



Erasmus School of Economics

Bachelor Thesis [Economics and Business Economics]

The Impact of Immigration on the Japanese Labour Market

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Abstract:

This thesis examines the effect of the share of foreigners on the unemployment rate in Japan to make a relevant contribution to making well-informed policy decisions on immigration in Japan and the existing scientific literature concerning labour economics. Using 20-year panel data on Japanese population, a fixed effects regression of the unemployment rate on the share of foreigners is performed, whilst controlling for unemployment benefits, membership of labour unions, population density, total fertility rate and maximum temperature. To account for unobserved heterogeneity across regions and over time, prefecture and year fixed effects are included. Regression results show that apparently, immigration has a negligible and insignificant impact on native unemployment rate.

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I. Introduction

Japan had been a prominent figure in Asia ever since it reopened to the world in 1854 after its national seclusion. Even after World War II, it was able to quickly recover from its defeat and rose rapidly as the world's then second largest economy, the period known as the Japanese Economic Miracle (Nakamura, 1995). However, this period of prosperity was bound to come to an end ever since Japan fell victim of the Japanese asset price bubble in late 1991. This caused Japan's economy to stagnate for years, which is known as the Lost Decade (Hayashi & Prescott, 2002). Even till this day, the economic consequences of the Lost Decade are still noticeable which policymakers attempt to suppress. The best-known reform attempt, initiated by Japan's prime minister Shinzo Abe, is the implementation of Abenomics. It consists of "three arrows" that need to be enforced together, those being (1) bold monetary easing to weaken the yen, attract Japanese exports and generate modest inflation of roughly 2%; (2) flexible fiscal policy to stimulate demand and consumption for short-term growth and to achieve a budget surplus over the long term; and (3) a structural reform to make Japanese industries more competitive and to encourage investment in and from the private sector (Harding, 2020).

The main topics on the political agenda that Japan has been left with are demographic issues that cause labour shortages and continues to be a serious factor of economic stagnation. Japan is one of the world's fastest-ageing nations where more than a quarter of the population is over the age of 65. These demographics required Abe administration to raise consumption tax, not only to compensate for Japan's fiscal deficit, but also to pay for pensions and healthcare for its ageing population. As a result, any fiscal stimulus measures are cancelled out and resulted in overall fiscal contraction (Lewis L. , 2019). Furthermore, the nation has been dealing with the record-low birth rate. In order to boost fertility rate, Abe administration announced in 2017 to spend 2 trillion yen (approximately 18 billion US dollars) on expanding free preschool for children and cutting waiting times at day care centres. However, these incentives are proving insufficient as the Ministry of Health, Labour and Welfare published a report in December 2019 indicating that the estimated number of babies born in Japan in 2019 fell to 864,000, which is the lowest since records began in 1899. Moreover, the number of deaths in 2019 also hit a post-war record high of 1.376 million, with a natural population decline of 512,000, being the highest ever (Jozuka, Kwon, & Yeung, 2019). As a response to the demographic squeeze that Japan is put in, a voice for immigration had been raised. Historically, Japan had been wary of admitting foreigners and sees itself as an ethnically and linguistically homogenous society, where its foreign population makes up only 2% of the total population (S.B., 2018). A step towards

change in this conservative view was achieved when Japan's parliament passed an immigration law that aims to attract 345,000 foreign workers over the next five years, which came into effect on 1 April 2019. However, opposition parties argue that this legislation was vague in the sense that it fails to address the issues of social inclusion and rights for foreign workers. Given the fact that foreign workers who are currently situated in Japan get mistreated in terms of getting unequal pay, working incredibly long hours and getting little or no training, the opposition stated that it is of huge importance to first abolish these issues under the existing scheme prior to admission of prospective foreign workers (Denyer, 2018).

This research is intended to estimate the impact of immigration on the Japanese labour market. Investigating this contributes to making well-informed policy decisions on immigration in Japan. These decisions concern whether to increase the number of foreign workers in order to tackle the demographic issues that cause labour shortages and thus economic stagnation, or to put a hold onto the inflow of foreign workers if it appears to deteriorate the labour market conditions of native workers, such as employment. Another factor worthwhile to take into consideration might be to focus first on proper enforcement of social inclusion and rights for immigrants who are already based in Japan. Therefore, it is of huge social interest that Japan makes the optimal decision for the sake of its economy, natives, and immigrants. Furthermore, most literature within this scope of research concentrate on the US and European countries, for they were amongst the magnets of international migrants, whereas studies for Japan are rare. Since Japan has become a victim of the demographic squeeze at such radical degree and is progressively reconsidering its immigration policy, it is of huge scientific relevance to investigate the case of Japan specifically. This leads to the following research question:

“What is the impact of immigration on the Japanese labour market in the period 1997-2016?”

This thesis will be followed by a literature review, which discusses Japan's immigration policy developments throughout the years, and the economic theory and empirical evidence of the effect of immigration on the local labour market. Thereafter, a clear description of the panel data and methodology concerning the fixed effects model will be provided. This is proceeded by an in-depth analysis of the regression results including its interpretation in relation to the literature review in order to provide some possible explanations. Lastly, a conclusion will be drawn along with the limitations of this study and some immigration policy recommendations.

II. Literature Review

In this part of the thesis, I will first discuss the history of immigration in Japan by its immigration policy developments throughout the years. Thereafter, I will introduce the economic theory and empirical evidence of the effect of immigration on the labour market in a host country. At last, I will provide a discussion of the review in relation to this study.

2.1 History of immigration in Japan

Japan's immigration past can be traced all the way back to the period of national seclusion (1639-1853). Immigration was prohibited as the shogunate suspected Western traders and missionaries to be forerunners of military conquest by Western powers. This is therefore considered a peculiar point in Japanese policymaking. The Japanese government began to sign international treaties of trade only when Commodore Matthew C. Perry of the US Navy threatened Japan to open its borders through gunboat diplomacy. Japan furthermore colonised Taiwan in 1895 and Korea in 1910. As a result, Japan was characterised by large emigration and colonial immigration (1853-1945). After WWII when Japan relinquished its colonies, many Koreans and Taiwanese still remained on Japanese land. Under the ruling of the Supreme Commander of Allied Powers (1945-1951), immigration became strictly controlled again (Kondo, 2015).

2.1.1 *The "52 Regime": 1952 Immigration Control Act*

The 1952 Immigration Control Act was enacted when Japan regained its independence by signing the San Francisco Peace Treaty with the Allied Powers. It was a strict surveillance system showing little or no tolerance for human rights, and was premised on a coercive "exclusion, discrimination and assimilation policy". In accordance with this act, all Koreans and Taiwanese lost their Japanese nationality and were registered as "aliens". The Ministry of Justice stated that they had to either return to their home country or naturalise, which would require them to have Japanese names. (Kondo, 2015). Furthermore, all foreigners were required to register as aliens within 90 days of entering Japan. They had to carry an alien registration certificate, which contained a great deal of information such as occupation, name, and address of workplace, and had to have their fingerprints taken. Those who did not comply could be imprisoned for up to one year or be fined for up to 200,000 yen (Komai, 2000). During this period, Japan was benefitting from the Japanese Economic Miracle (Nakamura, 1995), and

therefore needed not heavily rely on foreign labour forces. According to Sellek (2001), six factors are explanatory for this phenomenon, namely: (1) overcrowded population; (2) “homogeneous people” mentality; (3) mass domestic migration; (4) automation; (5) reliance on external labour market; and (6) long working hours.

2.1.2 The “82 Regime”: 1982 Immigration Control and Refugee Recognition Act (ICRRA)

Japan opened its borders to refugees and improved immigrant rights after the ratification of the International Covenant on Economic, Social and Cultural Rights (ICESCR) in 1979 and the Refugee Convention in 1981. The Immigration Control and Refugee Recognition Act (ICRRA) was enforced in 1982 and influenced by the G7 summit member states calling for acceptance of Indochinese refugees. This period can be characterised by an “equality and internationalisation policy” (Kondo, 2015). As the ICRRA imposed equal treatment for immigrants and Japanese with respect to social security, discrimination against immigrants was reduced to a certain extent. Such as the abolishment of the constraints on foreigners’ eligibility for national pension scheme and child and family allowance. Those who were not covered by health insurance through their employer were entitled to the National Health Service of their local government (Komai, 2000). Moreover, the assimilative naturalisation procedure of “Japanese name only” clause was eliminated from the administrative guideline on naturalisation. As the world’s then second largest economy fell victim to the Japanese asset price bubble in the late 1980s, called the Lost Decade (Hayashi & Prescott, 2002), Japan’s labour shortage mainly in the labour intensive industry raised the dispute as to whether it should open its borders for foreign workers. However, since 1988, the Ministry of Labour has enacted two basic policies (1) skilled labour, or so-called specialised and technical labour, will be actively admitted; (2) admission of unskilled labour, or so-called simple labour, will be cautiously examined (Kondo, 2015).

