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JSTAR First Results 2009 Report

ICHIMURA Hidehiko
RIETI

SHIMIZUTANI Satoshi
RIETI

HASHIMOTO Hideki
the University of Tokyo

RIETI
Research Institute of Economy, Trade & Industry, IAA

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Japanese Study of Aging and Retirement

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2009 Report

Hidehiko Ichimura
The University of Tokyo, Graduate School of Economics
Research Institute of Economy, Trade and Industry (RIETI)

Hideki Hashimoto
The University of Tokyo, Graduate School of Medicine

Satoshi Shimizutani
Research Institute of Economy, Trade and Industry (RIETI)
Institute for International Policy Studies (IIPS)

Abstract

This paper provides an overview of the first wave of the Japanese Study of Ageing and Retirement (hereafter "JSTAR"). Using this rich and unique dataset, we describe in detail how middle-aged and elderly Japanese live in terms of economic, social, health, and family status. In this project, our intention is to zoom in to paint a picture of the lives of individuals and zoom out to also provide a panorama view of society, while extracting scientific findings which we hope are innovative and insightful regarding life in Japan as well as other countries in the world. Moreover, we try to connect these new scientific findings to efforts toward enhancing the effectiveness of policymaking.

Japanese Study of
Aging and Retirement

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By

Hidehiko Ichimura
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Japanese Study of Aging and Retirement

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Authors:

Hidehiko Ichimura: University of Tokyo, Graduate School of Economics; Research Institute of Economy, Trade and Industry (RIETI)

Hideki Hashimoto: University of Tokyo, Graduate School of Medicine

Satoshi Shimizutani: Research Institute of Economy, Trade and Industry (RIETI); Institute for International Policy Studies (IIPS)*
* Corresponding author. For any queries on JSTAR, please contact Satoshi Shimizutani at <shimizutani-satoshi@rieti.go.jp>

Japanese Study of Aging and Retirement

Chapter 1
Introduction

1 Introduction

Acknowledgments

This book was written by the three principal investigators (PIs) of the Japanese Study of Aging and Retirement (JSTAR). Analogous to the international standard of longitudinal panel data on aging and retirement, JSTAR is a large enterprise with multiple researchers and administrative staff involved in the project.

Japan was the latest starter to construct a world standard database on aging and retirement among the industrialized countries when this project started in 2005. While Japan has been experiencing the fastest pace of aging among industrialized countries, it was a disgrace that Japan was the only one left behind in the ongoing move toward creating an internationally comparable database on middle-aged and elderly persons. The lack of available data delayed the evaluation of social security policies and made it impossible for Japan to provide valuable experience as the country at the forefront of population aging, despite being closely watched by the rest of the world.

Thus, we needed to catch up with other industrialized countries by producing a study as quickly as possible. Under very strict time and monetary constraints, the success of JSTAR relied heavily on the enthusiasm and the hard work of the researchers on the JSTAR team as well as the profound understanding and generosity of countless people. We are sure that JSTAR could never have reached this stage without them. It is not possible to thank everyone by name, but we hope that each person involved knows that we are truly grateful for the cooperation given. We emphasize that a tremendous number of people helped the project anonymously and greatly contributed to its success. As representatives of the JSTAR team, we would like to express appreciation for their understanding and continuing support for the success of JSTAR. Among the many people who provided invaluable assistance, we would like to mention the following people.

First, we thank all the participants in this study for their cooperation and patience. The final number of participants in the first wave exceeded 4,200 individuals. Despite having to undergo a lengthy face-to-face interview, very exceptional in Japan, the participants understood the purpose and the significance of the study in terms of both domestic and international perspectives and were committed to the social responsibility of improving understanding of the aging society and policy effectiveness. In that sense, they are not only participants in JSTAR but also contributors to worldwide studies on aging and retirement. We sincerely hope that they enjoyed participating in this study and will continue to participate in the project in the future with intellectual curiosity and social responsibility. Needless to say, we also thank interviewers for their diligent work, professional expertise, and exceptional patience to obtain cooperation from the interviewees. The earnest and enthusiastic efforts of the interviewees and interviewers form the backbone of this project.

Second, we thank two institutions that provided funds for the data collection. First, the Research Institute of Economy, Trade and Industry (RIETI) provided the full funding for the pilot studies and covered more than half of the total costs for the first wave. The JSTAR project was initiated by Masaru Yoshitomi, former RIETI

CRO, who continued to encourage the project to progress successfully under a “new economics of aging” project at RIETI for which Ichimura and Shimizutani have been responsible since 2005. We also thank other RIETI staff members, especially Kozo Oikawa, Yuji Hosoya, and Akira Kawamoto. The funds provided by RIETI were spent for the survey in Kanazawa and Adachi. The remaining part of the first wave was funded by the “Project on Economic Analysis of Intergenerational Issues” supported by the Ministry of Education, Culture, Sports, Science and Technology of Japan (grant number 18002001). The project has been led by Noriyuki Takayama at Hitotsubashi University and Shimizutani has been in charge of the subproject on retirement for constructing and using this dataset. The funds provided by the project were spent for the surveys in Sendai, Takikawa, and Shirakawa. We emphasize that the unit of the survey is the municipality and each survey in a municipality is autonomous and separately funded by different institutions, which contrasts with a national representative survey. As described in the text, our sampling design is different from a typical national representative sampling since we sought to collect as many respondents as possible from a municipality with the same culture, history and policy environment to adjust for unobserved heterogeneity. At the same time, we utilize the summary datasets from the surveys in the five municipalities together for analyses including those in this book and make public the large part of anonymized datasets to allow researchers to examine a variety of health, aging, and retirement topics at the national level. Some parts of the dataset such as the details of the health expenditures and details of the residential location information need to be withheld for confidentiality reasons.

Third, we thank the five municipalities of Sendai city, Kanazawa city, Takikawa city, Shirakawa town, and Adachi special ward in Tokyo. We are certain that the cooperation and profound understanding shown by these municipalities was crucial to the success of JSTAR and, without it, we would not have been able to obtain a high response rate or official records on medical and long-term care use. We requested assistance from each municipality in three aspects: writing a letter to individuals selected in the sample to ask for cooperation with JSTAR under the name of the municipality (the cooperation included any responses to questions and confirmations from the individuals in the sample), providing the survey agency a list of names and their addresses that were randomly chosen using household registration in each municipality, and offering information on medical and long-term care use records held by municipalities if a respondent agreed. We are not able to list here all the names of the persons who cooperated with the process of JSTAR, but a large number of government officials, from the mayor to section staff, whether met directly or not, kindly cooperated with this project. In addition, Ota ward in Tokyo gave us cooperation in performing pilot studies, which greatly enhanced our understanding of a field survey on middle-aged and elderly people. We thank Mikio Kawa for introducing government officials in charge at Kanazawa and Takikawa to us. The day-to-day operation of JSTAR was done by a survey agency (Kazuo Shikano and Tsukasa Ueno) and RIETI (Naoto Nagase) including instructions and follow-up with each interviewee.

Fourth, we thank the HRS, ELSA, and SHARE teams. HRS (Health and Retirement Study), ELSA (English Longitudinal Survey on Aging) and SHARE (Survey on Health, Ageing and Retirement in Europe) are the role models for JSTAR. When we started JSTAR in 2005, Robert Willis gave us instructive suggestions to follow SHARE, a cross-national survey in Europe for our work on Japan. In summer 2005, Ichimura, Shimizutani and Haruko Noguchi (JSTAR team) met Axel H. Börsch-Supan at Mannheim Research Institute for the Economics of Aging and Robert Willis, David Weir, and Olivia Mitchell at the Survey Research Center (SRC) at University of Michigan. They very willingly provided constructive and realistic suggestions to initiate JSTAR, which greatly facilitated starting the survey. We are also grateful to David Weir, Arie Kapteyn, Richard Suzman, James Smith, and Kenneth Langa who visited us at RIETI to further discuss JSTAR in summer 2006 and gave us very knowledgeable and practical advice. David Weir and John Phillips at the National Institute on Aging (NIA) also visited RIETI in 2007 for further instructions and Nicole Kirgis and Heidi Guyer kindly provided an intensive TTT (Train-The-Trainers) program to supervisors of the surveys at each municipality before starting the first wave in January 2007. Japanese translation of the initial questionnaire and TTT was funded by the National Institute on Aging through the HRS team. We also benefited from discussions with ELSA team members including Michael Marmot, Richard Blundell and James Banks. We also thank Jinkook Lee and Dararatt Anantanasuwong, and Albert Park for the suggestions from a previous similar survey in Asia. Jinkook Lee and John Phillips visited us again in June 2008 for further consultation on JSTAR. All these people have provided us continuing support and encouragement for JSTAR whenever required, whether it involved visiting or communicating through email on several occasions including during the International Social Security Project by the National Bureau of Economic Research (NBER).

Again, we would like to emphasize that the list above is far from complete and we owe a debt of gratitude to many other persons for their professional help indispensable to the success of the first wave of JSTAR. For the analysis in this book, we thank Takashi Oshio and Kazuo Yamaguchi (both of whom belong to the JSTAR team) as well as Naohito Abe and Daiji Kawaguchi for constructive suggestions, and Yoichi Goto, Junya Hamaaki, Hidetada Kato, Shintaro Minami, Hisakazu Matsuyama and Koji Miyawaki for their excellent research assistance. We also thank KNT for logo design and Terri Nii for her editing work. We believe that this book will represent at least a small part of the tremendous contributions of the people involved in this project. Moreover, we would be delighted if JSTAR provides useful data to researchers around the world on aging and retirement and a pragmatic opportunity for formulation of more effective policies founded on scientific evidence both in Japan and internationally.

1.1 Preface

This book provides an overview of the first wave of the Japanese Study of Aging and Retirement (hereafter "JSTAR"). Using this rich and unique dataset, we describe in detail how middle-aged and elderly Japanese live in terms of economic, social, health, and family status. In this project, our intention is to paint a picture of the lives of people that is both zoomed in to focus on individuals and zoomed out to provide a panorama, and extract scientific findings which we hope are innovative and insightful regarding life in Japan as well as other countries in the world. Moreover, we try to connect these new scientific findings to efforts toward enhancing the effectiveness of policymaking.

JSTAR project researchers aimed to construct a world-class longitudinal dataset on middle-aged and elderly Japanese persons to enable researchers worldwide to perform scientific investigation on aging and retirement from an international perspective. JSTAR builds on the shoulders of preceding large scale "family" surveys like HRS (Health and Retirement Study), ELSA (English Longitudinal Survey on Aging), SHARE (Survey on Health, Ageing and Retirement in Europe) all of whose teams' knowledge, instructions, and encouragement were indispensable to initiating JSTAR.

In particular, this book emphasizes a comparison between Japan and SHARE, a study performed in more than 10 countries in continental Europe. The reason that we chose SHARE as a reference among the "family" of world standard datasets on aging and retirement is that only SHARE transcends national borders and performs multiple-country surveys and thus prioritizes transnational information. As described below, the origin of JSTAR is found in SHARE in that we started the project with SHARE as a direct role model. The contents and analyses of this book are generally comparable with those in Health, Ageing and Retirement in Europe: First Results from the Survey of Health, Ageing and Retirement in Europe (2005), edited by Axel H. Börsch-Supan, which we call the "SHARE book" below.

The most important message of this book is the similarity and diversity of life circumstances for middle-aged and older people across both individuals and municipalities even within Japan. Of particular interest is the substantial variation in many life aspects of middle-aged and elderly across individuals.

JSTAR and SHARE as well as other HRS type surveys find a substantial diversity across individuals in middle and older ages in their samples. The SHARE book emphasizes an enormous wealth in diversity of cultures, histories, and policy approaches in continental European countries and on the resultant different shapes of individual behavior across nations. The diversity across municipalities and individuals within a country provides unusually large potential to extract new scientific findings and policy implications for population aging. JSTAR's unique features are found in the homogenous living circumstances in culture, history, and policy within a municipality, in contrast to the large gap in the same seen in different countries. This means that, when examining topics related to aging and retirement, it is easier to control for unobserved heterogeneity caused by innate characteristics across regions without relying on a fixed effect model, and thus to distill the effect of what interests researchers more clearly.

This advantage is especially important for analysis on aging and retirement. Similar to European countries, Japan has been aging and is currently one of the most aged societies in the world. The aging process in Japan will continue in the future and in fact will even accelerate. However, we must keep in mind that aging takes place in all domains of life and the effect of aging on people's living standard is not uniform but very diverse. The diversity comes both from individual heterogeneity and different cultural, historical and policy backgrounds. We believe that our focus on variations in a large number of individuals in selected municipalities which are controlled for cultural, historical, and policy environment is a unique approach to examining a variety of topics on aging and retirement and contributes to rethinking a way of sampling survey data.

JSTAR and SHARE and other "family" surveys like HRS and ELSA share the common motivation and philosophy to understand a variety of levels of aging, from individuals to countries, from an international perspective. The first wave of JSTAR, which took place in the first half of 2007, contains data on individual living circumstances of 4,200 persons in five municipalities scattered in the eastern geography of Japan. JSTAR has made every effort to construct data comparable with SHARE and other surveys so that researchers worldwide are able to explore the Japanese experience of aging and retirement in a comparable way.

This book presents the first results from the JSTAR baseline data. We realize that this is only a first step to a better understanding of aging and retirement in Japan. Additional research agendas will be more clearly investigated when longitudinal data is available and when more in-depth econometric analyses are performed. However, we believe that even a cross-sectional analysis will reveal many unexplored findings which stimulate further scientific research. As the SHARE book emphasizes, aging is inevitable and affects all of us both as individuals and societies. Together with the "family" members, we hope that JSTAR will push forward our scientific frontiers on aging and retirement so that the innovative knowledge will contribute to the enhancement of happiness and well-being of all the people on the earth.

1.2 Population Aging in Japan

The main background of the JSTAR project is population aging. Population aging is one of the most serious social and economic challenges in modern society. Japan is not an exception and has experienced the most drastic demographic change among industrialized countries. The pace of population aging in Japan is far faster than that of other industrialized countries. As of 2005, one of every five people in Japan was aged 65 or older. In the meantime, we have witnessed the fertility rate fall to an historically low level. The ongoing drastic demographic changes—population aging combined with lower fertility—are posing an unprecedented challenge to the Japanese economy. Other countries undergoing population aging are keenly watching how Japan will cope with this daunting challenge.

While Japan and European countries are the most "aged" nations in the world, the share of the older demographic is currently higher in Japan (over 20%) than the average in European countries. In addition to the historically high level of the proportion of the aged, the pace of aging in Japan is literally unprecedented and is far more rapid than in European countries. The proportion of population aged 65 and over out of the total population was about 5% in 1950, increasing to 12.5% in 1990, and then reaching 20.2% in 2005. According to the latest population projections released by National Institute of Population and Social Security Research (NIPSSR) (2007), the share of those aged 65 years and above is expected to reach 30.5% of the total population in 2025, and further increase to 39.6% in 2050.

The aging of Japan is occurring much faster than in Europe whose proportion of the population aged 65 and over is projected to increase to 28% in 2050 as the SHARE book shows. In other words, in terms of the share of the elderly population, Japan faces the most severe demographic challenge in the world. Among the major European countries, Italy has the largest share of the elderly in 2005 (19.7%) and will also have the largest in 2050 (32.7%), which is still much lower than that of Japan.

Figure 1-2-1 illustrates the population pyramids in Japan at three different points in time: 2005, 2025, and 2050. A dynamic process of demographic change is neatly described in the change of share in the three pyramids. A textbook explanation describes the general path of a population pyramid from first a mountain (or Mt. Fuji)-shaped outline (larger younger generation and smaller older generation) to a diamond-shaped form (the middle-aged group is dominant) and then an urn-shaped outline (larger older generation and smaller young generation). The pyramid in Japan, which is currently diamond-shaped, will become a typical urn shape like that of SHARE countries. The most dominant age cohort is moving upward and, in 2050, the largest age cohort will be those aged around 80. The top-heavy shape is evidence that the Japanese demographic pyramid in the future will be very unstable in that a thin base must support a large head.

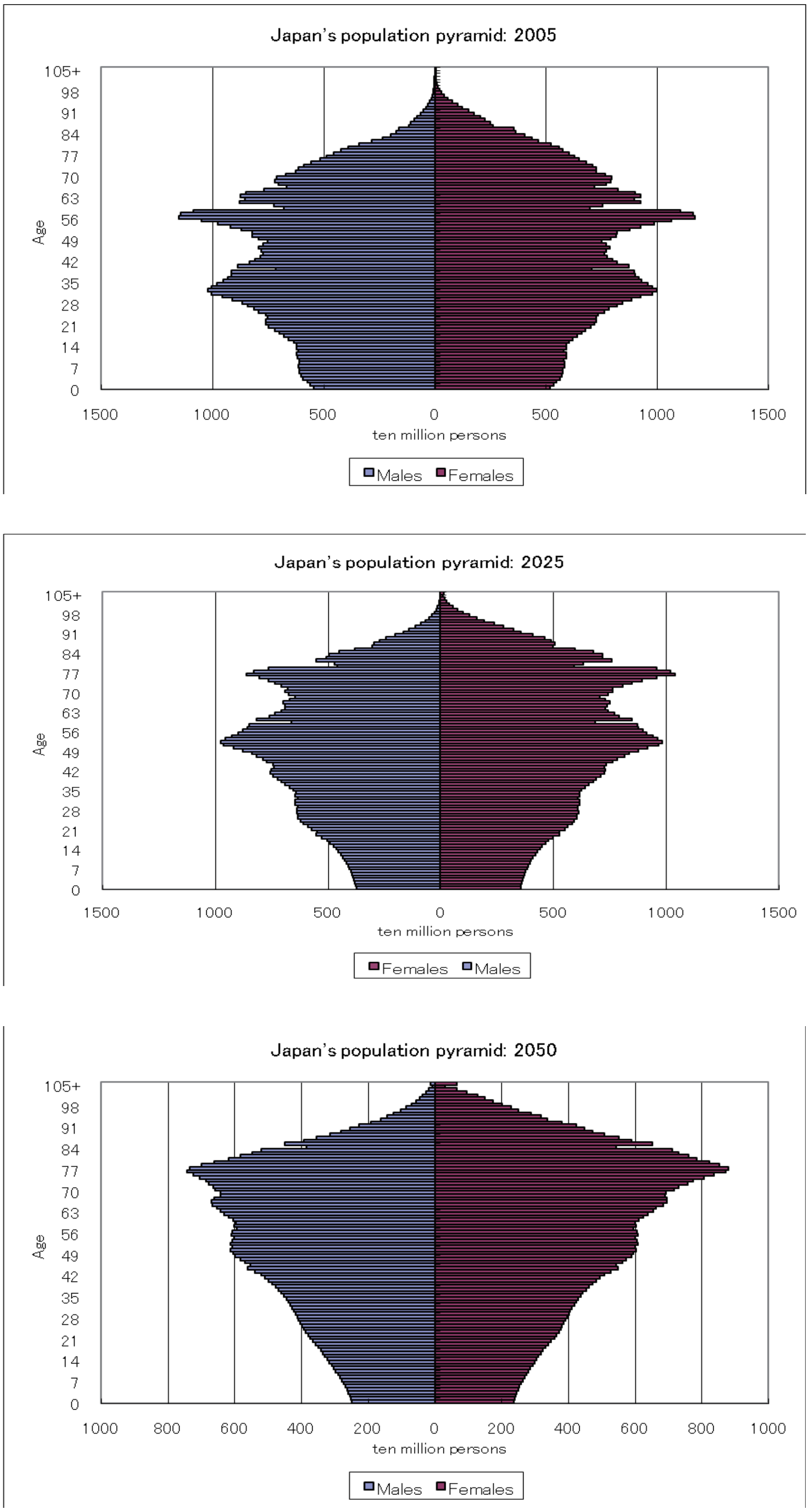

Figure 1-2-1 Japan's population pyramid in 2005, 2025, and 2050

There are two driving forces propelling the aging process in Japan: low fertility and increased life expectancy. Japan's birth rate remains at an historically low level. Figure 1-2-2 shows that the total fertility rate of 3.65 in 1950 declined to 1.54 in 1990. The rate further declined to 1.26 in 2005 and slightly recovered to 1.32 in 2006. Japan's current total fertility rate is comparable with Italy (1.32), Spain (1.35) and Germany (1.34) whose total fertility rates belong to the lowest group among European countries (all figures are current as of 2005 and available from EUROSTAT "Population and social condition"). Despite several policy measures taken by the government to stimulate the birth rate, the projection of fertility rates in the future is pessimistic. According to the population projections by NIPSSR (NIPSSR (2007)), the total fertility rate will level off for the next four decades: the medium variant of the fertility rate is projected to be 1.23 in 2025 and 1.26 in 2050 (1.54 at the high variant and 1.06 at the low variant in 2050). In contrast, EUROSTAT's projections show that the total fertility rate will be 1.40 for Italy and 1.45 for Germany in 2050, all of which are much higher than that of Japan (EUROSTAT (2005)).

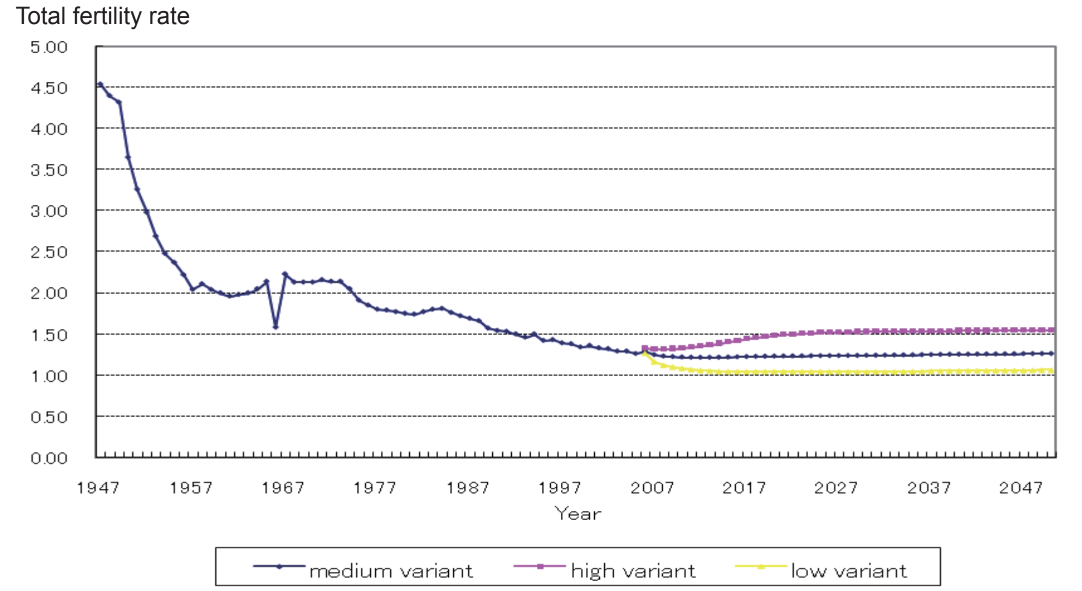

Figure 1-2-2 Total fertility rate in Japan

At the same time, Japanese life expectancy is now one of the longest in the world. Figure 1-2-3 illustrates life expectancy at birth by gender in 2003 when the data is available for all the 14 countries in the figure (OECD 2007), i.e. 12 European countries, the US, and Japan. The life expectancy at birth was 78.4 years for males and 85.3 years for females, both of which were the longest in the world. While the life expectancy at birth for males is similar to Sweden and Switzerland, that for females is even more remarkable. The difference in longevity is greater if comparing Japan and the US: 3.6 years longer for Japanese males and 5.2 years longer for females. What accounts for the world's longest life expectancy for Japanese people is surely a fascinating topic to be explored from a variety of angles. JSTAR provides an opportunity to examine the striking difference between Japan and other countries, a subject that has attracted interest from researchers from around the world.

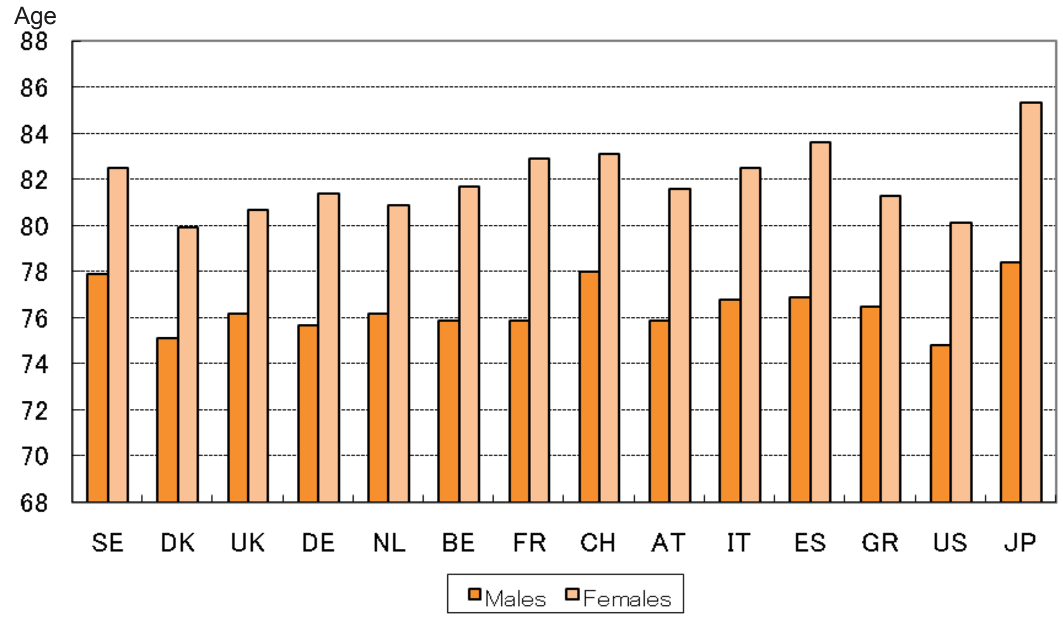

Figure 1-2-3 Life expectancy at birth, 2003

The long life expectancy will continue to be in favor of Japan in the future. According to the NIPPSR estimation (NIPPSR 2007), the medium variant of life expectancy at birth will extend to 81.4 years for males and 88.2 years for females in 2025, and further increase to 83.4 years for males and 90.1 years for females in 2050. On the other hand, according to EUROSTAT (2005), the life expectancy at birth in the SHARE countries will extend to 80-84 years for males in 2045-2050 (the longest is 83.6 in Italy and Austria) and 84-89 years for females (the longest is 89.1 in France and 88.8 in Italy). The life expectancy for Japanese males is comparable with the longest expectancy in Europe and that for Japanese females exceeds that in all European countries.

The lower fertility rate and the longer longevity result in a higher old age dependency ratio. The ratio in this subsection is defined as the number of elderly aged 65 and over to population aged between 15 and 64. We should keep in mind that this definition is different from that in the SHARE book which calculates the number of the elderly aged 60 and over to that of those aged between 20 and 60. The data source is the United Nations (2007). Japan's old age dependency ratio was only 8.3% in 1950 and as of 2005 is 29.8%, which is comparable with Denmark and Italy. However, the figures in 2050 are remarkable (United Nations 2007), as seen in Figure 1-2-4. Japan's old age dependency ratio will increase dramatically to 73.8% in 2050 and will exceed the highest in Europe (63.3% in Spain) by 10 percentage points and is almost twice as large as that in the US (34.1%). Those observations imply that burden of aging is exceptionally larger for Japan than other industrialized countries. Similar to Europe, the dependency ratio has received so much attention in policy debates in Japan since the higher old age dependency ratio may be associated with a larger burden of tax and social security contribution from younger generations. In this sense, Japan's future must be viewed very soberly.

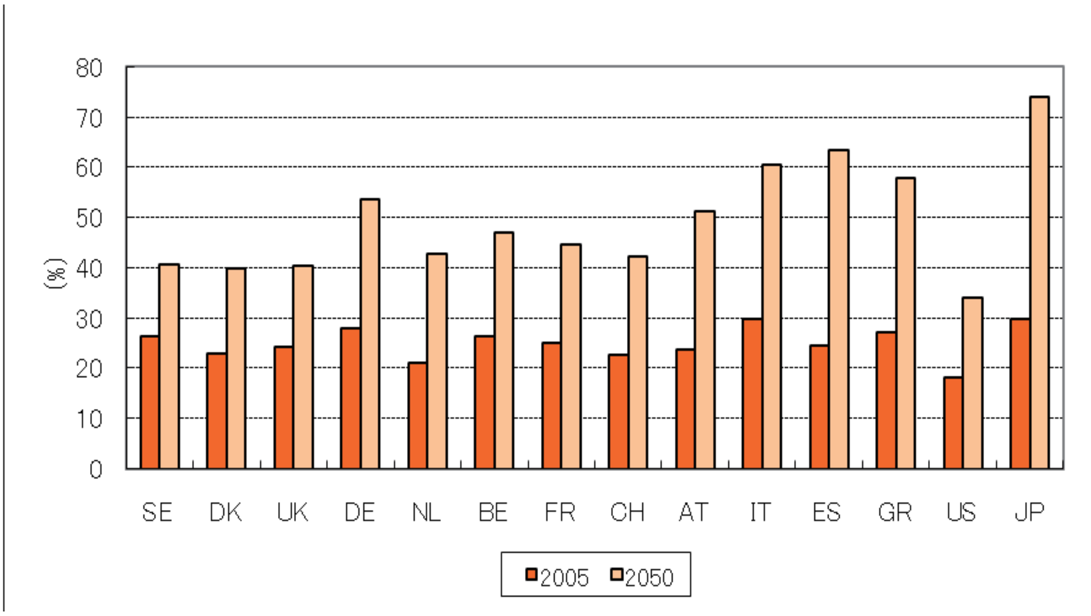

Figure 1-2-4 Old age dependency ratio, 2005 and 2050 (population 65 or over to population 15 to 64 years)

Fortunately, the negative effect can be mitigated by the higher labor force participation rate in Japan. In addition to demographic changes, we need to take account of when people retire and their required social security benefits as well as medical and long-term care. These considerations are also associated with family and social networks, to which we should expand our scope. According to EUROSTAT (Employment rate of older workers by gender), Japan's employment rate of workers aged between 55 and 64 is 81.4% for males and 51.2 % for females (see Figure 1-2-5). The male employment rate of Japanese is higher than that of Switzerland whose rate is the highest in the SHARE countries (76.4%) and twice as large as that of France whose rate is the lowest (40.5%). This observation implies that the high dependency ratio might be somewhat compensated by the higher employment rate in Japan. In contrast, the employment rate for Japanese females is 51.2% and located at the middle of SHARE countries, i.e. between the higher group (67.0% in Sweden and 58.1% in Switzerland) and the lower group (23.0% in Italy and 26.0% in Belgium). This figure shows that there is a large scope to stimulate the female labor supply in this age group in Japan.

The employment of the elderly can be described as employment of someone of retirement age after that person has initially left the labor force. In contrast to several European countries which experience "early retirement," Japan currently enjoys a late retirement age. Figure 1-2-6 depicts the "effective" retirement age, which is defined as a weighted average of net withdrawals from the labor market at different ages over a five year period for workers initially aged 40 and over, for 15 developed countries in the 2002-2007 period (OECD 2008). The latest retirement age is observed in Japan for both males and females; 69.5 years for males and 66.5 years for females. The figure for Japanese males is higher than that for Sweden, the second highest, by 3.8 years while that for females is higher than Switzerland, the second highest, by 2.4 years. It is remarkable that the gap in the effective retirement age between Japanese males and French males (58.7 years) with the lowest retirement age exceeds 10 years.

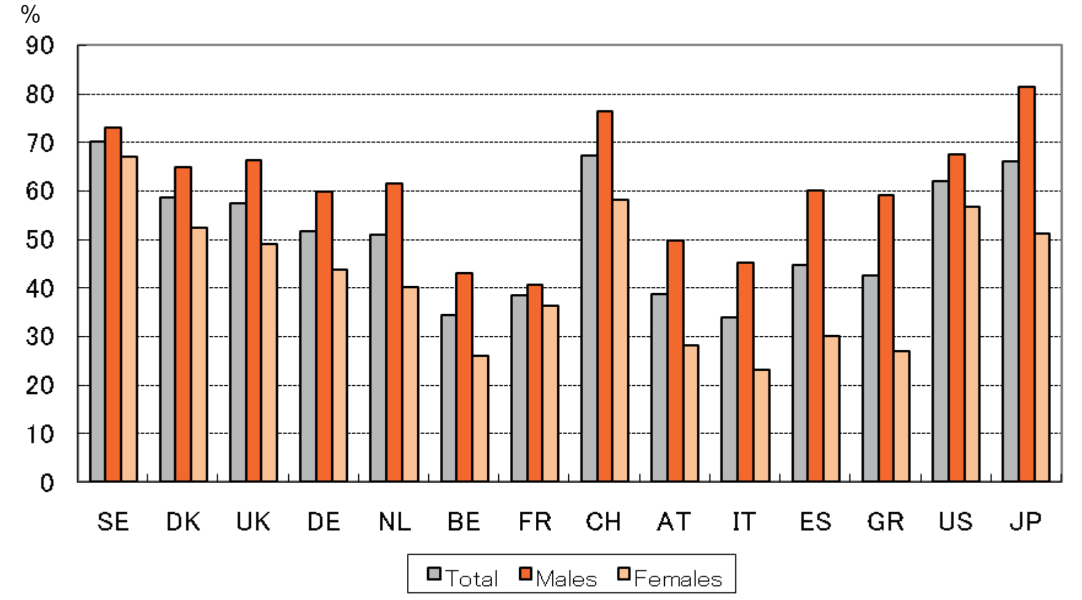

Figure 1-2-5 Employment rates of workers aged 55-64, 2007

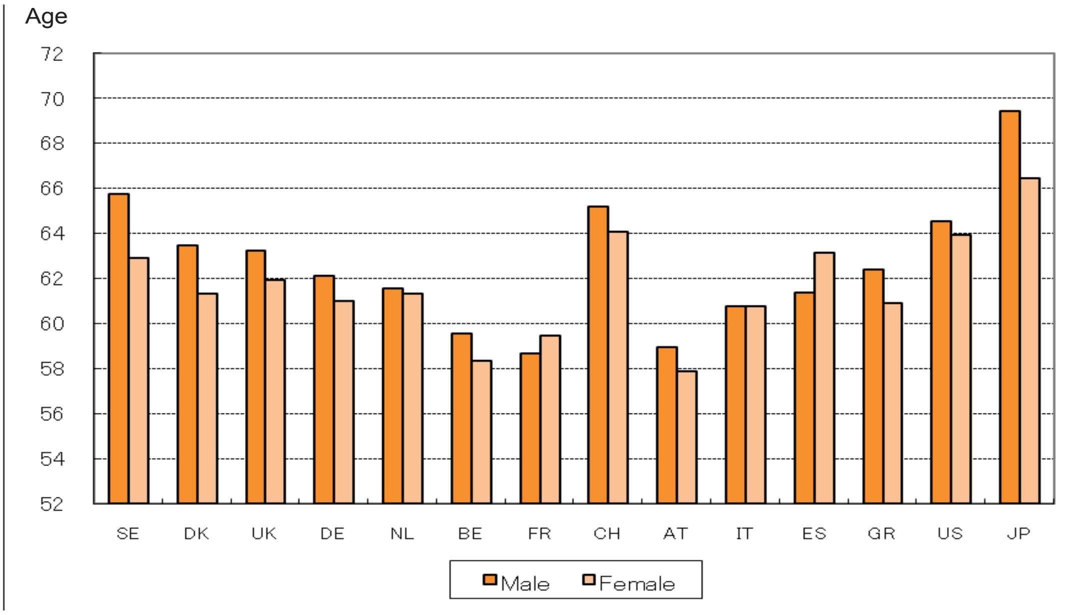

Figure 1-2-6 Average effective age of retirement (2002-2007)

Late retirement is one of the most distinct features of the elderly labor supply in Japan. Understanding what accounts for Japanese retirement behavior is surely important not only for Japan but also other developed countries which suffer from early retirement. JSTAR provides information on a variety of pathways to retirement as well as key affecting factors including economic/health status and quality of workplace and family/social networks, most of which are measured in an internationally comparable way. We believe that one of the most important contributions in JSTAR will be found in uncovering and examining the unique Japanese retirement behavior from a variety of angles to extract policy implications for other developed countries.

Even if the rapid speed of aging and sharp rise in the old age dependency ratio might be somewhat offset by the higher labor force participation, one might wonder whether Japan can escape from a huge burden of social security and health expenditure. Here we will review two large components of expenditure related with aging: pension benefits and health expenditure.

Figure 1-2-7 illustrates the net replacement rate for an average earner from mandatory pension programs. The replacement rate is a measure of pension generosity and the net replacement is defined as the individual pension entitlement net of taxes and contributions as a percentage of individual pre-retirement earnings net of taxes and contributions. According to the figure, the replacement rate of Japan is the lowest among the 14 countries. Excepting the UK, the rate is about 60% or more in European countries and exceeds 90% in Greece, Netherland and Austria, which is consistent with the findings in the SHARE book that the share of current public pension expenditure out of GDP is lowest in the UK (about 5%), and highest in Austria (almost 15%). In terms of replacement rate, the Japanese pension program is less generous, which mitigates social security expenditure. Due to the difference in definitions and projected years, it is difficult to compare future pension expenditures between Japan and the SHARE countries. According to the latest official projections released by Ministry of Health, Labour and Welfare (MHLW 2006), the total amount of social security expenditure (pension, medical, and welfare) will be 1.41 trillion yen in 2025 which corresponds to 26.1% of national income in the case that social security reforms are enforced.

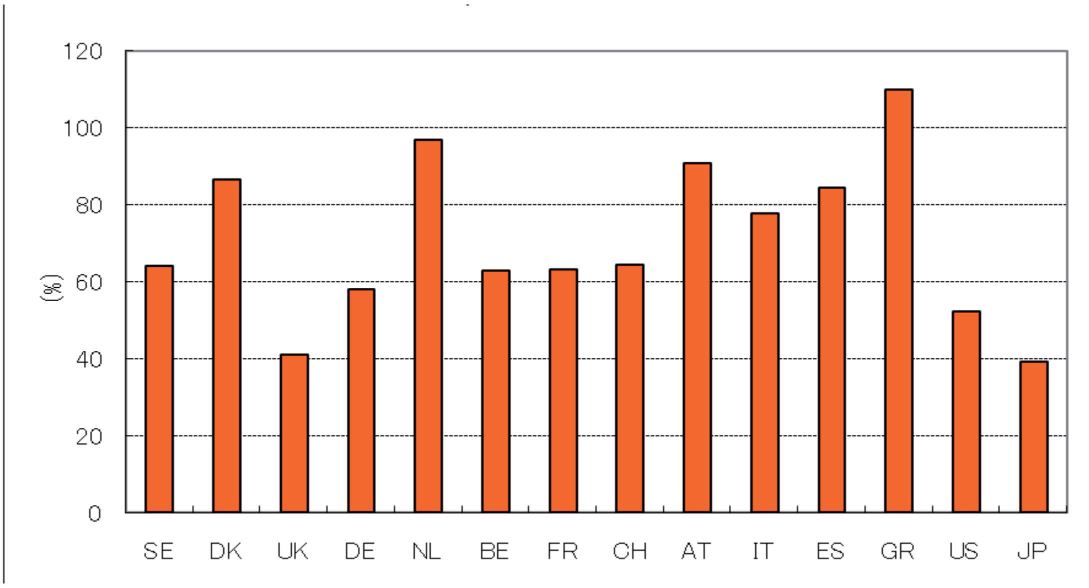

Figure 1-2-7 Net replacement rate for an average earner from mandatory pension schemes

The public pension program also works as a device to redistribute resources among people, which is closely related with the issue of poverty. In recent years, there has been tremendous policy debate on economic inequality in Japan which some attribute to a larger proportion of the elderly whose inequality is larger than younger generations. Although there has been no consensus on the factors, that the poverty rate for the elderly in Japan is higher than other industrialized countries must be recognized.

Figure 1-2-8 reports poverty rates among people aged 65 and over in 2000 (Förster & Mira D'Ercole 2005). The poverty rate is defined as the proportion of individuals with equivalised disposable income less than 50% of the median income of the entire population. Note than there is no data for Belgium and Spain. We observe that the proportion of the poor in Japan is 21.1%, which is much higher than all the other countries except Greece and the US. In most SHARE countries, the poverty rate among the elderly is relatively low compared to Japan. While the lower replacement ratio of the public pension program might contribute to the large disparity in disposable income of the elderly, what accounts for the larger proportion of the poor in the Japanese elderly should be addressed from a variety of angles, including income and wealth at retirement, mutual transfers among family members, and health deterioration. JSTAR provides rich data to explore who the poor elderly are and the differences between the rich and the poor among the elderly.

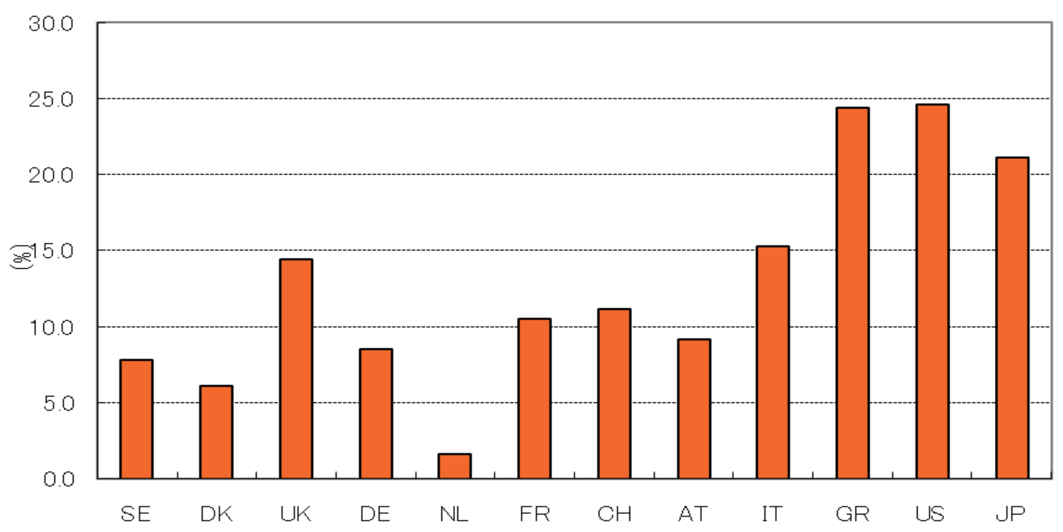

Figure 1-2-8 Poverty rates among people aged 65 and over, 2000

Lastly, we turn to the size of health expenditure. One striking feature is that Japan has the longest life expectancy in the world and at the same time its medical expenditure is relatively small. Figure 1-2-9 reports health expenditure per capita on a dollar basis and the share relative to GDP in the 14 industrialized countries, which is taken from OECD (2007). The amount of health expenditure per capita is about US$3,000 in Japan, which is comparable with that in the U.K. Although health expenditure per capita is smaller in some European countries like Italy, Spain, and Greece, it is larger in most countries. In particular, the figures for Switzerland and the US are twice as large as that for Japan.

The lower amount of medical expenditure per capita in Japan among industrialized countries is also evident in the share of medical expenditure relative to GDP. In 2004, the share of medical expenditure to GDP was 8.0% in Japan, which is the lowest among the countries (OECD 2007). The highest is 15.2% for the US and the share for all European countries ranges between that of Japan and the US. We believe that JSTAR enables exploration of what accounts for the low medical expenditure relative to economic size in Japan. Health status along with economic and social circumstances

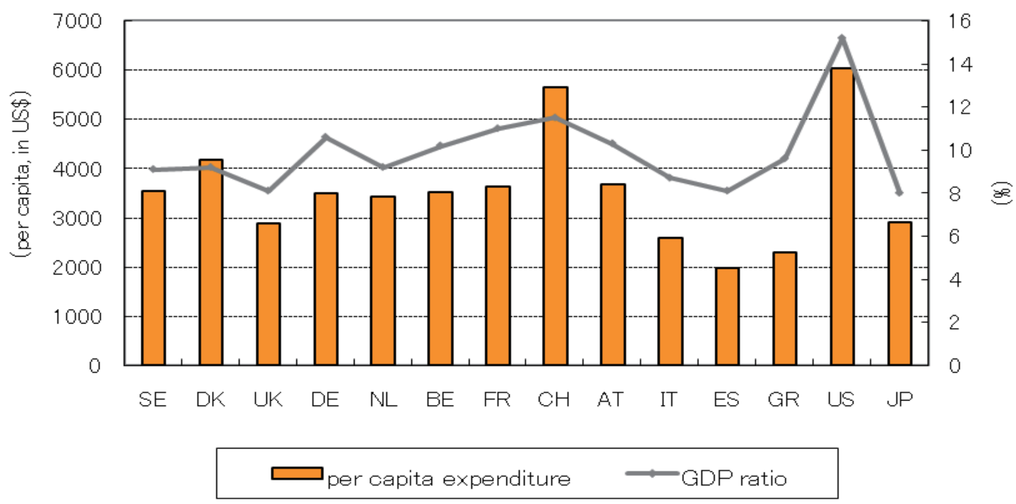

Figure 1-2-9 Health expenditure per capita, 2004

is a possible factor but a comprehensive dataset to explore the topic has been lacking in Japan. JSTAR includes a variety of variables related with those factors and enables researchers to find a key factor to mitigate health expenditure in Japan.

What is more interesting is to relate health expenditure with health care. Figure 1-2-10 performs an analysis similar to that in the SHARE book which takes life expectancy as a measure for the output of health care or the ultimate goal of a health care system. The SHARE book classifies the SHARE countries and the UK into four categories, depending on health expenditure per capita and life expectancy: the first group includes countries with high health care expenditures and good results in terms of life expectancy such as France, Sweden, and Switzerland. The second group contains countries with low expenditures and low life expectancies, most prominently the UK. The third group refers to countries which manage to have well above average life expectancy but that spend a smaller share of GDP on health care, such as Italy and Spain. The fourth and the most disturbing group includes the countries in which life expectancy is low, but health care expenditures are nevertheless above average, prominently Denmark. Note that the data on life expectancy and health care expenditure in the SHARE book dates to 2001 but that in this chapter it dates to 2003, although the data source is the same.

The figure demonstrates that Japan is an outlier and is located far above the average life expectancy but spends smaller medical expenditure. Another outlier is the US which suffers from larger medical expenditure and shorter life expectancy. This unlikely combination of the long life expectancy and low medical expenditure in Japan poses a puzzle for both researchers and policymakers. One might argue that this is because Japanese people are extremely healthy but another view might be that the Japanese health care delivery system is unusually efficient. Alternatively, other factors might explain the ambivalent combination. While there has so far been no consensus on what accounts for this observation, it is critical to disentangle the main causes for the unusual combination for both Japan and other countries that have a huge medical expenditure burden. In other words, the Japanese experience has a large potentiality to provide useful lessons for other countries.

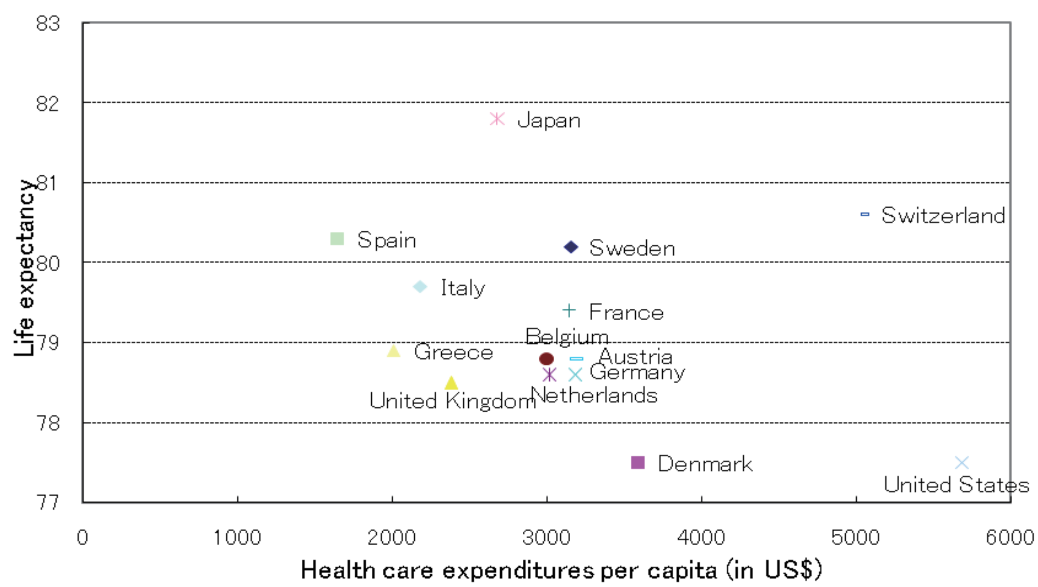

Figure 1-2-10 Health care expenditures and life expectancy in 2003

While Japan is now enjoying late retirement and lower health expenditure, it would be too optimistic to believe that this pattern will continue in the future. In both Europe and Japan, pension and health care reforms are always placed top priority on the agenda of policymakers and the direction of the debate usually focuses on cutting the total amount of government expenditures. Unfortunately, a large volume of policy debates on these social systems has not been supported by empirical evidence. To be fair, we have little knowledge on the mechanism of how public policy affects individual behavior and how the government can cut expenditure without negatively impacting people's well-being. What is described in this subsection is based on casual observations whose details are not firmly established; further, there has been no data available to examine causes and interactions of these observations and thus to extract scientific findings and useful policy implications for Japan and other counties with challenges of an aging population.

JSTAR is the first data in Japan to tackle these topics from an international perspective, and, together with SHARE and other family surveys, expands the knowledge frontier on a global scale to contribute to the design of more effective policies.

1.3 Individual Aging: Health, Economics, and Social Networks

Aging takes place at a variety of levels from the national to the individual and affects all of us in all domains of our lives. In terms of a national population, this is especially true for Japan which experiences an unprecedented speed of aging in the world. There has been a large volume of debates on population aging and not a day passes without a report in the media about population aging in Japan. See Shimizutani (2006, 2007) for further discussion related to this subsection.

We notice that virtually all arguments put forward thus far on the need to reform the social security system apply the same reasoning. The first part of the reasoning asserts that under the rapid speed of aging, an increase in the number of elderly who are "supported" by the pay-as-you-go social security system leads to an inevitable increase in social security expenditures including pension payments and medical and nursing care expenses. The second part claims that Japan's fertility rate remains low and the number of young people who "support" the social security system is unlikely to increase substantially. There seems to be no definitive fertility-boosting measure and therefore little likelihood of a sharp recovery. The third part of the reasoning is that the combination of population aging and low fertility translates into a decreasing number of the supporting population and a rapidly increasing number of the supported population, which invites an imbalance between social security benefits with the result that the burdens will trigger collapse of the social security system.

As a consequence, this type of argument warns that the social security burden per active person will increase to an unsustainable level, thus undermining Japan's economic vitality and ultimately make the social security system unsustainable and calls for drastic reforms of pay-as-you-go social security programs that must be implemented immediately. Indeed in recent years, major and successive reforms have been implemented in the pension, medical care, and long-term care programs. However, the reality remains that Japan has been unable to find a fundamental solution despite all the lengthy discussions year after year. We still do not see that any tangible improvement has been made to the nation's social security system.

We should observe that the most important viewpoint seems to have been missing in all the arguments to date. This type of "traditional" argument, which can be also called a "macro and institutional approach," has serious caveats in that it works solely on funding in a fragmented fashion with little collaboration across bureaucratic boundaries. As a result, the approach discards two missing perspectives essential to the debates.

First, this approach ignores the individual level decision-making (e.g. reactions to different incentives) and focuses exclusively on the funding side. Thus, most of the debates have concentrated on to what extent overall social security expenditures and the resulting burden on the younger generation will increase as a result of further aging of the Japanese population. Such arguments typically present the estimates of the aggregate expenditure on social security based on the projected future benefits, resulting from a systematic calculation. While we do not deny that discussion of social security funding is important, any argument discarding individual decision-making will not be productive. In particular, the way individuals will respond to different incentives and policy changes is a critical question to improve economic efficiency. Changes in pension benefits would change the patterns of income and asset distribution by age group as well as the patterns of labor supply. Likewise, changes in self-burden of medical and nursing care costs would alter demand for these services. Moreover, it is very likely that the scarce evidence on policy impacts has left public policies unchecked and inefficient.

Second, the traditional approach does not deal with the well-being of the elderly. Well-being should be measured from multiple angles including economic, health, and family and social networks. In particular, the diversity of individual circumstances of the elderly in terms of those aspects must not be ignored. The living circumstances for those in their late 60s are totally different from those for people in their 80s. Some elderly people earn a high income, live in good health, and are blessed with family and friends. Others suffer from a low income and live in poor health without family. Policy effectiveness of the social security program is not separable from health conditions of individuals and their families, household economic status, family relationships, and social activities. No effective policy can be generated from discussions that treat the different subgroups of the elderly as one and the same. Fine-tuned policies in full consideration of diversity among individuals cannot be developed from discussions focused exclusively on funding.

What is worse in Japan is the (unnecessary) division of social security policy across areas. While pensions, medical care, and nursing care as well as elderly employment and family relationship are closely interrelated, they have been discussed separately and links between them have been extremely weak. Policy effectiveness should be measured from the viewpoint of beneficiaries, not from that of the government agencies that implement the policies. No effective policy can be formulated by viewing lives of the elderly only partially, as if they were separate entities, for instance, as a pensioner, as a recipient of medical services, and as a nursing care receiver. Government policies must be evaluated on whether they, in terms of collective effect, contribute to the improvement of the living standards of the elderly.

Despite enormous discussion taking the traditional approach, many topics essential to understanding the effect of aging have not been covered or sufficiently clarified to date. The following are just a few examples:

1. Do people have sufficient funds upon retirement to support them the rest of their lives? What role should public pensions play in supporting retirement? Answers to these two questions will clarify what constitutes an appropriate allocation of pension benefits.

2. What are the reasons behind the unusually late retirement age in Japan? This is a topic of great interest to European countries where the spread of early retirement is causing a rapid increase in the social security burden.

3. What impacts do the pension system, the system of mandatory retirement at a fixed age, and the health status of the elderly have on labor supply? This is important from the viewpoint of how Japan should prepare for the predicted labor shortage.

4. How should roles be allocated between in-home and facility-based nursing care? What types of people can rely on family care? Is the existing nursing care system truly improving the quality of life for those receiving its services? What is the role of the family? While Japan possesses the greatest longevity in the world, why is the proportion of Japanese who consider themselves happy smaller than in other countries?

5. When the price of medical and/or nursing care or the proportion of the price paid by individuals is raised, does it reduce unnecessary benefits or hinder the provision of necessary benefits? In what type of people can such effects be observed? What are effective measures to prevent the deterioration of health conditions, i.e., an increase in the level of care needed? Clarifying these points is essential for reforming the medical and nursing care systems.

Thus, we need to endeavor to formulate a new approach that emphasizes individual decision-making (microeconomic-based) and the overall welfare of the elderly. The basic criteria underpinning this approach is quite simple: whether or not a social security policy is useful should be assessed from the point of view of the beneficiaries. For that, we should look at how elderly people respond to different incentives in a variety of life aspects such as their health condition, employment status, financial status, family ties, and links with friends and communities. This is because the social security system is closely interrelated with and thus inseparable from all these factors.

This sort of idea is certainly quite natural and common internationally but has been missing in most arguments in Japan, partly due to the lack of data in Japan. Given the rapid pace of population aging, a fundamental change in thinking is imperative and urgently needed. However, it is no easy task to capture the overall picture of elderly people's living standards and reflect diverse circumstances of the elderly in public policies. The only way to take in the voices of individual elderly people and link the reality of their life to social security policies is to build and then analyze a large micro-level dataset that contains a wealth of information. This type of survey contributes to "evidence-based policymaking" too. Indeed, some public policies have failed to achieve their goals and instead ended up causing unexpected side effects. It is thus necessary to conduct a strict ex post facto evaluation of each policy, using actual data to examine whether the goals have been met, whether there have been any side effects or wasted resources, and to use the evaluation results for further institutional improvement. Eliminating waste related to social security policies is particularly meaningful because the cost of social security benefits represents a significant portion of Japan's national budget.

