



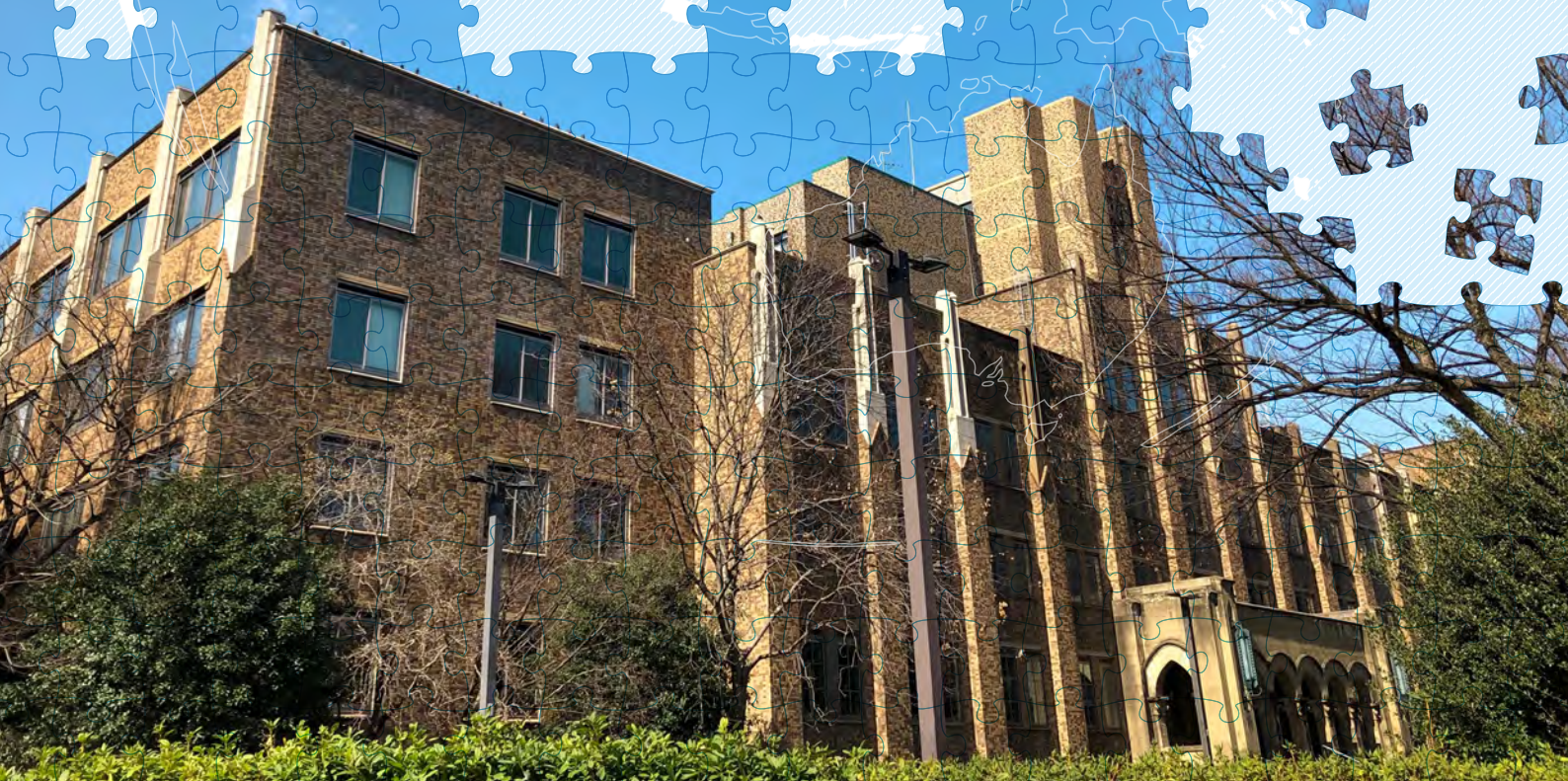
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Co-ethnic Neighborhood Quality and the Educational Opportunities: Upper Secondary Education Enrolment in Japan



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Abstract

Japan is a unique new immigrant destination because while the entire system is egalitarian compared to other societies, its educational system excludes immigrant children primarily due to the language barrier. Subsequently, we aim to scrutinize the following two questions of (1) whether co-ethnic neighborhood quality affects children's opportunities for upper secondary education (high school enrolment) in Japan and, if so, (2) whether that effect varies across nationalities as an indicator of ethnicity. Grounded on the premise that the co-ethnic neighborhood effect depends on adaptation to the Japanese educational context, we utilize national census data in 2010 and employ a fixed-effect regression model to control the unobserved neighborhood effect. The random and fixed effect models support the positive effects of co-ethnic neighborhood qualities, including the percentages of highly educated residents, employed residents, and residents who have lived in the neighborhood since birth, even after considering children's socioeconomic backgrounds and unobserved neighborhood heterogeneity. We also found that these effects vary across children's nationalities.

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Introduction

Since the early 1990s, Japan has seen a growing number of immigrants or “newcomers.” Official statistics about foreign nationals in Japan² report that the population size of people in Japan without Japanese citizenship was about 2.9 million in 2020. This was an increase from about 1.3 million in 1992, meaning that the population had doubled by 2020. This number includes “oldcomer” residents, primarily people from Korea coming to Japan before and during World War II or their descendants.³ However, the primary contributor has been the increase in the “newcomers” during these three decades because while the total foreign population has increased, the number of “oldcomers,” who were predominantly “Special Permanent Residents,” has decreased from 590,193 in 1992 to 304,430 in 2020.

The diversity of the immigrant population in terms of ethnic backgrounds has also increased. Before the Japanese government revised the Immigration Control and Refugee Recognition Act in 1990, most of the foreign population were oldcomers from Korea. After the revision, however, the largest group is currently Chinese immigrants, Korean and Vietnam immigrants currently constitute the second largest group, and Filipino and Brazilian immigrants follow in terms of their population size.

As many immigrants settle in Japan, the educational opportunities for their children have gathered public attention, and the visibility of immigrant children in Japan has increased. The Immigration Services Agency of Japan reported that the number of foreign children aged 0 to 14 reached over 240,000 in 2020, an increase from 170,000 in 1986. Under the situation of a declining birth rate among Japanese nationals, the presence of immigrant children has increased relatively. Moreover, if they continue to live in Japan, they must also attend upper secondary education for their subsequent life chances. This can be a problem for some children, given the monolingual nature of Japanese school education (Okano and Tsuneyoshi 2011). It reflects the general perspective of the Japanese government that foreign residents living in Japan should remain temporarily. Subsequently, there are few policies to support the education of immigrant children, resulting in lower enrolment rates in primary and secondary education than those of Japanese children.

Although Korean and Chinese children tend to attend primary and secondary schools, those from other countries are often left behind (Chitose 2008; Ishida 2020). Additionally, even if immigrant children enroll in school, their level of Japanese linguistic fluency can

² Statistics on foreign residents in Japan by the Ministry of Justice.

³ Japan annexed Korea in 1910, and Korean people possessed Japanese citizenship during the period of Japan’s rule. Due to the signing of the San Francisco Peace Treaty in 1951, they lost their citizenship because the annexes were no more Japanese territories. Those who remained in Japan became “Special Permanent Residents” and this included most of the “oldcomers.”

create an achievement gap (Ishida et al. 2016). This is not just a matter of teaching language. Japanese teachers and school professionals sometimes regard immigrant students who are not proficient in Japanese as having a developmental disorder and move them into special needs classrooms, even when they do not have a disorder (Aiso 2021).

