

IMMIGRATION OF NIKKEIJIN TO EASE THE JAPANESE AGING CRISIS

by

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May 2000

ABSTRACT

Japan faces severe economic and demographic problems: an aging society, an underfunded social security system, declining consumption levels, a large public debt and problems in the financial sector. These problems directly and/or indirectly contribute to the current economic slowdown in Japan. One solution for raising economic activity may lie elsewhere rather than in expansionary monetary and fiscal policies – by increasing the economically active population through temporary immigration, which may help to offset aging, re-finance the social security system and increase public transfers to the treasury. This immigration solution, of course, would work only under a given set of conditions. These conditions would require that temporary immigrants of Nikkeijin – Japanese descendants born and domiciled abroad – be complements to Japanese workers while making positive fiscal contributions. Given these positive effects, simulation analysis is conducted to determine a type and number of Nikkeijin who would contribute most to the public treasury.

I. INTRODUCTION

Japan experienced rapid economic growth in the 1970s, and moderate growth in the '80s, but in the '90s it started to stumble. Currently, the world second-largest economy is struggling to extricate itself from a lengthy recession. The government's efforts to stimulate the economy employing expansionary fiscal policy have been ineffective. At the same time, Japan will soon have a larger number of people aged 65 and older as a result of longer life expectancy and a low fertility rate. This places a heavy burden on the public finances of the country. In this chapter, the current problems that Japan faces are discussed extensively – an aging society, an underfunded social security system, and a large public debt – followed by a discussion on how temporary immigrants may be a one viable solution to these problems.

1.1 The Demographic Circumstances in Japan

According to The Nikkei Weekly¹, the average life expectancy for Japanese is the highest in the world. In 1997, it hit a record of 83.82 years for women and has been the world's highest for thirteen consecutive years. For men, it was 77.19 years, and the world's highest for two consecutive years. While it is good on the one hand to have a long life expectancy, on the other, the longer that people live, the more pressure they place on the national pension plan. This long-lived society is captured in changes in the dependency rate.²

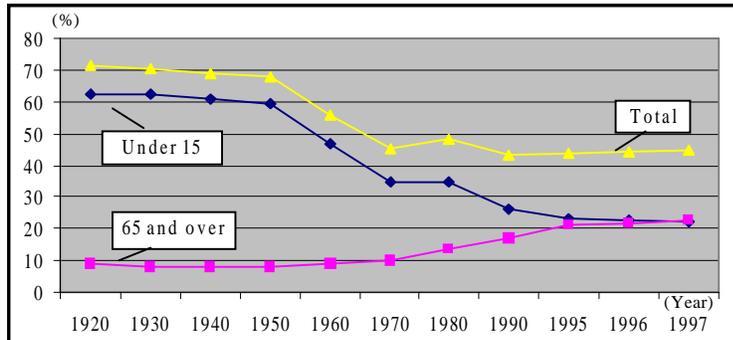
Changes in the Japanese dependency rate over time since 1920 are depicted in Figure 1.1. The total dependency rate decreased from 1920 to 1990 due to the significant decrease in under15 year-old dependency rate, which is a result of low fertility rate. Thereafter, it started to increase slightly due to a steady increase the percentage of the population over 65, and the dependency rate of the elderly began to overtake that of the young. This indicates an aging society, a society with an increasing number of individuals aged 65 and above. If this

¹ The Nikkei Weekly, 21September 1998, "Topics and People."

² Dependency rate is the population aged 65 and above or aged 14 and under divided by working age population age 15 to 64. The higher the rate, the more dependent people in the society.

pattern continues, the dependency rate of the elderly will exceed the dependency rate of the young in the near future.

Figure 1.1 Dependency Rate for Japan



Data source: Japanese Statistics Bureau.

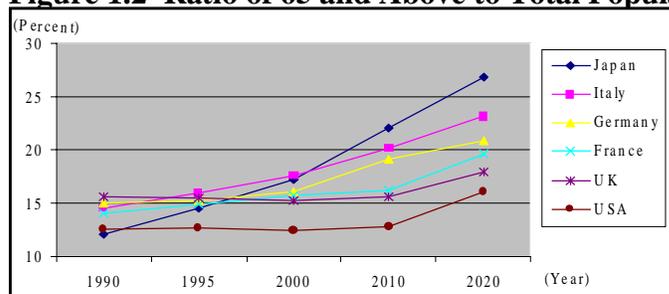
This aging society in Japan is worsened by a declining fertility rate. As depicted in Figure 1.1, the “under-15” dependency rate has been declining, which is a direct result of declining fertility rate. Since 1970, the fertility rate has been decreasing steadily in Japan being well below 2.1, the necessary rate for a constant population growth. In 1998, it was 1.38, which is the historical lowest rate (see Appendix, Table A.1).

The aging population phenomenon is not only happening in Japan but also in other countries such as Italy, Germany, France, the United Kingdom and the United States. These countries are also entering an era of an aging society that will arrive fully some time in the 21st century.

Figure 1.2 depicts the degree of aging. All countries will experience an increasing ratio of age 65 and above to its total population. Japan had the lowest ratio in 1990 compared to the other countries; however, its ratio is increasing rapidly and it is estimated that it will have the highest ratio among the other countries in 2020. In 2020, it is predicted that the ratio in Japan will be 26.85%, and this is expected to increase to 32.3% in 2050.³ Japan is aging very quickly, and it is clear that Japan is entering the last stage of the process of demographic transition.⁴

³ Source: Statistic Bureau and Statistics Center.

⁴ The demographic transition has four stages: the first stage sees a high fertility rate combined with a high death rate. In the second stage, death rates decline but the fertility rate stays the same as in the first stage. In the third

Figure 1.2 Ratio of 65 and Above to Total Population

Source: Japan Information Network.

A useful tool to measure the increasing economic burden of aging on the young generation is a support ratio derived by computing the ratio of working age individuals (Labour Force Participants {LFP}, 25 to 64 years), to the number of retirees (age 65 and above). This ratio depicts how many working age individuals are required to support a single retiree. The numbers of workers supporting a single retiree in Japan and Canada are shown in Table 1.1 below. In Japan in 1995, 3.76 persons supported one retiree, and in Canada in 1998 it was 4.41 persons to one retiree. Without changes in each country's population growth, the ratio will decrease dramatically to 1.08 in Japan and 1.43 in Canada after 25 years. This trend clearly illustrates the potential burden faced by future generations.

Table 1.1 Supporting Ratio

Japan	Canada
3.76 (1995)	4.41 (1998)
1.08 (2020)	1.43 (2023)

Source: Japan, Statistic Bureau and Statistics Center.
Canada, Statistics Canada.
The ratios are calculated by author.

The United Nations (2000) reports the potential support ratio (PSR), a similar concept calculated above, for Japan and other countries with declining populations. Canada's PSR is not reported; however, Japan's PSR in 1995 is reported as 4.77, which is a one-person

stage, both birth and death rates decline, and both rates eventually become the same. In the last stage, the birth rate is below the death rate, and the population declines. The gap between live births and total deaths is shrinking in Japan, which clearly indicates that it is at the end of the third stage just before both rates converge (see Appendix, Figure B.1).

difference from the calculation above. This discrepancy arises because the UN uses different age groups for labour force participants aged 15 to 64. Although the support ratio calculated by the author and the UN are slightly different for 1995, a concluding result for the future support ratio is the same – it decreases. The PRS in 2050 is predicted to be 1.47, 1.71 and 1.91 for a fertility rate of low, medium and high, respectively. Even with the high fertility projection, it decreases to less than half of PRS in 1995, and it is still below a required fertility rate for constant population growth.

Based on these numbers, it appears that Japan will have a larger number of people aged 65 and above relative to a working-age population. As individuals live longer and as society experiences a simultaneous reduction in the fertility rate, a question arises; how are the increasing number of retirees (aged 65 and above) going to be supported? One solution may be lower pension for older people compared to previous generations, otherwise younger generations have to bear a greater burden to provide current level of benefits under a “pay-as-you-go” pension system.⁵ Pension expenditure will exceed pension revenue so that more people will be collecting pensions than will be paying in.

The Japanese public financial structure must be changed to meet the increasing demand and decreasing supply of revenue for pensions. Scrutinizing the public pension system should provide some insight in order to judge the increasing burden on the young as well as the overall pressure on the pension scheme.

1.2 The Japanese Pension System

There are two types of pension plans in Japan, a public plan administrated by the government, and a set of private plans administrated by employment associations. Information on private plans is limited and therefore precludes an extensive discussion at this time. However, rough calculations estimate that approximately 41% of individuals in the labour force have some type of private pension.⁶

The basic public pension system is mandatory for all Japanese citizens and when an individual retires, it provides pension benefits based on the amount of pension payment during one’s employment period. There is also an optional premium plan available, which

⁵ A “pay-as-you-go” pension system is the current working-age generation supporting current retiree.

pays varying levels of benefits dependent upon employment characteristics such as private or public sector employer, etc. Takayama (1997) reports that more than 80% of the income for three-quarters of non-working retirees consists of the public pension benefits, and 40% of non-working retirees rely solely on their income stream from the public pension system.

In order to qualify as a pension recipient, an individual must participate in one of the public pension systems for 40 years.⁷ All individuals must begin their payment at 20 years of age, with few exceptions, and continue contributing until 59 years. Individuals without any income, for example students, can apply for a temporary exemption of payments.

The public pension system has two layers of benefits. A common first layer – the Basic Pension System (BPS) – for all citizens aged 65 and above, and a second layer – Employees’ Pension Insurance (EPI) for those who contributed to the second layer.⁸

There are three types of job classifications, listed in Table 1.3, which determine the public pension system individuals must take.

Table 1.3 Job Classification for Pension Qualification

Type 1	self-employed, farmer, or students
Type 2	workers who are not Type 1
Type 3	spouse of type 2 worker: stay at home, or working part time earning less than ¥1,300,000 [CND\$16,250] a year ⁹

Source: Ministry of Health and wealth, Pension Department.