Indeed, a series of large-scale panel surveys of middle-aged and older people is being undertaken in many countries to ostensibly establish a "world standard," as represented by the Health and Retirement Study (HRS) in the United States, the English Longitudinal Study of Ageing (ELSA) in Britain, and the Survey of Health, Ageing and Retirement in Europe (SHARE) in continental Europe. The HRS is being conducted under the leadership of the University of Michigan and serves as a role model for the following survey. These moves are starting to proliferate among Asian countries such as South Korea and Thailand, as well as China and India.

All these surveys uncover the individual circumstances of aging. Population aging is often associated with pessimistic concerns about declining health and deteriorating productivity and uncertainty after retirement. At the same time, individual aging process is very diverse and the variation of individual circumstances increases with age. This pattern is becoming more diverse due to the longer life expectancy. As the SHARE book demonstrates, we need to keep in mind that any topic related with aging should be examined from multiple interdisciplinary angles emphasizing economic status, health status, and family and social networks. These linkages have been largely ignored in Japan, partly due to data availability and because most of the previous findings are fragmental.

Each of these surveys has hundreds of extremely diverse questions about health, economic status, employment, family relations, and participation in social activities since aging affects all domains of an individual's life and all important elements including retirement, health and health care, how time is spent, income and consumption, family relationships, and social networks are closely linked. This complexity calls for multidisciplinary expertise applied to the survey. The accumulation of such data will make it possible to identify, for instance, how elderly people would react to certain policy changes and what sort of incentives would be effective in eliminating wasteful expenditures. In the US, whenever formulating a new social security policy, the White House reportedly checks with the HRS for supporting scientific evidence.

Survey respondents represent a broad spectrum ranging from pre-retirement people aged around 50 to the elderly, many of whom are medical and nursing care users. Also common to all these surveys is that interviewers conducted face-to-face interviews with respondents, they used computers (CAPI: computer-aided personal interview), and the interviews consumed significant time. Database development in these countries is being carried out as part of an international joint project and surveys are, through close coordination among country leaders, deliberately designed to allow for international comparison.

JSTAR shares the philosophy and analytical motivation of SHARE and other family surveys. First, economic status in terms of income and wealth is strongly correlated with health and well-being of the elderly, though the direction of causality is not well understood. This association is also deeply examined in Chapter 2 of this book. Individuals with lower economic status are more likely to have worse health status and vice versa. Second, health status is also linked with family and social networks (Chapter 3). Individuals with better health status are more likely to enjoy closer family and social linkage and vice versa. Third, economic status is also connected with family and social networks through a variety of forms of mutual transfers. The critical issue is to disentangle the causal relationship among the three areas; in fact, unless it is well analyzed, we cannot extract useful implications for more effective policymaking. The linkages among (1) income security and personal wealth, (2) kinship and social networks, living arrangements, and (3) physical and mental health, disability, and mortality are also affected by public policy including social security, redistribution, and housing policies. In other words, we should examine the relationship between the private and public domain on aging and retirement issues.

A world standard survey would require the knowledge and dedication of researchers, enthusiastic cooperation with the survey by individuals in the sample as well as sufficient understanding of the survey by public institutions. Although tens of millions of yen are needed for each round of the survey, the amount represents less than 0.001% of the annual expenditure on medical and nursing care in Japan. In order to continue future waves of JSTAR, it is imperative to gain the understanding of a large number of local governments and develop multifaceted cooperation among foundations and other entities concerned with social security. When these attempts are successfully achieved, Japan will make headway toward beneficiary-oriented social security policies and its accumulated knowledge will be utilized all over the world.

1.4 How JSTAR was Created

This subsection describes the development process of the JSTAR project. As we emphasized, construction of micro-level data that provide the foundation for policy debate is indispensable to redesigning the social security system. The United States has established an effective research system that collects and utilizes a wide range of individual information on economic, employment, and health statuses of the middle-aged and elderly and their family and social networks, a system that is now becoming a "world standard." This type of research system now prevails in Europe and several Asian countries, too. First and foremost, Japan must make up for its delays and catch up with the rest of the world.

Indeed, as of 2005, Japan was the only industrialized country left not engaged in creating a "world standard" database. Not only has this delayed the evaluation of social security policies, it has created a situation in which Japan, despite being closely watched by the rest of the world, has been unable to offer its unique and valuable experience as the country at the forefront of population aging. In other words, Japan is standing at a crucial point in shifting to a beneficiary-oriented system and to develop social security programs firmly based on empirical findings.

It is very easy to insist on the importance of a world standard database on aging and retirement in Japan but it is very difficult to construct one. Japan's earlier attempts to conduct longitudinal surveys of middle-aged and older people were segmented and fell far short of the world standard. What we really need is longitudinal, multidisciplinary, and internationally comparable survey data. This is surely a challenge and calls for extraordinary enthusiasm and hard work of researchers, genuine cooperation of interviewees and interviewers, ample understanding among relevant government and other public agencies, vigorous input from leading researchers all over the world, and sufficient funding. That this type of project is demanding in many aspects is the main reason that a Japanese version of world standard research on the middle-aged and elderly people has not been available.

Although belated, moves toward conducting large-scale, world standard longitudinal surveys of middle-aged and older people have begun to emerge. Dr. Masaru Yoshitomi, former RIETI President and CRO, with serious concerns about the lack of firm empirical evidence and effective policy implications in any debates on social security program, started the "new economics of aging" project in 2004. Starting from April 2005, a group of keen researchers led by Yoshitomi have been actively working toward making Japan's first world standard longitudinal dataset on aging and retirement. This project was further stimulated at Axel Börsch-Supan's presentation on SHARE at a National Bureau of Economic Research (NBER) International Social Security meeting in Lake Como, Italy in May 2005. Ichimura and Shimizutani, who have been affiliated with RIETI, initiated the project in June of the same year. They contacted Robert Willis (former principal investigator of HRS) and Axel Börsch-Supan (coordinator of SHARE) both of whom were very willing to collaborate on starting a Japanese version of HRS/ELSA/SHARE. In July, together with the Japanese team members, we previewed datasets available in Japan and translated the common parts of the SHARE questionnaires into the Japanese language and examined a variety of research questions in order to identify additional questions to those in SHARE. In August, we visited both PIs at the Mannheim Institute for Aging and Survey Research Center (SRC) at University of Michigan with Haruko Noguchi (Japan team). The discussion with the HRS/SHARE teams was extremely useful for starting our project and formed the base of JSTAR.

HRS/ELSA/SHARE take an interdisciplinary and longitudinal approach and thus are the role models of JSTAR and our innovations rest on these preceding projects. Conversations and discussion with the HRS/ELSA/SHARE teams facilitated the starting of JSTAR and it is fair to say that JSTAR could not have succeeded in such a short time without the cooperation and assistance of the members of those project teams. In fact, we set up the JSTAR team in summer 2005 which included Hashimoto, and completed the first version of the questionnaire and performed pilot surveys in the Ota and Adachi wards in the center of Tokyo in November 2005. The time lag between our visit to the HRS/SHARE teams and implementation of these pilot studies was only four months. Consultations with the HRS/ELSA/SHARE teams also contributed to making JSTAR comparable with the international family of surveys. During the same period, we also discussed availability of other datasets and a new survey on aging with project leaders gathering panel data in Japan.

We learned a lot from the two pilot studies in Tokyo including how to cope with lower response rates. We continued preparations for a full-scale panel survey of middle-aged and older people comparable to the world standard. We have kept close contact with the leaders of HRS/ELSA/SHARE from whom we have received enthusiastic support. In a workshop held on August 4-5, 2006 at RIETI, we had extremely substantive and pragmatic discussions on topics such as questionnaire contents, survey methods, and response rates. This workshop was realized primarily with the support of the National Institute on Aging (NIA) and prominent attendees included HRS and SHARE leaders, indicating the degree of interest in Japan's population aging problem and social security policies based on empirical analysis. One of the most impressive statements in the conference was from the director of the NIA. He stated that HRS has been contributing to the formulation of overall social security policies in the US, and whenever considering a new policy, the White House checks with HRS as to whether there is scientific evidence that supports a certain policy.

Following the completion of two preliminary surveys and several meetings with the HRS/ELSA/SHARE teams, we further developed our questionnaire and survey instrument throughout 2006. In fall 2006, we negotiated with several municipalities to request cooperation with the survey and obtained strong support from five local governments who provided a linkage with data from official statements of medical and nursing care use. We required the survey agency to select interviewers with superior performance. In fall 2006, we also held a "Train-The-Trainers" program with help from the Survey Research Center at University of Michigan and two instructors gave two-day intensive training for supervisors in charge of each municipality.

The first full-scale survey was launched in Shirakawa town in January 2007. The individuals in the sample were aged between 50 and 75 and randomly chosen based on household registration held at each municipality. In the first wave, we excluded those who are institutionalized due to difficulty to contact, but we hope in the future to be able to interview a first-wave interview subject even if he/she is subsequently institutionalized. We started the survey in each municipality between January and the beginning of April 2007.

Before starting to perform the survey, the principal investigators (Ichimura, Hashimoto & Shimizutani) and Katsunori Kondo (Japan team) gave two-day instruction regarding the survey to interviewers in each municipality emphasizing the significance of the survey and answering any inquiries including details about the questionnaire and usage of personal computers (CAPI). The PIs also conducted follow-up interviews at least twice with most of the interviewees some weeks after the survey started in each municipality. The survey concluded in Kanazawa in July 2007. After completing all the interviews, we began to sort the dataset examining data quality (identifying outliers) and response rate to each question. We performed a host of cross-checks and plausibility checks of all data but more work on data cleaning process was necessary. Although a huge workload, it was incumbent on us to carefully examine the data since if a mistake or inappropriate element were not identified in the first wave, the negative effects would last in the following surveys.

The analyses in this book are based on a cleaned dataset but it must be said that some errors remain. We will continue working to solve those issues and add more work on imputations before the data is released and made open for researchers in the world. Micro-level data from JSTAR, processed so as to protect the individuals' identities, will be made available to researchers under restricted conditions, enabling the objective examination of policy effects. We will strive to release the data as early as possible to the interested research community, together with a web-based user support system.

Unquestionably, only when such a large-scale panel survey is undertaken in Japan will it become possible for the government to formulate effective social security policies firmly based on empirical analysis and for researchers to explore new scientific findings from the Japanese experience. By breaking down the walls of institutional or financial arguments, we must reconsider social security policy from the viewpoint of the elderly, and, at the same time, we will be able to generate new knowledge and ideas useful not only in Japan but also internationally. As Dr. Yoshitomi put it, it would be "disgraceful" if Japan continues to basically be the only developed country without a world-standard panel survey of the elderly amid the rapid aging of its population. We do hope that this project will gain understanding and support from as many people as possible.

1.5 Our Sample: 50+ in Japan

1.5.1 Introduction

The individuals in the baseline sample of JSTAR are aged between 50 and 75 and live in five municipalities in the eastern area of Japan. The cities are Takikawa city in Hokkaido, Sendai city in the Tohoku area, Adachi ward which is a special city in the center of the Tokyo metropolis, Kanazawa city in the Hokuriku area and Shirakawa town in a mountainous town in the Chubu area. More than 4,200 individuals in the sample kindly participated in the survey with eager cooperation and the response rate is close to 60%, which is much higher than the Japanese standard and is comparable with the "family" surveys in other countries.

In contrast to those surveys, we did not use the standard national representative random sampling but chose to conduct stratified random sampling within each municipality after selecting the five municipalities. We emphasize the three merits of our sampling design.

First, the sampling allows us to collect data on individuals in a homogenous health, economic, and social policy environment; they live in the same municipalities. The sample size for each municipality is sufficiently large for econometric analysis. Typically, national representative random sampling samples data from a few hundred regions with a few dozen individuals for each region. This approach may be effective in reproducing the "national representative" averages. However, this methodology may not be effective for econometric analysis and policy evaluation. The biggest problem is that we cannot control for unobserved innate difference across regions. It is natural to assume that individual decision-making is affected by different environments and is responsive to different incentive programs. In most cases, empirical analyses using national representative samples deal with unobserved heterogeneity employing an indicator variable to represent each region, but we need to explicitly consider the heterogeneity of those environments in order to obtain estimates with smaller inconsistency. A few dozen individuals for each region is not sufficient to conduct reliable econometric analysis and we need to combine individuals from many regions in an empirical analysis. In contrast, our sampling design enables us to analyze what interests us without being affected by different circumstances which affect individual behavior in health and economic and social networks since this method collects a large number of individuals in the same environment, i.e. in the same municipalities. While the current number of municipalities is too small, by collecting data from more municipalities with different characteristics, eventually we will be able to cover most types of municipalities in Japan. Even now, we will show that by reweighting, some of the observed national characteristics can be reproduced by our sample with some accuracy.

Second, because we received the endorsement from each of the municipalities the response rate was higher. Most recent surveys in Japan have suffered from lower response rates compared with the international standard. A response rate of 15-30% is not rare in Japan. We obtained a high degree of cooperation from government officials of five municipalities and those cities sent a letter to encourage each respondent to participate in JSTAR, which surely improved the credibility and trustworthiness of JSTAR, and therefore helped to raise the response rate. Moreover, each municipality publicized the survey in the regular newsletter to residents (most local governments publish newsletters to citizens every month or every two weeks). Furthermore, government officials were in charge of responding to questions and answers from individuals who received the letter and indeed many individuals in the sample made calls to city hall to confirm that the survey was authorized by the municipality. As a result, the response rate of JSTAR is 60%, which is comparable to the international standard. It would have been impossible to receive the endorsements from all the municipalities if we had conducted the standard random sampling.

Third, we put in a request to the municipalities and received permission to link our data with the official record on medical and long-term care use for those individuals from whom we received permission. Again, this would not have been possible with the standard sampling design. Precise information on medical and elderly care use is indispensable to the evaluation of health policies. Japan has a mandatory universal medical and long-term care insurance program. While medical insurance for company employees is covered by their employers, self-employed workers and retired persons are covered by a national mandatory plan called the National Health Insurance (NHI) program which provides hospitalization and medical services. The long-term care insurance (LTCI) program, which started in 2000, also covers all residents in Japan and provides non-medical elderly care for those who are aged 65 and over and approved to use care services through the public program. The insurers of the NHI program and the LTCI program are municipalities or their alliances and they retain official records on use of medical and elderly care services. JSTAR asked the respondents who are participating in these programs to give permission to connect the survey data with official records on monthly service use of those two programs for the previous 24 months. By doing so, we were able to obtain precise data on health services use. While those services for people aged 75+ are provided through an independent insurance program from April 2008, there was no respondent eligible for the scheme in the baseline data collected in the first half of 2007 but there will be after the second wave.

1.5.2 Overview of Five Municipalities in the Baseline Wave

Next, we will briefly describe the five municipalities. Figure 1-5-1 illustrates the location of the five municipalities, all of which are located in the eastern part of Japan. We plan to expand the number of municipalities to cover all regions in Japan in the future, to cover the country from northernmost Hokkaido to southernmost Okinawa. In general, the larger the number of municipalities from which data is collected the easier it will be to relate the data back to the overall population because we would obtain a larger number of individuals in more diverse circumstances.

Takikawa city is located in the central part of Hokkaido which is the most northern prefecture in Japan. The population exceeds 40,000 persons in 20,000 households and the area is 116 square kilometers. Most of the city consists of plains located between two large rivers. The climate is cold and the temperature on average is 7 degrees Celsius but the gap in temperature in summer and winter is very large. Usually, it snows from the end of November until the beginning of April. The most important in-

Figure 1-5-1 Location of the five municipalities

dustries in Takikawa city are transportation and commerce. Several railways intersect at Takikawa station and a national road passes through the city between Sapporo (the largest city in Hokkaido) and Asahikawa (the second largest). While Takikawa city does not have any large coal mining sites, there were many coal producing sites in its surrounding areas. In the past, the city flourished when coal production was profitable. After most of the coal mining sites were closed, Takikawa has been a declining city, and in this respect is typical of many middle or small sized cities in Hokkaido.

Sendai city is the largest urban city in the Tohoku region and its population exceeds one million with about 450,000 households. Sendai was a castle city governed by a powerful governor (*daimyo*) from the beginning of the Edo period (1603-1868) and it has been the center of the Tohoku area in terms of industry, education, and government administration since the Meiji period (1868-1912). While most municipalities in the Tohoku area suffer from declining population in recent years, Sendai's population has been increasing due to vital economic activities and convenience in transportation including easier access to Tokyo. Sendai's economic activity is often called the "branch economy," i.e., most Japanese large companies established their Tohoku branch in Sendai. The city's area is very large, 788.09 square kilometers, and expands from the mountain area in the west to the Pacific Ocean in the east. Sendai city consists of a variety of districts including both very urban and rural areas. The climate is relatively cold compared to Tokyo, but it does not snow as much as in Hokkaido or areas facing the Japan Sea. Sendai is a traditional city with a large number of historic and cultural sites, which are clearly found in the center of the city, though many traditional sites were destroyed by bombing during the Second World War. It is often discussed that the innate character of the people is very modest and durable.

Adachi city is located in the northeast part of metropolitan Tokyo, bordering Saitama prefecture. The population of the city is about 650,000 persons with about 300,000 households and the area is 53.20 square kilometers. While the area is the third largest among the 23 wards (special cities) of Tokyo, Adachi city is characterized as a downtown district and is the densest municipality among the five JSTAR municipalities. Most of the area consists of low elevation plains with many rivers. The main industry of the city before the Second World War was agriculture in most areas and commerce and transportation in the most southern area. After the war, many people who lived in other Tokyo wards moved to Adachi city. Now the most dominant industry is small-sized manufacturing and many new apartments have attracted younger generations. We note that Adachi's average income level is the lowest among the 23 special wards in Tokyo.

Kanazawa city is located in the Hokuriku region facing the Japan Sea and serves as the center of the region. Like Sendai, Kanazawa has a long tradition and was established as a castle town with a powerful governor in the Edo period. Kanazawa has many rivers and ports and is a center of regional transportation. Kanazawa's population is about 460,000 persons with180,000 households and the area is 467.8 square kilometers. Kanazawa is often called a "little Kyoto" and the center of the city especially is a very traditional and cultural area. There are many cultural and historic sites in the city (Kanazawa was not bombed during the Second World War) and there are famous regional dishes and arts (china, etc.). Downtown Kanazawa has beautiful and traditional streets with many temples, Japanese gardens (Kenroku-en park) and museums. Kanazawa is one of the most popular tourist towns in Japan and attracts foreign visitors. There are also many novelists born in Kanazawa and novels that describe the city. Kanazawa is a rainy city and it snows a lot in winter. In the surrounding area, there are many residential areas and agricultural activities.

Shirakawa town is located in Gifu prefecture, north of Nagoya city, and is a mountainous area in the Chubu region. Shirakawa town is full of nature including many beautiful streams and woods. The town is known for production of Japanese tea called "Shirakawa cha" and the lumber industry (and residential construction using lumber). The area is large at 237.9 square kilometers, and the variation in elevations from sea level is also large (from 150 meters to 1,223 meters) in the town and people can live in only 5% of the area. Shirakawa is typical of a mountainous rural town in Japan and the population has been declining to about 10,000 persons with 3,300 households and the share of elderly aged 65 and over in the total population exceeds 30%. The average temperature is 12 degrees Celsius and it is cold in winter but it does not snow much.

1.5.3 Main Historical Events for the Individuals in the JSTAR Sample

The age of the individuals in the JSTAR sample is between 50 and 75 as of the first half of 2007. The oldest person in the sample was born in 1932 and the youngest in 1957. When we need to construct a longitudinal data to distinguish between age effect and cohort effect, we should keep in mind that, when looking at the age gradient in any topics in this book, we need to pay attention to both the 25-year age gap between the oldest and youngest in the sample and the drastic difference in life experience in each generation.

Table 1-5-1 summarizes main historical events for those generations in their lives. The individuals in the oldest group in their 70s in 2007 (we call them the "70s group" here) were born in the first half or the middle of the 1930s. There was a world-wide economic depression and many international conflicts in the 1930s and the living standard became worse and worse until the end of the Second World War in 1945 when this population was elementary school students. Those in their 60s in 2007 (we call them the "60s group" here) were born before or after the end of the Second World War while those entering their 50s in 2007 (we call them the "50s group" here) included the first baby boomers (born in 1947-1950).

After the reconstruction period, the Japanese economy entered a high growth era from the mid-1950s when people in the 70s group began to work. Most of the individuals in the 60s group were still in school. The youngest people entering their 50s were born in 1957 and did not experience the hardest periods of Japan in the 20th century. In the 1960s, the growth rate of the Japanese economy further accelerated and the economic boom lasted until the mid-1970s. During this period, Japanese people enjoyed a higher living standard, which is represented by widespread acquisition of TV sets, air conditioners, and cars, as well as greater economic presence in the international community. The Tokyo Olympic games in 1964 were a symbol of Japan's expanded presence as a large economic power. Another symbolic event was EXPO '70 in Osaka. Around 1970, the 70s group was entering middle-age and most of the individuals in the 60s group began to work and those in the 50s group were still school students.

Table 1-5-1 Chronology of modern Japanese history

Birth years of JSTAR respondents

1920s	1923	Great Kanto Earthquake				
	1929	Great Depression began				
1930s	1931	Manchurian Incident				
	1933	Withdrawal from the League of Nations	1932			
	1937	Japan-China war began		1937		
	1939	Outbreak of World War II in Europe				
1940s	1941	Outbreak of the Pacific War				
	1945	Atomic bombs in Hiroshima and Nagasaki; end of World War II				
	1947	New Constitution of Japan came into effect			1947	
1950s	1950	Korean War began	18	13		
	1953	Television broadcasting began				
	1956	Member of the United Nations				
		High growth era; "no longer wartime economy"				1957
1960s	1960	Plan to double national income	28	23	13	
	1962	Cuban missile crisis				
	1964	Tokyo Summer Olympics; Shinkansen train operation began				
	1966	Izanagi Economic Boom				
	1969	First moon landing by Apollo				
1970s	1970	EXPO '70 in Osaka	38	33	23	13
	1972	Reversion of Okinawa to Japan				
	1973	First oil crisis; end of the high growth era				
	1979	Second oil crisis				
1980s	1985	Plaza Accord	48	43	33	23
	1986	Outbreak of the bubble economy				
	1987	Louvre Accord; privatization of Japan Railways				
	1989	End of the Showa Era; introduction of consumption tax				
1990s	1990	Persian Gulf War	58	53	43	33
	1991	Collapse of the bubble economy				
	1995	Kobe Earthquake; sarin gas attack on Tokyo subway				
	1998	Nagano Winter Olympic Games; bankruptcy of large companies				
2000s	2001	9.11 Terror attacks on the United States	68	63	53	43
	2002	Japan and Korea co-host World Cup soccer games				
	2004	Chuetsu Earthquake				
	2007	Started JSTAR First Wave	75	70	60	50

After the first oil shock in 1973, the Japanese economy entered a stable growth period at a new stage with many events of international turbulence including the second oil shock in 1979. It is fair to say that Japanese economic growth substantially slowed in the second half of the 1970s and a more pessimistic view of the future prevailed, which might have affected the life design of the 70s group. Around 1980, the individuals in the 70s group were in their mid-40s and those in the 60s group were also aged between the mid-30s and the beginning of their 40s. These people began to work in the high growth era and indeed experienced the downturn of long-run economic growth. In contrast, most of the individuals in the 50s group began to work after the first oil shock and were in their mid to late 20s in 1980.

In the second half of the 1980s, Japan enjoyed again high growth in the bubble economy and asset prices in stocks and land increased at historic levels. In the beginning of the 1990s, the bubble economy collapsed and Japan began to experience a decade-long recession. The economic downturn was more severe in the second half of the 1990s when many bankruptcies including prestigious banks and security companies took place. During that period, most of the individuals in the 70s group retired while those in the 60s and 50s groups experienced hard times with more corporate restructuring and higher unemployment.

After 2000, although the Japanese economy recovered, the recovery was not powerful. At the same time, there have been more serious public concerns about the future; with the rapid speed of aging combined with the decline in fertility and longer life expectancy, people are concerned with the growing uncertainty about the sustainability of the social security program. These trends are not really new but most people became very conscious of them after 2000. During the period, more people in the 70s group retired and became eligible for public pensions and this is also the case for some in the 60s group. People in the 50s group were still in their prime age.

1.5.4 JSTAR Sampling Design

We sampled 2,000 persons aged between 50 and 75 in Sendai, Adachi, and Kanazawa and 1,000 persons in the same age range for Takikawa and Shirakawa by the two-step stratified sampling. The first level strata are defined by randomly determined locations within each municipality: there were 100 locations each in Sendai, Adachi, and Kanazawa, and 50 locations each in Takikawa and Shirakawa. Within each location, 20 individuals were randomly chosen.

The locations were determined by the following procedure: the size of the population was divided by 100 or 50 (depending on the city) to obtain the interval size and then after randomly determining a starting location using the household registry data, the subsequent locations were picked by moving down the registration list by intervals starting from the last point. This method works because the household registry data are sorted by address.

The Japanese household registry is reliable and most government statistics also depend on it. The difference between JSTAR and SHARE is that in the former, the municipalities are not randomly selected but were randomly chosen in the latter. We will turn to this point at the end of this subsection.

Aided by the support from local governments, we attained a reasonable response rate of 60% which is comparable to the international standard. While we see a higher response rate in a rural area (i.e., Shirakawa) and among older age groups, JSTAR successfully attained reasonable response rates in all municipalities.

1.5.5 Response Rate of JSTAR

Table 1-5-2 represents the response rate by municipality and age. The table shows two types of response rate. One is defined as the number of the respondents for the interview divided by the sum of the number of the respondents and the number of refusals. The other is defined as the number of respondents for the interview divided by the number of the individuals in the list to be interviewed. The difference comes from those whom an interviewer could not contact for any reason (see the discussion about Table 1-5-3 below). In what follows, we proceed with the discussion using the former definition of the response rate.

Table 1-5-2 Response rate by gender, age, and municipality

(1) ALL Municipalities

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	87	40	32	64.05%	63.27%	57.40%	56.47%
74	268	158	85				
73	247	138	83				
72	249	149	75				
71	307	188	97				
70	335	184	109				
69	345	202	107	62.51%		55.58%	
68	259	154	80				
67	287	161	90				
66	297	157	108				
65	372	193	135				
64	372	195	138	58.48%	56.43%	51.26%	46.92%
63	351	183	129				
62	329	183	106				
61	265	129	98				
60	304	141	119				
59	395	188	148	55.50%		45.41%	
58	491	222	184				
57	408	188	144				
56	395	167	146				
55	357	164	123				
54	343	147	133	55.34%		44.35%	
53	296	133	113				
52	308	140	101				
51	287	131	98				
50	298	128	103				
Total	8252	4163	2884	59.09%		50.45%	

(2) Sendai

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	21	5	14	52.03%	56.03%	45.93%	48.82%
74	58	30	22				
73	43	20	19				
72	57	21	26				
71	62	33	24				
70	66	32	25				
69	79	47	23	59.43%		51.22%	
68	57	36	18				
67	67	32	20				
66	83	33	37				
65	83	41	31				
64	103	51	35	55.84%	51.79%	46.78%	40.62%
63	92	39	39				
62	78	41	25				
61	71	35	23				
60	75	30	33				
59	105	45	42	51.50%		39.82%	
58	134	53	54				
57	102	43	37				
56	116	40	42				
55	103	42	35				
54	93	30	40	48.89%		35.81%	
53	83	30	33				
52	81	32	30				
51	87	30	33				
50	100	37	37				
Total	2099	908	797	53.26%		43.26%	

(3) Kanazawa

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	32	14	10	63.35%	62.03%	55.80%	55.14%
74	58	34	21				
73	42	24	15				
72	50	27	18				
71	56	34	16				
70	81	45	23				
69	66	34	22	60.66%		54.46%	
68	46	25	16				
67	64	36	22				
66	51	33	16				
65	76	37	31				
64	88	44	42	61.07%	55.34%	55.99%	48.87%
63	83	47	27				
62	103	60	32				
61	58	34	18				
60	77	44	27				
59	115	47	55	52.51%		45.90%	
58	126	58	53				
57	97	44	42				
56	96	45	36				
55	91	47	32				
54	101	44	44	54.55%		45.73%	
53	73	32	28				
52	102	46	35				
51	64	32	25				
50	93	44	33				
Total	1989	1011	739	57.77%		50.83%	

(4) Takikawa

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	3	1	2	65.14%	62.08%	60.43%	57.26%
74	38	25	11				
73	39	17	18				
72	40	30	8				
71	57	36	19				
70	58	33	18				
69	58	30	24	59.23%		54.33%	
68	48	25	18				
67	45	24	17				
66	43	22	19				
65	60	37	17				
64	56	30	19	60.01%	59.18%	52.67%	49.91%
63	50	30	16				
62	49	27	16				
61	40	18	18				
60	48	23	16				
59	48	28	12	62.77%		51.53%	
58	56	28	15				
57	33	18	10				
56	56	27	20				
55	36	17	13				
54	21	8	9	49.44%		40.37%	
53	32	12	16				
52	27	10	12				
51	29	14	8				
50	0	0	0				
Total	1070	570	371	60.57%		53.27%	

(5) Shirakawa

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	19	15	1	90.61%	90.09%	84.41%	84.14%
74	54	43	5				
73	55	42	7				
72	46	40	6				
71	53	49	3				
70	36	33	1				
69	47	39	6	89.39%		83.77%	
68	37	31	4				
67	29	25	1				
66	37	31	4				
65	41	34	4				
64	32	27	4	85.50%	85.80%	76.71%	73.82%
63	34	28	5				
62	34	25	5				
61	26	20	2				
60	20	12	3				
59	32	24	5	85.00%		71.13%	
58	56	44	4				
57	64	43	7				
56	44	27	8				
55	43	32	6				
54	45	34	5	87.04%		75.00%	
53	33	26	3				
52	32	23	3				
51	45	34	5				
50	33	24	5				
Total	1027	805	112	87.79%		78.31%	

(6) Adachi

Age	# of samples (A)	# of respondents (B)	# of refusals (C)	Response Rate (I) = (B)/((B)+(C))	50-64 or 65-74	Response Rate (II) =(B)/(A)	50-64 or 65-74
75	12	5	5	53.87%	54.94%	47.15%	47.91%
74	60	26	26				
73	68	35	24				
72	56	31	17				
71	79	36	35				
70	94	41	42				
69	95	52	32	55.84%		48.53%	
68	71	37	24				
67	82	44	30				
66	83	38	32				
65	112	44	52				
64	93	43	38	47.29%	46.78%	41.09%	38.25%
63	92	39	42				
62	65	30	28				
61	70	22	37				
60	84	32	40				
59	95	44	34	44.92%		35.90%	
58	119	39	58				
57	112	40	48				
56	83	28	40				
55	84	26	37				
54	83	31	35	48.75%		38.27%	
53	75	33	33				
52	66	29	21				
51	62	21	27				
50	72	23	28				
Total	2067	869	865	50.12%		42.04%	

The overall response rate is 59.1%, close to 60%, which is unusually high compared to the recent Japanese standard and is internationally comparable with other “family” surveys. Even if we take the second definition, the response rate exceeds 50%. The high response rate of JSTAR should be emphasized especially when we consider that it is an extraordinarily burdensome survey (on average it takes an hour and a half to complete) and the internationally comparable response rate is evidence that JSTAR is comparable with other family surveys not only in terms of comparability of the questionnaire but also in terms of reliability of data quality.

The response rate differs across age and municipalities. First, looking at the difference by age range, in general, the response rate increases with age. The highest rate is 64.1% for respondents aged 70 and over and the lowest is 55.3% for respondents aged between 50 and 54. One of the reasons that the cooperation rate is higher for those who are older is that younger respondents are busier and do not find time to have an interview. We should take this point when analyzing the dataset.

Next, we see a variation across municipalities. We observe higher cooperation in Shirakawa and Takikawa and lower cooperation in urban areas. The highest is Shirakawa where the rate is as high as 87.8%. The response rate for those aged 70 and over has the highest rate of 90.7% and that for those aged 55-59 has the lowest rate of 85.0% in Shirakawa. The second highest is Takikawa. The average response rate in Takikawa is 60.6%. The highest is again observed for those aged 70 and over (65.1%). We should note that the rate for those who are aged 50-54 is 49.4%, which is much lower than that for other age groups. The middle rank of the five municipalities is Kanazawa. The overall response rate is 57.8%. The highest is observed for those aged 70 and over and the lowest is observed for those aged 55-59. The fourth ranked is Sendai with an overall response rate of 53.3%. What is interesting is that the highest rate is observed for those aged 65-69, not aged 70 and over in Sendai. Adachi has the lowest response rate of 50.1%. The highest is observed for those aged 65-69 and lowest for those aged 55-59.

Table 1-5-3 represents the detailed response rate by survey item and reasons for no response. The response rate discussed above is based on the number of respondents for interview, the main body of the survey. The upper panel shows the slightly larger number of respondents who agreed to filling in a self-completion questionnaire ("leave behind") against those who also cooperated for the interview. The number of respondents for the nutrition survey, while smaller, is close to 3,900. The number of respondents who gave us the agreement to link the survey data with official records of National Health Insurance (NHI) and public long-term care insurance (LTCI) program is approximately 2,500. We asked only those who have those two types of insurances, consisting mostly of those aged 65 and over, to give us permission to link the public records with JSTAR. For example, a respondent who has a full time job at a firm and takes part in the health insurance program for employees was not asked for agreement on the NHI or LTCI programs.

The number of respondents who agreed to the second wave is about 3,800; i.e. about 90% of the respondents in the first wave agreed to have an interview again in two years’ time. This is remarkably high for a Japanese panel study. We can expect the JSTAR sample to be stable.

Table 1-5-3 Response rate and reasons of no response

(1) Summary

Municipalities	Interview	Leave behind	Nutrition survey	Official medical/LTC records	Agree with the next wave	Response rate (interview)
Sendai city	908	927	905	424	768	53.3%
Kanazawa city	1,011	991	849	650	911	57.8%
Takikawa city	570	562	491	389	518	60.6%
Shirakawa town	805	809	768	517	776	87.8%
Adachi city	869	896	858	489	782	50.1%
Total	4,163	4,185	3,871	2,469	3,755	59.1%

(2) Number of samples, respondents and no response

Municipalites	# of samples	# of respondents	# of no response
Sendai city	2,099	908	1,191
Kanazawa city	1,989	1,011	978
Takikawa city	1,070	570	500
Shirakawa town	1,027	805	222
Adachi city	2,067	869	1,198
Total	8,252	4,163	4,089

(3) Reasons of no response

Municipalities	Moving out	Long-term absence	Absence	Refusals	Address unindentified	Not eligible	Others/ unidentified
Sendai city	40	41	232	797	15	16	50
Kanazawa city	31	49	115	739	26	4	14
Takikawa city	38	19	57	371	3	2	10
Shirakawa town	9	8	58	112	2	3	30
Adachi city	48	29	169	865	20	8	59
Total	166	146	631	2884	66	33	163

The lower panel reports the reason for no response. While the dominant reason is refusal, some individuals in the sample moved away, had a long-term or short term absence, were not eligible, or interviewers were not able to identify the address which is drawn from the household registration at each municipality.

We believe that there are three factors to explain the high response rates. First, the respondents had a profound understanding of the importance and significance of the survey and they held a high sense of responsibility toward its social value. Second, the interviewers were very enthusiastic about the survey, sharing a common motivation with the researchers on the JSTAR team. They were particularly motivated after the interviewer leaders in each district participated in the HRS team's "train the trainer" program. Third, each municipality encouraged the respondents to cooperate with JSTAR interviews.

1.5.6 Data Quality of JSTAR

There are two perspectives in evaluating the quality of the JSTAR data: first, whether the JSTAR data represents the population aged 50-75 in each municipality well, and second, whether the JSTAR data represents the Japanese population aged 50-75 well. We examine the JSTAR data from the first perspective in this section and discuss how we plan to examine the JSTAR data from the second perspective.

To our knowledge, the census data is the only one available whose sample size is sufficient for comparison with JSTAR in each municipality. Since other official data collects a small number of individuals from each municipality, which makes it difficult to reproduce the population of each municipality, we use it to examine whether JSTAR data can represent the population as a national representative. The Census is performed every five years; the one in 2005 is the closest in terms of timing.

Since the number of variables in the Census available at the municipality-level is limited, we will compare the results from JSTAR and the Census below, focusing on some selected variables: sex/age decomposition, marital status by sex/age groups, employment status by sex/age groups, and educational attainment by sex/age groups (Table 1-5-4). We performed a series of Chi-squared tests to examine the equality of the shares in JSTAR and the census at 5% significance assuming the sampling variation contribution of the census data can be ignored.

(1) Age composition by sex

In all municipalities except for Shirakawa, the fraction of individuals in the older age group tends to decrease after 55-59 in census data whereas in JSTAR data the fraction increases. Therefore the age composition is different in JSTAR data from the Census.

The JSTAR sample contains a smaller fraction of individuals in their 50s both for males and females. This is a direct reflection of the lower response rate for the younger cohort. The situation is worse for women in their 50s. Interviewers reported that often interview rejection occurs when husbands intervene even when wives were willing to participate. Effectively, then, for this group we need to get a positive response from both husbands and wives. In contrast, the share of 60-64 for females is not different from that in the Census except for Sendai.

(2) Marital status

The Census contains information on marital status, which is classified into four categories: never married, married, widowed, and divorced. We observe that the distribution of the marital status given age is remarkably consistent with the census data (Table 1-6-2). The Chi-square p-values show that the equalities of the married are not rejected with the 5% significance level except for a few cases for each of the categories. This result indicates that interview response is not strongly related to the marital status. The shares of non-married, i.e. never married, widowed, and divorced are very small.

(3) Employment status

The Census contains information on employment status classified into eight categories: mostly work, housework and work, attending school and work, absent from work, unemployed, housework, attending school, and other. We classified all work categories into "Worked," absent from work as "Absent from work," unemployed as "Unemployed," and the rest into "Not in labor force."

For both males and females, except for Adachi, the shares of "worked" in JSTAR and the Census are comparable although the similarity is not as good as that we saw for the marital status. For Adachi, the JSTAR sample contains a higher fraction of workers than in the Census. In other municipalities as well, in general, JSTAR participants are more labor market active than the Census population.

(4) Educational attainment

Lastly, we validate educational attainment data in JSTAR using the Census data for each sex/age category. Unfortunately the Census contains educational attainment data for Sendai, Kanazawa, and Adachi only. Thus the comparison is restricted to these three cities.

The educational attainment distribution in JSTAR data is different from that in the Census for both males and females across all age groups. The educational attainment is much higher in the JSTAR data than in the Census data.

In this section, we validate the JSTAR data by comparing some key variables with the population of each municipality using the Census data. We found that JSTAR succeeded in representing the population of each municipality in terms of both marital status and many of the work statuses for males at a given age. But we find that JSTAR does not represent the population of each municipality for the education attainment nor does it represent the work status of females well.

The natural next step is to find out whether the individuals from the five municipalities are able to represent the population in Japan by some reweighting scheme. As emphasized, the sampling design of JSTAR is not designed primarily to be nationally representative but to be suitable for policy evaluation on a municipality basis. Even so, it is worthwhile to see whether the individuals in the five-municipality sample can be used to represent the population of Japan. Indeed, we plan to validate several key variables using five government statistics as follows. The variables include income, wealth and health which are not available in the Census data.

1. *National Survey on Income and Expenditure (Zenkoku shouhi jittai chosa) in 2004*
2. *Basic Survey on Employment Structure (Shugyo kozo kihon chosa) in 2002*
3. *Survey on Employment of the Elderly (Kounenreisha shugyo jittai chosa) in 2004*
4. *Basic Survey on Social Lives (Shakai seikatsu kihon chosa) in 2001*
5. *Basic Survey on People's Lives (Kokumin seikatsu kiso chosa) in 2004*

Although these surveys are not censuses, the sample is randomly chosen from all regions in Japan and the sample size of those surveys is large enough to rely on the validation. We chose the latest version of each survey, most of which are performed every three to five years. While the methodology and the questionnaire questions related to the four key variables that we examine—employment, income, education, and

Table 1-5-4 Comparision of key variables between JSTAR and the census

(1) Sex and age; (2) Marital status

		Sex					Never married				
		JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS
Sendai											
Male	All	100.00%				100.00%					
	50-54	11.62%	1.53	0.0000	reject	24.09%	2.36%	0.72	0.2283	accept	2.96%
	55-59	22.78%	2.00	0.0813	accept	25.69%	1.80%	0.63	0.3798	accept	2.00%
	60-64	24.83%	2.06	0.0067	reject	20.10%	0.55%	0.35	0.2081	accept	0.92%
	65-69	20.96%	1.94	0.0050	reject	16.40%	0.36%	0.28	0.3439	accept	0.49%
	70-74	19.82%	1.90	0.0001	reject	13.72%	0.00%	0.00	0.1519	accept	0.24%
Female	All	100.00%				100.00%					
	50-54	12.08%	1.60	0.0000	reject	23.34%	1.87%	0.67	0.3734	accept	1.66%
	55-59	19.57%	1.95	0.0069	reject	24.79%	1.84%	0.66	0.2983	accept	1.52%
	60-64	22.95%	2.07	0.0384	reject	19.50%	0.82%	0.44	0.3869	accept	0.96%
	65-69	25.36%	2.14	0.0000	reject	16.91%	0.81%	0.44	0.4543	accept	0.76%
	70-74	20.05%	1.97	0.0048	reject	15.45%	0.37%	0.30	0.2029	accept	0.72%
Kanazawa											
Male	All	100.00%				100.00%					
	50-54	10.32%	1.46	0.0000	reject	21.66%	2.41%	0.73	0.4740	accept	2.36%
	55-59	22.02%	1.98	0.0040	reject	27.69%	0.58%	0.36	0.0098	reject	2.23%
	60-64	30.28%	2.20	0.0000	reject	20.87%	1.27%	0.54	0.1738	accept	0.85%
	65-69	20.18%	1.92	0.0049	reject	15.69%	0.36%	0.29	0.3681	accept	0.47%
	70-74	17.20%	1.81	0.0306	reject	14.08%	0.00%	0.00	0.1287	accept	0.29%
Female	All	100.00%				100.00%					
	50-54	15.00%	1.60	0.0017	reject	20.28%	1.35%	0.52	0.2713	accept	1.07%
	55-59	23.00%	1.88	0.0423	reject	26.40%	0.69%	0.37	0.1541	accept	1.18%
	60-64	22.40%	1.86	0.1382	accept	20.44%	0.36%	0.27	0.0974	accept	0.92%
	65-69	22.00%	1.85	0.0007	reject	16.67%	0.30%	0.25	0.1696	accept	0.65%
	70-74	17.60%	1.70	0.2010	accept	16.22%	0.00%	0.00	0.0308	reject	0.69%
Takikawa											
Male	All	100.00%				100.00%					
	50-54	3.86%	1.14	0.0000	reject	20.65%	3.75%	1.13	0.0600	accept	2.36%
	55-59	14.39%	2.08	0.0000	reject	24.36%	1.19%	0.64	0.3656	accept	1.43%
	60-64	24.91%	2.56	0.0087	reject	19.35%	0.00%	0.00	0.0870	accept	0.64%
	65-69	26.67%	2.62	0.0003	reject	18.70%	0.49%	0.41	0.3713	accept	0.37%
	70-74	30.18%	2.72	0.0000	reject	16.94%	0.00%	0.00	0.2288	accept	0.19%
Female	All	100.00%				100.00%					
	50-54	5.39%	1.46	0.0000	reject	21.15%	1.63%	0.81	0.4498	accept	1.53%
	55-59	14.94%	2.30	0.0010	reject	23.32%	1.94%	0.89	0.0799	accept	1.03%
	60-64	22.82%	2.70	0.0809	accept	19.27%	0.35%	0.38	0.3570	accept	0.52%
	65-69	26.97%	2.86	0.0024	reject	19.74%	1.21%	0.71	0.0036	reject	0.29%
	70-74	29.88%	2.95	0.0000	reject	16.52%	0.23%	0.31	0.4112	accept	0.31%
Shirakawa											
Male	All	100.00%				100.00%					
	50-54	12.34%	1.68	0.0000	reject	21.84%	1.39%	0.60	0.1246	accept	2.27%
	55-59	27.30%	2.28	0.0192	reject	22.85%	0.88%	0.48	0.1653	accept	1.48%
	60-64	19.42%	2.03	0.0034	reject	14.54%	0.39%	0.32	0.1893	accept	0.79%
	65-69	18.11%	1.97	0.2142	accept	19.73%	0.29%	0.27	0.1714	accept	0.69%
	70-74	22.83%	2.15	0.1960	accept	21.05%	0.00%	0.00	0.1574	accept	0.26%
Female	All	100.00%				100.00%					
	50-54	9.91%	1.66	0.0002	reject	17.38%	0.00%	0.00	0.2107	accept	0.20%
	55-59	17.65%	2.12	0.3330	accept	18.58%	0.00%	0.00	0.1275	accept	0.40%
	60-64	15.79%	2.03	0.1278	accept	18.23%	0.36%	0.33	0.3204	accept	0.55%
	65-69	22.91%	2.34	0.1846	accept	20.88%	0.00%	0.00	0.1014	accept	0.50%
	70-74	33.75%	2.63	0.0001	reject	24.93%	0.46%	0.38	0.2274	accept	0.25%
Adachi											
Male	All	100.00%				100.00%					
	50-54	8.91%	1.44	0.0000	reject	19.17%	2.74%	0.82	0.0770	accept	4.18%
	55-59	19.34%	1.99	0.0207	reject	23.71%	3.12%	0.88	0.2070	accept	3.92%
	60-64	20.61%	2.04	0.2742	accept	21.86%	1.62%	0.64	0.1757	accept	2.33%
	65-69	25.45%	2.20	0.0010	reject	19.31%	0.58%	0.38	0.1255	accept	1.21%
	70-74	25.70%	2.20	0.0000	reject	15.95%	0.47%	0.35	0.3758	accept	0.60%
Female	All	100.00%				100.00%					
	50-54	9.54%	1.45	0.0000	reject	17.40%	0.45%	0.33	0.0307	reject	1.61%
	55-59	19.80%	1.97	0.1018	accept	22.43%	1.94%	0.68	0.2846	accept	1.59%
	60-64	20.54%	2.00	0.1770	accept	22.45%	0.53%	0.36	0.1243	accept	1.14%
	65-69	26.41%	2.18	0.0023	reject	20.73%	0.77%	0.43	0.4121	accept	0.87%
	70-74	23.72%	2.10	0.0001	reject	16.99%	0.35%	0.29	0.1657	accept	0.77%

		Married					Widowed					Divorced				
		JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS
Sendai																
Male	All															
	50-54	19.84%	1.90	0.3100	accept	18.91%	0.47%	0.33	0.1747	accept	0.25%	1.42%	0.56	0.2855	accept	1.13%
	55-59	21.58%	1.96	0.4128	accept	21.15%	0.51%	0.34	0.3753	accept	0.42%	1.80%	0.63	0.1963	accept	1.33%
	60-64	18.07%	1.84	0.2926	accept	17.09%	0.55%	0.35	0.4488	accept	0.60%	0.92%	0.46	0.4093	accept	1.03%
	65-69	14.98%	1.70	0.3037	accept	14.12%	0.89%	0.45	0.3406	accept	0.73%	0.18%	0.20	0.0924	accept	0.71%
	70-74	12.93%	1.60	0.2432	accept	11.86%	0.32%	0.27	0.0824	accept	0.96%	0.47%	0.33	0.3691	accept	0.38%
Female	All															
	50-54	18.67%	1.92	0.4704	accept	18.53%	0.47%	0.34	0.2223	accept	0.80%	2.33%	0.74	0.2954	accept	1.97%
	55-59	18.36%	1.90	0.3359	accept	19.18%	2.14%	0.71	0.1535	accept	1.53%	2.14%	0.71	0.4922	accept	2.13%
	60-64	15.19%	1.76	0.3582	accept	14.56%	2.26%	0.73	0.4634	accept	2.19%	1.23%	0.54	0.3281	accept	1.50%
	65-69	12.89%	1.65	0.2274	accept	11.71%	2.26%	0.73	0.1473	accept	3.16%	0.97%	0.48	0.4533	accept	1.02%
	70-74	10.80%	1.53	0.1534	accept	9.33%	3.91%	0.95	0.2901	accept	4.47%	0.37%	0.30	0.2215	accept	0.68%
Kanazawa																
Male	All															
	50-54	17.33%	1.81	0.4857	accept	17.26%	0.96%	0.47	0.0001	reject	0.19%	0.96%	0.47	0.3853	accept	1.11%
	55-59	25.96%	2.10	0.0515	accept	22.69%	0.00%	0.00	0.0864	accept	0.42%	1.15%	0.51	0.2661	accept	1.52%
	60-64	17.55%	1.82	0.4256	accept	17.90%	0.32%	0.27	0.2541	accept	0.55%	1.74%	0.63	0.0883	accept	1.07%
	65-69	14.80%	1.70	0.2047	accept	13.45%	0.18%	0.20	0.0974	accept	0.69%	0.36%	0.29	0.2022	accept	0.69%
	70-74	12.58%	1.59	0.3910	accept	12.15%	0.94%	0.46	0.4960	accept	0.94%	0.38%	0.29	0.4791	accept	0.39%
Female	All															
	50-54	16.77%	1.67	0.4054	accept	16.37%	0.00%	0.00	0.0275	reject	0.73%	2.16%	0.65	0.3066	accept	1.86%
	55-59	22.04%	1.85	0.2255	accept	20.67%	2.53%	0.70	0.1025	accept	1.78%	1.15%	0.48	0.0296	reject	2.45%
	60-64	17.15%	1.69	0.1267	accept	15.31%	2.19%	0.65	0.3672	accept	2.42%	0.73%	0.38	0.0690	accept	1.55%
	65-69	12.27%	1.47	0.2331	accept	11.24%	3.03%	0.77	0.3056	accept	3.44%	1.06%	0.46	0.4553	accept	1.11%
	70-74	10.69%	1.38	0.1473	accept	9.33%	5.16%	0.99	0.4945	accept	5.17%	0.37%	0.27	0.1327	accept	0.82%
Takikawa																
Male	All															
	50-54	13.14%	2.00	0.0544	accept	16.68%	0.00%	0.00	0.2365	accept	0.18%	1.88%	0.80	0.2084	accept	1.33%
	55-59	21.98%	2.45	0.2525	accept	20.39%	0.00%	0.00	0.1012	accept	0.57%	1.19%	0.64	0.2299	accept	1.76%
	60-64	16.62%	2.21	0.4943	accept	16.59%	0.82%	0.53	0.4854	accept	0.84%	1.91%	0.81	0.1411	accept	1.21%
	65-69	17.23%	2.24	0.4047	accept	16.69%	0.49%	0.41	0.2378	accept	0.89%	0.49%	0.41	0.3566	accept	0.67%
	70-74	15.95%	2.17	0.3048	accept	14.88%	0.20%	0.26	0.0574	accept	1.22%	0.79%	0.52	0.3095	accept	0.57%
Female	All															
	50-54	11.39%	2.05	0.0195	reject	16.30%	1.63%	0.81	0.0908	accept	0.84%	6.51%	1.59	0.0000	reject	2.40%
	55-59	16.84%	2.41	0.3807	accept	17.59%	1.94%	0.89	0.3434	accept	1.62%	2.59%	1.02	0.3551	accept	3.00%
	60-64	15.41%	2.33	0.3936	accept	14.80%	2.10%	0.92	0.3928	accept	2.37%	1.40%	0.76	0.4262	accept	1.55%
	65-69	13.06%	2.17	0.3715	accept	13.79%	3.95%	1.25	0.3772	accept	4.36%	1.52%	0.79	0.3156	accept	1.18%
	70-74	11.02%	2.02	0.3712	accept	10.37%	3.90%	1.25	0.1909	accept	5.15%	1.15%	0.69	0.1483	accept	0.62%
Shirakawa																
Male	All															
	50-54	20.45%	2.07	0.0950	accept	17.87%	0.00%	0.00	0.1354	accept	0.32%	0.00%	0.00	0.0106	reject	1.37%
	55-59	19.77%	2.04	0.4071	accept	20.25%	0.66%	0.41	0.1178	accept	0.32%	1.54%	0.63	0.0507	accept	0.79%
	60-64	12.77%	1.71	0.4808	accept	12.69%	0.59%	0.39	0.3736	accept	0.48%	0.79%	0.45	0.2999	accept	0.58%
	65-69	18.30%	1.98	0.4150	accept	17.87%	0.86%	0.47	0.3947	accept	0.74%	0.29%	0.27	0.3400	accept	0.42%
	70-74	18.14%	1.97	0.2922	accept	19.25%	2.42%	0.79	0.0514	accept	1.43%	0.24%	0.25	0.2068	accept	0.11%
Female	All															
	50-54	15.21%	2.00	0.3432	accept	16.03%	1.63%	0.70	0.0082	reject	0.60%	0.54%	0.41	0.4939	accept	0.55%
	55-59	15.32%	2.00	0.2633	accept	16.63%	1.30%	0.63	0.2908	accept	1.00%	1.96%	0.77	0.0003	reject	0.55%
	60-64	13.58%	1.91	0.2184	accept	15.13%	3.22%	0.98	0.0802	accept	2.10%	0.71%	0.47	0.2379	accept	0.45%
	65-69	16.36%	2.06	0.3658	accept	17.08%	3.67%	1.05	0.2958	accept	3.15%	0.56%	0.42	0.0271	reject	0.15%
	70-74	18.98%	2.18	0.2786	accept	17.73%	5.03%	1.22	0.1289	accept	6.59%	0.46%	0.38	0.3715	accept	0.35%
Adachi																
Male	All															
	50-54	14.79%	1.79	0.0823	accept	12.47%	1.10%	0.53	0.0000	reject	0.20%	0.55%	0.37	0.1286	accept	1.16%
	55-59	19.97%	2.02	0.0218	reject	16.22%	0.00%	0.00	0.0943	accept	0.44%	0.62%	0.40	0.0605	accept	1.61%
	60-64	18.35%	1.95	0.1083	accept	16.06%	0.27%	0.26	0.1258	accept	0.78%	1.62%	0.64	0.4185	accept	1.49%
	65-69	16.22%	1.86	0.2477	accept	14.99%	1.16%	0.54	0.4117	accept	1.04%	1.35%	0.58	0.3296	accept	1.12%
	70-74	14.05%	1.75	0.1901	accept	12.58%	1.26%	0.56	0.4158	accept	1.39%	0.16%	0.20	0.1114	accept	0.65%
Female	All															
	50-54	14.28%	1.73	0.2044	accept	12.91%	1.34%	0.57	0.0533	accept	0.68%	1.34%	0.57	0.2197	accept	1.85%
	55-59	17.44%	1.88	0.3285	accept	16.63%	0.83%	0.45	0.1383	accept	1.48%	2.21%	0.73	0.4390	accept	2.33%
	60-64	16.84%	1.85	0.3476	accept	16.12%	3.74%	0.94	0.1239	accept	2.80%	1.07%	0.51	0.0968	accept	1.96%
	65-69	14.40%	1.74	0.3727	accept	13.84%	4.80%	1.06	0.2857	accept	4.24%	0.77%	0.43	0.1505	accept	1.36%
	70-74	12.61%	1.64	0.0134	reject	9.42%	2.98%	0.84	0.0137	reject	5.45%	1.05%	0.50	0.3722	accept	0.90%

