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The Disparity in High School Enrollment between Native and Immigrant Children in Japan*

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Abstract

This study examines the assimilation of immigrant children in Japan in terms of high school enrollment using the 2010 Population Census from the Ministry of Internal Affairs and Communications (MIC). Immigrant children are defined as children who have at least one foreign-born parent in this study. We examine the gap between native and immigrant children with similar characteristics using nonlinear decomposition. We find that the average school attendance probability of immigrant children is significantly lower than that of native children. Immigrant children with one parent who is a foreigner show a large difference. Factors that enlarge the gap are shorter length of stay in Japan, parents' lack of use of Chinese characters in their country of birth, parents' lower level of regular employment status, and lack of home ownership. The most important factor above in explaining the gap is parental background in terms of use of Chinese characters. The total explained part of all observable factors is about 90% in the comparison between native and immigrant children whose parents are both foreigners. Furthermore, immigrant children who have not attended high school are more likely to be unemployed.

Keywords: Immigrant, High school enrollment, Decomposition method

JEL classification: J15, I24, I28

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1. Introduction

Issues of immigrant children have attracted much policy interest in Japan recent years (Cabinet 2018, 2019a, 2019b), in the background of an increasing number of migrants to Japan since 2012. According to the Ministry of Justice, there were a record 2,731,093 foreign residents in Japan in 2018. For many years, Japan has hesitated to accept foreigners owing to concerns about an increase in crime, fiscal burden, and unemployment of Japanese workers, even though many foreign countries accept foreigners as immigrants¹. However, Japan faces a serious problem of ageing population, and thus, the Japanese government has shifted its policy toward accepting foreign residents as workers in Japan's labor force, which faces a supply shortage.

For example, the residency management system was renewed in 2012. Under the new system, the period of the right to stay in Japan has been extended to a maximum of 5 years, including the maximum validity period of a re-entry permit. These changes have encouraged more foreign residents to come to Japan. In 2018, Japan's parliament approved a new immigrant law, the Immigration Control and Refugee Recognition Act, for workers to ease the labor shortage. Under the new law, foreigners are allowed to work in such sectors as construction, farming, and nursing, but not as technical trainees or interns. In addition, two new visa categories have been created for foreign workers: 1) the first is renewable for 5 years and covers semi-qualified and blue-collar work, in which there is a labor shortage, and 2) the second category for high-skilled workers has no renewal limit. Both visa types require proficiency in Japanese. The new law is expected to increase both high-skilled and low-wage workers from foreign countries.

Even though, in recent years, Japan's immigration system has been changing to accept foreign residents and Japan is becoming a more multiracial and multiethnic society gradually, they face the problem of assimilation, especially in comparison to the experience of foreign residents in some other host countries. It is important that foreign residents undergo assimilation in host countries, as doing so has a positive impact on host countries. In particular, because immigrants are likely to have children, the assimilation of immigrants' children is an important policy issue. Several studies reveal that immigrant children experience difficulties with education, employment, and other forms of social participation in host countries, especially those immigrant children whose mother tongue differs from the host country language or languages. This language disadvantage causes serious problems for the future success of immigrant children. When immigrant children grow up, their lack of language skills is a huge disadvantage in critical life stages, such as school entrance examinations and job interviews. Thus, governments in foreign host countries have implemented policies to help immigrant

¹ Immigrants are people who legally move from one country to a host country. In Japan, immigrants do not have citizenship rights to settle or reside. Permanent residents and naturalized citizens in Japan are regarded as immigrants.

families to assimilate better. It is an unavoidable issue for countries that accept foreign residents.

The purpose of this study is to examine the assimilation of immigrant children² into host countries in terms of high school attainment and to discuss associated immigrant issues. Assimilation is the process whereby immigrants become “more like” natives along some specified dimension; e.g. social, cultural, and economic assimilation (Grant 1999, Borjas 1985, 1995). This study examines assimilation of educational attainment. The gap between natives and immigrants measures how well the immigrant assimilate (Hu 2000), and the narrower gap for longer period of stay confirms existence of assimilation among immigrants (Grant 1999)³. Furthermore, high school attendance is examined because as mentioned in previous studies on immigration in Japan, the education attainment gap increases in the period of high school. It is crucial for regular employees and high-earning workers to have graduated from high school. Japan has a history of restricting the acceptance of foreign residents who can be assimilated easily into the host country, including *Zainichi*⁴ and *Nikkei*⁵. Without a strictly enforced policy, it may be difficult to adjust the language proficiency of immigrant children and to decrease the gap. One of the factors that has promoted assimilation in Japan is that the language of immigrants is similar to that of Japanese. Many factors determine educational attainment, including financial factors. It is necessary to clarify which is the most important factor behind the gap in order to enhance assimilation of immigrants. To do so, we use a non-linear decomposition method with data from 2010 Population Census in Japan⁶.

The differences between immigrants and natives are in part related to family structure. Immigrant children whose parents are both foreigners have a disadvantage at high school compared to immigrant children with only one parent who is foreigner, because of the low level of spoken Japanese at home. However, if immigrant family members are *Zainichi* and *Nikkei*, they have Japanese roots and experience of Japanese culture, and a significant difference might not be observed. Therefore,

² In this study, we use the following definitions. First-generation immigrants are foreign-born individuals who have immigrated to a host country and did not have the host-country citizenship at birth. Second-generation immigrants are individuals who were born in the host country and have at least one parent born in a foreign country. Immigrant children (children of immigrants) are individuals with at least one parent born in a foreign country. Immigrant children include both children born in a foreign country and children born in the host country. Natives (or children of native-born parents) are individuals born in the host country and whose parents are also both born in the host country. Natives also include the third-generation immigrants and higher-generation immigrants.