With little public support and strong monolingual pressure, immigrant children do not receive sufficient assistance to learn within the school education system. Instead, they may have to rely on their socioeconomic backgrounds or co-ethnic resources collectively held in ethnic neighborhoods. Accordingly, this study examines the co-ethnic neighborhood effect on high school enrolment in Japan. In Japan, completing high school education is the minimum requirement for subsequent opportunities such as higher education and transition from school to work. Subsequently, we focus on high school enrolment.

As reviewed below, the prior research has demonstrated the educational inequality of immigrants. However, these studies have centered on western societies, and by focusing on Japan, this study provides significant insight into this theme. Even though Japan is becoming a newly diversified society (Laurence et al. 2021), it is still a negative immigration society because it is reluctant to integrate immigrants into the mainstream (Bartram 2000). Focusing on the Japanese context will contribute to discussions about whether co-ethnic resources are effective regardless of societal contexts.

From the abovementioned motivation, we first review previous studies that have focused on ethnic neighborhoods and educational inequality and relevant empirical findings. This review is followed by our main thesis about how neighborhoods function in education in the Japanese context. We induce empirical hypotheses through the review and examine the hypotheses using Japanese census data from 2010. To the best of our knowledge, the census micro dataset is the best way to examine the effect of co-ethnic group characteristics on children's education. The discussion and conclusion follow our data analysis.

Ethnic Neighborhood Effects on Education

While immigrant scholars have paid attention to how immigrant children's neighborhood characteristics enable and constrain their educational achievement and attainment, researchers in urban studies and sociology of education have also long been interested in this issue in various societal contexts (Alvarado and Cooperstock 2021; Lei 2022). Regardless of ethnic or immigrant background, the neighborhood is thought to play a crucial role in educational opportunity, and this is often examined through social and institutional contexts. Previous studies have argued that there are several potential mechanisms regarding how the neighborhood works (Ellen et al. 1997; Mayer and Jencks 1989), and the social and institutional contexts account for a considerable part of the neighborhood effect (Ainsworth 2002). Although the present study does not examine all of them thoroughly but particularly focuses on the socioeconomic composition of neighborhoods, a general review will more

clearly highlight our approach.

Children's Exposure to Others in Neighborhoods

Influence from others is a neighborhood effect mentioned in previous studies. This perspective, called the “contagion” or “social control” model by Mayer and Jencks (1989: 1441), assumes that those who surround children in a neighborhood convey their attitudinal and behavioral characteristics directly or indirectly. Even without direct social interactions, children think of the behaviors of others nearby as “normal” or “acceptable” in their daily lives (Ellen and Turner 1997: 838). Adults and older peers can be their role models, and they internalize those seniors' values and behaviors as social norms. For instance, in a neighborhood of highly educated people, it becomes “normal” for children to get an undergraduate degree, regardless of whether they want to pursue this. Moreover, given that it is normal to go to tertiary education, the shared and collective value works like an educational ethos (Rutter et al. 1979). Accordingly, all actions that are friendly to status attainment have legitimacy in a community, and children focus on climbing the ladder of educational attainment.

Given that well-off neighborhoods provide better educational opportunities, the other way around also stands. Studies on residential segregation have been a long-standing theme of neighborhood inequality studies (Hwang and McDaniel 2022; Mario and Newman 2001). For example, Wilson published a seminal work on an inner-city and explained how poverty and inequality emerge in a neighborhood associated with a severe lack of job opportunities among Black people (Wilson 1987, 1991). The economic marginality stemming from scarce job opportunities lowers perceived self-efficacy, which results in children's exposure to less educationally motivated persons (Wilson 1991: 11). Also, disadvantaged people must concentrate in poor neighborhoods because they cannot afford to live in more affluent ones (Massey 1990; Massey and Denton 1993). This then creates a neighborhood where disadvantaged people are provided with low-quality schools due to budget problems or negative peer effects.

The effect of average neighborhood characteristics is somewhat ambiguous (Small and Newman 2001). It should be plausible that the relationship between the constructs and measurements is not always coherent, primarily because of data limitations. However, the influence of the neighborhood's socioeconomic composition should also reflect a mixture of the role model effect, the peer effect, and the information effect of social networks. Moreover, there have been few studies about the association between education and neighborhoods in Japan that the present study focuses on, indicating that it is necessary to investigate the neighborhood effect in this context even as a composite.

Other Aspects of the Neighborhood Effect

The affluence of a community affects children's educational circumstances via the quality of local services (Thrupp et al. 2002). In less affluent communities, public services are less likely to have fewer staff and facilities to encourage learning (Ellen and Turner 1997: 837). Although it could depend on the financial system of educational expenditure in each country's context, the poverty concentration in certain neighborhoods can reduce financial support for public school education (Massey 1990: 350).

Institutional completeness is relevant for educational settings in neighborhoods with high numbers of children of immigrants and ethnic minorities. This concept refers to how far an ethnic group develops its social organizations that provide various services to its members (Breton 1964; Zhou 2009; Zhou and Lee 2013). For instance, the co-ethnic social organizations include public facilities like libraries with co-ethnic staff members and books, non-profit organizations, religious organizations, and ethnic associations. With such facilities in their neighborhoods, immigrants and their children can utilize educational resources and maintain their sense of belonging to the community. Accordingly, they can also accumulate and mobilize social capital, that is, various social supports through dense and cohesive co-ethnic networks. Otherwise, social disorganization and isolation in deprived neighborhoods result in low social cohesion and can lead to high crime levels (Karyda 2020; Peterson and Krivo 2009). Additionally, if racial segregation is interrelated with socioeconomic deprivation and criminal violence, immigrant children will likely suffer from disrupted neighborhood circumstances.

Immigrant Children's Education and Co-ethnic Neighborhood Resources

The abovementioned general arguments on the neighborhood effects can be particularly crucial for immigrant children, and how their neighborhoods are organized as ethnic communities is an indispensable aspect of an ethnic group's "mode of incorporation" (Portes and Rumbaut 2001; Waldinger and Catron 2016). Unlike native children, immigrant children and their parents need to adjust to the host societies after migration and are supposed to be familiar with the local context and language from the outset. Accordingly, a favorable reception setting likely makes them more suitable for their new situation, and a neighborhood or daily existence area is a pivotal element of the setting.

Both qualitative and quantitative evidence confirm that immigrant children's neighborhood circumstances are relevant to their educational success. For example, qualitative studies have illustrated that co-ethnic social capital, strengthened by social organizations, allows children to access educational resources (Khachikian 2020; Zhou 2009; Zhou and Lee 2013). Quantitative analyses in the west coast region of the U.S. have also demonstrated this effect by demonstrating that larger co-ethnic communities exemplify the

positive effect of being integrated into the host society (Lee 2018a). Additionally, neighborhood quality, measured by the percentage of university graduates, high-quality housing, and ethnic density, is associated with completing secondary education among second-generation immigrant adolescents in Belgium (Fleishman et al. 2011, 2013). Similarly, a study that used nationally representative data from the U.S. reports that immigrant adolescents in non-poor neighborhoods can achieve educational attainment by assimilating into the host society (Xie and Greenman 2011).

Meanwhile, different neighborhood characteristics do not necessarily have monotonical positive effects on immigrant children's educational success. For instance, a Swedish quantitative study reports that the co-ethnic average years of education conditions the effect of co-ethnic youth population size on educational attainment (Bygren and Szulkin 2010). According to another Northern European study, the native-immigrant gap in educational attainment is considerably explained by parental socioeconomic status, while the neighborhood fixed effect marginally contributes to generating the gaps (Hermansen 2016).