(3) Employment status

		Worked					Absent from work					Unemployed					Not in labor force				
		JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS
Sendai																					
Male	50-54	22.20%	1.98	0.2375	accept	20.82%	0.00%	0.00	0.1685	accept	0.21%	0.94%	0.46	0.2972	accept	1.22%	0.00%	0.00	0.0457	reject	0.64%
	55-59	23.89%	2.04	0.1185	accept	21.57%	0.26%	0.24	0.4231	accept	0.31%	0.51%	0.34	0.0402	reject	1.54%	1.03%	0.48	0.4293	accept	1.12%
	60-64	16.23%	1.76	0.0071	reject	12.37%	0.18%	0.20	0.3546	accept	0.28%	0.74%	0.41	0.0682	accept	1.64%	2.95%	0.81	0.0199	reject	5.11%
	65-69	8.02%	1.30	0.0695	accept	6.31%	0.00%	0.00	0.1399	accept	0.27%	0.53%	0.35	0.3514	accept	0.69%	7.84%	1.28	0.2967	accept	8.56%
	70-74	4.26%	0.96	0.0804	accept	3.10%	0.00%	0.00	0.1872	accept	0.18%	0.32%	0.27	0.3312	accept	0.22%	9.14%	1.38	0.3342	accept	9.75%
Female	50-54	16.34%	1.82	0.0831	accept	13.98%	0.00%	0.00	0.2111	accept	0.16%	1.40%	0.58	0.0142	reject	0.58%	5.60%	1.13	0.0279	reject	8.18%
	55-59	14.08%	1.71	0.1567	accept	12.44%	0.31%	0.27	0.2300	accept	0.16%	1.22%	0.54	0.0417	reject	0.58%	9.18%	1.42	0.1018	accept	11.15%
	60-64	7.60%	1.30	0.0973	accept	6.07%	0.00%	0.00	0.2605	accept	0.10%	0.41%	0.31	0.2784	accept	0.26%	11.50%	1.57	0.2163	accept	12.78%
	65-69	5.32%	1.10	0.0023	reject	2.95%	0.00%	0.00	0.3121	accept	0.06%	0.32%	0.28	0.0883	accept	0.11%	11.28%	1.55	0.0915	accept	13.51%
	70-74	1.49%	0.60	0.4815	accept	1.46%	0.00%	0.00	0.3266	accept	0.05%	0.19%	0.21	0.0742	accept	0.04%	13.77%	1.69	0.4706	accept	13.65%
Kanazawa																					
Male	50-54	20.70%	1.94	0.2317	accept	19.31%	0.48%	0.33	0.0904	accept	0.20%	0.48%	0.33	0.2814	accept	0.71%	0.00%	0.00	0.0364	reject	0.73%
	55-59	25.39%	2.08	0.2433	accept	23.96%	0.58%	0.36	0.1998	accept	0.34%	0.29%	0.26	0.0449	reject	1.16%	1.44%	0.57	0.4707	accept	1.40%
	60-64	18.19%	1.85	0.0136	reject	14.46%	0.32%	0.27	0.4982	accept	0.32%	0.63%	0.38	0.1572	accept	1.15%	1.74%	0.63	0.0039	reject	4.33%
	65-69	10.16%	1.45	0.0149	reject	7.43%	0.00%	0.00	0.1171	accept	0.32%	0.36%	0.29	0.2645	accept	0.59%	5.17%	1.06	0.0878	accept	6.80%
	70-74	5.26%	1.07	0.1358	accept	4.20%	0.19%	0.21	0.3732	accept	0.27%	0.56%	0.36	0.0830	accept	0.24%	8.07%	1.30	0.2797	accept	8.87%
Female	50-54	14.87%	1.59	0.3057	accept	14.08%	0.27%	0.23	0.1777	accept	0.12%	1.35%	0.52	0.0002	reject	0.37%	9.19%	1.29	0.0001	reject	5.47%
	55-59	18.13%	1.72	0.1397	accept	16.35%	0.23%	0.21	0.3501	accept	0.16%	0.92%	0.43	0.0784	accept	0.48%	3.21%	0.79	0.0000	reject	9.17%
	60-64	11.86%	1.45	0.0024	reject	8.36%	0.18%	0.19	0.3447	accept	0.12%	0.36%	0.27	0.3814	accept	0.29%	5.66%	1.03	0.0000	reject	11.49%
	65-69	5.15%	0.99	0.1370	accept	4.17%	0.00%	0.00	0.2595	accept	0.08%	0.00%	0.00	0.2561	accept	0.09%	6.67%	1.12	0.0001	reject	12.15%
	70-74	3.87%	0.86	0.0097	reject	2.30%	0.00%	0.00	0.2761	accept	0.07%	0.00%	0.00	0.3620	accept	0.02%	14.01%	1.55	0.4067	accept	13.64%
Takikawa																					
Male	50-54	18.77%	2.31	0.3993	accept	18.19%	0.00%	0.00	0.2215	accept	0.21%	0.00%	0.00	0.0370	reject	1.11%	1.88%	0.80	0.0876	accept	1.06%
	55-59	23.17%	2.50	0.2050	accept	21.18%	0.59%	0.46	0.0616	accept	0.19%	0.59%	0.46	0.1494	accept	1.29%	0.00%	0.00	0.0161	reject	1.58%
	60-64	14.99%	2.11	0.0783	accept	12.24%	0.55%	0.44	0.0734	accept	0.18%	2.18%	0.87	0.0341	reject	1.07%	1.64%	0.75	0.0013	reject	5.80%
	65-69	8.61%	1.66	0.2002	accept	7.32%	0.00%	0.00	0.2938	accept	0.10%	0.98%	0.58	0.1943	accept	0.59%	8.86%	1.68	0.1632	accept	10.65%
	70-74	4.73%	1.26	0.2065	accept	3.80%	0.00%	0.00	0.2826	accept	0.12%	0.98%	0.58	0.0028	reject	0.22%	11.23%	1.87	0.2219	accept	12.74%
Female	50-54	16.27%	2.38	0.0958	accept	13.40%	0.00%	0.00	0.3027	accept	0.11%	1.63%	0.81	0.0064	reject	0.50%	3.25%	1.14	0.0101	reject	7.09%
	55-59	18.14%	2.48	0.0076	reject	12.89%	0.00%	0.00	0.3328	accept	0.08%	0.00%	0.00	0.1851	accept	0.33%	5.18%	1.43	0.0066	reject	9.96%
	60-64	10.86%	2.00	0.0077	reject	6.91%	0.00%	0.00	0.3575	accept	0.06%	0.00%	0.00	0.2939	accept	0.12%	8.41%	1.79	0.0369	reject	12.17%
	65-69	5.16%	1.43	0.0883	accept	3.55%	0.30%	0.35	0.0000	reject	0.01%	1.21%	0.71	0.0000	reject	0.03%	13.06%	2.17	0.0995	accept	16.10%
	70-74	3.44%	1.17	0.0116	reject	1.60%	0.23%	0.31	0.0152	reject	0.02%	0.00%	0.00			0.00%	12.85%	2.16	0.1888	accept	14.87%
Shirakawa																					
Male	50-54	21.84%	2.12	0.2284	accept	20.31%	0.00%	0.00	0.1171	accept	0.37%	0.00%	0.00	0.0773	accept	0.53%	0.00%	0.00	0.0594	accept	0.63%
	55-59	22.41%	2.14	0.2494	accept	20.99%	0.22%	0.24	0.2027	accept	0.53%	0.00%	0.00	0.0459	reject	0.74%	0.22%	0.24	0.1764	accept	0.58%
	60-64	12.77%	1.71	0.1500	accept	11.11%	0.20%	0.23	0.3982	accept	0.26%	0.00%	0.00	0.1171	accept	0.37%	1.57%	0.64	0.0728	accept	2.80%
	65-69	12.58%	1.70	0.2287	accept	11.37%	0.29%	0.27	0.3400	accept	0.42%	1.14%	0.54	0.3066	accept	0.90%	5.72%	1.19	0.1576	accept	7.03%
	70-74	11.61%	1.64	0.0438	reject	9.10%	0.00%	0.00	0.0594	accept	0.63%	0.00%	0.00	0.0677	accept	0.58%	9.19%	1.48	0.1654	accept	10.74%
Female	50-54	13.58%	1.91	0.3131	accept	14.54%	0.54%	0.41	0.0835	accept	0.20%	0.00%	0.00	0.2431	accept	0.15%	3.26%	0.99	0.1902	accept	2.50%
	55-59	13.37%	1.89	0.4851	accept	13.44%	0.00%	0.00	0.2431	accept	0.15%	0.98%	0.55	0.0279	reject	0.35%	3.91%	1.08	0.2655	accept	4.65%
	60-64	11.08%	1.75	0.1565	accept	9.44%	0.00%	0.00	0.1843	accept	0.25%	0.71%	0.47	0.0002	reject	0.10%	6.43%	1.37	0.0973	accept	8.44%
	65-69	9.31%	1.62	0.0938	accept	7.39%	0.00%	0.00	0.2849	accept	0.10%	0.28%	0.30	0.1499	accept	0.10%	11.29%	1.76	0.1447	accept	13.29%
	70-74	5.95%	1.32	0.4691	accept	5.84%	0.00%	0.00	0.3439	accept	0.05%	0.23%	0.27			0.00%	18.75%	2.17	0.4490	accept	19.03%
Adachi																					
Male	50-54	18.07%	1.94	0.1095	accept	15.81%	0.00%	0.00	0.1670	accept	0.24%	0.55%	0.37	0.1207	accept	1.19%	0.55%	0.37	0.4507	accept	0.60%
	55-59	21.22%	2.06	0.1459	accept	19.13%	0.31%	0.28	0.4001	accept	0.39%	0.94%	0.49	0.1889	accept	1.47%	1.25%	0.56	0.4341	accept	1.16%
	60-64	20.78%	2.05	0.0007	reject	15.00%	0.00%	0.00	0.0872	accept	0.47%	0.27%	0.26	0.0195	reject	1.56%	0.81%	0.45	0.0014	reject	3.63%
	65-69	13.32%	1.71	0.0071	reject	9.67%	0.00%	0.00	0.1066	accept	0.39%	0.97%	0.49	0.4727	accept	1.00%	4.63%	1.06	0.0244	reject	7.20%
	70-74	7.11%	1.30	0.0445	reject	5.20%	0.00%	0.00	0.1292	accept	0.32%	0.32%	0.28	0.3461	accept	0.45%	8.37%	1.40	0.2974	accept	9.14%
Female	50-54	12.94%	1.66	0.1154	accept	11.08%	0.00%	0.00	0.2323	accept	0.13%	0.45%	0.33	0.4512	accept	0.49%	3.57%	0.92	0.0511	accept	5.40%
	55-59	15.78%	1.80	0.0647	accept	13.24%	0.28%	0.26	0.2566	accept	0.15%	1.66%	0.63	0.0008	reject	0.53%	4.71%	1.05	0.0051	reject	8.20%
	60-64	14.43%	1.74	0.0016	reject	10.04%	0.00%	0.00	0.2135	accept	0.15%	1.60%	0.62	0.0001	reject	0.41%	6.41%	1.21	0.0006	reject	11.55%
	65-69	9.79%	1.47	0.0002	reject	5.71%	0.00%	0.00	0.2503	accept	0.11%	1.34%	0.57	0.0000	reject	0.21%	9.60%	1.46	0.0028	reject	14.41%
	70-74	4.91%	1.07	0.0008	reject	2.47%	0.00%	0.00	0.2739	accept	0.09%	0.70%	0.41	0.0000	reject	0.08%	11.39%	1.57	0.0583	accept	14.09%

(4) Educational status

		Elementary / junior high school					Senior high school					Two-year college / training school					University or more				
		JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS	JSTAR	SE	p-value	5% significance	CENSUS
Sendai																					
Male	50-54	0.00%	0.00	0.0001	reject	3.16%	10.39%	1.46	0.0719	accept	12.72%	0.94%	0.46	0.4628	accept	0.99%	12.75%	1.59	0.0006	reject	8.46%
	55-59	3.34%	0.86	0.3839	accept	3.60%	10.02%	1.43	0.4314	accept	10.27%	3.34%	0.86	0.0000	reject	0.61%	8.73%	1.35	0.0007	reject	5.30%
	60-64	1.66%	0.61	0.0110	reject	3.73%	10.88%	1.49	0.0171	reject	8.12%	0.55%	0.35	0.4187	accept	0.63%	7.01%	1.22	0.0003	reject	3.88%
	65-69	3.21%	0.84	0.1666	accept	4.13%	8.20%	1.31	0.0705	accept	6.47%	0.53%	0.35	0.4185	accept	0.61%	4.10%	0.95	0.0846	accept	2.98%
	70-74	3.31%	0.85	0.4435	accept	3.43%	6.31%	1.16	0.1190	accept	5.07%	0.95%	0.46	0.2364	accept	1.34%	3.00%	0.81	0.0038	reject	1.47%
Female	50-54	0.93%	0.47	0.0096	reject	2.85%	9.80%	1.46	0.0009	reject	15.34%	7.00%	1.25	0.0001	reject	3.66%	5.60%	1.13	0.0000	reject	2.03%
	55-59	1.84%	0.66	0.0227	reject	3.69%	14.39%	1.72	0.0699	accept	12.03%	5.51%	1.12	0.0000	reject	1.97%	2.75%	0.80	0.0005	reject	1.08%
	60-64	2.87%	0.82	0.0584	accept	4.47%	10.47%	1.50	0.3043	accept	9.72%	4.72%	1.04	0.0000	reject	1.56%	1.23%	0.54	0.0640	accept	0.64%
	65-69	2.90%	0.82	0.0241	reject	5.02%	9.67%	1.45	0.2321	accept	8.65%	3.22%	0.87	0.0000	reject	1.14%	0.97%	0.48	0.0667	accept	0.46%
	70-74	3.16%	0.86	0.0889	accept	4.54%	8.00%	1.33	0.1648	accept	6.80%	3.91%	0.95	0.0000	reject	1.04%	0.37%	0.30	0.2479	accept	0.22%
Kanazawa																					
Male	50-54	0.48%	0.33	0.0000	reject	5.50%	7.70%	1.28	0.0001	reject	13.84%	3.37%	0.86	0.0000	reject	1.10%	10.11%	1.44	0.0172	reject	7.45%
	55-59	2.88%	0.80	0.0023	reject	6.15%	12.12%	1.56	0.0859	accept	10.14%	4.04%	0.94	0.0000	reject	0.57%	8.65%	1.35	0.0000	reject	4.05%
	60-64	5.22%	1.07	0.3911	accept	5.52%	8.70%	1.35	0.1902	accept	7.59%	1.42%	0.57	0.0000	reject	0.28%	5.53%	1.10	0.0000	reject	2.46%
	65-69	5.70%	1.11	0.4995	accept	5.70%	7.49%	1.26	0.3096	accept	6.88%	0.18%	0.20	0.3644	accept	0.26%	2.32%	0.72	0.2964	accept	1.96%
	70-74	6.01%	1.14	0.0694	accept	4.53%	6.01%	1.14	0.3602	accept	5.61%	0.19%	0.21	0.0379	reject	1.06%	1.88%	0.65	0.0523	accept	1.08%
Female	50-54	0.81%	0.40	0.0000	reject	4.99%	11.63%	1.43	0.0030	reject	16.15%	6.22%	1.08	0.0001	reject	3.26%	1.62%	0.56	0.3691	accept	1.44%
	55-59	1.84%	0.60	0.0000	reject	6.70%	14.46%	1.57	0.0080	reject	11.08%	8.03%	1.22	0.0000	reject	1.39%	2.07%	0.64	0.0003	reject	0.74%
	60-64	3.10%	0.78	0.0003	reject	7.02%	12.59%	1.48	0.0001	reject	8.01%	3.28%	0.80	0.0000	reject	0.85%	1.28%	0.50	0.0026	reject	0.45%
	65-69	6.36%	1.09	0.1678	accept	7.50%	7.12%	1.15	0.2772	accept	7.83%	2.12%	0.64	0.0001	reject	0.70%	0.91%	0.42	0.0025	reject	0.26%
	70-74	7.00%	1.14	0.4575	accept	6.88%	6.45%	1.10	0.3829	accept	6.79%	1.47%	0.54	0.0013	reject	0.51%	1.11%	0.47	0.0000	reject	0.13%
Takikawa																					
Male	50-54	3.75%	1.13			0.00%	9.39%	1.73			0.00%	1.88%	0.80			0.00%	5.63%	1.37			0.00%
	55-59	3.56%	1.10			0.00%	13.07%	2.00			0.00%	1.19%	0.64			0.00%	6.54%	1.46			0.00%
	60-64	4.09%	1.17			0.00%	11.72%	1.91			0.00%	1.36%	0.69			0.00%	2.18%	0.87			0.00%
	65-69	4.92%	1.28			0.00%	9.11%	1.70			0.00%	1.23%	0.65			0.00%	3.45%	1.08			0.00%
	70-74	7.48%	1.56			0.00%	6.30%	1.44			0.00%	1.58%	0.74			0.00%	1.58%	0.74			0.00%
Female	50-54	3.25%	1.14			0.00%	6.51%	1.59			0.00%	8.13%	1.76			0.00%	3.25%	1.14			0.00%
	55-59	2.59%	1.02			0.00%	14.25%	2.25			0.00%	6.48%	1.59			0.00%	0.00%	0.00			0.00%
	60-64	4.55%	1.34			0.00%	11.91%	2.09			0.00%	2.45%	1.00			0.00%	0.35%	0.38			0.00%
	65-69	11.54%	2.06			0.00%	5.47%	1.46			0.00%	2.13%	0.93			0.00%	0.30%	0.35			0.00%
	70-74	9.87%	1.92			0.00%	5.97%	1.53			0.00%	0.69%	0.53			0.00%	0.00%	0.00			0.00%
Shirakawa																					
Male	50-54	6.04%	1.22			0.00%	5.58%	1.18			0.00%	5.11%	1.13			0.00%	5.11%	1.13			0.00%
	55-59	8.79%	1.45			0.00%	10.76%	1.59			0.00%	1.10%	0.53			0.00%	2.20%	0.75			0.00%
	60-64	9.24%	1.48			0.00%	3.93%	1.00			0.00%	0.98%	0.51			0.00%	0.39%	0.32			0.00%
	65-69	14.29%	1.79			0.00%	4.57%	1.07			0.00%	0.29%	0.27			0.00%	0.57%	0.39			0.00%
	70-74	16.69%	1.91			0.00%	3.63%	0.96			0.00%	0.48%	0.36			0.00%	0.00%	0.00			0.00%
Female	50-54	5.43%	1.26			0.00%	7.06%	1.43			0.00%	4.89%	1.20			0.00%	0.00%	0.00			0.00%
	55-59	5.22%	1.24			0.00%	9.45%	1.63			0.00%	3.26%	0.99			0.00%	0.33%	0.32			0.00%
	60-64	11.08%	1.75			0.00%	5.00%	1.21			0.00%	1.79%	0.74			0.00%	0.36%	0.33			0.00%
	65-69	15.24%	2.00			0.00%	4.23%	1.12			0.00%	1.41%	0.66			0.00%	0.00%	0.00			0.00%
	70-74	21.72%	2.29			0.00%	2.74%	0.91			0.00%	0.46%	0.38			0.00%	0.00%	0.00			0.00%
Adachi																					
Male	50-54	2.19%	0.74	0.0034	reject	5.22%	6.57%	1.25	0.0025	reject	11.01%	0.55%	0.37	0.1938	accept	0.98%	9.86%	1.50	0.0000	reject	4.60%
	55-59	3.43%	0.92	0.0011	reject	7.49%	10.61%	1.55	0.1998	accept	9.37%	1.56%	0.63	0.0070	reject	0.60%	8.11%	1.38	0.0000	reject	2.90%
	60-64	5.13%	1.11	0.0152	reject	8.11%	10.26%	1.53	0.0653	accept	8.17%	1.89%	0.69	0.0000	reject	0.42%	4.59%	1.06	0.0003	reject	2.09%
	65-69	8.50%	1.41	0.1492	accept	7.15%	7.92%	1.36	0.1938	accept	6.82%	0.77%	0.44	0.0494	reject	0.31%	2.12%	0.73	0.3618	accept	1.88%
	70-74	8.68%	1.42	0.0000	reject	4.24%	4.89%	1.09	0.2529	accept	4.22%	0.47%	0.35	0.4753	accept	0.50%	1.89%	0.69	0.0834	accept	1.15%
Female	50-54	1.34%	0.57	0.0004	reject	4.95%	7.58%	1.31	0.0009	reject	12.71%	6.69%	1.24	0.0000	reject	2.50%	1.34%	0.57	0.2474	accept	1.00%
	55-59	3.32%	0.89	0.0002	reject	8.01%	9.14%	1.42	0.0830	accept	11.31%	7.75%	1.32	0.0000	reject	1.34%	2.21%	0.73	0.0000	reject	0.53%
	60-64	7.75%	1.32	0.1879	accept	9.00%	12.29%	1.62	0.0317	reject	9.59%	1.87%	0.67	0.0175	reject	0.89%	0.53%	0.36	0.2642	accept	0.35%
	65-69	9.21%	1.43	0.1711	accept	7.94%	8.25%	1.36	0.3502	accept	7.75%	2.69%	0.80	0.0000	reject	0.57%	0.58%	0.37	0.0800	accept	0.24%
	70-74	8.41%	1.37	0.0107	reject	5.76%	6.66%	1.23	0.0955	accept	5.22%	1.58%	0.62	0.0009	reject	0.50%	0.00%	0.00	0.2156	accept	0.15%

health—is slightly different (the surveys were not interviewed but mailed), most of the major items we wish to examine are very similar. Using micro-level data from these surveys, we plan to investigate if there is a reasonable weighting scheme reflecting the age and gender and other variables with which the JSTAR data can be used to reproduce the official statistics results at the national level.

Lastly, we should mention the "oldest-old" in SHARE who are defined as those aged 80 and over. Since the age range in JSTAR is between 50 and 75, the oldest-old is currently out of scope of JSTAR. However, we will pursue tracking the same individuals who were surveyed in the first wave. This means that we will have a chance to explore those oldest-old people's lives in the future. We realize that this is particularly important for Japanese people who are enjoying the longest life expectancy in the world.

1.5.7 Conclusions

• JSTAR collects comprehensive information on living circumstances of people aged between 50 and 75 living in five municipalities. Our sampling design is to select several municipalities with diversity and to choose randomly the individuals in the corresponding age group, a selection process that has merits in homogenous policy circumstances, response rate, and links to official records on medical and long-term case use.

• JSTAR enjoys a response rate of 60%, which is much higher in terms of the recent Japanese standard and is comparable with "family" surveys like SHARE. The Census comparison shows that JSTAR succeeded in representing the population of each municipality for the marital status in the given ages and many of the work statuses for males in the given ages. But JSTAR does not represent the population of each municipality in terms of educational attainment nor does it sufficiently represent the work status of females.

• We plan to rearrange the individuals in the JSTAR sample to make a national representative sample using several key variables in the future.

1.6 The Main Messages of JSTAR

This subsection highlights the main messages of the first wave of JSTAR below. The findings are descriptive and substantially diverse. Readers will realize that most of them transcend borders of each academic discipline. While some facts were known to specialists in each academic field, we aim to put them in a broader context. We wish to emphasize that even the baseline data, which is cross-sectional, uncovers a large volume of insights and new scientific discoveries. At the same time, we note the limitation and restriction of those results. One limitation comes from the cross-sectional characteristics of the first wave, which does not allow us to examine the direction of causality. Another limitation is that most of those findings are preliminary in that most of them are based on simple summary statistics and do not control for a variety of factors.

However, those limitations are easily to be overcome. The second wave is planned to be performed in 2008-2009 for the respondents who were interviewed in the first wave, which enables us to construct a longitudinal data. Moreover, in-depth analyses are possible before constructing the second wave. After the data is cleaned, micro-level data from JSTAR will be available for researchers all over the world. More researchers examine the data, more fruitful and excellent outputs are to come. By doing so, we strongly hope that JSTAR will contribute to discovery of new scientific knowledge and to more effective policymaking to enhance the well-being of people on the earth.

As emphasized in the introduction of this chapter, we mainly focus on comparison between JSTAR and SHARE and this is also the case for what are presented below.

The most important message of the first wave of JSTAR is the similarity and diversity of life circumstances for middle-aged and older people across both individuals and municipalities within Japan. Of particular interest is the substantial variation in many life aspects of middle-aged and elderly across individuals in terms of health, family and socioeconomic status, which echoes the SHARE book finding. Furthermore, JSTAR's unique features are derived from its sampling strategy: it took the municipality as a cluster of sampling, instead of adopting nationwide probabilistic sampling. The municipality is a regional, cultural, historical, and political unit of people's life that is shared by regional residents. By comparing across and within municipalities with adjustment for individual characteristics, JSTAR could provide a unique opportunity to see what is shared in common and what is diverse in the lives of middle-aged and elderly people in this country, making an unusually large potential to extract new scientific findings and policy implications for population aging.

JSTAR provides some innovative insights on health in this country (Chapter 2). Japan's unique characteristics of health and health care issues, especially the ambiguous combination of the longest average life expectancy and very low GDP ratio of medical expenditure, will have considerable potential to formulate important lessons for health policy in future comparative analysis with data from SHARE countries. But the first report of JSTAR specifically focuses on the health disparity within this country. As in European countries, in Japan the prevalence of physical health problems among the elderly is high, but there is substantial variation among the subjects. Moreover, within Japan, where universal health care insurance covers all residents, there are substantial variations in physical health (subjective health status, prevalence of specific diseases) and functioning (ADL, IADL) depending on socioeconomic status. As mentioned earlier, since there is an endogenous relation between health and socioeconomic status, we have to wait for future panel data for causal inference. However, it could be safely said that the health disparities seem not to be remedied by a universal health care program alone, and more fundamental social policies should be tailored towards disadvantaged groups.

There is also a disparity in risky health behaviors (smoking, drinking, physical inactivity, and overweight) across gender, age, and municipality within Japan, and like Europe, socioeconomic disparities are also observed. However, the pattern is varied across the types of behavior: smoking was related to lower education and household income, while heavy drinking was reversely related to education and income. Physical inactivity was related to lower education among males, while obesity was related to lower education among females. Socioeconomic gradient was also observed in mental health and cognitive functions. Prevalence of depression depends on gender, marital status, socioeconomic conditions, and physical functions. Although age is the strongest and most consistent predictor of cognitive impairment, which would support the patho-physiological basis of the impairment, education was another significant predictor of cognitive impairment. Socioeconomic disparity was observed even in health check-up and nutrition intake. Japan has started a unique national health check-up program that offers all citizens an annual health check-up since 2008, but there is considerable variation across demographic, socioeconomic, and insurance conditions in the probability of having a health check-up in the past year. Older age, lower education, lower household income, and being not the employed household head were related to higher odds of missing a check-up in the past year, suggesting that better information provision and health education targeted to the socioeconomically deprived, aged, and women in the community would be keys to the effectiveness of the program. JSTAR included a detailed food frequency questionnaire to reveal nutritional intake among the middle-aged and elderly. As revealed, dietary patterns, e.g. intake of vegetables and fruits, are strongly associated with demographic, socioeconomic, and regional environmental conditions.

Turning to health service utilization, even under the Japanese non-selective public health program, we see variations in out-of pocket payment across educational attainment, household income, age, and municipality. Lower education was associated with lower probability to meet out-of-pocket, mainly due to less access to dental and surgical services. The poorest group faced the largest share of out-of-pocket to their equivalent household income, suggesting that the Japanese public health care system is regressive. Japanese elderly, once they made contact with physicians, are more likely to make regular visits each month, which was more often seen among those with lower educational attainment. Contrary to the SHARE results, these associations between education and health service utilization remained significant even after controlling for health conditions. Thus, lower health literacy and consequent lack of skills for self-care among those with lower education may be the culprit for overuse of outpatient service and less use of dental care in Japan.

Construction of longitudinal data after the second wave makes it possible to explore determinants of physical health problems among the elderly, especially to disentangle causal relationship between health and socioeconomic status, and to evaluate effectiveness of health policy. Further research should examine the relationship between risky health behavior and health outcomes to contribute to more effective health policymaking by targeting specific groups, the segment of population who needs a close attention and intensive health education in new health promotion programs.

Along with health, work, and socioeconomic status, family relationship is an important factor to determine well-being of the middle-aged and older. Even for contemporary elderly Japanese in an urbanized setting, the family has remained a strong provider of institutional and everyday-life integration. The historical decline of marriage has not yet become apparent in the first survey of JSTAR. The marriage bond is fairly strong especially for males, and maintained even into the 70s. The multigenerational structure of the family remains prevalent, but with a large variety across municipalities. The proportion of co-residence of elderly with their adult children is seen as prevalent as in the case in Mediterranean countries. However, the different patterns across municipalities rather suggest that the likelihood of living accommodations and geographical proximity, and subsequent contact frequency are likely to be affected by regional difference in opportunity structures of employment and housing markets, rather than by the strength of traditional family norms.

In contrast to the prototypical view of conventional norms and the seniority culture in Japan, the strength of family ties seems at most to be the same as that of the family in the Continental countries, and cross-regional differences also suggest that Japan is somewhat in transition from a strong family tradition to an individual-centered weak-family culture. Physical limitation is more prevalent for older people and may be an important determinant of housing and living arrangements. But the prevalence of physical limitation and home ownership do not change much across age groups. Another important factor is the number of children. The proportion of the respondents without any children occupies less than 10% in all municipalities. The most dominant number of children is two in all municipalities except Shirakawa where the number is three and the number of natural children is negatively correlated with education.

Non-monetary support exchange takes a variety of forms such as giving personal care, helping instrumental daily activities, or simple contact to share socioemotional support. The pattern of provision of care to fragile parents showed striking differences across age, gender and region, suggesting that the traditional family system and norms that value a lineal relationship are still influential and put the burden of elderly care unevenly on females. In contrast, females are more likely to receive help than males, and are more likely to report ADL limitations, but less likely to receive help for ADL. That females tend to over-report their physical limitation, or females have less access to help for ADL is an interesting topic deserving further investigation on exchange and support within and between households for international social policy discussion.

Monetary transfers across generations that may help the policy and research on risk sharing among/across families. Those in their 50s are most likely to receive monetary transfer from outside of the household, and at the same time most likely to give transfer to outside the household. Thus, those in their 50s are exposed to most financial burden of monetary transfer. Those in rural areas are more likely to receive monetary transfer, and those in rural areas are more likely to give transfer, suggesting that more traditional living accommodation/family structure may shape the pattern of monetary transfer across families. Inheritance transfer is more likely to be reported among males and those in rural areas with a stronger family tradition. Among those with living parents, the expected inheritance in future may explain wealth formation stratified by socioeconomic status.

In addition to health and family status, job environment and quality of work are strong predictors of a worker's health. Quality of employment in terms of (im)balance between perceived effort and reward was observed as was seen in Northern European countries with "high quality of work." Quality of employment in terms of task control, however, was as poor as that of medium-fair level countries. Quality of employment is strongly associated with socioeconomic status (education) and with self-reported well-being; lower quality of employment goes along with higher prevalence of poor self-rated health and depression.

The Japanese elderly hold a unique position in retirement behavior. They retire later than those in most OECD countries and maintain a high labor force participation rate. We see a large variation in self-reported employment status across municipalities under the same pension program. Other factors might be more responsible for the different retirement behavior. Even among "healthy" persons, we see a large variation in labor force participation. Moreover, public pension programs play a large role in Japan. While the first pillar is mandatory for all residents in Japan, the second pillar is occupation-related and varies across individuals. The replacement ratio for men varies at around 30% to 50%. For women it varies between 10% and 100% uniformly. The participation rate for the third pillar comprising purely private pension is generally much higher at 20% to over 40% for men and women

Examining the variety of transition paths to retirement is especially important in Japan but there is little research on the intermediate period between work and retirement. The patterns in the share of the self-assessed unemployed or the disabled have different shapes between Japan and European countries. This is also the case for people who are "partially retired." Possible factors including institutional arrangements or health status should be examined to account for the difference. In contrast, the disability pension enrollment is very low in Japan at a range of 1-2%, which is lower than the minimum in European countries. There is a very small variation in the enrollment ratio across age, health status, or municipality.

JSTAR reveals non-work activities for the elderly. Activities of those aged 55 to 75 show a remarkably stable relationship among four out of five municipalities. About 20% engage in hobbies, 15% in community activities, 10% in volunteering, 10% in sports, 5%-9% in learning, less than 5% in religious activities, providing help to others, and also politics. The average share of participation in volunteer work in Japan is close to 10%, which is comparable with the middle group in Europe and the volunteer participation rate in Japan is not correlated with age or health status. Market work in Japan is much higher and activities to provide help to others are much lower than in SHARE countries.

Further detailed analysis using longitudinal data is necessary to explore the determinants on late retirement, the dynamic transition process among a variety of transition paths, as well as engagement in unpaid work and what they receive from those activities, and how participation in volunteering activities improves quality of life for the elderly and how policies toward those activities are designed.

Finally, some evidence is obtained on socioeconomic status, which is associated with health and family status. When focusing on net annual household income, we observe systematic difference in the equivalent household income across age, education, household type, as well as municipality. The household income data should be elaborated through imputation and correction of each income item, evaluation in real terms using price difference across municipalities and computation of a point value for the income range based on the unfolding brackets. Imputations are particularly important for some large items like pension income and imputed rents to measure the well-being of middle-aged and older people.

Wealth is a main source for compensating consumption after retirement. There are some differences in the systematic pattern between household income and wealth. The amount of net financial assets (the sum of deposits, bonds and stock minus non-mortgage liabilities) is larger for those aged in their 60s or 70s while household income declined for a household in the 70s. Household income is smaller for the non-married living with a parent/parents and/or a child/children but this is not the case for net financial assets. Household income is significantly smaller in Takikawa while net financial assets are significantly larger in Kanazawa. Both household income and net financial assets are larger for university or more graduates.

The ownership rate for real assets (land and houses) is about 30% with a large variation across municipalities and household demographics. After controlling for a variety of factors, the amount of net total assets (the sum of net financial assets and net real assets) is significantly larger for a household in the 70s, or in Kanazawa, or university or more graduates. We need to elaborate data on each item further to compute household net worth more precisely and examine the relationship between portfolio and fundamental parameters including risk aversion, time patience, and life expectancy.

Turning to consumption measures, which directly stand for well-being, systematic differences across household demographics and municipality are also observed. The equivalent food spending (foods and eating out) is larger in Adachi and smaller in Takikawa and Shirakawa. Food expenditure also differs across management of household expenses, some specific household types, municipalities, as well as educational attainment. While the equivalent monthly total expenditure is smaller in Takikawa and Shirakawa, again, systematic difference across household characteristics including management of household expenses, some specific household types, and educational attainment is found.

In terms of inequality measured by a Gini coefficient, wealth inequality is larger than income inequality and income inequality is larger than consumption inequality. The degree of inequality is comparable with that in Central European countries in terms of income and consumption and with that in Northern European countries in terms of wealth, though there are some variations in inequality across municipalities. Lastly, the male's educational level is higher than that of females and there is a large disparity in educational attainment across municipalities. This pattern is also observed in children's educational level. The strong correlation in educational attainment between husband and wife and between parents and children are confirmed. Further research should examine the determinants of inequality of income, consumption and wealth, which hold important policy implications for distribution policy. In particular, the effect of educational linkage across generations on family relationships and intergenerational transfer should be investigated.

1.7 Where Do We Go from Here?

We believe that some preliminary analysis using the baseline JSTAR data have succeeded in producing innovative results. The success was made possible by the comprehensive data on all domains of daily lives, especially economic, health and social/family networks, for the middle-aged and older people. The high response rate of 60%, which is unusual in recent studies in Japan, and our sampling design focusing on selected municipal residents strengthened our findings. We again emphasize that those results in this book are very preliminary and in-depth analyses are needed for more robust results which will be performed by many researchers inside and outside Japan. JSTAR provides social infrastructure for researchers on the well-being of the middle-aged and older people in many academic fields all over the world.

The most important next step for us is surely to re-interview the respondents in the first wave and to construct a longitudinal dataset for middle-aged and older Japanese people. This is critical for detecting causal relationships among health, economics, and social domains; without this, the impact of JSTAR would be less than expected. All the “family” surveys have the longitudinal characteristics and observe individuals as they age over time. Aging is a process and we must observe a sequence of events controlling for individual innate characteristics, which is indispensable for econometric analyses. In particular, we emphasize that constructing panel data is also critical for policy evaluation. Recently, Japanese government implemented several major reforms on pension, medical and long-term care insurance programs. The eligible age for public pension and mandatory retirement age is in transition from age 60 to 65. Considering those institutional changes as natural experiments, we are able to identify effects of reforms on individual behavior, so that we extract clean policy implications. It is often that policy effect is not necessarily what policy makers presumed and brings some side effects, which sometimes are detrimental to institutions or people. In Japan, quantitative evaluation of change in public policies has been largely ignored and many policy changes have been implemented without empirical evidence, which might have caused large inefficiency. In other words, we need a longitudinal data to explore how public policies are effective in order that we learn a great deal from those reforms which are instructive for Japan and other countries.

At the same time, we need to strengthen our relationship with “family members” of the international consortium. As stated, we learned a lot from preceding surveys, especially HRS and SHARE, and we are very grateful for those teams. Surely, we will continue to keep close communications and cooperation with those surveys. At the same time, we should emphasize that JSTAR is not purely an import product from abroad. We strive to stimulate creative research using JSTAR which is beneficial for the world. As we emphasized in this chapter, Japan is a treasure chest for many aged related topics: the world’s highest longevity, the latest retirement age, as well as a lower share of medical expenditure relative to economic size. These casual observations should be explored by firm empirical analyses. Not only Japanese but also any researchers around the world have great potential to learn lessons for scientific research and policymaking. In this sense, we plan to participate in a harmonization project of these family surveys so that any interested researchers can easily make use of JSTAR data.

We hope that this book will be the first opportunity for world researchers to understand the significance and importance of JSTAR and stimulate intellectual interest in the Japanese experience from an international perspective. If our intention succeeds, our effort and input in JSTAR will be well-compensated.

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Japanese Study of Aging and Retirement

Chapter 2

Health and Health Care

2 Health and Health Care

2.1 Physical Health

2.1.1 Introduction

Aging is naturally accompanied by physical and functional deterioration and a higher likelihood of health problems. The aging of the population and subsequent burdens of medical and long-term care have become a common challenge to industrialized countries, including OECD member countries. In contrast to the US health care system's heavy reliance on the private sector, Japan and other OECD countries have basically adopted a public mandatory health care insurance system. Within this broad description, however, in OECD countries there is a wide variety of health care systems characterized by unique historical, cultural, and political backgrounds. We can also observe a wide variety within and across countries in terms of health achievement. A recent project to evaluate the efficiency, effectiveness, and equity of health care across OECD countries purported to learn lessons on issues related to health from other countries (OECD 2004). In this sense, Japan holds a very unique position of health and health care among OECD countries and promisingly offers important policy implications for other countries. The uniqueness of Japanese health and health care is summarized as follows.

First, Japan has the highest pace of aging in industrialized countries and the longest life expectancy in the world. According to OECD Health Data 2008, the life expectancy at birth for a Japanese male was 79.0 years in 2006, ranking third in the OECD circle following Iceland (79.4) and Switzerland (79.2). The number for a Japanese female was 85.8 years, the longest in the world (OECD 2008). Longevity of Japanese women is particularly remarkable when we compare Japan's number with those of Germany (82.4), France (84.4), and Sweden and Norway (82.9 for both). The increase in life expectancy is often attributed to a decreased infant mortality rate and improved elderly longevity which are further attributed to the improvement in economic living standards, public health interventions, medical technology innovations, and access to medical care. However, what made Japanese success possible in such a short period of just the past 50 years remains to be articulated.

Second, medical expenditure relative to economic size in Japan is very low for its excellent health achievement, compared to the OECD standard. While the total health expenditure of many major OECD countries is around 10% or more of GDP, the Japanese share was only 8.2% in 2005, a figure similar to those of the United Kingdom, Finland, and Ireland (OECD Health Data 2008).

This ambiguous combination of long life expectancy and low GDP ratio of medical expenditure poses a puzzle for both researchers and policymakers. One might argue that it reflects the fact that the Japanese people is extremely healthy. Another assertion might be that the Japanese health care delivery system is unusually efficient. Campbell and Ikegami argue that Japanese health policy has been successful in striking a balance between free access and cost containment, while it left quality control somewhat behind (Campbell & Ikegami 1999). Recent political debate over the skyrocketing health expenditure in the forthcoming super-aged society and threatened sustainability of the system requires empirical analysis of the main factors that enabled this unusual combination of low cost and high health achievement. The analysis is critical not only for Japan, but for other countries who also suffer from a huge medical expenditure. In other words, the Japanese experience has great potential to provide useful lessons for other OECD countries.

In addition to the large difference in health and health care among countries, we should also pay attention to the substantial variation in health status among socio-economic groups within a country. Japan is not an exception which is described throughout this chapter. Despite the unique position of the Japanese population health and health care system, only limited socioeconomic and epidemiological research on the health disparity across socioeconomic positions has been conducted, mainly due to a lack of a comprehensive dataset.

Health disparity might be associated with genetic predisposition, individual attributes such as lifestyle behaviors, or environmental factors such as climate, toxic exposure, and accessibility to social, economic, and health resources. Thus, a comprehensive data collection is necessary to identify the socioeconomic, behavioral, and biological determinants of health. JSTAR is able to provide a large potential to study health problems related with aging, and to compare them with European countries in SHARE and HRS and ELSA in a consistent way. These surveys enable exploration of a variety of topics including prevalence of health problems, health care services (provision and utilization), and consequences of health issues on quality of life in an international perspective and jointly contribute to new scientific findings and evidence-based policymaking.

2.1.2 Overview of Health Domains in JSTAR

The questionnaire of health related variables used in JSTAR was originally based on the generic version of the SHARE questionnaire with modifications for the Japanese context. JSTAR has a wide range of indicators of physical health which have been grouped in four categories similar to SHARE: summary measures including self-reported health status, disease status, limitations in functioning, and limitations in activities of daily living. In addition, JSTAR performs a unique nutrition survey which provides background to health status. We will preview these variables in this subsection and provide more details in later subsections.

JSTAR has two measures for self-perceived health: a "North American" version with five answer categories ranging from "excellent" to "poor," and a "European" version with five answer categories ranging from "very good" to "very poor." Questions in the former version are asked in the interview, which employs the same scale used in existing domestic public surveys such as the Comprehensive Survey of Living Conditions of People. Questions in the latter, which is also employed in the Health and Retirement Study (HRS) as well as the English Longitudinal Survey on Aging (ELSA), are asked in the leave-behind (self administrative) questionnaire in JSTAR, though the translation of this European version has not been empirically tested beforehand. Thus, in this report, the results of the North American version are used unless otherwise specified. While there is no question on long-term health problems, we conducted a detailed history recording on disease conditions in JSTAR. JSTAR asked respondents to choose one of the four categories for activity limitations for the past 12 months, which corresponds to the Global Activity Limitation Index (GALI) (Robine & Jagger 2003) asking respondents to choose one of the three categories for activity limitations over the past six months.

JSTAR has asked respondents whether they had a chronic disease diagnosed in their lifetime (20 named diseases). In the case of cancer, the location of the cancer (20 body parts) was also identified. Limitations in functioning were measured by self-report on mobility sensory functioning and other aspects of physical functioning. In addition to these responses, grip strength was measured using a handheld dynamometer (Smedley type, Hand Grip Meter, No. 6103, TANITA, Tokyo, 75 kg) in the dominant hand. Grip strength is a strong predictor of functional limitations and disability (Rantanen et al. 1999; Ishizaki et al. 2000).

The method of measurement of grip strength was different in Japan: subjects stood with the arm straight out, which is accordance with the instructions of the Japanese Ministry of Education, Sports, and Science for measurement with a Smedley type dynamometer. SHARE, HRS, and ELSA adopted a measurement with the subject seated and the elbow flexed at 90 degrees, which was originally a measurement style for the Jammer type dynamometer. Whether the use of different measurement methods and equipment influences results is a matter for further research.

While SHARE recorded walking speed for respondents aged 76 and over, JSTAR omits the measurement since the respondents surveyed in JSTAR were aged 75 or under. Finally, limitations in "activities of daily living" were measured by self-report in six types of daily activities (e.g. dressing, getting in/out bed, eating, etc.). Limitations in "instrumental activities of daily living" (IADL) were measured using the Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIGIC), which has been a standard measurement of IADL in Japan, and includes items (e.g. preparing a meal, shopping, making telephone calls, etc.) compatible to the scale used in SHARE and ELSA (Nicholas, Huppert, McWilliams et al. 2003).

2.1.3 Prevalence of Physical Health Problems

Table 2-1-1 illustrates the prevalence of physical health problems. The numbers in the table correspond to the averages for males and females in each measure of health. The figures in parentheses are maximum and minimum figures within the averages by gender and municipality. We should note that the age range of the respondents differs between JSTAR and SHARE. JSTAR surveys persons aged between 50 and 75 while SHARE collects data from persons aged 50 and over including those in their 80s. We should keep in mind this difference in age range between JSTAR and SHARE throughout this chapter.

Table 2-1-1 General physical health measures among men and women in JSTAR sample

Health measure	Levels	Men		Women	
Summary measures					
Self-perceived health					
(US version)	Less than "very good"	50.9	(46.1-55.0)	53.8	(49.2-57.2)
Activity Limitations (GALI)	1 or 2	15.0	(12.4-19.4)	19.9	(17.0-23.5)
Diseases and symptoms					
Chronic diseases	2 or more diseases	36.0	(31.0-46.0)	34.7	(27.6-38.7)
Limitations in functioning					
Mobility and functioning	1 or more limitations	12.7	(9.1-16.0)	22.2	(19.3-27.6)
Grip strength	Mean grip strength	35.6	(33.4-36.8)	22.7	(21.5-23.3)
Limitations in activities of daily living					
ADL limitations	1 or more limitations	5.0	(3.8-8.6)	6.0	(3.9-9.9)
IADL limitations	1 or more limitations	44.4	(38.6-51.2)	35.2	(33.2-38.8)

SHARE found that 40% of male respondents and 48% of female respondents answered less than "good" in self perceived health status in the European version questionnaire. If we use the European version questionnaire in JSTAR, the corresponding number is 70.9% for males and 75.6% for females. Since Japanese respondents tend to choose the medium category (in this case "3. fair"), the proportion of "less than good" may understate actual health status among JSTAR respondents. Instead, the proportion of those who answered less than "very good" (or the second category) in the US version is shown in the table: it is 50.9% for males and 53.8% for females.

The results also showed a higher portion of subjects answering that they had activity limitations in the GALI scale, compared to SHARE results. Taking that the SHARE sample includes subjects older than in the JSTAR sample, it seems that the J-STAR sample has a larger portion of complaints of "poorer" health status compared to the sample subjects in SHARE. According to the Comprehensive Survey of Living Condition of People 2004, however, 57.9% of males and 60.2% of females aged 55-74 responded with a health perception less than "very good." Thus, compared to those in the national survey, the JSTAR sample gave rather better self-report health status. These puzzling numbers suggest that we have to be careful when we interpret the difference in perceived health status across countries, an aspect further discussed in Section 2.3.

In terms of self-reported chronic diseases, more than one-third of the JSTAR respondents had at least two chronic diseases diagnosed during their lifetimes. However, the numbers of self-reported health status by males are marginally smaller and those of females are substantially smaller compared to the ones in the SHARE sample.

The proportion of subjects with one or more limitations in mobility and sensori-physical functions (eyesight, hearing, and chewing) was 39.8% for males and 44.2% for females in JSTAR. The corresponding figures in SHARE were still higher: 43% for males and 50% for females. The difference may be accounted for by the difference in the samples' age ranges as described above. Grip strength was measured by almost all respondents (which they seem to have enjoyed). The average grip strength was 36 kilograms for males and 23 kilograms for females, numbers that are lower than those in SHARE (43 kilograms and 26 kilograms, respectively). The variation might be due to an innate physical structural difference between Japanese and European Caucasians.

Lastly, JSTAR has a set of measures for ADL (Activities of Daily Living) and IADL (Instrumental Activities of Daily Living), similar to those in the SHARE questionnaire. Five percent of males and six percent of females reported that they had one or more limitations in six activities in daily life, e.g. dressing and using the toilet. The numbers were lower than those in SHARE (9.2% for males and 12.5% for females). In contrast, 44% of males and 35% of females in JSTAR reported that they had one or more limitations in IADL measured by the TMIGIC scale, which seems much higher than those in SHARE (11.8% for males and 21.1% for females). If we limit the questions to seven items of the TMIGIC scale to standardize the scale content to the SHARE questionnaire, the number drops to 10.6% for males and 7.6% for females, which is even lower than the SHARE results. Many of the subjects who complained of limitation in IADL in JSTAR answered that they did not engage in social engagements such as talking with younger people or visiting friends, which were included in TMIGIC but not in the SHARE questionnaire. Social engagement and participation will be further discussed in Chapter 3, Social and Family Context.

2.1.4 Variations by Age, Gender, and Municipality

Most physical health problems are strongly related with age and their prevalence is proportional or progressive with age. In this section, the prevalence of the self-reported disease status will be presented by age, gender, and municipality. It is important to mention two caveats beforehand. As mentioned in the SHARE report, JSTAR sampled residents living in the community and excluded institutionalized persons from its sampling frame. Since those persons are likely to have more health problems and occupy a larger portion of the older population, the disease prevalence reported in JSTAR and/or SHARE may be underestimated. The other caveat is the cross-sectional character of the baseline observations. We should keep in mind that the results across different age cohorts are affected by the mixture of the age and cohort effects. For example, the older groups are not only older but also belong to a different generation and life course, factors that are likely to affect health and health care issues. We need to be careful that “age-gradient” includes cohort effects too. This limitation is common to all cross-sectional datasets and will be overcome when longitudinal data are constructed after the second wave of research.

Figures 2-1-1 and 2-1-2 illustrate the prevalence of chronic diseases by gender and municipality. The most common chronic diseases in the JSTAR sample are hypertension, followed by heart disease, hyperlipidemia, and diabetes.

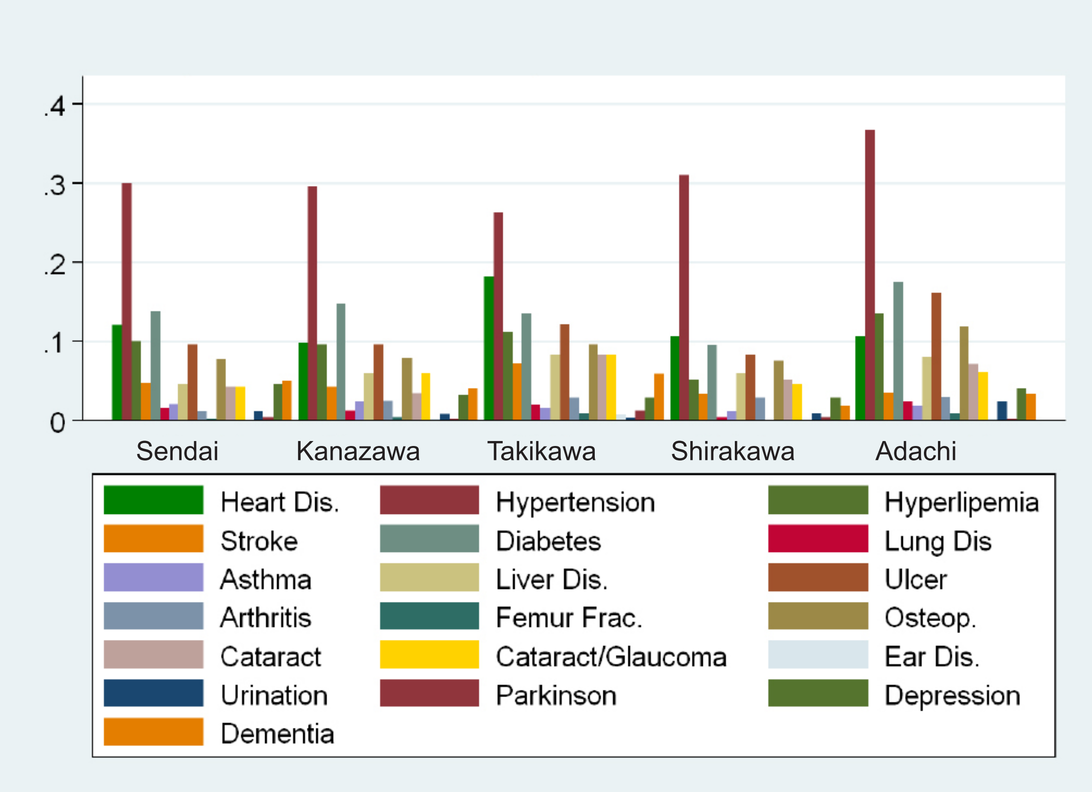

Figure 2-1-1 Prevalence of self-reported chronic diseases by municipality: males

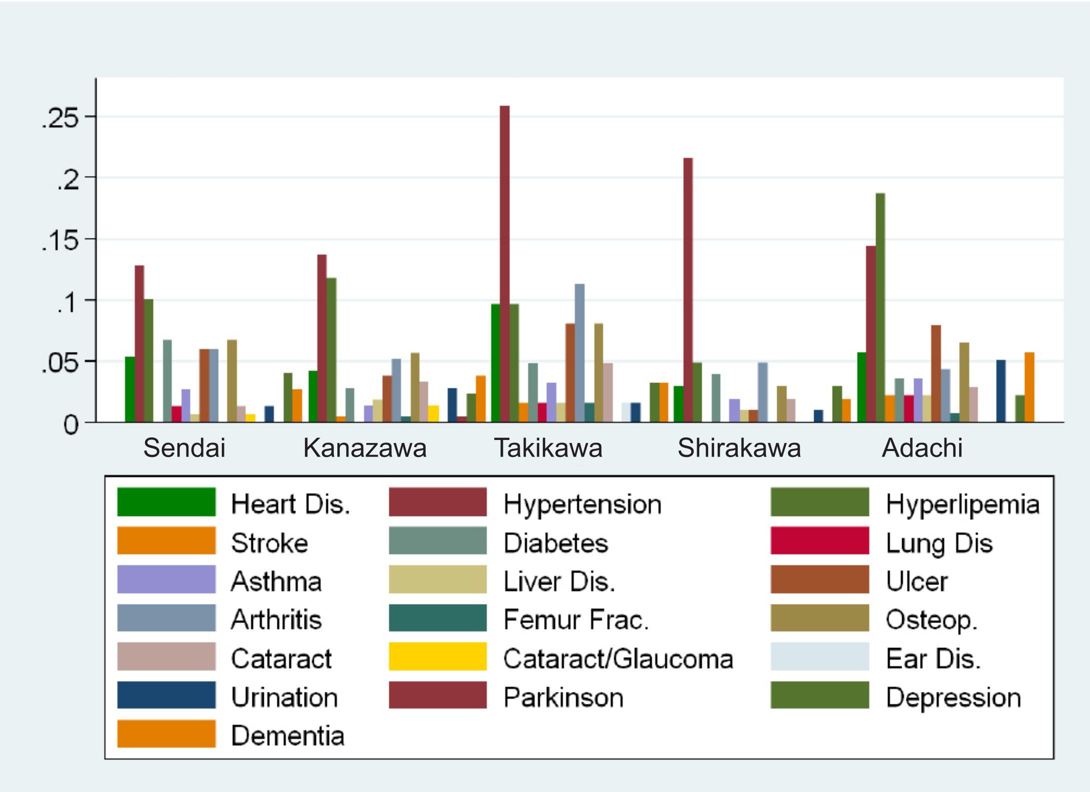

Figure 2-1-2 Prevalence of self-reported chronic diseases by municipality: females

Since disease prevalence is age-dependent, we should take a closer look at the numbers by stratifying by age. Figures 2-1-1-1~3 show the prevalence among males by age strata, the 50s, 60s, and 70s. The corresponding figures for females are Figures 2-1-2-1~3. The prevalence of hypertension increases with age. Compared to the numbers in the SHARE report, JSTAR respondents showed similar numbers and trends of hypertensive prevalence. In the 70s category, 40% to 50% of respondents answered they have been diagnosed as hypertensive. In the 50s category, males had a higher prevalence compared to females, and the sex difference in the hypertension prevalence was dissolved in the 70s. Females in their 50s in Takikawa city showed exceptionally higher prevalence of hypertension.