⁶ The number is calculated by the author. Source: Prime Minister’s Office.

⁷ A minimum period is 25 years, which includes either a contribution or an exemption period. An individual who does not satisfy this minimum period cannot collect public pension.

⁸ EPI consists of other independently operated former public pension systems so that the problem of how to integrate different types of remuneration and benefits has remained unsolved. Source: Prime Minister’s office, and Ministry of Health and Wealth.

⁹ If a spouse earns more than ¥1,300,000 a year, a spouse is considered to be type 1. There are an estimated 12,000,000 individuals of type 3, who are mainly housewives. If an individual works part time for more than $\frac{3}{4}$ of a regular employee’s working hours, s/he is considered a Type 2 worker. The exchange rate is set at CND\$1 = ¥80. This is an approximate number of the recent average exchange rate. This approximate exchange rate is used throughout this paper.

Type 1 workers must take the Basic Pension System (BPS) which covers first layer.¹⁰ Type 2 and 3 workers must take the Employees' Pension Insurance system (EPI), and pay a remuneration base, which covers both first and/or second layers of the public pension.

The BPS and the EPI differ in their payments, benefits and starting ages. This is summarized in Table 1.4 below.

Table 1.4 Pension Payment and Benefit

	Monthly payment	Monthly benefit	Starting age
Basic Pension System	¥13,300 [CND\$1,625]	An individual receives ¥67,017 (1999 price level) [CND\$837.71]	65 years old
Employees' Pension Insurance	17.35 % ¹¹ of income	A couple receives ¥230,983 [CND\$2,887.29] including the basic plan coverage, (husband worked & wife stayed at home for 40 years)	60 years old

Source: Ministry of Health and wealth, Pension Department. [<http://www.mhw.go.jp/topics/nenkin/zaisei/>]

The first layer, BPS, is universal such that all citizens will receive it after age 65. Two thirds of the revenue for the BPS is collected by taxing the current working population, and by collecting interest income on past revenue collections. The government provides the remaining one-third from general revenue. The second layer is optional, and payment and benefit differ according to type of worker and payments a worker contributes to the second layer system.

The EPI has a serious problem in that the current working generation pays for the current retirees, or "pay-as-you-go". As the support ratio of 3.76 declines to 1.08 in 2020, the future Type 2 working generation will bear approximately 3 times the current burden.

The pension system is revised every five years. The year 1999 was a revision year, and the Ministry of Health and Wealth announced the following changes to the pension plans:¹²

¹⁰ If s/he wants to collect the second layer (different from Type 2's second layer), a Type 1 worker has to pay an additional fixed monthly payment of ¥400 [CND\$ 5.00] and will receive a fixed monthly benefit of ¥200 [CND\$2.50] multiplied by contribution periods.

¹¹ This is a representative number of the remuneration.

- **Raising the starting age for the EPI from 60 to 65.** For males, this change will be phased in starting in 2013 and completed by 2025, and for females 2018 and 2030 respectively. For both genders, the age for which they qualify for benefits will increase by one year every three years.
- **Government contributions to the pension plan will be increased from one-third to half of the total share by 2004**
- **Introduction of a private pension plan, starting when a private pension law has been established**

It is not clear exactly how the government will raise a sufficient amount of revenue to match the increased spending. It is unlikely that the government can increase its spending when confronted with an increasing deficit as a result of a recent recession.

1.3 Financial System Crisis And A Subsequent Recession

The problems Japan faces in its pension system were compounded when the rapid economic growth slowed after a speculative bubble burst in the early 90s resulting in a recession. The Japanese government has been trying to stimulate the economy by expansionary fiscal and monetary policies, which have not yet been successful. Now it has to cope with two situations, financing the aging society and extricating the economy from its recession.

Households do not appear to be responding well to the expansionary policies, which have included tax cuts. There are two reasons for this: first, households respond less to the stimulus packages since they have to bear the tax burden later. Thus, instead of increasing spending, individuals will save the extra money for the future. Secondly, this reaction is consistent with pension shortfalls. Individuals are aware of the demographic problems so that the government has to come up with a new pension plan soon or later. If a new plan has to be financed with some kind of taxes, households – especially younger generations – will have to bear that tax burden, and they will save more in anticipation of the future tax. Older households who are close to retirement will also save since there are no guarantees for receiving the current prevailing pension benefits.

¹² Source: Ministry of Health and Wealth, “Topics,” 5 March 1999.

These predictions appear to be appropriate when compared to observations of an actual tax cut in December 1997. Households were given a tax rebate of \$300, but this was not enough to encourage consumer spending. Instead, there was a decrease in store sales according to Tankan survey held in January and February (Markin, 1998). These effects run contrary to government efforts to stimulate the economy through consumer spending.

Fiscal policy does not seem to work since the current government debt is too large and increasing steadily preventing any expenditures. The Japanese government experienced its first deficit in 1965 when it issued bonds and undertook fiscal expenditures to stimulate the economy. Despite the economic recovery, the government continued to incur annual deficits, which in turn increased Japan's debt level. It is worthwhile to investigate the escalating government debt since it results in an underfunded social security system (see Appendix, Figure B.2).

The debt consists of outstanding government bonds, mostly long-term bonds (10 years and over), and extra borrowings. Issuing long-term bond is the government's way of financing. In 1970s, long-term bond to total debt ratio was approximately 60%, in 1980s it was 70%, and in the early 1990s it reached about 85%. Luhman (1993) comments on the troubled government bond financing of the 1980s.

In 1987, government bonds outstanding represented 43 percent of GDP, and debt servicing costs in 1987 exceeded the annual expenditure for social security. Initially the Japanese government essentially forced banks to buy the debt at below market rates, but by the 1980s the banks had begun to balk. The situation reached a climax in the mid-1980s when the government had to issue new bonds for continuing deficit to rollover the bonds that it had issued 10 years earlier.

This outstanding government debt, which exceeds the social security expenditure, creates the sense of an insecure future for citizens who respond by saving more, despite recent government fiscal packages for stimulating consumer spending. Proposed government spending or tax cuts will result in even deeper debt, which will create even greater difficulty in funding social security programs.

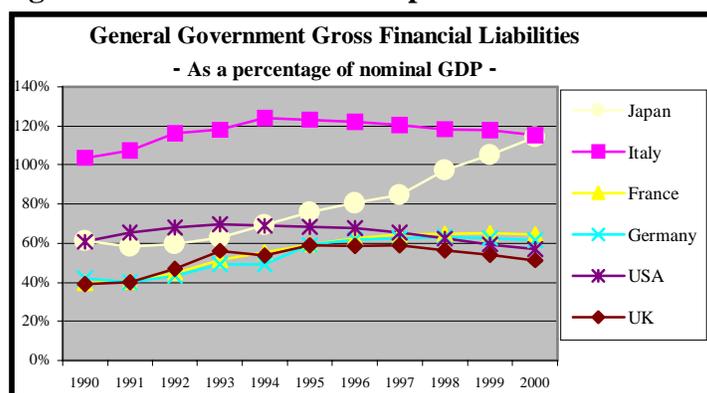
According to a recent news article,¹³ total government spending has reached 120 trillion yen [approximately CND \$1.5 trillion] since 1992. There is a pessimistic view that

¹³ Source: South China Morning Post. [<http://www.scmp.com/News/Business/>]

the government is unable to control the debt. Even though with an optimistic view of economic recovery, there is a threat that the debt will be deeper when the government bond yields increases since part of debt was financed through bond issues.

Comparing the debt level to other countries, Japan has the worst situation. Figure 1.3 depicts international comparisons of general government gross financial liabilities as a percentage of nominal GDP for the last decade.¹⁴ While most of the countries have decreased or leveled their debts, Japan has continuously increased its debt level. In 1999, it passed 100 % of GDP to 105.4 %, and in 2001 it is predicted to reach the highest rate among OECD countries of 122.1 % of nominal GDP.

Figure 1.3 International Comparison of Government Debt



Source: OECD Economic Outlook 66

At the beginning of the recession, government spending was too little to stimulate the economy, and so it was financed through issuing bonds, which increased the debt level. The debt is too large to be balanced in a short period of time, and the current slumping economic conditions require government expenditures. The government faces a dilemma of ineffective fiscal policy. It needs to stimulate the economy but the debt level is running out of control and the economy is still in recession.

One way of dealing with the large debt is to lower interest rates, which would allow the government to reduce the interest payments and raise government bond prices. Lowering the official discount rate is another way to stimulate the economy by increasing the money

¹⁴ Year 1999 and 2000 are estimates and projections.

supply. Since 1995, the official discount rate has continued at a historic low of 0.5 percent, a level well below other advanced industrial nations (see Appendix, Figure B.3). Official discount rate was first decreased by 0.5 % in 1991, after which it decreased gradually and has remained at 0.5 % for five years. This decreasing official discount rate clearly captures the government's attempt at expansionary monetary policies aimed at stimulating the economy, however, it has been ineffective. It appears that reductions in interest rates as a policy measure have been exhausted.

Despite the stimulus from the government and the historic low interest rate, the Japanese still save.

1.4. Japanese High Savings Rate

Japan has historically been regarded as a high saving country and as the table below suggests it continues that tradition. For example, gross saving as a percentage of GDP was 30.8% in 1995, which is the highest among the OECD countries (see Appendix, Table A.2). None of the OECD countries have a savings rate anywhere close to that of Japan.

There are several studies that show substitution effect between public social security benefits, especially pension benefits, and private savings. DeVoretz and Shamsuddin (1997) estimate wealth accumulation model, and find that public wealth is a substitution for private wealth that is, in 1984, a dollar increase in social security led a twelve cents decrease in private wealth. Moreover, a study by King and Dicks-Mireaux (1982) confirm that, *ceteris paribus* social security and pension wealth reduce private saving.

This could be what prevailing in Japan. The society is aging, and individuals anticipate a reduction in the public pension benefits thereby saving more and consuming less at current level of nearly zero interest rate. The government could increase the pension benefits to stimulate the economy if a substitution effect between public pension and private saving is true for Japan. By receiving more pension benefits, *ceteris paribus* individuals would save less and consume more. Once individuals start to consume more, then more economic activities are generated, and the economy could be stimulated out of the recession.