³ Grant (1999) found many cohorts of immigrants “may never assimilate” because their gaps between natives did not narrow.

⁴ Most members of ethnic minorities in Japan are of Korean and Chinese descent, referred to as *Zainichi*; they are usually people from Japan’s former colonies and their descendants. However, migrants from Asia and South America have become a noteworthy presence since the late 1980s.

⁵ A person of Japanese ancestry living abroad as a citizen of another country is referred to as *Nikkei*. Most *Nikkei* now residing in Japan are from Korea, China, and Brazil.

⁶ As indicated by Takenaka et al. (2016), Population Census is the largest dataset available in Japan. However, its usage has some limitations for analysis, because some factors, such as income, language proficiency, and year of immigration to Japan, are not surveyed. This study attempts to solve these data limitations by using alternative variables.

this study compares three types of children: 1) native children whose parents are both Japanese; 2) immigrant children whose parents are both foreigners; and 3) immigrant children with one parent who is a foreigner.

The rest of this paper is organized as follows. Section 2 introduces the related literature. Section 3 describes the empirical strategy. Section 4 introduces the data and descriptive statistics. The results are presented in Section 5. Section 6 concludes.

2. Related Literature

For the assimilation of immigrant children, previous studies provide findings in wide range of research fields. Many studies compare immigrant and native children, and examine the reasons for the gaps between them, including discrimination and differences in ability and social or family background. This section introduces the results of previous studies related to the education of immigrant children.

Previous studies suggest that determinants of immigrant children's educational outcomes include parental characteristics, such as the length of stay in a host country, language skills, and aspirations for and expectations of children's school performance (OECD, 2017). For example, the length of stay in the host country positively affects immigrant children's language skills and school grades (Worswick, 2004; Dos Santos and Wolff, 2011; Nielsen and Rangvid, 2012; Smith et al., 2016). Parents' language skills also have positive effects on their children's speaking proficiency and school attendance (Bleakley and Chin, 2008; Casey and Dustmann, 2008; Dos Santos and Wolff, 2011).

Compared to native parents, immigrant parents have higher aspirations for and expectations of their children. This tendency is observed in Hungary (Brinbaum and Cebolla-Boado, 2007), Belgium (Hagelskamp et al., 2010), and the U.S. (Raleigh and Kao, 2010). The literature also indicates that high parental aspirations have a positive effect on children's educational achievements (Kao and Tienda, 1995; Vallet and Caille, 1999; Glick and White, 2004; Hagelskamp et al., 2010). On the contrary, according to theoretical findings of Coate and Loury (1993), immigrant families are less motivated to invest in skills, because of low returns of their investment in human capital. Losen and Orfield (2002) indicate that children from some communities may face discrimination about access to schooling, quality of schooling, grade retention, and tracking decisions. Thus, while immigrants' parents have high aspirations for their children to receive high-quality education, it is difficult for these aspirations to translate into reality. The aspiration-achievement paradox of immigrants is suggested by Salikutluk (2016).

There are only a few related studies in Japan. Ishida et al. (2016) use cross-sectional microdata of the Programme for International Student Assessment from 2000 to 2012 and find that first-generation immigrants perform worse in reading literacy than do natives and second-generation immigrants. The authors also clarify that the negative effects of the immigrant children become insignificant and small when controlling for language spoken at home. There is an insignificant effect

for the immigrant children in the results of test scores in mathematics and science.

Korekawa (2012, 2018), using 2000 and 2010 Population Census, show that disparity in school attainment increases from the high school period. Korekawa (2018), who uses the same data as us, finds that immigrants who have lived in Japan for more than 5 years tend to attend high school. He also finds that children in single-mother households have difficulty attending high school.

The abovementioned literature concludes that there is a statistically significant difference between immigrants and natives. However, these studies do not investigate the main determinant of this difference and the extent of the impact of observable factors on the difference. It is crucial to determine which factors enlarge the difference in order to enhance assimilation of immigrants and resolve the disparity between immigrants and natives.

3. Empirical Strategy

This study uses the decomposition method developed by Blinder (1973) and Oaxaca (1973). This method, which is widely used in studies related to wage gaps by sex and race, divides wage differences into explained and unexplained parts. The explained part refers to differences that can be accounted for by observable characteristics whereas the unexplained part, which is often regarded as a measure for discrimination, refers to the residual part that cannot be accounted for by such differences in determinants. This method enables us to reveal which factors widen the difference between immigrant and native children. Blinder–Oaxaca decomposition is mainly used in the framework of linear regression models (ordinary least squares) although it has been extended to non-linear regression models to obtain consistent parameters and avoid misleading results (Gomulka and Stern, 1990; Fairlie, 1999, 2003, 2005; Yun, 2003).

First, we consider the decomposition method using the following linear regression model:

$$Y^g = X^g \beta^g + e^g, \quad (1)$$

where Y^g is a vector of dependent variables, X_j^g is a vector of independent variables, β_j^g is a vector of coefficient parameters, and e^g is a vector of error terms. g indicates nationality, that is, whether an individual is an immigrant or a native (n is native and f is immigrant). i indicates that an individual is omitted for simplification.

The decomposition using the linear regression model is as follows:

$$\bar{Y}^n - \bar{Y}^f = \Delta^{OLS} = \hat{\beta}^n (\bar{X}^n - \bar{X}^f) + \bar{X}^f (\hat{\beta}^n - \hat{\beta}^f), \quad (2)$$

where $\bar{Y}^g = \sum Y^g / N^g$ is the average value of the dependent variables and $\bar{X}_j^g = \sum X_j^g / N^g$ is the average value of the independent variables. N^g is the sample size. $\hat{\beta}^g$ is an estimated parameter.

