre-selection role like a virtual border for foreign visitors because 'many countries require airlines not to let anyone enter the aircraft who is not in possession of a valid visa' (Neumayer, 2006, p75). As this says the visa restriction may be one of the most powerful ways to control visitors' flow. On the other hand, some countries introduce visa waiver program or the relaxation of visa restriction for certain countries from which they consider they have few unwelcome visitors. Some countries also often introduce the relaxation of visa as a diplomatic tool. If the requirement of visa is abolished, we can assume that foreigners can enter into the country easily. However, it has been unsure whether this statement can be applied to both legal visitors and illegal visitors, and how big the impact of visa waiver is. Then, this paper tries to investigate the effects on both legal visitors and illegal visitors, and examine whether the visa policy, both visa relaxation and visa regulation, works as one of the immigration policies.

The effects of visa policies on the legal tourists have been researched. Neumayer (2010a) and Lawson and Roychoudhury (2016) investigate a impact of visa restriction for foreign visitors using the data of about 30,000 country pairs. Both of them suggests that the visa restriction reduce the bilateral flow of legal visitors and the cost of the restriction is high considering the economic impact from tourists. Balli et al.(2013) and Beenstock et al.(2015) investigate the effect of visa waiver program in Turkey and Israel respectively. They use inbound tourists' data of each country and suggest that the termination of visa requirement increase the number of inbound visitors. Xu (2013) compares the similar two countries, one of which is applied the visa waiver program of the U.S. and the other of which is not so. This paper suggests the visa waiver program increases inbound visitors to the U.S.. These papers focus on the effect on legitimated visitors, most of whom are tourists. The estimations of these tourism demand with or without a visa factor were researched a lot (Song and Li, 2008 or Witt and Witt, 1995, for example), and this kind of papers employs the income of visitors, the travel cost, exchange rates, and some events like a war or a tourism campaign as determinant factors of the tourism demand. Therefore, we use these factors as well as the dummy of the visa waiver for the analysis of the foreign visitors.

There are fewer papers about other effects of visa than research about tourism demand. Bertoli and Moraga (2012) focuses on the immigrants, who stay in the destination country relatively longer than tourists, and shows that visa restrictions of each country may reduce the number of immigrants. Neumayer (2010b) shows that visa restrictions may reduce the foreign direct investment and the amount of

trade between the countries. However, as far as we know, there is no research about visa and illegal migration although there are some papers about illegal migrant and policy like Pinotti (2017). Then, we also carry out a regression analysis about visa and illegal migrants.

Considering these two aspects, legal and illegal visitors, we investigate the effects of the visa waiver using Japanese data. Japanese government employ the visa policy as a diplomatic tool as well as the controlling tool of traveler from 2000s[1]. Therefore, we might assume that Japanese visa policy is relatively exogenous. However, as many countries including Japan do so, the visa restriction is usually implemented in order to control the flow of foreigners or to reduce the number of unwelcome visitors. Thus, there might be reverse causalities between the visa policy and the number of foreign visitors or illegal migrant. In this paper, we perform Granger causality check and confirm that the effect of such reverse causalities is relatively low if there are some.

This paper consists of five sections. The following section will explain the Japanese visa system and the situations about foreign visitors. The empirical analysis about foreign visitors and illegal migrants are investigated in section 3 and section 4 respectively. Section 5 discusses the results and policy implications, and presents concluding remarks.

2   Visa system and foreign visitors in Japan

Japanese visa system is not simple. Foreigners who want to enter Japan have to issue a valid visa at a consulate of each country before they leave to Japan in principle. Each visitor has to issue a visa according to his or her status of residence. The visa classification, which is showed as table 1, is linked to the classification of status of residence though both classification is not completely the same. Before issuing visa, in principle, visitors, except temporary visitor who issues short-term stay visa, have to get a certificate of eligibility from representatives in Japan and the representatives have to be issued the certificate from a regional immigration bureau in Japan. These procedures are time-consuming and visitors have to prepare visa issuance fee, which is usually 3,000 yen, many documents like a balance statement for a bank account, and representatives in Japan.

However, travelers with short-term stay visa often are not required such complicated processes because they need not get a certificate of eligibility and there are some visa relaxation measures depending on countries. The most popular measure of visa relaxation is visa waiver. If the country of a temporary visitor is selected as a visa-waived country, he or she can enter Japan without visa. The number of visa-waived countries is 67 in January 2017 (table 2). As table 2 shows, visa-waived countries are mainly western countries while some Latin American and Asian countries are also selected. At a glance, these visa-waived countries are relatively high income and have a strong tie with Japan. However, there are some low or middle income countries which do not necessary have a strong connection with Japan like Suriname or Lesotho. The permitted period of stay for visa waiver is basically 90 days except Thailand and Brunei, whose period of stay is 15 days. The list of visa-waived countries can be varied and some

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[1] For example, three of five Japanese visa relaxations in 2016 is formally determined in the summit meeting between the Japanese prime minister and a foreign leader.

Asian and European countries were added to the list while only Colombia was excluded from it in 2004 as table 3 shows.