The prevalence of heart disease also increases proportionally to age. The sex difference was somewhat small in the 50s, but males in their 70s showed higher prevalence (21.5%) compared to females (15.4%). Again, Takikawa city showed the highest numbers in every age and sex category. The prevalence of heart disease in the JSTAR sample was almost as high as those in the SHARE sample, which was somewhat unexpected. We should be careful in interpreting this result because the prevalence in SHARE seems lower than expected from other previous reports.

The prevalence of hyperlipidemia was not age-dependent. In Sendai and Adachi, the prevalence among males decreased over age. The trend was the same even after limiting the sample to those who underwent annual health check-ups. Thus, the decreasing trend was not likely due to under-diagnosis, but was an actual trend among men in the urban areas. Female respondents in their 70s and over showed a higher prevalence (12.6%) than men in the same age category (8.8%). It is well known that menopausal women have a higher chance of hyperlipidemia and subsequent atherosclerotic diseases because estrogen has an effect to lower serum cholesterol, and women after menopause lose the protective effect by estrogen. It should be noted that those in Shirakawa had the lowest numbers in prevalence in any age and sex category, and younger males in urban areas showed the highest prevalence, suggesting that eating habits may be different in urban and rural areas, a result tested by nutrition data analysis in the following section.

The prevalence of diabetes in male respondents was twice as high as that in females, and increased proportionally with age. Again, Shirakawa has the lowest prevalence (7.0%) and Adachi the highest (12.2%), suggesting the urban lifestyle may be related to higher prevalence of diabetes.

The prevalence of stroke clearly increased over age (1.0% in the 50s and 5.8% in the 70s), and was higher among males than females (4.5 vs. 2.6%, respectively), which is on par with previous epidemiological observations. The number is almost compatible with that in the SHARE sample.

Cancer prevalence was also proportional to age (2.7% in the 50s and 5.8% in the 70s). It is interesting to note that after adjusting for age and sex, Shirakawa showed the significantly lowest prevalence of cancer (Odds ratio 0.38 [0.21-0.70]). Whether this is due to low incidence or due to a high mortality rate needs to be further investigated when the second wave data is prepared.

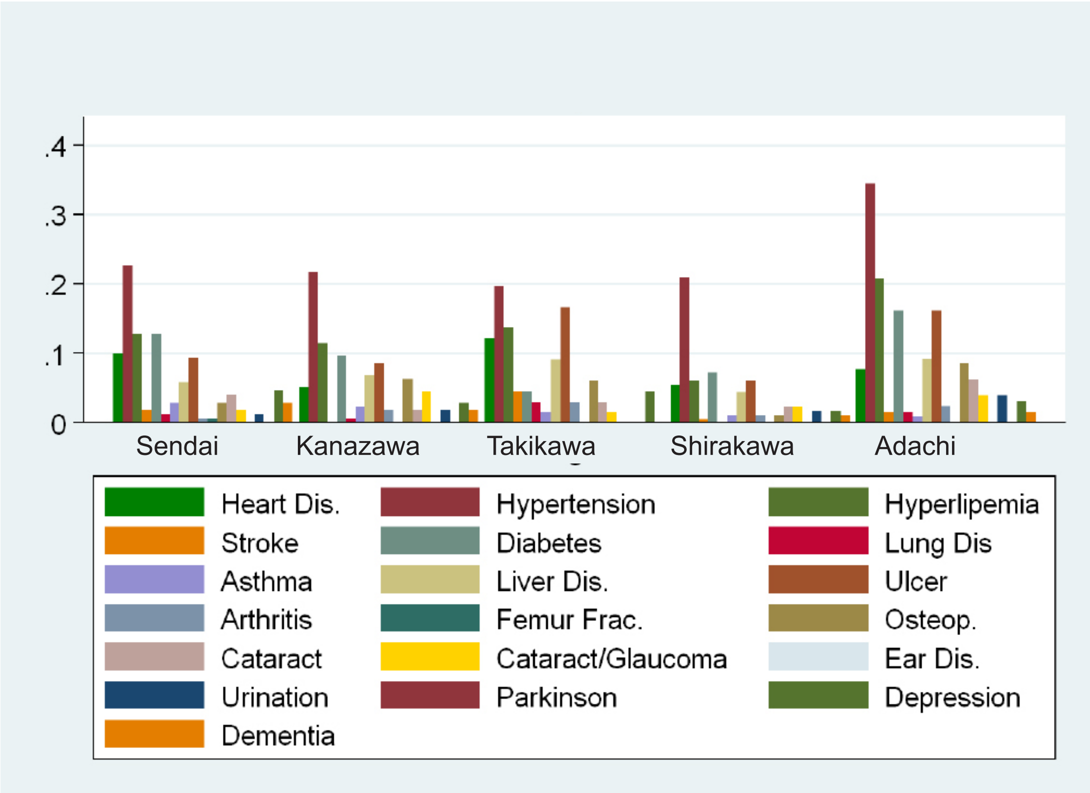

Figure 2-1-1-1 Prevalence of self-reported chronic diseases by municipality: males in 50s

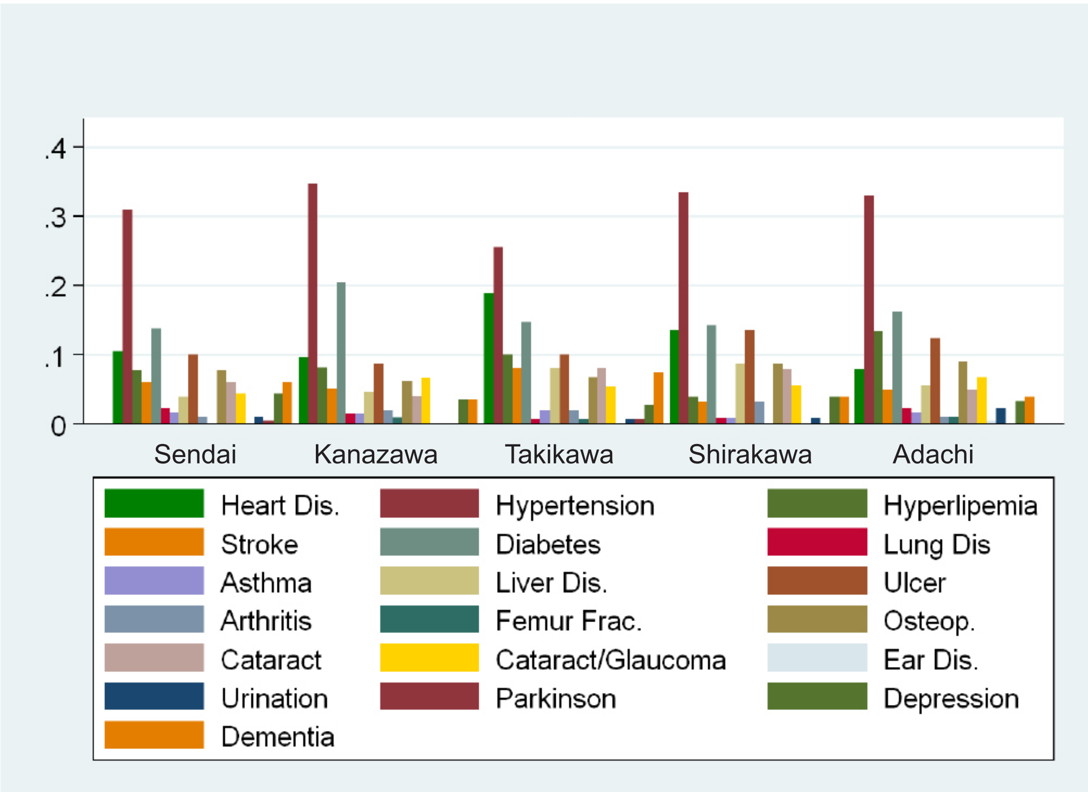

Figure 2-1-1-2 Prevalence of self-reported chronic diseases by municipality: males in 60s

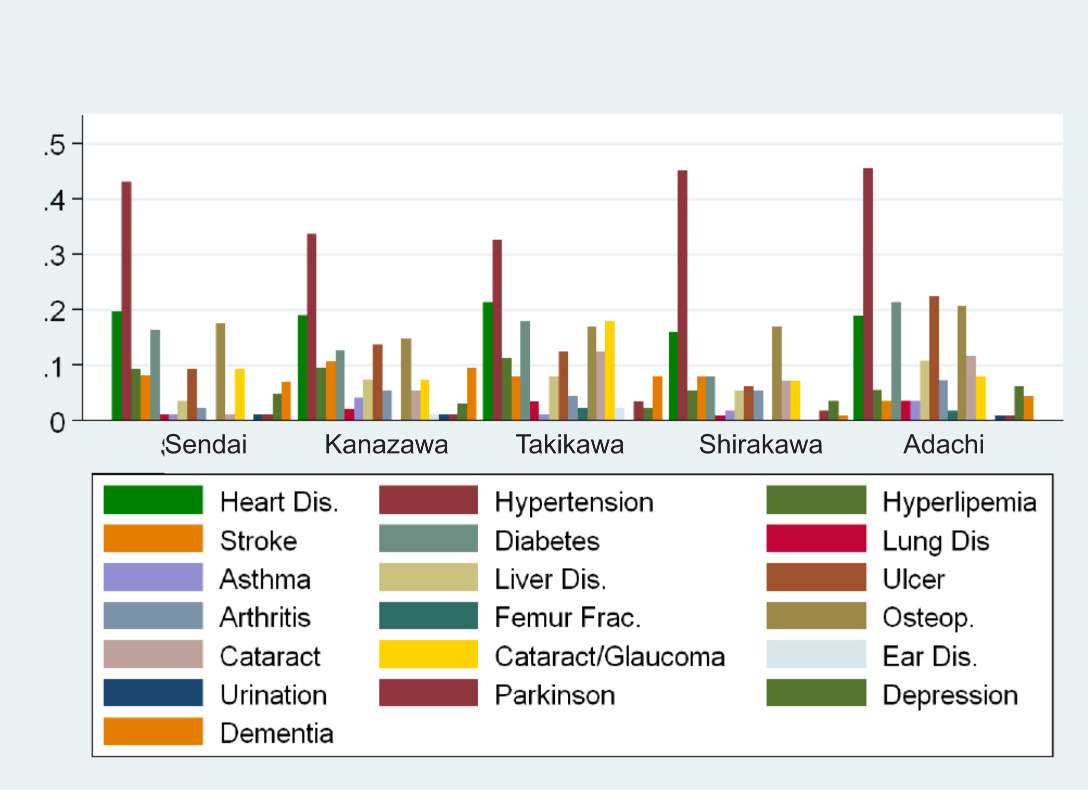

Figure 2-1-1-3 Prevalence of self-reported chronic diseases by municipality: males in 70s

Other age-related diseases such as cataract, arthritis, and hip fracture also showed increasing odds to age. Cataract was more frequently diagnosed in the 70s age group (22% for the 70s and 5% for the 50s) and in females (8.9% for males and 14.0% for females), but after adjusting for age and sex, there was no difference across municipalities. Arthritis and hip fracture was more often reported in those aged in their 70s, and among females. It is noteworthy that, even after adjusting for age and sex, Takikawa showed significantly higher prevalence of arthritis and hip fracture. Heavy snow in the winter months and related falling accidents may attribute to the difference, and further investigation in the following wave survey may be necessary.

The older respondents are not only likely to have a chronic condition, but also likely to have more numbers of chronic conditions. Those in their 50s had 0.9 disease conditions on average, while those in their 70s had 1.7 diseases per respondent on average. Due to physiological decline and high likelihood of multiple chronic conditions, older subjects are more likely to suffer functional decline in mobility, sensori-physical functioning, and IADL. Among respondents aged in their 70s, 32.6% had a limitation in more than one item of mobility, 15% in eyesight, 17% in hearing, 57% in chewing, and 15% in more than one item of IADL.

After adjusting for age and sex, Adachi and Takikawa showed significantly higher odds ratio for having more than two diseases (OR 1.47 ($p<0.001$) and 1.43 ($p=0.002$), respectively; Sendai as reference category), and having limitation in mobility and sensori-physical functioning (OR 1.52($p<0.001$) and OR 1.33($p=0.009$), respectively). Adachi also showed significantly higher odds ratio for having a limitation in IADL (OR 1.65 ($p=0.003$)).

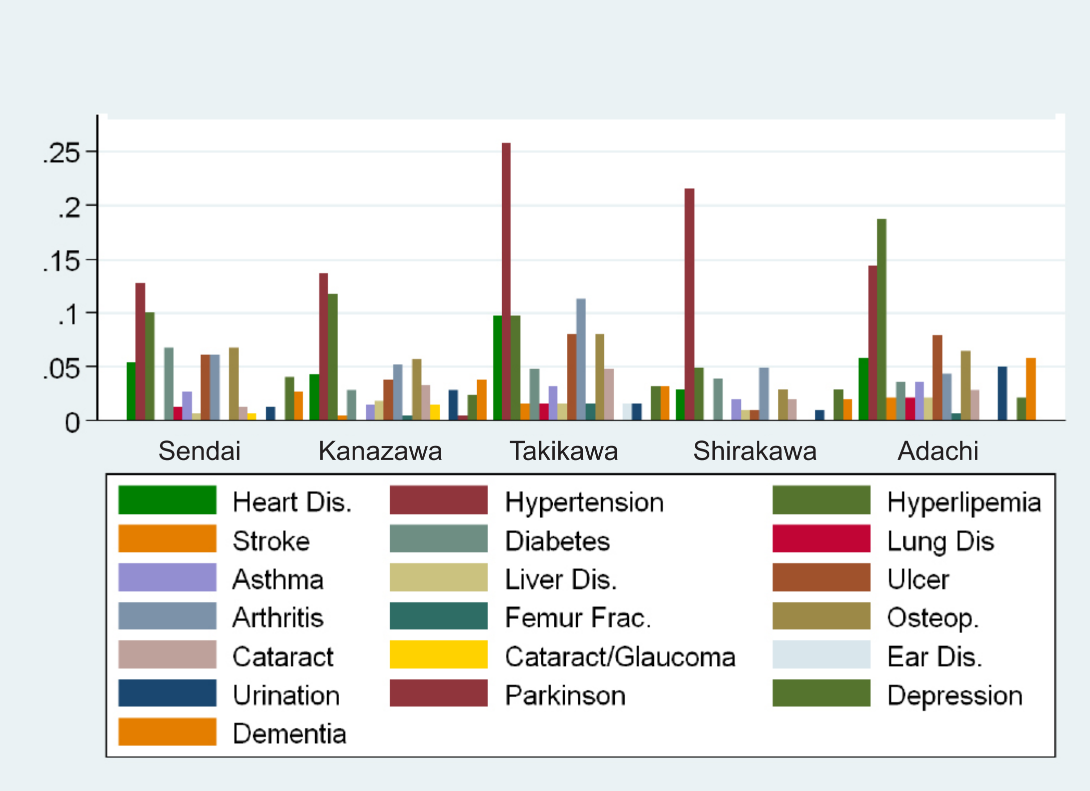

Figure 2-1-2-1 Prevalence of self-reported chronic diseases by municipality: females in 50s

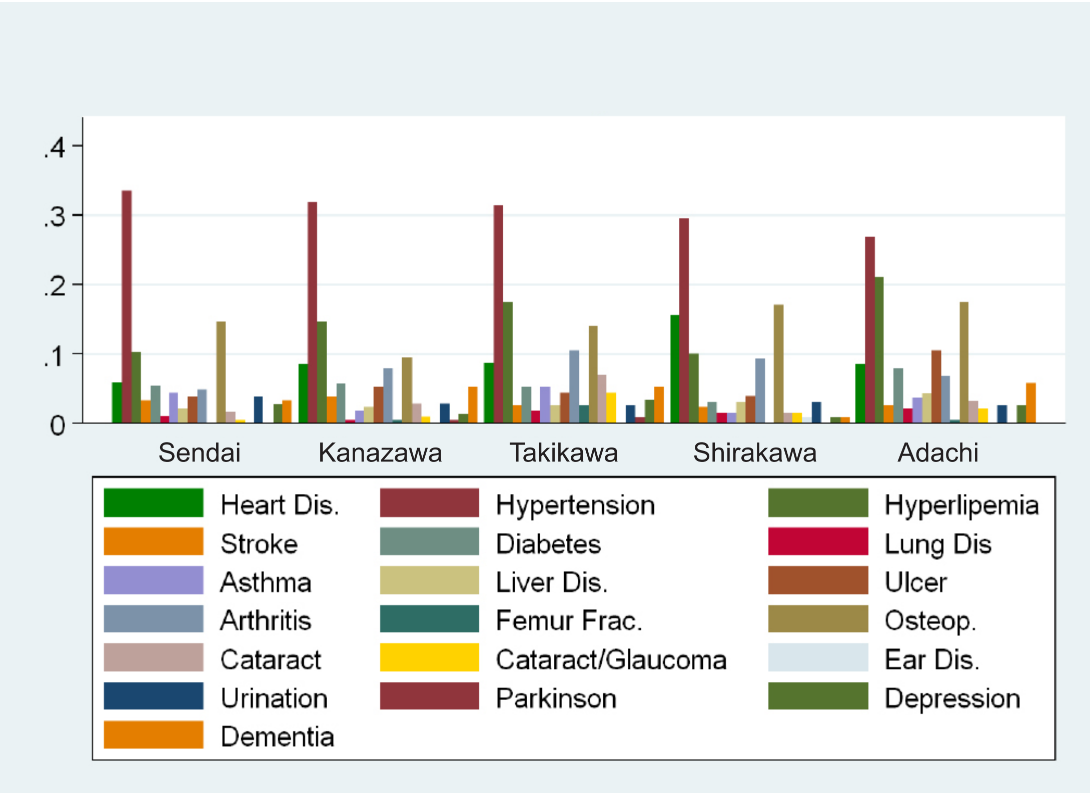

Figure 2-1-2-2 Prevalence of self-reported chronic diseases by municipality: females in 60s

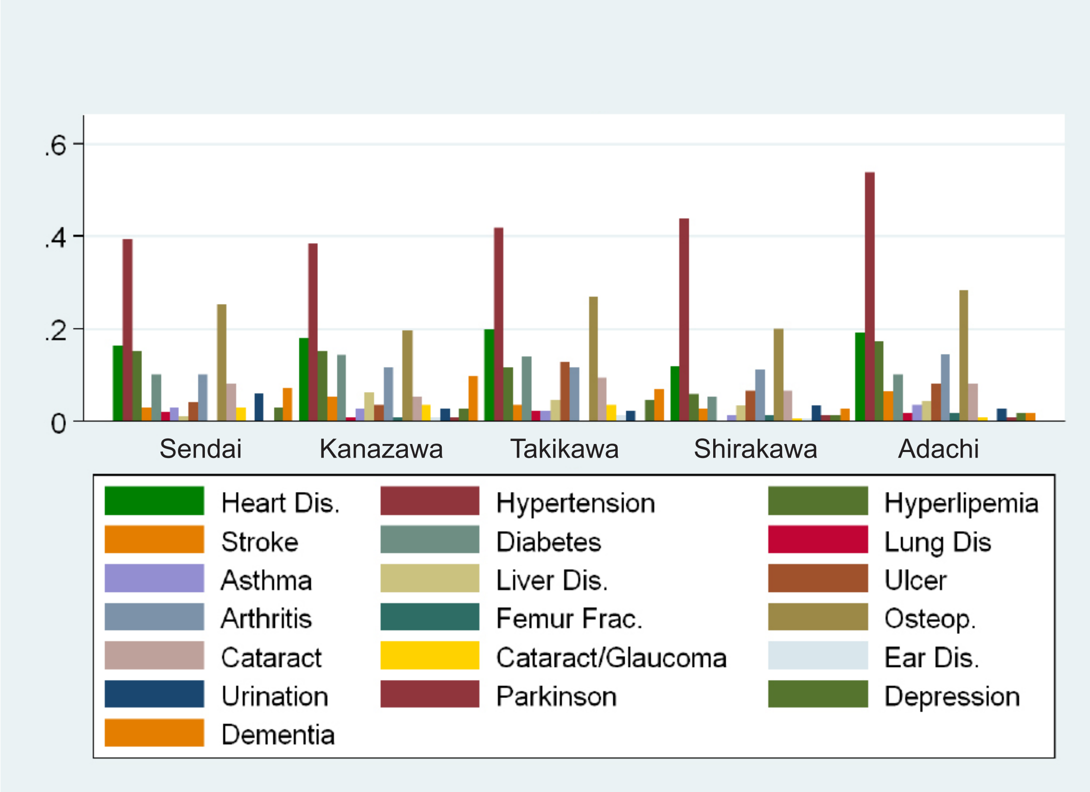

Figure 2-1-2-3 Prevalence of self-reported chronic diseases by municipality: females in 70s

Figure 2-1-3 shows the results for grip strength, which is often used as an objective measure of physical health and is known as a strong predictor of functional prognosis. The average measure was declined with age, and males showed higher measure than females in any age category. In the 50s, the average measure was close to 40 kilograms for males and 25 kilograms for females. There was not much difference in grip strength across municipalities, though the average for males in Adachi is somewhat lower. In the 70s, Adachi has the lowest average among all municipalities for both males and females. After adjusting for age and sex, Adachi showed significantly lower grip strength (-2.3kg compared to Sendai residents as reference). Whether these differences can be attributed to socioeconomic gradient of health across municipalities will be the topic in Section 2.3.

One caveat must be mentioned here. We should keep in mind that the method for measuring grip strength differs between SHARE and JSTAR even though both surveys use the same Smedley type dynamometer. The effect of the difference in the mode of grip strength measurement will be examined in a small pilot study and as part of the second wave survey.

As we have observed, the prevalence of health problems varies substantially across municipalities even in the same country. The determinants of such cross-regional variance attract research interests: they might be demographic, behavioral, or socio-economic attributes; the policy implication is accordingly quite different. JSTAR provides interesting opportunities for looking at differences across municipalities in the prevalence of health problems because it contains comprehensive measure of lifestyle behaviors, dietary habits, socioeconomic resources and medical service utilization.

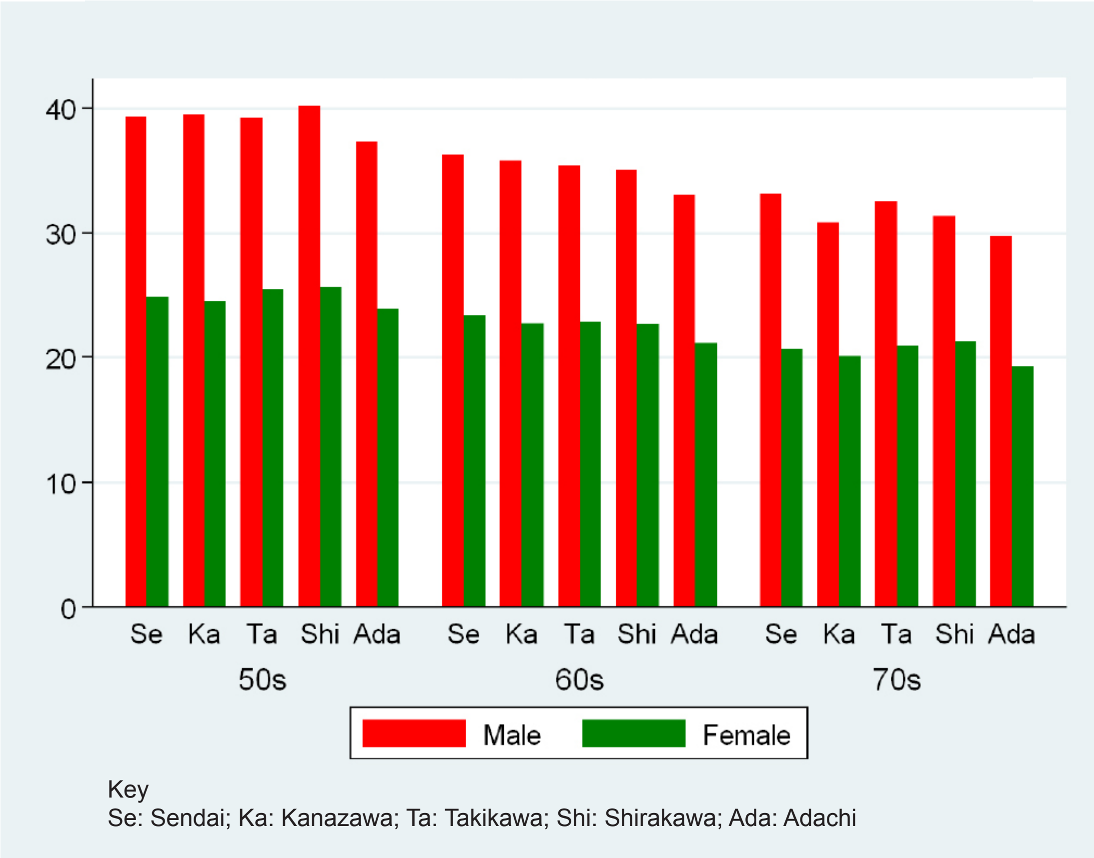

Figure 2-1-3 Grip strength by age and sex

However, JSTAR has just finished its first wave data collection, and it makes only cross-sectional data which limits the potential of the dataset for causal inference. The longitudinal data are critical for providing opportunities to better understand the inter-personal and cross-regional differences.

2.1.5 Conclusions

• Japan's unique characteristics of health and health care issues, especially the ambiguous combination of the longest average life expectancy and very low GDP ratio of medical expenditure, have considerable potential to formulate important lessons for health policy in other developed countries.

• As in European countries, in Japan the prevalence of physical health problems among the elderly is high, but there is substantial variation within the subjects. JSTAR has unusually rich variables on health and health care as well as social, economic, family and employment status, and allows us to explore a variety of issues related with health issues.

• Construction of longitudinal data after the second wave makes it possible to explore determinants of physical health problems among the elderly, especially to disentangle causal relationship between health and socioeconomic status, and to evaluate effectiveness of health policy.

2.2 Socioeconomic Disparities in Physical Health across Regions

2.2.1 Introduction

The disparity in health status across socioeconomic positions is considered as one of the "oldest" problems in modern societies. Japan is known as an egalitarian country compared to European countries, and some attribute the Japanese people's longest life expectancy to egalitarian social norms (Marmot & Smith 1989). However, even in Japan, the health gap between the rich and the poor is identified in various dimensions of health: e.g. self-reported health (Shibuya et al. 2002), all causes and disease specific mortality (Fukuda et al. 2005; Nakaya et al. 2005; Fujino et al. 2005), and physical and mental functions (Murata et al. 2008; Yamazaki et al. 2005). In Europe, the social gradient of health has been increasing in recent years (Mackenbach et al. 2003), though there is little empirical data in the Japanese case.

There has been a tremendous volume of policy debate on widening income inequality in Japan after the decade-long recession beginning in the early 1990s. Most of those debates focus only on economic disparity and often ignore health disparity. Although several epidemiological studies identifying socioeconomic disparity in health have been conducted, they do not adequately treat the endogenous problems between economic status and health status. Despite the importance to both academics and policymakers, a lack of data on both health and socioeconomic status has hampered the development of empirical research on socioeconomic positions and health.

Several factors contribute to difficulties in conducting studies of socioeconomic disparity in health. One is that income, educational attainment, and occupational class are inter-related yet have distinctive relationships with health status, health related behaviors, and access to economic and health resources. Thus, they should be concurrently measured and controlled. Previous epidemiological studies in Japan often failed to cover all of them. In the case of elderly population, especially, wealth and consumption rather than income are a better proxy for lifetime income, though no epidemiological studies have measured wealth and consumption so far. To the contrary, household economic studies measured income, consumption, and wealth, though they ignored health measurement. JSTAR includes household economic measurement in detail, and a set of various health measures as shown in the previous section.

Another major difficulty is that socioeconomic status and health are endogenous. Socioeconomic status discriminates in terms of access to health care and other health-supporting resources. Although the universal health insurance system covers all residents of Japan, it cannot be ignored that a portion of the lowest income group is not able to pay the insurance premium and thus loses eligibility to receive medical services at 10% co-payment. Socioeconomic status further discriminates in terms of the opportunity for social participation and social relationship, which affects mental health and functions among the elderly. (Murata et al. 2008) Inversely, health status affects the chance for social strata mobility. Such endogenous problems are not fully solved with panel data collection per se, as often claimed by epidemiological studies. Panel data with comprehensive measurements allows researchers to use adequate analytic techniques to overcome endogenous problems.

JSTAR enables us to perform in-depth examination of the nature and size of health disparities and of the relationship between health and socioeconomic status in a way comparable to SHARE. This subsection provides an overview of socioeconomic disparities in physical health in Japan. The main message is that Japan, which is often considered a relatively homogenous and egalitarian country, has serious health disparity across socioeconomic positions, and the size of the effect cannot be ignored. As in European countries, persons in the lower socioeconomic classes experience disproportionate burden of morbidity and disability. The government should pay close attention to these facts and reform public policies toward mitigating the disparities in health status across socioeconomic status.

In what follows, we use educational level as an indicator to represent socioeconomic status, as the SHARE report did. Educational attainment is a proxy for lifetime income while household income, another candidate to measure socioeconomic status, fluctuates and varies across life stages, especially for those at the time of retirement. Educational attainment may also be related to skills and knowledge for healthier lifestyles. In Japan, elementary and junior high school education (nine years) is compulsory. We divide the sample into those with compulsory education only (which corresponds to Levels 0-2 (pre-primary, primary and lower secondary education) defined by ISCED (international standard classification of education) (UNESCO 1997) and those with higher educational attainment.

The 2000 Census collected educational attainment of the Japanese population (note that the 2005 Census did not collect education data). We can estimate the proportion of those with compulsory education from the 2000 statistics, assuming that the attrition pattern since then would be equal regardless of the level of educational attainment. Thus, we simply regard here that those in age group 50-54 in 2000 would reach age 55-59 in 2005. Therefore, the proportion of those with compulsory education would be 21.2% in the 54-59 age group for both sexes, while the corresponding number in the JSTAR sample was 17.9% for males and 14.4% for females. The proportion in the 60s age group would be 32.7% for males and 36.8% for females in the Census, while it is 37.8% for males and 41.8% for females in the JSTAR sample. The proportion in age group 70-74 would be 42.3% for males and 46.3% for females in the Census, while it is 54.3% for males and 58.0% for females in JSTAR. Thus, compared to the national Census, the JSTAR sample includes a larger portion of those with primary education attainment. This is largely because the sample in Shirakawa had a dominantly large portion of those with primary education: 71% of males and 74% of females in their 60s were of primary education attainment.

Another indicator of socioeconomic status is household income, but caution must be paid. The unit of survey in JSTAR as well as in SHARE is the individual, not the household. And the household is defined as a couple (if married) and their economic dependents, if any. For example, if a woman is a homemaker and does not earn income, her individual income is measured as zero. In JSTAR and SHARE, the spouse's income is also measured. Therefore, household income is defined as the sum of the income of each individual member of the two-member household. To obtain equivalent household income adjusted for household size, we divided the value of income by the square root of the number that is the sum of the couple, their dependent children and parents living together, assuming these parents are economically dependent, which may not always be the case.

In order to illustrate socioeconomic disparities in health, we calculated age-adjusted odds ratios, as the SHARE report did, since age is the strongest predictor of health status, and age is also related to educational attainment. The odds ratio compares the risk of disease or disability between low vs. middle/high educational groups, and between lower vs. upper of median income groups. An odds ratio of 1 indicates that there are no differences between the two groups. And odds ratio larger than 1 indicates a higher risk of disease/disability among the lower socioeconomic group. For example, an odds ratio of 1.3 means that the lower socioeconomic group has a 30% higher chance of disease/disability status, compared to their higher socioeconomic counterpart. We also include municipalities as dummy variables to compare across municipalities.

2.2.2 Physical Health Problems across Socioeconomic Status

Figures 2-2-1, 2-2-2, and 2-2-3 illustrate odds ratios of educational attainment for perceived health status less than “very good” (in the US version questionnaire), ADL limitations, and IADL limitations, respectively. Figures 2-2-4, 2-2-5, and 2-2-6 illustrate odds ratios of equivalent household income for perceived health and ADL/IADL limitations.

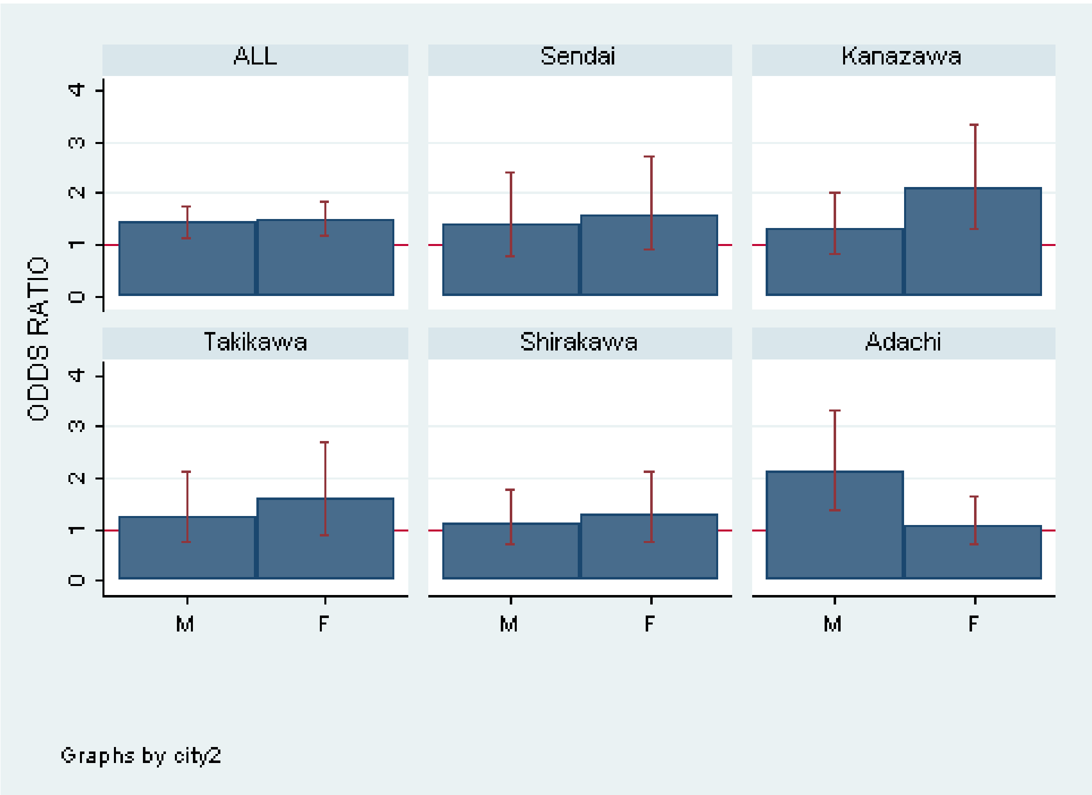

Figure 2-2-1 Perceived health status vs. education

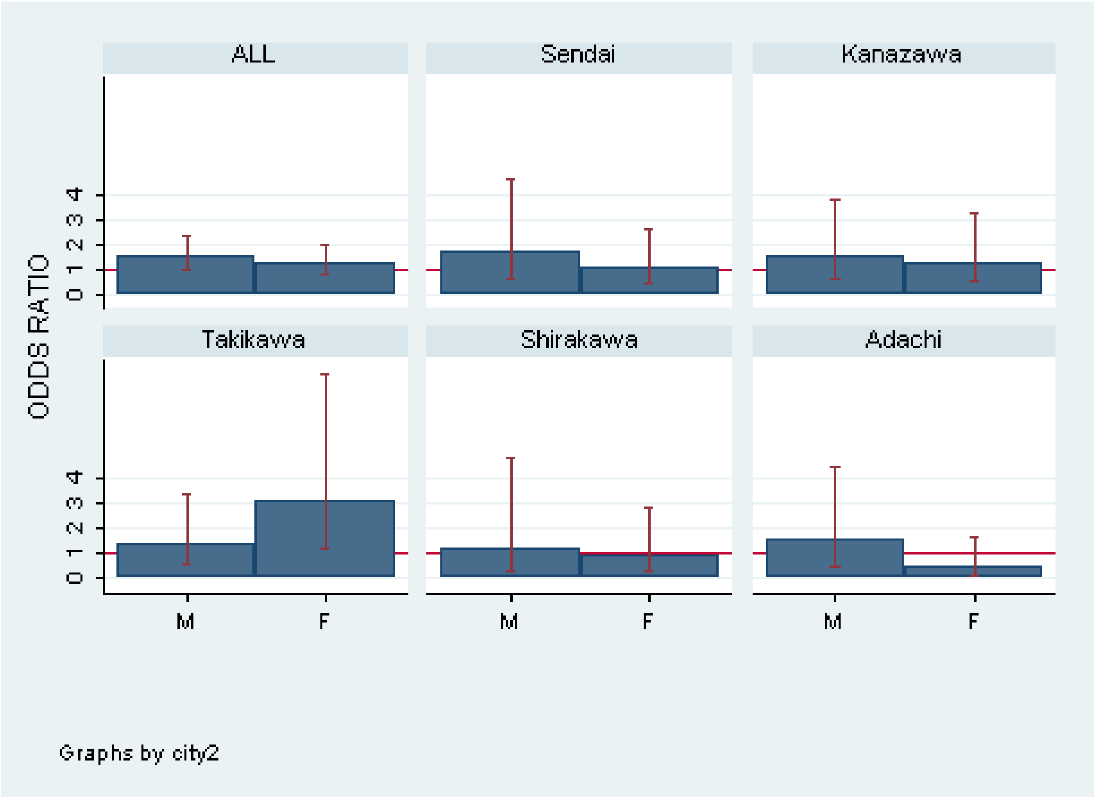

Figure 2-2-2 ADL limitations vs. education

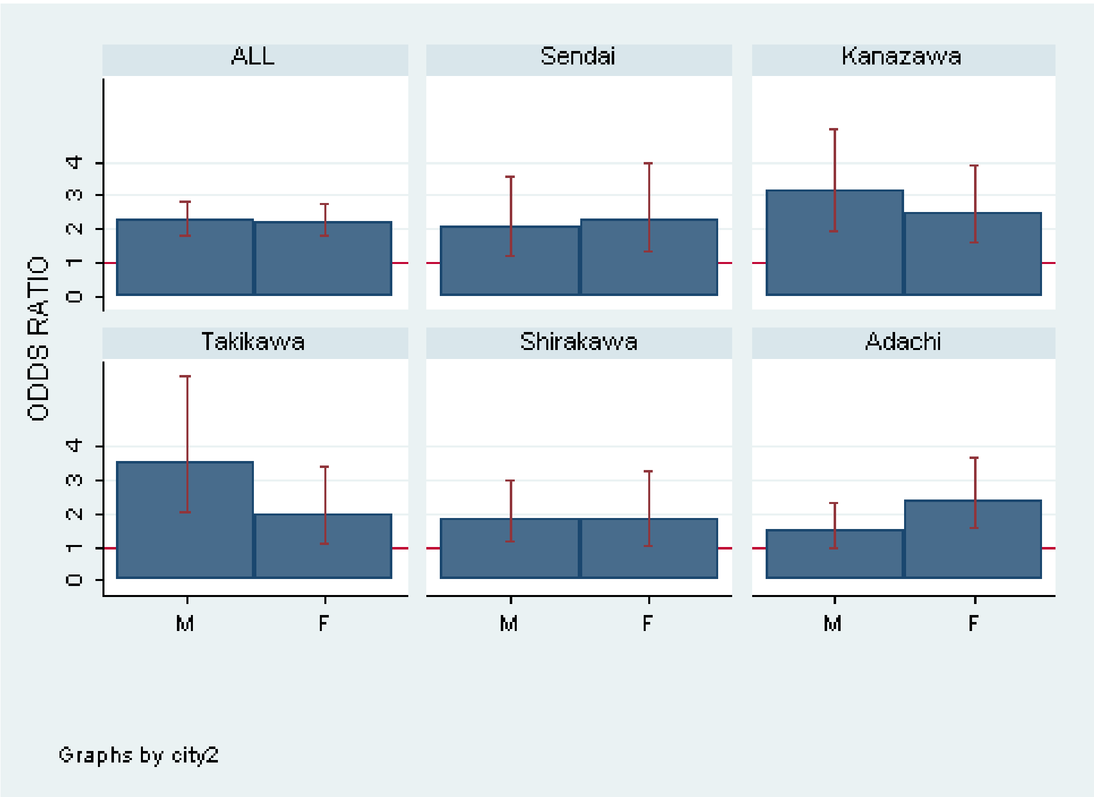

Figure 2-2-3 IADL limitations vs. education

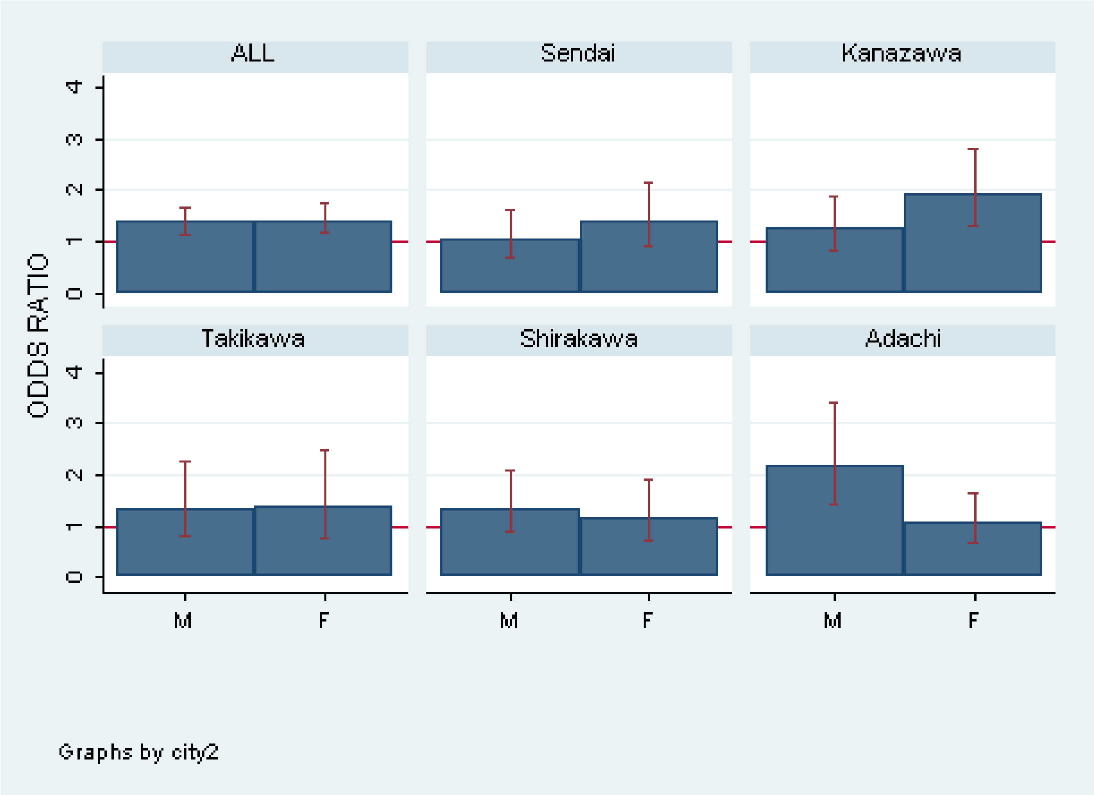

Figure 2-2-4 Perceived health status vs. equivalent household income

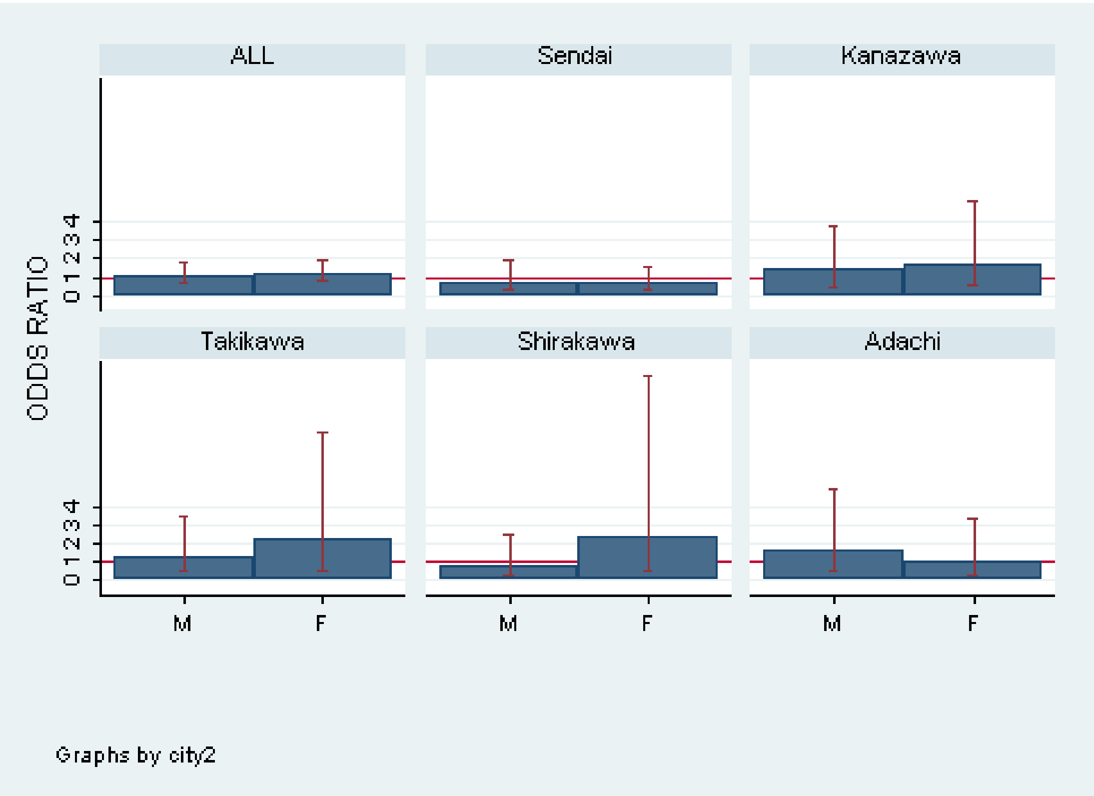

Figure 2-2-5 ADL limitations vs. equivalent household income

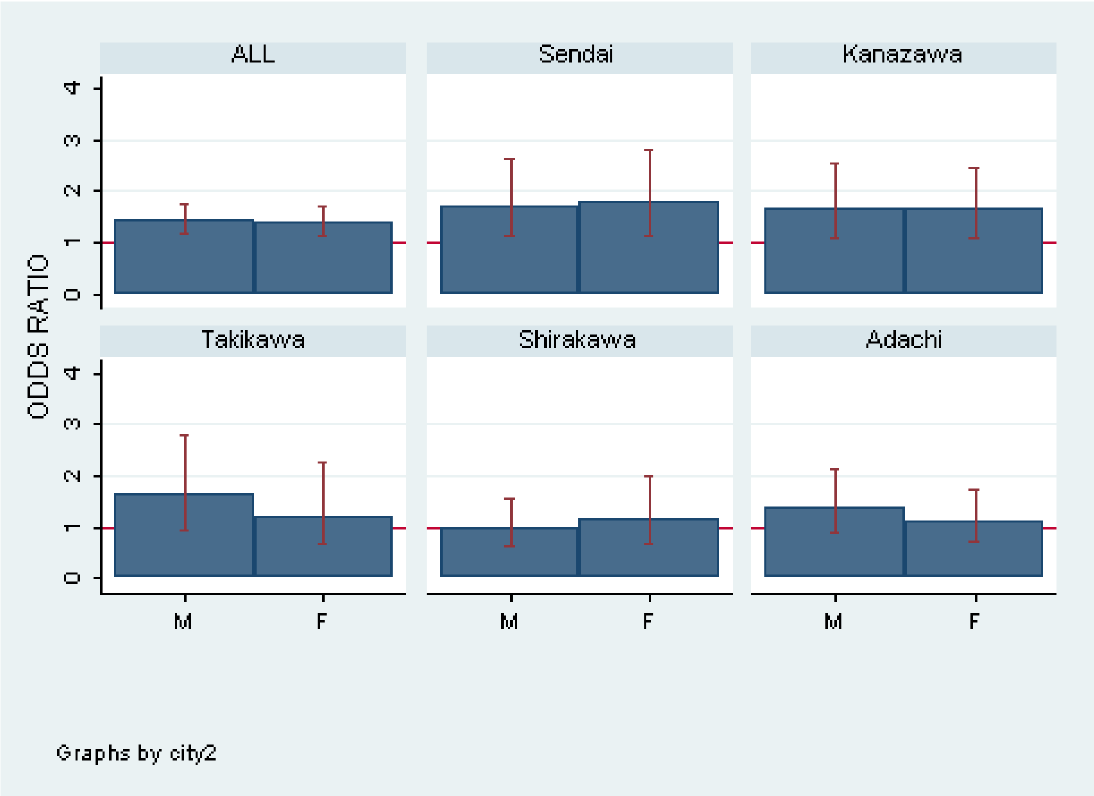

Figure 2-2-6 IADL limitations vs. equivalent household income

As a whole, odds ratios of lower education attainment for reporting self-perceived health less than "very good" were 1.42 [1.15-1.75 for 95% confidence interval, or CI] for males and 1.46 [1.18-1.81] for females, after adjusting for age and municipalities (Figure 2-2-1, left upper graph). The impact of lower educational attainment was observed the most saliently among females in Kanazawa, and males in Adachi.

In the males category, the odds ratio of lower educational attainment for ADL limitation was marginally significant (OR 1.50 [0.96-2.33]) adjusting for age and municipalities, though the measure was not significant among females (OR 1.27 [0.83-1.95]) (Figure 2-2-2, left upper graph). There were no significant differences across municipalities for males, but there were higher odds for ADL limitation among females in Takikawa, compared to those in the other municipalities.

IADL limitation showed highly significant associations with educational attainment in both sexes. The odds ratio of lower education for IADL limitations after adjusting for age and municipalities was 2.24 [1.81-2.79] for males and 2.22 [1.78-2.78] for females (Figure 2-2-3, upper left graph).

Household equivalent income was also significantly related to self-perceived health status and IADL limitations. The odds ratio of health status less than "very good" in the lower income category was 1.37 [1.13-1.67] for males and 1.41 [1.16-1.73] for females, adjusting for age and municipalities (Figure 2-2-4, upper left graph). The odds ratio of ADL limitation was not significant in both genders (Figure 2-2-5). The odds ratio of IADL limitation was 1.44 [1.18-1.76] for males and 1.39 [1.12-1.72] for females (Figure 2-2-6).

We also tested interaction terms between socioeconomic dummies and demographic dummies (age and sex). None except for interaction between education and age on IADL limitation were significant (p=0.02, not shown in figures), The impact of lower educational attainment on IADL limitation was significantly lower among those in their 70s compared to younger categories. That is, since IADL limitation is strongly age-dependent, the impact of educational attainment is “diluted” by the effect of age in older strata.

Figures 2-2-7-1 to 2-2-7-6 report the odds ratios of having specific chronic diseases according to educational attainment. After adjusting for age, the prevalence of heart disease and hypertension were not related to educational attainment in either sex (Figures 2-2-7-1 and 2-2-7-2, respectively). The exception was females in Sendai, where the odds ratio of lower education for hypertension was 2.04 [1.16-3.58].

The odds ratios of the prevalence of hyperlipidemia was less than 1: that is, lower education was protective against hyperlipidemia; odds ratios adjusted for age were 0.63 [0.43-0.92] for males, and 0.69 [0.50-0.94] for females (Figure 2-2-7-3). The results are similar for equivalent household income (data not shown). Higher income was associated with higher odds of being diagnosed as hyperlipidemia. The negative association between socioeconomic status and hyperlipidemia was also found in males in the SHARE sample. It is speculated that economic accessibility to meat and other fat containing foods may be the culprit.

JSTAR includes a detailed food frequency questionnaire, which is not available in SHARE. Fat Calorie Ratio (FCR) is a ratio of fat energy intake to total energy intake, and the national recommendation in Japan is 25%. After adjusting for age and sex, middle/higher educational attainment compared to preliminary education attainment was related to increase in FCR by 1~1.4 % in the JSTAR sample (data not shown in figures). This finding may give some explanation to the association between hyperlipidemia and educational levels.

Unexpectedly, odds ratios for the prevalence of diabetes were not significant, and the point-estimate of the odds ratio of lower education was larger than 1 (1.25 [0.60-2.58] for males and 1.44 [0.96-2.16] for females) (Figure 2-2-7-4). Interestingly, the odds ratio of lower household income was less than 1 (0.88 [0.67-1.14] for males and 0.94 [0/65-1.34] for females) (not shown in figures). Why lower education was positively related to diabetes prevalence while it was negatively related to hyperlipidemia needs in-depth analysis, because lower FCR among the lower educational group appears contradictory to the higher prevalence of diabetes.

For other disease statuses, figures will be shown by sex, but they are combined across municipalities because the prevalence is low. The odds ratios are adjusted for age and municipalities.

Stroke was significantly related with educational attainment among males. Odds ratios of lower education was 2.13 [1.34-3.39] for males after adjusting for age and municipalities. For females the association was only marginal (OR 1.76 [0.95-3.24]) (Figure 2-2-7-5). The interaction between sex and education was not significant. Thus, the difference would be mainly due to the sex difference in baseline prevalence of stroke.