In equation (2), the first term on the right-hand side is the explained part, which is the differences of the independent variables, and the second term is the unexplained part, which is the differences of the coefficients.

The decomposition of the outcome variable is not appropriate for the non-linear case, because the conditional expectation $E(Y^g|X^g)$ in the non-linear regression model is different from $\bar{X}^g\hat{\beta}^g$ in the linear regression model. Then, decomposition using the non-linear regression model is necessary.

Next, we consider the following non-linear regression model:

$$Y^{g*} = X^g\beta^g + e^g,$$

$$Y^g = \begin{cases} 0 & \text{if } Y^{g*} \leq 0 \\ 1 & \text{if } Y^{g*} > 0 \end{cases} \quad (3)$$

where Y^{g*} is a latent variable. The decomposition of the mean difference of outcome Y^g between natives and immigrants in the case of reference group n is as follows:

$$\bar{Y}^n - \bar{Y}^f = \Delta^{NL,n} = [\sum F(X^n\hat{\beta}^n)/N^n - \sum F(X^f\hat{\beta}^n)/N^f] + [\sum F(X^f\hat{\beta}^n)/N^f - \sum F(X^f\hat{\beta}^f)/N^f], \quad (4)$$

where $\sum F(X^g\hat{\beta}^g)/N^g$ is the conditional expectation of Y^g given X^g , which is evaluated at parameter β in the case of group g . Under a logit model, the probability is written as $p^g = Pr(Y^g = 1|X^g) = (\exp(X^g\beta^g))/(1 + \exp(X^g\beta^g)) = F(X^g\hat{\beta}^g)$, where F is the cumulative distribution function⁷. In equation (4), the first term on the right-hand side is the explained part, which is the differences of the variables, and the second term is the unexplained part, which is the differences of the coefficients. Equation (4) shows the decomposition in the case of reference group n . Then, $\hat{\beta}^n$ is used as a weight for the first term in the decomposition, and X^f is used as a weight for the second term.

As mentioned by Oaxaca (1973), there are alternative methods for calculating the decomposition to deal with the so-called “index problem” with Blinder–Oaxaca decomposition. It is difficult to choose from alternative methods of calculating the first term of the decomposition. For example, Oaxaca and Ransom (1994) suggest a method to weight the first term using coefficients estimated from the pooled sample of the two groups. However, in some research cases, there are more than two comparative groups. Fairlie (2005) and Fairlie and Robb (2007) suggest another decomposition method that weights the first term using coefficients estimated from the full sample of all groups. The advantage of this method is that it includes full sample information of all groups and

⁷ If the conditional expectation of Y^g given X^g is linear, then a linear probability model is estimated.

it is useful for our research, which compares the gaps of three groups.

In addition, this method shows the solution for the problem of the sample size difference between two comparative groups. First, we use the pooled coefficient estimates to calculate the predicted outcome probabilities for each group of observation. Second, we randomly draw a subsample of the larger sample size group to equal the size of the full sample of the smaller sample size group. Each observation in the subsample of the larger sample size group and the full sample of the smaller sample size group is separately ranked by the predicted probabilities. Then, we use the method of Oaxaca and Ransom (1994) for a robustness check.

4. Data

This study uses individual data of 2010 Population Census provided by the Ministry of Internal Affairs and Communications. The data pertain to the entire population in Japan. It includes information about education level (diploma), age, family structure, working status, and nationality. These data survey 51,950,504 households and 128,057,352 people (48.7% are men). There are about 125,359,000 Japanese citizens and about 1,648,000 foreign residents. This study uses the detailed sample tabulation data, which extract 10% of the data, and merges children's data with their parents' data. In addition, we use the data of female and male samples aged 16 to 18 years who live with both their fathers and mothers⁸, and we exclude non-responses. For the college enrolment period, a lot of children no longer live with their parents, especially children living in urban areas. Thus, we focus on the high school period. The final sample size we use is 223,133. Usually, there are so few immigrants that it is difficult to study them, and collecting the data of immigrant children is especially difficult in Japan traditionally. However, owing to the large sample size of our data, we can compare the probabilities of immigrant and native children.

We use independent variables based on surveys from previous studies. For the dependent variables, we use variables correlated with assimilation. According to previous research, longer length of stay makes it easier for immigrants to obtain high-quality education. Thus, this study employs length of stay in Japan as a dummy variable that equals 1 if parents have lived in Japan for more than 5 years, and 0 otherwise.

Parental background is also an important determinant of children's educational attendance. This study uses three kinds of independent variables. First, we assume that immigrants whose mother tongue is similar to the host country's language find it easier to assimilate into the host country. For immigrants in Japan, home country use of Chinese characters is an advantage for assimilation⁹. Thus, we employ a dummy variable that equals 1 if at least one parent's home country uses Chinese

⁸ Adding such constraints, it is highly possible that the data is limited foreign children who live in Japan with family visas.

⁹ Chiswick and Miller (2005), and Ispording and Otten (2013, 2014) insist that the similarity of mother tongue and host country's language positively affects language acquisition in the host country.

characters, such as Japan, China, Taiwan, Korea, and Vietnam, and 0 otherwise¹⁰. Second, we consider that financial burden is a crucial issue for whether immigrants decide to send their children to school. To observe the financial burden effect, we employ four kinds of father's employment status as dummies, namely, a regular employee dummy, a non-regular employee dummy, an executive officer dummy, and a self-employed/employed dummy, as well as an unemployed dummy (the reference group is the not working group). In addition, we use a mother's working dummy variable, which equals 1 if the mother works, and 0 otherwise¹¹. Third, parents who have graduated from with a 4-year college degree may have higher aspirations for and expectations of their children. This study uses a 4-year college graduate dummy, which is set to 1 if at least one parent has graduated with a 4-year college degree, and 0 otherwise.