2.1.3 The “90 Regime”: 1990 Revised ICRRA

In the 1990s, Japan experienced a large inflow of foreign residents for the first time in history, as to be seen in Table 1. Even though the Ministry of Labour still held onto the official policy of restricting access to foreign workers, in reality, there were three loopholes which made it possible for them to still be admitted to work. According to Endoh (2019), this led to the Revised ICRRA in 1990 that had the following implications for foreign workers: First, to meet the labour needs for manufacturing or assembly plants, Japan granted *Nikkeijin* (persons of

Japanese descent whose ancestors emigrated overseas in the 19th and 20th century, mostly from Latin-America) and their families, *teijusha* visas (for long-term but non-permanent residence) to enter the labour market with unlimited access to work through the front door. Second, for labour-intensive jobs in farming, construction, food or hospitality, the *gino jisshusei* (technical trainee) system started in 1993, opening a side door to workers from Indochina. However, this system received some severe criticism for exploiting these trainees with low wages and requiring them to return to their home country within 3 years. Third, there is a back door for irregular migrants mainly from South Korea, the Philippines and China, amongst others. The Revised ICRA brought tens of thousands of workers every year to businesses struggling with the post-bubble economic contraction and fierce market competition. Furthermore, these different “door” strategies enabled Japan to procure a cheap and flexible labour force whilst avoiding an outright immigration policy (Endoh, 2019).

Table 1: Number of Registered Foreigners by Citizenship, 1975–2014

Year	Chinese	Korean	Filipino	Brazilian	Peruvian	Others	Total
1975	48,728	647,156	3,035	1,418	308	51,200	751,842
1980	52,896	664,536	5,547	1,492	348	58,091	782,910
1985	74,924	683,313	12,261	1,955	480	77,679	850,612
1990	150,339	687,940	49,092	56,429	10,279	121,238	1,075,317
1995	222,991	666,376	74,297	176,440	36,269	185,998	1,362,371
2000	335,575	635,269	144,871	254,394	46,171	270,164	1,686,444
2005	519,561	598,687	187,261	302,080	57,728	346,238	2,011,555
2006	560,741	598,219	193,488	312,979	58,721	360,771	2,084,919
2007	606,889	593,489	202,592	316,967	59,696	373,340	2,152,973
2008	655,377	589,239	210,617	312,582	59,723	389,888	2,217,426
2009	680,518	578,495	211,716	267,456	57,464	390,472	2,186,121
2010	687,156	565,989	210,181	230,552	54,636	385,637	2,134,151
2011	674,879	545,401	209,376	210,032	52,843	385,977	2,078,508
2012	652,555	530,046	202,974	190,581	49,248	408,252	2,033,656
2013	647,310	526,578	206,805	185,694	48,995	433,741	2,049,123
2014	648,734	508,561	213,923	177,953	48,263	489,169	2,086,603

Adapted source: Kondo, 2015

2.1.4 The “present regime”: Categories of alien residents (ARs) by visa status

The Great Recession in 2008 and the massive earthquake and ensuing Fukushima Meltdown in 2011 caused a temporary fall in the population of immigrants, as to be seen in Table 1. Overall, the severance of Japan’s labour shortage remained significant. The second Abe administration, which rules from 2012 to present day, made adjustments on the immigration portal with respect to the trainee and student visa programmes to facilitate labour influx (Endoh, 2019). Table 2 in Appendix B exhibits Japan’s current legal structure for immigration and residence control of

ARs. Figure 1 shows that over 2.5 million ARs in Japan in 2018 are administered based on this structure. Following Endoh (2019), two categories are to be distinguished: status-based and activity-based. The status-based category considers the visa statuses: (a) permanent resident (PR); (b) special PR, mostly those with ancestry usually related to its former colonies, Korea or Taiwan; (c) Long-term resident or *teijusha* (mostly co-ethnic *nikkeijin*); and (d) spouses and children of Japanese nationals and PRs. The activity-based category consists of the classifications: (a) high-skilled, where 27 job categories are part of it including professionals, caregivers and those engaged in cultural activities; (b) technical trainees; (c) specified activity, such as working holiday, housekeepers in special economic zones, Economic Partnership Agreement nurse or caregiver candidates, and asylum-seekers; (d) “non-work” activities, mainly involving international students; and (e) specified skilled, which came into effect as of 1 April 2019. The remaining category “Others” represents family visitors amongst others, which is irrelevant for this research. All activity-based visas characterise residency limits, employment, and welfare eligibility, and provide fewer rights and less freedom than the status-based ones.

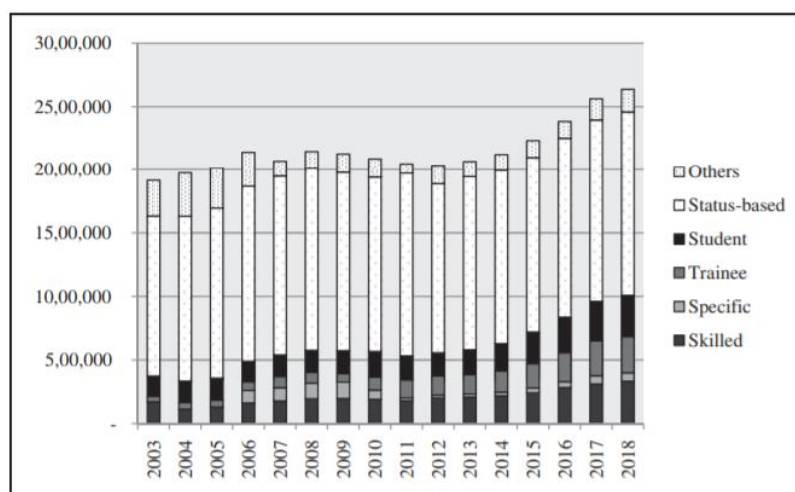


Figure 1: Annual number of alien residents by status, 2003–2018.

Source: Ministry of Justice, 2018

Figure 1 illustrates the progression of AR inflow by status, from 2003 up until 2018. It is seen that during this time interval, there has been a significant increase in ARs from circa 1.9 million to around 2.6 million. Amongst them, the activity-based category has doubled in size. Its fraction of trainees has strikingly increased by 543% and the share of students by 106% over this period (Ministry of Justice, 2018). Number of high-skilled also increased roughly by the

same ratio as students, and as for the specified activity visa status holders, a fluctuating trend is to be seen.

2.1.5 The new AR status as of 1 April 2019: Specified Skilled Worker

The Specified Skilled Worker visa status was implemented on 1 April 2019 as a system to accept ARs that have a certain level of expertise and skill and can begin work immediately in response to circumstances of serious labour shortages due to the demographic squeeze. Therewith, the Government of Japan aims to attract 345,000 foreign workers over the next five years. Table 3 in Appendix B outlines the two types of Specified Skilled Worker visas along with the conditions that should be met to have them issued by the Immigration Services Agency. Specified Skilled Worker (i) is a status applicable to foreign nationals engaging in jobs that require considerable degree of knowledge or experience in a specified industry field. There are 14 fields in total, including nursing care, accommodation, cleaning, agriculture, industrial machinery, electronics and information, aviation, and food service industries. Specified Skilled Worker (ii) is a status applicable to ARs engaging in jobs that require proficient skills belonging to 2 fields: construction, and shipbuilding and ship machinery (Immigration Services Agency, 2019)

Since the enforcement of the 1990 Revised ICRRA, Japan has apparently intended several times to tackle the issue of labour shortage via immigration influx based on different forms of immigration easing policy. Subsequently, it is of interest to consider how government policies that restrict, or favour large-scale immigration shift the supply curve and alter labour market outcomes according to economic theory.

2.2 Economic theory of the effect of immigration on the labour market in a host country

In labour economics, the economic theory regarding the immigration effect on the labour market is conventionally accompanied by discussion of a simple model of the labour market. In this model, there is an upward sloping labour supply curve, indicating that when wages increase, more households are willing to give up their hours of leisure for labour. The labour demand curve is downward sloping, meaning that when wages decrease, firms are willing to hire more workers.

2.2.1 The short-run impact of immigration when immigrants and natives are perfect substitutes

Figure 2 is a model that exhibits the short-run impact of immigration, which according to Borjas (2019), assumes that immigrants and native workers are perfect substitutes and capital stock used for aggregate production is fixed. In absence of immigration, the equilibrium wage is set at W_0 . The inflow of immigrants is perceived as an exogenous supply shock shifting the supply curve rightwards from S_0 to S_1 , which causes a fall in wages from W_0 to W_1 and a rise in total employment from L_0 to L_1 . However, there are native workers who are unwilling to work at wage level W_1 , which leads to a reduction of native employment from L_0 to N_1 . The created gap between N_1 and L_1 hereby is being filled by immigrants (Borjas, 2019). In this sense, immigrants “take jobs away” from natives by reducing the native wage and convincing some native workers that it is no longer worthwhile to work. Thus, when immigrant and native workers have the same types of skills and are competing for the same types of jobs, the demand curve is downward sloping, and capital is fixed, then natives will be worse off in the short run as a result of immigration.