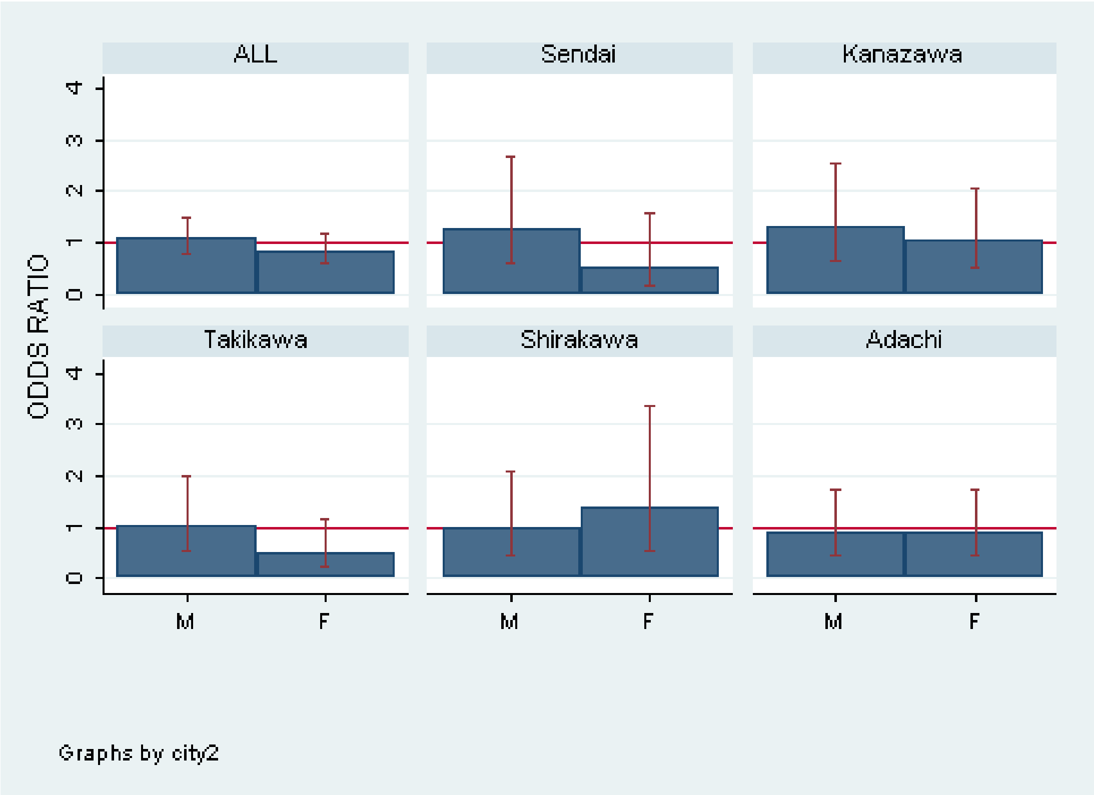

Figure 2-2-7-1 Heart disease prevalence vs. education

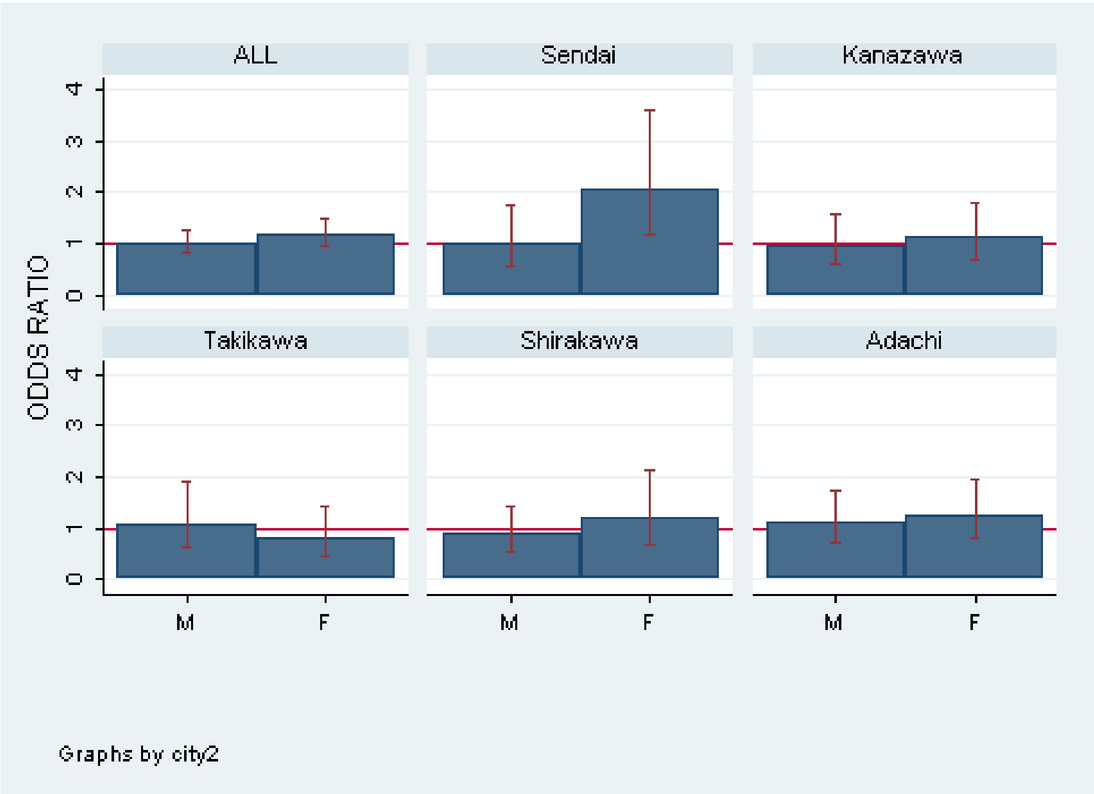

Figure 2-2-7-2 Hypertension prevalence vs. education

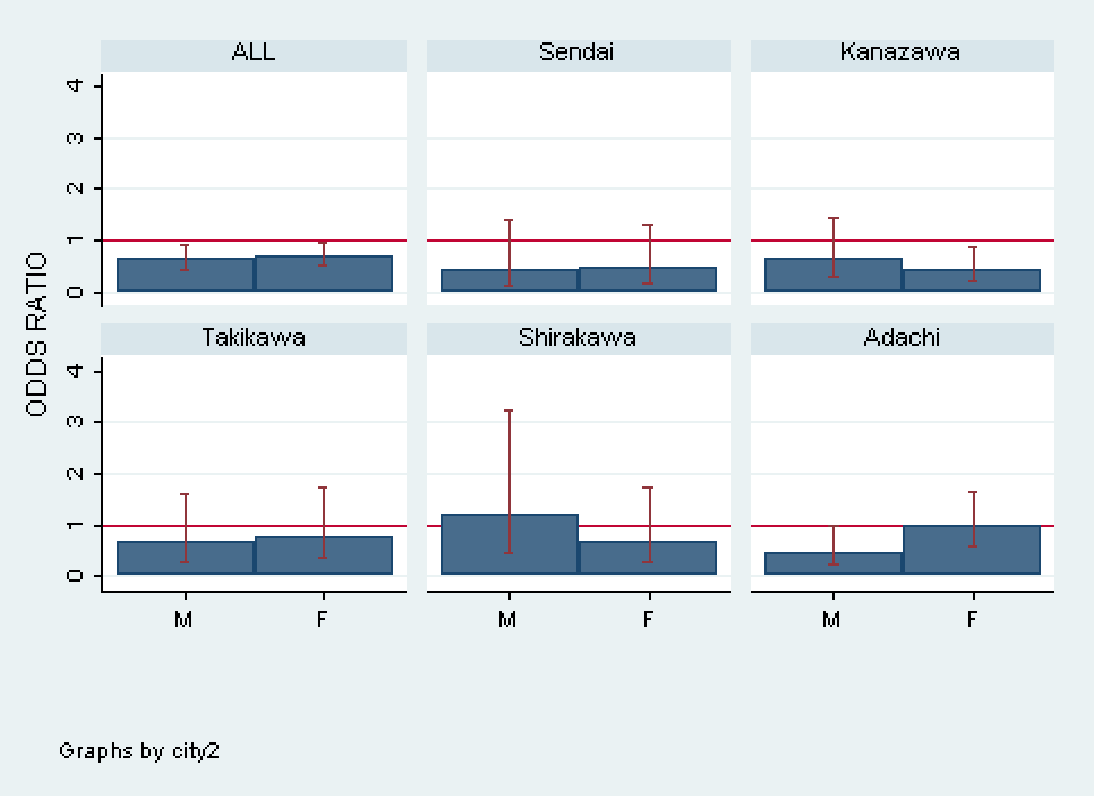

Figure 2-2-7-3 Hyperlipidemia prevalence vs. education

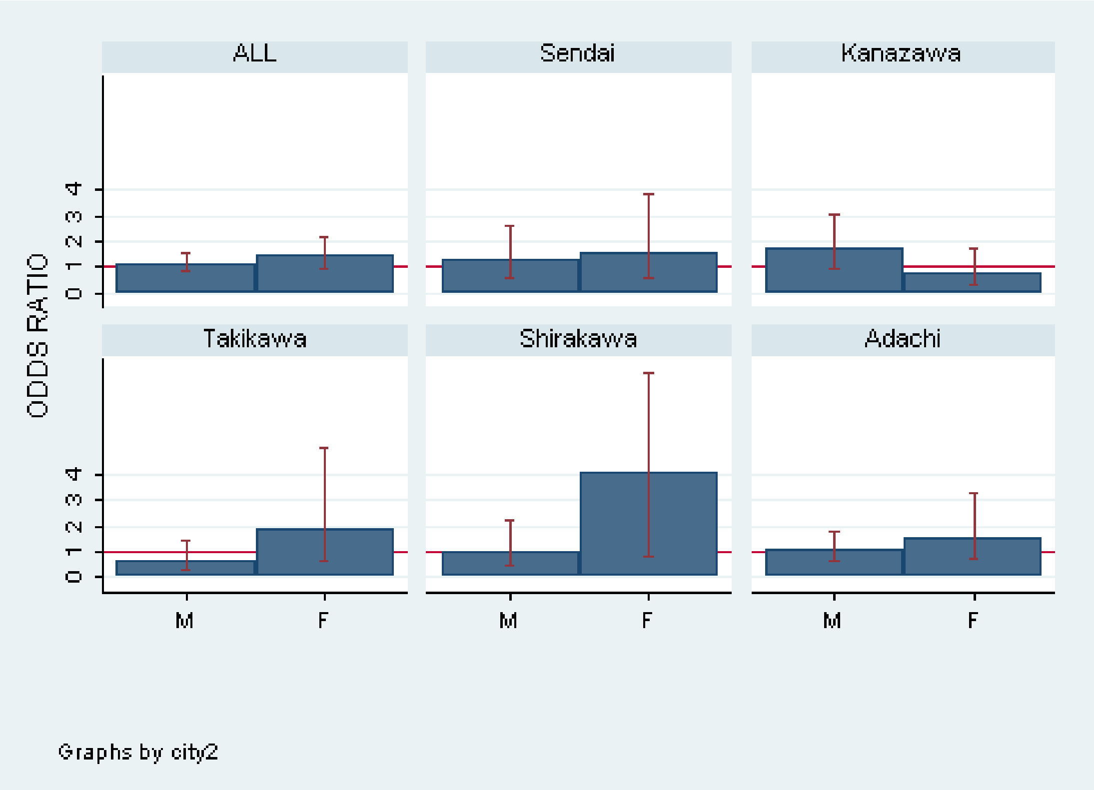

Figure 2-2-7-4 Diabetes prevalence vs. education

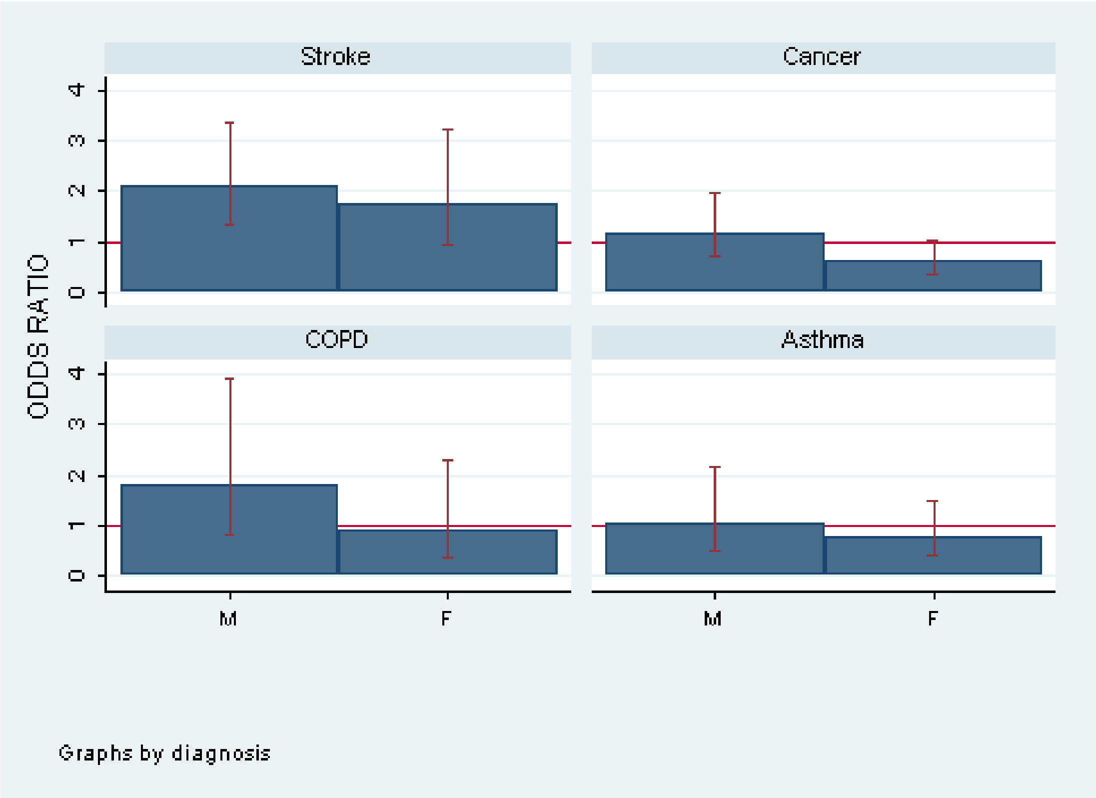

Figure 2-2-7-5 Other disease prevalence vs. education

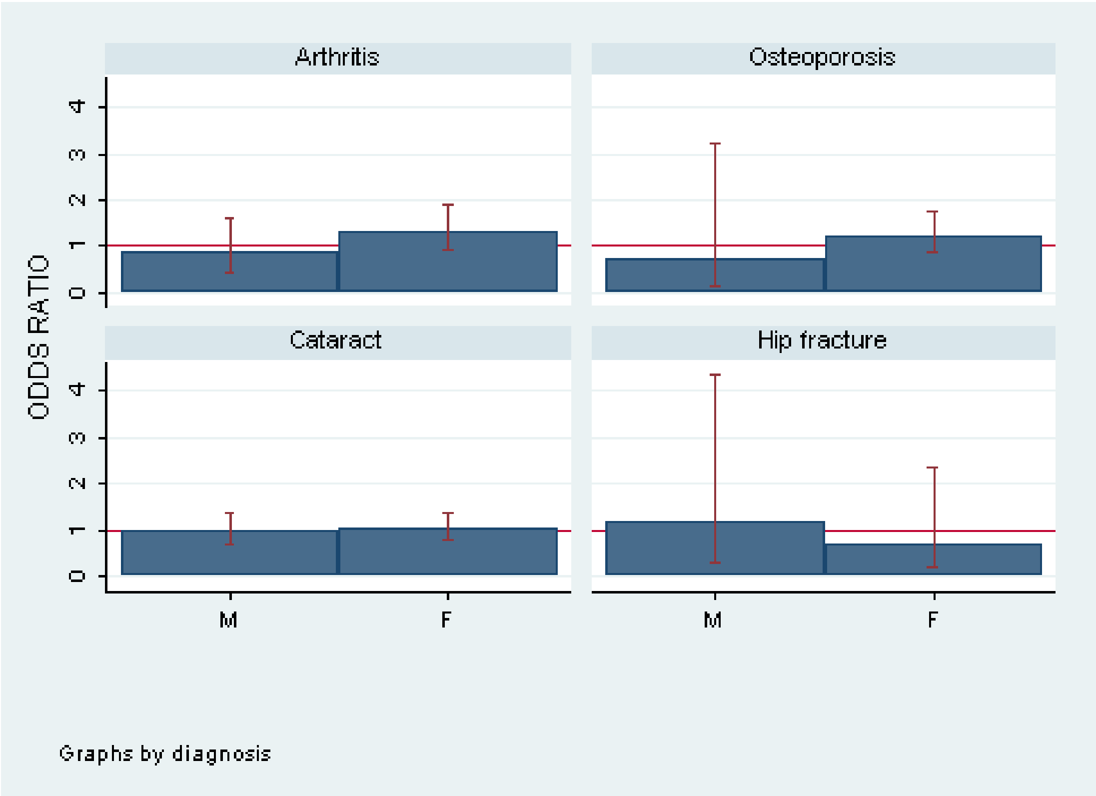

Figure 2-2-7-6 Other disease prevalence vs. education

Cancer was not associated with educational attainment or household income among males. Among females, prevalence of cancer was marginally associated with lower educational attainment: OR 0.61 [0.36-1.03] (Figure 2-2-7-5). The negative association between cancer prevalence and educational attainment was also found in the SHARE sample in both sexes. The SHARE researchers interpret the results in that those in lower socioeconomic groups suffer a higher cancer incidence and higher case fatality, which reduces the prevalence among those in lower class (Schrijvers et al. 1995). That is, the lower prevalence of cancer in lower educational attainment was not due to a lower chance of getting cancer, but a higher chance of dying earlier of cancer. Whether or not the argument holds true in the Japanese case has to wait for follow-up surveys in JSTAR. Fujino et al. reported in their longitudinal survey of community residents aged over 50 that educational attainment was positively and significantly related to mortality due to cancer among males, and a non-significant but positive gradient was observed among females, after adjusting for age, smoking habits, and occupational types (Fujino et al. 2005). However, they failed to control for income.

COPD seemed associated with lower educational attainment among males (OR: 1.80 [0.82-3.92]) but not among females. It may be related to smoking behavior which was more prevalent among younger males with lower educational attainment. Arthritis prevalence was only marginally associated with lower education among females (OR 1.31 [0.91-1.90]) (Figure 2-2-7-6). Otherwise, there was no remarkable association found in cataract, osteoporosis, or hip fracture.

We did notice the gender gap in the share of having diseases, especially stroke, diabetes, arthritis, or ulcer. What is more interesting is the variation across gender and municipalities. We see a very high prevalence of heart disease in Takikawa (males), hypertension in Sendai (females), stroke in Takikawa (males) and cancer in Takikawa (males). As discussed in a following subsection of health behavior, several factors such as smoking and dietary habits might be responsible for those differences.

2.2.3 Physical Functioning Limitations across Socioeconomic Status

Limitation in mobility was significantly associated with lower educational attainment. After adjusting for age and municipality, odds ratios of lower educational attainment for the limitation were 2.23 [1.66-3.03] for males and 1.56 [1.22-2.00] for females (Figure 2-2-8-1). A significant difference across municipalities was also found for females. Even after adjusting for age, females in Shirakawa had significantly lower odds for reporting limited mobility, whereas those in Takikawa showed significantly higher odds for mobility limitation. The difference remains even after adjusting for household income levels and educational attainment.

Limitation in sensori-physical functioning (e.g. eyesight and hearing) also showed an educational gradient. Adjusting for age, males with lower educational attainment had significantly higher odds of having eyesight limitation (OR 1.44 [1.05-1.98]) (Figure 2-2-8-2), and hearing limitation (OR 1.83 [1.35-2.49]) (Figure 2-2-8-3). Female counterparts showed a non-significant but positive relationship (OR 1.25 [0.92-1.78] for eyesight and 1.29[0.86-1.92] for hearing). Limitation in chewing function was significantly related to lower educational attainment in both sexes (1.37 [1.11-1.70] for males, and 1.36 [1.09-1.69] for females) (Figure 2-2-8-4). After adjusting for age and sex, there were no significant differences across municipalities.

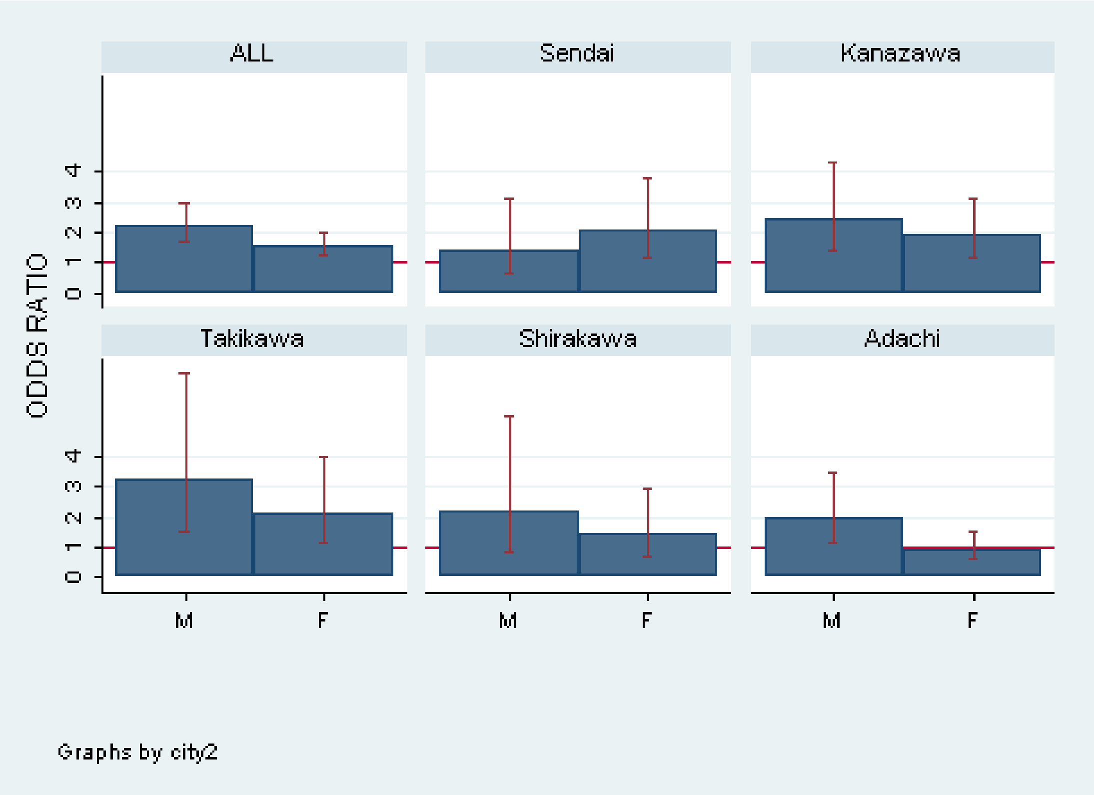

Figure 2-2-8-1 Limitation in mobility vs. education

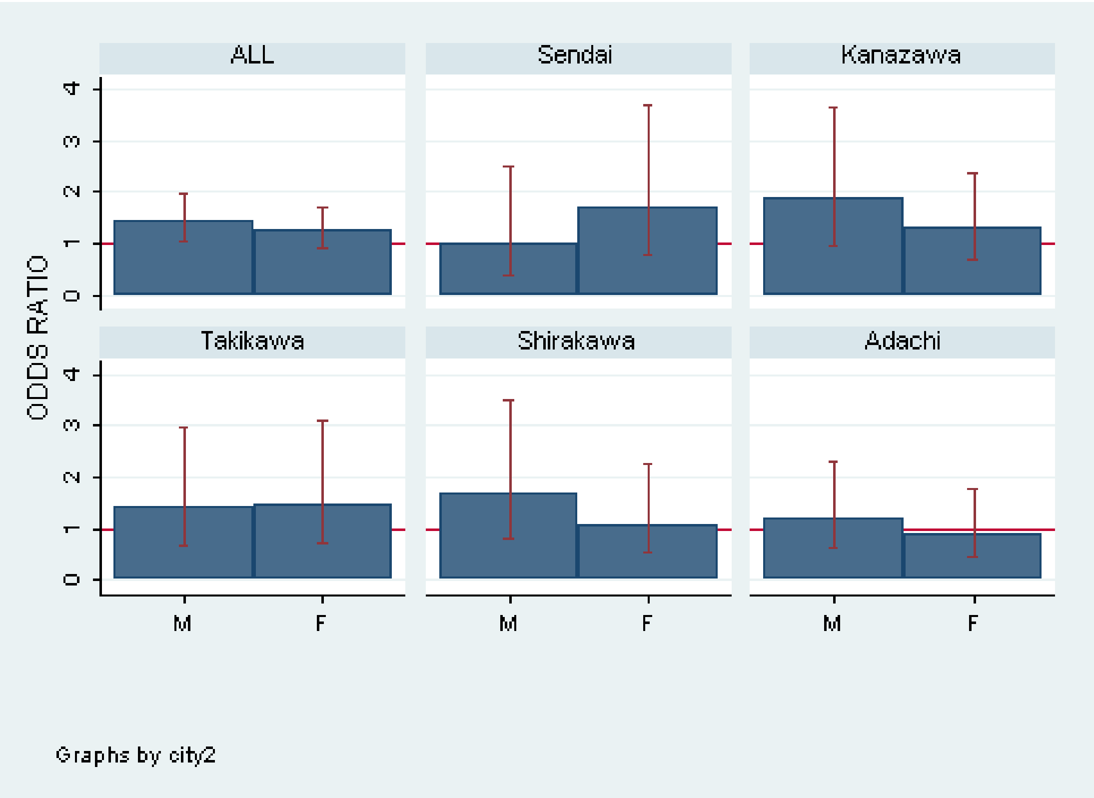

Figure 2-2-8-2 Limitation in eyesight vs. education

This pattern is confirmed even by grip strength, which is one of the objective physical health functioning and strength predictors of functional and life prognosis (Rantanen et al. 1999). After adjusting for age, sex, and municipalities, those belonging to the lower educational attainment category had significantly lower grip strength, and the effect was larger among males than among females (interaction between sex and education $p<0.001$) (data not shown in figures). Males with lower educational attainment showed lower grip strength by 1.69kg compared to those with high school or higher education. The female counterpart showed less grip strength by 0.77kg. The results remained significant even after adjusting for height.

Since the pattern of socioeconomic disparity was similar across different measurements of physical functioning, it would strongly suggest that those with a lower socioeconomic status suffer more from physical limitations and burdens in daily life. This finding is consistent with previous studies in Europe (Cambois et al. 2001; Huisman et al. 2003) and in Japan (Ishizaki et al. 2002).

SHARE provides further evidence on the relationship between health and socioeconomic disparities in all European Countries. That is, throughout Europe, the most disadvantaged socioeconomic groups have a higher prevalence of physical health problems than those in a higher socioeconomic status.

In general, we observe the same pattern in the relationship between health and socioeconomic status in Japan, and the magnitude of disparity varies across regions. The finding in this subsection poses a serious challenge for both Japan and European countries operating a universal health care system. Even under the universal health care system, we see a substantial disparity among people with different socioeconomic positions. The disparity is not random but is clearly concentrated on the disadvantageous group. This implies that a universal health care system is not enough to mitigate health disparities, and that policies should pay more attention to root causes of socioeconomic disparities in health. The finding also suggests that regional factors amplify or mitigate socioeconomic disparity in health even though they share the universal health care system. What constitutes regional difference invites further investigation.

Some studies have found that socioeconomic disparities in health are largely the result of socioeconomic disparities in adverse material circumstances (van Lenthe et al. 2004). Others found socioeconomic disparities in risk behaviors such as smoking, alcohol taking, or diet (we will explore these factors in later subsections). In either case, the current policy debates focusing simply on income inequality might be superficial, and policy reforms to equalize access to health care can be a partial remedy for the health disparity. Previous studies in Europe found higher health care utilization in the lower income group is due partly to lower labor participation. As such, non-health sector policy also affects people's health and related utilization. Thus, comprehensive and structural social policy debate, ranging across health care, education, health promotion, economic, and labor aspects may be required to achieve health equality (Marmot 2004; Kondo 2005). Large and comprehensive datasets that SHARE and JSTAR can provide in further follow-up surveys will be promising contributions to such empirical policy debates.

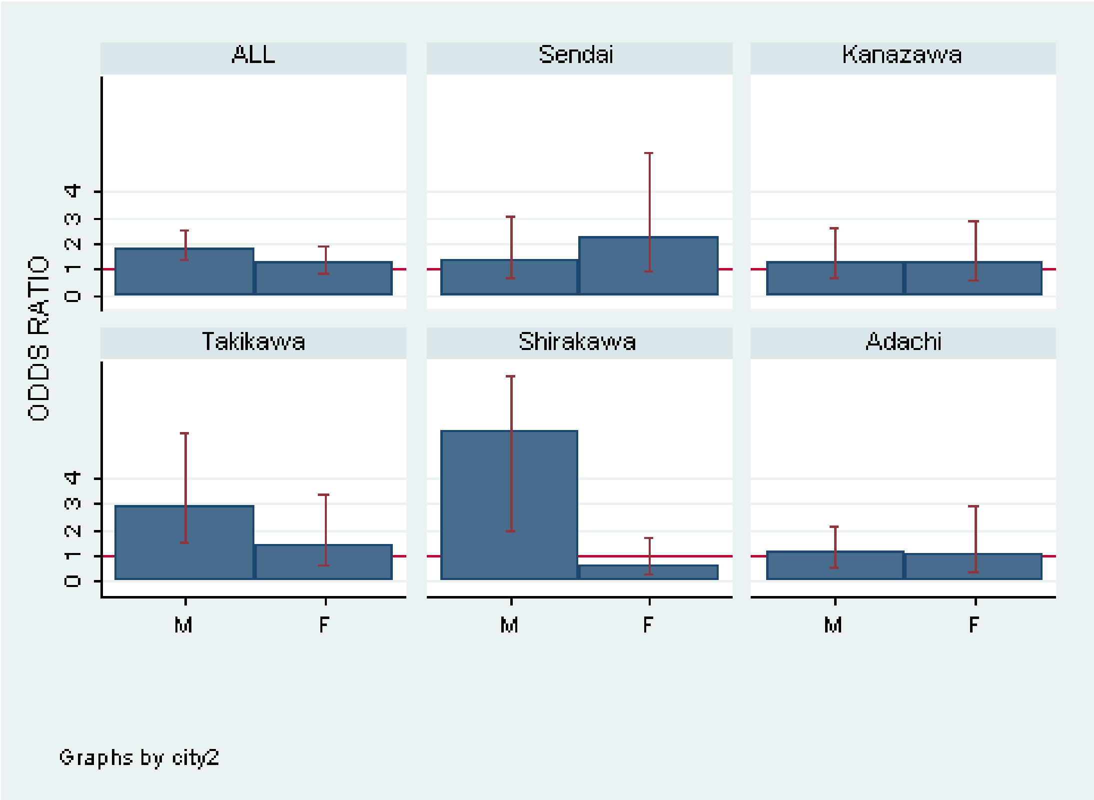

Figure 2-2-8-3 Limitation in hearing vs. education

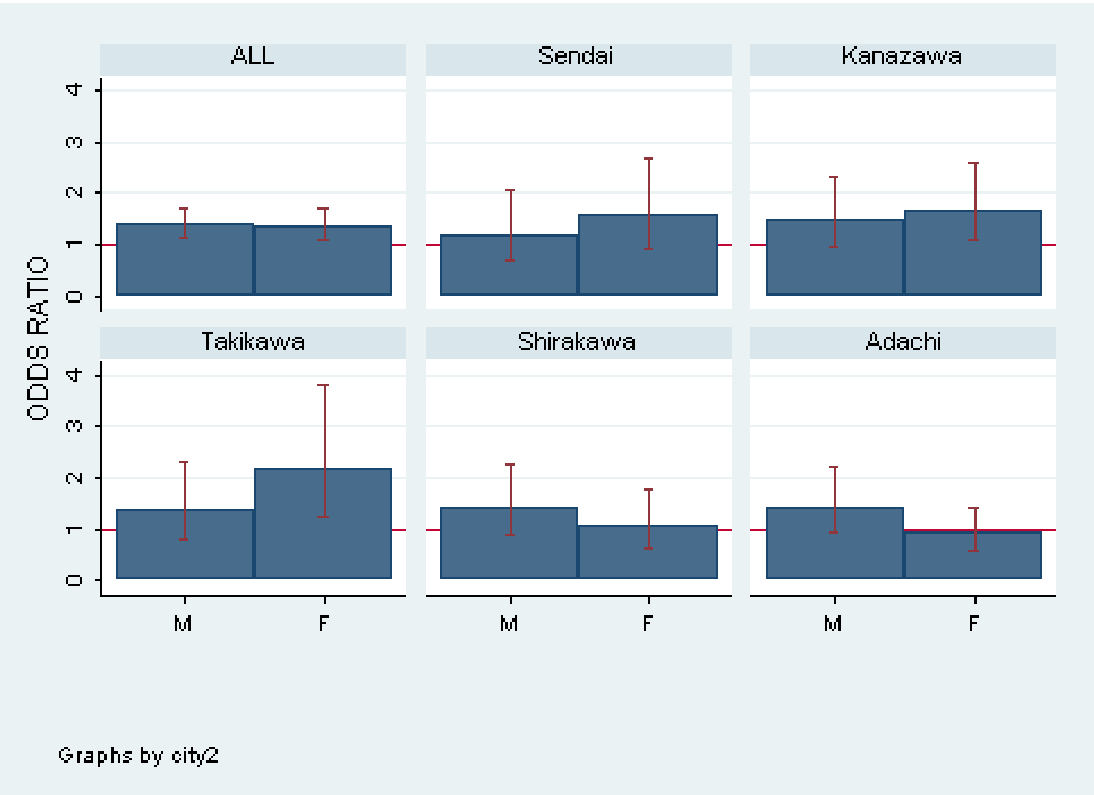

Figure 2-2-8-4 Limitation in chewing vs. education

2.2.4 Conclusions

• Within Japan, where universal health care insurance covers all residents, there are substantial variations in physical health and functioning depending on socioeconomic status.

• There is an endogenous relation between health and socioeconomic status. The health disparities seem not to be remedied by a universal health care program alone, and more fundamental social policies should be tailored towards disadvantaged groups.

• Longitudinal data are necessary to identify what policy measures can mitigate health disparities and socioeconomic disparities and how effective they are.

2.3 Cross-Regional Differences in General Health

2.3.1 Introduction

Self-reported health status is a useful indicator of individual health and serves as a predictor of mortality (Idler & Benyamini 1997). Due to the relative ease of obtaining the data, many studies have relied on self-perceived health status as the measure for the individual overall health condition and estimated relationship between health status and variables of interest. At the same time, a number of studies insisted that the self-reported perception of health status may not be comparable across countries or individuals (Kapteyn, Smith, & van Soest 2007) since some people are more likely, while others are less likely, to rate themselves as having a better health status, even when that status is objectively measured as identical. For example, Americans show a tendency to choose extreme answers while European and Japanese people tend to avoid extreme answers in general (Hayashi & Kuroda 1997).

Thus, while the self-reported health status is useful, we should be careful in comparing subjective health status across individuals, regions, and countries. Each respondent may have his or her own particular reference in evaluating the individual health condition. In Europe, Groot (2000) and Van Doorslaer and Gerdtham (2003) found that older persons are more likely to rate their status as better than otherwise comparable younger respondents. As a result, age-gradient of self-reported health may underestimate the decline in true health. In Japan to date, however, study on biases in self-reported health across different age strata has been scarce. Hayashi and Kuroda (1997) reported that Japanese have a tendency to choose the middle-response category in general, and younger rather than elderly respondents show the tendency at a higher rate.

While SHARE has to confront the issue of response differences derived from different habitual language use, JSTAR respondents share same language, and are less likely to be susceptible to bias in response due to different connotations. However, we should still keep in mind that the same word can be perceived and interpreted differently among individuals with different attributes, even in the same country.

Figure 2-3-1 shows the proportion of JSTAR respondents who reported being in “excellent” or “very good” health in a 5-response self-reported health question (US version), by gender and municipality. The proportion of the two healthiest categories was 47.6% for all, and in Shirakawa it was 52.4%, which was the highest number across municipalities. As we have already seen in Section 2.2, people in Shirakawa were least likely to have chronic conditions and functional limitations. The proportion of the two healthiest categories was around 45% in Kanazawa and Adachi, followed by 47–48% in Sendai and Takikawa.

What we observe in these figures is a variation in the self-reported health status across regions or gender even in the same country. The SHARE book also reported a wide variation in subjective health status across countries. Fifty percent of the Danish respondents and more than 40% of the Swedish and Swiss respondents report to be in very good or excellent health, figures that are similar to Japan. In contrast, the proportion of people in “very good heath” is around 20% in France, Germany, Italy, and

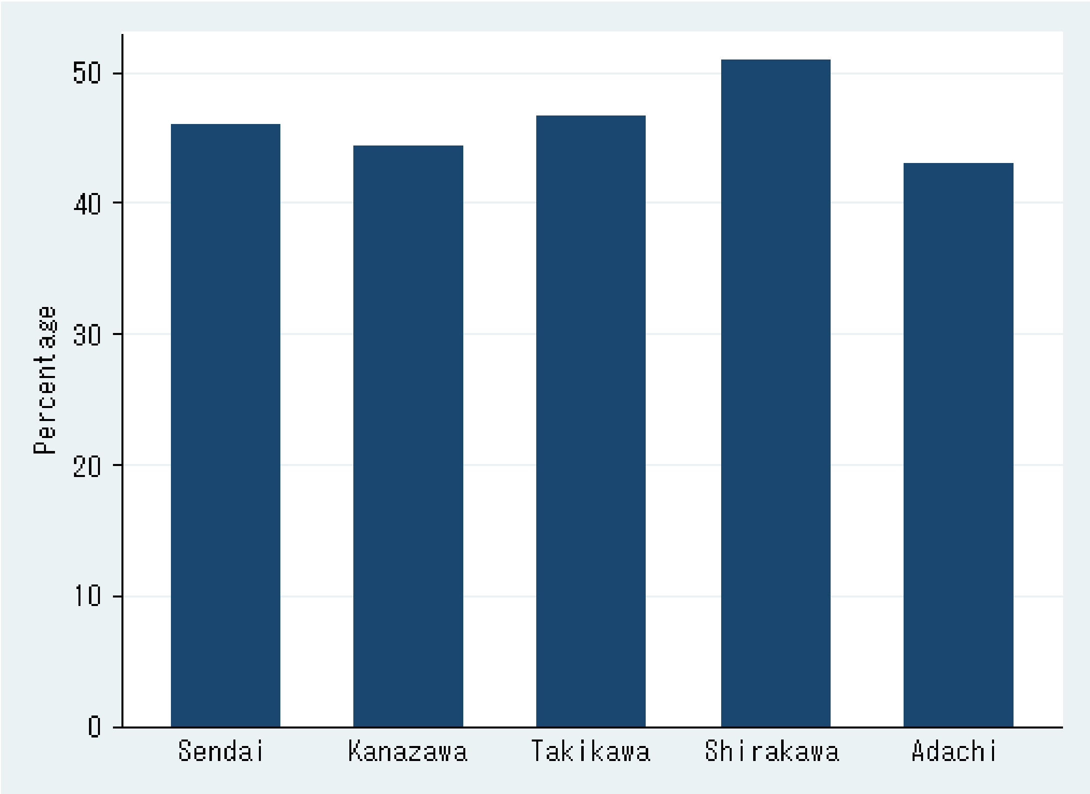

Figure 2-3-1 Proportion of respondents in “very good” or “excellent” health, by municipality

Spain. However, concluding that Danish people are healthier than Germans is unconvincing. Danish people may simply have a tendency to report excellent health, even if they have about the same true health status as Germans. The same is true in the JSTAR case. We have to carefully examine the information of self-reported health.

2.3.2 Two Measures to Adjust for Reporting Bias

For this purpose, SHARE adopted two popular measures to adjust for bias in self-reported health status. The first approach is to construct “true” measures which stand for objective health condition and employ the objective measure to correct reporting bias. We will turn to this measure below. The second approach is to use anchoring vignettes. An anchoring vignette is a methodology to ask a respondent to report his health status and then rate the health status of hypothetical persons with a different health status after hearing short descriptions. This method asks respondents to rate other individuals on the same scale used for themselves (King et al. 2004). Thus, self-reported health status is adjusted by the responses to vignette questions, which facilitate an interpersonal comparison. In other words, this method uses a comparison of health status for one’s own and hypothetical persons to adjust for reporting biases. SHARE collects the vignettes from a sub-sample of respondents. JSTAR has not yet tried it, but a pilot study on anchoring vignettes using the questionnaire is underway in Japan in an independent study (“COMPARE” project).

In this subsection, we take the first approach. As the SHARE book takes, we compute an objective health index that is composed of disease status and measured functions, which are less susceptible to individual difference in perception, and allows us to examine how self-reported health status is biased across demographic, socioeconomic, and regional conditions.

As in SHARE, JSTAR has two different versions of the self-reported health question with five choices: the "European" version provides choices from "very good" to "very poor" and is used in the WHO survey. The "North American Version" ranges from "excellent" to "poor," and is used in the Japanese Comprehensive Survey of Living Conditions of People. This section uses the latter version to maintain comparability with the SHARE book.

2.3.3 Computing a Single Health Index

The idea of a health index is to calculate a comparable health measure based on objective information on a respondent's health, assuming that there is a "true" and comparable health condition across persons or countries. The index is a continuous and latent variable to employ an ordered probit model to regress the response to subjective health status (5 choices) on a variety of variables related with objective measures in the questionnaire (Cutler and Richardson 1997). The health index is then computed as a linear prediction from this regression (the latent variable). Then the index is scaled to 0 for the respondent with the worst observed health state and a value of 1 for respondents without any conditions or limitations (excellent health).

The health index is estimated based on the prevalence of a variety of health conditions and functional limitations of each respondent. The independent variables include diagnosed chronic conditions (named 20 diseases), ADL and IADL limitations, depression measured in CES-D, mobility limitations, height, weight, grip strength and cognitive ability as well as demographic variables such as gender and age. In this procedure, the estimated coefficients capture a specific amount that the presence of a certain condition or limitation reduces the value of the latent "health" index, which reflects their effect on health. While the weights are assumed to be the same for each respondent (and hence the same across municipalities) within JSTAR, the thresholds of the latent variables was compared across municipality so that "fixed municipality effects" are examined.

Although we used a similar estimation model for health index to that adopted in SHARE, we should be clear that we cannot make a simple comparison between our results and those in SHARE even with estimated index, because we used a pool of the JSTAR sample for our estimation, while SHARE used their own risk pool. Once we confirm that similar estimations are available in SHARE and JSTAR, we can make a comparable analysis with micro level data from both surveys that is compiled in the future.

2.3.4 Differences in Response Styles by Region and Individual Attributes

Figure 2-3-2 shows the distribution of the health index by municipality. Note that we pooled both sexes to estimate the health index. The box located in the middle of each bar refers to the median and the 25th and 75th percentiles, and the upper and lower bars indicate the adjacent values of the health distribution, respectively. First, we notice that the disparity across municipalities is smaller in the standardized health index than in a simple subjective report. The medium of the index is 0.704 in all regions. The result shows that we should be careful in comparing self-reported health status and that the simple comparison is in fact misleading.

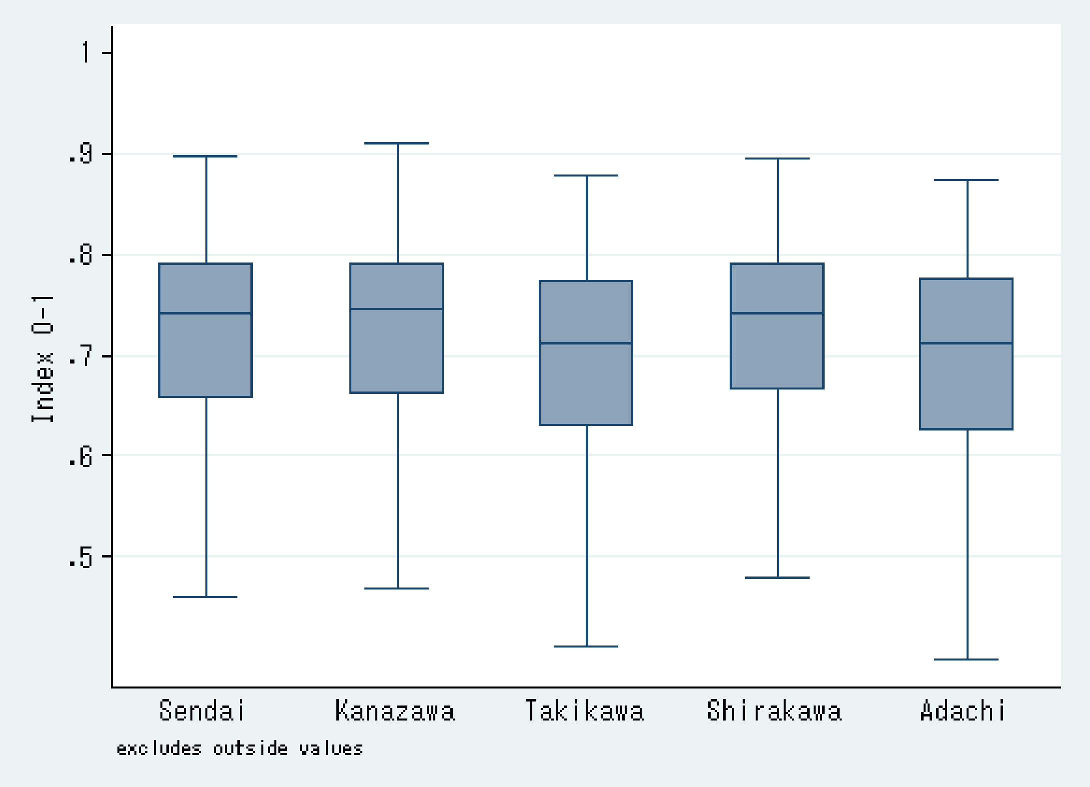

Figure 2-3-2 Distribution of standardized health index, by municipality

We turn to relate the health index values with the respondent's self assessment of health. Following the SHARE method, we assume that each individual would report "very good" or "excellent" health only if his or her health index value surpasses a specific threshold value. Concretely, we compute region-specific thresholds as the exact percentiles of the municipality-specific health index distribution that correspond to the proportion of respondents that report "very good" or "excellent" health. For example, since 47.6% of all JSTAR respondents reported to be in "very good" or "excellent" health, we take the 47.6 percentile of health index value as the threshold, which is 0.726.

The estimated thresholds of "very good" and "excellent" health for each municipality are shown in Figure 2-3-3. As we can observe, there was little difference in the thresholds across municipality. Sendai, Kanazawa, and Shirakawa have a higher

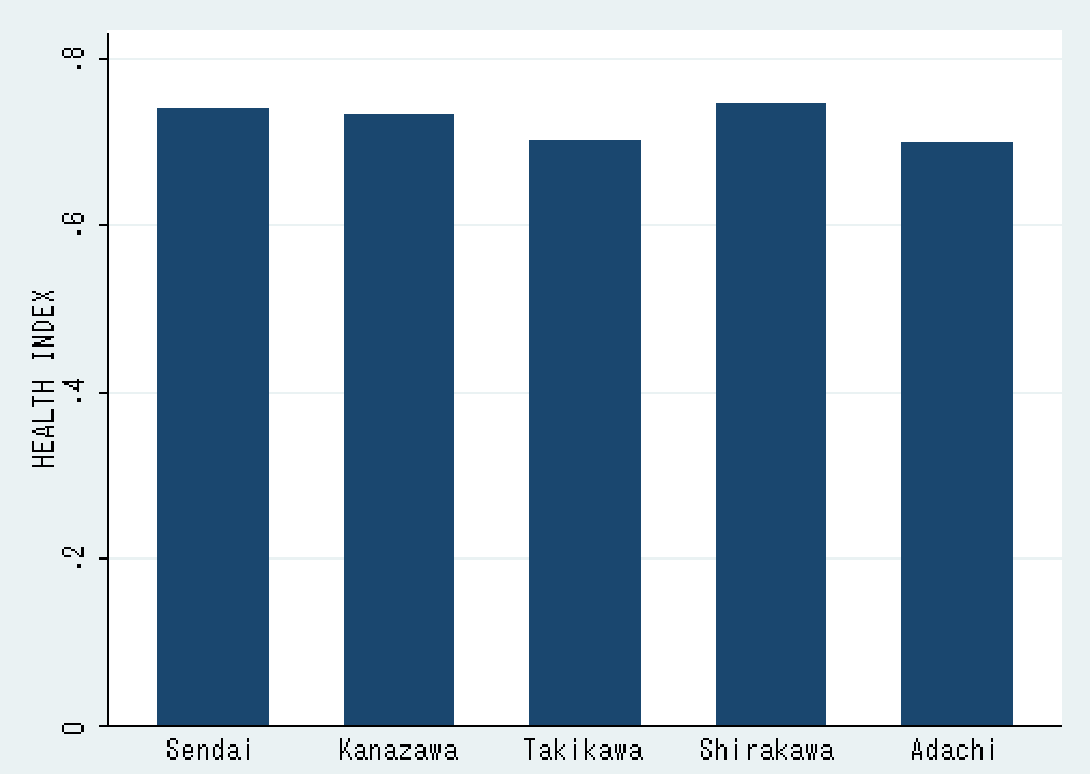

Figure 2-3-3 Health index cut-off points to “very good/excellent” health, by municipality

threshold than Takikawa and Adachi, but the difference is quite small. This means that bias in self reporting of perceived health status across regions will not largely account for the differences in self-reported health status.

Lastly, Figure 2-3-4 compares self-reported health levels with adjusted health levels. The horizontal line shows the proportion of those who answered “very good” or “excellent” to self-reported health questions, and the vertical line shows the proportion of those who should have answered “very good” or “excellent” according to the objectively estimated health index score. For this analysis, we adopted a standard cut-off point of 0.7264 for all the respondents, not region-specific thresholds. The red line is a 45 degree line. If the subjective report and the estimated report pattern converge, the dot should be on this 45 degree line. If the dot comes to the right to the line, it means that self-reported status tends to be better than objective health conditions, or the respondents tend to over-report their health status. As the figure shows, respondents in Adachi and Takikawa tend to over-report their health status, though the deviation is quite a bit smaller compared to the cross-country difference observed in the SHARE results. Thus, response bias in self-perceived health questions across regions seems trivial in JSTAR, as we have already confirmed in Figure 2-3-3.

Taking the difference between estimated and actual response of “very good” or “excellent” health, we conducted ordered logistic analysis to test whether age, gender, socioeconomic position, and region may contribute to any tendency to over- or under-report the perceived health status. The results showed that older age significantly leads

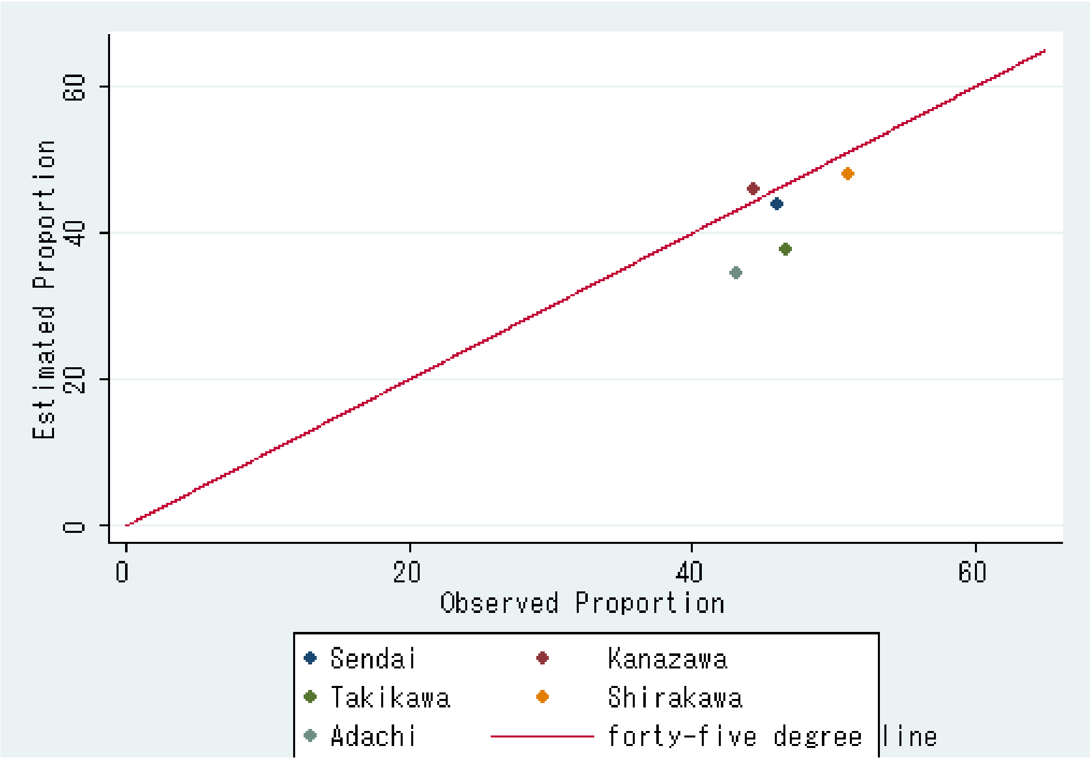

Figure 2-3-4 Estimated vs. observed proportion of those in "very good/excellent" health, by municipality

to over-report (these respondents tend to report "very good" or "excellent" even though actual health conditions are not as good). Gender, educational attainment, household income, and region were not significantly related to biased response. These results elicit caution when we interpret the impact of aging on self-reported health, because relying on self-reported health may under-estimate the actual gradient of health across different age strata.

2.3.4 Conclusions

• Self-reported health is not directly comparable across persons or regions. One approach to correct reporting bias is to measure a single health index which is based on objective health measures.

• Self-reported general health shows large cross-municipality variations. Comparison of self-report and objectively estimated health index shows that cross regional difference is less likely to be due to biased response across regions, but rather to actual difference in health conditions.

• Self-reported health is over-reported among older people, which raises caution when we interpret the impact of demographic conditions on self-reported health.

2.4 Health Behavior

2.4.1 Introduction

This subsection examines several behavioral health factors which are closely related to functional capacity and mortality: smoking, alcohol consumption, physical activity, and weight control. In Europe, these behaviors have been proved to be related to lower mortality and improved functional capacity among elderly and health benefits (Adams et al. (1990); Davis et al. (1994); and Johansson & Sundqvist 1999). In Japan, large population-based epidemiological cohort studies, such as the Japanese Public Health Center Study (JPHC) (Inoue et al. 2004; Iso et al. 2004; Mannnami et al. 2004) and Japan Collaborative Cohort Study (JACC) (Fujino et al. 2005; Iso et al. 2005; Lin et al. 2005; Lin et al. 2007), were conducted in the 1990s to identify the impact of lifestyle behaviors on the incidence and mortality due to cancer, stroke, and cardiovascular disease among middle-aged community residents. These studies followed a large-sized sample (70,000 to 100,000) for 5-10 years, which allowed them to investigate diseases with rare mortality. Further, JPHC conducted a detailed dietary questionnaire, and JSTAR has adopted the same. However, these epidemiological studies failed to measure individual-level socioeconomic variables such as household income. JPHC did ask occupational types at baseline, but not occupational history and educational attainment. Neither did they have information regarding consumption and utilization of medical care. Besides, their measurements were not compatible to research in other countries, which prevents cross-country comparison. JSTAR provides an unusual chance for researchers to examine the prevalence of these behaviors and their effects on health care utilization and subsequent health outcomes among Japanese elderly.

First, we preview the prevalence of smoking, alcohol consumption, physical activity, and body-mass-index (BMI). Then, we examine these behaviors in different age and socioeconomic groups. The JSTAR questionnaire regarding these behaviors is comparable with that of SHARE. The leave-behind-question asked a respondent whether he/she (1) currently smokes on a daily basis or (2) previously smoked on a daily basis but has quit, or (3) has never smoked on a daily basis. There are two small differences between JSTAR and SHARE. One is that since most smokers in Japan smoke cigarettes, JSTAR does not distinguish within smoking types (while cigarettes, cigars, cigarillos and pipes are distinct in SHARE). The other is that SHARE asked whether a respondent has ever smoked for at least for one year but JSTAR asked regarding smoking on daily basis. If a respondent is smoking or has smoked, he/she is asked when he/she began to smoke and, if not currently smoking, when he/she quit, which allows us to estimate years of smoking for individuals. Then a respondent is asked the number of cigarettes smoked per day. Alcohol consumption was also inquired in the leave-behind-question. The respondent was asked about the frequency of consuming alcoholic beverages (beer, spirits, whisky, sake, or wine) in the last six months and about the amount of consumption for each kind of alcohol if he/she drinks at least once or twice a week. JSTAR does not ask respondents whether they drink more than two glasses since the definition of “two glasses” in SHARE is not necessarily clear. The questions on physical activities differ between JSTAR and SHARE.

Following ELSA, SHARE asked respondents about frequency of moderate physical activity (gardening, cleaning the car, walking) and vigorous physical activity (sports, heavy housework, a job involving physical labor). JSTAR does not have the corresponding questions but asks the number of minutes of walking per day. Lastly, the interview questions in JSTAR have self-reported height and weight so that we calculate the body mass index (BMI, weight (kg) divided by the square of height (m2). According to the World Health Organization (2000), BMI equal to or higher than 30 was used as a cutoff point for obesity and that between 25 and 29.9 as overweight.

2.4.2 Health Behavior by Gender and Age

Table 2-4-1 reports summary statistics of those measurements on health behavior. We should keep in mind that the age range is different between JSTAR and SHARE. While SHARE includes respondents aged 80 and over, JSTAR respondents are aged between 50 and 75.