Table 1: The visa classification

Visa type	Purpose or example	Period of stay
Short-term stay visa	Tourism, business, and visiting friends or relatives	~90 days
Highly skilled professional visa	Highly-skilled human resources per "Points System"	Depending on the conclete type of visa (usually more than 90 days)
Working visa	Proffessor, artist, journalist, entertainer, and so on	
General visa	Student, cultural activities, training, and so on	
Specified visa	Long-term resident, spouse or children of Japanese, and so on.	
Diplomatic visa	Diplomat	
Official visa	Official	
Visa for Medical Stay	Medical stay	~90 days/ 6 month/ a year

Source: Ministry of Foreign Affairs of Japan

Table 2: The list of visa-waived country

Asian	Europe					Oceania	Latin America
Indonesia	Iceland	Finland	Switzerland	Liechtenstein	Lithuania	Australia	Argentina
Singapore	Ireland	France	Sweden	Romania		New Zealand	Uruguay
Thailand	Andorra	Bulgaria	Spain	Luxemburg	Middle-East	North America	El Salvador
Malaysia	Italy	Belgium	Slovakia	United Kingdom	Israel	United States	Guatemala
Brunei	Estonia	Poland	Slovenia	Denmark	Turkey	Canada	Costa Rica
Korea	Austria	Portugal	Serbia	Germany	Africa	Latin America	Suriname
Taiwan	Netherland	Macedonia	Czech	Norway	Tunisia	Barbados	Chili
Hong Kong	Cyprus	Malta	Croatia	Hungary	Mauritius	Honduras	Republic of Dominica
Macau	Greek	Monaco	San Marino	Latvia	Lesotho	Mexico	Bahama

Source: Ministry of Foreign Affairs of Japan

Table 3: The changes of the visa-waived country list

| Year	Added country (Excluded country)	Year	
2000	Latvia, Lithuania	2009	Romania
2001		2010	
2002	Slovakia	2011	Cerbia
2003		2012	
2004	Hong Kong, (Columbia)	2013	Thailand, Malaysia
2005	Korea, Taiwan, Macau, Bulgaria	2014	Indonesia
2006		2015	
2007		2016	
2008		2017	

Source: Ministry of Foreign Affairs of Japan

Another measure of visa relaxation is the issuance of multiple visa. While visitors usually have to issue visa every time they enter Japan, they do not have to issue visa if they have valid multiple visas. Thus, it makes easier to enter Japan than the ordinal way. However, travelers still have to issue a visa in this measure and the valid term of multiple visa varies in each country or each individual. Other measures of visa relaxation include discount of visa issuance fee or changes of criteria for issuing visa while these are assumed to have less effective than visa waiver because travelers still have to issue visa. In addition, the information of these minor measure of visa relaxation is not published completely because some foreigners may abuse visa system[*2]. Thus, we focus on the effect of visa waiver and exclude the other minor visa relaxations as explanatory variables.

[*2] For instance, if criteria for issuing visa like a balance of bank account are published, people can borrow much money from others and mimic as if they are rich. Although we tried to get the information of visa relaxation including minor measures from the ministry of foreign affairs of Japan, it denied to publish for such a reason.

The number of foreign visitors are increasing as figure 1 shows. Most of them enter Japan in their capacity as short term stayers. Since visa waiver can be applied to short term stayers whose countries are selected as visa-waived countries, visa waiver may have a great impact on these short term stayers. In addition to visa waiver, several factors can be considered as factors to increase the number of travelers. Economic development of Asian countries are one of them. Japan is nearby Korea, Taiwan, China, and Southeastern Asian countries, where rapid economic growth have been experienced from 1990s. Another factor is the increasing number of airlines represented by low-cost carrier (LCC). This is mainly caused by deregulation of aviation policies of Japan and other countries[*3] and can be assumed as a exogenous factor. Tourism policy may also affect the tourism demand. Japanese government holds a inbound tourism promotion called 'Visit Japan Campaign' (VJC) from 2003. This promotion is mainly held in selected countries and some research suggest VJC succeeds in inviting a large amount of tourists to Japan[*4]. In addition, as ordinal estimations of tourism demand suggests, weak Japanese yen may increase the number of tourists.