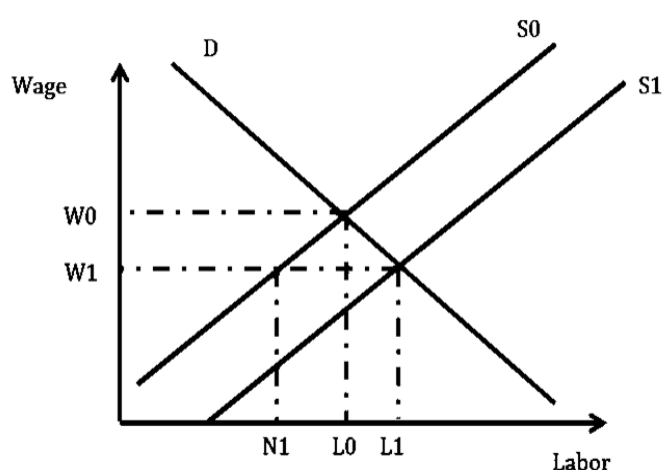


Figure 2: The short-run impact of immigration when immigrants and natives are perfect substitutes

2.2.2 The short-run impact of immigration when immigrants and natives are complements

However, it is questionable whether the assumption holds that immigrants and native workers are perfect substitutes. It may be that immigrants and natives do not have same types of skills and are not competing for the same types of jobs (Ottaviano and Peri, 2012). Immigrants might be unskilled and employed mainly at the labour-intensive jobs, allowing the more skilled native workers to perform tasks that reflect the full potential of their human capital. In this way, the influx of immigrants increases native productivity as natives can now specialise in tasks that

are better suited to their skills. Immigrants and natives thus complement each other in the labour market. This in turn causes a shift of the labour demand curve rightwards from D_0 to D_1 . As to be seen in Figure 3, this leads to a rise in both wages from W_0 to W_1 and native employment from L_0 to L_1 (Borjas, 2019). In this sense, immigrants “create jobs” for natives as some natives who previously did not find it profitable to work now see the higher wage rate as an additional incentive to enter the labour market. Thus, when immigrant and native workers have different types of skills and are not competing for the same types of jobs, the demand curve is downward sloping, and capital is fixed, then natives will be better off in the short run as a result of immigration.

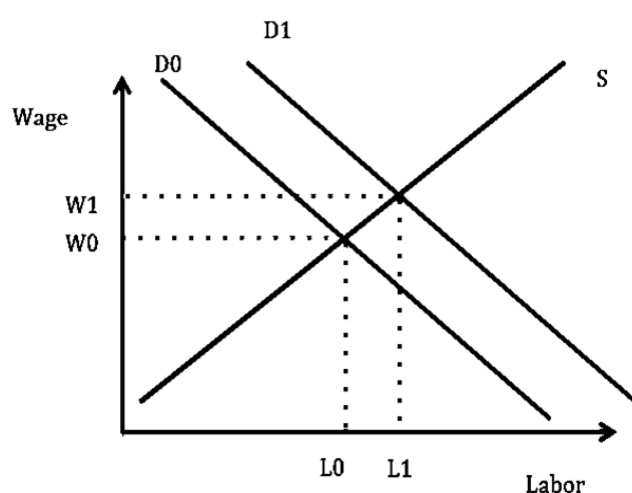


Figure 3: The short-run impact of immigration when immigrants and natives are complements

2.2.3 The long-run impact of immigration when immigrants and natives are perfect substitutes

Consider the labour market in the long run which assumes immigrants and native workers are perfect substitutes, capital stock has fully adjusted, and the aggregate production function characterises constant returns to scale. Figure 4 illustrates the dynamics in the labour market that occurs in the long run. Initially, immigration shifts labour supply curve rightwards from S_0 to S_1 , causing a fall in wage and rise in total employment. This lower wage resulting from the competition between immigrants and natives in the short run, enables firms to increase their profitability. Over time, this will inevitably attract capital flows into the marketplace, as old firms expand and new firms open up shops to take advantage of the lower wage (Friedberg & Hunt, 1995). Increasing capital stock needs increasing demand for new labour, shifting the labour demand curve rightwards from D_0 to D_1 such that it intersects with S_1 in the long run. This brings the wage back to its original level W_0 , which in turn encourages more native

employment, going from N_1 to L_0 . At this pre-immigration equilibrium, the same number of native workers is employed as was employed prior to the immigrant influx. Immigrant employment on the other hand remained the same, going from $(L_1 - N_1)$ to $(L_2 - L_0)$ (Borjas, 2019). A side note to take into account is that labour demand should increase substantially in order for the labour market to re-adjust and return to the equilibrium in absence of immigration. A discussion of the aggregate production function is provided in Appendix A. Even though it is not specified how long it takes for the long run to arrive, it is nevertheless concludable that the effect of immigration on the labour market is non-existent in the long run mainly due to the capital expansion.

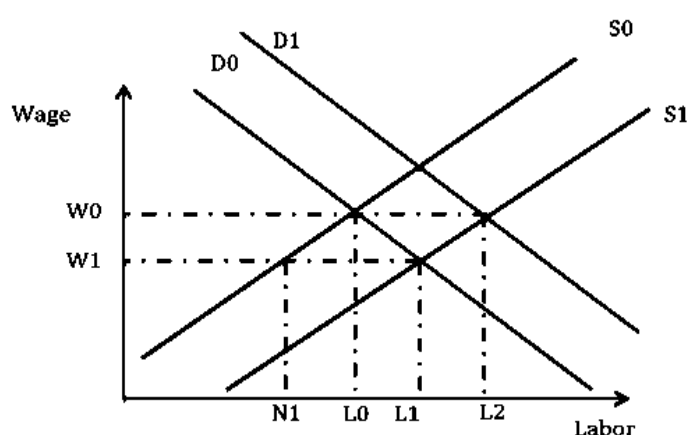


Figure 4: The long-run impact of immigration when immigrants and natives are perfect substitutes

However, economic agents are not as rational as suggested by economic theory. Furthermore, whether its assumptions hold is also a matter of debate. For instance, the important assumption that capital stock is fixed is unrealistic (Ottaviano and Peri, 2012; Lewis and Peri, 2015; Peri, 2016). Economic theory alone cannot determine the net effects of immigration on labour markets. Empirical investigation is needed to measure these effects. Therefore, it is of interest to review the existing empirical literature.

2.3 Empirical evidence of the effect of immigration on the labour market in a host country

There exists a handful of literature discussing various empirical analyses that have come to wide-ranging conclusions concerning the labour market effect of immigration. Generally speaking, empirical studies on this matter can be divided in two approaches: spatial correlation and national skill-cell (Okkerse, 2008; Edo, 2019).

2.3.1 Spatial correlation

This approach exploits the fact that immigrants tend to cluster in a limited number of geographical areas (i.e. cities, states, regions) to assess their effects on the local labour market. These studies compare wage or employment levels in areas that experienced a substantial increase of immigrants with those in areas that have experienced little immigration. The key is to control for heterogeneity across areas, hence studies often contain area fixed effects (Okkerse, 2008; Edo, 2019).

Altonji and Card (1991) were the first to use spatial correlation for 120 cities in the US, focusing on less-skilled natives. In their framework, the labour market consists of skilled and unskilled labour. Using cross-section regression, first differences between 1970 and 1980 and instrumental variable (IV), they found negligible impact of immigration on employment. Pischke and Veiling (1997) also adopt the first differences between 1985 and 1989 and IV method for their analysis on German natives using a dataset of county-level variables. To construct more unified labour market regions, they aggregate the 328 counties to 167 larger regions. To address the potential problem of immigrant selection into local labour markets, they condition on previous labour market outcomes which allows for mean reversion in the unemployment rate. Consequently, little evidence for (un)employment effects was found. Studies showing similar results are (Mühleisen and Zimmermann, 1994; Dustmann *et al.*, 2005; Breunig *et al.*, 2017).

Several other studies point to a negative effect of immigration. Card (2001) divides new and older immigrants and natives into distinct groups and focus on skill-group-specific outcomes within cities. He finds that intercity migration flows of older immigrants and natives are unaffected by new immigrant influxes. Using cross-section regression of 1990 US Census with city fixed effects and IV, he finds that 1 percentage point rise in immigrant share would lower employment by at most 1 percentage point. Angrist and Kugler (2003) who use fixed effects panel model with IV between 1983 and 1999, find larger effects for EU countries with a fall of employment of up to 1.6 percentage points due to immigration. One reason for this might be because wages in Europe are more rigid than in the US (Edo, 2019). Labour market rigidities (strict employment protection, high minimum wage, generous welfare state benefits) tend to increase unemployment (Angrist & Kugler, 2003; Edo, 2019). Studies showing similar results are (Winegarden & Khor, 1991; Winter-Ebmer & Zweimüller, 1999; Fairlie & Meyer, 2003).

2.3.2 National skill-cell

This approach provides a reliable solution to the identification issues arising from cross-area adjustments. It aims to estimate the labour market effects of immigration at the national level across different skill groups defined in terms of both education and years of work experience (and/or occupation). These studies examine how wages or employment in a narrowly defined skill group is affected by immigration into that group. The key is to control for heterogeneity across skills, hence studies often contain skill fixed effects (Okkerse, 2008; Edo, 2019).