However, current government debt would be an impediment for this policy option since it is too large to afford higher pension benefit payments.

Given the inefficient fiscal policy stemming from large government debt and inefficient monetary policy with the low interest rate, government solutions seems to be exhausted. The obvious question now is, how can Japan come out of the recession without employing further expansionary fiscal policies and thereby not jeopardizing its pension system?

1.5 A Possible Solution to Finance the Pension Shortfall

Since internal remedies do not appear to be helpful, it may be prudent to look beyond Japan's borders for help in simultaneously increasing its economic activity, financing the social security system, and reducing the government debt.

Temporary Immigration could be a solution, because it brings a young, active population that will buy goods and services, and thereby increase economic activity and also will pay taxes, which will contribute to financing the social security system.

Temporary immigration brings temporary changes to the structure of the population pyramid. Japan could set a specific age target for accepting temporary immigrants to alter its population pyramid. The current population pyramid is depicted in Appendix Figure B.4. There are two spikes in the pyramid that result in a pressure on the social security system, but the second spike will support the first spike. The problem becomes serious when the second spike gets older because simply there is no third spike to support the second one. With a declining fertility rate, it is difficult to see the third spike to be born. However, accepting more temporary immigrants can fill the gap in the population imbalance and change the pyramid into the traditional shape of a reversed triangle. The higher the working age population in the economy, the greater the economic activity, which may lead to higher overall consumption levels in Japan, which would assist in expanding the economy out of its current recession.

Given the high dependency rate of aged 65 and over and a low fertility rate, it is unlikely that Japan would see any population increase in the near future. As people age, they

consume less and use more social securities such as pension benefits and medical care. Given the debt, the government will not be able to cover all the costs imposed by this demographic pressure. However, temporary immigrants will place only a small burden on the social security system. They are not old enough to be entitled to pension benefits, they will leave Japan before they are eligible to receive pension benefits, and they are younger and therefore will require less state-funded medical attention. The economic activities of temporary immigrant will raise Japanese domestic consumption levels while reducing the pressure on public finances.

A recent publication by United Nations (2000) proposes migration as a solution to declining and aging population in various countries, including Japan. They estimate the total population and population aged 65 and above by 2050 and the required number of migrants to offset the aging for five scenarios. The first two scenarios forecast the population peak and decline in Japan by 2050 based on a medium fertility rate. Under this scenario, it is predicted that the population of those aged 65 and above would continuously increase and its percentage to the total population is predicted to more than double from 14.6% to 31.8%.

The last three scenarios calculate the required number of migrants to maintain the size of total population, the size of working-age population and the ratio of the working-age population to the retired-age population, and it is predicted that Japan needs 381,000 immigrants, 609,000 immigrants and 10 million immigrants per year, respectively. In their discussion, they admit the implausibility of accepting 10 million immigrants per year to sustain the working age to the retired-age ratio. One option they suggest is increasing the retirement age to 77 years in order to maintain the 1995 potential support ratio (PSR).

The UN report serves as a rough guide for the required number of immigrants to offset the aging in a country, but it lacks an insightful solution. It does not consider each immigrant's contribution to the economy. Each immigrant could contribute more than an average citizen in a country so that fewer immigrants would be required to maintain the current level of economic activity although the size of total population and the working-age population decreases or PSR arises.

Temporary immigrants would contribute to the public treasury through their income and consumer taxes, helping to reduce the debt level. Without any reduction on its debt, the

government has few options available to stimulate the economy and to deal with the aging society that imposes a pressure on the budget. How temporary immigrants could be a remedy for Japan is discussed in the next chapter.

II. TEMPORARY IMMIGRATION: THEORY AND PRACTICE

This chapter starts with a review of immigration literature. Since Japan is not an immigrant-receiving country, little literature is available; therefore, Canadian literature is reviewed to conceptualize the effects of temporary immigration. Immigration policy has been questioned throughout history as to whether immigrants increase economic activity, decrease wages for Canadian citizens, increase the unemployment rate, or whether they use more social security benefits than Canadian citizens. These issues are tested and answered by many scholars, and the majority of research concludes positive marginal effects of immigrants. Next, assimilation issues of immigrants have to be taken into account given the high level of homogeneity in Japanese society. How the degree of homogeneity in society would affect assimilation is discussed. Lastly, simulation analyses are conducted to verify positive effects of temporary immigration for financing the pension shortfall in Japan.

2.1 Theory

Japan does not have a history of immigration and accordingly studies on immigration issues are rarely found. Canada, in contrast, has a long history of immigration, recently accepting approximately 250,000 immigrants throughout the 1990s, and has undertaken numerous studies on immigration issues. Japan can learn from the Canadian experience. In the following discussion, we investigate how the Canadian context might fit the Japanese case with consideration given to different cultural and social circumstances.

DeVoretz (1995) addresses the immigration issues that Canada has been facing. Since 1967, the number, origin, and characteristics of immigrants have varied tremendously. The number of immigrants to Canada has fluctuated from 222,000 to 84,000 in 1985, and bounced back to 251,000 in 1993, and the origin of immigrants shifted from developed countries to developing countries during the '80s. The characteristics of immigrants have changed as Canadian policies placed a different focus on qualifications. There are three

ways to apply for immigration to Canada: as an independent applicant via point assessment; through family reunification; and as a refugee based on humanitarian grounds. In the late '60s and early '70s, approximately half the immigrants came as independents and were considered good prospects to assimilate into the Canadian labour market. By the 1980s, the focus shifted to the family reunification. As the origins and characters of immigrants changed over time, questions arose; did new immigrants create job opportunities for the Canadians or did they increase the unemployment rate? Were there differences in economic performances between different groups of immigrants – especially female? If they failed in the labour market, were any costs imposed on society in terms of welfare and/or unemployment insurance? DeVoretz summarizes the answer to these questions. The economic returns from immigrations are positive but they are diminishing, with the effects varying from region to region in Canada.

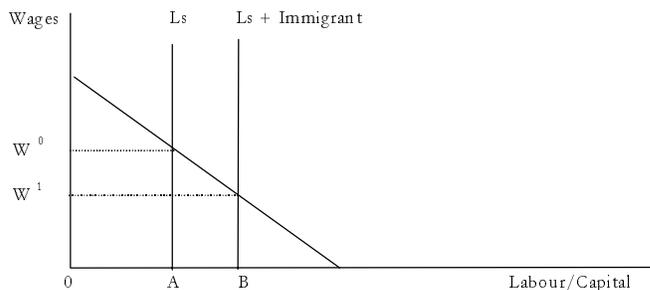
Such issues could potentially arise in Japan, and it is important to examine the specific issues concerned with accepting immigrants in a hosting country. These are whether temporary immigrants increase or decrease wages for Japanese, whether they create or displace job opportunities for Japanese, and whether they impose public costs or generate revenue.

2.1.(i) Wage Effects

Akbari and DeVoretz (1992) revealed that foreign-born immigrants did not displace the Canadian employment in economy-wide circa 1980. They used an elasticity of complementarity to measure the unemployment impact of immigrants on the Canadian labour force. They found no evidence of employment displacement in the overall Canadian economy, but they found that there existed some displacements in a portion of the economy. This is a very important study to contrast with the Japanese situation because the unemployment rate soared as a result of the recent recession, and Japan needs economically active labour without displacing Japanese employment.

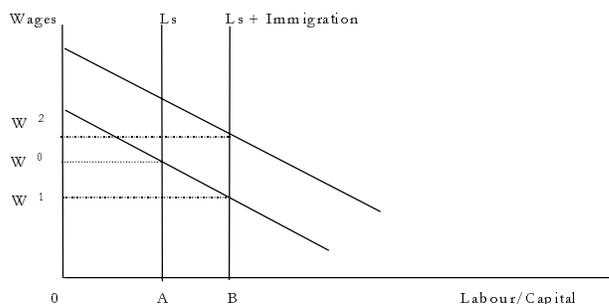
DeVoretz and Laryea (1998) employ a theory of labour demand and supply to measure the wage effect from immigration. As immigrants arrive in a country, labour supply increases. A static case of increase in a labour supply is depicted in Figure 2.1 below.

Figure 2.1 Increase in Labour Supply – Static Case –



As the supply of labour increases, *ceteris paribus* there is a deduction in wages from W^0 to W^1 , which results in capitalists' gain and labour's loss. However, a dynamic case is that complementary capital would be brought into the economy with the immigration inflow, which results in shifting the demand curve simultaneously. This could result in higher wages for labor with greater employment opportunities, and higher returns for the capitalist. This dynamic case is depicted in a figure below.

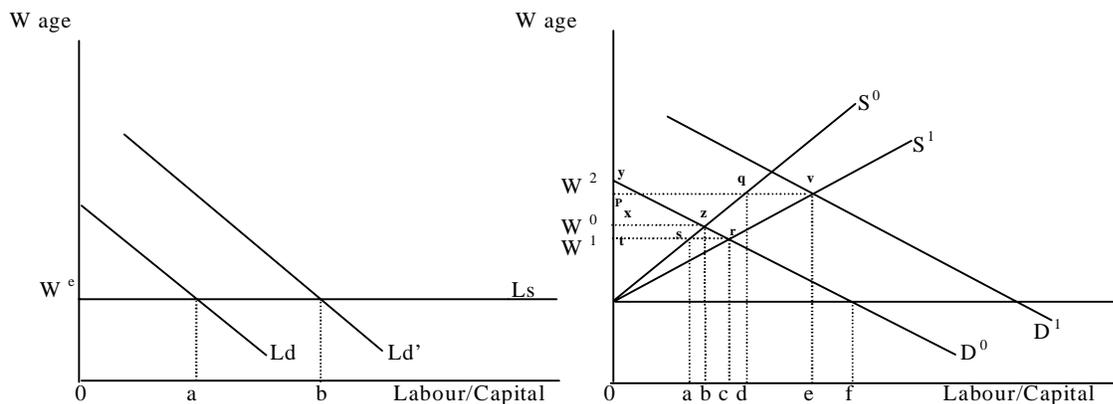
Figure 2.2 Increase in Labour Supply – Dynamic Case –



In order to analyze labour displacement, elasticities of labour substitution must be computed. The following figure depicts both displacement and wage effects. The left figure represents the perfectly elastic situation of the world labour supply at wage W^e . The right figure depicts a labour market in the immigrant receiving country. If foreign workers were to seek maximum earnings, they (Of) would immigrate to Japan without any cost incurred and the Japanese labour market would be occupied by foreign workers at wage W^e of world

equilibrium level. If Japan closes its door to foreign workers, the wage rate in Japan will be W^0 .