The previous studies have suggested that we should pay more attention to the macro-level context of the society of interest, and a larger societal milieu should affect how the co-ethnic neighborhoods improve immigrant adolescents' educational opportunities. A comparative study between Canada and the U.S. revealed that the co-ethnic average educational attainment as a resource is differently associated with immigrants' educational attainment between the two countries (Lee 2018b). In this case, the differential co-ethnic resource effect is interpreted as the difference in selectivity stemming from immigration policies. As for the Norwegian case, the author explains that the egalitarian welfare state setting possibly restrains the achievement gap coming from the between-neighborhood variation (Hermansen 2016).

Japan as a New Immigrant Destination

Current State of Japan

In the sense that the ethnic neighborhood effect depends on the social context, Japan stands out as being considerably different from other western societies, where prior research has focused, for several reasons.

First, Japan is a “new immigrant destination (NID)” (Winders 2014). What is ‘new’ depends on regional contexts, and “there is little consensus on what constitutes a NID’s features” (Winders 2014: S154). By the term “NID,” some researchers refer to a specific district within a country, such as the U.S. (Stamps and Bohon 2006), while for others, it is applied to entire countries (Azzolini et al. 2012). Nevertheless, NIDs commonly feature a rapid increase in the immigrant population and a lack of institutional infrastructure to integrate them into the host society (Winders 2012).

As we introduced earlier, the number of newcomers in Japan has increased since the early 1990s due to the Immigration Control and Refugee Recognition Act amendment of 1990, which set up new residential qualification categories for foreign workers. Crucial backgrounds for the amendment were the 1980s' labor shortage and non-Japanese citizen's work not permitted under previous frameworks (Kuwahara 2005). The Japanese government had to manage this situation while holding a policy of not increasing the number of immigrants, whom the government has regarded as those who intend to settle in Japan. Before the amendment, most non-Japanese citizens were Korean people and their descendants. After that, the newcomer immigrants have predominantly come from East Asia (China and Korea), Southeast Asia (Philippines and Vietnam), and South America (Brazil and Peru).

While Japan is becoming a NID in East Asia, it is still very different from other NIDs like Spain and Italy (Azzolini et al. 2012). According to the OECD International Migration Database, Japan's foreign population sizes in 2010 and 2019 were 2,184,000 and 2,731,000, respectively.⁴ In terms of the relative size of the total population, these are 1.7% and 2.2%, respectively. These figures are lower than traditional immigration societies like the U.S., the U.K., and the NIDs, where previous studies have focused.

How is the current immigrant population in Japan distributed? According to choropleth maps from the 2015 census, immigrants are concentrated in the metropolitan areas and manufacturing and agriculture production centers (Laurence et al. 2021). There are variations in the immigrant population at the prefecture and municipality levels, and it is an inter-consortium of municipalities where the immigrant population is concentrated.⁵ It is not clear whether they are segregated from Japanese nationals. For example, a study in Japan pointed out that recent immigrants did not create ethnic enclaves (Hirota 2003). Additionally, Japan is a society with low residential segregation on average, and a comparative study revealed that Tokyo currently has a lower level of residential segregation stemming from socioeconomic status than New York and London (van Ham et al. 2020). Tokyo does not necessarily represent all Japanese cities, but it is realistic to assume that there are lower levels of residential segregation in Japan except for several severely and historically discriminated districts called "*braku*" (Morgan 2007; Tabuchi et al. 2012) compared to other global cities.

Subsequently, it is possible to presume that there has not been strong residential segregation arising from the current immigrant population and its distribution in Japan (Korekawa 2021). It is also conceivable that labor demands in the Japanese economic market determine where immigrants live, considering that the Japanese government has reluctantly

4 See <https://www.oecd.org/els/mig/keystat.htm>

5 See the website of "*Gaikoku-jin Syuju Toshi Kaigi* (the council of cities of non-Japanese residents)." <https://www.shujutoshi.jp/index.html>

opened its door to immigrants.

Regarding the inequality across neighborhoods, the Japanese financial system has also equalized imbalances of fiscal power among local governments. The central government subsidizes local governments based on the population size because each prefecture and municipality has varying levels of annual tax revenue. In Japan, the expenditure on senior secondary (high school) education heavily depends on the prefectural fiscal budget, which relies on the central redistribution. Further, each municipality is responsible for the personnel expenses of teachers in compulsory (elementary and junior high schools) education, but the central government's budget currently subsidizes one-third of the total expenditure. Although there have been critical debates about the balance of educational costs between the local and central governments (Kariya 2010; Kobayakawa 2013), the Japanese redistribution system has restrained the fiscal inequality of public education spending from a regional perspective.

Conditional Egalitarian Educational System and Neglect of Ethnic Minorities

The abovementioned points of the smaller immigrant population share than other NIDs, overall weak residential segregation, and egalitarian fiscal system toward education seem to hide the problems of immigrant children's education in Japan. However, in theory, these characteristics in Japan should be the backdrops of their disadvantages in schooling. Otherwise, it is impossible to understand why gaps exist in school enrolment and academic performance between native and immigrant children (Chitose 2008; Ishida 2020; Ishida et al. 2016).

Regarding the educational settings in Japan, there is not a widespread perception of the necessity to integrate immigrant children into the Japanese educational system. This is because of the small presence of immigrants across the country. Except for some cities that have a sizable number of immigrants and their children, immigrants are unusual for most municipalities in Japan. In Japan and the U.S., which are different in many respects, we can see the low priority at the policy level for immigrants due to their small number.

Considering that the central government has not tried to integrate immigrants into Japanese society, controls the educational curriculum until secondary education, and influences the fiscal budget of each prefecture through its redistribution system, immigrant children are being shut out of this system. Even though the Japanese education system has egalitarian features, it only benefits children of Japanese nationals and immigrant children deeply assimilated into Japan. In an abstract or theoretical sense, such a situation is in line with arguments from previous studies in that the NIDs lack institutional infrastructure to meet the need of immigrants (Azzolini et al. 2012; Stamps and Bohon 2006; Winders 2012, 2014).

A monoethnic or monocultural aspect of schooling has been thought to prevent immigrant children's integration into Japanese education, and it is both a cause and consequence of the centralized and standardized educational system. While before the

migration of newcomers Japan had a history of indigenous inhabitants like the Ainu people and the Korean oldcomers, Japanese public policies have not considered cultural diversity (Nomoto 2009; Weiner 2009). These policies also apply to current immigrant children. However, the Japanese central and local governments have made more effort to develop measures for children from diverse backgrounds than previously. For example, they have developed policies to provide additional teaching staff and Japanese language learning opportunities for non-Japanese native students.⁶ However, their support is chiefly centered on assimilation and learning the Japanese language, and they have been consistent with a policy position that provides ethnically homogeneous school education.

Heterogeneous Co-ethnic Neighborhood Effect on High School Enrolment in Japan

NID societies lack public support with which immigrant children can overcome their disadvantages in school education. In Japan, the Japanese-language absolutism in every respect of education has excluded immigrant children from the mainstream system. Meanwhile, co-ethnic social organizations are unlikely to assist with this problem due to the immigrant's small presence in Japan and each local community. Hence, the Japanese context is the opposite of established immigration societies.

Nevertheless, the co-ethnic composition surrounding children of immigrants should be influential in Japan. This prediction will apply to immigrant children who are behind regarding Japanese language skills. It is not plausible to expect a positive impact of the ethnic community with any institutionalized force on the immigrant children's educational success. In the meantime, unlike the institutional completeness perspective, it is still possible to anticipate the co-ethnic peer effect based on the contagion model (Mayer and Jencks 1989) and social support from nearby co-ethnic groups. Without policy support or co-ethnic organizationally established assistance, immigrants and their children in Japan must rely on their socioeconomic backgrounds and support from other people.