Edo (2015) uses annual data of French labour survey consisting of only men from 1990 to 2002. Applying OLS with education, experience and period fixed effects, interactions of fixed effects amongst them, along with IV, he shows that 10% rise in the share of immigrants lowers the employment rate of male natives with similar education and experience by about 3%. To study the role of labour market rigidities in shaping these effects, Edo (2016) uses the same data and decomposes employment of native workers into fixed-term or permanent contracts. As permanent or indefinite-term contracts are characterised by higher wage protection whereas fixed-term contracts have a short duration and terminate at no cost, firms can achieve wage adjustments when contracts expire. Edo (2016) finds that there are no employment effects of native workers covered by fixed-term contracts. The findings in Edo (2015, 2016) differ from the results in Ortega and Verdugo (2014), who analyse five censuses of French labour survey between 1968 and 1999 and apply the same methodology. They find a positive effect of immigration on employment of competing natives. Perhaps the conclusions are diverging because Edo (2015, 2016) captures short-run effects, whereas Ortega and Verdugo (2014) exhibit longer run effects. As adjustments take time, the initial and longer run impacts of immigration differ (Edo, 2019).

In accordance with the findings of Edo (2016), Carrasco *et al.* (2008) show for Spanish native workers that immigration impact on employment was negligible even though in Spain the share of immigrants increased from 1% in 1960 to almost 14% in 2013. Gonzalez and Ortega (2011) exhibit consistent findings. They find that the immigrant influx into the Spanish economy between 2000 and 2006 had no effect on employment of native workers at the province-education level.

In line with the findings of Edo (2015), Borjas *et al.* (2010) use data from the 1960–2000 US censuses to examine the immigration effect on employment of black and white men. In their study, native labour consists of only black and white native workers who are perfect substitutes.

Applying OLS with interactions of fixed effects between education and time, and those between experience and time, and IV, they find that a 10% immigration influx in a particular skill group lowered the employment rate of black men by 5.9 percentage points, whereas a fall of 2.1 percentage point was observed amongst white men.

According to Edo (2019), the difference in size of the negative immigration impact across studies depends on the degree of substitutability between natives and immigrants, the institutional context, and the speed at which economies adjust to immigration through capital accumulation. Moreover, despite the negative effects reported in skill-cell studies mean that some workers lose from immigration, however it can also create winners in the native population of employers and complementary workers.

2.4 Discussion

Reviewing all the literature that are relevant for this study allows me to conclude the following:

1. Historically, Japan had been wary of admitting foreigners and sees itself as an ethnically and linguistically homogenous society. However, since the enforcement of the 1990 Revised ICRRA, Japan has intended several times to address the issue of labour shortage via immigration influx based on different forms of immigration easing policy.
2. Apparently, there seems to be no consensus in the existing literature regarding the impact of immigration on the labour market in a host country. On the one hand, economic theory shows that it is a matter of substitutability between immigrants and natives, and the time span of the study being short run or long run which is not specifiable. On the other hand, empirics classify the spatial correlation approach and the national skill-cell approach, within which there may be numerous differences across studies in terms of data, operationalisation, model assumptions, amongst others.

In this study, the Japanese population data between 1997 and 2016 will be considered. According to section 2.1, this means that immigration during this period is in accordance with the Revised ICRRA and Japan's current legal structure for immigration and residence control of ARs. Based on section 2.2, it is not specified when the short run transitions into the long run, which means that it is unknown whether this research is conform the short run or long run to make any theoretical derivations from it. Furthermore, in this thesis the spatial correlation approach will be used, which in line with the reviewed literature in section 2.3, means that the effect of immigration on employment is likely to be negative or none.

The existing literature within this scope of research appears to concentrate on the US and European countries, for they were amongst the magnets of international migrants. In contrast, this study focuses on Japan specifically as it is progressively reconsidering its immigration policy to compensate for the demographic squeeze. Moreover, most studies implementing the spatial correlation approach conduct a cross-sectional regression analysis with first differences or area fixed effects, along with an IV estimation. However, this thesis performs a panel data regression analysis with prefecture and year fixed effects to account for unobserved heterogeneity across areas and over time.

III. Data and Methodology

3.1 Data

In order to estimate the impact of immigration on the Japanese labour market, four panel datasets are being used from the Statistics Bureau of Japan (with e-Stat as its Portal Site of Official Statistics of Japan), who conducts important statistical surveys of Japan, and provides accurate statistics that are beneficial for society, by responding adequately to socioeconomic changes in the country. The time interval covered for this analysis is from 1997 up until 2016 and the regions considered includes all 47 prefectures of Japan, which provides us with 940 observations to work with. This is chosen such that the data on all variables for the prefectures are consistent throughout these 20 years. Data on the unemployment rate per prefecture per year, the outcome variable, are derived from the Annual Report on the Labour Force Survey¹ (2020), which elucidates the annual state of employment and unemployment of around one hundred thousand Japanese natives aged fifteen years old and over. Furthermore, data on the share of foreigners per prefecture per year, the variable of interest are obtained from the Population Census² (2020) that is taken every quinquennial, and the Annual Report on the Population Estimates³ (2020), which grasps Japan's population in detail every year for the intercensal period of 5 years based on the Population Census. Additionally, the System of Social and Demographic Statistics⁴ (2020) provides prefectural and yearly data on the control variables, those being amount of unemployment benefits, membership of labour unions,

¹ <https://www.stat.go.jp/english/data/roudou/report/index.html>

² <https://www.e-stat.go.jp/en/stat-search/files?page=1&toukei=00200521>

³ https://www.e-stat.go.jp/en/stat-search/files?page=1&layout=datalist&toukei=00200524&tstat=000000090001&cycle=7&month=0&tclass1=00001011679&cycle_facet=tclass1%3Acycle

⁴ <https://www.e-stat.go.jp/en/regional-statistics/ssdsvview/prefectures>

population density, total fertility rate, as well as maximum temperature. This dataset systematically collects and organises statistical data by region in 13 fields which indicate the actual state of Japanese natives' lives such as population and households, natural environment, and economic base, amongst others.

3.2 Methodology

The empirical analysis performed in this research is based on a fixed effects regression with prefecture and year fixed effects, such that one can control for unobserved heterogeneity across regions and over time. Following the line of the authors Bauer *et al.* (2013), I estimate the impact of the share of foreigners per prefecture per year on the unemployment rate per prefecture per year. This study is based on macro level of analysis instead of micro level where I made the adjustments of focusing on data on Japanese natives instead of German natives, excluded the estimation of the regional yearly impact of the share of foreigners on wage and changed the sample selection by taking only the full sample of natives into consideration instead of also discussing additional samples of low-skilled and high-skilled natives. Furthermore, I included several other reasonable control variables in order to better account for endogeneity, instead of performing an additional instrumental variable strategy. The regression model to be estimated is the following:

$$\begin{aligned} unemployment_{it} = & \beta_0 + \beta_1 foreign_{it} + \beta_2 \ln(insurance_{it}) + \beta_3 \ln(union_{it}) + \\ & \beta_4 \ln(popden_{it}) + \beta_5 fertility_{it} + \beta_6 temperature_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (1)$$

Where $unemployment_{it}$ is the outcome variable which indicates the unemployment rate in percentages in prefecture $i = 1, \dots, 47$ in year $t = 1, \dots, 20$ and $foreign_{it}$ the variable of interest that indicates the share of foreigners in percentages in prefecture i in year t . Followed by control variables per prefecture i per year t , $\ln(insurance_{it})$ represents the natural logarithm of the amount of employment insurance benefits expressed in yen and $\ln(union_{it})$ states the natural logarithm of the membership of labour unions. $\ln(popden_{it})$ specifies the natural logarithm of the population density. Furthermore, $fertility_{it}$ indicates the total fertility rate in fractions and $temperature_{it}$ gives the maximum temperature expressed in degrees Celsius. Moreover, α_i are the prefecture fixed effects and λ_t , are the year fixed effects with ε_{it} as the error term.

3.3 Operationalisation of the variables

$unemployment_{it}$ indicates the prefectural yearly unemployment rate and is defined as $(\text{unemployed persons} / \text{labour force}) \times 100$. An unemployed person is a someone with no job and did no work at all during the reference week; ready to work if work is available; and did any job seeking activity or was preparing to start a business during the reference week (including waiting for the outcome of job seeking activity done in the past). The labour force consists of employed persons and unemployed persons among population aged 15 years old and over (Annual Report on the Labour Force Survey, 2020).

$foreign_{it}$ indicates the prefectural yearly share of foreigners and is defined as $(\text{foreign population} / \text{foreign and Japanese population}) \times 100$. The Population Census of Japan uses the *de jure* population concept for enumerating the people. That is, a person was enumerated at the place where he or she usually lived and was counted as the population of the area including the place. The term “persons usually living” was defined in the census as those persons who had lived or were going to live for three months or more at their respective households at the census date. Persons who had no usual places of living in this sense were enumerated at the places where they were present at the date of the census. In accordance with the described rules, all persons living in Japan were enumerated whether they were foreigners or not (Population Census, 2020).