In addition, as control variables, we use a female dummy variable, age, number of brothers and sisters, home ownership dummy variable (1 if the household owns a home, and 0 otherwise), densely inhabited district dummy variable (1 if the household lives in a densely inhabited district, and 0 otherwise), and prefecture dummy variable.

Before proceeding with the analysis, Table 1 shows the main descriptive statistics of high school attendance. The percentage of the native sample is 98.8%, that of immigrants whose parents are both foreigners is 0.364%, and that of immigrants with one parent who is a foreigner is 0.824%. There are very few individuals with roots in foreign countries in our data. According to Table 2, which shows descriptive statistics for the nationality of fathers, mother, and their children, the majority of immigrants are Korean (about 41%), Brazilian (about 20%), and Chinese (about 20%) in the sample of immigrants whose parents are both foreigners. From our data, they may be *Nikkei*, that is, people of Japanese ancestry that are living abroad as citizens of other countries and their descendants came back to Japan¹². There are large differences in the immigrant sample with one parent who is a foreigner between the nationality of mothers versus fathers. In this sample, the percentage of Japanese fathers

¹⁰ According to the survey research such as OECD (2017), parents' language skills affects their children's language skills. Almost all studies related to the immigrant children's education performance use the variables about parents' language skills instead of children's language skills, because the data that previous studies used does not include the information about children's language skill itself. OECD (2017) also suggests that the relationship between parents' language skills and their children's language skills is not simple. For example, the problem of reverse causality, which means that children's language skills affect their parents' language skills, makes the empirical analysis difficult. The researchers must confirm their analysis results carefully. While there are some cautions in the research on immigrant children's language skills, almost all studies conclude that low parents' language skills negatively affect their children's language acquisition.

¹¹ The most appropriate variable to explain the impact of family economic conditions could be income. However, 2010 Population Census does not cover the amount of earnings, hourly wages, annual incomes, bonus and so on. As a result, we use variables of father's employment types, mother's working status, and home ownership to measure the impact of economic conditions.

¹² According to the Statistics on Foreign National Residents published by the Ministry of justice in Japan, the percentages of permanent resident, spouse or child of Japanese national, spouse or child of permanent resident, and long-term resident are 85.5% for Korean, 98.5% for Brazilian, and 38.6% for Chinese. These foreign residents tend to choose the status of residence which enables them to stay longer in Japan.

is 83.5% of all fathers. Of all mothers, the percentage of Thai mothers is 37.9%, that of Japanese mothers is 16.5%, that of Korean mothers is 16.2%, and that of Chinese mothers is 13.6%. The percentage of Japanese children with Japanese nationality is 89.1%. Thus, our data include many immigrant children with roots in Japan even if both parents are from abroad.

Returning to Table 1, the percentage of native Japanese children who attend high school is 96.8%, that of immigrants whose parents are both foreigners is 89.7%, and that of immigrants with one parent who is a foreigner is 90.9%. Most of the sample attend high school at the ages of 16 to 18 years. Individuals who do not attend high school tend to be working, searching for jobs, or homemakers. The sample of immigrants with one parent who is a foreigner differs slightly from the other samples, with a higher percentage of unemployed.

The percentages of samples living in Japan for more than 5 years is almost 100% for natives and immigrants with one parent who is a foreigner. The percentage of immigrants whose parents are both foreigners is about 10 percentage point lower than that of the other two groups. The percentage of female children ranges from 47.1% to 49.2% for different subsamples. The gender ratio is almost 50–50. The average age is 16.879 to 16.924 years. The mean number of brothers and sisters ranges from 2.097 to 2.226. The percentage of parents whose home country uses Chinese characters is 64.1% for immigrants whose parents are both foreigners. This means that more than half of immigrant children whose parents are both foreigners have at least one parent from a country that uses Chinese characters.

About 70% to 80% of all parents are employed. Of native parents, 72.9% are regular employees, 4.59% are non-regular employees, and 9.04% are executive officers; of parents to immigrant children who are both foreigners, 42.7% are regular employees, 26.0% are non-regular employees, and 12.5% are executive officers; and of parents to immigrant children with only one parent who is a foreigner, 53.4% are regular employees, 13.2% are non-regular employees, and 10.4% are executive officers.

For natives, 74.9% have a working mother and 34.1% have one parent who is a college graduate; for immigrants whose parents are both foreigners, 61.3% have a working mother and 34.3% have one parent who is a college graduate; and for immigrants with one parent who is a foreigner, 59.0% have a working mother and 28.8% have one parent who is a college graduate.

Among natives, 84.1% own their own homes; for immigrants whose parents are both foreigners, 49.9% own their own homes; and among immigrants with one parent who is a foreigner, 63.9% own their own homes. Meanwhile, 51.8% to 79.6% of households live in a densely inhabited district. Households with foreign parents tend to be located in densely inhabited districts, such as the Kanto area, including Tokyo, Saitama, and Kanagawa, and the Kansai area, including Osaka, Kyoto, and Hyogo (see Tables 1 and 3).

[Insert Tables 1–3 here]

5. Estimation Results

5.1 Logistic regression

First, we present the logistic regression results in Table 4 for high school attendance using the samples of natives, immigrants whose parents are both foreigners, immigrants with one parent who is a foreigner, and the pooled sample.