Previous studies have reported that immigrants' socioeconomic backgrounds are associated with the propensity to enroll in compulsory and upper secondary education (Chitose 2008; Ishida 2020; Takenoshita et al. 2013). Furthermore, some studies have investigated the enrolment gaps in upper secondary education between Japanese and immigrant children and have demonstrated that this can be explained by children's socioeconomic backgrounds (Hagiwara and Liu 2020; Ishida 2020). However, these studies have never tackled the association between the immigrants' neighborhood circumstances and

6 See the handout (No.2-4-2) of the 139th meeting of the Japanese National Commission for UNESCO Subcommittee on Education (July 26th, 2019). (in Japanese).

https://www.mext.go.jp/unesco/002/006/002/001/shiryo/1414099_00002.htm

educational opportunities.

Qualitative research has complemented the limitation of quantitative studies regarding investigating how the immigrants' social interactions affected their children's education. Co-ethnic social networks based in close living areas provide some forms of support that help keep immigrant children at school (Kobayashi and Tsuboya 2021). The previous findings can be summarized in the following three ways, which are similarly pointed out in the western literature.

One is that instrumental and mental support from the co-ethnic networks helps immigrant mothers obtain information about schools. A fieldwork study revealed that Filipino mothers could mobilize their networks formed in church like the social capital, Coleman (1988) proposed (Miura 2013). Cultural inheritance within the co-ethnic group is also important, and it maintains the ethnic identity that is supposed to result in a sense of belonging (Jin and Yasumoto 2010; Nukaga and Miura 2017). Even indirect influences can benefit immigrant children, and a typical example is that co-ethnic members serve as role models in educational attainment. Some qualitative studies have also demonstrated that immigrant children without such models struggle to form educational and career aspirations (Miyajima and Ota eds. 2005; Tsuboya 2015).

Taken together, the co-ethnic neighborhoods will pull for children's education when they struggle to adapt themselves to Japanese school education. Prior research in Japan implies that South American and Southeast Asian children are good examples. They and their parents are less fluent in the Japanese language than children from East Asia (Castro-Vázquez 2009; Shikama 2008), and their social backgrounds are less stable or affluent than Chinese, Korean, and Japanese parents (Ishida 2020). Accordingly, their educational opportunities depend on more co-ethnic neighborhood characteristics.

In contrast, co-ethnic neighborhood effects will not emerge in Japanese children because they can more easily adapt to the Japanese educational system. As for Korean children, the co-ethnic neighborhood effects may be similar to those in Japanese children due to the historical process of their assimilation into Japan. Chinese children are situated in an intermediary position between Japanese and South American/Southeast Asian children. This group consists of highly skilled migrants and those who migrated through other routes like international marriage, and the co-ethnic neighborhood effect is likely mixed.

As mentioned above, it is possible to hypothesize that the co-ethnic neighborhood quality can contribute to providing an opportunity for schooling through social support and the existence of role models. Meanwhile, it is still open whether such networks are important in Japan, where the immigrant community force is unlikely. Also, prior research in Japan has not specified what aspects of co-ethnic neighborhood quality are important. A series of studies by Fleischmann et al. (2011, 2013) should be noted because they have considered several dimensions of co-ethnic neighborhood characteristics simultaneously. Subsequently,

digging into the co-ethnic neighborhood network effect is an important research step on immigrants and education in Japan as a NID.

Data and Methods

The 2010 National Census Data

Sample Settings

We utilize the 2010 National Census in Japan to examine the heterogeneous co-ethnic neighborhood effect hypothesis. To the best of our knowledge, the 2010 Census dataset is appropriate for the following reasons. First, no large-scale nationwide data distinguishes ethnic background other than the census. We can also dig into the neighborhood effects at the survey tract-level only with the census, and other data enable us to use municipal-level units at best. Second, educational background is a question asked every ten years in the census, and accordingly, it is not available in the 2015 data.⁷ In this study, we use nationality information to indicate ethnic background. One limitation of the census in Japan is that it does not include information about birthplace. However, there is no Japanese data that can consider both nationality and birthplace as far as we are aware.

The target population here is all residents born from April 1992 to March 1995 in the survey. Because the census includes information on birth month and year, it is possible to define each child's school grade roughly. The present study focuses on whether a child is enrolled in upper secondary education and children's school grades in the dataset correspond to the 10th to 12th year. The analytical sample size is 3,112,904 from the 123,756 census tracts.

In the following analyses, we restrict the sample into seven groups; Korean, Chinese, Philippines, Vietnamese, Brazilian, Peruvian, and Japanese children. Other than Japanese children, these six nationality groups comprise most immigrant (foreign) children in Japan. It is technically possible to include other groups that we can specify by nationality in the dataset, including children with Thai, Indonesian, British, and U.S. nationality. However, we exclude them just due to the small number of cases. There is also the "other nationalities" category in the data, but we do not use these because it is impossible to calculate the co-ethnic neighborhood variables mentioned below.

⁷ The 2020 census is the latest data on educational background, but we are concerned about any influence of the COVID-19 pandemic. Subsequently, we assume that the 2010 data is more suitable than the 2020 data.

Key Variables

Our outcome is a dichotomous variable that distinguishes whether a child is enrolled in a high school or not. The census first asks respondents to answer whether they attend a school or have graduated from schools at the time of the survey, and then they are supposed to answer their current or last school. The children in this study have two statuses: (1) students in high schools or corresponding (“enrolling” and “high school”) and (2) non-enrolled after completing junior high school or dropouts from high school (“graduated” and “junior high school”). Those in the first case are coded one, and otherwise, zero in the outcome variable.

The key explanatory variables here are the indices of the co-ethnic neighborhood quality. Here, “co-ethnic” is equivalent to “same nationality.” We use the five variables underneath based on the findings of previous studies. The percentage of co-ethnic residents indicates ethnic concentration in a neighborhood. As indices of socioeconomic qualities, we use the percentages of (1) the undergraduate or more, (2) managerial or professional workers, and (3) unemployed in the co-ethnic residents of the same neighborhood. We also analyze the percentage of the co-ethnic residents living since birth or for ten or more years in the same neighborhood. This is one criterion for permanent resident status, and we assume that this is an indicator of co-ethnic neighborhood cohesion. If more people live in the same place for a long time, they are likely to get to know each other. It is possible to assume that such a co-ethnic neighborhood is dense and cohesive, and social norms will effectively work against individuals, as the social capital framework suggests (Coleman 1988).

These five variables are calculated within the same nationality groups for each neighborhood. The “neighborhoods” refer to the census tracts nested in each municipality and prefecture in this study.⁸ Suppose a fictitious neighborhood consists of three Japanese, two Korean, and four Chinese (nine residents). In this neighborhood, the percentages of the three nationalities are 33%, 22%, and 44%. Accordingly, the value varies across nationalities within the single variable of the co-ethnic concentration.

As for the rest of the co-ethnic neighborhood variables, each percentage is calculated within the same nationality group. For example, suppose that there are one Japanese, one Korean, and three Chinese immigrants with an undergraduate or higher degree in this neighborhood. In this case, the percentages of highly educated are 33% (1/3), 50% (1/2), and 75% (3/4) for each group. By defining them in those ways, it is possible to investigate the effects of the co-ethnic qualities within the same neighborhood.