$\ln(insurance_{it})$ represents the natural logarithm of the prefectural yearly amount of benefits to job seekers from employment insurance expressed in yen. As referred to in Article 10 of the Employment Insurance Act (Law No. 116 of December 28, 1974), benefits for unemployment shall consist of the job applicant benefits, employment promotion benefits, educational training benefits and continuous employment benefits (System of Social and Demographic Statistics, 2020). Based on studies of Feldstein (1976, 1978), higher unemployment insurance benefits relative to wages are associated with a greater probability of observing a worker on layoff. Topel (1983, 1984) presents strong evidence that, because of incomplete experience rating, the presence of unemployment insurance significantly increases the frequency of layoff unemployment. Therefore, I expect a positive sign of coefficient for employment insurance benefits on unemployment rate.

$\ln(union_{it})$ represents the natural logarithm of the prefectural yearly number of employees that are members of labour unions. According to the Labour Union Law (Law No. 174 of June 1, 1949), there are two forms: (1) Unit labour unions comprise an individual membership and has no internal lower-part organisations (such as branches) that can act independently, i.e. a labour

union formed by workers of a company within the establishment; (2) Unitary labour unions comprise an individual membership and has internal lower-part organisations (such as branches). The lowest-part organization is a “Unit-count union” and the highest-part organization is the “Headquarter” (System of Social and Demographic Statistics, 2020). Using unions, real wages, and employment data of Britain from 1951-1979, Nickell and Andrews (1983) finds that the union effect on employment yields around 400,000 jobs for an unchanged capital stock path. Therefore, I expect a negative sign of coefficient for membership of labour unions on unemployment rate.

$\ln(popden_{it})$ states the natural logarithm of the prefectural yearly population per km² of inhabitable area (System of Social and Demographic Statistics, 2020). Using the settled areas of South Australia as a case study, a paper by Smailes *et al.* (2002) tested the hypothetical positive relationship between population density and unemployment as people losing jobs would be obliged to move out of the sparsely inhabited areas whereas those who lived in more densely inhabited areas would be more likely either to find another job locally or to remain there for amenity reasons. They find that it was weakly positive in 1981 and insignificant by 1996 due to the rural crisis of the mid-1980s to the mid-1990s. Thus, I expect a positive sign of coefficient for population density on unemployment rate.

$fertility_{it}$ specifies the prefectural yearly sum of age-specific fertility rates, which is the sum of annual births to women aged 15-49 relative to the population of women aged 15-49 (System of Social and Demographic Statistics, 2020). Bernhardt (1993) examines the empirical evidence on the relationship between fertility and women’s employment. She finds that fertility exerts a negative influence on work-force participation, in the sense that a new-born baby has a dramatic and immediately inhibiting effect on workforce participation for the woman who has just become a mother. This effect tends, however, to be temporary and decreases as the child gets older. Hence, I expect a positive sign of coefficient for the total fertility rate on unemployment rate.

$temperature_{it}$ specifies the prefectural yearly highest temperature amongst monthly averages of daily highest expressed in degrees Celsius (System of Social and Demographic Statistics, 2020). Using a 28-year panel on individual employment, Jessoe *et al.* (2016) investigate the labour market implications of climate change in rural Mexico. They find that a high occurrence of heat leads to a reduction in local employment by up to 1.4%. Thus, I expect a positive sign of coefficient for the maximum temperature on unemployment rate.

α_i control for unobserved factors that differ across prefectures but are constant every year. One such unobserved factor may be the admission rate of a university in a certain prefecture which differs per prefecture but remains the same every year. This is a potential unobserved factor since in Japan, what university you get admitted to, based on entrance examination, highly determines your future employability and career prospects (Rohlen, 1983). As the admission rate tends to be very low for top ranking universities, one might observe that the lower the admission rate, the more prestigious the university, the less likely the alumni will be unemployed.

λ_t control for unobserved factors that are the same across prefectures but vary annually. One such unobserved factor might be amendments in national law regarding employment or wages, which is prefecture-invariant but time-varying. As amendments restructure the labour market, native workers are subject to the consequences thereof, which may make them better or worse off in terms of employability.

ε_{it} captures all the remaining relevant variables not included in the model, i.e. the unexplained part of the dependent variable.

3.4 Descriptive Statistics

Both graphical and tabular representations of the data will be given in order to better understand their characteristics, trends and correlation between variables.

Figure 5 in Appendix C shows the average unemployment rate over the years 1997-2016. It is apparent that unemployment rate has an upward sloping trend from 1997 to 2002, with 2002 being the peak year. This might very well be the cause of the Japanese asset price bubble in late 1991, also known as the Lost Decade which caused Japan's economy to stagnate for years (Hayashi & Prescott, 2002). Unemployment rate began to decrease until 2007, after which a huge jump is observed in 2009 due to the global financial crisis. Then, a gradual decrease of it is seen until 2016, the lowest in 20 years.

Figure 6 in Appendix C shows the average unemployment rate per prefecture. It is noticeable that Okinawa is characterised with the highest rate, followed by Osaka, Aomori, and Fukuoka. The prefectures Shimane, Fukui, Gifu, and Mie have the lowest average unemployment rate. Historically, Okinawa has always been a special case. As a result of the Treaty of Mutual Cooperation and Security between the United States and Japan signed in 1960, Japan is obligated to supply the US forces with land and facilities in exchange for their defence. Since

maintaining armed forces and other war-making potential in Japan conflicts with the Japanese constitution, Japanese government pretended that the treaty had been imposed on Japan by the US. This had been done so by letting US choose Okinawa as the best location for stationing its troops and building stockpiles of weapons for deployment in every direction in times of international crises. This is the reason why Okinawa is not progressing, along with the absence of big factories, big industry and the fact that the local market is quite small (Kirk, 2013). According to Hirata *et al.* (2003), Osaka and Fukuoka exhibit high rates of population inflow and high ratio of youth labour force, which might very well explain their high youth unemployment rates. Whereas in Shimane, there are high rates of population outflow and low ratio of youth labour force, together indicating its low youth unemployment rate. Furthermore, prefectures like Osaka and Fukuoka are mainly driven by the service industry which characterises high ratio of part-time workers, often displaying high unemployment rates. Moreover, in Aomori, its cold and snowy climate serves as a factor to increase the ratio of part-time or seasonal job seekers and to lower the active job openings ratio, which may provide an explanation for its high unemployment rate (Hirata *et al.*, 2003).

Figure 7 in Appendix C shows the average share of foreigners over the years 1997-2016. It is obvious that the every quinquennial 2000, 2005, 2010 and 2015 is characterised by a radical increase in the average share of foreigners. These inconsistencies might be explained by the deviations between the Population Census which took place in all these quinquennials, and the Population Estimates which provide data on all the other years based on the Population Census. Furthermore, an upward sloping trend is observed from 1997 until 2008, which is an indication of the effect of the 1990 Revised ICRRA that brought tens of thousands of workers every year to Japanese businesses struggling with the post-bubble economic contraction and fierce market competition (Endoh, 2019). Thereafter, a short-term decrease is seen till 2012 because of the global financial crisis. From 2012 onwards, a steep positive trend is once again noticeable as the 2012 Abe Administration made adjustments on the immigration portal with respect to the trainee and student visa programmes to facilitate labour influx that led to Japan's current legal structure for immigration and residence control of ARs (Endoh, 2019).

Figure 8 in Appendix C shows the average share of foreigners per prefecture. Expectedly, Tokyo prefecture is characterised with the highest share, followed by Aichi, Osaka, and Kyoto. A reason for this may be because they are all major metropolitan areas in Japan. The OECD (2018) published in the report "Regions and Cities at a Glance" that in 2016, metropolitan areas in Japan account for 74% of national GDP (compared to 63% of OECD average) and 73% of

national employment (compared to 58% of OECD average). Consistent with these findings are the studies of Friedberg and Hunt (1995) and Peri (2016) who find that immigrants tend to cluster in geographical areas with thriving economies. Thus, more immigrants will be living in areas with high economic opportunities. These areas often have all kinds of amenities that are more foreigner friendly such as many public and private institutions accommodating the use of English and offering more international job opportunities. Moreover, Bartel (1989) and Massey *et al.* (1994) find that immigrants often settle in places where previous immigrants already live. There are more people of the same ethnic group sharing the same culture and language whom newcomers might feel more comfortable being around. The prefectures Aomori, Akita, Kagoshima, and Miyazaki apparently have the lowest average share of foreigners, which might be explained by a shortage of economic activities or little presence of previous immigrants.

Table 4 provides the descriptive statistics of the variables. It is shown that Japan's average unemployment rate is apparently 4.027%, which is relatively much lower than that of the OECD average at 7.15% (OECD, 2020). The average share of foreigners in Japan is circa 1%, which as mentioned in the above literature, is indeed very small. The reason why this value differs from the 2% that S.B. (2018) mentions in the introduction, is likely because our mean is calculated as the average share of foreigners throughout 1997-2016, whereas the one indicated by S.B. is the share of foreigners in 2018. What is also noticeable is that the amount of unemployment benefits is enormous as its logarithmic value is 23.619, on average. As expected from the introduction, Japan's total fertility rate of 1.431 is on average lower than that of the OECD average at 1.69 (OECD, 2020). In addition, the standard deviations of unemployment rate and maximum temperature are relatively high, being 1.089 and 1.864, respectively.