Figure 2.3 Displacement and Wage Effects



Setting a quota of workers to accept will result in the labour supply to increase from S^0 to S^1 . This brings two important effects. One, the wage rate would decrease to W^1 , and the total employment increase form $0b$ to $0c$. However, foreign workers displace domestic employment from $(0b)$ to $(0a)$, or by the amount (ab) . Two, Japanese workers lose while the capitalist gains. As more workers come to Japan, the wage rate falls to W^1 from W^0 so that the total labour earning changes from $(0xzb)$ to $(0trc)$. The labour earnings for Japanese decrease from $(0xzb)$ to $(0tsa)$, while foreign workers will gain $(asrc)$. The capitalist gain increases from (xyz) to (tyr) . If there exists an increased complementary capital with foreign workers coming to Japan, then the demand for labour increases accompanied with more labour earnings and employment creation for Japanese with commensurate gains to capitalist. Suppose demand increased from D^0 to D^1 as supply increased from S^0 to S^1 . Then wage rates increase from W^0 to W^2 , and the labour earnings for Japanese also increase to $(0pqd)$, the labour earnings for foreign workers increase to $(dqve)$, and the total labour earning increased to $(0pve)$.

This scenario depends on the elasticity of both labor demand and labour supply and the magnitude of the quota. The more inelastic both labour demand and supply are, the

greater the wage fluctuations. Displacement would be greater with more elastic labour supply and less elastic labour demand.

By using wage effects and elasticities of factor complementary to determine the effect of immigration in the Canadian labour market, DeVoretz and Laryea found that wage compression through immigration inflow was minimal, and no adverse effects were found. However, when they looked at the labour market closely by industries, there was a wage compression in specific industries such as the primary, transportation industries.

If Japan accepts more temporary immigrants, Japanese do not want to experience a wage reduction due to the increased number of workers. Rather, it would be better to have increased wages so that both capitalists and labour gain.

2.1.(ii) Contributions to the public treasury

A study by Akbari (1994) indicates that foreign-born immigrants contributed more to the social security system than they use and hence subsidize the social security system for the average Canadian circa 1990. He computes the net balance of transfers as taxes paid minus the service consumed, and uses income and earnings of immigrants and divided immigrants groups into 6 different years of entry. He finds that using either income or earning for the calculation does not make a difference, and immigrants in all six different cohorts contribute to the public treasury. He also finds that immigrants use more educational services than Canadians due to greater number of children per immigrant. He points out that these children could be seen as a good investment as they would provide a positive external benefit and contribute to the public treasury in the future.

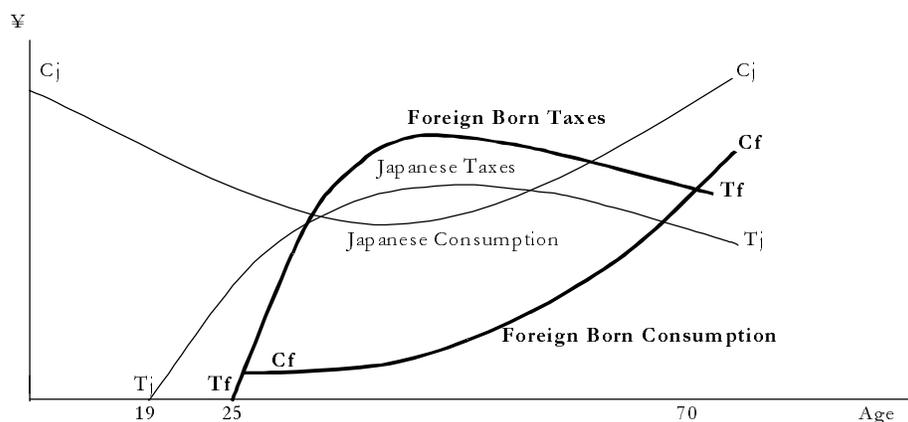
Storesletten (2000) verifies a positive contribution of immigrants in the U.S. regardless of their retirement costs. Moreover, young immigrants would alter the current population pyramid without their childhood in a host country. This contribution would offset a future burden placed on the government when the baby boom generation retires. He examines the contribution of different age groups of high-, medium- and low- skill immigrants to balance the government budget. High-skill immigrants between ages 20 and 54, and medium-skill immigrants between 25 and 49 could balance the budget, but none of the low-skill immigrants could balance the budget in any age groups. He proposes an

“immigration reform” policy by increasing the 40 to 44-year-old high-skill immigrants from current 0.44 percent to 0.617 percent (1.6 million) to balance the budget. This immigration reform policy is considered as another policy option to balance the budget rather than increasing taxes to support the future aging population in the U.S.

DeVoretz (1999) theorizes how foreign-born immigrants would be positive net contributors to Canadians by computing the amount of tax payment made and the level of public goods consumption. He researches the metropolitan cities in Canada and finds that foreign-born immigrants are net contributors on average, but the contribution levels vary among cities.

Figure 2.4 below depicts an optimistic case where a foreign-born individual makes a positive contribution to the public treasury. The figure is changed to fit the Japanese context and is adjusted original Canadian case. DeVoretz notes that public good consumption curve is more convex than goods and service consumption in the life cycle theory. This is due to the nature of public good consumption, which is more age-specific. Public goods, such as education, are consumed in early stages and health services in the latter part of the life cycle. Japanese start consuming public goods (C_j-C_j) at birth (health), then after age 6 in education. Between the ages of 19 to 22, most Japanese exit the educational system and enter the labour force and start paying taxes (T_j-T_j). On the other hand, with foreign-born immigrants, consumption (C_f-C_f) begins later, after entry to Japan. Then consumption depends on their economic and demographic conditions, and it could lie below or above Japanese consumption. It could lie below the Japanese consumption curve (C_j-C_j) when immigrants face a restriction on their entitlement for health care due to the residency requirements, and a restriction for employment insurance due to the length of employment requirements. In contrast, (C_f-C_f) could lie above (C_j-C_j), if immigrants make great use of social assistance upon their arrivals.

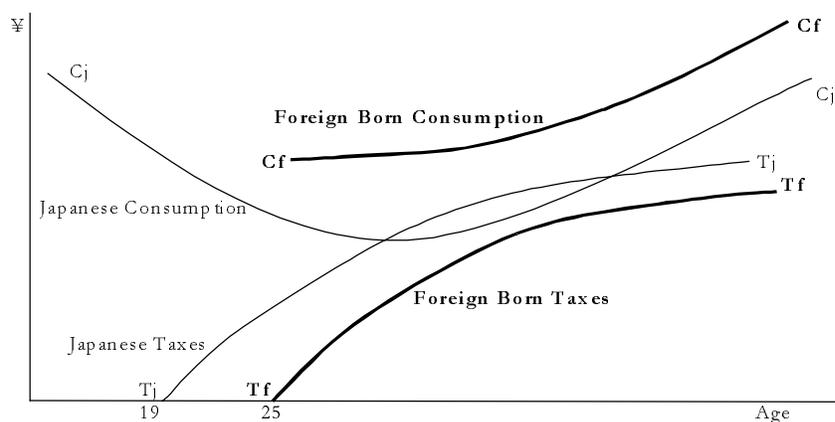
Figure 2.4 Tax Contribution – Optimistic Case –



For tax payments, DeVoretz argues, in the Canadian case immigrants pay at lower levels in the beginning but later pay more than native-born Canadians since foreign-born earnings tend to be higher. This could be true in the Japanese case if immigrants earn more and pay more taxes later in their residency. However, if immigrants earn less than Japanese, the contribution into the tax system would be lower than depicted.

The following figure depicts a pessimistic case when immigrants contribute less tax and consume more public services than Japanese. This could happen when immigrants have lower incomes and contribute less compared to their consumption of social security services.

Figure 2.5 Tax Contribution – Pessimistic Case –



DeVoretz compares the foreign-born contribution levels to the Canadian contribution levels in metropolitan cities. He disaggregates the data by gender and city. In Vancouver, he finds that Canadian males, females and foreign-born female heads of households contribute

more than the Canada-wide average, and foreign-born male heads of households contribute less than the Canada-wide average. However, female head of households, in net transfer, contribute significantly less than do their male counterparts. Immigrants in Vancouver and Toronto make positive contributions to the public treasury. Canada-wide, immigrants make higher contributions than do the Canadian born.

These studies suggest that immigrants have a positive contribution to the public treasury. Thus, immigration is a potential policy tool for Japan to employ that could relieve the burden on its young in the near future and also contribution to the treasury.

The conditions to insure a positive economic output from temporary immigrants would require that these immigrants be productive complements to Japanese workers. In other words, they must enhance Japanese workers' wages and create employment opportunities for Japanese residents, all while making positive fiscal contributions to assist reducing the pension fund shortfall. These studies satisfy all those conditions. Given these positive effects, the next set of questions would be, how many, how long, and what type of temporary immigrants should reside in Japan to maximize its economic benefits? Assimilation costs to immigrants is another significant issue that must be addressed in order to complete a comparison.