⁸ Unfortunately, it is impossible to identify the geographical relationships among tracts. Therefore, we cannot rigorously control the spatial correlation among them in the empirical models.

Covariates

As the previous studies have pointed out, children's socioeconomic backgrounds affect their chances of enrolling in Japanese school education (Chitose 2008; Ishida 2020; Takenoshita et al. 2013). We should consider this respect because seemingly positive co-ethnic neighborhood qualities towards education may only reflect socioeconomic selectivity. Accordingly, we need to control the socioeconomic background variables as confounders against co-ethnic neighborhood quality and high school enrolment.

As for children's information, we control their gender (female dummy), nationalities (the reference category is Japan), and potential school grades (from 10th to 12th), living in a house owned by the head of the household (yes = 1, no = 0), and living since birth (yes = 1, no = 0). We use the information about their fathers and mothers as well: their nationalities (Japan (ref.), non-Japan, absence⁹), educational backgrounds (elementary/junior high school (ref.), high school, junior/technical college, undergraduate/graduate degree), employment statuses (regular employment (ref.), non-regular, executive/self-employed with employees, self-employed without employees, not working).¹⁰ Table 1 illustrates the summary statistics of all key variables and covariates.

Fixed-effect Regression Model

The present study employs a fixed-effect regression model with the variables mentioned above for the following empirical analyses. The co-ethnic neighborhood quality will depend on that of the entire neighborhood. For instance, a certain ethnic group concentrating in a neighborhood consisting of lowly qualified immigrants may result from neighborhood traits like lower rent prices and worse public safety issues. At the same time, children who continue to stay in such a neighborhood may not be available to succeed in their education due to the bad neighborhood effects or their parents' residential choices when they do not care about children's surroundings. In this example, the substantial issue is about the entire neighborhood but not the co-ethnic neighborhood qualities.

To avoid the confounding effect of the neighborhood, we control the tract-level fixed

⁹ Because the census is a household survey, the absence of a child's father or mother does not necessarily mean that the household is a single-parent family. There can be other reasons such as living away from home for work (*tanshin-funin* in Japanese).

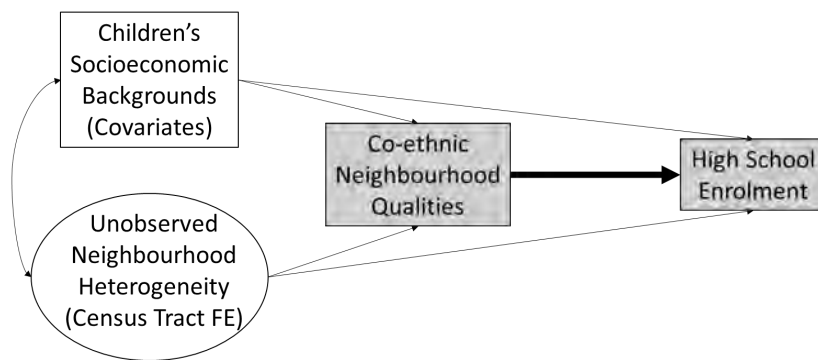
¹⁰ If the information of a child's father or mother is not available due to the absence of each, we impute the value of the reference category for parental education and employment status variables. This approach is not problematic because the effect of "Absent" must be captured by the corresponding dummy variable in the regression models.

effects in the linear probability regression model. Each tract approximately covers one or several blocks, and it is possible to assume people in the same tracts can contact each other in person. The following equation (1) is our empirical model, and Figure 1 illustrates the present model.

$$y_{ij} = a + \mathbf{Xb} + \mathbf{Z\gamma} + \alpha_j + e_{ij} \quad (1)$$

where y_{ij} in equation (1) is the outcome variable, and a is the intercept. The vectors of \mathbf{Xb} and $\mathbf{Z\gamma}$ refer to the co-ethnic neighborhood qualities and covariates, respectively. An important component is α_j that is the census tract fixed effect. Lastly, the error term is denoted as e_{ij} (1).

Figure 1: The structure of variables of interest



Our primary interest here is the coefficients of the co-ethnic neighborhood qualities, \mathbf{b} in equation (1) and the bold path from “Co-ethnic Neighborhood Qualities” to “High School Enrolment” in Figure 1. Meanwhile, we should consider the confounding effects of covariates as socioeconomic selectivity and census tract fixed effects as unobserved neighborhood heterogeneity. It is possible to identify them by γ and α_j in equation (1). By doing so, we can obtain more rigorous effects of the co-ethnic neighborhood qualities on high school enrolment than never considering the confounders. In the following analyses, we estimate random effect models as baselines, which means there is no path from the unobserved neighborhood heterogeneity in Figure 1. Then, we add the fixed effects and covariates step by step.

Results

Table 2 illustrates the results of linear probability random and fixed-effect models. Model 1 is the random effect model that only includes the nationality dummy variables and random variance component at the tract level. Except for Korean children, children from the other five groups are behind Japanese children in the high school enrolment rate, and Vietnamese, Filipino, and Brazilian children are 20% lower than their Japanese counterparts. The disadvantages seem slightly mild for Peruvian and Chinese children, but their negative

coefficients are statistically significant.

Model 2 adds the co-ethnic neighborhood qualities to Model 1. As for all indicators, children are more likely to enroll in high schools in co-ethnic neighborhoods with higher qualities. All the five variables are statistically significant, and each sign of the coefficient is consistent with the theories and findings of previous studies. This model demonstrates positive coefficients of the percentages of the co-ethnic residents, managerial or professional workers, and people living for a long time in the same neighborhoods. Also, the coefficient of the percentages of the co-ethnic unemployed is negative, which means children can enjoy their high school educational opportunities in the co-ethnic neighborhoods with a low unemployment rate.

As mentioned above, however, these seemingly positive impacts on educational opportunities possibly reflect unobservable neighborhood heterogeneities. Model 3 considers this respect by controlling the tract level fixed effects. As for the percentages of the co-ethnic residents, its coefficient is statistically insignificant and decreases by about 80% compared to Model 2. That means the effect of the co-ethnic concentration primarily comes from all the other kinds of neighborhood effects. The rest of the explanatory variables still have significant coefficients, but the coefficient of the percentage of the co-ethnic managerial or professional workers is reduced by about 60%.

In Model 4, we added the children's socioeconomic background variables to the fixed-effect model (Model 3). After considering the effects of covariates, the effect of the percentage of co-ethnic managerial or professional workers is not statistically significant or is reduced by around 80% from the former model. It is possible to see the same result of the coefficient of the percentage of the co-ethnic residents as well. Hence, co-ethnic concentration and occupational composition should reflect immigrant selectivity and unobserved neighborhood heterogeneity. Still, the rest of the three variables remain statistically significant, and their coefficients are as expected.

Children's socioeconomic backgrounds are also associated with their high school enrolments, similar to a previous study (Ishida 2020). As for children's demographic backgrounds, the girl's dummy demonstrates a positive coefficient. In the meantime, the linear effect of school grades is negatively significant. This result means older children are less likely to be enrolled in high schools, which partly indicates the influence of their dropout parents' nationalities, and children from mothers with foreign nationalities are less likely to go to high school. For both fathers and mothers, the effects of "Absent" are positively significant, but this category contains various meanings. As for parental educational backgrounds, a higher educational career leads to their children's high school enrolment. In Japan, having a regular job leads to economic stability, and other employment types are negatively associated with their children's education. Also, living in an owned house, which means financial and residential stability, is positively associated. Lastly, the coefficient of

living at the same address since birth is positively significant, reflecting the positive aspect of residential incorporation in the neighborhood.¹¹

The series of random and fixed effect models support the significant effects of the co-ethnic neighborhood quality, the entire neighborhood, and children's backgrounds. However, the co-ethnic neighborhood quality may differentially affect high school enrolment across nationalities. Model 5 includes interaction terms between the five co-ethnic neighborhood quality variables and children's nationalities to examine the heterogeneous effect. All the five co-ethnic neighborhood variables appear to have significant interaction effects in Table 2. Overall, the heterogeneous effects are conceivable. As for Model 5, the results of other covariates are nearly identical to those in Model 4.