Table 4: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
unemployment _{it} (%)	940	4.027	1.089	1.700	8.400
foreign _{it} (%)	940	0.980	0.641	0.112	4.194
ln(insurance _{it}) (yen)	940	23.619	0.852	21.835	26.041
ln(union _{it}) (members)	940	11.819	0.870	10.472	14.656
ln(popden _{it}) (inhabitants per km ²)	940	6.868	0.730	5.477	9.170
fertility _{it} (fraction)	940	1.431	0.140	1.000	1.960
temperature _{it} (°C)	940	31.880	1.864	24.600	35.500

Table 5 exhibits the correlation between the variables. It is seen that all correlations except that between maximum temperature and membership of labour union are significant at the 1%

significance level. Our correlation of interest between $unemployment_{it}$ and $foreign_{it}$ appears to be weakly negative, being -0.105. What is noticeable is that $unemployment_{it}$ has a relatively stronger positive correlation with $\ln(insurance_{it})$, but a weaker positive correlation with $\ln(union_{it})$ and $\ln(popden_{it})$. Moreover, $unemployment_{it}$ is negatively correlated with $fertility_{it}$ and $temperature_{it}$. It furthermore stands out that $foreign_{it}$ has a substantial positive correlation with $\ln(union_{it})$ and $\ln(popden_{it})$, being 0.598 and 0.653, respectively, which indicates that membership of labour unions and population density may be important control variables.

Table 5: Correlation Table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) $unemployment_{it}$	1.000						
(2) $foreign_{it}$	-0.105*	1.000					
(3) $\ln(insurance_{it})$	0.431*	0.354*	1.000				
(4) $\ln(union_{it})$	0.179*	0.598*	0.884*	1.000			
(5) $\ln(popden_{it})$	0.189*	0.653*	0.621*	0.699*	1.000		
(6) $fertility_{it}$	-0.243*	-0.298*	-0.556*	-0.569*	-0.449*	1.000	
(7) $temperature_{it}$	-0.136*	0.271*	-0.095*	-0.039	0.362*	0.148*	1.000

* $p < 0.01$

IV. Results

In this section, the results of the fixed effects regression will be shown and discussed. Thereafter, an in-depth analysis of the baseline regression will be provided, followed by its interpretation in relation to the literature review in order to provide some possible explanations.

Table 6 in Appendix D exhibits the regression results for the impact of the share of foreigners on the unemployment rate. In column (1), an OLS regression is performed of the share of foreigners on the unemployment rate without prefecture and year fixed effects. Both the coefficient of $foreign_{it}$ and the constant are significant at 1% significance level. According to this estimate, increasing share of foreigners decreases unemployment rate. However, this might be the result of omitted variable bias. In order to account for unobserved heterogeneity across prefectures, column (2) includes prefecture fixed effects. Little changes hereby except that the coefficient of $foreign_{it}$ and the R-squared are reduced a bit. Adding year fixed effects to column (3) controls for unobserved heterogeneity over time and shows that the effect of share of foreigners increases from -0.223 to -0.168 and is estimated less precisely, going from 1% to 10% significance. Furthermore, the R-squared increases substantially from 0.008 to 0.793. Evidently, the year fixed effects account for a large amount of variation in the data. When the control

variables employment insurance benefits, and membership of labour unions are included in column (4), impact of $foreign_{it}$ and R-squared do not change appreciably, whereas the constant falls radically from 3.146 to -23.01 which is less precisely estimated and has a huge standard deviation of 9.288. Here, the positive coefficient of $ln(insurance_{it})$ is significant at 1% level, whilst that of $ln(union_{it})$ is negative and not significant. The baseline regression is reported in column (5) that includes the regressors population density, total fertility rate and maximum temperature with negative coefficients at 1% significance level, leading to enormous differences. The impact of share of foreigners changes substantially from -0.164 to -0.00775, which has become practically negligible and insignificant. Moreover, the effect of membership of labour unions also changes remarkably from -0.161 to 0.970, which has become significant at 5% level. The constant expands to -1.041, becomes insignificant and has a larger standard deviation. This implies that the regression in column (4) is subject to omitted variable bias. Columns (6) and (7) report alternative regressions with additional controls to check whether the baseline regression is sensitive to changes. As to be seen in column (6), the regression includes $welfare_{it}$ and $ln(disaster_{it})$ whose impact is negligible and insignificant. The former indicates the prefectural yearly percentage ratio of expenditure for welfare⁵. The latter specifies the natural logarithm of the prefectural yearly value of damage caused by disasters expressed in yen⁶ and has 5 missing values in the dataset. There appears to be no appreciable change in the other coefficients as a result thereof, which means that the baseline regression does not suffer from omitted variable bias when excluding them. Thus, these two regressors need not be included. The regression in column (7) contains two other additional predictors $commercialarea_{it}$ and $industrialarea_{it}$ whose impact is also negligible and insignificant. They give the percentage ratio of commercial and neighbouring commercial area⁷, and industrial and quasi-industrial area⁸, respectively. Similarly, there seems to be no remarkable change in the

⁵ Guarantees a minimum standard of living for people whose income is low because of illness, accident, and unemployment, or those who have a difficult life because of medical costs. According to Articles 11 to 18 of the Public Assistance Act (Law No. 144 of May 4, 1950), welfare is divided into eight categories depending on the type of assistance: livelihood aid, education aid, housing aid, medical aid, long-term care aid, maternity aid, occupational aid and funeral aid (System of Social and Demographic Statistics, 2020).

⁶ As described in the White Paper on Disaster Management, a disaster is damage caused by storms, hurricanes, floods, storm surges, earthquakes, tsunamis, volcanic eruptions, and others (System of Social and Demographic Statistics, 2020).

⁷ In a commercial area, banks, cinemas, restaurants and department stores are constructed. Residential buildings and small factory buildings are also permitted. A neighbouring commercial area is designated to provide daily shopping facilities for the neighbourhood residents. In addition to residential and shop buildings, small factory buildings are permitted (Ministry of Land, Infrastructure and Transport, 2003).

⁸ In an industrial area, any type of factory can be built. While residential and shop buildings can be constructed, school, hospital and hotel buildings are not permitted. A quasi-industrial area is mainly occupied by light industrial facilities and service facilities. Almost all types of factories are permitted except those which are considered to considerably worsen the environment (Ministry of Land, Infrastructure and Transport, 2003).

other coefficients as a result thereof, which means that the baseline regression does not suffer from omitted variable bias when excluding these as well. Therefore, these two regressors need neither be included.

The baseline regression in column (5) shows that a 1 percentage point increase in the share of foreigners would decrease unemployment rate by 0.00775 percentage point, *ceteris paribus*. To put it into perspective using the most recently available data, we refer to the share of foreigners in 2019, which is 1.93% (Annual Report on the Population Estimates, 2020) and the average unemployment rate in 2019, being 2.4% (Annual Report on the Labour Force Survey, 2020). If the share of foreigners rises by 1 percentage point, this would lead to an average unemployment rate of 2.392%, which indicates a 0.0032% decrease. In practice, we consider the new AR status of the Specified Skilled Worker implemented on 1 April 2019 as mentioned in the introduction and literature review. It aims to attract 345,000 foreign workers in the next five years, whilst the number of foreigners in Japan in 2019 is around 2,436,000 and the number of Japanese in 2019 is circa 123,731,000 (Annual Report on the Population Estimates, 2020). This would accommodate a share of foreigners of $(2,436,000 + 345,000 \text{ foreign population}) / (2,436,000 + 345,000 + 123,731,000 \text{ foreign and Japanese population}) \times 100 = 2.20\%$ in the next five years, *ceteris paribus*. This is not even close to a 1 percentage point increase in the share of foreigners in Japan which implies an even more negligible decrease of the average unemployment rate as a result of immigration influx. Furthermore, as the coefficient of the share of foreigners is not significant, the hypothesis that the share of foreigners has no effect on the unemployment rate cannot be rejected at the 5% significance level. With respect to economic theory, this finding is in line with the long-run impact of immigration when immigrants and natives are perfect substitutes, stating that the effect of immigration on the labour market is non-existent in the long run mainly due to the capital expansion. Although it is not specified when the short run transitions into the long run, having a time span of 20 years makes it somewhat possible to view this study as a potential long run analysis. Moreover, in accordance with empirical evidence, this finding is consistent with the majority of the literature indicating a negligible impact of immigration on the local employment.