Figure 1: The number of foreign visitors
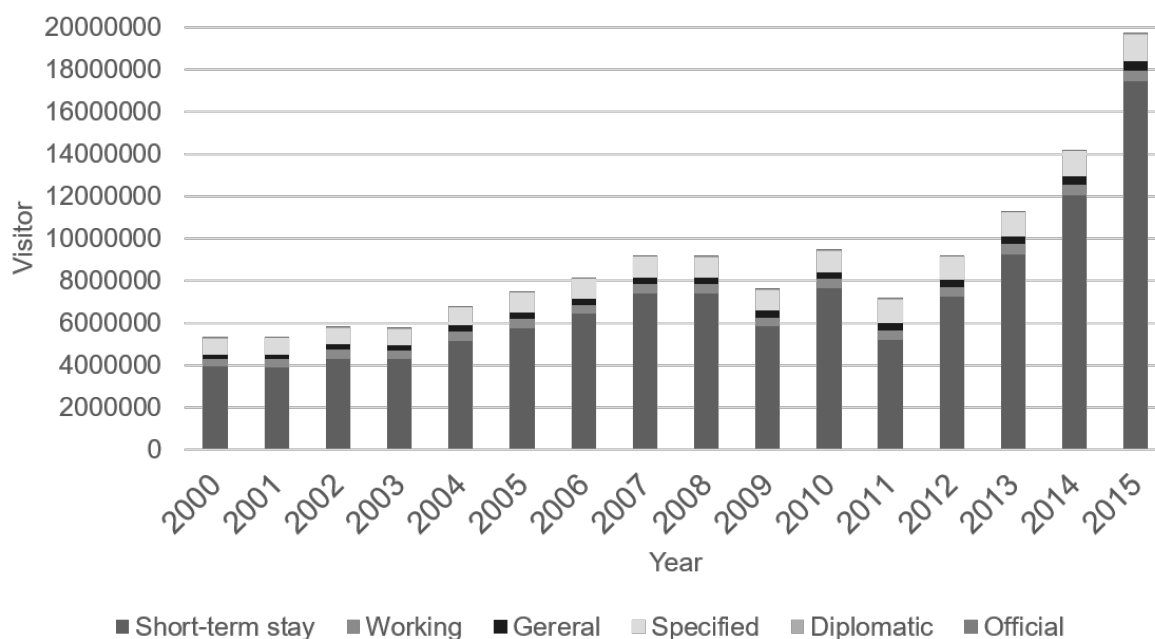
Source: Ministry of Justice of Japan[*5]

[*3] Japanese government abolished a demand-supply adjustment regulation and approval of tariffs and charges in 2000. China did a similar deregulation in 2004. Indeed, eleven of twenty four aviation companies which have a scheduled flight in Japan started their frights after deregulation. Considering five companies which were founded after 1995 expecting the deregulation, increasing number of fright can be attributed to deregulation of aviation policies.

[*4] Nakazawa (2009) and JNTO (2015) are examples.

[*5] Highly skilled professional visa started from 2015 and is omitted since the number of people with it was 2,300, which is a very small number. Medical stay visa holders, who are very few, are included in short term stayers.

Figure 2: The stock number of illegally overstayed foreigners at January 1st
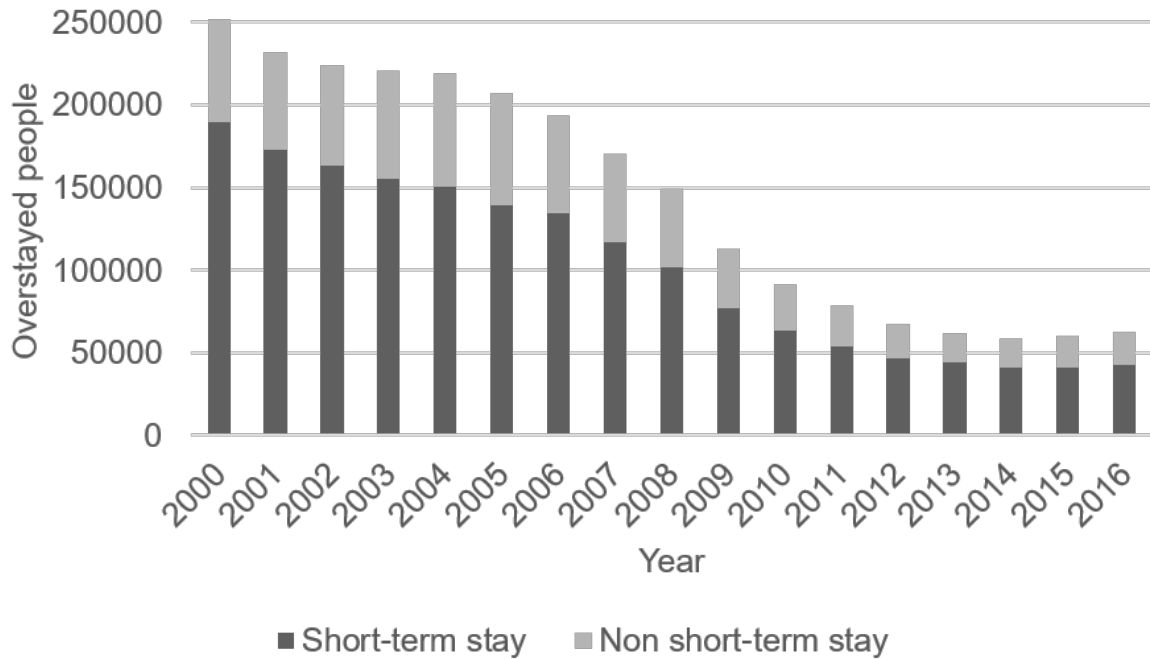
Source: Ministry of Justice of Japan