Table 2-4-1 Prevalence of behavioral risk factors among men and women in JSTAR subjects

	Health related behaviors	Men		Women	
Smoking habit					
	Ever smoking 1+ years	78.6	(74.0-80.7)	17.6	(7.2-25.0)
	Current smoking	35.2	(34.0-39.1)	10.3	(4.7-15.8)
	Average number of years smoking	27.4	(26.2-29.5)	23.4	(21-34.4)
	(among the total population)				
Drinking habit					
	Daily/5-6 times per week	51.8	(48.6-55.0)	12.6	(8.0-16.1)
	Never in the last six months	23.2	(22.2-25.0)	60.0	(55.4-66.0)
Physical activity					
	Neither vigorous nor moderate physical activity	7.3	(4.8-12.5)	6.5	(4.4-13.5)
Overweight/obesity					
	Overweight (BMI 25-29.9)	25.1	(21.1-33.1)	19.3	(15.5-27.0)
	Obesity (BMI 30+)	2.4	(0.5-3.3)	2.2	(1.3-3.5)
	Overweight or obesity (BMI 25+)	27.5	(22.9-36.4)	21.5	(16.8-29.3)

First, we observe that nearly 80% of males have smoked on a daily basis during their lifetime. The corresponding figure for females is less than 20%. The figure for males is higher in JSTAR than that in SHARE (64%) while that for females is lower in JSTAR than that in SHARE (27%). When confining results to current smokers, 35% of male respondents were current smokers, and the number is still higher than the 23.9% in SHARE. For females, 10% percent of JSTAR respondents were current smokers, and the number is a little lower than 13.2% in SHARE female respondents.

We also notice a disparity among municipalities in smoker prevalence (the numbers in parentheses are the maximum and minimum among five municipalities). Compared to SHARE female respondents, JSTAR female respondents showed a wide range of smoking prevalence across regions: the lowest was 4.7% in Shirakawa and the highest was 15.8% in Adachi. Since smoking prevalence was significantly different by age category, however, we should compare the prevalence by age strata (Figures 2-4-1-1 for males and 2-4-1-2 for females). If we focus on female respondents in their 50s, 25.2% in Adachi and 9.9% in Shirakawa were current smokers. In the cases of Takikawa and Adachi, smoker prevalence was drastically different across age strata (Figure 2-4-1-2). The difference between female smoking prevalence in the 50s and that in the 70s counted about 16 points in both cities, while it was about 7 points in other cities. A further difference is observed in the average years of smoking: that exceeds 27 years for males and 23 years for females, both of which are higher than in Europe (Table 2-4-1). This means that while the share of female smokers is lower, their experience is comparable with male smokers.

Second, we look at alcohol consumption. More than a half of males and 12% of females consumed alcohol beverages daily or 5–6 times per week during the last six months (Table 2-4-1). Similar to cigarette consumption, the share of male drinkers is higher while that of female drinkers is lower in JSTAR compared to the numbers in SHARE. The shares of the respondents who did not drink during the last six months were 23% for males and 60% for females. Again, as discussed below, those numbers range across gender and municipalities.

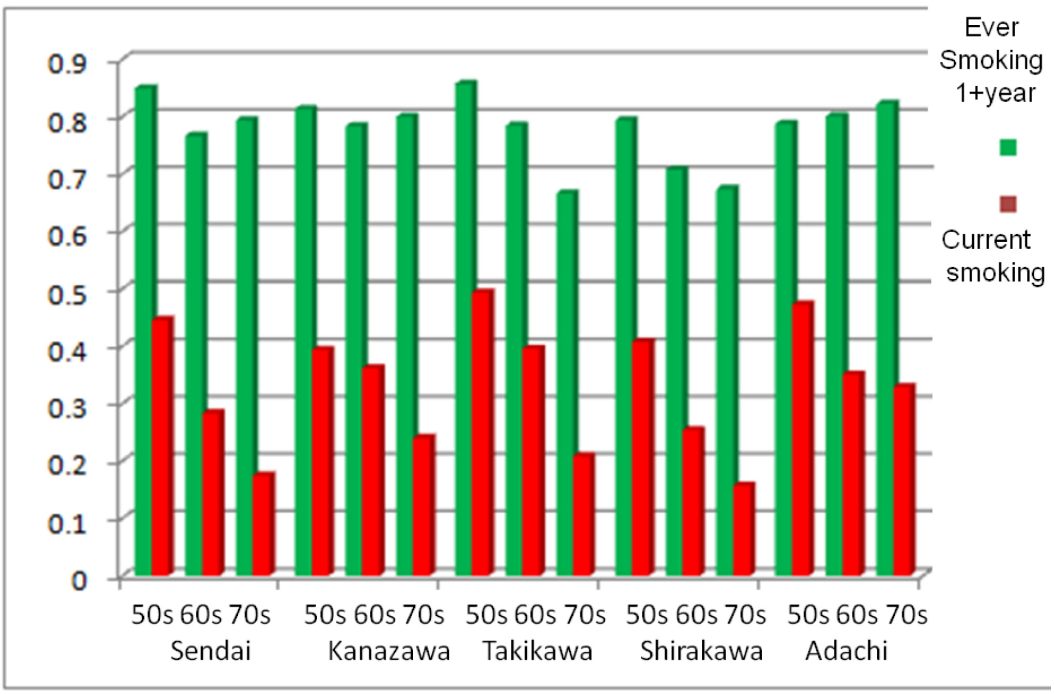

Figure 2-4-1-1 Smoking behavior by municipality, males

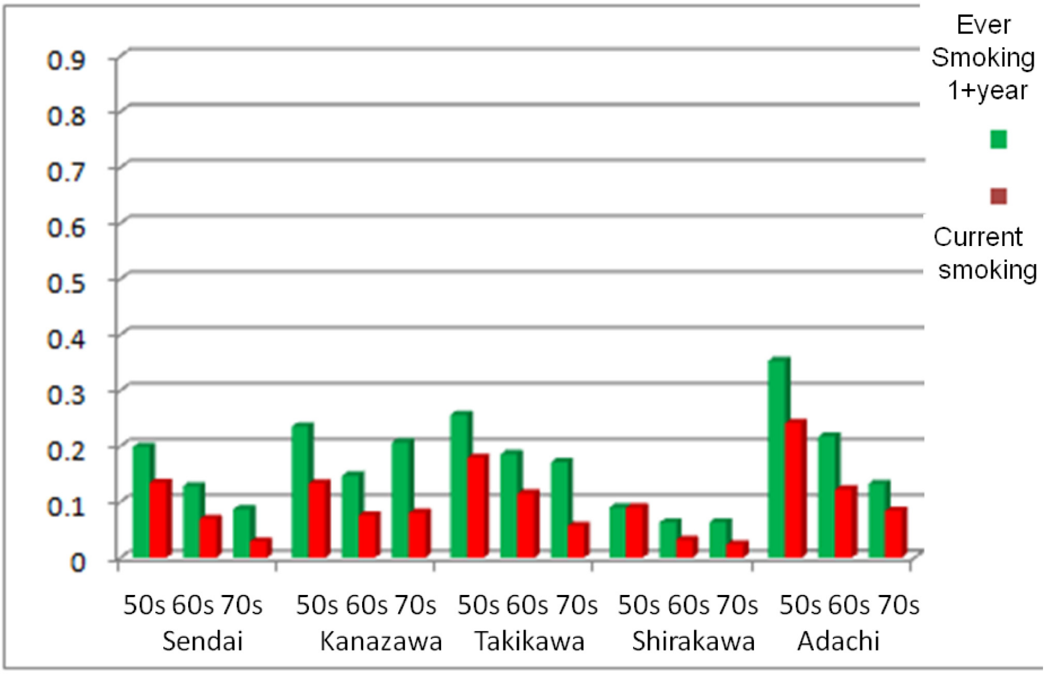

Figure 2-4-1-2 Smoking behavior by municipality, females

The share of the respondents who do not walk (or are not able to walk), which is a surrogate to physical inaction (do not do any moderate or vigorous physical activity), in the SHARE questionnaire was about 7% for both males and females. While the definition and the age range differ between JSTAR and SHARE, the proportion seems lower in JSTAR than in SHARE and this is especially the case for females.

According to the National Health and Nutrition Survey 2005, about 30% of males in their 50s to 60s, 24% of females in their 50s, and 29% of females in their 60s had a BMI over 25. Overweight respondents whose BMI ranges between 25 and 29.9 were seen in about a quarter of males and close to 20% in females in JSTAR. Those figures are much lower than those in SHARE (50% for males and 36% for females in SHARE) as expected. Obese respondents whose BMI is equal to or greater than 30 is also as low as 2% both for males and females in JSTAR respondents, which is again much lower than the corresponding numbers in SHARE results (16% for males and 18% for females). The SHARE report warns readers that overweight is on an increasing trend, especially for males. In Japan, according to the National Health and Nutrition Survey, overweight among middle aged males is also increasing over past decades.

Obesity, especially central obesity, is related to metabolic syndrome with increased risk of Type-II diabetes, cardiovascular disease, and consequent functional disabilities and mortality in Europe where obesity has become epidemic, and it is true in Japan too, where the prevalence of obesity was still moderate (Tsugane et al. 2002).

2.4.3 Variations by Age, Socioeconomic Status, and Municipality

(1) Smoking behavior

The upper left graph in Figure 2-4-2-1 reports the odds ratio of lower educational attainment on being a current smoker by gender, adjusted for age and municipality. Those with lower educational attainment showed the odds ratio of 1.37 [1.09-1.71] for males and 1.63 [1.14-2.34] for females to be a current smoker. That is, those with lower educational attainment are more likely to be smokers. The interaction between sex and educational attainment was not significant, that is, the impact of education on the likeliness to be a smoker is about the same in both genders. However, as we can see in Figure 2-4-2-1, the impact of lower educational attainment on being a smoker was somewhat larger in females than in males, except for those in Shirakawa.

If we look at the impact of household equivalent income, those with less than median income showed significantly higher odds to be a current smoker. (OR 1.52 [1.27-1.82]) (not shown in the figures). The association of household income with likelihood of being a current smoker was observed independently of those with educational attainment.

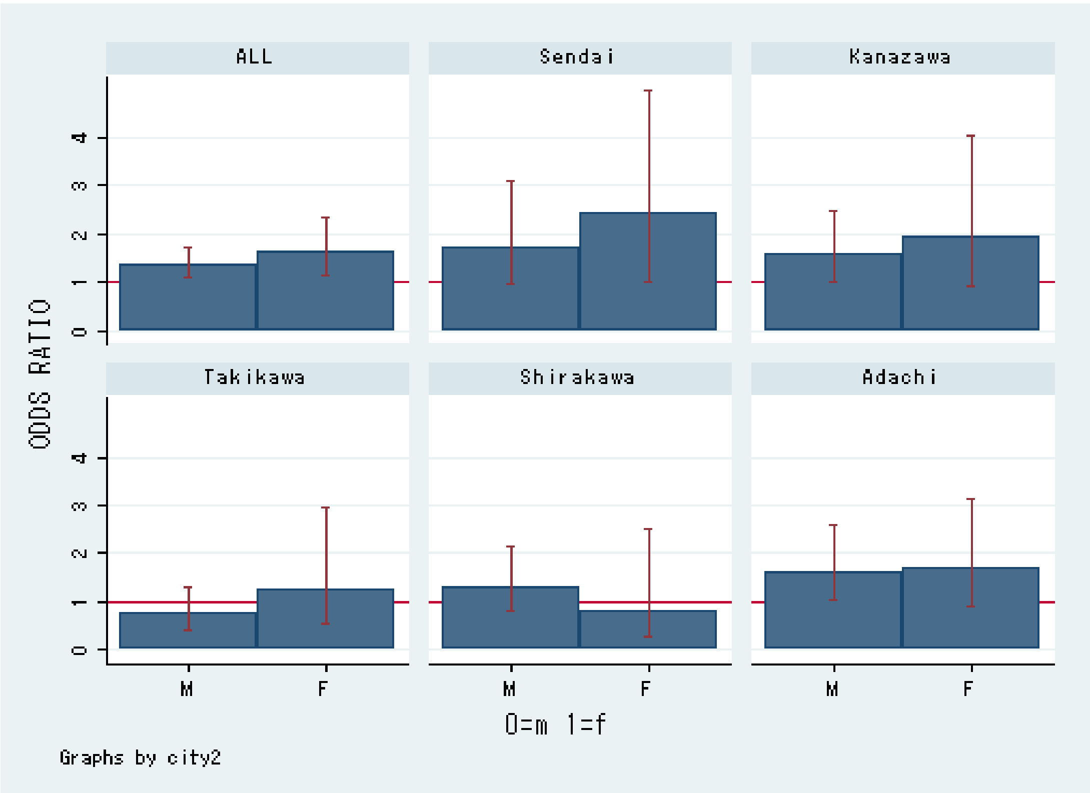

Figure 2-4-2-1 Odds ratio of lower education on being a current smoker, by sex and region, adjusted for age

(2) Drinking behavior

Figure 2-4-2-2 shows the odds ratio of education attainment for being a daily/5-6 times-a-week drinker. Adjusting for age and municipality, those with lower educational attainment showed slightly lower odds to be a daily drinker (OR 0.86 [0.70-1.06] for males, 0.99 [0.70-1.40]). We did not find any significant interaction between sex and educational attainment, or between sex and household income. Those patterns seem not to be coincident with those in Europe which see that higher educated persons are more likely to consume more alcohol, especially in the case of females. When we compare municipalities, those in Kanazawa city were significantly more likely to be daily drinkers, which might be due to a unique social engagement pattern there.

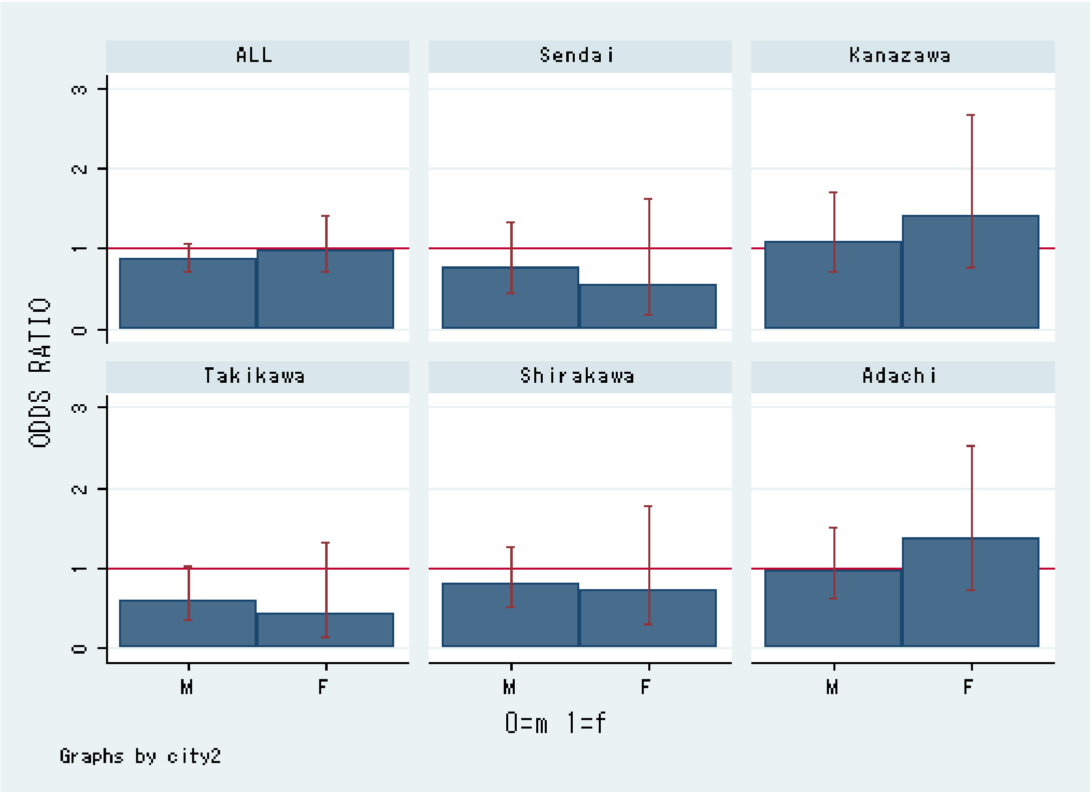

Figure 2-4-2-2 Odds ratio of lower education on daily/frequent drink, by sex and region, adjusted for age

Excessive alcohol consumption is known to be harmful to health, but lately there has been a lot of discussion of the potential health benefits of moderate alcohol consumption. Recently Sulander et al. (2004) have shown among elderly men evidence for the U-shaped association between alcohol consumption and functional ability. The same U-shaped association between alcohol consumption and mortality has also been identified among Japanese middle-aged men and women (Lin et al. 2005). Previous epidemiological studies identified that alcohol intake <20g/day ethanol equivalent is associated with the lowest mortality due to cancer and heart disease, and that no consumption and consumption > 20g/day lead to higher risks. In JSTAR, we have a detailed estimation of alcohol intake (ethanol g/day) through the food frequency questionnaire, which is not available in SHARE. We preliminarily conducted a multinominal logit model using 3 levels of alcohol consumption (none, less than 20g/day, and over) as a dependent variable to find influential factors of the alcohol consumption pattern. Lower educational attainment was negatively associated similarly with moderate (<20g/day) and heavy (>20g/day) alcohol consumption. Income effect was positive and stronger in heavy consumption (data not shown).

The share of Japanese male daily drinkers is higher than the average in Europe and is comparable with France, Italy, and Spain whose share is greater than 30%. The share of female drinkers, which is lower than that of the male counterpart both in Japan and Europe, is also comparable with countries with the highest shares like France, Italy, the Netherlands, and Denmark. Consumption was highest in three southern European countries of France, Italy and Spain, but was clearly lower in Greece. SHARE asked the frequency and rough quantification of alcohol consumption by simply asking the number of glasses per consumption. Since drinking habits vary across countries, the precision of alcohol consumption is quite limited in the SHARE questionnaire. On the other hand, JSTAR uses a detailed consumption survey by asking frequency, type, and quantity of alcohol beverages, and an additional food frequency questionnaire, which gives a better opportunity to analyze the association of alcohol consumption with socioeconomic status and consequent health problems.

(3) Physical inactivity and obesity

The odds ratio of lower educational attainment on physical inactivity (those who don't walk or walk less than 30min per day), adjusting for age, limitation in ADL, and municipality was 2.11 [1.42-3.12] for males and 1.03 [0.67-1.59] for females. (Figure 2-4-2-3) Interaction between education and gender was significant (p=0.027). The impact of lower educational attainment on physical inactivity was more salient among males than among females, even after taking into consideration age, ADL limitation, and region. We also found that people in Takikawa were significantly less likely to walk compared to those in other cities (OR: 2.67 [1.76-4.05]). We speculate that this was due to snow in the winter time, and the tendency to use a car for daily transportation in a region with a less extensive public transportation system.

Figure 2-4-2-4 shows the odds ratio of education on being overweight, or BMI >= 25, a criterion for overweight. Adjusting for age and municipality, the odds ratio of lower educational attainment on being overweight were 1.11 [0.89-1.41] for males and 1.40 [1.09-1.81] for females. Interaction between gender and education was marginally significant (p=0.12). Lower educational attainment was related to obesity among females, but less among males. Thus, educational attainment was a risk factor of obesity especially among females.

It is interesting to note that people in Takikawa have the highest odds ratio of being obese (OR 1.48[1.17-1.88]) while those in Shirakawa have the lowest odds ratio (OR 0.70 [0.55-0.90]) (data not shown in the figures). This is in line with the municipal difference in walking habits. We refer to the data in the food frequency questionnaire to assess whether the difference in BMI across municipalities was due to the difference in the food intake pattern. We focused on Fat Calorie Ratio (FCR) again, and corrected Total Energy Intake (cTEI) which was the estimated total energy intake divided by standard body weight. Standard body weight was calculated as body weight for

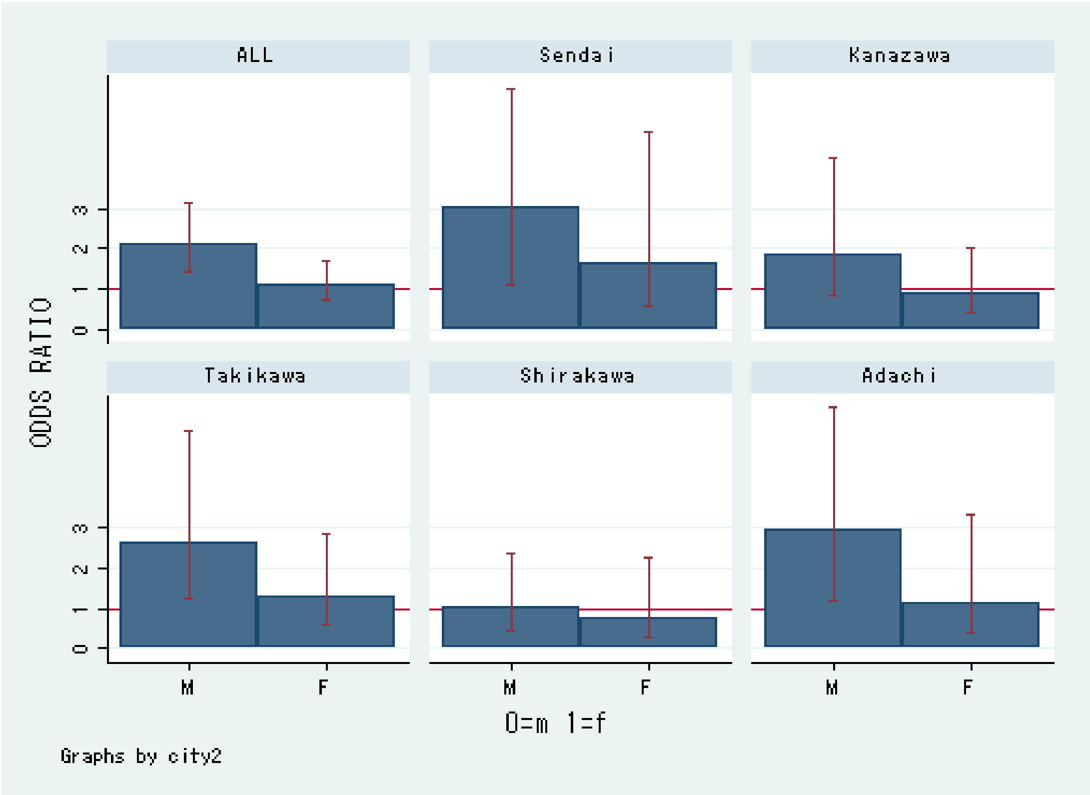

Figure 2-4-2-3 Odds ratio of lower education on physical inactivity, by sex and region, adjusted for age

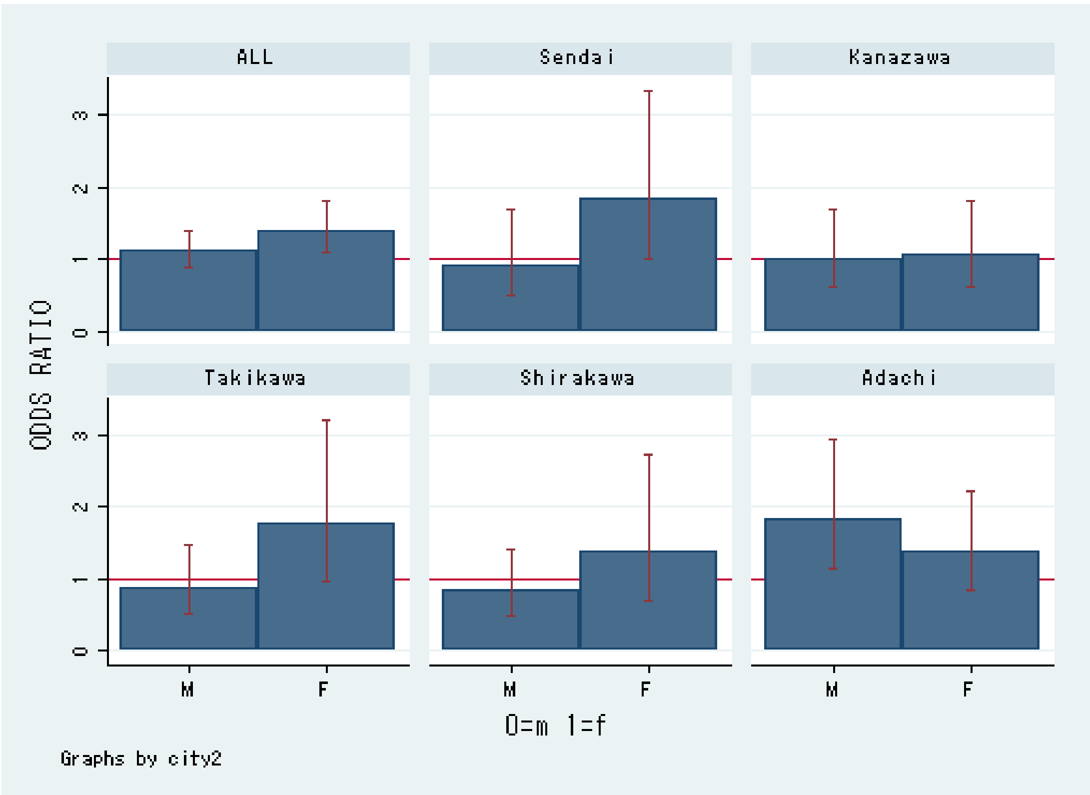

Figure 2-4-2-4 Odds ratio of lower education on overweight, by sex and region, adjusted for age

BMI=22 for the given body height (22 X (body height(m))2). ANOVA regressed on FCR or cTEI as a dependent variable, and with age and sex as covariates, shows that people in Takikawa did not have significantly higher FCR or cTEI. Thus, it is most likely that the highest prevalence of obesity in Takikawa was due to physical inactivity rather than over-intake.

The results on behavioral risk factors in this subsection are preliminary in that this is based on cross-sectional observation. Further research with a follow-up panel survey is required to better address the relationship between risky health behaviors on health outcomes, i.e. the effect of overweight on the prevalence of heart disease. In Europe, overweight is more problematic than in Japan and the SHARE book calls for health promotion for mitigating metabolic syndrome, diabetes and cardiovascular disease, premature mortality, and decline in functional capacity so as to decrease socioeconomic inequalities. In addition, the book discusses the different actions that are needed in different countries based on cross country differences. It seems that cross-municipality disparity in risky health behavior is smaller than cross-country difference in Europe but we still observe substantial disparities even within Japan across gender, age, municipality and social status. More targeted policies might be needed even within a country to address ways to discourage those behaviors.

2.4.4 Conclusions

• There is a disparity in risky health behavior (smoking, drinking, physical inactivity, and overweight) across gender, age, and municipality within Japan. Overweight and obesity are health threats in this JSTAR population 50+. This can have enormous effect on the incidence of chronic disease, and consequent health care resource use in future decades.

• As in Europe, in Japan, socioeconomic and gender disparities are observed in health behaviors; smoking was more prevalent among those with lower educational attainment. Physical inactivity was more prevalent among males with lower education, but not among females. Overweight was more prevalent among females with lower education, but less evident among males.

• Further research should examine the relationship between risky health behavior and health outcomes to contribute to more effective health policymaking by targeting specific groups.

2.5 Mental Health

2.5.1 Introduction

One of the most serious social issues in Japan is suicide. After the rate suddenly rose at end of the 1990s, more than 30,000 persons have committed suicide every year. Among the OECD countries, Japan's suicide rate (the number of persons who committed suicide per 100,000 people) is ranked as one of the highest since 1998. Actually, in 2004 the rate was the highest for males and the second highest for females. By age and gender group, males aged 65 and over had the largest share (48.1%), which is double that of those aged 25-45 (25.2%). The increase of suicide among middle-aged males in the second half of the 1990s is often attributed to the economic turndown (Chen, Choi, and Sawada 2008). The gap across age groups is even larger for females: 35.5% for those aged 65 and over, versus 9.9% for those aged 25-45. The high suicide rate among elderly females in this country is often attributed to women's deprived status under the traditional agnate family system.

Psychiatric studies identified that mental depression is a strong predictor and risk factor for committing suicide. It is a matter of debate, however, whether depression causes social isolation and economic difficulties, or economic and social difficulties lead to depression and subsequent suicide.

In Europe, late-life depression, when defined according to the broad criterion of clinical significance, is a common disorder affecting 10% to 15% of the over-65-year-old population (Beekman et al. 1999). In Japan, a recent community-based cross-sectional survey of psychiatric disorders did not detect any difference in the prevalence of psychiatric disorder including depression across socio-demographic attributes, though the severity of psychiatric disorder was significantly greater among older and unmarried residents (Kawakami et al. 2005). Another cross-sectional survey found that a higher prevalence of depression was found among the unmarried, females, and with lower household income (Inaba et al. 2005). However, longitudinal population-based studies of the elderly population have not been conducted so far in this country.

The JSTAR leave-behind-questionnaire includes the CES-D scale (Center for Epidemiological Studies Depression Scale) which also has been used in previous domestic studies as well as in the Health and Retirement Study (HRS) of the US. In contrast, SHARE adopts EURO-D scale which has been validated in an earlier cross-European study of depression prevalence, EURODEP (Prince et al. 1999a; Prince et al. 1999b). EURO-D was developed to link the data measured in different scales across EU countries, including CES-D, Zung Depression Scale, and other already validated scales. Thus, the EURO-D score can be estimated based on items in CES-D we measured in the JSTAR sample for comparative purpose. However, we judged that including this estimation is not appropriate in this JSTAR report since the adjusted depression measure has not been validated in Japan. Rather, we chose to proceed with the discussion using the original scoring algorithm of the CES-D scale below.

The CES-D scale includes 20 items to measure mental status, specifically in terms of depression and anxiety disorders. Each item lists a specific symptom of the disorder, and the respondent is asked to choose the frequency of each symptom during the past one week by a 4 level response: not at all, 1-2 days, 3-4 days and more than 5 days per week. The scale ranges from 0-60, and 16 is the worldwide recommended cut-off point for screening depression status. We emphasize again that different depression scales are employed between Japan and Europe. In the SHARE book, the threshold of clinically significant depression in the EURO-D scale is 3, which was validated by the EURODEP for comparative analysis within the EU, but whether mental status of 3 in the EURO-D score is the same as that of 16 in CES-D is not confirmed.

In JSTAR, we also asked present and past history. About 0.6% of respondents had a past history of diagnosed depression, and about 1.4% were currently under treatment.

We will examine in this chapter the prevalence of current depression, measured in CES-D, by age, gender, and region. We also follow the analysis conducted in the SHARE report to identify the association of depression status with living accommodations, household income, and social support exchange, using logistic regression. In these analyses we always control for age, gender, and marital status. We will provide the odds ratio and other estimates for a whole sample, and by municipality. Sampling weights were not applied. In the graphs we present the estimates from the models and a 95% confidence interval.

2.5.2 Variations across Gender, Age, and Municipality

Figure 2-5-1 illustrates the prevalence of depression (defined as CES-D score>=16) by age and gender. First, we observe that the overall share of people who are currently suspected of suffering from depression is around 17%. Second, the prevalence was somewhat lower for people in their 60s compared to the 50s and 70s, a trend seen in both sexes. Lastly, females showed a higher prevalence than male respondents, which was on par with previous population-based surveys in Japan and internationally. This trend was confirmed when we use logistic regression analysis; the female gender (OR 1.24[1.06-1.48]) and age in the 60s (OR 0.68 [0.68-0.99]) were significant predictors of depression prevalence. Otherwise, there was no significant difference across municipalities, after adjusting for age and sex.

We did not observe a clear gradient increase of depression prevalence over age, as the SHARE report has found. We need to be careful in comparing the results with those in Europe because of different scales to measure depression. The Euro-D scale in SHARE measures mood disorder and motivation deficit, which may often be observed in the case of a cognitive disorder among the elderly. As Prince et al. (1999b) already acknowledged, the Euro-D may over-diagnose depression disorder because the score is contaminated with the effect of motivation deficit, and the age gradient that was reported in the SHARE report may be artifact due to the effect of motivation deficit in the elderly.

In spite of this difference, it is of interest that we observed a similarity between JSTAR and SHARE in that females have a higher prevalence of depression than males. In Europe, the excess in depression prevalence among females is clearly evident in the EURODEP consortium study. (Prince et al. 1999b) The degree of excess varies across the life course (Jorm 1987), though it is also associated with marital status. However, SHARE failed to find a significant interaction between gender and marital

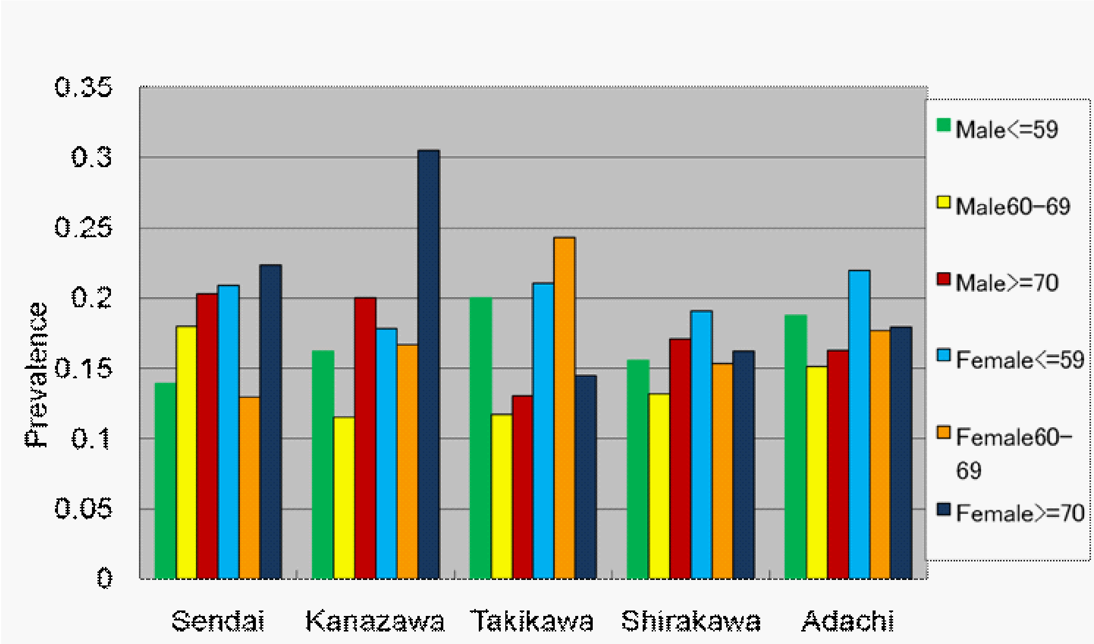

Figure 2-5-1 Prevalence of depression

status (specifically the protective effect of marital status among males but not among females), which has been consistently found in previous studies. In JSTAR, we found a significant main effect of gender difference in depression prevalence. Even after we controlled for age, municipality, education, marital status, and interaction between gender and marital status, the female gender was significantly related to higher chance of having depression (OR: 1.26 [1.04-1.52]). Furthermore, gender showed a significant interaction with marital status; divorce was related to higher odds of having depression among males, but not among females (data not shown). We shall take a closer look at the relationship of depression with marital and income status in the next section.

2.5.3 Variations across Marital and Income Status

SHARE reports that not being married and living alone were consistently associated with depression. Figure 2-5-2 presents the association of current depression with living arrangement and marital status. Current depression is associated with the single living arrangement and unmarried status, and the association was similarly observed across municipalities. Living alone showed a highly significant association with depression status (OR 1.90 [1.47-2.46], adjusting for age, sex, and municipality). Unmarried status also showed a highly significant association with depression status (OR 1.87 [1.43-2.43] adjusting for age, sex, and municipality).

Whether depression leads to single residence and un-married status, or the reverse is true remains to be studied in a future follow-up survey. Some might argue that living alone is a risk factor for depression since the person is less likely to contact and communicate with other people and family members. Social isolation and lack of social interaction is a well known risk factor of functional decline and mortality (Ishizaki et al. 2000). Others might discuss that living with other persons is stressful and is a risk factor for depression. This would be especially true among females who were bound

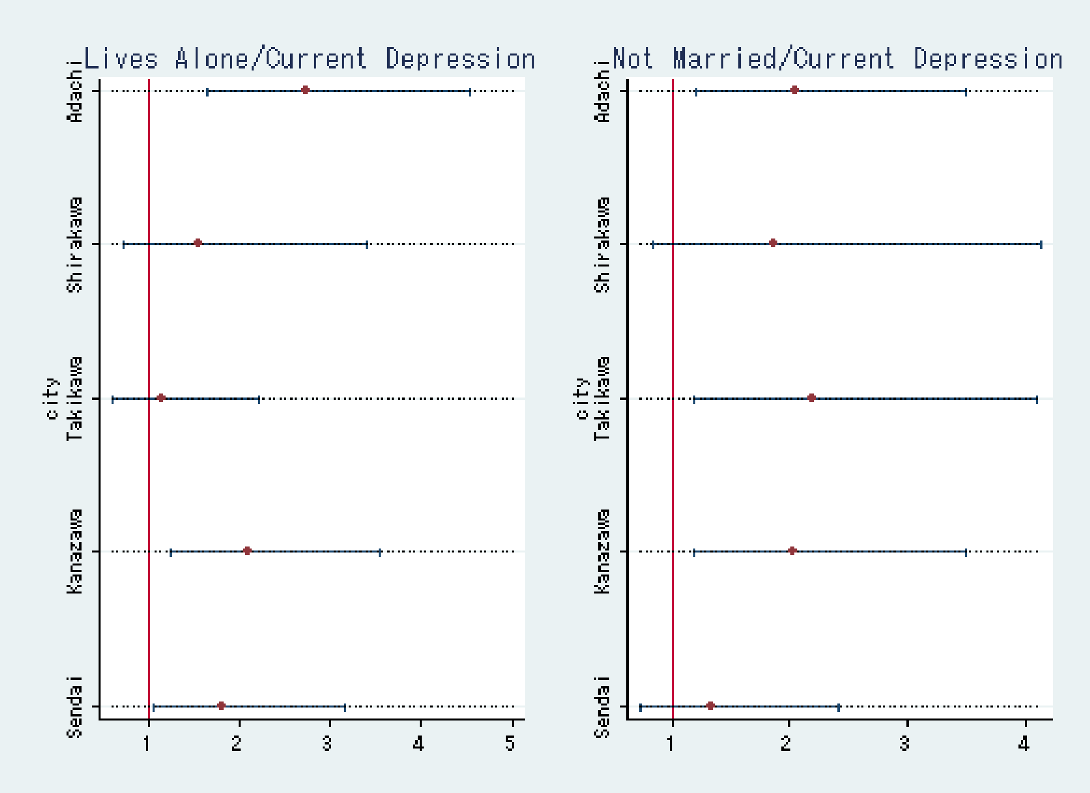

Figure 2-5-2 Odds ratio relative to non-depressed on living alone and not married

in the gender role and lack of power in the traditional large family system (Takeda et al. 2004). In fact, the mortality among elderly females was the lowest among those living alone (Murata et al. 2005). Further investigation is needed to figure out what causes the difference in the pattern across living arrangement and marital status, especially paying attention to the role of family members.

Following the analysis in the SHARE report, we modeled household equivalent income as log-normally distributed outcomes. We controlled for age, sex and marital status. Figure 2-5-3 shows the effects. The x-axis indicates the predicted income of a person with depression as proportion of that of a non-depressive case. Although depression was not consistently associated with income in SHARE, our results show an overall tendency that depression is associated with lower household equivalent income. Those with depression had 0.89 times less household income compared to non-cases (p=0.003 when all cities are combined). Interestingly, the finding in JSTAR was similar to those in Denmark and Sweden, the countries with high welfare regimes. Another finding to be noted was that the income-depression association was not significant in Sendai. What makes differential relationships between income and depression across regions deserves detailed analysis that includes other influential factors such as family structure, social support, and regional variables such as welfare system and the level of social capital.

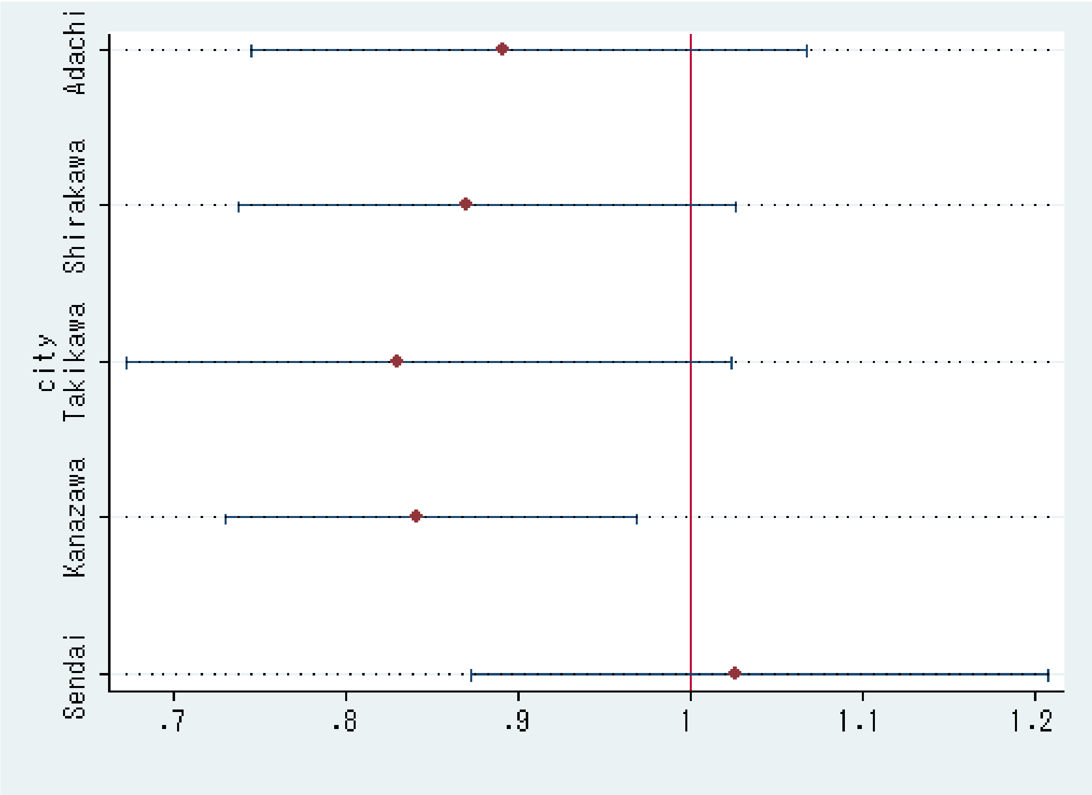

Figure 2-5-3 Equivalent income as proportion of that of non-depressed

In the SHARE analysis, depression was associated with wealth, rather than income. This was, moreover, only apparent in northern European countries. Since wealth is a better proxy to lifetime income and belonging to social class than is current income, the association between depression and wealth may suggest the causal direction of economic disadvantage on mental health, rather than the reverse relationship. A detailed analysis using wealth in JSTAR data is being prepared. Preliminary analysis shows that the disparity between the depressed and non-cases was much larger in relation to wealth compared to that of household income, which would be on par with SHARE findings (data not shown).

2.5.4 Depression and Support

The associations between depression and giving/receiving emotional, practical or financial support were modeled using logistic regression, controlling for age, sex and marital status, following SHARE. Figure 2-5-4 shows that depressed people are in general less likely to give support and more likely to receive it, results quite similar to those in SHARE. The association between depression and receiving support is stronger in Takikawa and Adachi cities.

2.5.5 Variations across Functioning and Physical Health

Many studies have commented on the strength of the cross-sectional relationship between physical health variables and depression in older age. Several longitudinal studies have shown a strong association between disablement at baseline and the

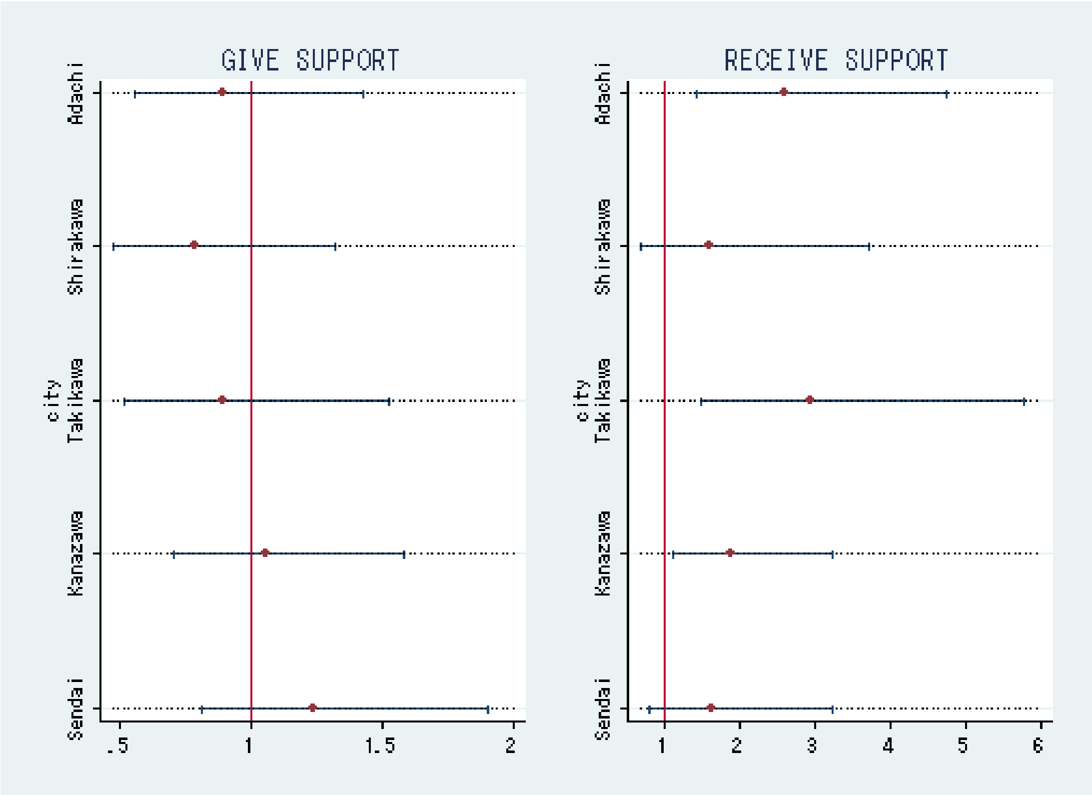

Figure 2-5-4 Odds ratio relative to non-depressed on giving and receiving support

subsequent onset of depression, and the impact was most manifest among those with the least social support (Prince et al. 1998; Schoevers et al. 2000). In Japan, a longitudinal study also identified that the decline in physical function was parallel with the loss of social interaction and the increased risk of depression (Asakawa et al. 2000).

Figure 2-5-5 illustrates the relationship between depression and the limitation in activities of daily living (ADL), instrumental activities of daily living (IADL), and mobility. It is clear that depression status was consistently and significantly related to higher odds of physical limitations, even after adjusting for age, sex, and marital status. Those with depression were two to three times more likely to report functional limitations, as was also shown in SHARE results. It is also manifest that the observed association varied in magnitude across regions: those in Sendai showed a significant association between depression and functional limitations, but those odds were the smallest among the five cities.

Figure 2-5-6 illustrates the associations between depression, and self-perceived health and chronic conditions, with the use of logistic regression to control for age, sex, and marital status. Those with depression had 1.5 to 2 times increased odds of reporting two or more chronic illnesses, and two to three times increased odds of reporting perceived health less than "very good" in the US version questionnaire. Again the findings are quite similar to those in SHARE.

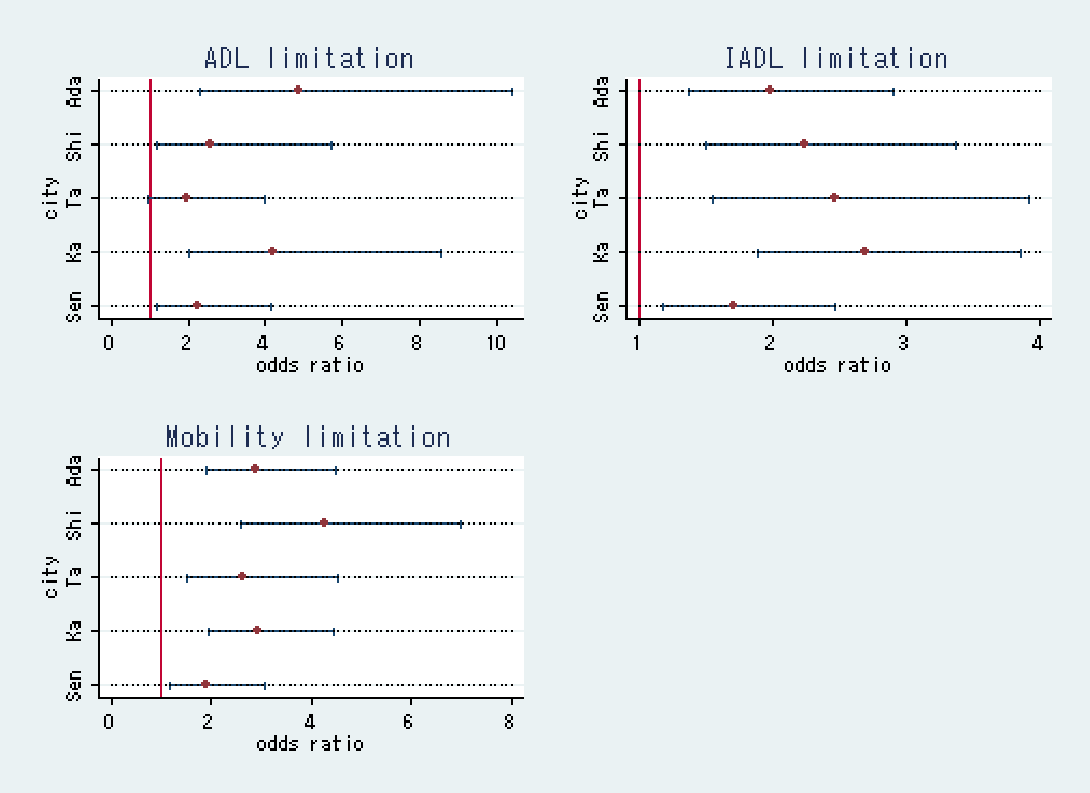

Figure 2-5-5 Odds ratio relative to non-depressed on limitations in ADL, IADL, and mobility

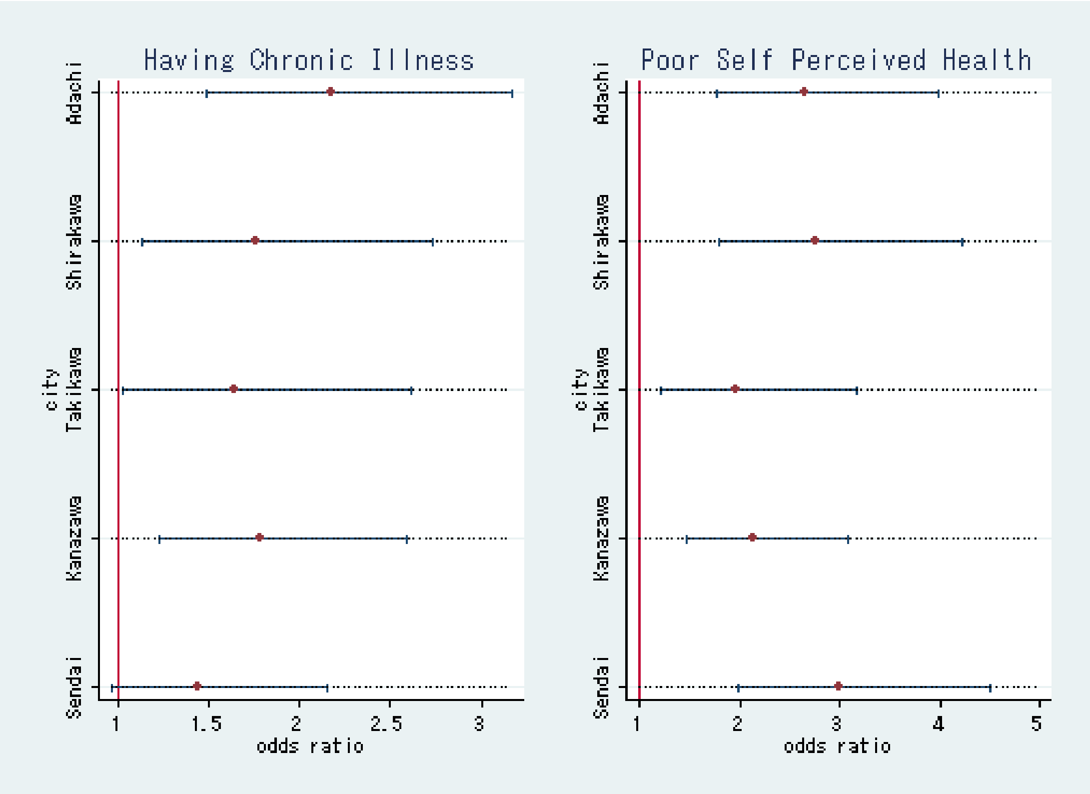

Figure 2-5-6 Odds ratio relative to non-depressed on having chronic illness/poor self-perceived health

In sum, we observe a large disparity in variations of the depression across attributes, most of which are consistent with those in what the SHARE book found. The negative impact of depression upon quality of life is underlined by the very strong associations between depression status, impaired functioning, and self-perceived health. Depression is a very disabling condition, of which burden of disease has become substantial both in industrialized and developing countries (Murray et al. 1997). Understanding the causal relationship between depression and salient life events and socioeconomic conditions in late-life is crucial for SHARE and JSTAR.

We should be patient, however, and not induce any conclusive causal inference at this stage. Since late-life depression and relative disadvantage in income, living arrangement, education, and social support are highly correlated with each other, it will always be difficult to determine the effect of one, independent of the others. Whether depression is the result of economic disadvantage, or vice versa, should be discussed when the panel data becomes available in the future JSTAR report.

2.5.6 Conclusions

• The prevalence of depression in Japan has a similar pattern to that in the SHARE report. The rich information in JSTAR provides opportunities to investigate determinants of depression within and across regions.

• While the prevalence of depression does not differ much across age or municipality in Japan, it does depend on gender, marital status, socioeconomic conditions, and physical functions.

• Longitudinal data will allow us to disentangle the causality of depression and other related factors described in this subsection, which will contribute to determining how to mitigate depression in old age.

2.6 Cognitive Function

2.6.1 Introduction

An expanding prevalence of dementia is a common challenge for industrialized countries. A research group funded by the Ministry of Health, Labour and Welfare of Japan recently reported that the number of those who are suffering from cognitive dysfunction is estimated at 2 million in 2005 and is expected to increase to 4.5 million in 2035 (Asahi Shimbun newspaper, 2008). However, this estimate was based on the prevalence data obtained in the 1980s and projected demographic data at that time.

In Europe, the prevalence of dementia is around 2% for those aged 65-70, and it doubles with every five year increase in age, reaching around 25-30% for the demographic aged 85 years and over (Lobo et al. 2000). In Japan, the municipal government often refers to the estimate released from the then Ministry of Health and Welfare in 1992. According to the official circular notice, the prevalence was 1.5% for those aged 65-70, and doubles with every five years until it reaches 27% in those aged 85 and over (Ministry of Health and Welfare, 1992). There has been no published reference cited for this number. We have to recognize that current policy for cognitive dysfunction among the elderly in this country has not been based on firm scientific evidence.

Other statistics on the prevalence of cognitive dysfunction were derived from claim bill data of Long-term Care Insurance, and it may be more reliable. A working group in the Ministry reported that based on the data, the estimate was 1.5 million in 2002, and the number was projected at 3.2 million in 2025 (Ministry of Health, Labour and Welfare 2006). A limited yet scientifically sound measurement of the prevalence in the community was provided by Ishizaki et al. (1998). They conducted a Mini-Mental State Examination, a validated measurement of cognitive function, on 90% of the residents aged 65 and over in a rural city in northern Japan (N=2,266). Mild cognitive impairment (MMSE score<24) was identified in 21.8% of the population, and severe impairment (MMSE<18) was found in 6.0%.

Surprisingly, there has been no scientifically reliable nationwide data on the prevalence of cognitive function in this country, and the recent working group in the Ministry cited the necessity of such statistics as soon as possible. Although studies using a sophisticated measurement of cognitive function are available in the clinical setting, a previous study conducted by a research team in the Tokyo Metropolitan Gerontology Institute has been the only nationwide population-based survey. However, MMSE is not sensitive enough to detect early stages of cognitive dysfunction.