The coefficients of the dummies for immigrants with one parent who is a foreigner are significantly negative, and are larger than those of immigrants whose parents are both foreigners. This means that immigrants with one parent who is a foreigner are less likely to attend high school than are natives and immigrants whose parents are both foreigners. The coefficients of immigrants whose parents are both foreigners are insignificant.

We also find significantly positive effects for the dummies for females, living in Japan for more than 5 years (except in the case of the native sample), parents whose home country uses Chinese characters, parents' working, parents who are 4-year college graduates, and home ownership. Immigrants' attendance of high school is encouraged by length of stay in Japan; parents' roots; parents' employment status, namely, regular employment, executive officer, and self-employed/employed; parents who are 4-year college graduates, and home ownership. The coefficients of the dummy for densely inhabited district is significantly positive only for the native sample.

However, the coefficients of the number of brothers and sisters are significantly negative for the results of natives and immigrants whose parents are both foreigners. Having more brothers and sisters discourages high school attendance. The coefficients of age are also significantly negative in all sample cases. This means that some high school children leave school.

[Insert Table 4 here]

5.2 Decomposition

The decomposition results are presented in Table 5. Columns 1 and 2 show the results using the three-group pooled sample and the decomposition method suggested by Fairlie (2005), while columns 3 and 4 show the results using the two-group pooled sample and the decomposition method suggested by Oaxaca and Ransom (1994). Columns 1 and 3 show the results of comparing natives with immigrants whose parents are both foreigners, while columns 2 and 4 show the results comparing natives with immigrants with one parent who is a foreigner.

From Table 5, the differences between natives and immigrants whose parents are both foreigners are 0.0715 in columns 1 and 3; the percentage of the explained part is 94.8% in column 1 and 91.2% in column 3. The decomposition results reveal that group differences in all of the included

characteristics account for about 90% of the difference in high school attendance. On the contrary, the differences between natives and immigrants with one parent who is a foreigner are 0.059 in columns 2 and 4; the percentage of the explained part is 20% in column 2 and 18.6% in column 4. These results indicate that immigrants' high school attendance probability is lower than that of natives on average. The range of difference between natives and immigrants whose parents are both foreigners is a little bit larger than that between natives and immigrants with one parent who is a foreigner. The latter disparity is more serious than the former one. The percentage of the explained part in the pooled sample comparing natives with immigrants whose parents are both foreigners is larger than that in the pooled sample comparing natives with immigrants with one parent who is a foreigner. This result indicates that there are many other reasons for the difference of high school attendance between natives and immigrants with one parent who is a foreigner, compared to immigrants whose parents are both foreigners.

Observing the results for each independent variable, we find significantly positive coefficients of the dummy variables, including living in Japan for more than 5 years; parents whose home country uses Chinese characters; parents' working, namely, regular employee, executive officer, and self-employed/employed; and home ownership. These factors enlarge the gap between natives and immigrants. The largest factor explaining the disparity in columns 1 and 3 is parents' roots, based on home country use of Chinese characters. The explained power is 0.0475 to 0.0482 (66.4% to 67.4% of the difference). The second largest factor is home ownership and its impact size is almost the same as that of father's regular employment status. The explained power of home ownership is 0.0148 (20.7% of the difference) and that of father's regular employment status is 0.0109 (15.2% of the difference).

Meanwhile, the largest factor explaining the disparity in columns 2 and 4 is home ownership. The explained power is 0.00552 to 0.00546 (9.3% to 9.4% of the difference). The second largest factor is father's regular employment status and its impact size is almost the same as that of home ownership. The explained power is 0.00509 to 0.00524 (8.6% to 8.9% of the difference).

[Insert Table 5 here]

5.3 The outlook for individuals who do not attend high school

Table 6 shows the results of the multinomial logit model for individuals who do not go to university. There are three decision variables, namely, working, unemployed, and homemaker (reference group is the working group).

From Table 6, the coefficients of both dummies for immigrants whose parents are both foreigners and immigrants with one parent who is a foreigner are significantly positive in unemployment estimation, while the coefficient for immigrants whose parents are both foreigners is

larger than that of immigrants with one parent who is a foreigner. This means that the former immigrants are more likely to be unemployed than natives and immigrants with one parent who is a foreigner. However, these coefficients for homemaking are insignificant.

With regard to unemployment, significantly positive results for the coefficients of the dummy variables for parents whose home country uses Chinese characters and parents who are 4-year college graduates. On the contrary, there are significantly negative results for the coefficients of the dummies of parent's employment status, child's age, number of brothers and sisters, and home ownership.

With regard to being a homemaker, the results of almost all variables are similar, but some coefficients show different results. The coefficient of the dummy for living in Japan for more than 5 years is negative and significant at the 10% level. The coefficient of the female dummy is significantly positive. The coefficients of the number of brothers and sisters as well as the home ownership dummy are insignificant.

[Insert Table 6 here]

6. Conclusion

This study examines the high school educational gap of natives and second-generation immigrants with similar characteristics in Japan using the non-linear decomposition method applied to data of 2010 Population Census.

From the results of the logistic regression, the average school attendance probability of immigrant children is lower than that of native children. School attendance probability increases with the following factors: living in Japan for more than 5 years; having parents whose home country uses Chinese characters; having a working father, namely, regular employee, executive officer, or self-employed/employed; having a mother who has a job; having a parent with a 4-year college degree; and home ownership. These results are observed when comparing natives and immigrants whose parents are both foreigners, and when comparing natives and immigrants with one parent who is a foreigner.