2.1.(iii) Homogeneity

According to Durkin (1998), an immigration policy may not work in a homogeneous society like Japan. His study shows that if a country is homogeneous, the cost of assimilation may often exceed its benefit and act as a deterrent to emigration. On the other hand, if a country is heterogeneous, the cost does not exceed the benefit and people are likely to emigrate. If heterogeneity increases by having immigration, it could be welfare-improving for the majority ethnic group in a host country as long as immigration increases the level of human capital. Durkin concludes that a government is recommended to exercise a restriction on immigration with lower human capital and have a limit on the total number of immigration with higher human capital for welfare improvement of a country. His second conclusion is that a lower level of heterogeneity in a country would lead to lower level of welfare because a country cannot attract immigrants who would increase a country's welfare. The last

conclusion is that if immigration increases the average level of human capital, it leads to a lower level of heterogeneity through increasing the net benefits of assimilation.

Since Canada is a heterogeneous society with multicultural policies, immigration integration is possible. Given the homogeneity of Japanese society, however, only certain types of temporary immigrants will be able to assimilate. It is asserted that the most preferable candidates for temporary immigration are those with Japanese heritage, born and currently residing outside of Japan. These returning immigrants will overcome the assimilation cost problem to the homogeneous society since they are originally Japanese. Moreover, “Nikkeijin” – second or third generation Japanese – could also assimilate into Japanese society with lower assimilation costs compared to non-Japanese.

Tsuda (1999) analyzes stylized facts and motivations of temporary return migration of Brazilian Nikkeijin to Japan during the 1980s and '90s. In the '80s, the Brazilian economy was in an unstable condition with a recession compounded by hyperinflation. The Japanese economy, on the other hand, was enjoying its last phase of rapid economic growth. These two contrasting economic situations motivated Nikkeijin to return to Japan temporary in the hopes of earning more than they could possibly earn in Brazil. Given a substantial economic condition gap between the two countries, the average savings Nikkeijin made in Japan was four to five times larger than the earnings in Brazil. Most of Nikkeijin who return to Japan temporary were in the above middle-income groups. One of main reasons for returning to Japan was to accumulate wealth for a luxurious lifestyle at a later time in Brazil. In Japan, there were labour shortages mostly in a low-skilled labour market, and Brazilian Nikkeijin were matched to fill this shortage.

DeVoretz (1998) has studied the effects of temporary workers between Canada and the US, and is skeptical about the net social benefits of the particular highly skilled flows. However, given a different skill mix of temporary workers and different geographical and cultural combinations, different results may occur in the Japanese case. Since this appears to be the only viable immigration policy option for Japan, contribution of Nikkeijin to the economy has to be investigated.

2.2 Practice

This immigration solution for Japan, of course, would work only under a given set of conditions given the high level of homogeneity in Japanese society. Brazil is considered as a top potential source of temporary immigrants to Japan since it possesses a large and established community of ethnic Japanese. The Ministry of Foreign Affairs of Japan has estimated that there are approximately 1.3 million Nikkeijin living in Brazil, and that there were 222,217 Brazilians living in Japan in 1998.

2.2.1 Brazilian Nikkeijin

Most of the Brazilian Nikkeijin living in Japan in 1998 were registered as either “Spouse of Japanese” (44%) or “Descendants of Japanese” (52%), in which case no visas were required. Nikkeijin have an advantage over other foreigners staying in Japan since they do not require either visas or the specific length of residency in Japan, as long as they can prove that they are Japanese descendants or spouses of Japanese. These Japanese descendants are called “Teiju-sha” – long term residents. Teiju-sha can stay in Japan permanently. Since Nikkeijin are qualified as Teiju-sha, they can stay in Japan permanently. Compared to Teiju-sha from other countries, Brazilians are the largest group at 54%, followed by Chinese 18.4% and Peruvian 9.4%.

According to a survey¹⁵ conducted by the Japan Institute of Labor and Statistical Research Centre in Hosei University, more than half of the Brazilian Nikkeijin residing in Japan in 1993 were single, had at least high school education and came to Japan for a better paying job. Approximately 75% of them planned to stay in Japan for less than two years. The average length of their stay was one year and nine months in 1993 and two years and four months in 1998. These survey results add weight to the possibility of a successful temporary immigration policy.

The Brazilian Nikkeijin population in Japan reveals a desirable shape to counter the Japanese aging population since it has the largest group in a working age group (age 20 to 44 years, both genders) (see Appendix Figure B.5). This group is likely to make net

¹⁵ Sample size is 394.

contributions to the treasury since it pays both income and consumption taxes and is less likely to use social benefits.

Due to limited data availability, the wage effects could not be calculated. Nonetheless, most of the Brazilian Nikkeijin work in a 3-K job – Kiken (danger), Kitanai (dirty) and Kistui (difficult) – these are the types of jobs that Japanese workers typically try to avoid. This implies that the Brazilian Nikkeijin can fill the labour shortage in the 3-K labour market. It is therefore safe to assume no substitution effects given a typical type of job that the Brazilian Nikkeijin would work.

2.2.2 Simulation Analysis

The majority of Brazilian Nikkeijin works in the manufacturing sector, but the detail earning profile for each age group of Nikkeijin is not available. Therefore the Japanese earning profile is applied to Brazilian Nikkeijin under an assumption that they earn and pay taxes in the same manner as Japanese. Discounted¹⁶ lifetime income tax contributions of the average single Japanese male¹⁷ age 20 to 59 in manufacturing sector is approximately 16.6 million yen [CND\$207,825] without consuming social security during his employment. This is applied to the same age group of each Brazilian male, and each age group contribution is summed to obtain total contribution. For example, if half of the total registered Brazilian male Nikkeijin are single and make the same income tax contributions, in sum, these single male Nikkeijin will contribute to the treasury approximately 73.5 billion yen [CND\$ 920 million], which is equivalent to 1.56% of the government pension funds provided in 1998. Alternatively, it is equivalent to approximately 0.0147% of the government debt. It is a very small amount; however, at the margin it is a positive improvement to the public treasury shortfall.

Three different simulation analyses are conducted. The first analysis examines the level of contributions given different population mix. For example, if the current existing mixed female and male Brazilian Nikkeijin population is all male, there would be a different contribution to the treasury. A different contribution from a different population mix is

¹⁶ The discount rate of 1.03 is chosen from OECD prediction of the short-term interest rate for Japan. Source: OECD economic Outlook 66.

¹⁷ Unless otherwise stated, single males are selected throughout the paper because they contribute the most income tax with the fewest deductions.

analyzed. The second is to calculate the number of Nikkeijin required for a given set of target level contributions. For example, an increase in retirement age by one year would save the government one-year's worth of pension benefits by not paying to the retirees. On the other hand, if there is no increase in the retirement age, the government has to pay one-third of the total pension benefits. If there is no increase in the retirement age and the government does not pay the pension benefits to the retirees, then a serious pension shortfall arises. Nikkeijin could offset this pension shortfall through income tax contributions. The required number of Nikkeijin to offset this pension shortfall is calculated in the second analysis. The final analysis looks at three different contributions made by a representative single male, and identifies the greatest contribution.

2.2.2.(i) Contribution by Different Population Mix

The analysis employs three different simulations with two different cases, and each case has three different scenarios. First, the analysis consists of three different population mixes represented by Simulations I to III. Simulation I employs the actual number of Brazilian Nikkeijin registered in Japan, Simulation II assumes that the Brazilian Nikkeijin population in Japan are all single males, and Simulation III assumes that the Brazilian Nikkeijin population in Japan is half female and half male. An average single individual Japanese male and female discounted lifetime income tax contribution from age 20 to 59 in manufacturing are applied to Nikkeijin to evaluate Nikkeijin's public finance impacts. The columns in Table 2.1 report these simulations.

Furthermore, two different cases for each simulation are calculated from real changes in the pension system as discussed in Chapter 1. The first case calculates how much contribution the Nikkeijin will make if they are to offset an increase in retirement age for Japanese by one year from 60 to 61. The government plans to increase the retirement age gradually starting in 2013, and people who will actually receive pension benefits at age 61 are currently 45 to 47 year-old. Total pension contributions and benefits are unknown until an individual actually retires because the pension that the individual will receive is based on his occupation and contributions during his employment period. For example, an individual could work for a company and then become self-employed later. Depending on the length of employment and self-employment, this individual would receive mixed pension benefits

from the Employees' Pension Insurance (EPI) and the Basic Pension System (BPS). Three scenarios are constructed to overcome this problem. Scenario 1 assumes that all of them are self-employed so that they will receive only BPS when they retire. Scenario 2 assumes that half the retirees are entitled to BPS and half to EPI. In scenario 3, which is the more realistic case, one quarter of the retirees are entitled to BPS and the rest to EPI. Scenario 3 is considered the most realistic case since currently 80 % of workers that are employed will collect EPI when they retire.

Note that in all scenarios for Case One, the pension recipient applies only to males since in most cases the male is the head of a household and is the one who pays into the pension system during the employment period. Female pension contributions and benefits are unknown because female pension benefits are masked by her marital status and her husband's pension contribution. Typically, a woman works until marriage, and after marriage she will be under her husband's pension plan unless the husband is self-employed.

Case One measures the Nikkeijin contribution in terms of a percentage reduction in the government's payment obligation associated with a decision not to increase the mandatory retirement age by one year. The results of Case One, scenario 1 – all males receive BPS – gives the largest percentage contribution. For example, if the Nikkeijin population residing in Japan is all male (Simulation II), they would make approximately a 14% contribution to offset the retirement age increase. This is followed by Simulation I and III with roughly 11% and 10% respectively. In scenario 3 – $\frac{1}{4}$ receives BPS and $\frac{3}{4}$ receives EPI – the contribution percentages drop dramatically owing to a greater payment required for EPI benefit. Relative to the contribution in scenario 1, scenario 3 has roughly three times less the contribution percentage. Approximately 5% of the contribution is made in Simulation II, and 4% in I and III. Overall, Simulation II offers the highest contribution level with a notable difference to I and III. This leads us to conclude that the immigration of male Nikkeijin would be preferable to female Nikkeijin since males earn more than females and pay more in income taxes. Immigration of male Nikkeijin would be positive on the margin, but it diminishes as the pension benefits vary from BPS to EPI.