Cognition can be divided into different domains of ability, which should be tested separately. Memory is often affected first, and most prominently. It is very difficult to distinguish between physiological and pathological decline of cognitive function in the early and mild stages of the impairment. Higher cognitive functions such as numeracy and word recall are believed to be more sensitive to mild and early impairment. Most aspects of cognitive ability have been shown to be relatively stable across the early life course, reflecting the strong influences of heredity, early environment, and education (Richards et al. 2004).

SHARE, HRS, and JSTAR had a common set of measurements on orientation, word recall, and numeracy. In SHARE and HRS, verbal fluency was also measured. JSTAR and her sister surveys provide a unique opportunity in a community setting to compare cognitive function in aging populations across OECD countries.

Cognitive function in midlife is known to be influenced by many factors—including but not limited to genes, educational attainment, occupation, physical functions, and depression (Lee et al. 2005; Liang et al. 1996). Cognitive function also affects the prognosis of functional decline (Ishizaki et al. 2006). Thus, if results vary between countries, they may be linked to a variety of underlying mechanisms. Of particular interest here is the impact of education.

Age-related cognitive impairment is generally considered to be an organic process, linked to neuro-degeneration. We would therefore anticipate that the effect of age upon cognitive ability would be similar across countries after adjusting for conventional risk factors such as diabetes, hyperlipidemia, and smoking. The effect of gender may vary particularly if confounded by educational opportunity and other social engagement. The core cognitive abilities assessed in JSTAR and SHARE are expected to have an impact upon the socioeconomic success of participants, indexed by income and/or wealth. Of interest here would be 1) whether any independent effect of cognitive function was discernible, having controlled for education and occupational status, and 2) the extent to which any such effects were seen in Japan as are seen in European countries.

We report each cognitive test score and examine the effect of poor cognitive performance on a number of economic, health, and social functioning measures. To simplify the presentation we focused on three key cognitive domains: memory (recall), disorientation, and numeracy. We did not include verbal fluency in JSTAR because standard measurement of the ability across different languages was not available, and a validated measure for verbal fluency with a short questionnaire was not available in Japanese.

Measurement of "disorientation of time and place" is a part of Mini-Mental Status Exam, and has been adopted in common by JSTAR, HRS, and SHARE. Memory was measured by asking the respondents to recall 10 words that are presented beforehand. Due to cultural and linguistic difference, purely comparable measurement of word recall was not validated across countries (e.g. HRS version includes the word "church" which may not be similarly familiar to Japanese elderly). After discussion with HRS researchers who are in charge of cognitive function assessment (personal e-mail communication with Prof. H. Dodge at Oregon State University), we decided to adopt a 10-word test from a part of Alzheimer's Disease Assessment Scale J-COG, which has been used in clinical trials for evaluating the efficacy of anti-dementia medicine (Mohs et al. 1983; Homma et al. 1992; Kawano et al. 2007). Finally, numeracy tests are completely comparable among JSTAR, SHARE, and HRS. The questionnaire asks the respondents to conduct a simple arithmetic calculation only in his/her head.

For these analyses SHARE has re-coded each of the cognitive measures to a binary variable with as near as possible to 7% scoring as impaired. In JSTAR, we adopted the same strategy to dichotomize each measure as follows: disorientation (if any failed answer=6.6%), word recall (initial recall less than or equal to 2 = 4.1%, late recall less than 1 = 8.3%), and numeracy (failed in the first two questions = 2.2%).

In these analyses we always adjust for the effects of age, sex, and education, and stratify for region. Additional variables are included as appropriate and are mentioned as each set of results is presented and discussed. Sampling weights were not applied. We present the estimates from the models and a 95% confidence interval.

2.6.2 Prevalence of Cognitive Impairment

Figures 2-6-1-1, 2-6-1-2, and 2-6-1-3 summarize the prevalence of cognitive impairment in disorientation, memory (initial word recall) and numeracy by age, sex, and region. For each domain, the overall trend shows that the prevalence of impairment rises with age. Exceptional was the case of males in Takikawa for disorientation and recall, where overall prevalence of dysfunction was higher than those in other cities, and the prevalence was higher among those in their 50s rather than among those in their 60s.

When we conducted a logistic model to predict the impairment with explanatory variables including age, gender, education, household income, marital status, and municipality,

• Even after controlling for covariates, age still shows the increasing gradient for all the domains of cognitive dysfunction, which supports the patho-physiological basis of cognitive impairment.

• Education was the strongest and most consistent socioeconomic predictor of cognitive impairment as expected.

• Age, gender, educational attainment and marital status did not explain all of the differences across municipalities in memory and disorientation.

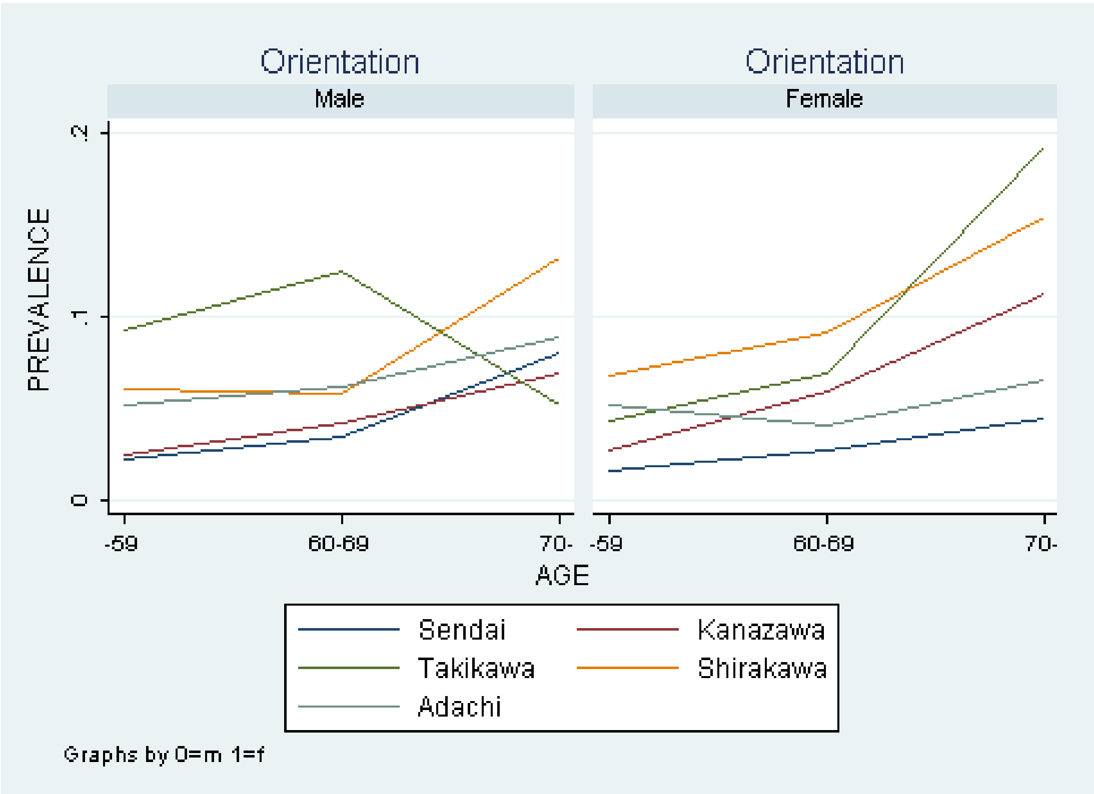

Figure 2-6-1-1 Cognitive impairment in orientation, by age, sex, and region

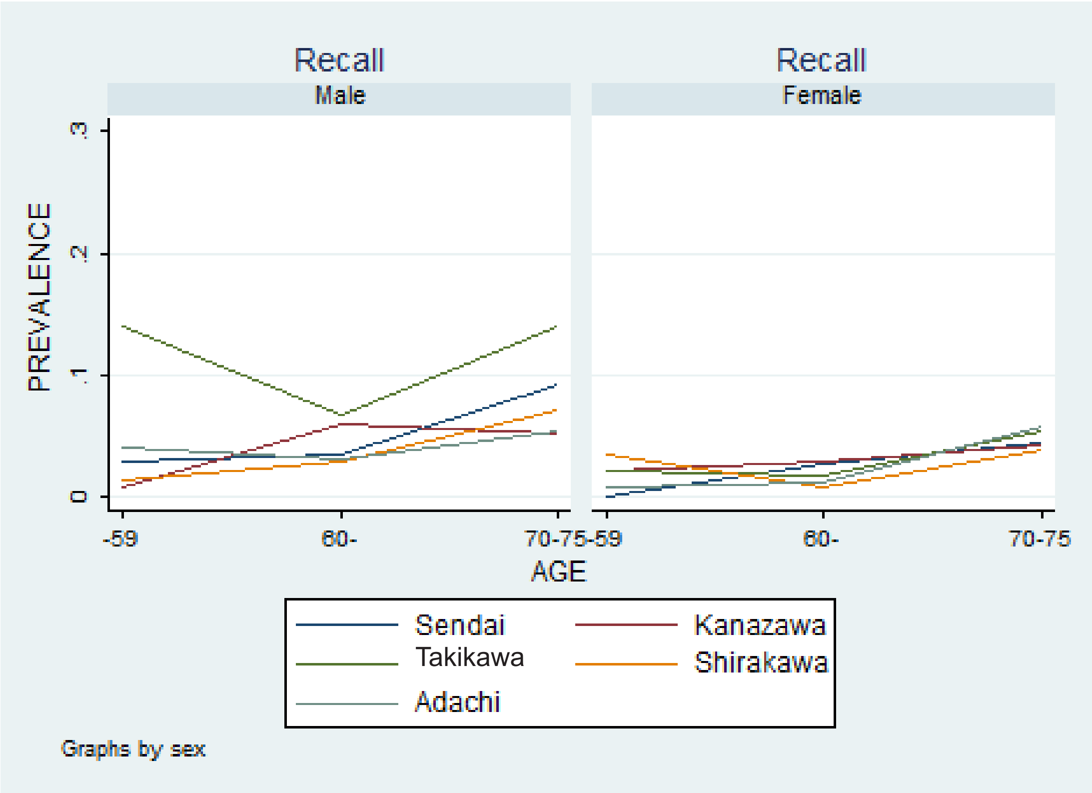

Figure 2-6-1-2 Cognitive impairment in word recall, by age, sex, and region

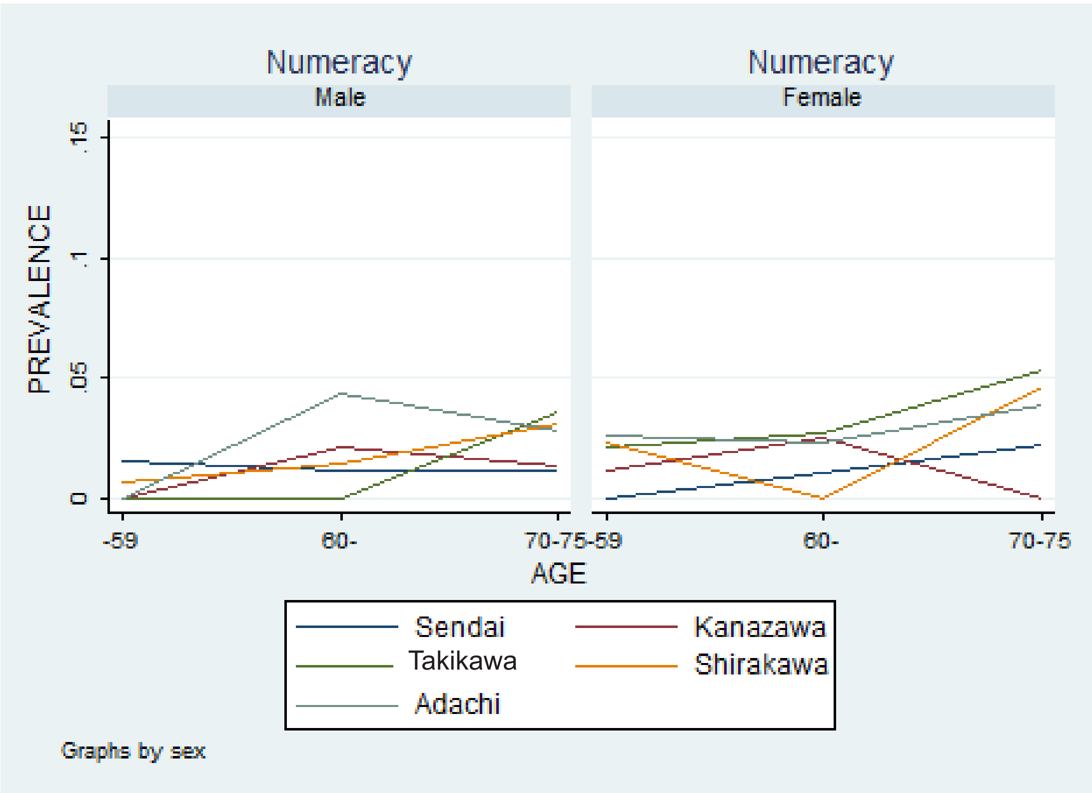

Figure 2-6-1-3 Cognitive impairment in numeracy, by age, sex, and region

These findings are in accord with the findings in SHARE. When we put all cities together and conduct logistic regression to control for age, gender, educational attainment, and marital status, those in Takikawa and Shirakawa, rural farming and forestry cities, showed higher odds of impairment in orientation, compared to those in the cities (ORs 2.05[1.20-3.50] and 2.36[1.43-3.91], respectively). As for word recall, those in Shirakawa had significantly lower odds of impairment (OR 0.44 [0.23-0.86]). This finding strongly suggests the association of social environment with the prevalence of cognitive function in different domains. However, their causal direction is, again, a matter of scientific debate. One could argue that a rural life with less intensity of social interaction may cause a higher chance of cognitive impairment. Others could counter-argue that those with moderate impairment were selectively excluded in the urban area due to higher access to institutionalization, which relatively raised the prevalence in rural areas. Again, follow-up JSTAR surveys in the future will provide us opportunities to answer which argument is the truth.

2.6.3 Cognitive Impairment and Education

In this section, we treat cognitive impairment as a predictor variable to lower education attainment, as the SHARE report did, for comparative purpose. However, we believe that the supposed causal direction of education on cognitive function in later life may be the reverse, and education should have been treated as a covariate rather than a target variable in this case.

Figure 2-6-2 presents the odds ratio of cognitive impairment on lower educational attainment, after adjusting for age, sex, and marital status. When data from the five cities was compiled, the odds of cognitive impairment to lower education was 1.50 (1.11-2.01) for orientation, 2.04 (1.42-2.95) for word recall, and 2.28 (1.37-3.81) for numeracy. The figure shows the results stratified by municipality, and all point estimates of odds ratios suggest the association between lower educational attainment and cognitive impairment, though many of the estimates were not statistically significant, due to a relatively smaller sample size to detect the impact of cognitive dysfunction for each city. There was no significant interaction between municipalities and cognitive dysfunction.

As such, cognitive function, however measured, was strongly and consistently associated with education. The effects of cognitive dysfunction were broadly similar across regions. When compared to SHARE data, Japanese elderly in JSTAR showed a similar pattern to those in Nordic countries, compared to southern European countries and Switzerland, where the relationship between education and numeracy was observed quite strongly. Although the SHARE report did not discuss this cross-country difference in the relationship between educational attainment and numeracy ability, that JSTAR results were similar to Nordic countries may suggest that the high quality of primary education in Japan and Nordic countries may contribute to the less remarkable association between cognitive function and educational attainment.

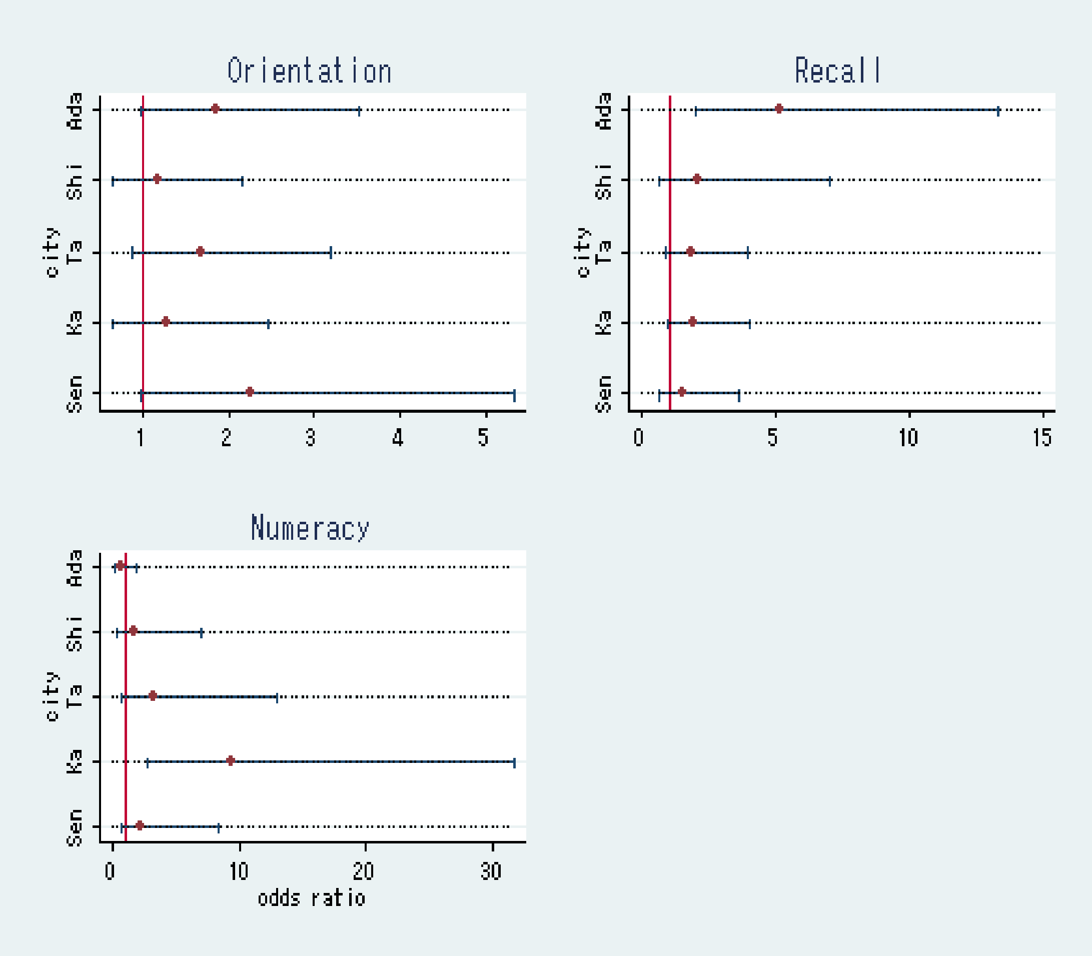

Figure 2-6-2 Adjusted odds ratio of cognitive impairment on low educational attainment, by region

2.6.4 Cognitive Impairment and Income

In Figure 2-6-3, we modeled equivalent household income as log-normally distributed outcomes with upper 1 percentile outliers excluded. The effect of cognitive impairment was estimated, controlling for age, gender, education and employment status. The association of impairment in the numeracy function with equivalent income was marginally significant when combined across regions. The point estimate of the proportion of equivalent income to that of non-impaired subjects was 0.84. (p=0.08). Disorientation and impaired word recall were negatively associated with equivalent household income, but were not significant (p=0.15, p=0.56, respectively). Exceptional was the case in Sendai where those with disorientation had 1.32 times more household income (p=0.108). Those in Takikawa with recall impairment have 0.74 times less income than their counterparts with intact recall (p=0.08).

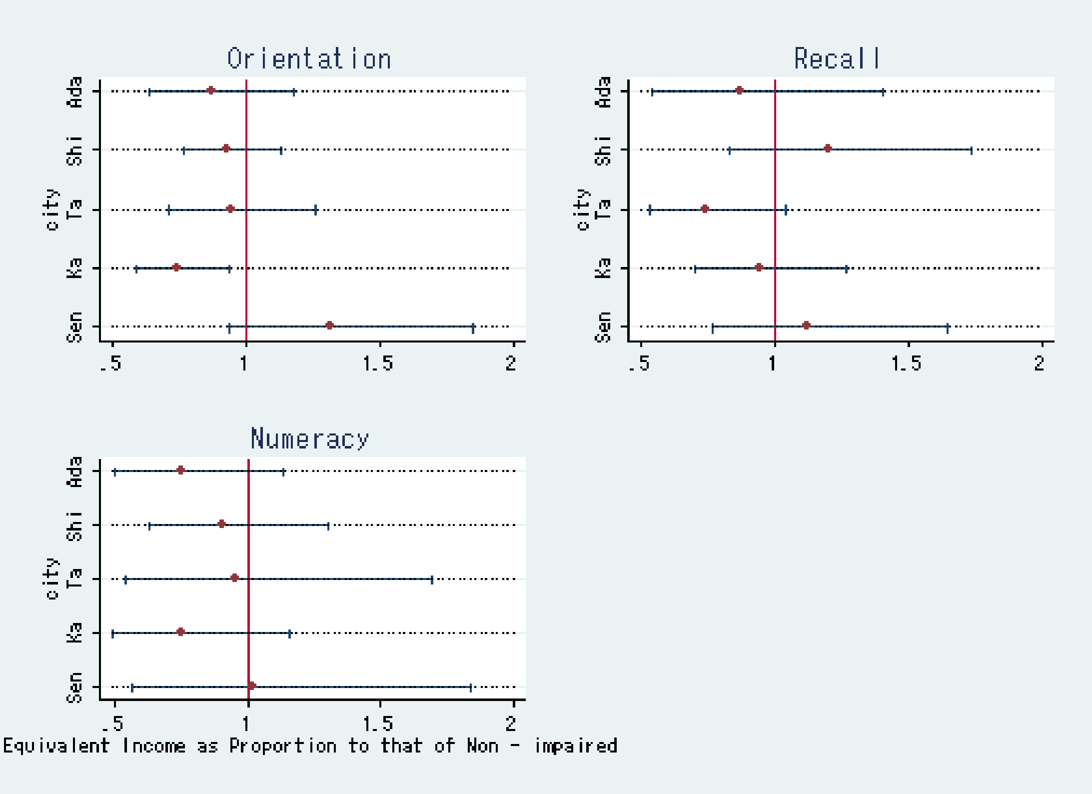

Figure 2-6-3 Equivalent income as proportion to that of non-impaired, by region

2.6.5 Cognition and Support

The effect of relative cognitive impairment upon giving and receiving emotional, practical or financial support was modeled using logistic regression, controlling for age, sex and education, following the SHARE analysis. Overall findings shown in Figure 2-6-4-1 (giving support) and Figure 2-6-4-2 (receiving support) were as expected in that those with cognitive impairment were generally less likely to give, and more likely to receive support than non-impaired subjects.

To be more specific, if we put the five cities together, those with disorientation (OR 0.67[0.47-0.95]) were significantly less likely to give support. Numeracy and recall impairment did not show a significant association with the likelihood of giving support. Being young, female, and with higher education were characteristics significantly related to higher odds of giving support.

As with receiving support, when the five cities are put together, those with impaired numeracy (OR 2.51 [1.32-4.77]) and memory impairment (OR 2.09 [1.24-3.52]) were significantly more likely to receive support compared to non-impaired subjects, while disorientation was not related to the likelihood of receiving support. Interestingly, the female gender was significantly related to higher likelihood of receiving support. Educational attainment and age were not related to likelihood of receiving support.

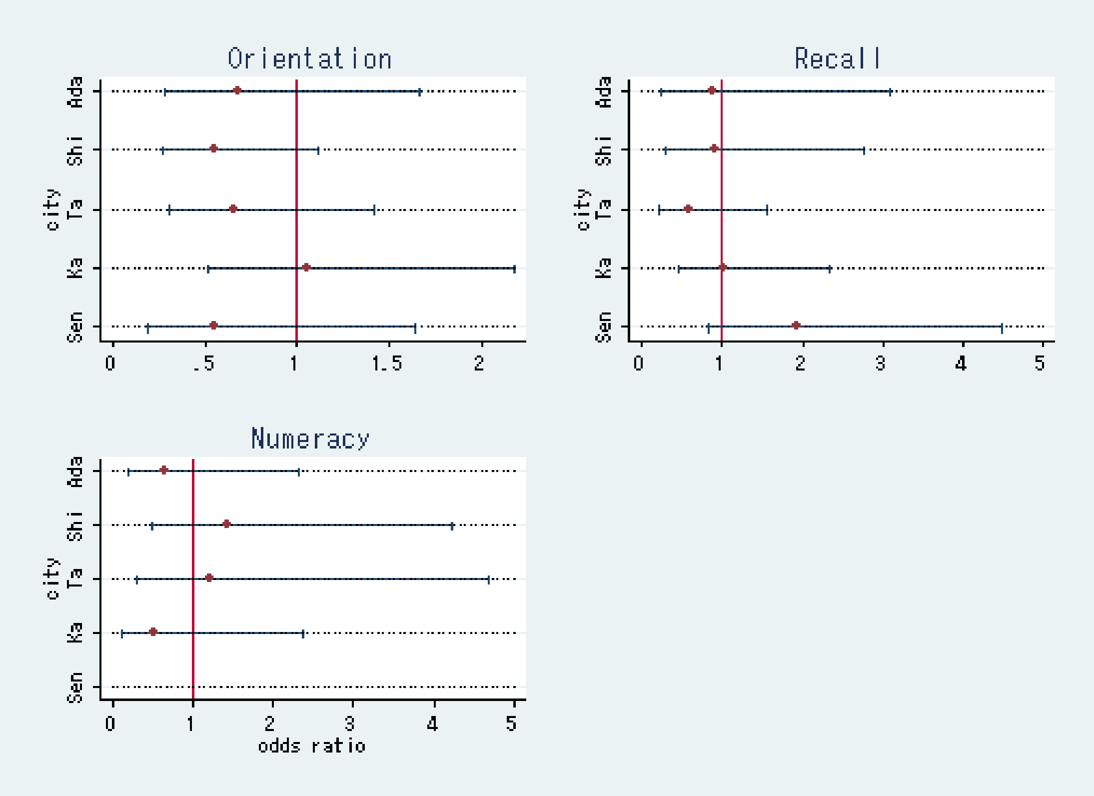

Figure 2-6-4-1 Adjusted odds ratio of cognitive impairment on giving support, by region

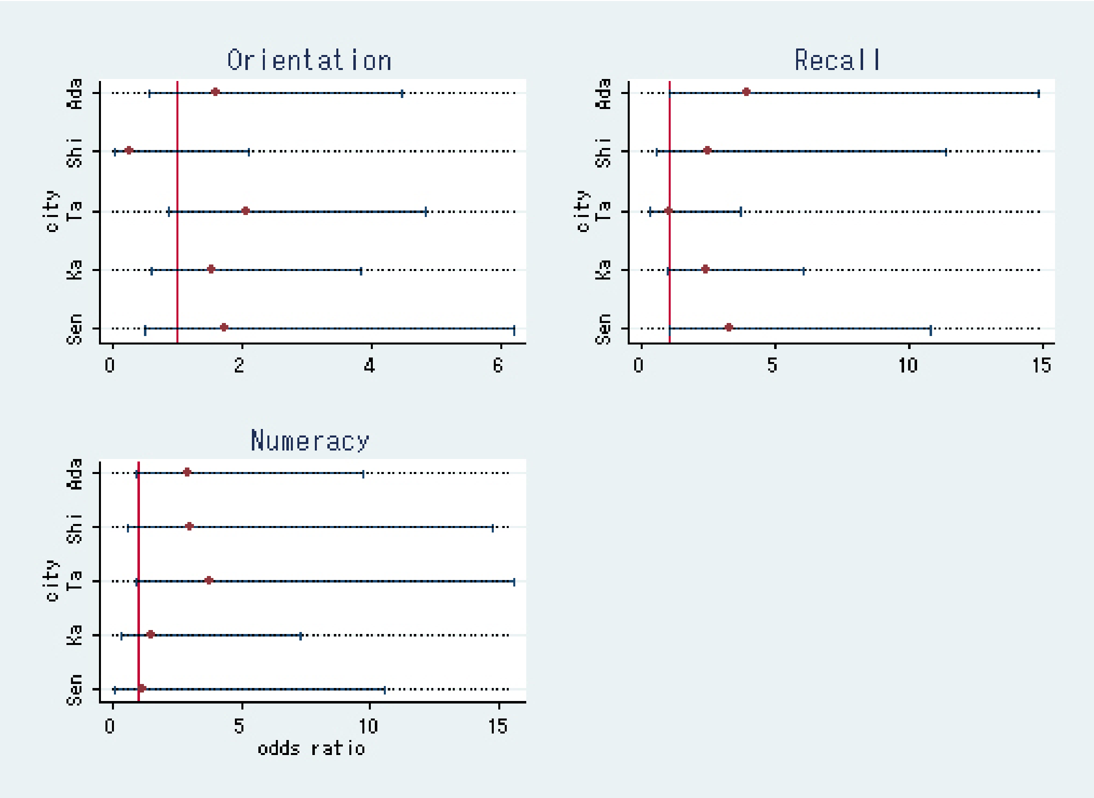

Figure 2-6-4-2 Adjusted odds ratio of cognitive impairment on receiving support, by region

There was no significant interaction between municipalities and cognitive function. Thus, there seems to be no regional variance in the association between cognitive function and likelihood of support exchange. However, those in Shirakawa were less likely to receive support, compared to respondents in other cities. We do not have a plausible explanation for this regional difference in the pattern of support exchange. Further analysis including the availability of formal and informal care for those in need in regional areas may be helpful.

2.6.6 Cognition and Functioning

The effect of relative cognitive impairment upon the mobility function, activities of daily living (ADL), and performance of instrumental activities of daily living (IADL) was modeled using logistic regression, controlling for age, sex and education. Again, we can see the overall trend that impairment in orientation, memory recall, and numeracy were all significantly related to limitations in mobility, ADL, and IADL, which is again the same as SHARE findings. When we stratify the analysis by municipality as shown in Figure 2-6-5-1 (mobility vs. cognitive functions), Figure 2-6-5-2 (ADL vs. cognitive functions), and Figure 2-6-5-3 (IADL vs. cognitive functions), however, the magnitude and direction of the associations were somewhat varied across regions and types of cognitive function, supposedly due to smaller sample size for each city to detect a robust association between functioning and cognition.

The association of numeracy and limitations in mobility and ADL was less salient compared to those of disorientation and recall. The effect of impaired numeracy was most salient in IADL limitation. Since IADL includes the function to manage money and payment, numeracy would be a necessary capacity.

Disorientation was less associated with functional limitations in Sendai and Shirakawa, compared to those in other cities, which may be related to regional difference in the patterns of social engagement and transfer. Memory impairment was inconsistently associated with ADL/IADL limitation across cities.

2.6.7 Cognition and Physical Health

The effect of cognitive impairment upon self-perceived health and chronic illness was modeled using logistic regression, controlling for sex, age, and education. There were clear and consistent negative effects of relative cognitive impairment (each domain) upon self-perceived health. There was no clear pattern of association with having two or more chronic physical illnesses. These findings are quite similar to those in SHARE.

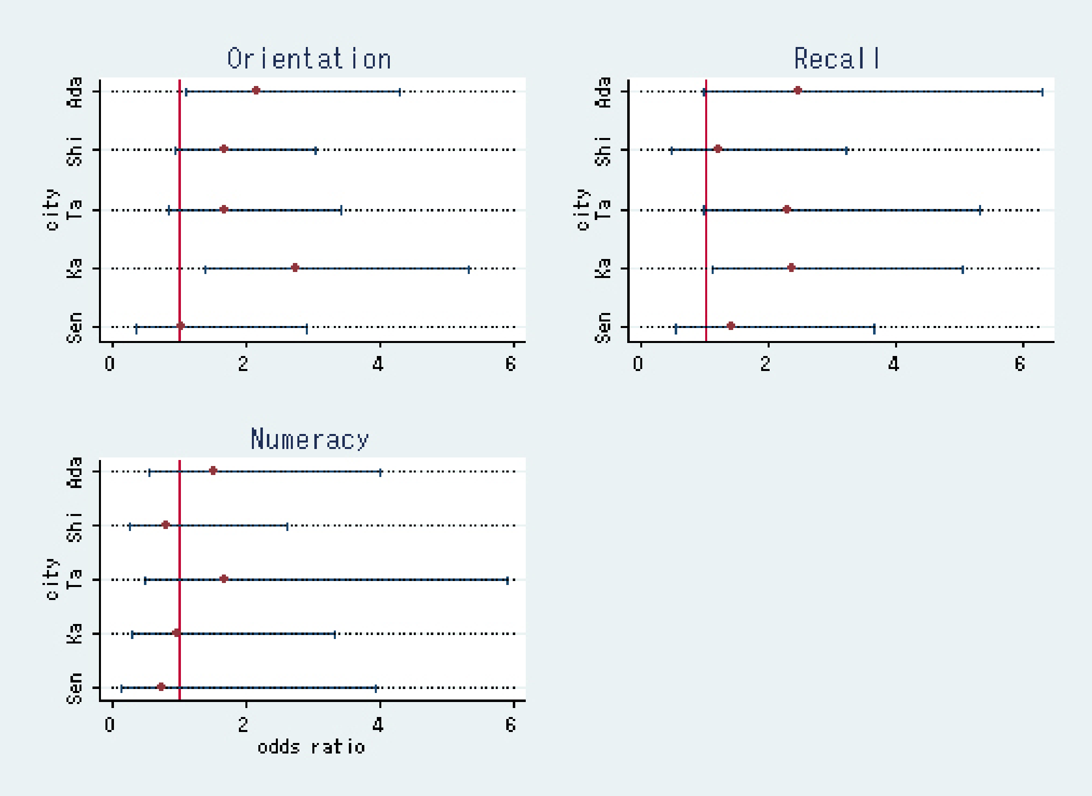

Figure 2-6-5-1 Adjusted odds ratio of cognitive impairment on mobility limitation, by region

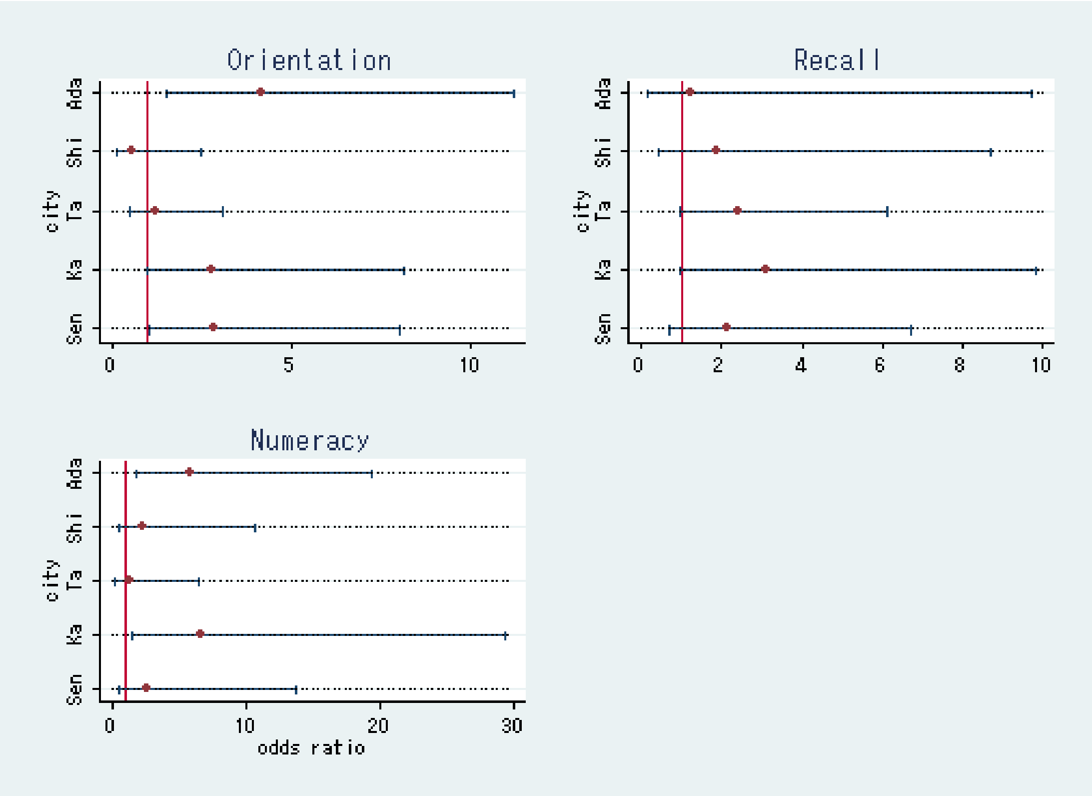

Figure 2-6-5-2 Adjusted odds ratio of cognitive impairment on ADL limitation, by region

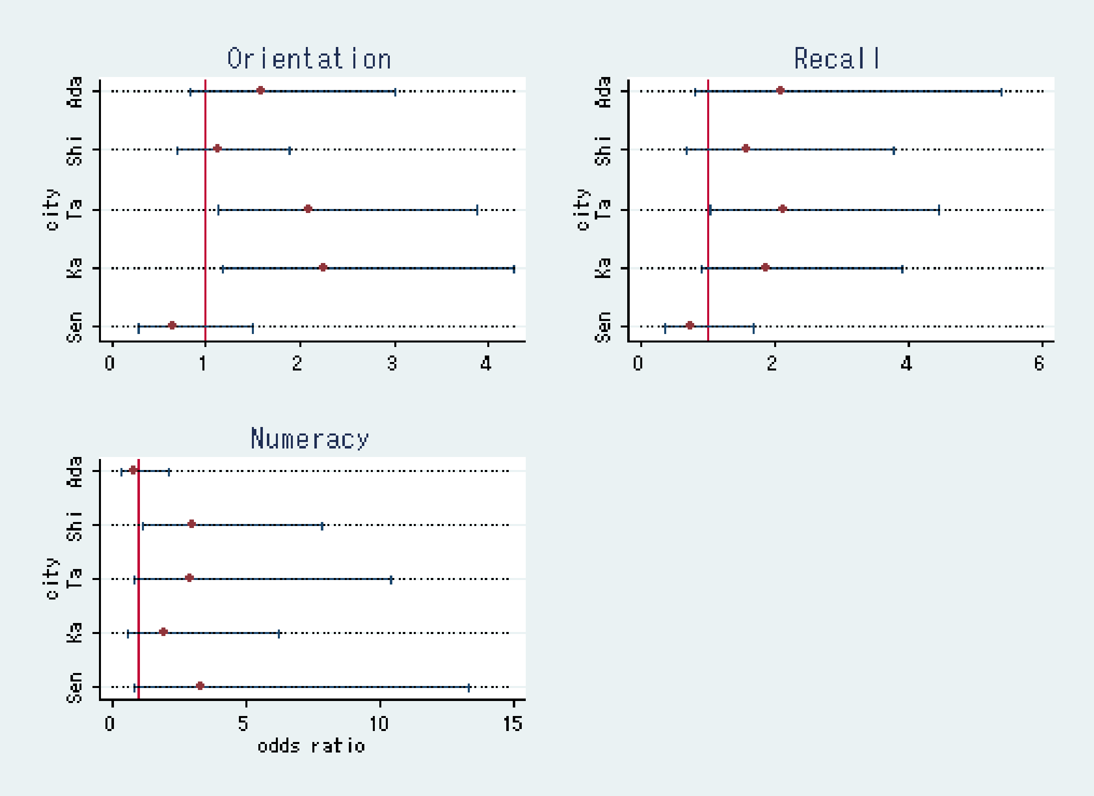

Figure 2-6-5-3 Adjusted odds ratio of cognitive impairment on IADL limitation, by region

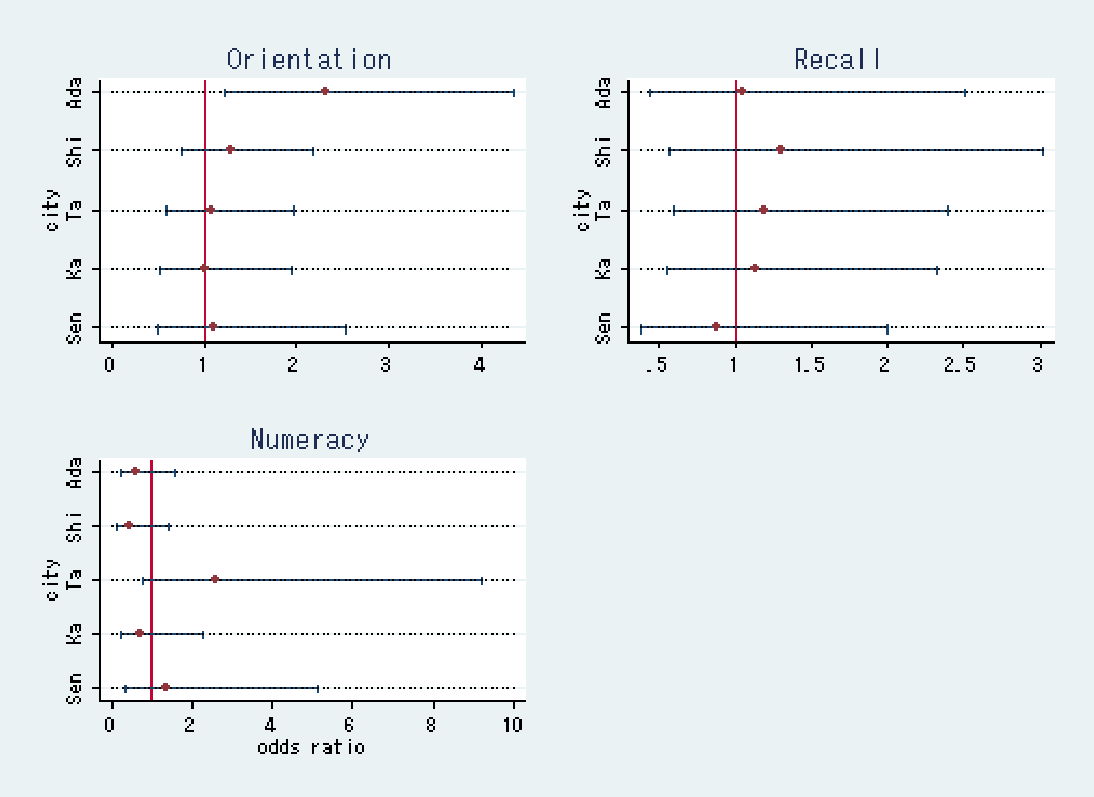

Figure 2-6-6-1 Adjusted odds ratio of cognitive impairment on having chronic diseases, by region

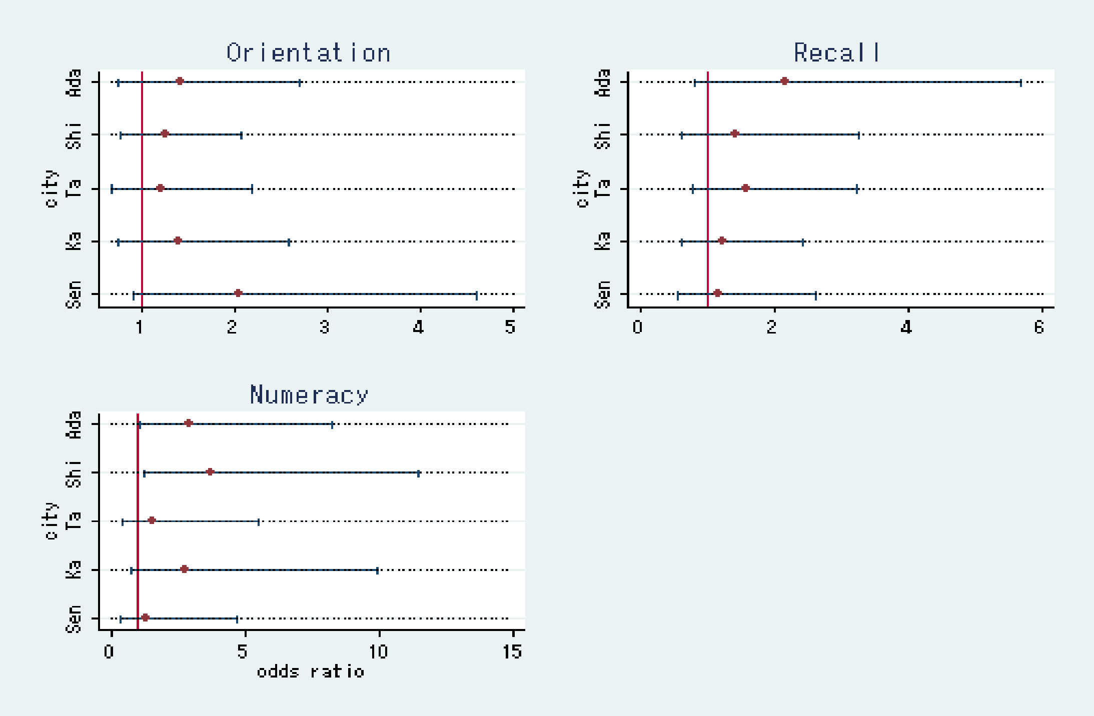

Figure 2-6-6-2 Adjusted odds ratio of cognitive impairment on poor self-perceived health, by region

2.6.8 Conclusions

• Even after controlling for covariates, age still shows the increasing gradient for all the items of cognitive dysfunction, which supports the patho-physiological basis of cognitive impairment.

• Education was the strongest and most consistent predictor of cognitive impairment as expected.

• Age, gender, educational attainment, and marital status did not explain all of the differences in the prevalence of cognitive impairment across municipalities, suggesting the association of social environment with the prevalence of cognitive function.

• Japanese elderly in JSTAR showed a similar pattern to those in Germany and Nordic countries, compared to Southern European countries, where the impact of education on numeracy was far stronger.

• Consistently across regions, people with numeracy impairment had lower incomes than those who were not impaired, which was comparable to the findings in SHARE. The associations were independent of education and current occupational status. The causal relationship between cognitive impairment and income disadvantage deserves further follow-up study and comparable analysis with SHARE and HRS.

• An interesting contrast emerged between rural towns and urban cities. While the risk of over-generalizing is conceded, a pattern emerges in which relative cognitive impairment is more prevalently seen in rural towns, and more robustly associated in urban cities with receiving support. Availability of informal care in rural areas and accessibility of formal institutionalized care in urban areas may cause this urban-rural difference, which provides an important policy implication in long-term care for those with cognitive impairment in the community. It also gives a research focus on comparative analysis with SHARE findings where a similar contrast was seen between northern and southern countries.

2.7 Out-of-Pocket Payments for Health Care Expenditures

2.7.1 Introduction

Beginning in 1961, the Japanese national health care program has mandated universal medical coverage. In the case of company-based health plans, employers are required to have a non-profit insurance organization or to join the government-driven plan to provide their employees with health insurance. Civilian office workers, teachers in private schools, and workers in some specialties are covered by a non-profit insurance organization for each worker type. In these employment-based health plans, the premium is set proportionally to annual income. At that time, half of the premium was paid by employers and the other half by employees.

In the case of community-based plans, which cover the self-employed, the retired, and those who are not covered by employment-based programs, municipalities become public insurers to provide mandatory health care coverage. The premiums of community-based plans are set by a combination of the community rate and income-proportional rate, and are levied on household heads. Since the community-based plans include high-risk beneficiaries with low income, premium revenue covers only half of the cost, and the remaining half is compensated by tax revenue.

At the beginning of the mandatory coverage, household heads were not required any copayment, while the dependent family member had to pay 50% of copayment. Gradually, the copayment rate was decreased to 30% for dependent family members in the 1980s. Due to financial pressure on national health insurance, however, 10% copayment for household heads was instead introduced in 1984 for the first time; it was raised to 20% in 1997 and since 2003 it has been 30%.

There are no deductibles in Japanese public insurance scheme to date, though the debate to introduce one has been made as a measure to control the extreme rise in medical expenditure. The upper limit of monthly contribution was set according to income levels, and the personal contribution over the limit is reimbursed by the insurers. For those who cannot afford premium payment and copayment, a means-tested subsidy is possibly available through welfare programs.

After 1973, the elderly aged 70 and over were entitled to free medical services both for outpatient and hospitalized services, which quickly raised national medical expenditure due to the expected moral hazard and subsequent over-utilization. In 1983, free medical services were abolished and the new Elderly Health Care Law was established. The law stipulated that the elderly were required to make a fixed amount monthly contribution, e.g. 400 yen per month for outpatient and 300 yen per diem for inpatient. The contribution amount has been amended and increased since then, until 20% coinsurance was introduced in 2002, with a monthly limit of 3,000 yen for outpatients and 37,200 yen for inpatients. From April 2008, a medical care program for the elderly aged 75 and over has begun to be operated as an independent program, though it needs some time to stabilize because political debate over an increased economic burden on low-income elderly households has been raised.

In 2000, another mandatory public insurance program was initiated to cover long-term care. Long-term Care Insurance (LTCI) is a non-selective mandated insurance payable by all Japanese residents aged 40 and above, driven by municipal government insurers. The LTCI is a single and dominant insurer for providing formal elderly care services in this country. Until the introduction of LTCI, elderly care relied on informal care in a traditional family setting in which the burden of care was the selective obligation of female family members. Besides that, long-term care was often offered in medical facilities, even for those without a need for medical attention. The introduction of LTCI originally purported to alleviate the burden of informal care and to efficiently use resources so as to reduce a large medical expenditure (Mitchell, Piggott and Shimizutani 2008). Elderly in need of long-term care must apply to the Local Care Needs Assignment Committee that decides whether the applicants meet the care eligibility criteria. Once approved, the beneficiaries are entitled to use formal care of any mix, under a monthly upper limit and with 10% copayment.

These programs in the Japanese health care system are evidenced by comparing the figures appearing in Table 2-7-1. Out-of-pocket (OOP) payments vary substantially across countries with different mixes of health insurance programs: public and private, or tax financing and social contribution. The proportion of OOP to total health expenditure ranges from 11% in Greece to 42% in Italy, and the rate of 18% in Japan is positioned in the middle of the range.

The major component of the Japanese health care program is the national mandatory health insurance operated as social insurance. The population covered by public/mandatory insurance is 100% in Japan which is the same as cases in most of the SHARE countries, except for Germany and Denmark where public insurance is not mandated.

According to OECD Health Data 2005, the share of the public social insurance program in the total health expenditure has been about 66% in Japan, which was about the same or a little lower than the programs in France and Germany (data not shown in the table). The supplemental insurance is not mandated in Japan, and the government does not hold a reliable statistic on the magnitude and prevalence of private supplementary insurance, though it would be estimated negligible as is the case in Sweden.

The data in Table 2-7-1 and what we have observed in previous sections poses an important theme. Apparently, non-selective availability of health insurance does not guarantee the achievement of health equity in the nation. Although the public mandated coverage of medical care does seem to close the health gap across socioeconomic class, a social gradient of health can be observed even in Japan and Sweden, where health care insurance is covered exclusively by the public domain. The remaining health gap in these countries may deserve close attention. One might argue that, even with mandatory public health insurance emphasizing equity, actual usage of medical recourse varies across gender, age, region or socioeconomic status. Babazono et al. reported that a rise in the copayment rate resulted in decreased access to primary care among those economically deprived (Babazono et al. 2005). Or, it may be due to a higher chance of ill-health and disability among those in lower social class, and even equal access to medical care does not solve the problem.

In what follows, we will explore possibilities of the former case, by looking over some variations in OOP, which may discriminate care access by socioeconomic position. In particular, we will assess the proportion and characteristics (age, gender,

Table 2-7-1 Comparison of Health Care Systems across OECD countries

Countries	Out-of-Pocket (as % of health expenditure)	% population covered by public/mandatory	% population covered by supplementary insurance	Financing scheme of public health system
Germany	11	91	9	Social insurance
Denmark	16	100	28	Tax financed
Netherland	17	75.6	64	Social insurance
France	20	99.9	86	Social insurance
Spain	20	99.8	10	Tax financed
Sweden	22	100	negligible	Tax financed
Austria	24	99	32	Social insurance
Switzerland	30	100	30	Social insurance
Greece	32	100	10	Tax financed
Italy	42	100	16	Tax financed
Japan	17	100	negligible	Social insurance

Source OECD data with Swiss Federal Office Public Health (2002)

educational attainment, and health status) of those who paid out-of-pocket over the past twelve months. Then, we will explore how OOP is related to ability to pay as expressed by household income.

2.7.2 Payments across Municipality, Gender, and Age

SHARE reports OOP for drugs, outpatient, inpatient, and daycare services. In JSTAR, OOP for drugs is not fully separable from outpatient expense because some outpatient clinics still sell drugs at their counter, rather than just issue a prescription for drugs at pharmacies. We also exclude daycare expense because very few respondents used the service in this wave of the survey.

Figure 2-7-1 presents the proportion of people who used any outpatient, inpatient, or dental services in the past 12 months. About 70% of the respondents used outpatient services, and about 50% used dental care services, and about 10% used in-patient services. We could see a variance across regions: Kanazawa (74%) and Adachi (72%) showed the highest proportion of outpatient service use, and Takikawa showed the lowest (61%). For dental service use, Sendai (50%) was followed by Kanazawa (47%) and Adachi (46%), and the least was Shirakawa (42%). For outpatient and dental care service, cities were more likely to use services compared to rural towns, suggesting that physical access to these services may be better in urban settings. For inpatient services, however, Takikawa, Kanazawa, and Sendai were the same (11%), followed by Adachi (9%), and Shirakawa (6%). Since Hokkaido, the northern prefecture where Takikawa is located, has the second largest number of hospital beds per population in Japan, a higher proportion of in-hospital service use there may be explained by this.

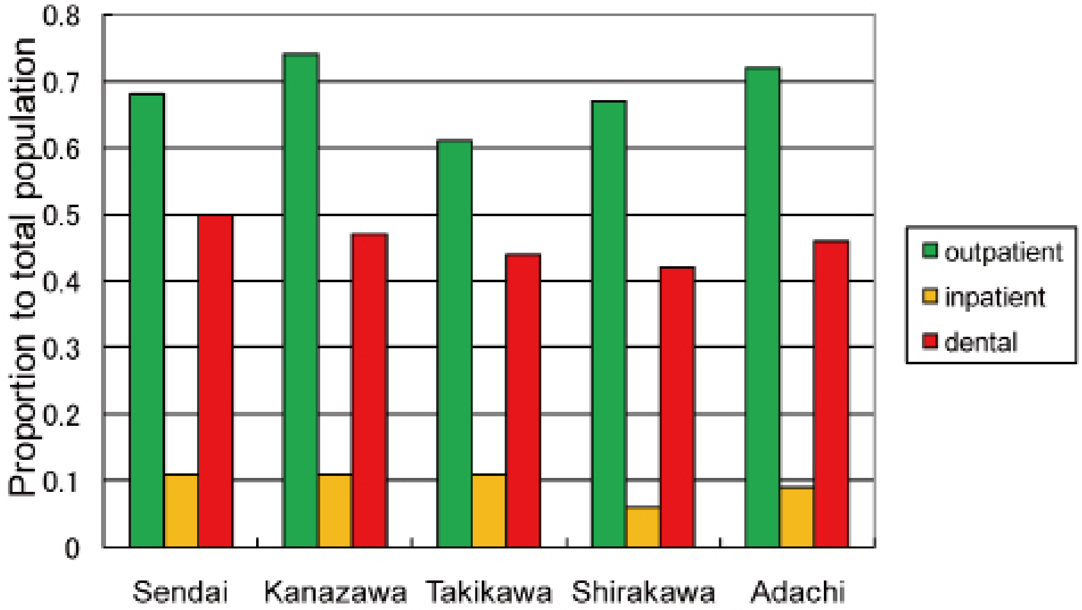

Figure 2-7-1 Proportion of people who used outpatient, inpatient, and dental services in the past 12 months, by region

Figure 2-7-2 shows average OOP payments among those who used the service. The largest average OOP expense was JPY125,000 in Adachi, followed by Kanazawa (JPY97,000), Sendai (JPY87,000), Takikawa (JPY84,000), and Shirakawa (JPY58,000). Patients in Adachi spent 2.1 times as much as those in Shirakawa. Adachi and Kanazawa spent JPY250,000 for inpatient service on average, while Takikawa spent as much as JPY157,000. Adachi also had the largest expenditures for outpatient and dental care services. In contrast, people in Shirakawa were least likely to use medical and dental services, and when they did use them, they spent the least.