On the contrary to the number of foreign visitors, the number of overstayed foreign nationals (those who illegally stay beyond their permitted period of stay) has largely reduced as figure 2 shows. In Japan, the Ministry of Justice record the types of visa, permitted period of stay, and nationalities of each visitor. From this record, they calculate and publish the number of overstayed foreigner in each year. Since these numbers are the stock of overstayed foreigners at January 1st of each year, we have to consider that several factors affects the flow of overstayed foreigners, which is used in our regression. The figure 2 also shows that a large part of overstayed people comes as temporary visitors and this implies that visa waiver may affect the number of these illegal travelers. Since the permitted term of stay for temporary visitors is usually 90 days or less and visitors overstayed even more a day than the permitted term are counted as illegally overstayed visitors, the effect of visa waiver would be shown in the flow of the same year. Other possible factors for increasing the number of overstayed visitors are a economic factor, a cost factor, and a policy factor. Large numbers of overstayed visitors come from Asian countries, which have high economic growths. Thus, we can guess that people there who might have come to Japan, which was much richer than their own country in the past, do not come since they become rich. On the other hand, a cost factor may work as a factor which increase illegals. Travel cost has been getting cheaper because the number of airlines has increased and people may come to Japan much easier than before. A policy factor is also important. Japanese government implemented a campaign to halve overstayed visitors from 2004 to 2009 and is still trying to reduce overstayed people using the know-how employed

in this campaign[*6].

Considering these backgrounds and factors, the following parts investigate the effect of visa waiver on both foreign visitor and overstayed people.

3 Empirical analysis about visa waiver and foreign visitors

In order to confirm whether visa waiver has an impact on the number of foreign visitors, we conduct static and dynamic panel data analysis using the data of 172 countries[*7] from 2000 to 2014. Descriptive statistics and data sources are shown in table 4.

Table 4: Descriptive statistics and data sources

Variables	Mean	Std Dev	Min	Max	Number	Source
Foreign visitor	47411.68	232904.2	0	3016112	2556	Statistical Survey on Legal Migrants
Direct aviation services	870.08	3987.71	0	42376	2580	OAG Aviation data
GDP per capita	15919.19	18723.6	336.80	159825.72	2580	Penn World Table
Real exchange rate	0.4939	0.3652	0.0168	2.6641	2580	Penn World Table
Visa Waiver dummy	0.3312	0.4698	0	1	2580	Treaty Database
VJC dummy	0.0565	0.2311	0	1	2580	White Paper of Tourism
Human Development Index	0.6662	0.1671	0.255	0.948	2413	United Nation Development Proglam
Human Capital Index	2.4492	0.6869	1.0694	3.7342	2145	Penn World Table

Our main hypothesis is:

$$Y_{it} = \alpha_0 + \alpha_1 I_{it} + \alpha_2 P_{it} + \alpha_3 \beta_{it}. \tag{1}$$

where Y_{it} is visitors from i to Japan at t, I_{it} denotes an income in i at t, P_{it} captures cost factors to come from i to Japan at t, β_{it} denotes a factor about preference to come to Japan from i at t, and α_0 is constant. We use the number of foreign visitor as an independent variable and several dependent variables corresponding to the hypothesis above.

GDP per capita is expected to capture the income level, which reflects the economic growth in each country, and its coefficient is assumed to be positive since richer people can afford to travel abroad. We employ three variables that represent cost factors and are the number of direct aviation service, real exchange rate, and visa waiver dummy. The number of direct aviation service between Japan and each country is used to explain the cost to travel and its coefficient will be positive. Although some research use the distance to capture this effect, we do not employ it since it is time-invariant and is omitted in the fixed-effect model we used. Real exchange rate is yen basis and would capture a cost factor, where inbound visitor will increase if the rate is high, which is equivalent to weak yen[*8]. Therefore, expected coefficient of real exchange rate is positive. The main explanatory variable is visa waiver dummy, which takes one if visa is waived in the whole year and takes the value between zero and one which shows how many days visa waiver is implemented[*9] if visa waiver is introduced in the middle of the year. It takes zero otherwise. Since visa waiver would allow foreigners to travel easily, the coefficient will be positive. The dummy variable of VJC represents a preference factor since people would like to travel if advertisements by VJC are successful. It takes one if VJC is implemented there and takes zero otherwise. Then, its coefficient should be positive. In addition to them, we employ GDP, population, nominal exchange rate,

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[*6] Pre-clearance of visitors in departed airport and Advance Passenger Information System (APIS), which check the information of passengers of each airlines, were introduced in 2005 and both are still employed.

[*7] The list of countries is shown in appendix.

[*8] The composition of real exchange rate is shown in the appendix.

[*9] It is equal to (Days when visa waiver implemented in a year)/365.

the amount of trade and year dummies while we conduct analyses. Except the results about year dummy, these results are sited in appendix.