Case Two examines the contribution that the Nikkeijin could make in terms of reducing the government's obligation to fund the pension system shortfall while maintaining

the retirement age at 60 years. Currently government support (funded from general tax revenues) accounts for one third of total pension payments and is expected to increase to half of the total pension payments by 2004. The question at hand is how much of a contribution the Nikkeijin would make in reducing the governments obligation to fund the pension shortfall under three different scenarios; one, if the government continues to pay one third of the total pension payments (one third support); two, if the government were to pay one half of the total pension payments (half support); and, three, if the government were to fund all pension payments (full support).

In Case Two, each support rate of one-third, half and full has three different representative years, 1998, 2010 and 2025. It is predicted that pension benefit payments will increase year by year so that the payments in 2025 will be greater than that in 2010, and the payment in 2010 will be greater than that in 1998 due to the aging society. For example, in Simulation 2, if the government pension support rate stays at the current rate of one-third of the total pension benefit payments, the percentage contribution of Nikkeijin decreases from 6.16 to 4.32 and 3.76 percent in 1998, 2010 and 2025 respectively.

Results in Case Two – the government pension support rate changes from one-third to half or to Full – are essentially the same as in Case 1. As the government pension support increases from the actual to half or to full support, the percentage of contribution in each simulation decreases. For example, in Simulation II, Nikkeijin contributions are predicted to be 4.32% in 2010 with a current support rate of one-third. When the support rate increases to half and to full in 2010, it is predicted to decrease to 2.92% and 1.49% respectively. As in Case One, an increase in the pension payment results in lower percentage contribution by Nikkeijin.

Overall, Simulation II (all male) provides the highest contribution rate across all simulations and cases. This is largely due to the fact that an average male earns more than an average female and therefore pays more income tax. The contribution results from Simulation I (actual) and Simulation III (half and half) are similar because there is approximately an equal number of Brazilian males and females resident in Japan.

One observation is that the level of contribution for one-third support in 2025 is close to the one for half support in 2010 for all the simulations. This implies that the

government could receive the same level of contribution from Nikkeijin even if the pension support rate increases to half. The same level is maintained through shortening the Nikkeijin contribution period.

Table 2.1 Simulation Analysis

Nikkeijin Contributions (per cent)			
	– Simulation I –	– Simulation II –	– Simulation III –
	Actual number of Brazilian Nikkeijin	All Male	Half Female, Half Male
Case 1: Offsetting retirement age increase			
BPS, Male	10.66	13.99	10.13
½ BPS, ½ EPI, Male	4.80	6.29	4.55
¼ BPS, ¾ EPI, Male	3.76	4.93	3.57
Case 2: Government Pension Contribution			
One-third support in 1998	4.69	6.16	4.46
2010	3.29	4.32	3.13
2025	2.86	3.76	2.72
Half support in 1998	3.20	4.19	3.04
2010	2.23	2.92	2.12
2025	1.95	2.56	1.85
Full support in 1998	1.66	2.18	1.57
2010	1.14	1.49	1.08
2025	0.99	1.30	0.94

Source: Calculations by author. Detailed calculation upon request.

2.2.2.(ii) Manpower

The second analysis (see Appendix, Table A.4) focuses on manpower – the number of Nikkeijin required to make a certain level of contribution in three different cases. The first case, offsetting a retirement age increase by one year, is the same as the simulation analysis in 2.2.(i). The second case is almost the same as 2.2.(i), the only difference is that there is a target contribution level set at 1%. In order to make a 1% contribution to the government pension support, say in 2010, the number of Nikkeijin required is calculated given the government pension support rate of one-third, half and full. The final case calculates the *fewer* number of Nikkeijin required. This case assumes that there is a 1% increase in the interest rate, and the returns on the savings increases. This increased private saving could

substitute the public pension benefit, referring to DeVoretz and Shamsuddin. Assuming this is true for Japanese case, there will be less demand for the public pension benefits, which is captured by the *fewer* number of Nikkeijin required. An interesting observation can be made by comparing the number of Nikkeijin calculated in the last case to the first two cases. If the numbers are similar, this means that an increase in the interest rate could offset the retirement age increase, and it could be equivalent to contributing 1% to the government pension support rate.

There are five representative age groups, and each age group implies a different length of stay. For example, the number of Nikkeijin in 20–59 age group indicates that Nikkeijin stay in Japan from age 20 to 59 (for 40 years) and then return to Brazil without collecting any social security benefits. The assumptions, which are the same for all other age groups, are as follows: during his stay in Japan, he is single, employed, pays income tax same manner as Japanese and does not consume any social security services. The longer the length of stay in Japan, the greater his contribution. However, the age group of 20–59 would not be a desirable option for Nikkeijin because it implies that they pay taxes but do not receive any return in the way of pension benefits when they retire. The sensible scenario for Nikkeijin would be a 5 to 10 years stay, age 20–24 or age 20–29. These age categories fit well to the assumptions. The probability of being single and using fewer social security benefits in these young age groups would be greater relative to the other older age groups.

Offsetting an increase in the retirement age provides infeasible results for the 20–24 and 20–29 age groups. The result requires millions of Nikkeijin in these age groups, and this is more than the total population of Nikkeijin living in Brazil. The required number of Nikkeijin for the other three age groups results in more feasible numbers. The lower the target contribution level and longer their stay, the more feasible is the projected required number of Nikkeijin. There is a dilemma in that the number of Nikkeijin in a feasible length of stay would not make a significant contribution; however, those making a notable contribution would be staying for 20 to 40 years, which is not feasible for Nikkeijin themselves.

In second case, the required number of Nikkeijin to make a 1% contribution to the government pension support, results in a more realistic numbers for most of the age groups.

For example, the required number of Nikkeijin age 20–29 is a minimum 22,893 to a maximum 108,620. There were approximately 39,000 Nikkeijin aged 20–29 living in Japan in 1998, and if they stayed for the age period from 20–29, the minimum contribution is well satisfied. To achieve the maximum level, a stay requires 2.8 times the number of Nikkeijin that resided in Japan in 1998. Other older age groups, in general, yielded more feasible required numbers than the 20–29 age group. It does not, however, result in the feasible required number of Nikkeijin for the 20–25 age group. The minimum number required Nikkeijin for age 20–25 is 53,848, and maximum 255,492. Given that the number residing in Japan at approximately 20,000, it requires twice as many Nikkeijin to satisfy the minimum requirement, and 13 times more for the maximum, which is not a feasible option.

The last case reports the *fewer* number of Nikkeijin required under the interest rate increases of one percent. It is fewer number of Nikkeijin required because the extra private savings from an increase in the interest rate would substitute for the public pension benefits. The consequence of this is less government pension benefit support required; therefore, fewer Nikkeijin are required. Given the fact that Japanese have a high saving rate, extra private saving yields in a large number. As a result, the required number of Nikkeijin is greater than the previous calculations. In other words, an increase in the interest rate can more than cover any contribution levels by Nikkeijin. However, the problem associated with this interest increase is that there are effects other than an increase in the net private saving, such as the interest payments of government bonds would increase, placing the government even deeper debt. Then, there would be little room left for the government to support the pension benefit payments, which is not a desirable outcome. The consequences of an increase in the interest rate are at this point undetermined.

Another analysis of manpower is conducted by determining the number of Nikkeijin required in each age group given the income tax contribution, net savings and savings from increasing the retirement age by one year.¹⁸ This analysis allows altering the number of

¹⁸ It is assumed that an individual 25 years old will receive the pension benefit at age 61, and the pension benefit he receives is either BPS or EPI. These savings are discounted, spread through his employment period. The difference between BPS and EPI is very small, less than one decimal after the analysis calculation. When the numbers are rounded out in each age group, there are no differences between BPS and EPI.

Nikkeijin required in each age group and the interest rate¹⁹ to achieve two particular targets. These target levels are similar to the focus in other analyses. If the government increases its pension benefit support in 2010 from one-third to half or to full, the number of Nikkeijin required in each age group is calculated with a simultaneous change in the interest rate. A difference from previous analysis is that this analysis simultaneously utilizes not only the income tax contribution but also Japanese extra net private savings and the retirement age increase, which could eventually become the government savings. The extra net savings from increasing the interest rate could substitute the public pension benefit, and a retirement age increase would be a saving for the government through not having to pay one-year's worth of benefits to retirees. These government savings could be used for the increased pension benefit support so that the income tax contribution would not be the only resource to generate revenue. An assumption is that extra government revenue from these savings would be directly used for increased pension support. With these assumptions, the number of Nikkeijin required in each age group is calculated and presented in Table 2.2.

Table 2.2 Required number of Nikkeijin in each age group

<i>age</i>	<i>One third to one half</i>	
25~29	525,325	(26)
30~34	677,936	(40)
35~39	893,414	(71)
40~44	1,068,000	(114)
45~49	1,212,620	(159)
50~54	1,349,169	(220)
55~59	1,168,919	(342)

The reported numbers show the total number of Nikkeijin required for the increase in the government pension support from one-third to half.²⁰ The numbers in parentheses

¹⁹ The original interest rate is set as 0.3%. This is same rate used to calculate the discounted income tax contribution. The interest rate is allowed to increase to 6%, the OECD prediction of 2000 U.S. short-term interest rate. The interest rate needs a ceiling level to have a sensible result, otherwise it results in hundreds and thousands percent. When the simulation is conducted, 6% interest rate is chosen to maximize the contribution level for all cases. Therefore it calculates the number of Nikkeijin required in each age group given the interest rate of 6%.

²⁰ To support the pension fully, the required number of Nikkeijin seems astronomical, and it is unrealistic to have a fully supported government pension plan based on this analysis; therefore, the number is not reported. It requires more than a hundred times more of resident Nikkeijin, and it is larger than the number of Nikkeijin in Brazil.

compare the number required and the actual number of male Nikkeijin resided in Japan in 1998. For example, the required number of Nikkeijin in the 25–29 age group is 26 times more than the actual number of Nikkeijin resided in Japan. When the pension support is increased to half, the required number of Nikkeijin seems more manageable; however, it still requires 26 to 342 times more than the actual 1998 residents. Thus, increased government pension support is doubtful.