Furthermore, from the baseline regression it seems that a 1% increase in unemployment benefits is associated with an increase in unemployment rate of 0.01143 percentage point, all else equal. This is consistent with the literature and the described expectation in section 3.3, even though the impact is slight. Perhaps the reason is because higher unemployment benefits create a disincentive effect to work. It could be that the benefits are high to the point that it causes

preference reversal, i.e. making people choose the benefits without working compared to the salary with working. Similarly, a 1% increase in membership of labour union increases unemployment rate by 0.0097 percentage point, *ceteris paribus*. This impact is weak and not in line with the finding of Nickell and Andrews (1983) and the expected sign of coefficient. If population density increases by 1%, then unemployment rate is expected to decrease by 0.0448 percentage point, controlling for all else. This small effect is against the finding of Smailes *et al.* (2002). It might be that a more densely inhabited area is due to the influx of workers that fill in the types of jobs that the already established population does not compete for. Thus, there is a more homogenous spread of low and high skilled workers causing more complementarity amongst workers. However, it is noticeable that the standard deviation of population density is relatively high, being 1.616. What is also remarkable is that unemployment rate tends to decrease by 1.522 percentage points as a result of an increase by 1 in the fraction of total fertility rate, holding all else constant. This effect is inconsistent with the finding of Bernhardt (1993) and the expectation of its sign of coefficient. An explanation may be because the more children women bear, the more financial resources are needed which the mothers therefore help obtain by getting (more) jobs. Moreover, a 1-degree Celsius increase in maximum temperature reduces unemployment rate by a slight 0.0591 percentage point, all else equal. Lastly, the constant appears to be -1.041 which is irrelevant to interpret as unemployment rate cannot be negative.

V. Conclusion

Japan has been a victim of demographic issues such as its fast-ageing population and low fertility rate, which caused labour shortages and continues to be a serious factor of economic stagnation. As a response, a voice for immigration was raised. Historically, Japan had been wary of admitting foreigners and sees itself as an ethnically and linguistically homogenous society. However, over the last few decades, enforcement of progressive immigration easing policy such as the 1990 Revised ICRRA motivated immigration influx aiming to fill the labour shortage. This raised the question as to whether immigration only has a bright side, or it happens to have an adverse effect on native employment. Therefore, this thesis aims to answer the research question: “*What is the impact of immigration on the Japanese labour market in the period 1997-2016?*”. Utilising Japanese population data between 1997 and 2016, a fixed effects regression of the unemployment rate on the share of foreigners is performed, whilst controlling for unemployment benefits, membership of labour unions, population density, total fertility rate and maximum temperature. To account for unobserved heterogeneity across regions and over

time, prefecture and year fixed effects are included. Regression results show that apparently, immigration has a negligible and insignificant impact on native unemployment rate. Nonetheless, this research has its limitations that should be taken into account. The data used in this study might not be well measured. For instance, the sudden jumps in the share of foreigners in the quinquennials in Figure 7 in Appendix C might indicate remarkable deviations between the Population Census and the Population Estimates. There are undoubtedly still omitted variables that directly affect unemployment rate and are correlated with share of foreigners, which biases our estimates. This thesis shows that admitting prospecting foreign workers has practically no impact on Japanese native employment. However, the imprecision of the estimated coefficient of share of foreigners means that we should be cautious about drawing policy conclusions from this analysis and that additional research is warranted. As to immigration policy recommendations, an assessment of the overall impact of immigration is needed to ultimately be able to give a statement concerning the welcoming of immigrants. This can be done through inclusion of studies regarding the impact of immigration on other factors that should be considered as well, i.e. native wages, public finances of host country, amongst others. Additionally, first addressing the proper enforcement of social inclusion and rights for immigrants who are already based in Japan is also matter of priority, as argued by opposition parties.

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VII. Appendices

Appendix A: Discussion of the aggregate production function

The extent of the rightward shift in the labour demand curve depends on the technology underlying the aggregate production function, which can be assumed to be the Cobb-Douglas production function:

$$Q = AK^\alpha L^{1-\alpha} \quad (2)$$

Where A is a constant, K is the capital stock, L is the number of workers and α is a parameter with a value between 0 and 1. This function furthermore characterises constant returns to scale. The theory of factor demand in a competitive labour market implies that rate of return to capital r is given by the marginal product of capital, and the wage w given by the marginal product of labour. Taking partial derivatives of equation (2) with respect to K , L and rearranging them respectively gives:

$$r = \alpha A \left(\frac{K}{L}\right)^{\alpha-1} \quad (3)$$

$$w = (1 - \alpha)A \left(\frac{K}{L}\right)^\alpha \quad (4)$$

The short run effect of immigration is the increase of the number of workers L . From equations (3) and (4), it is derivable that this will raise the rate of return to capital r and lower the wage w . Over time, the higher r will lead to an increase in capital stock K . In the long run, it is assumed that r returns to its initial level as the aftermath of capital adjustments. Equation (3) shows that this can only be the case when the capital-labour ratio (K/L) is fixed in the long run. In other words, when L increases at a certain rate due to immigration, then K should increase at the same rate as a result thereof. Consequently, equation (4) illustrates that if (K/L) is constant in the long run, then w must also be constant in the long run (Borjas, 2019).

Appendix B: Immigration policy tables

Table 2: Categories of alien residents (AR) by visa status

Category	Visa status
Status-based (economic activity is unrestricted)	General permanent resident (PR) Special PR Long-term resident Spouses and children of Japanese nationals and PRs
Activity-based (economic activity is restricted)	High-skilled Technical trainee Specified activity “Non-work” activity Specified skilled (as of 1 April 2019)
Others	Family visitor (amongst others)

Source: Ministry of Justice, 2018

Table 3: Specified Skilled Worker visa types and their respective conditions

Conditions	Specified Skilled Worker (i)	Specified Skilled Worker (ii)
Specified industry field	14 fields	2 fields
Qualification	Pass an industry-specific qualification exam and a Japanese language proficiency test, (exempted if completion of Technical Intern Training)	Pass an industry-specific qualification exam
Family reunion	Disallowed	Allowed
Duration/ Renewability	Up to five years/ Renewed every 1 year, 6 months or 4 months	Renewed every 3 years, 1 year or 6 months
Switch to other status and requirements	Eligible to become Specified Skilled Worker (ii)	Eligible for Permanent Residence
Support by Accepting Organizations or Registered Support Organizations	Eligible	Ineligible

Source: Immigration Services Agency, 2019

Appendix C: Descriptive statistics graphs

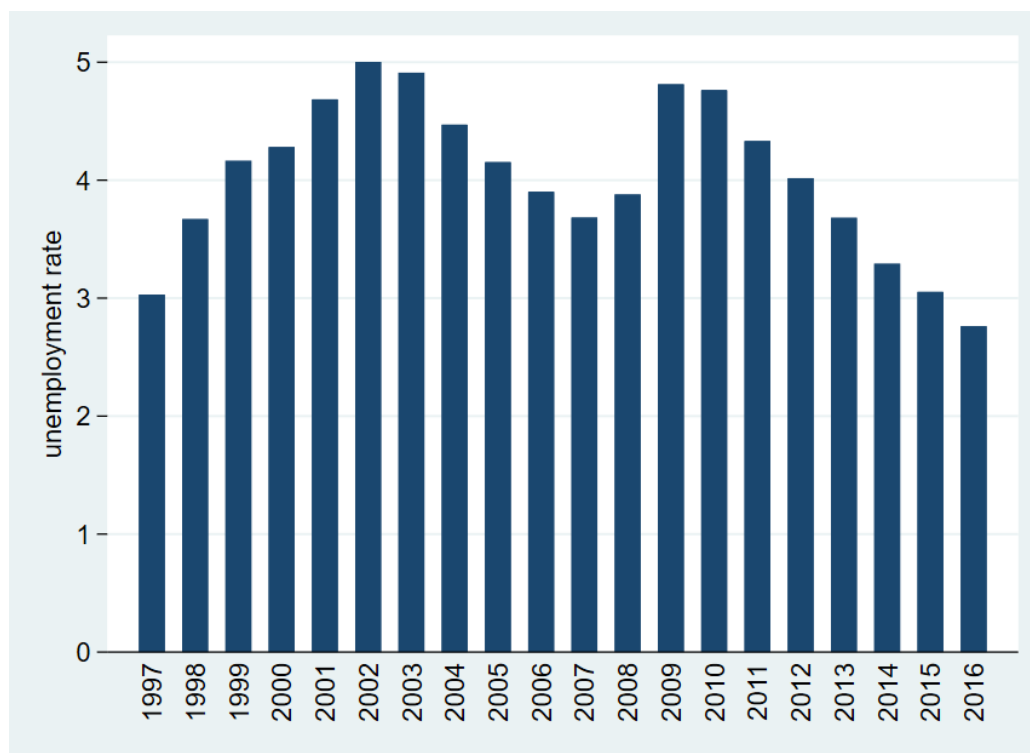


Figure 5: Average unemployment rate over the years 1997-2016.