In the meantime, Model 5 in Table 2 does not directly indicate nationality's co-ethnic neighborhood quality effects. Hence, we demonstrate the linear combinations of the main and interaction effects based on Model 5, and Table 3 illustrates the results of those linear combinations.

As for the percentage of the co-ethnic residents, its effect is negatively significant for Filipino and Vietnamese children and insignificant for other groups except for Brazilian children. There is an exceptional result for Brazilian children; a positive linear combination effect. However, the interaction effect of the Brazilian result is not significant in Model 5, so this result should be interpreted with caution.

The linear combination effect is positively significant for Vietnamese, Brazilian, and Peruvian children regarding the percentage of the co-ethnic undergraduates or more highly educated, and meanwhile, it is not significant for children of other nationalities. The percentage of co-ethnic managerial or professional workers demonstrates a significantly positive effect for Brazilian children but a negative one for Peruvian children.

Another co-ethnic neighborhood quality variable is the percentage of unemployed co-ethnic immigrants. Positive interaction effects exist in Korean and Chinese children in Model 5, but the linear combination effect is significantly negative across all nationalities. Therefore, it should be fair to interpret that the co-ethnic unemployment rate consistently negatively affects children's high school enrollment and that some differences among nationalities seem negligible.

Finally, the linear combination effect of the percentage of co-ethnic neighbors living in the same place since birth or for ten or more years is positively significant for the six nationality groups other than Korean children. For Koreans, the interaction effect in Model 5 is negatively significant and offsets the positive main effect. Meanwhile, positive effects are added for Chinese, Filipino, Vietnamese, and Brazilian children. Also, if pressed, this

¹¹ These results of children's socioeconomic backgrounds can be outcomes of their selectivities, but the present study does not focus on rigorously identifying the effects of their socioeconomic backgrounds.

positive effect appears to be greater for children from China, Vietnam, Filipino, and Brazil.

Discussion

In the current study, we scrutinized the following two questions of (1) whether the co-ethnic neighborhood quality affects children's opportunities for upper secondary education (high school enrolment) in Japan and, if so, (2) whether that effect varies across nationalities as an indicator of ethnicity. To examine the heterogeneous effect of co-ethnic neighborhood quality on children's education, we used the national census data from 2010 and employed the fixed-effect regression model to control the unobserved neighborhood effect.

As for the first question, our results support the positive impacts of some co-ethnic neighborhood qualities on high school enrolment and indicate that co-ethnic socioeconomic qualities are important. Even after considering the effects of children's socioeconomic backgrounds and unobserved neighborhood (census tract) fixed effects, the coefficients of the following three variables remain statistically significant: the percentages of the undergraduate or higher degree, the co-ethnic unemployed people, and co-ethnic residents living since birth or for ten or more years in the same neighborhood. Meanwhile, the percentage of the co-ethnic residents as an index of the ethnic concentration becomes insignificant after controlling the neighborhood fixed effects, and its effect also decreases considerably. The percentage of the co-ethnic managerial or professional workers becomes insignificant after considering the covariates' effects.

For children's and their parent's decision-making of whether they should go to high school, the educational background of their neighbors seems most substantial because it possibly works as a social norm about educational attainment. As the contagion or social control model suggests (Mayer and Jencks 1989), it should be normal and usual to be highly educated in a neighborhood of highly educated residents. Accordingly, the information and social support exchanged between residents on education can also become pro-educational attainment. It is conceivable to interpret the effect of unemployed co-ethnic immigrants similarly.

Additionally, the co-ethnic residential neighborhood seems to function as social capital. In Japan, where completing high school education is taken for granted (Kagawa et al. 2014), it can be considered deviant for children not to go to high school or drop out. A cohesive co-ethnic neighborhood where its members know each other perhaps leads to children and their parents not giving up the socially required educational attainment with all eyes focused on them.

Meanwhile, the insignificant effect of the ethnic concentration implies that the ethnic cluster is not sufficient to be an educational resource for children. This is in line with our argument in the previous section describing Japan's situation as a NID. With a still small absolute population size of immigrants, it is not plausible to build the co-ethnic social

organizations with institutional completeness, as U.S. scholars have found.

What about the other insignificant variable; the percentage of the co-ethnic managerial or professional workers? One possible interpretation is that the occupational composition in each co-ethnic neighborhood reflects their selectivity to stay in the neighborhood; for example, immigrants (and Japanese citizens) live in a certain neighborhood because they can be economically affordable. After considering the unobserved neighborhood effects, including the land price and living costs, the co-ethnic occupational composition may not eventually have other meanings for children's educational opportunities.

Regarding the second question, we investigated the heterogeneous co-ethnic neighborhood effects that induce Japan's conditional egalitarian educational system. The fixed-effect model with the interaction effects demonstrates the results in line with the hypothesis in this study. The effects of co-ethnic neighborhood qualities are more salient among South American and Southeast immigrant children than in East Asian groups more embedded in Japanese society. For the immigrant children that are not familiar with the Japanese language, the strongest barrier against social integration in Japan, it is paramount to gain information and social support from their co-ethnic neighbors, who are nearby significant others.

In the meantime, the series of regression models do not perfectly fit our hypothesis. An unexpected result is the co-ethnic neighborhood quality effect on Filipino children's high school enrolment. We initially situated them in the group where the co-ethnic neighborhood resources would work well, but the empirical results were not clearer than those of other children in the same group (Vietnamese, Brazilian, and Peruvian children).

Concerning this respect, it may be possible to make a speculative explanation from the viewpoint of the characteristics of Filipino immigrants in Japan. In 2010, there were 210,181 people with Filipino nationality in Japan, but 78% were female.¹² As Table 1 illustrates, many fathers of Filipino children are Japanese men because their mothers conceivably settle in Japan with the "Spouse of a Japanese citizen" status. Japan has a prolonged large gender socioeconomic gap (Brinton 1989; Fuwa 2004), and Filipino immigrants, vastly consisting of women, suffer from dual inequalities by gender and ethnicity (Ogaya 2021). Accordingly, even though the co-ethnic neighborhood quality is well off regarding socioeconomic situations like educational background, Filipino (female) adults may not be role models for the status attainment because their socioeconomic backdrops do not pay off well.

¹² See the results of the 2010 statistics on foreign residents in Japan by the Ministry of Justice.

Conclusion

Although some issues remain, our points still hold in the present study: the rich co-ethnic neighborhood quality fosters the opportunity for upper secondary education in Japan. Its impact depends on how immigrants adapt to the conditional egalitarian Japanese educational system. The co-ethnic resources are not universally beneficial for immigrant children's educational attainment even within the same host society. One of the contributions of this paper is to have demonstrated that Japan is a good case to investigate the heterogeneous co-ethnic neighborhood effect across ethnicities among NIDs. Another contribution we made is to have provided an overall picture of the educational inequality of immigrant children in Japan with a large-scale dataset and relatively rigorous empirical approach.