2.2.2.(iii) An Individual's Contribution

The last analysis takes a close look at a single male's marginal contribution during his employment between ages 25 to 59, derived from different scenarios (see Appendix, Figure B.6). There are three direct benefits to the government. First, there is the discounted income tax contribution. Second, the government would save one-year's worth of pension benefit payments by increasing the retirement age by one year. This is comparable to an individual's contribution to the government pension support by not receiving one-year's worth of pension. This saving is discounted and spread throughout his employment period, which is a marginal contribution an individual makes every year. The third benefit is an individual's discounted extra net savings derived by increasing the interest rate by 1 per cent.

This analysis tells us that the largest contribution an individual would make every year is the income tax contribution regardless of age. In the aggregate data, depending on the age, the contribution Nikkeijin would make is analyzed, but this does not indicate which benefit contributes the most. Each contribution case is applied to an individual in order to see which case would contribute most in different age groups. It reveals that income tax contribution is the most beneficial, followed by an increase in the interest rate for ages above 50 and the retirement age increase for age 25 to 49. In any given age group, income tax contribution would provide the greatest benefit. The larger the number of people paying income tax, the greater the benefit. In this analysis, it is shown that having more temporary immigrants contributes most, which would partially offset the pension shortfall.

III. CONCLUSION

Japan is becoming an aging society, and among OECD countries it is the country with the largest elderly population. At the same time, its economy is in a recession. The government has to finance its aging society and the recession simultaneously; however, unless the economy improves, the government debt balloon that is growing larger will burst from its efforts to stimulate the economy. Despite government efforts, the economy remains in recession, and financing the aging society without placing a burden on the young or old has not been achieved. One of viable solutions to ease this crisis would be the temporary immigration of Nikkeijin. They have an advantage in assimilating into the homogeneous Japanese society, and would contribute to the treasury by paying taxes and would raise economic activity simultaneously.

Simulation analyses were conducted to determine the degree of which could the Nikkeijin ease the pension shortfalls. Overall, they make a positive contribution; however, the number required is very large and unrealistic, and the length of stay has to be longer than 20 years in order to make a significant impact. Thus, the number of Nikkeijin required is not feasible to offset the pension shortfall completely. An increase in the interest rate could also cover the pension shortfall and it would reduce the need of Nikkeijin; however, a consequence from the increase in the interest rate is undetermined considering the increased interest payment on bonds. When we look closely at an individual marginal contribution, it is clear that, in any age group, on the margin the income tax benefit is larger than any other possible contributions such as the retirement age increase or the interest rate increase. The larger the number of people pays income tax, the greater the contribution to the public treasury. Therefore, temporary immigration of Nikkeijin needs to be encouraged because it would be an additional source of income tax contributions, and it is one of possible simultaneous solutions for the pension shortfall and the current recession.

APPENDICES

Appendix A: Tables

Table A.1 Fertility Rate in Japan

Year	1950	1970	1980	1990	1995	1998
Total Fertility Rate	3.65	2.13	1.75	1.54	1.42	1.38

Source: Japanese Statistics Bureau, [<http://www.stat.go.jp/1602.htm#jf02-09>], and Japan Information Network, [<http://jin.jcic.or.jp/stat/stats/02VIT11.html>]

Table A.2 International Comparison of Gross Savings

Gross Saving As A Percentage Of GDP, 1977-1995					
	1977	1980	1985	1990	1995
Total OECD	22.7	22.5	21.3	21.0	N/A
<i>Japan</i>	32.0	31.1	31.7	33.6	30.8
OECD North America	19.7	20.2	18.1	15.9	16.2
Canada	20.9	22.9	19.6	16.4	17.1
Mexico	19.7	22.2	22.5	19.2	19.5
United States	19.6	19.8	17.6	15.6	15.9
OECD Europe	22.3	21.6	20.5	21.3	19.5
France	24.4	23.6	18.9	21.5	19.7
Germany	21.7	21.7	22.0	24.9	21.4
Italy	26.0	24.7	21.6	19.6	19.7
Netherlands	22.8	20.5	24.3	26.0	24.6
Sweden	17.8	17.8	17.5	17.7	16.6
United Kingdom	18.5	17.7	17.6	14.3	13.9

Source: Gardner. p.618

Table A.3 Number of Registered Brazilians in Japan 1990 – 1998

1990	1991	1992	1993	1994	1995	1996	1997	1998
56,429	19,333	47,803	154,650	159,619	176,440	201,795	233,254	222,217

Source: Ministry of Justice, <http://www.moj.go.jp/PRESS/990531-1.htm> (in Japanese)

Table A.4 Simulation Analysis – Manpower

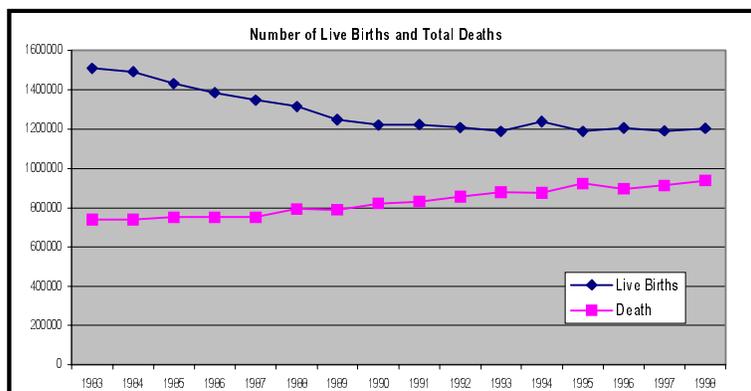
Number of Nikkeijin required to offset an increase in the benefit receiving age							
Case 1 (BPS only, Male)			Number of Nikkeijin				
# of male * Benefits (@1999 price level)			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	2,068,289,812,000		124,400.8	191,282.3	371,317.3	1,007,431.2	2,369,642.5
CND \$*	25,853,622,650						
Case 2 (1/2 BPS, 1/2 EPI, Male)			Number of Nikkeijin				
# of male * Benefits (@1999 price level)			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	4,598,480,536,280		276,583.5	425,282.6	825,559.0	2,239,846.9	5,268,485.5
CND \$*	57,481,006,704						
Case 3(1/4 BPS, 3/4 EPI, Male)			Number of Nikkeijin				
# of male * Benefits (@1999 price level)			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	5,863,575,898,420		352,674.8	542,282.8	1,052,679.9	2,856,054.8	6,717,907.0
CND \$*	73,294,698,730						
Number of Nikkeijin Needed to Make 1% Contribution to the Government Pension Support							
Government Funds to the Pension System 1/3 Support (1999 Price level)			Number of Nikkeijin				
1998			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	4.7 trillion	47,000,000,000	2,826.9	4,346.7	8,437.8	22,893.0	53,848.0
CND \$*	58.75 billion						
2010			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	6.7 trillion	67,000,000,000	4,029.8	6,196.4	12,028.4	32,634.64	76,762.0
CND \$*	83.75 billion						
2025			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	7.7 trillion	77,000,000,000	4,631.3	7,121.2	13,823.7	37,505.48	88,219.0
CND \$*	96.25 billion						
Government Funds to the Pension System 1/2 Support (1999 Price level)			Number of Nikkeijin				
1998			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	6.9 trillion	69,000,000,000	4,150.1	6,381.3	12,387.5	33,608.81	79,053.4
CND \$*	86.25 billion						
2010			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	9.9 trillion	99,000,000,000	5,954.5	9,155.8	17,773.3	48,221.33	113,424.4
CND \$*	123.75 billion						
2025			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	11.3 trillion	113,000,000,000	6,796.6	10,450.6	20,286.7	55,040.51	129,464.3
CND \$*	141.25 billion						
Government Funds to the Pension System Full Support (1999 Price level)			Number of Nikkeijin				
1998			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	13.3 trillion	133,000,000,000	7,999.5	12,300.3	23,877.3	64,782.19	152,378.3
CND \$*	166.25 billion						
2010			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	19.4 trillion	194,000,000,000	11,668.5	17,941.8	34,828.6	94,494.3	222,266.1
CND \$*	242.5 billion						
2025			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	22.3 trillion	223,000,000,000	13,412.7	20,623.8	40,034.9	108,619.8	255,491.4
CND \$*	278.75 billion						
Fewer Number of Nikkeijin Needed If There is a 1 per cent Increase in Rate of Return							
Savings in Trust Funds (end of Dec., 1998)			Number of Nikkeijin				
1998			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	433.4 trillion	4,334,092,000,000	260,681.4	400,831.1	778,093.7	2,111,067.5	4,965,575.2
CND \$*	5.42 trillion						
Time Deposit Savings in All Banks (end of Dec., 1998)			Number of Nikkeijin				
1998			Age 20-59	Age 20-49	Age 20-39	Age 20-29	Age 20-24
JPN yen	298.5 trillion	2,985,260,000,000	179,553.6	276,086.7	535,939.7	1,454,072.8	3,420,216.5
CND \$*	3.7 trillion						

Source: Calculations by author. Detailed calculation upon request to the author.