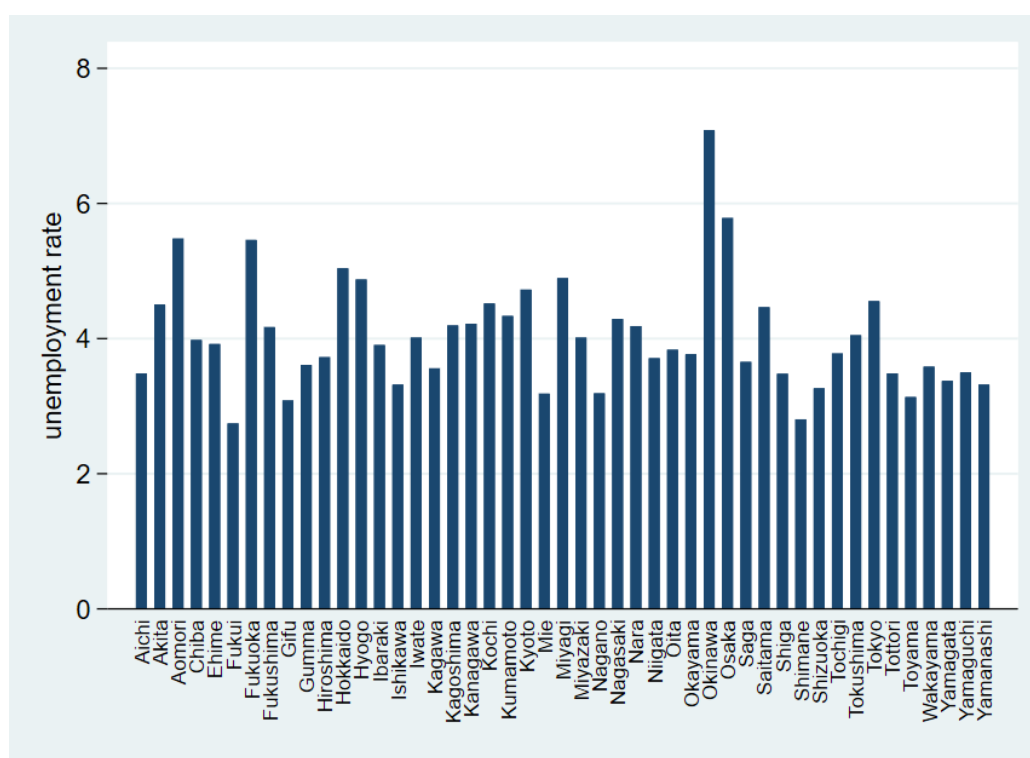


Figure 6: Average unemployment rate per prefecture.

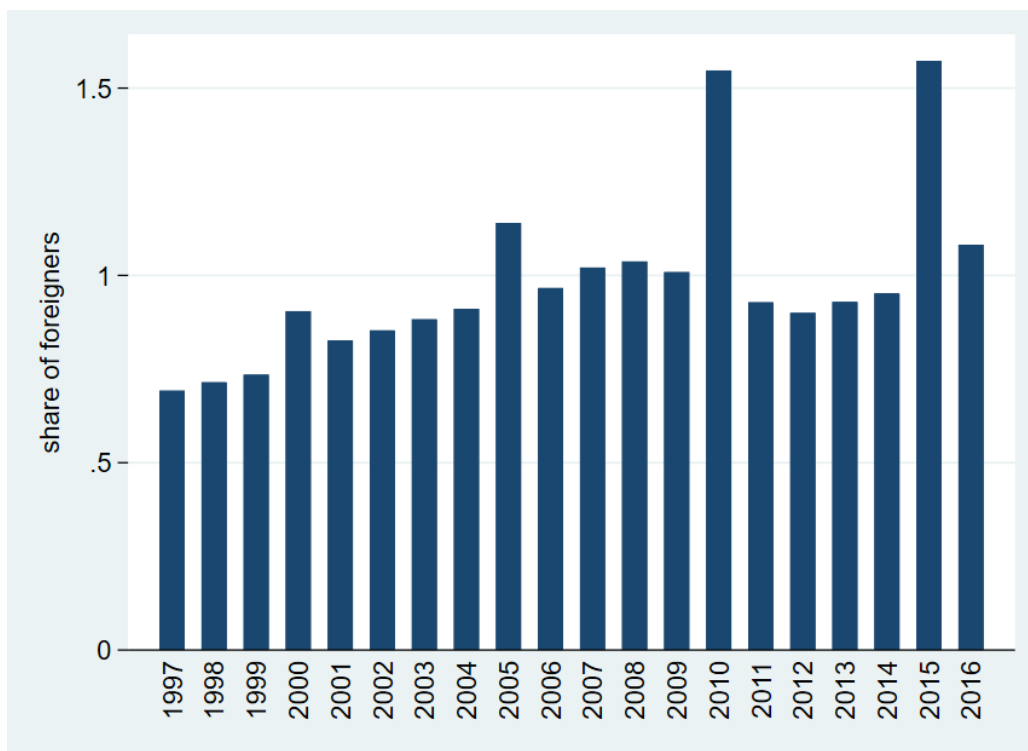


Figure 7: Average share of foreigners over the years 1997-2016.

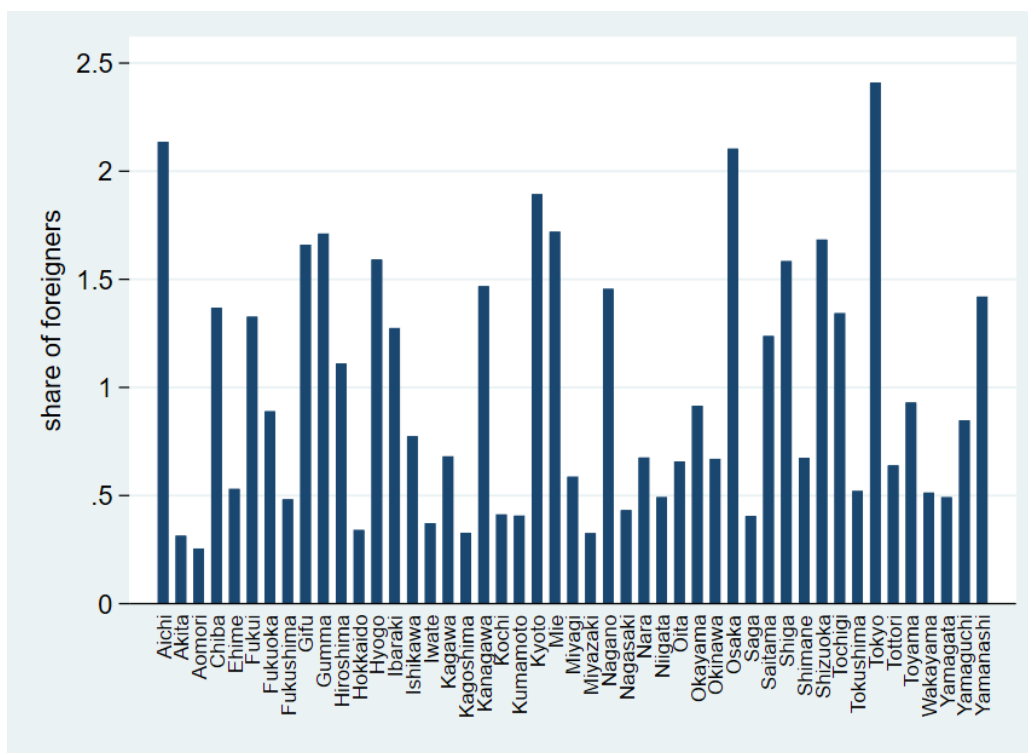


Figure 8: Average share of foreigners per prefecture.

Appendix D: Regression table

Table 6: Regression results for the impact of the share of foreigners on the unemployment rate.

VARIABLES	(1) unemployment	(2) unemployment	(3) unemployment	(4) unemployment	(5) unemployment	(6) unemployment	(7) unemployment
foreign _{it}	-0.178*** (0.0599)	-0.223*** (0.0594)	-0.168* (0.0919)	-0.164* (0.0913)	-0.00775 (0.106)	-0.0182 (0.103)	-0.0202 (0.101)
ln(insurance _{it})				1.173*** (0.294)	1.143*** (0.238)	1.157*** (0.244)	1.149*** (0.239)
ln(union _{it})				-0.161 (0.440)	0.970** (0.431)	0.978** (0.427)	0.992** (0.433)
ln(popden _{it})					-4.480*** (1.616)	-4.534*** (1.538)	-4.633*** (1.545)
fertility _{it}					-1.522*** (0.479)	-1.519*** (0.486)	-1.583*** (0.492)
temperature _{it}					-0.0591*** (0.0148)	-0.0585*** (0.0146)	-0.0575*** (0.0143)
welfare _{it}						0.0494 (0.190)	0.0807 (0.178)
ln(disaster _{it})						-0.00608 (0.00661)	-0.00636 (0.00663)
commercialarea _{it}							0.0424 (0.119)
industrialarea _{it}							-0.0351 (0.0395)
Constant	4.201*** (0.0675)	4.246*** (0.0583)	3.146*** (0.0782)	-23.01** (9.288)	-1.041 (12.03)	-1.034 (11.77)	-0.0520 (12.15)
Observations	940	940	940	940	940	935	935
R-squared	0.011	0.008	0.793	0.814	0.838	0.838	0.839
prefecture FE	NO	YES	YES	YES	YES	YES	YES
year FE	NO	NO	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1