From the results of the non-linear decomposition, this study also finds a significant difference of high school attendance probability between native children and immigrant children for the high school period for ages 16 to 18 years. The size of the difference between native children and immigrant children is different depending on whether both the parents of immigrant children are foreigners, or only one is a foreigner. The size of the difference between native children and immigrant children whose parents are both foreigners is larger than that between native children and immigrant children with one parent who is a foreigner. The factors that enlarge the gap are length of stay in Japan, parents with a home-country that uses Chinese characters, parents' employment status, parents who are 4-year college graduates, and home ownership. The non-linear decomposition results show that it

is crucial to improve the following two aspects for better assimilation of immigrants: 1) language proficiency and 2) financial status of immigrants. The first issue can be solved by, for example, providing an opportunity to immigrants to study Japanese, and encouraging immigrants to learn strong Japanese language skills. To resolve the issue of financial status, one solution would be to increase scholarships and student loans for immigrants. There is already some funding available through the Japan Student Services Organization, which is the largest and most well-known provider of scholarships and student loans in Japan. With increasing numbers of immigrant students, the need for scholarships and loans is expected to increase in the future. Another way to improve the financial status of immigrants would be to increase human capital invested in immigrants.

This research has the following limitation. This study defines immigrant children as people whose parents are both foreign, or as those with one parent who is a foreigner. However, from the data, researchers know the parental background only for cases in which children live with their parents. In other words, there may be sample selection bias, because individuals living without their parents are excluded from the sample. Analysis with a sample of immigrants who are not living with their parents is left for future research.

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Table 1. Descriptive Statistics

	Native	Immigrant whose parents are both foreigners	Immigrant with one parent who is a foreigner	Pooled sample
Native	1.000	0.000	0.000	0.988
Immigrant whose parents are both foreigners	0.000	1.000	0.000	0.00364
Immigrant with one parent who is a foreigner	0.000	0.000	1.000	0.00824
Attending school	0.968	0.897	0.909	0.967
Working	0.0196	0.0590	0.0364	0.0199
Unemployed	0.00909	0.0369	0.0446	0.00949
Homemaker	0.00313	0.00738	0.0098	0.00320
Living in Japan for more than 5 years	0.999	0.898	0.953	0.998
Parents: Home country uses Chinese characters	1.000	0.641	1.000	0.999
Father: Not working	0.0117	0.0467	0.0571	0.0122
Father: Regular employee	0.729	0.427	0.534	0.726
Father: Non-regular employee	0.0459	0.260	0.132	0.0474
Father: Executive officer	0.0904	0.125	0.104	0.0907
Father: Self-employed/employed	0.123	0.141	0.173	0.123
Mother: Working	0.749	0.613	0.590	0.748
Parents: 4-year college graduate	0.341	0.343	0.288	0.341
Female	0.492	0.474	0.471	0.492
Age	16.924	16.879	16.899	16.923
Number of brothers and sisters	2.156	2.226	2.097	2.156
Own a home	0.841	0.499	0.639	0.838
Densely inhabited district	0.518	0.796	0.628	0.520

Source: 2010 Population Census (MIC)

Table 2. Descriptive Statistics (Nationality)

	Native	Immigrant whose parents are both foreigners	Immigrant with one parent who is a foreigner	Pooled sample
Father: Japanese	1.000	0.000	0.835	0.995
Father: Korean	0.000	0.416	0.0973	0.00232
Father: Chinese	0.000	0.199	0.0218	0.000905
Father: Thai	0.000	0.0258	0.00109	0.000103
Father: Filipino	0.000	0.000	0.000544	0.0000448
Father: Indonesian	0.000	0.00492	0.00109	0.0000269
Father: Vietnamese	0.000	0.0246	0.000	0.0000896
Father: British	0.000	0.00123	0.00326	0.0000314
Father: American	0.000	0.0148	0.0131	0.0001613
Father: Brazilian	0.000	0.203	0.00272	0.000762
Father: Peruvian	0.000	0.0689	0.000544	0.000256
Father: Others	0.000	0.0418	0.0239	0.000350
Mother: Japanese	1.000	0.000	0.165	0.989
Mother: Korean	0.000	0.411	0.162	0.00283
Mother: Chinese	0.000	0.198	0.136	0.00184
Mother: Thai	0.000	0.0295	0.379	0.00323
Mother: Filipino	0.000	0.000	0.0555	0.000457
Mother: Indonesian	0.000	0.00492	0.00489	0.0000583
Mother: Vietnamese	0.000	0.0246	0.00218	0.0001076
Mother: British	0.000	0.00369	0.000	0.0000134
Mother: American	0.000	0.0148	0.00707	0.000112
Mother: Brazilian	0.000	0.205	0.0277	0.000977
Mother: Peruvian	0.000	0.0664	0.00707	0.000300
Mother: Others	0.000	0.0418	0.0533	0.000592
Japanese	1.000	0.0160	0.891	0.995
Korean	0.000	0.411	0.0103	0.00158
Chinese	0.000	0.192	0.0473	0.00109
Thai	0.000	0.0258	0.0353	0.000390
Filipino	0.000	0.000	0.00381	0.0000359
Indonesian	0.000	0.00492	0.000544	0.0000224
Vietnamese	0.000	0.0246	0.000544	0.0000941
British	0.000	0.00369	0.000	0.0000134
American	0.000	0.0197	0.000544	0.000103
Brazilian	0.000	0.204	0.00272	0.000766
Peruvian	0.000	0.0640	0.000	0.000233
Others	0.000	0.0344	0.00761	0.000211

Source: 2010 Population Census (MIC)

Table 3. Descriptive Statistics (Prefecture)