Table 5: Empirical results of static panel analysis

VARIABLES	(1)Fix-effect Panel visitor	(2) Fix-effect Panel visitor
Visa waiver	129,308**	128,493**
	(51,501)	(51,371)
Direct aviation services	50.02***	49.76***
(DAS)	(7.378)	(7.285)
GDP per capita	-0.195	-0.327
(GCP)	(0.303)	(0.308)
Real exchange rate	21,912**	14,767
(RXR)	(11,038)	(12,744)
Visit Japan Campaign	79,721***	81,151***
(VJC)	(29,696)	(29,624)
Constant	-52,023**	-45,578**
	(21,004)	(18,774)
Year dummy	No	Yes
Sargan-Hansen	$\chi^2(4)=45.65$***	$\chi^2(17)=34.67$***
Observations	2,556	2,556
R-squared	0.580	0.585
Number of code	172	172

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The empirical results of static panel analyses are shown at table 5. The results show that the coefficient of visa waiver is significantly positive and about 129,000, while the significant level are different among the models. These coefficients are quite small compared to the former research except Beenstock et al.(2015). This may be because the former research use panel data with short time series and fixed characteristics might not be captured there, while Beenstock et al.(2015) and we use data with relatively long time series. The signs of other coefficients are shown as we expected except GDP per capita. This might be because Japan has many visitors from low or middle income countries in Asia like China and Southeastern Asian countries.

In addition to the static panel analysis, we conduct dynamic panel analysis since the trend of inbound demand seems to be dynamic and we could employ this method thanks to large data size[10]. In this analysis, the hypothesis is modified as

$$Y_{it} = \gamma Y_{it-1} + \alpha_0 + \alpha_1 I_{it} + \alpha_2 P_{it} + \alpha_3 \beta_{it}. \tag{2}$$

We use the first order GMM estimation, which tells consistent estimators without assumptions about initial condition. In order to obtain the result, we use two-step weight matrix as a weight of GMM. The contraction of each variable we employed is the same as a static panel's one.

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[10] Unfortunately, dynamic panel analysis is not feasible in the analysis for illegal overstayed foreigners because the sample size is limited there. We now try to get broader data set.

Table 6: Empirical results of dynamic panel analysis

VARIABLES	(1) First Difference GMM Panel visitor	(2) First Difference GMM Panel visitor
L.visitor	0.517***	0.529***
	(0.0151)	(0.00948)
Visa waiver	95,417***	82,756***
	(18,265)	(27,850)
Direct aviation services	36.39***	36.67***
(DAS)	(0.473)	(1.718)
Real exchange rate	45,450***	34,466***
(RXR)	(5,230)	(4,098)
GDP per capita	0.826	0.0808
(GCP)	(0.510)	(2.083)
Visit Japan Campaign	18,883**	21,063
(VJC)	(7,847)	(20,459)
Constant	-53,764***	-42,150*
	(9,550)	(22,922)
Pre-determined variable	-	VISA
Observations	2,212	2,212
Number of code	172	172

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The empirical results of dynamic panel analyses are shown at table 6. Column (1) shows the result where VISA is a exogenous variable, while the result of column (2) assumed VISA is a pre-determined variable. The results show that the coefficient of visa waiver is significantly positive while its magnitude is somewhat lower than statistic panel's one. The signs of most coefficients are the same as statistic panel's one though some of their significancy and magnitudes are changed. From the result, the significancy and magnitude of real exchange rate become strong. On the other hand, the dummy of visit Japan campaign become weaker. However, GDP per capita is still insignificant here. This may show GDP per capita irrelevant to inbound demand of Japan.

We also check the Granger causality from the number of visitors to visa waiver as table 7 shows. Though only three-years-lagged variables show that the number of visitors may increase the probability of visa waiver, the causality does not seem to exist. While we also conduct regressions including four-years-lagged variables, these results do not show causality even in three-years-lagged variables.

Table 7: Granger causality check

VARIABLES	(1) Probit Visa waiver	(2) OLS Visa waiver
visitor_1	-3.42e-07	4.76e-09
	(9.19e-07)	(2.31e-07)
visitor_2	-5.91e-07	2.07e-08
	(1.24e-06)	(2.83e-07)
visitor_3	2.25e-06*	3.41e-07
	(1.19e-06)	(2.61e-07)
Constant	-0.455***	0.325***
	(0.0296)	(0.0106)
Observations	2,040	2,040
R-squared		0.025

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

While we should conduct regressions including instrumental variables (IV) considering the endogeneity, it is difficult to find concrete example of IV for visa. Then, we conduct panel analyses with checking the Granger causality as is often the case. If any, the endogeneity of visa would work for overestimation of coefficient of visa waiver, although our results are very small comparing to the former research. Anyway, as a result, we show that the effect of visa waiver exist but is smaller than it is suggested in the previous

papers.

4   Empirical analysis about visa waiver and the illegally overstayed foreigners

As well as legal foreign visitors, visa waiver may increase illegal immigrants since it allows them to enter Japan easily. In this section, we investigate whether visa waiver increase overstayed foreigners, who we choose as an representative of various types of illegal immigrants, employing the data of 13 countries[*11] from 2000 to 2014. Since the published data of overstayed foreigners are limited only worst ten countries in a year, the number of countries in the data is limited compared to the analysis of legal visitors. Descriptive statistics and data sources are shown in table 8.