We will mention the future tasks in closing. The most critical limitation of this study is that we cannot dig into the characteristics of each neighborhood. Because it is impossible to identify the specific location of each census tract, we cannot connect each unit to the information from other secondary sources (e.g., the number of facilities for extracurricular activities and organizations assisting foreign residents). That is one of the reasons why we must control the neighborhood influence as the fixed effect in our regression analyses. Also, we cannot consider any spatial correlation between each neighborhood though the characteristics of other neighborhoods nearby may have some impacts. However, to the best of our knowledge, there is no data that enables us to investigate that issue at the neighborhood level, so this remains a future question.

Additionally, the information that the census data collects is limited. This study empirically investigated the co-ethnic neighborhood quality effect by comparing Japanese and immigrant (foreign) children. However, we need other qualitative and quantitative data to consider more nuanced aspects such as children-parent relationships and other daily activities. Based on the heterogeneous co-ethnic neighborhood effects demonstrated by our findings, it is possible to conduct further surveys with a comparison among ethnicities in the future.

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Table 1: Summary statistics of variables of interest														
	Japan		Korea		China		Philippines		Vietnam		Brazil		Peru	
	n = 3,096,065		n = 6,681		n = 4,098		n = 1,636		n = 364		n = 3,117		n = 943	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
High school enrolment rate	0.976	0.152	0.974	0.159	0.913	0.282	0.789	0.408	0.725	0.447	0.802	0.399	0.874	0.332
The co-ethnic neighborhood qualities														
% of co-ethnic residents	99.073	1.426	3.155	6.012	1.596	2.680	0.766	1.091	2.175	2.820	4.445	7.014	1.353	1.749
% of undergraduate or higher	15.344	8.085	16.808	14.715	23.620	21.208	11.405	14.331	4.779	9.452	5.674	7.796	10.184	13.585
% of managerial/professional workers	7.839	2.607	7.504	8.614	7.253	10.988	1.352	5.502	1.163	5.290	1.530	3.909	0.819	4.026
% of unemployed	3.206	1.184	5.203	6.413	4.843	8.949	5.984	11.117	8.113	11.801	5.945	7.094	7.221	10.487
% of co-ethnic living since birth or for ten or more years	60.803	15.203	49.482	28.296	16.379	22.113	16.141	22.864	31.693	28.761	17.032	20.418	21.844	27.702
Children's gender														
Boys	0.509	0.500	0.507	0.500	0.500	0.500	0.473	0.499	0.486	0.500	0.517	0.500	0.523	0.500
Girls	0.491	0.500	0.493	0.500	0.500	0.500	0.527	0.499	0.514	0.500	0.483	0.500	0.477	0.500
School grades														
10th	0.341	0.474	0.338	0.473	0.328	0.470	0.325	0.469	0.286	0.452	0.396	0.489	0.362	0.481
11th	0.328	0.470	0.325	0.469	0.322	0.467	0.319	0.466	0.308	0.462	0.327	0.469	0.335	0.472
12th	0.331	0.470	0.337	0.473	0.350	0.477	0.356	0.479	0.407	0.492	0.277	0.448	0.303	0.460
Father's nationality														
Japan	0.833	0.373	0.029	0.169	0.296	0.456	0.526	0.499	0.104	0.306	0.019	0.135	0.020	0.141
Foreign countries	0.002	0.043	0.770	0.421	0.605	0.489	0.244	0.430	0.684	0.466	0.840	0.367	0.840	0.367
Absent	0.165	0.371	0.201	0.401	0.099	0.299	0.229	0.420	0.212	0.409	0.142	0.349	0.140	0.347
Mother's nationality														
Japan	0.964	0.187	0.022	0.148	0.015	0.122	0.006	0.078	0.014	0.117	0.005	0.069	0	-
Foreign countries	0.007	0.081	0.942	0.234	0.961	0.194	0.960	0.195	0.953	0.211	0.957	0.204	0.969	0.173
Absent	0.030	0.170	0.035	0.185	0.024	0.153	0.034	0.180	0.033	0.179	0.038	0.192	0.031	0.173
Father's education														
Elementary/Junior high school	0.219	0.414	0.255	0.436	0.257	0.437	0.378	0.485	0.522	0.500	0.394	0.489	0.322	0.468
High school	0.398	0.490	0.366	0.482	0.349	0.477	0.408	0.492	0.374	0.484	0.471	0.499	0.361	0.480
Junior/Technical college	0.075	0.264	0.053	0.225	0.065	0.247	0.068	0.253	0.036	0.186	0.037	0.189	0.124	0.330
Undergraduate/Graduate degree	0.307	0.461	0.325	0.469	0.328	0.470	0.145	0.353	0.069	0.253	0.098	0.297	0.193	0.395
Mother's education														
Elementary/Junior high school	0.073	0.260	0.076	0.265	0.237	0.426	0.211	0.408	0.470	0.500	0.311	0.463	0.220	0.414
High school	0.520	0.500	0.549	0.498	0.376	0.484	0.523	0.500	0.429	0.496	0.542	0.498	0.407	0.492
Junior/Technical college	0.293	0.455	0.184	0.387	0.122	0.328	0.078	0.268	0.044	0.205	0.037	0.188	0.174	0.379
Undergraduate/Graduate degree	0.114	0.318	0.191	0.393	0.265	0.441	0.188	0.391	0.058	0.233	0.111	0.314	0.199	0.400
Father's employment status														
Regular employment	0.774	0.419	0.522	0.500	0.593	0.491	0.599	0.490	0.522	0.500	0.445	0.497	0.410	0.492
Non-regular employment	0.028	0.165	0.052	0.222	0.114	0.318	0.178	0.383	0.203	0.403	0.426	0.495	0.428	0.495
Executives/Self-employed with employees	0.105	0.307	0.261	0.439	0.118	0.322	0.071	0.257	0.063	0.244	0.032	0.176	0.023	0.151
Self-employed without employees	0.066	0.248	0.107	0.309	0.058	0.233	0.048	0.213	0.058	0.233	0.019	0.136	0.022	0.148
Not working	0.027	0.163	0.058	0.233	0.117	0.322	0.104	0.305	0.154	0.361	0.078	0.268	0.116	0.320
Mother's employment status														
Regular employment	0.253	0.435	0.163	0.370	0.161	0.367	0.139	0.346	0.118	0.323	0.207	0.405	0.176	0.381
Non-regular employment	0.427	0.495	0.314	0.464	0.319	0.466	0.467	0.499	0.503	0.501	0.519	0.500	0.513	0.500
Executives/Self-employed with employees	0.023	0.151	0.062	0.242	0.038	0.192	0.016	0.125	0.025	0.156	0.010	0.099	0.007	0.086
Self-employed without employees	0.056	0.229	0.086	0.280	0.049	0.217	0.023	0.149	0.058	0.233	0.019	0.136	0.018	0.133
Not working	0.241	0.428	0.375	0.484	0.433	0.496	0.355	0.479	0.297	0.457	0.245	0.430	0.285	0.452
Living in a house owned by the head of household	0.790	0.407	0.646	0.478	0.472	0.499	0.294	0.456	0.297	0.457	0.239	0.427	0.287	0.453
Living at the current address since birth	0.257	0.437	0.173	0.378	0.036	0.187	0.020	0.141	0.113	0.317	0.039	0.194	0.058	0.234

Table 2: Random and fixed regression models on the high school enrolment (Linear Probability Model)