	Native	Immigrant whose parents are both foreigners	Immigrant with one parent who is a foreigner	Pooled sample
Hokkaido	0.117	0.000	0.0446	0.116
Aomori	0.0131	0.000	0.00272	0.0130
Iwate	0.0135	0.000	0.0103	0.0134
Miyagi	0.0180	0.000	0.0120	0.0179
Akita	0.00760	0.000	0.000	0.00751
Yamagata	0.0111	0.000	0.0272	0.0112
Fukushima	0.0204	0.000	0.000	0.0201
Ibaraki	0.0232	0.0271	0.0451	0.0234
Tochigi	0.0162	0.0308	0.0163	0.0163
Gunma	0.0157	0.0283	0.0234	0.0158
Saitama	0.0529	0.0640	0.0865	0.0532
Chiba	0.0373	0.000	0.0712	0.0374
Tokyo	0.0457	0.0812	0.0957	0.0462
Kanagawa	0.0474	0.0972	0.0740	0.0478
Niigata	0.0196	0.000	0.0136	0.0195
Toyama	0.0067	0.000	0.000	0.00667
Ishikawa	0.0093	0.000	0.00326	0.00924
Fukui	0.0066	0.000	0.0114	0.007
Yamanashi	0.0104	0.0148	0.0114	0.010
Nagano	0.0242	0.0406	0.0430	0.024
Gifu	0.0182	0.0406	0.0158	0.018
Shizuoka	0.0290	0.0578	0.0261	0.0291
Aichi	0.0497	0.124	0.0620	0.0501
Mie	0.0152	0.0197	0.0141	0.0152
Shiga	0.0117	0.0283	0.00870	0.0118
Kyoto	0.0191	0.0467	0.0234	0.0192
Osaka	0.0558	0.172	0.0908	0.0565
Hyogo	0.0353	0.0812	0.0402	0.0355
Nara	0.0137	0.000	0.000	0.0135
Wakayama	0.0104	0.000	0.000	0.0103
Tottori	0.00631	0.000	0.00544	0.00628
Shimane	0.00655	0.000	0.000	0.00648
Okayama	0.0147	0.0098	0.0114	0.0147
Hiroshima	0.0217	0.0283	0.0223	0.0217
Yamaguchi	0.0109	0.000	0.000	0.0108
Tokushima	0.00736	0.000	0.00489	0.00731
Kagawa	0.00748	0.00738	0.000	0.00742
Ehime	0.0114	0.000	0.00218	0.0112
Kochi	0.00863	0.000	0.000	0.00853
Fukuoka	0.0392	0.000	0.0239	0.0389
Saga	0.00882	0.000	0.00544	0.00876
Nagasaki	0.0117	0.000	0.00489	0.0116
Kumamoto	0.0160	0.000	0.00816	0.0159
Oita	0.00853	0.000	0.00435	0.00847
Miyazaki	0.0115	0.000	0.00544	0.0114
Kagoshima	0.0187	0.000	0.0141	0.0186
Okinawa	0.0161	0.000	0.0147	0.0161

Source: 2010 Population Census (MIC)

Table 4. Logit Estimation Results

Logit model Dependent variable: Schooling dummy	Age 16–18 years			
	Native	Immigrant whose parents are both foreigners	Immigrant with one parent who is a foreigner	Pooled sample
Immigrant whose parents are both foreigners				-0.0544 (0.238)
Immigrant with one parent who is a foreigner				-0.871*** (0.0962)
Living in Japan for more than 5 years	-1.692* (1.017)	1.567*** (0.421)	1.093*** (0.338)	0.759*** (0.197)
Parents: Home country uses Chinese characters		1.469*** (0.416)		1.384*** (0.299)
Father: Regular employee	0.652*** (0.082)	0.654 (0.551)	0.685* (0.373)	0.655*** (0.0789)
Father: Non-regular employee	0.059 (0.0922)	-0.816 (0.571)	-0.0596 (0.414)	0.0459 (0.0884)
Father: Executive officer	0.729*** (0.0943)	0.538 (0.845)	1.343*** (0.518)	0.740*** (0.091)
Father: Self-employed/employed	0.363*** (0.0874)	-0.503 (0.687)	0.818* (0.424)	0.371*** (0.0841)
Mother: Working	0.354*** (0.029)	1.634*** (0.379)	0.173 (0.204)	0.358*** (0.0287)
Parents: 4-year college graduate	1.376*** (0.0411)	0.548 (0.355)	1.199*** (0.294)	1.365*** (0.0404)
Female	0.165*** (0.0252)	0.323 (0.302)	0.171 (0.180)	0.168*** (0.0249)
Age	-1.267*** (0.0210)	-0.934*** (0.190)	-0.893*** (0.115)	-1.251*** (0.0205)
Number of brothers and sisters	-0.278*** (0.0151)	-0.250** (0.122)	-0.136 (0.111)	-0.274*** (0.0148)
Own a home	0.626*** (0.0306)	0.486 (0.346)	0.505** (0.202)	0.622*** (0.0301)
Densely inhabited district	0.113*** (0.0297)	0.209 (0.414)	0.0877 (0.230)	0.114*** (0.0294)
Prefecture	Yes	Yes	Yes	Yes
Constant	26.23***	17.28***	16.15***	22.15***
	-1.092	-3.604	-2.017	-0.519
Observations	220,481	813	1,839	223,133
Loglikelihood	-26491	-176.3	-468.8	-27206

Notes: ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. Coefficients and standard errors are shown in parentheses. The results are estimated by employing cluster robust standard errors using household ID.