Table 8: Descriptive statistics and data sources

Variables	Mean	Std Dev	Min	Max	Number	Source
Overstayed foreigners (flow)	-851.46	1576.48	-7560	3846	180	Immigration Control Report
Direct aviation services	7213.19	10566.61	0	42376	195	OAG Aviation data
GDP per capita	15688.71	16387.57	1174.42	72743.53	195	Penn World Table
Real exchange rate	0.3678	0.2056	0.0449	1.1760	195	Penn World Table
Visa Waiver dummy	0.1936	0.3906	0	1	195	Treaty Database

Note that we use the flow data which is equal to the stock in the current year minus the stock in the previous year. This is because descriptive statistics of overstayed foreigners shows negative value.

Our main hypothesis is:

$$Y_{it} = \alpha_0 + \alpha_1 I_{it} + \alpha_2 P_{it}. \tag{3}$$

where Y_{it} is visitors from i to Japan at t, I_{it} denotes an income in i at t, P_{it} captures cost factors to come from i to Japan at t, and α_0 is constant. Thought there might be preference factors like easiness for overstayed visitor to live in Japan, such factors are not available and we do not use Visit Japan Campaign dummy since it is a tourism promotion policy, not an overstay promotion. We use the flow of overstayed foreigners as an independent variable and several dependent variables corresponding to the hypothesis above as we do in the previous section. GDP per capita represents income of each countries and its coefficient is expected to take negative value since visitors from poorer countries would overstay more. The number of direct aviation service, real exchange rate, and visa waiver dummy will capture the cost to travel. Since increase of these values means the reduction of travel cost, these coefficients are presumed to be positive while the coefficient of real exchange rate can be negative because sending money in stronger yen will be reasonable for overstayed foreigners. The composition of each variable are the same as we explained in the previous section. In addition to them, we employ GDP, population, nominal exchange rate, the amount of trade and year dummies while we conduct analyses. In particular, year dummies will capture the effect of the governmental campaign to halve overstayed visitors from 2004. Except the results about year dummy, these results are sited in appendix.

The empirical results are shown at table 9. Although most of explanatory variables are not significant, the three of four coefficients about the visa waiver dummy are significantly positive and take values of around 900. These results for visa waiver are consistent with our main hypothesis, which is that visa waiver will increase the number of overstayed foreigners. Comparing the effect on legal visitor, these

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[*11] The list of countries is shown in appendix.

coefficients are relatively small. Most of the other explanatory variables are insignificant and the signs of them vary from model to model except real exchange rate. This is may be because low real exchange rate in yen basis means strong yen, where overstayed foreigners can send more money in terms of their currency.

Table 9: Empirical results

VARIABLES	(1)Fixed-effect Panel Overstayed foreigner	(2)Fixed-effect Panel Overstayed foreigner
Visa waiver	892.9*	968.0**
	(455.9)	(337.1)
Direct aviation services	-0.0392	-0.0464
(DAS)	(0.0593)	(0.0438)
GDP per capita	0.0163	0.00602
(GPC)	(0.0221)	(0.0141)
Real exchange rate	-627.0	-530.5
(RXR)	(1,214)	(1,508)
Constant	-761.2**	-1,026**
	(309.8)	(418.1)
Year dummy	No	Yes
Sargan-Hansen	$\chi^2(4)=24.65$***	-
Observations	180	180
R-squared	0.029	0.332
Number of code	13	13

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

We also check the Granger causality from the flow of overstayed foreigner to visa waiver as table 10 shows. From this results, the causality does not seem to exist.

Table 10: Granger causality check

VARIABLES	(1) Probit Visa waiver	(2) OLS Visa waiver
Overstayed foreigner (OF)_1	-2.84e-05	-9.62e-06
	(0.000101)	(3.12e-05)
OF_2	-8.19e-06	-1.83e-06
	(0.000169)	(5.26e-05)
OF_3	3.72e-05	1.23e-05
	(9.20e-05)	(2.86e-05)
Constant	-0.728***	0.210***
	(0.153)	(0.0481)
Observations	144	144
R-squared		0.009

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

As well as the previous part, the results in this section may be affected by endogeneity. In particular, the endogeneity of visa waiver policy might exist, while we check that there are not the Granger causality from the number of overstayed visitor to visa waiver.

In addition, the analyses in this section are conducted with limited sample comparing to the analyses in section 3. Thus, an analysis with a more sophisticated method or a large sample data is needed. However, we firstly show that visa waiver would increase overstayed foreigners and its impact on overstayed foreigners might be small comparing with its impact on legal visitors.

5   Concluding remarks

Considering the results of section 3 and 4, can we say that we should abolish visa restriction or we should make more strict visa system? Perhaps we cannot say either clearly because the results show that

visa waiver will increase both legal visitors and illegally overstayed foreigners. Neumayer (2010a, 2010b) and Lawson and Roychoudhury (2016) insist that the each government in the world should abolish visa restriction since it will increase tourists, investments, or trades among the countries referring to their empirical results that show visa restriction impede the good interactions among the countries. However, since visa system itself was enacted to protect a country from unwelcome people like potential offenders and terrorists, the side effect of visa waiver should be considered. From our results, there may be an unfavorable side effect in visa waiver. Therefore, the governments should use visa policies taking it into account.