	Model 1 (RE)		Model 2 (RE)		Model 3 (FE)		Model 4 (FE)		Model 5 (FE)	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Nationality (ref: Japan)										
Korea	-0.000948	0.001887	0.144171 ***	0.006536	0.038479 **	0.012496	0.042851 **	0.012368	0.040614	0.060127
China	-0.062157 ***	0.002396	0.090800 ***	0.006781	-0.002320	0.012898	0.021785	0.012739	-0.015495	0.060056
Philippines	-0.186103 ***	0.003790	-0.013915	0.007422	-0.104645 ***	0.013370	-0.081446 ***	0.013159	-0.089869	0.060209
Vietnam	-0.244746 ***	0.008071	-0.069525 ***	0.010206	-0.153891 ***	0.014846	-0.108911 ***	0.014652	-0.130682 *	0.061229
Brazil	-0.170124 ***	0.002762	-0.002988	0.006696	-0.080013 ***	0.012297	-0.047872 ***	0.012219	-0.091265	0.059819
Peru	-0.098599 ***	0.004996	0.076067 ***	0.008052	-0.010682	0.013480	0.010028	0.013362	-0.008508	0.060112
% of co-ethnic residents			0.001407 ***	0.000066	0.000252	0.000132	0.000138	0.000129	0.000073	0.000601
% of undergraduate or higher			0.000464 ***	0.000019	0.000789 ***	0.000094	0.000285 **	0.000093	-0.000132	0.000299
% of managerial/professional workers			0.001289 ***	0.000055	0.000486 **	0.000170	0.000101	0.000167	-0.000255	0.000781
% of unemployed			-0.004355 ***	0.000075	-0.005487 ***	0.000152	-0.004994 ***	0.000149	-0.007890 ***	0.001101
% of co-ethnic living since birth or for ten or more years			0.000290 ***	0.000008	0.000799 ***	0.000047	0.000638 ***	0.000046	0.000622 ***	0.000097
Nationality x % of co-ethnic residents										
Korea									0.000203	0.001253
China									-0.000690	0.001649
Philippine									-0.024122 ***	0.004029
Vietnam									-0.034739 ***	0.003479
Brazil									0.001821	0.001318
Peru									0.000343	0.003446
Nationality x % of undergraduate co-ethnic										
Korea									-0.000009	0.000308
China									0.000284	0.000310
Philippine									0.000545	0.000402
Vietnam									0.002136 *	0.000966
Brazil									0.002131 ***	0.000468
Peru									0.001338 **	0.000479
Nationality x % of man/prof co-ethnic										
Korea									0.000076	0.000795
China									0.000772	0.000808
Philippine									0.001195	0.001052
Vietnam									0.000664	0.001823
Brazil									0.003079 **	0.001061
Peru									-0.004162 **	0.001483
Nationality x % of unemployed co-ethnic										
Korea									0.004991 ***	0.001113
China									0.003812 **	0.001120
Philippine									0.000849	0.001144
Vietnam									0.001590	0.001296
Brazil									0.001345	0.001141
Peru									0.001471	0.001183
Nationality x % of co-ethnic living since birth or for ten or more years										
Korea									-0.000553 ***	0.000109
China									0.000370 *	0.000143
Philippine									0.000631 **	0.000191
Vietnam									0.002145 ***	0.000307
Brazil									0.000331 *	0.000166
Peru									-0.000175	0.000203

Table 2 (Cont'd): Random and fixed regression models on the high school enrolment (Linear Probability Model)

	Model 1 (RE)		Model 2 (RE)		Model 3 (FE)		Model 4 (FE)		Model 5 (FE)	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Girls							0.00548 ***	0.00017	0.00548 ***	0.00017
School grades (linear)							-0.00812 ***	0.00011	-0.00812 ***	0.00011
Father's nationality (ref. Japan)										
Foreign countries							0.00201	0.00165	0.00339 *	0.00166
Absent							0.01797 ***	0.00046	0.01795 ***	0.00046
Mother's nationality (ref. Japan)										
Foreign countries							-0.01527 ***	0.00107	-0.01524 ***	0.00107
Absent							0.03238 ***	0.00069	0.03234 ***	0.00069
Father's education (ref: elementary/junior high school)										
High school							0.04100 ***	0.00041	0.04098 ***	0.00041
Junior/technical college							0.04382 ***	0.00051	0.04379 ***	0.00051
Undergraduate/graduate degree							0.04565 ***	0.00044	0.04563 ***	0.00044
Mother's education (ref: elementary/junior high school)										
High school							0.08427 ***	0.00045	0.08425 ***	0.00045
Junior/technical college							0.09238 ***	0.00047	0.09235 ***	0.00047
Undergraduate/graduate degree							0.09257 ***	0.00053	0.09251 ***	0.00053
Father's employment status (ref: regular employment)										
Non-regular employment							-0.00981 ***	0.00053	-0.00975 ***	0.00053
Executives/Self-employed with employees							-0.00218 ***	0.00031	-0.00217 ***	0.00031
Self-employed without employees							-0.00116 **	0.00038	-0.00115 **	0.00038
Not working							-0.01919 ***	0.00054	-0.01921 ***	0.00054
Mother's employment status (ref: regular employment)										
Non-regular employment							-0.00055 *	0.00023	-0.00055 *	0.00023
Executives/Self-employed with employees							-0.00120	0.00062	-0.00120	0.00062
Self-employed without employees							-0.00132 **	0.00044	-0.00133 **	0.00044
Not working							-0.00655 ***	0.00026	-0.00655 ***	0.00026
Living in a house owned by the head of household							0.02358 ***	0.00025	0.02359 ***	0.00025
Living at the current address since birth							0.00381 ***	0.00021	0.00381 ***	0.00021
Intercept	0.97667 ***	0.00011	0.81640 ***	0.00649	0.90438 ***	0.01324	0.88574 ***	0.01304	0.91169 ***	0.05993
n of children	3112904		3112904		3112904		3112904		3112904	
n of tracts	123756		123756		123756		123756		123756	
sigma u	0.016		0.013		0.071		0.071		0.072	
sigma e	0.153		0.153		0.153		0.149		0.149	
rho (ICC)	0.011		0.007		0.180		0.183		0.186	
corr(u_i, Xb)	0 (assumed)		0 (assumed)		-0.125		-0.099		-0.139	

*** p < 0.001, ** p < 0.01, * p < 0.05

Table 3: Linear combinations of main and interaction effects for each nationality (based on the results of Model 5)

	% of co-ethnic residents		% of undergraduate or higher		% of managerial/ professional		% of unemployed		% of living since birth or for ten or more years	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Japan (main effect)	0.00007	0.00060	-0.00013	0.00030	-0.00026	0.00078	-0.00789 ***	0.00110	0.00062 ***	0.00010
Korea (main + interaction effects)	0.00028	0.00071	-0.00014	0.00015	-0.00018	0.00025	-0.00290 ***	0.00030	0.00007	0.00007
China (main + interaction effects)	-0.00062	0.00124	0.00015	0.00014	0.00052	0.00027	-0.00408 ***	0.00027	0.00099 ***	0.00011
Philippine (main + interaction effects)	-0.02405 ***	0.00380	0.00041	0.00027	0.00094	0.00071	-0.00704 ***	0.00034	0.00125 ***	0.00017
Vietnam (main + interaction effects)	-0.03467 ***	0.00328	0.00200 *	0.00092	0.00041	0.00166	-0.00630 ***	0.00072	0.00277 ***	0.00029
Brazil (main + interaction effects)	0.00189 *	0.00078	0.00200 ***	0.00036	0.00282 ***	0.00073	-0.00655 ***	0.00039	0.00095 ***	0.00014
Peru (main + interaction effects)	0.00042	0.00317	0.00121 **	0.00038	-0.00442 **	0.00127	-0.00642 ***	0.00048	0.00045 *	0.00018
*** p < 0.001, ** p < 0.01, * p < 0.05										