Table 5. Nonlinear Decomposition Results

Nonlinear decomposition Dependent variable: High school attendance dummy	Age 16–18 years							
	All sample		All sample		Native/Immigrant whose parents are both foreigners		Native/Immigrant with one parent who is a foreigner	
	(Native vs Immigrant whose parents are both foreigners)	(Native vs Immigrant whose parents are both foreigners)	(Native vs Immigrant with one parent who is a foreigner)	(Native vs Immigrant with one parent who is a foreigner)	(Native vs Immigrant whose parents are both foreigners)	(Native vs Immigrant whose parents are both foreigners)	(Native vs Immigrant with one parent who is a foreigner)	(Native vs Immigrant with one parent who is a foreigner)
Living in Japan for more than 5 years	0.00753*** (0.00235)	10.5%	0.00202*** (0.000681)	3.4%	0.00431* (0.00248)	6.0%	0.000981 (0.000666)	1.7%
Parents: Home country uses Chinese characters	0.0475*** (0.0141)	66.4%			0.0482*** (0.0142)	67.4%		
Father: Regular employee	0.0109*** (0.00158)	15.2%	0.00524*** (0.000819)	8.9%	0.0109*** (0.00163)	15.2%	0.00509*** (0.000800)	8.6%
Father: Non-regular employee	-0.000862 (0.00179)	-1.2%	-0.000211 (0.00044)	-0.4%	-0.000908 (0.00188)	-1.3%	-0.000256 (0.00044)	-0.4%
Father: Executive officer	0.000691** (0.000273)	1.0%	-0.000175 (0.000193)	-0.3%	0.000676** (0.000272)	0.9%	-0.0000814 (0.000193)	-0.1%
Father: Self-employed/employed	0.00131*** (0.00041)	1.8%	-0.000381 (0.00026)	-0.6%	0.00125*** (0.00041)	1.7%	-0.000368 (0.00026)	-0.6%
Mother: Working	0.00182*** (0.000213)	2.5%	0.00231*** (0.00021)	3.9%	0.00178*** (0.000203)	2.5%	0.00224*** (0.000205)	3.8%
Parents: 4-year college graduate	-0.00111** (0.000529)	-1.6%	0.00127*** (0.000140)	2.2%	-0.00039 (0.000508)	-0.5%	0.00127*** (0.000141)	2.2%
Female	6.58E-05 (0.0000672)	0.1%	9.61e-05*** (0.0000324)	0.2%	7.35E-05 (0.0000693)	0.1%	0.000102*** (0.0000329)	0.2%
Age	-0.0162*** (0.00340)	-22.7%	-0.00212*** (0.000300)	-3.6%	-0.0173*** (0.00354)	-24.2%	-0.00182*** (0.000282)	-3.1%
Number of brothers and sisters	0.00142*** (0.000219)	2.0%	-0.000708*** (0.000121)	-1.2%	0.00165*** (0.00022)	2.3%	-0.000586*** (0.000122)	-1.0%
Own a home	0.0148*** (0.00150)	20.7%	0.00552*** (0.000331)	9.4%	0.0148*** (0.00151)	20.7%	0.00546*** (0.000330)	9.3%
Densely inhabited district	-0.00148*** (0.000409)	-2.1%	-0.000698*** (0.000190)	-1.2%	-0.00145*** (0.000408)	-2.0%	-0.000702*** (0.000192)	-1.2%
Prefecture	0.001420 (0.00091)	2.0%	0.000339 (0.000379)	-0.6%	0.00155* (0.000900)	2.2%	0.000289 (0.000375)	-0.5%
Observations	223,133		223,133		221,294		222,320	
Explained part	0.0678		0.0118		0.0652		0.011	
Difference	0.0715		0.059		0.0715		0.059	
% of explained part	94.8%		20.0%		91.2%		18.6%	
Probability_1	0.897		0.909		0.897		0.909	
Probability_0	0.968		0.968		0.968		0.968	
Numbers_1	813		1,839		813		1,839	
Numbers_0	220,481		220,481		220,481		220,481	

Notes: ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Coefficients and standard errors are shown in parentheses. The percentages on the right side are the sizes of explained part in each factor. The results are estimated by employing cluster robust standard errors using household ID.

Table 6. Multinomial Logit Model Results

Multinomial logit model Dependent variable: Status dummy (Reference group: Working)	Age 16–18 years	
	Unemployed	Homemaker
Immigrant whose parents are both foreigners	0.937* (0.508)	0.0778 (0.927)
Immigrant with one parent who is a foreigner	0.808*** (0.182)	-0.104 (0.319)
Living in Japan for more than 5 years	0.624 (0.425)	-1.132* (0.616)
Parents: Home country uses Chinese characters	1.175** (0.589)	1.971* (1.151)
Father: Regular employee	-1.162*** (0.164)	-0.639*** (0.242)
Father: Non-regular employee	-1.068*** (0.18)	-0.562** (0.279)
Father: Executive officer	-1.079*** (0.194)	-0.649** (0.291)
Father: Self-employed/employed	-1.307*** (0.177)	-0.834*** (0.265)
Mother: Working	-0.430*** (0.0628)	-0.720*** (0.0942)
Parents: 4-year college graduate	0.311*** (0.0924)	0.860*** (0.132)
Female	-0.0565 (0.0574)	1.794*** (0.102)
Age	-0.679*** (0.0417)	-1.011*** (0.0588)
Number of brothers and sisters	-0.0473* (0.0276)	-0.0552 (0.045)
Own a home	-0.232*** (0.0657)	-0.0221 (0.105)
Densely inhabited district	-0.0281 (0.0656)	-0.148 (0.104)
Prefecture	Yes	Yes
Constant	11.13*** -1.021	15.79*** -1.713
Observations		7,265
Loglikelihood		-5738

Notes: ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively. Coefficients and standard errors are shown in parentheses. The results are estimated by employing cluster robust standard errors using household ID.