In addition, our results also show that the effect of visa waiver is smaller in overstayed foreigners than in legal visitors. From this, it can be suggested that the net economic effect of visa waiver will be positive. However, potential social welfare loss by criminals of illegal foreigner is unaccountable since the losses by a murder or a terror cannot be converted into economic measures easily. Ignorance of overstay caused by visa waiver may also lead to ignorance of situations of overstayed people since they are sometimes exploited because of their illegitimacy. Some overstayed people have no choice but to work under the minimum wage because they cannot work as legitimated workers do. Indeed, some people have been arrested for exploiting overstayed foreigners in Japan[*12]. While these ethical aspects of overstayed foreigner are out of the range of this paper, policymakers should consider these aspects as well as economic effects of visa.

The indicator, illegally overstayed foreigners, which we employed perhaps should be reconsidered since they include the number of those who just overstayed even a day but not commit other crimes. However, the arrest rate of overstayed people is obviously and significantly higher than legal visitors[*13]. In addition, even if they do not commit a crime, overstay itself is illegal in Japan. Thus, this indicator is reasonable to employ in this context.

As we discuss, visa relaxation is not a simple issue. Thus, other policies like tourism promotions or deregulation of aviation market would be suitable to implement if the government want to increase the number of inbound travelers eliminating potential illegal foreigners, since these policies are suggested to be valid in this paper. Anyway, this paper can offer a different point of view about visa policy and we hope that visa policy will be considered from both legal and illegal visitors.

Finally, we have to remark that our analyses are dependent on some assumption and limited data. In particular, endogeneity between visa waiver and the dependent variables should be examined with more sophisticated methods, though we checked the Granger causalities. In addition, other aspects or other policies about immigration control can be examined as extensions of this research. For example, the different type of visa relaxation like issuance of multiple visa can be researched if there is refined data. In order to obtain a further insight into immigration control policy, more sophisticated research are needed.

[*12] The Mainichi news paper on November 21st in 2012, for example, reported that Indonesian man was arrested because he introduced overstayed foreigners to some companies and deducted the income of these foreigners unjustly.

[*13] The arrest rate of the criminal law by overstayed foreigners is 0.4% while 0.2 % by all people in Japan (including legal visitors) and 0.02% by legal foreign visitors (National Police Agency, 2016a 2016b).

Appendix

1 The list of countries employed in the analyses

Table A1: The list of countries employed in the analysis of legal visitors

Angola	Bolivia	Czech Republic	Gambia, The	Jordan	Madagascar	Nepal	El Salvador	Uganda
Albania	Brazil	Germany	Guinea-Bissau	Kazakhstan	Maldives	New Zealand	Serbia	Ukraine
United Arab Emirates	Barbados	Djibouti	Equatorial Guinea	Kenya	Mexico	Oman	Sao Tome and Principe	Uruguay
Argentina	Brunei Darussalam	Dominica	Greece	Kyrgyz Republic	Macedonia, FYR	Pakistan	Suriname	United States
Armenia	Bhutan	Denmark	Grenada	Cambodia	Mali	Panama	Slovak Republic	Uzbekistan
Antigua and Barbuda	Botswana	Dominican Republic	Guatemala	St. Kitts and Nevis	Malta	Peru	Slovenia	St. Vincent and the Grenadines
Australia	Central African Republic	Algeria	Hong Kong	Korea, Rep.	Myanmar	Philippines	Sweden	Venezuela, RB
Austria	Canada	Ecuador	Honduras	Kuwait	Montenegro	Poland	Swaziland	Vietnam
Azerbaijan	Switzerland	Egypt, Arab Rep.	Croatia	Lao PDR	Mongolia	Portugal	Seychelles	Yemen, Rep.
Burundi	Chile	Spain	Haiti	Lebanon	Mozambique	Paraguay	Syrian Arab Republic	South Africa
Belgium	China	Estonia	Hungary	Liberia	Mauritania	West Bank and Gaza	Chad	Zambia
Benin	Cote d'Ivoire	Ethiopia	Indonesia	St. Lucia	Mauritius	Qatar	Togo	Zimbabwe
Burkina Faso	Cameroon	Finland	India	Sri Lanka	Malawi	Romania	Thailand	
Bangladesh	Congo, Dem. Rep.	Fiji	Ireland	Lesotho	Malaysia	Russian Federation	Tajikistan	
Bulgaria	Congo, Rep.	France	Iran, Islamic Rep.	Lithuania	Namibia	Rwanda	Turkmenistan	
Bahrain	Colombia	Gabon	Iraq	Luxembourg	Niger	Saudi Arabia	Trinidad and Tobago	
Bahamas, The	Comoros	United Kingdom	Iceland	Latvia	Nigeria	Sudan	Tunisia	
Bosnia and Herzegovina	Cabo Verde	Georgia	Israel	Macao	Nicaragua	Senegal	Turkey	
Belarus	Costa Rica	Ghana	Italy	Morocco	Netherlands	Singapore	Taiwan	
Belize	Cyprus	Guinea	Jamaica	Moldova	Norway	Sierra Leone	Tanzania	