* \$1=Y80

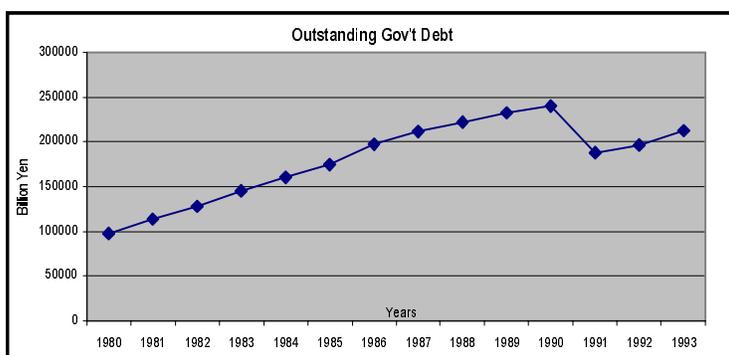
Appendix B: Figures

Figure B.1 Number of Live Births and Total Deaths in Japan



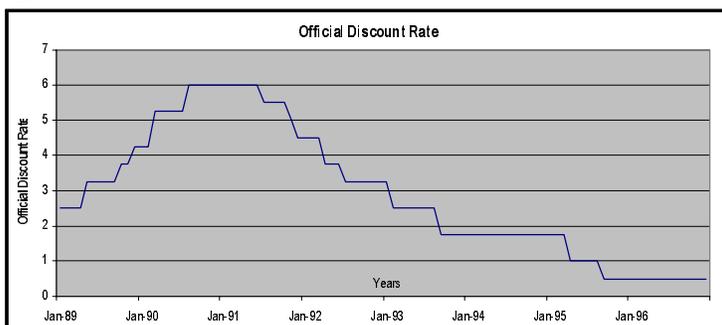
Source: Japan Information Network, Statistics, <http://www.jin-japan.org/stat/stats/02V!T21.html>

Figure B.2 Outstanding Government Debt



Source: IMF, <http://datacentre2.chass.utotonto.ca/cgi...e=&f=plain&a=annual&n1=Japan&s1=1588+8>

Figure B.3 Official Discount Rate



Source: Bank of Japan, available at <http://www.boj.or.jp/en/down/long/data/hkinri.txt>

Figure B.4 Japanese Population Pyramid

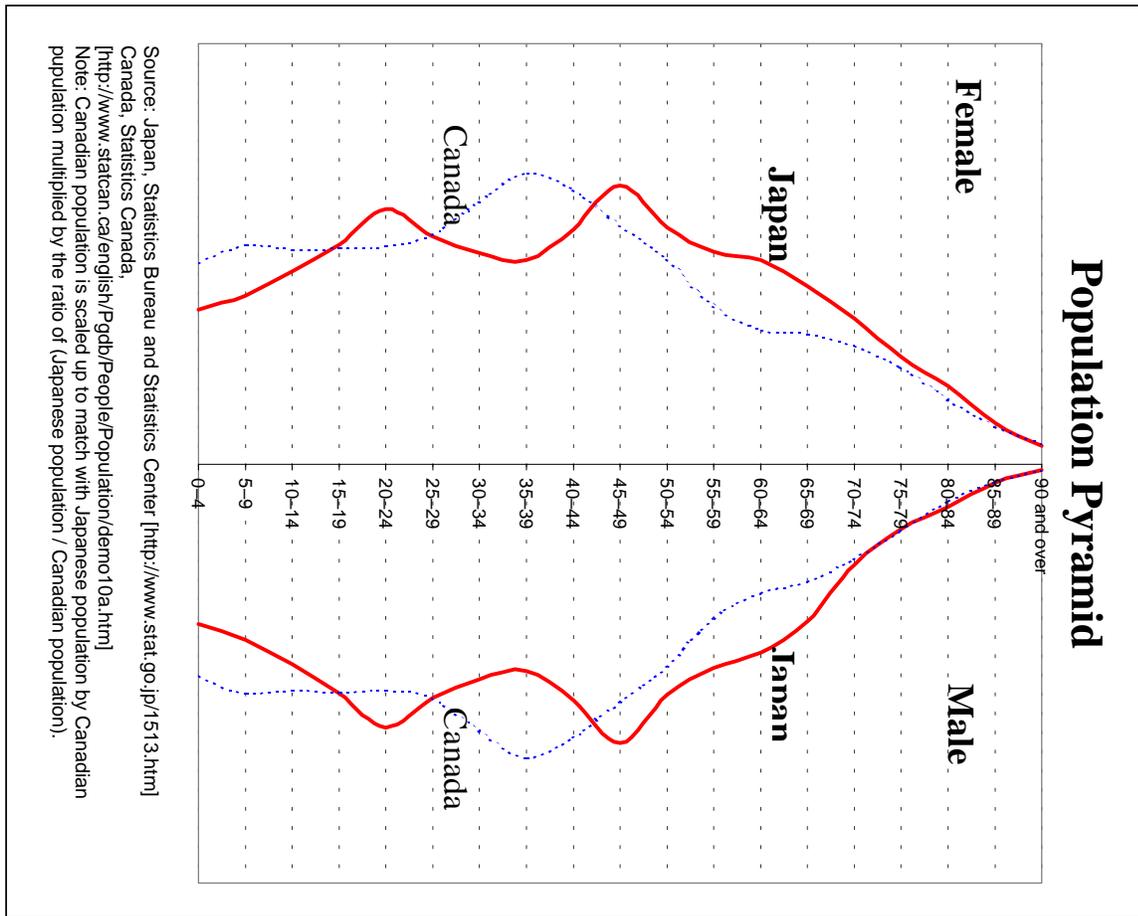
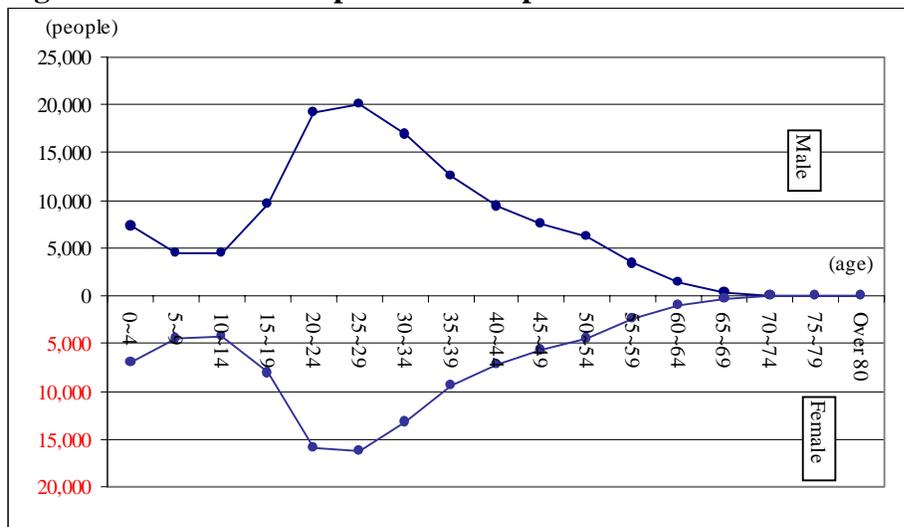
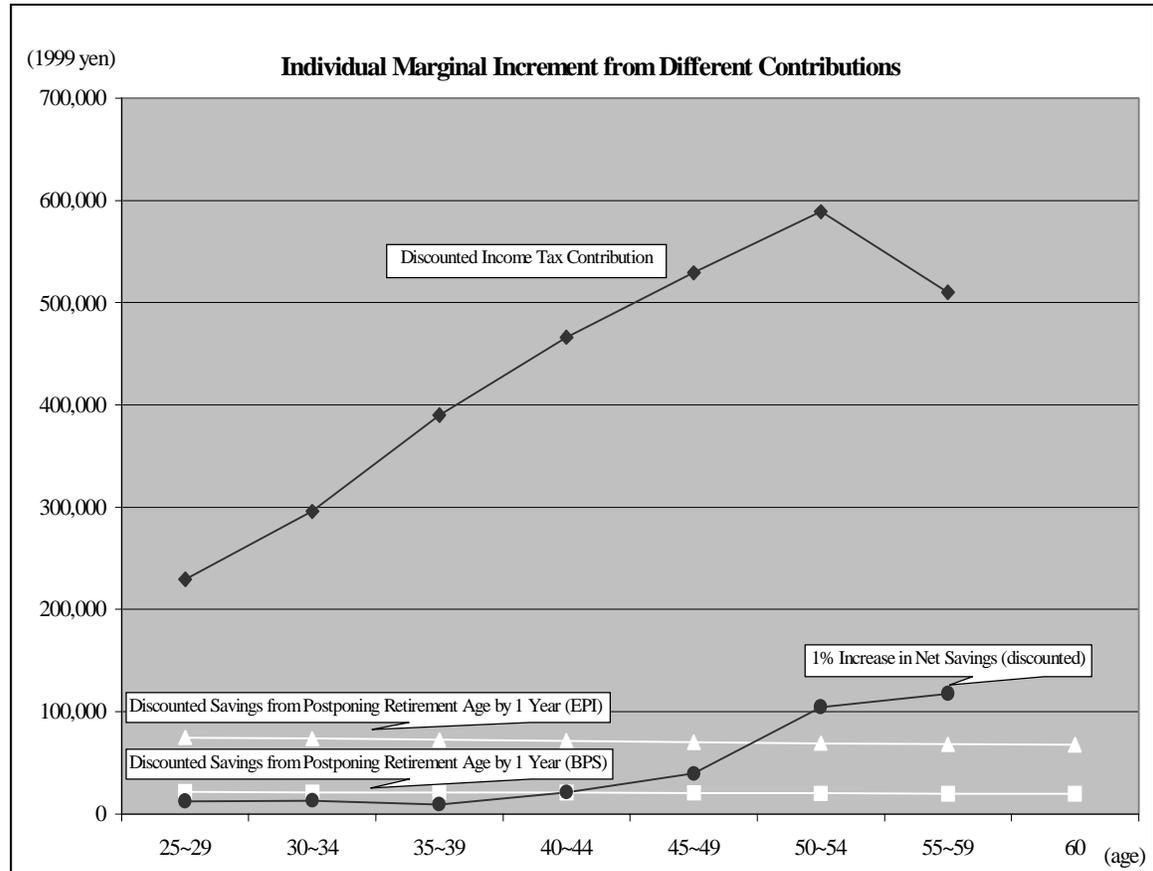


Figure B.5 Brazilian Population in Japan



Source: Ministry of Justice, <http://www.moj.go.jp/PRESS/990531-1-s2-1-1.htm> (in Japanese)

Figure B.6 Simulation Analysis – Individual Marginal Contribution –



Source: Author's calculations, see text.

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