Table A2: The list of countries employed in the analysis of overstayed foreigners

Korea, Rep.	Philippines	China	Thailand	Malaysia
Taiwan	Indonesia	Brazil	Vietnam	Singapore
Sri Lanka	Myanmar	Peru		

2 Composition of real exchange rate

Exchange rates between currencies and currency units vary from country to country. For example, one unit of Korean won is equal to about 0.1 Japanese yen while U.S. dollar is equal to about 110 yen. In reality, the perception for these units should be changed and converted into a united criterion. Thus, we calculate a nominal exchange rate of each currencies in yen basis first and set its rate in 2000 as a unity using the data from Penn World Table. Denote this modified nominal exchange rate as $mnxr_{it}$. Penn World Table shows the price level of household consumption, pl_c, in each country at each year using the level of one in U.S. 2011 as a unity. Then, when we denote Japanese pl_{cit} as Jpl_{cit}, modified real exchange rate, $mrxr_{it}$ that we employed in the analyses is

$$mrxr_{it} = \frac{mnxr_{it} \times pl_{cit}}{Jpl_{cit}}.$$

Note that this real exchange rate is yen basis and the lower it is, the stronger yen is realized.

3 Results when other variables are employed

We conduct several analyses with other variables than we employed in the table 5, 6, 9. Table A3 and A4 shows the results of static panel analyses about legal visitors and illegally overstayed foreigners respectively.

Table A3: Empirical results of analyses about legal visitors with other variables

VARIABLES	(1)Fixed-effect visitor	(2)Fixed-effect visitor	(3)Fixed-effect visitor	(4)Fixed-effect visitor	(5)Fixed-effect visitor	(6)Fixed-effect visitor
Direct aviation services	50.06***	49.72***	41.75***	41.55***	44.55***	44.26***
(DAS)	(7.363)	(7.278)	(14.88)	(14.79)	(13.41)	(13.42)
GDP per capita	-0.0699	-0.354			-0.351	-0.470
(GPC)	(0.314)	(0.305)			(0.352)	(0.361)
Nominal exchange rate	13,752*	15,482				
(NXR)	(7,952)	(11,123)				
Visa waiver	128,211**	127,352**	145,792**	145,215**	138,129**	137,413**
	(51,030)	(50,888)	(62,190)	(62,207)	(56,839)	(56,870)
VJC	83,342***	81,399***	56,129*	59,604*	70,103**	71,483**
	(29,610)	(29,464)	(31,359)	(31,194)	(31,828)	(32,028)
GDP			0.0566	0.0571		
			(0.0350)	(0.0349)		
Population			-1,189*	-1,221*		
(POP)			(657.8)	(641.6)		
Real exchange rate			17,416*	9,102	17,304*	11,668
RXR			(9,449)	(8,825)	(9,296)	(10,205)
Trade					1.21e-05	1.22e-05
					(1.25e-05)	(1.27e-05)
Constant	-56,443**	-55,462**	-29,468	-22,540	-53,713**	-48,100**
	(24,143)	(22,436)	(29,178)	(27,120)	(21,878)	(19,922)
Year dummy	No	Yes	No	Yes	No	Yes
Observations	2,556	2,556	2,556			
R-squared	0.578	0.585	0.603	0.608	0.585	0.590
Number of code	172	172	172	172	172	172

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A4: Empirical results of analyses about overstayed foreigners with other variables

VARIABLES	(1)Fixed-effect Overstayed Foreigners	(2) Fixed-effect OF	(3) Fixed-effect OF	(4) Fixed-effect OF	(5) Fixed-effect OF	(6) Fixed-effect OF
Visa waiver	881.0*	979.7**	1,200	754.7	829.6	1,068**
	(457.4)	(336.7)	(751.6)	(503.2)	(654.3)	(475.9)
GDP per capita	0.0124	-0.00463			0.0159	0.00980
(GPC)	(0.0225)	(0.0238)			(0.0226)	(0.0122)
Direct aviation services	-0.0427	-0.0496	-0.0826	-0.0801	-0.0192	-0.0744
(DAS)	(0.0542)	(0.0464)	(0.118)	(0.0746)	(0.134)	(0.109)
Nominal exchange rate	-132.1	841.7				
(NXR)	(713.5)	(1,618)				
GDP			0.000688*	0.000772***		
			(0.000329)	(0.000214)		
Population			-55.36***	-83.35***		
(POP)			(17.08)	(24.08)		
Real exchange rate			-877.5	-128.4	-394.6	-907.6
(RXR)			(656.3)	(1,238)	(515.9)	(1,151)
Trade					-4.22e-08	6.15e-08
					(1.69e-07)	(1.35e-07)
Constant	-783.2	-1,891	8,674**	12,560***	-795.8**	-1,004**
	(632.9)	(1,303)	(3,072)	(3,678)	(317.2)	(382.3)
Year dummy	No	Yes	No	Yes	No	Yes
Observations	180	180	180	180	180	180
R-squared	0.027	0.334	0.063	0.364	0.031	0.335
Number of code	13	13	13	13	13	13

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

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