Figure 2-7-3 shows the proportion of OOP spent in each type of service. About 45%-60% of OOP was shared by outpatient services. Inpatient services shared 19%-31%, and dental service shared 19%-26% of total OOP. We can observe a variance across regions: Shirakawa paid OOP mainly for outpatient services, and least likely used in-hospital and dental services, whereas Kanazawa spent the largest portion on inpatient services, and the least for outpatient services.

In SHARE, payments for outpatient care and medicines contribute to more than 80% of the expenditures across the countries with various health care systems. In contrast, payments for inpatient and day care represent very small parts of the financial burden related to medical expenditures. We should keep in mind, however, that the OOP payment scheme differs across insurance systems. Per diem payment is required in Austria, Germany, France, Spain, Sweden, and Greece. In Japan, fixed rate co-insurance with an upper monthly limit is required for hospitalization. In all countries, prescribed pharmaceuticals are submitted to OOP payments through various mechanisms, either a fixed fee per drug (Austria, Germany, Italy, Sweden, and Denmark with a cost ceiling in the two last cases) or a co-insurance rate (France, Spain, Greece, and Japan). In Switzerland, the OOP payments take the form of a fixed amount deductible and a co-insurance rate of 10% on all health care services up to a cost ceiling per year.

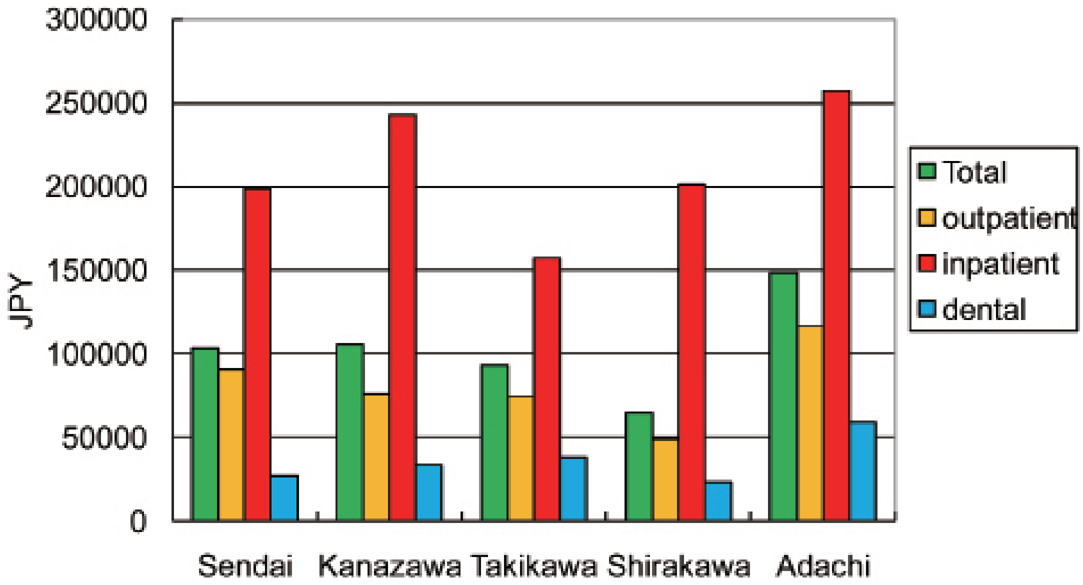

Figure 2-7-2 Average OOP payment in the past 12 months, by region

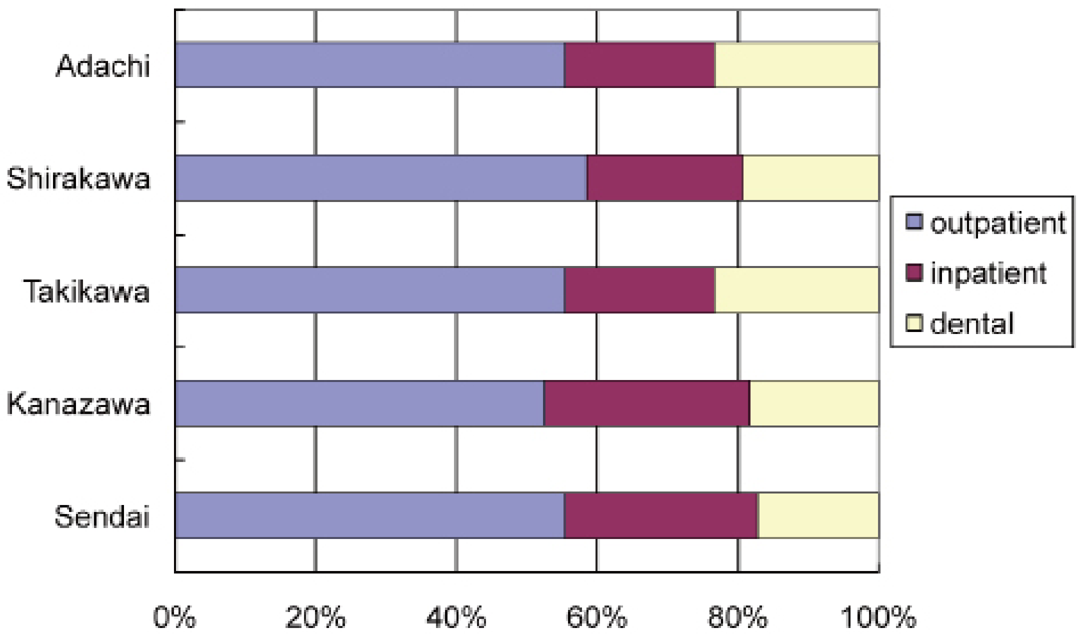

Figure 2-7-3 Proportion of OOP spent in each type of service, by region

2.7.3 Factors Associated with OOP Payments

Table 2-7-2 reports the share of the respondents who met positive OOP. In most of the SHARE countries, around 80% of the respondents paid out-of-pocket with large variations: it was lower in the Netherlands, France, and Spain (around 40%) and especially low for those aged 65 and over in Spain (less than 30%) where Spanish national health insurance exempts elderly patients from copayment. In JSTAR, 69% of the respondents answered positive out-of-pocket in the past 12 months, and the proportion was comparable across regions. The number is close to that in Switzerland. It is mainly because a larger portion of JSTAR respondents reported they had no visit to outpatient, inpatient, or dental services in the past 12 months, as we will see in Section 2.8. Among those who did use any outpatient, inpatient, and/or dental services, 98-99% reported positive out-of-pocket payment, which is not surprising since Japanese public health insurance asks for copayment for all citizens, except for those covered by welfare assistance and exempted from copayment.

Table 2-7-2 Percentage of People Being faced with Positive Out-of-Pocket Payment

		By age groups (%)			By gender (%)	
	All (%)	50-59	60-69	70+	Female	Male
Sendai	68.4	59.5	74.3	76.1	71.6	65.2
Kanazawa	69.3	58.6	76.9	78.7	69.8	68.7
Takikawa	65.5	59.5	62.5	77.8	68.1	63.4
Shirakawa	68.0	60.7	70.4	75.1	69.9	66.3
Adachi	68.0	64.0	67.2	77.1	68.3	67.7

Table2(cont.)

	By subjective health (%)		By educational levels (%)	
	Good	Less than good	Secondary	Mandatory
Sendai	60.8	76.0	68.2	69.9
Kanazawa	63.6	74.1	68.3	72.7
Takikawa	56.6	73.6	65.0	66.3
Shirakawa	62.0	74.6	64.9	69.6
Adachi	62.2	73.0	68.9	67.0

As was true in the SHARE report, JSTAR respondents also showed increasing proportion of meeting positive out-of-pocket payment as the respondent's age went up. Female respondents were more likely to meet OOP, though gender difference in the chance of having positive PPO was somewhat smaller compared to those in SHARE countries. Those with poorer subjective health also had a higher chance of meeting positive PPO, and it is simply due to their higher chance of using medical services. Simple comparison did not show a clear relationship between the chance of positive PPO and educational attainment, though multivariate analysis adjusting for health status leads to a different conclusion as we will discuss later.

The SHARE report concludes that there was no clear relationship between OOP and educational level. However, the table gives a different picture. In the Netherlands, Spain, and France, where the percentage of subjects facing positive OOP is generally low, the likelihood of meeting positive PPO gradually rises as educational attainment goes up. In contrast, other SHARE countries where around 70%-80% of subjects meet positive OOP, the difference in educational level is not clear. JSTAR shows that Japan further marks a unique position: lower educational attainment was associated with a lower chance to meet OOP, and this is significant after adjusting for age, sex, household income, subjective health, and region (OR; 0.81 [0.68-0.98], " high school education or higher" as reference category). Further analysis found that the chance to use outpatient and/or in-hospital service in the past 12 months was not significantly related to educational attainment, but the chance to use dental service was significantly related to education (see Chapter 2 section 8), which may contribute to lower chance to meet OOP among those with lower educational attainment. In the same line, lower household income was significantly associated with lower probability to meet OOP, after adjusting for age, sex, education, subjective health, and regions (OR; 0.80 [0.68-0.93], as "more than median income" as reference category), and lower income was also significantly associated with lower chance to visit dentists. Although Japanese public health does cover dental services, fee charges out of public health insurance scheme was allowed in the system, and copayment for dental services tended to be costly, which may hinder access to the service among those in low income households.

In JSTAR, those who paid OOP with supplemental private insurance were virtually zero: none for outpatient and dental care services, and only 0.9% (3 out of 325) for inpatient service. Supplemental private insurance in Japan plays only a limited role. There are virtually no insurance plans in this country that cover OOP for co-insurance payment. As is discussed in the SHARE report, in France and the Netherlands where supplemental insurance is prevalent and mandated, it is more common among those with higher household income, and is significantly related to higher OOP and higher utilization of medical resources.

2.7.4 Equity Issues in OOP Payments

The SHARE book examined the share of OOP in total household income to discuss the vertical equity across income levels. This is relevant and even more important in our Japanese case, because we would want to know whether current Japanese policy of "health care for all" is successful to achieve it or not. Figure 2-7-4 reports the mean of OOP if OOP is positive, and the ratio of OOP to equivalent household income.

As is the case in the SHARE results, JSTAR results also showed a regressive nature of OOP to income levels: the share of OOP to equivalent household income was the largest among those in the lowest quartile of income. Another point to be noted was that the share was the highest among those in their 60s, followed by those in their 50s, and the least among those in their 70s. The OOP share across age categories is somewhat similar to that of Spain where the national health insurance exempts copayment to those above 65. The same is true in the Japanese system. At the time of the first wave survey of JSTAR, those above the 70s were treated in the Elderly Health Care system in which the service recipient was required to pay a lower coinsurance rate with a lower upper limit in monthly expense, compared to those under age 70. Thus, those in their 60s and with lower household income faced the highest share of OOP to their household income (7.8%). Since this group of respondents was likely to have a limited financial liquidity due to retirement, we could say that the current Japanese system seems quite regressive to those with most difficulties in their financial status.

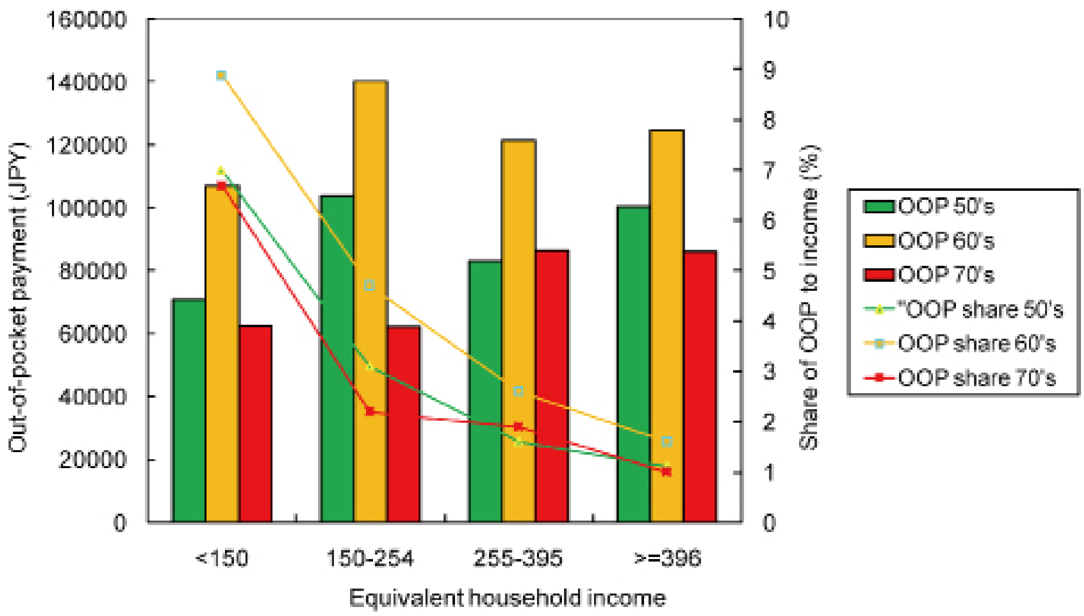

Figure 2-7-4 Amount of OOP and its share of equivalent household income by income level and age

The large share of OOP to household income showed a variance among municipalities: the share in the poorest quartile was 8.3% in Sendai, 8.2% in Kanazawa, and 7.9% in Adachi, while the corresponding number was 5.7% in Takikawa and 4.8% in Shirakawa.

For the poorest respondent, the share of OOP payment varies a lot between countries in the SHARE report. In Denmark, Austria, Germany, Sweden, and Switzerland, OOP share was about 6% of total income in the poorest group, which is about the same as the JSTAR finding above. In southern European countries (Spain, Greece, Italy), this share was much higher and comprised between 10% and 12%. The financing issue related to OOP is particularly crucial to the extent that out-of-pocket may present a barrier to health care utilization, and in particular to outpatient care for primary and preventive services.

In sum, we explored some determinants of OOP payments including gender, age, and municipality as well as health status and education/income level. While Japan has a long history of more than 40 years of a mandatory public health insurance program, we see a substantial variation in OOP payments across those factors. When longitudinal data is constructed, we will be able to perform more in-depth analysis on determinants of OOP expenditures among the elderly over time.

2.7.5 Conclusions

• OOP payments depend on a share of health insurance programs in each country. Under the mandatory health insurance system which guarantees equity and free access to medical resources, we see a larger share of people owing OOP under 20%-30% coinsurance.

• Even under the non-selective public health program, we see variations in OOP payment across educational attainment, age, and municipality. Lower education was associated with lower probability to meet OOP. Those in their 60s were most likely to meet positive OOP.

• As regards the association between OOP payments and ability to pay, the poorest group faced the largest share of OOP to equivalent household income, suggesting that the Japanese public health system is as regressive as several SHARE member countries such as Denmark, Austria, Germany, Sweden, and Switzerland. Among municipalities, those with poorest households in cities showed the higher share of OOP to household income compared to their counterparts in rural areas.

2.8 Health Services Utilization in Older Japanese

2.8.1 Introduction

While the GDP share of medical expenditure in Japan is the lowest among OECD countries (see Subsection 2-1), there is a large gap in medical costs between the young and the old. According to the national health expenditure estimate by the Ministry of Health, Labour and Welfare (MHLW 2006), of the JPY24.4 trillion (or US$24.4 billion) of total medical expenditure in 2004, JPY12.9 trillion was used for those aged 65 and over. That is, while JPY190 thousand was spent per capita for the whole population, if we limit to those aged 65+, the per capita spent was JPY520 thousand. The Japanese Government started a new health care insurance program specifically for those aged 75 and over since 2008 April, aiming at controlling the medical cost rise among the most elderly demographic, though political concerns with the traditional seniority culture and failed system management fuel a political debate, and the leading political Liberal Democratic Party has already announced an amendment to the policy.

It is commonly seen in every developed country today that the aging population spends a relatively larger expense for health care, and there has been a debate whether population aging per se is a major driving force increasing health expenditure among developed countries (Zweifel et al. 1999). Although a larger proportion of aged people are in general more likely to suffer from chronic or acute diseases and multiple morbidities, we need to pay attention to the fact that health care utilization of people, especially of the old, is very heterogeneous, depending not only on health status but also socioeconomic conditions. This subsection decomposes health care service utilization in Japan to uncover some important factors to account for utilization patterns among the middle-aged and elderly population in this country, with some comparative analysis with the SHARE countries. Disentangling the patterns of health care utilization in Japan may provide some important policy implications for other countries that also suffer from the elevation of health care expenditures.

To date, internationally comparable datasets to explore different utilization patterns across countries with different health care systems have been scarce even among OECD countries (van Doorslaer & Masseria 2004). Moreover, no available data allowed an examination of the effect of socioeconomic status on health care utilization in a cross-country comparative perspective (van Doorslaer et al. 2004). SHARE and JSTAR allow us to examine health utilization patterns across socioeconomic status and health condition in Japan and OECD countries in a consistent way.

In this subsection, we follow the SHARE analysis again, and explore cross-sectional relationships between a variety of factors such as age, gender, subjective health or education, and the utilization of health services. JSTAR has rich information on self-reported health care utilization of outpatient and inpatient services including surgery. The frequency of outpatient visits was asked because many Japanese elderly make visits to clinics on a regular basis by week or by month. The use of hospitalization and surgical services were measured based on a twelve-month recall.

Analyses of bivariate relationships between age, gender, subjective health or level of education with health services utilization were performed on non-weighted data.

The effect of education and household income was then studied after adjustment for age, gender, and subjective health status in unweighted multivariate regression models (logistic regression for dichotomous response variables, ordered logistic regression in case of response variables showing more than two levels); subjective health was finally introduced in our multivariate models beside age, gender, and education. Analyses were essentially conducted on the whole dataset.

2.8.2 Variation across Age, Gender, Municipality and Health/Socioeconomic Status

(1) Outpatient service

Figure 2-8-1 shows the distribution of outpatient visits to clinics in the past twelve months. The number of reported medical consultations in the past year is strongly related to age, which is similar to what SHARE found. What seems strikingly different from the SHARE report is that a larger portion of respondents did not make any visit in the past year in the JSTAR sample: 40% of those in their 50s did not contact a physician. Even among those in their 70s, 20% of them had no contact with a physician. In SHARE, the numbers were only 18% of those in their 50s and 7%-8% of those in in their 70s. Another difference was found in the frequency of visit: those who did make a visit to a physician made far more frequent contact with a physician compared to SHARE samples. For those in their 70s, 40%-50% of them made more than six contacts in the past year in the SHARE sample, while nearly 70% of their counterparts in JSTAR made more than six contacts. The difference between JSTAR and SHARE respondents may be attributed to the legally-mandated health check-up system in Japan that is the focus of section 2.9. The health check-up system provides a substitution to a consultation visit with a physician.

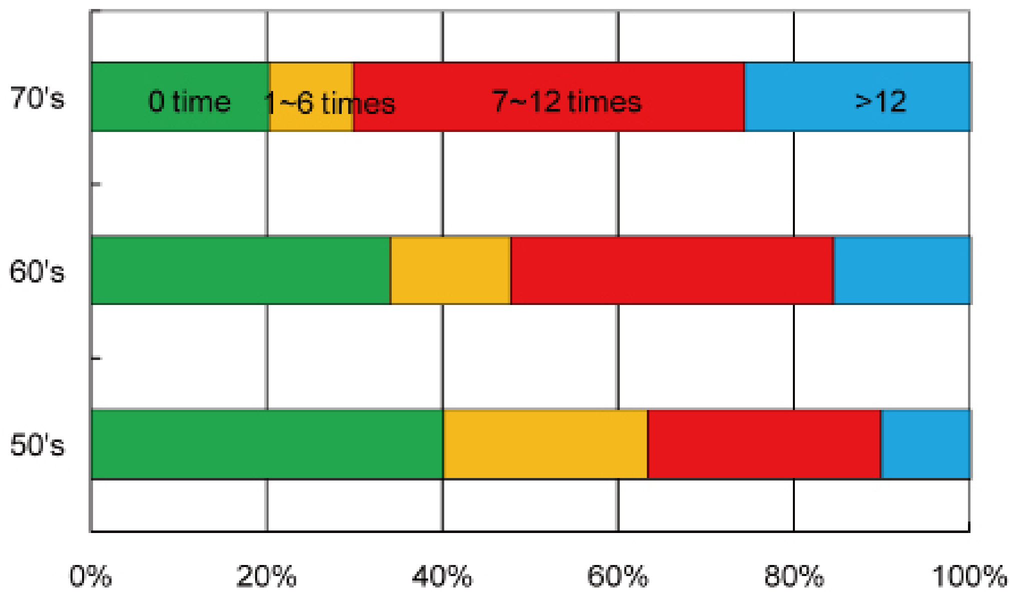

Figure 2-8-1 Distribution of the number of outpatient visits in the past 12 months, by age

We conducted logistic regression on the use of services, adjusting for age, sex, educational attainment, household equivalent income, subjective health status, and region. The odds of outpatient service use linearly increased over age: those in their 70s were 2.8 times more likely to use the outpatient service compared to those in their 50s (OR 2.76 [2.16-3.52]). Females were 1.5 times more likely to use the service (OR 1.46 [1.25-1.70]). Educational attainment and household equivalent income were not related to the odds of service use. As expected, poor subjective health status was related to higher odds to use outpatient services (OR 2.31 [1.98-2.70]). Among regions, Takikawa was the least likely to use outpatient service, even after adjusting for age, sex, income, education, and subjective health status, suggesting least access to the service among the five municipalities (OR 0.63 [0.48-0.81], Sendai as reference municipality).

The results were basically similar if we use ordered probit regression to account for the number of contacts as a categorical variable. Exceptional was that lower educational attainment was marginally significant in the frequency of visit made in the past year (p=0.08), even after adjusting for age, sex, subjective health status, and household income. As Figure 2-8-2 shows, the proportion of those who did not make any visit was similar across education statuses, but those with none or primary education were more likely to make a visit more than 6 times, compared to those with higher educational attainment.

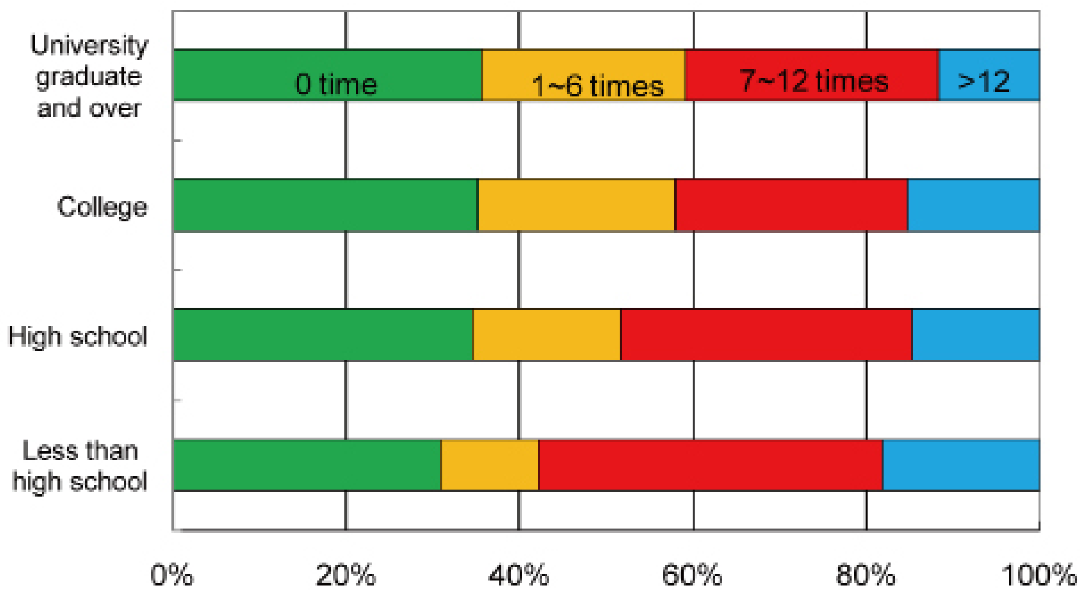

Figure 2-8-2 Distribution of the number of outpatient visits in the past 12 months, by educational attainment

Interestingly, what we found in this figure is quite similar to the corresponding figure in SHARE: once a visit is made, those with lower education tend to make more frequent visits to a physician. However, in the SHARE report, the effect of education was lost after adjustment for subjective health status, and the authors attributed this to poorer health status among those belonging to lower educational categories. In JSTAR, the effect of education remained even after adjusting for subjective health status, which strongly suggests that low educational attainment may be related to frequent visits through lower health literacy and less ability for self-care.

(2) Dental service

For dental care services, the highest odds of service use was seen in the age category of the 60s, and the odds was lower among the 70s. Females were 1.3 times more likely to use dental care service (OR 1.34 [1.10-1.63]). Lower educational attainment (OR 0.79 [0.67-0.93]) and lower household equivalent income (OR 0.86 [0.75-0.99]) were significantly related to less likelihood of dental care service use, suggesting that access to dental care was somewhat regressive to socioeconomic status. SHARE also found that lower education was significantly related to less likelihood of dental care visit after adjusting for demographic and health status. It is not surprising because in many EU countries dental care was out of the coverage in the public mandatory package (Doorslare et al. 2004). In the Japanese case, dental care is covered by the public insurance; however, the utilization pattern was significantly different according to education and income status, suggesting that higher copayment and out-of-pocket coverage in dental care may preclude access to the service among those in a lower socioeconomic status, even under public insurance coverage. Among regions, Takikawa was less likely to use dental care service (OR 0.80 [0.63-1.02], Sendai as reference municipality).

(3) Inpatient service

For inpatient service, age was also related to linearly increased odds of service use. Interestingly, females were significantly less likely to use inpatient service (OR 0.71 [0.56-0.90]). This discrepancy between outpatient and inpatient service use between genders suggests that women tend to take better care of their own health by seeking preventive services to avoid the risk of hospitalization. This hypothesis should be tested in the follow-up stage in a later JSTAR survey. In the SHARE case, however, there was no gender difference in the chance of hospitalization. Income and education were not significantly related to inpatient service use. Finally, among regions, Shirakawa was the least likely to use inpatient service (OR 0.58 [0.38-0.88], Sendai as reference municipality). The results were basically similar when we used ordered probit regression to account for the frequency of hospitalization. Although SHARE found that lower education was related to less likelihood of hospitalization after adjusting for subjective health, we did not find such association.

A comparative study of health care systems across EU countries (van Doorslaer et al. 2004) found that several countries have a vertical inequality in the access to specialty care and inpatient care. What we found in JSTAR suggests that the Japanese health care system was somewhat successful in achieving vertical equality in access to outpatient and inpatient services, but not to dental service. In outpatient service, lower education attainment may be associated with overuse of the service.

(4) Surgery

In JSTAR, we asked regarding inpatient and outpatient surgery in the past year. We also asked about invasive exams such as cardiac catheterization, gastroenterology endoscope, and arthroscopy. In this analysis, we include these invasive procedures as a part of surgery services. In SHARE, the inpatient or outpatient surgery was related to age, but not to gender. In JSTAR, the chance of undergoing surgery in the past year increased linearly with age, and females showed significantly lower likelihood of surgery (OR: 0.71 [0.58-0.86]), even after adjusting for age, education, income, subjective health, and region. Income was not associated with surgery. Lower education was marginally associated with less chance to undergo surgery (OR: 0.82 [0.65-1.03]).

2.8.3 Conclusions

• JSTAR successfully provides an opportunity to investigate the factors influential on the utilization pattern of medical care across different layers of socioeconomic conditions and regions in a comparable way with European findings in SHARE. Such detailed analysis has been made possible for the first time in Japan because JSTAR measured a comprehensive set of medical utilization, health status, and socioeconomic conditions among elderly households.

• Japanese respondents in the JSTAR sample were less likely to make a visit to physicians in the past year, compared to those in SHARE, but among those who did make a visit, they made more frequent visits compared to those in SHARE. There are few in SHARE who visited a physician 1-5 times a year. Japanese elderly, once they made contact with physicians are more likely to make regular visits each month. Such regular use was more often seen among those with lower educational attainment.

• Women reported significantly more outpatient service use, but less inpatient service and surgical services than men in JSTAR, which deviates from SHARE findings.

• Educational attainment showed various associations with medical service use. Lower education was related to more frequent visits in outpatient services, less use of dental care, and surgery, and no significant relationship was found with inpatient service, which is similar to SHARE. However, it is crucial to investigate the effect of education on utilization in light of other factors that may act as confounding. Although SHARE results suggested that the association of lower education and frequent visits were due to poorer health status among those with lower education, our JSTAR results suggest that lower health literacy and consequent lack of skills for self-care among those with lower education may be the culprit for overuse of outpatient service and less use of dental care.

• Regional differences in medical service use, lower in rural areas, and higher in cities, may require further in-depth analysis using a multivariable technique taking into consideration region-specific statistics such as the number of clinics and beds per population and other regional resource data. Further work will be based on the behavioral model of health services utilization which would be affected by health literacy, socioeconomic resources, and regional resource availability in order to provide a better insight on policy implications and comparative discussion with European countries, which should better serve as a basis for health policy decisions.

2.9 Health Check-up

2.9.1 Introduction

The annual health check-up program is a unique characteristic of the Japanese health care system. Several laws offer all the citizens in this country a chance to get health check-up on an annual basis. The Elderly Health Care Law mandates regional municipalities to offer citizens aged 40 and over a free or low-cost health check-up. The Hygiene and Safety at Worksites Law mandates every employer with more than 50 employees to offer free annual health check-up to employees. Finally, the School Law mandates the school agency to offer check-up to school employees and students. Since August 2008, a new national health check-up program has been launched, and every municipality and employer who is in charge of providing health check-up is required to report to the government the results of health check-up and subsequent health education program to prevent metabolic syndrome and consequent medical care cost rise (Ministry of Health, Labour and Welfare, 2008). However, the program has been criticized as it is less supported by scientific evidence of program efficacy and theoretical basis of health education program.

JSTAR asked the respondent citizens whether they had a health check-up in the past 12 months, and if not, what prevented them from getting one. In this subsection, we will present descriptive statistics on health check-up, and what determines the chance of getting it.

2.9.2 Variation across Age, Gender, Municipality and Health/Socioeconomic Status

(1) Demographic factors

The lower portion of Figure 2-9-1 presents the association of health check-up and demographic factors. The likelihood of having a health check-up in the past year linearly decreased over age: 73% of those in their 50s had had a check-up, while the number falls to 51% among those in their 70s ($p<0.001$). Females had less chance of having a health check-up compared to males (60% vs. 67%, $p<0.001$). These figures are presumably confounded by working status and insurance type.

(2) Insurance types

Japanese national insurance in general is comprised of two types: community-based insurance and employment-based insurance. Community-based insurance is for those self-employed and retired. For both types, dependent family members are covered by the insurance plan of their household head. Thus, we describe four categories of insurance type: "employed-based and self-insured, "community-based and self-insured," "employed-based and dependent family," and "community-based and dependent family."

The middle portion of Figure 2-9-1 depicted that those with "employed-based and self-insured" showed a distinctively higher proportion of health check-up (84%) compared to other types (54%-59%). Since health check-up at the worksite can easily get compliance from employees to participate in the check-up, this is not surprising. Those who are self-employed and dependent on the insured household head suffer more from psychological and economic barriers because the health check-up is provided only in a limited time and place, even though they are entitled to have health check-up. JSTAR clearly revealed the disparity in the opportunity of health check-up according to health insurance type.

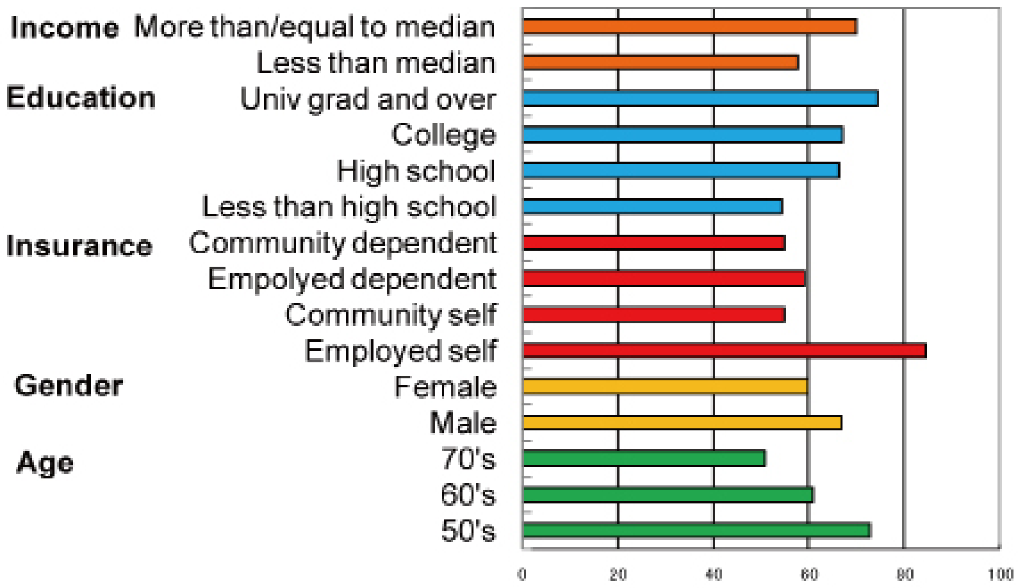

Figure 2-9-1 Proportion of those who had a health check-up in the past year, by age, gender, insurance type, income, and educational attainment

(3) Socioeconomic status

The upper portion of Figure 2-9-1 presents the likelihood of having health check-up in the past year by different layers of socioeconomic conditions. Higher educational attainment was linearly and significantly related to higher likelihood of having a health check-up: 54% of those with less than a high school education had a health check-up, while 74% of university graduates had a check-up in the past year. Higher household income was also significantly related to the higher chance to have a health-checkup. Again, income and education was tightly confounded by age, sex, and occupational status, which in turn related to insurance type. Thus, we need to conduct a multivariate analysis.

Logistic regression on having a health check-up in the past year was conducted adjusting for age, gender, insurance type, education, and household income. Not surprisingly, all of the factors except for sex showed significant associations with the chance of having check-up, even after adjusting for each other. The significance of gender was lost after insurance types were included in the model. Older age, lower education, lower household income, and insurance type other than “employment-based and self-insured,” were significantly and independently related to less odds of having a check-up.

(4) Region

Even after adjusting for these variables, those in Sendai city had remarkably and significantly higher odds of having a health check-up. Sendai city is known to have a unique health check-up system across community and work places, especially for cancer screening. Such a unique policy history would promote Sendai as a champion city in health check-up.

2.9.3 Reasons for Not Having Health Check-up

Next, we focused on those who did not have a health check-up in the past year. For these respondents, JSTAR asked the reasons they did not have one: being busy, no need felt without any symptoms, concerns with cost payment, fear of learning bad news, and others.

Those who answered “being busy” tended to be in a group that was younger, was “employed-based and self-insured,” with higher educational attainment and higher household income.

Those who answered “no need felt without any symptoms” tended to be younger. Otherwise, sex, insurance type, education, and income level were not related to this answer type. However, as expected, the response pattern was significantly more prevalent among those who reported better than good subjective health, current smokers, and those without depression status. Those who answered “cost concerns” were only 16 respondents, and tended to be with lower household income. Finally, those who answered “fear of learning bad news” tend to be female and dependent family members to household heads, suggesting those with less control over the household economy. Further analysis may be deserved in family dynamics and household economy with the results obtained in Chapter 3 in this book.

2.9.4 Conclusions

- Japan has a unique national health check-up program that offers all citizens an annual health check-up.
- JSTAR found, however, that there is considerable variation across demographic, socioeconomic, and insurance conditions in the probability of having a health check-up in the past year.
- Multivariable analysis confirmed that older age, lower education, lower household income, and insurance type other than “employment-based and self-insured,” were significantly related to less odds of having a check-up in the past year.
- Sendai city, which is famous for its unique heath check-up policy, showed distinctively higher compliance to annual health check-up.
- Reasons not to have a health check-up depend on age, sex, working status, and socioeconomic condition. The results suggest that better information provision and health education in the community would enhance compliance to the program. Those who answered “fear of learning bad news” may suffer less economic discretion in the household.

2.10 Nutrition Intake

2.10.1 Introduction

JSTAR has incorporated a detailed food frequency questionnaire in the survey. The Brief Dietary Habit Questionnaire was developed and validated by Sasaki et al. (2003a, b). This self-administered questionnaire asks the respondents to recall the frequency of taking a specific type of food. The results were analyzed with a pre-determined and validated algorithm which could provide a detailed estimation on nutrition intake with relatively high precision, compared to other modes of nutrition intake measurement, as well as to biomarkers obtained from urinary and blood sample. The analysis using the results of the nutrition survey is still ongoing, and this subsection provides a limited portion of preliminary results to present the potential of the nutrition dataset to reveal the mechanism of health impact by socioeconomic conditions and consumptions.

2.10.2 Variations in Nutrition Intake by Age, Sex, and Region

Figures 2-10-1~5 depict the average estimated amount of nutrition intake per day by age, sex, and region. Figure 2-10-1 shows the intake of salt. Recommended amount of salt intake per day by the Ministry of Health, Labour and Welfare is less than 12g per day. As the table shows, all of the age, sex, and region cells exceed the recommended amount. Specifically, males over 60 in cities tend to exceed 14g per day, and may need an intensive educational intervention.

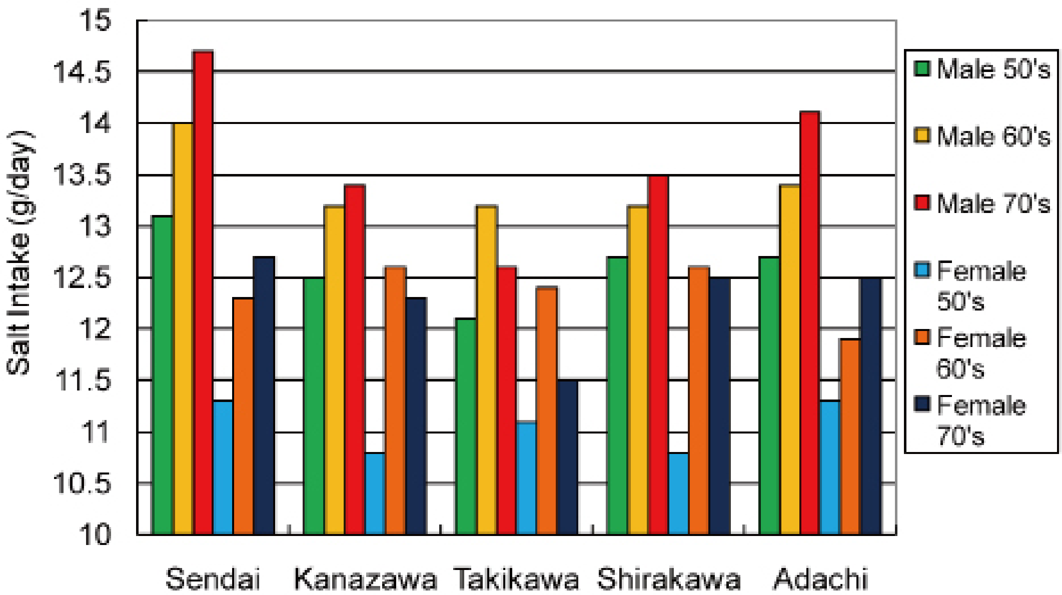

Figure 2-10-1 Estimated salt intake (gram) per day, by age, gender, and region

Figure 2-10-2 shows the average amount of estimated alcohol intake, in grams per day equivalent to ethanol. Daily intake less than 20g is recommended for preventing cardiovascular disease and cancer. Alcohol is known to be associated with the risk of cardiovascular disease and cancer in the U-shape manner: those without any alcohol intake may suffer higher odds of getting the diseases compared to those with moderate intake. Males in their 50s, excepting those in Shirakawa, showed an average amount of alcohol intake exceeding 20g per day.

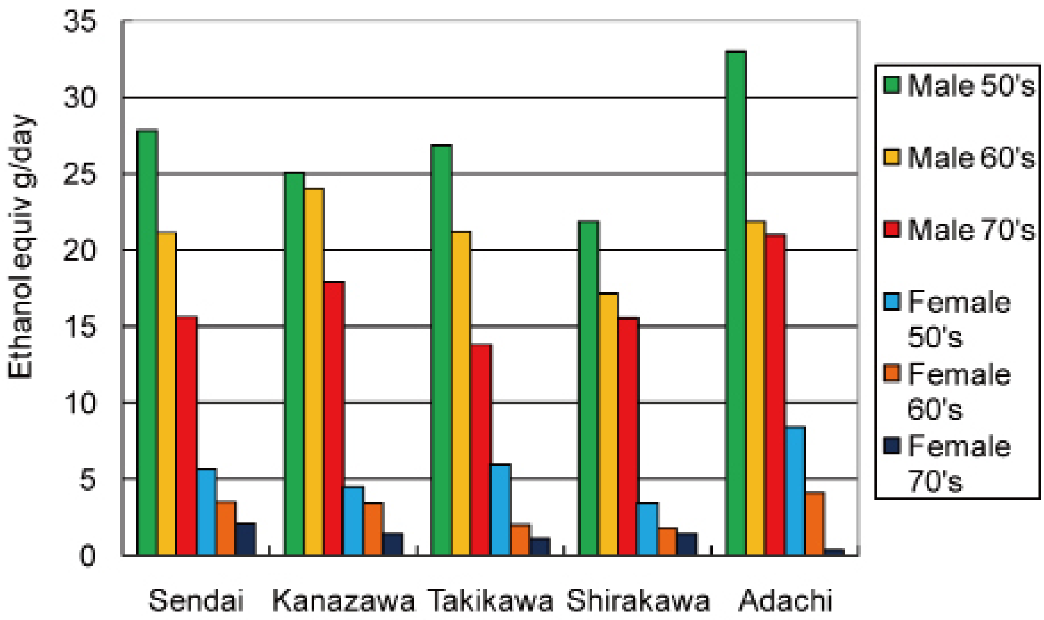

Figure 2-10-2 Estimated alcohol intake (ethanol equivalent, gram) per day, by age, gender, and region

Figure 2-10-3 shows cholesterol intake in miligrams per day; 300mg is the recommended intake. Those in Shirakawa in both sexes tend to have a higher intake of cholesterol, which may require close attention. We suspect local delicacies (e.g. grilled eel, perhaps) may be the reason. Figure 2-10-4 shows fat calorie ratio, or the proportion of fat intake to total energy intake, for which less than 26% is the recommendation. Females in cities tend to exceed the recommended proportion. Finally, Figure 2-10-5 shows intake of fruit and vegetables in grams per 1,000 Kcal energy intake. As we can observe, females and older ages are related to a healthier style of intake of fruit and vegetables.

2.10.3 Variations in Socioeconomic Status

Since nutrition intake would be affected by individual preference, economic resources, and regional culture, we conducted a multivariable regression to consider the socioeconomic difference in nutrition intake patterns. Following that we briefly report the obtained results for each nutrition item. The regression model included age, sex, educational attainment (less than high school vs. higher), monthly expense (less than median vs. higher), current smoking status, and region.

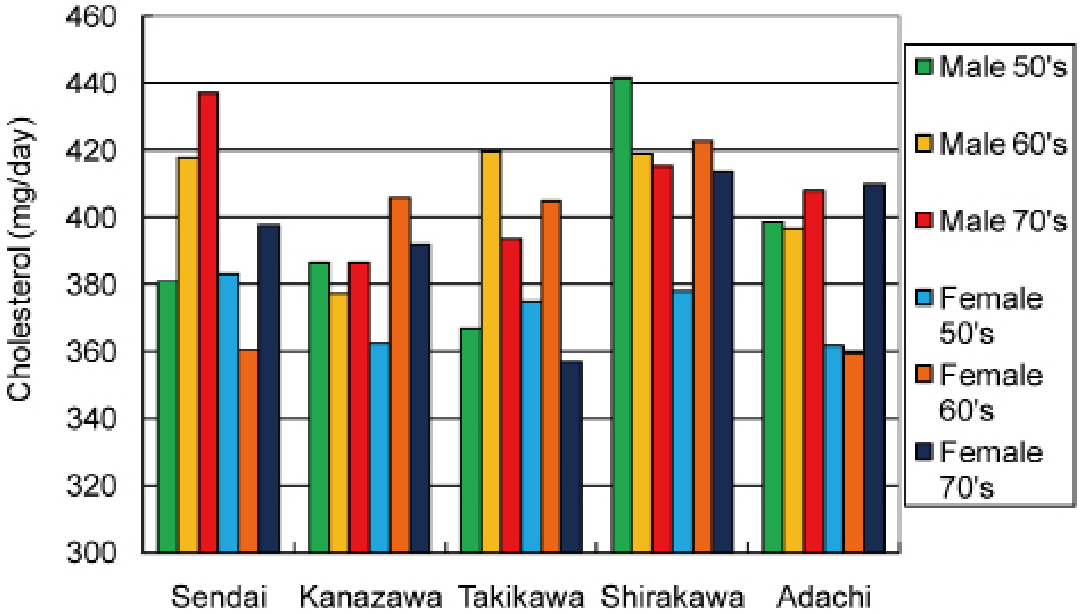

Figure 2-10-3 Estimated cholesterol intake (milligram) per day, by age, gender, and region

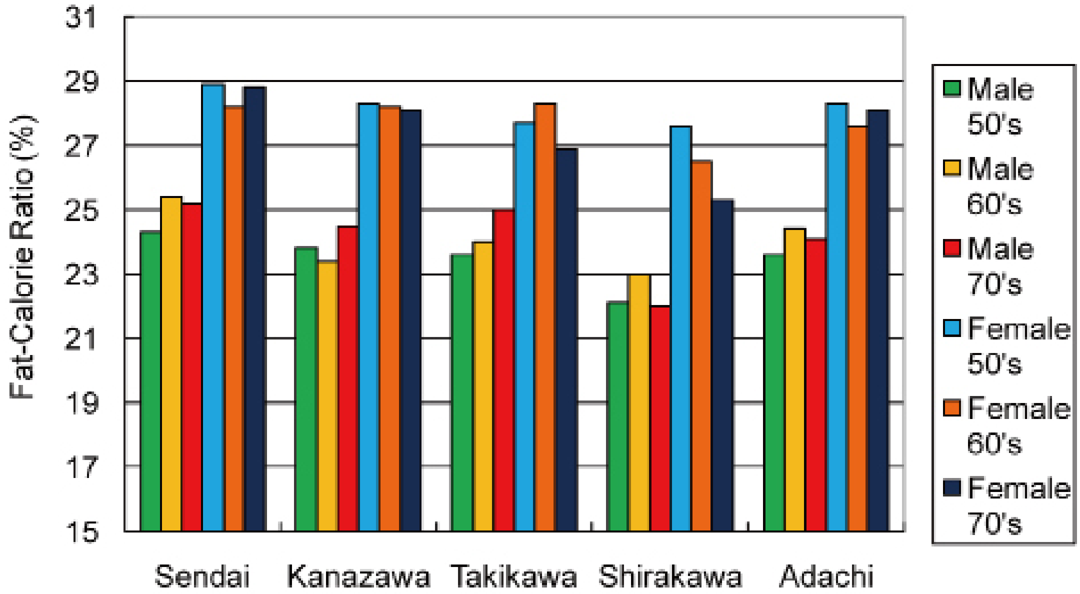

Figure 2-10-4 Estimated fat calorie ratio (%), by age, gender, and region

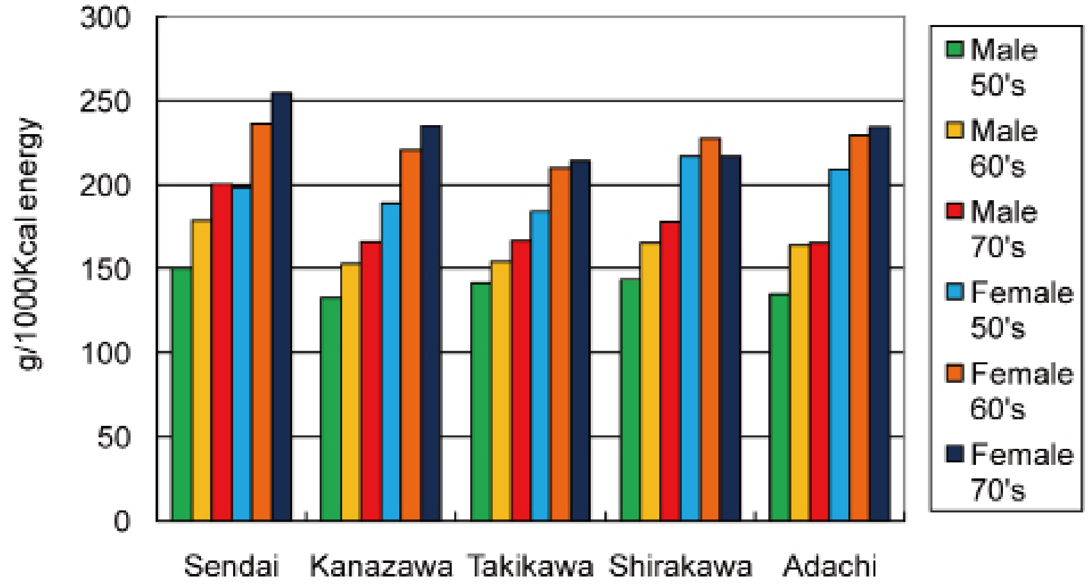

Figure 2-10-5 Estimated fruit and vegetable intake (gram) per day, by age, gender, and region

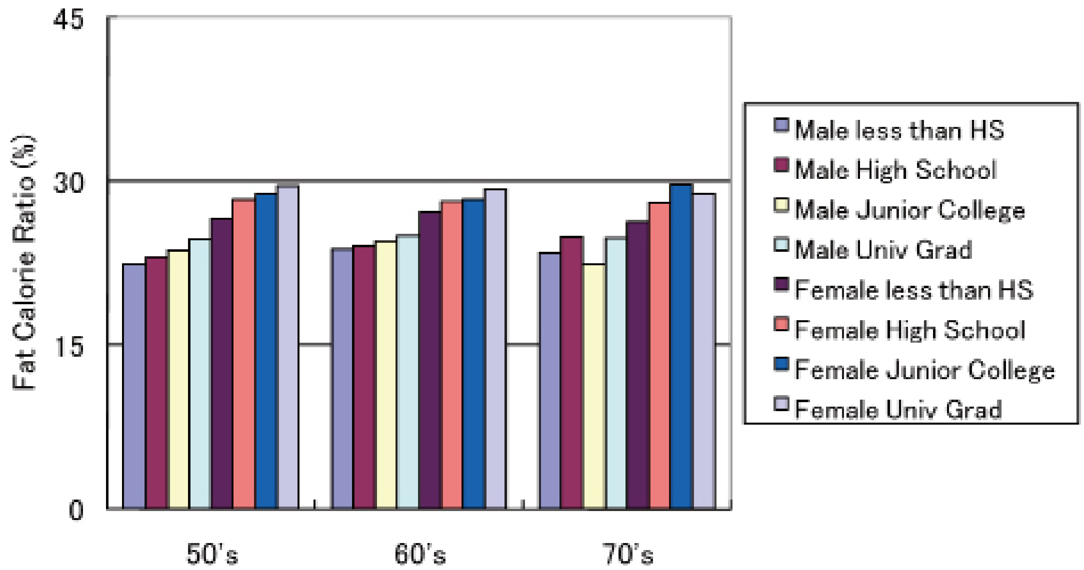

Figure 2-10-6 Fat calorie ratio by age, gender, and education

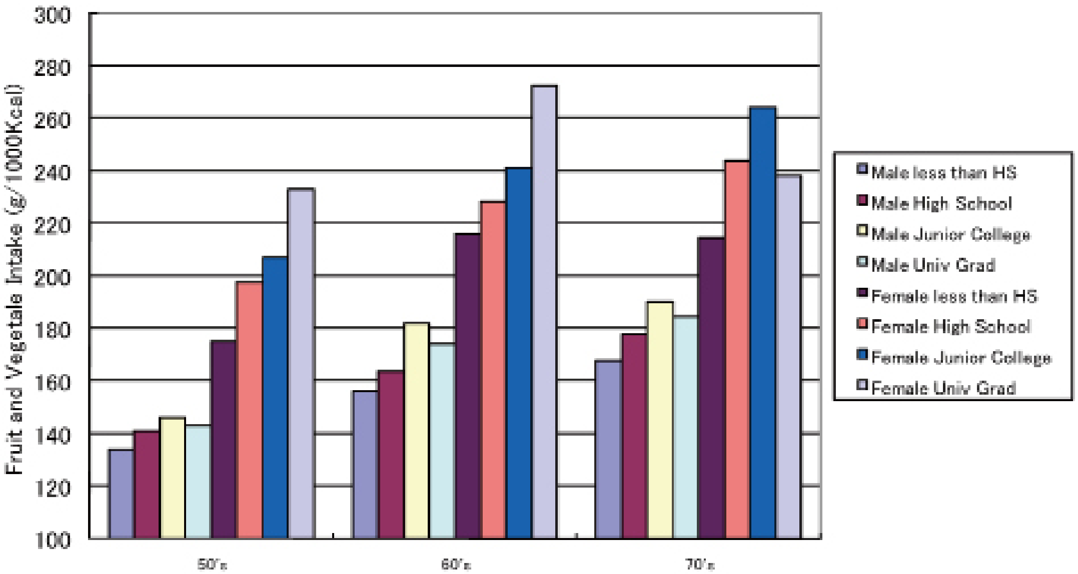

Figure 2-10-7 Fruit and vegetable intake by age, gender, and education

Salt intake was larger among the older demographic, males, and those with higher monthly expense. Those in Kanazawa and Takikawa had significantly less intake of salt compared to those in Sendai.

Alcohol intake was larger among the younger group, males, current smokers, those with higher education and higher monthly expense. Among cities, those in Adachi had significantly higher intake of alcohol.

Cholesterol intake was larger among the older group, and those with higher education. Even after adjusting for age, sex, education, monthly expense, and smoking status, those in Shirakawa had a significantly higher amount of cholesterol.

Fat calorie ratio was higher among females, non-smokers, and those with higher education. Those in Sendai had a significantly higher ratio compared to those in Kanazawa, Shirakawa, and Adachi.

Fruit and vegetable intake was larger among the older group, females, non-smokers, and those with higher education and monthly expense. Those in Kanazawa and Takikawa had significantly lower amount of fruit and vegetables compared to those in other cities.

These findings in the first wave should give a basis to investigate the impact of healthy diet on health outcomes, and the association of socioeconomic conditions through dietary habits with health outcomes in future follow-up surveys.

2.10.4 Conclusions

- JSTAR provides a unique opportunity to test how lifestyle and preference affect the health conditions among elderly through dietary patterns.
- Dietary patterns are strongly affected by demographic, socioeconomic, and regional environmental conditions. Further analysis will offer policy implications on the segment of population who needs close attention and intensive health education in new health promotion programs.

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Japanese Study of Aging and Retirement

Chapter 3
Social and Family Context

3 Social and Family Context

3.1 Housing and Living Arrangements

3.1.1 Introduction

Housing and living arrangements are basic needs for all households and individuals and are indispensable to daily life along with food and clothing. We examine two important aspects of housing, as a place to live, and as an important component of nonfinancial wealth.

First, housing and living arrangements are closely related with the well-being of people. People spend most of their time in their houses, especially in the case when they are retired, and comfortable housing and living arrangements enhance living standards and happiness in life. Housing also provides a place where family members, friends, and acquaintances gather and serves as a center for family relationships and social networks. This is especially the case for family members if the house was inherited from ancestors and is to be handed over to descendants. In this case, a house is a symbol of the family and related members.

At the same time, housing and living arrangements form an essential component of the nonfinancial wealth position. This is especially the case for homeowners. For most people housing is the most expensive purchase in their lives and the most valuable asset in their wealth, which affects their well-being throughout their life courses. The timing of buying and selling a house or that to inherit from the previous generation and leave bequests to the next generation is critical for wealth accumulation.

We should keep in mind that essential components of housing and living arrangements vary across life stages, and, in general, they play a more important role for older generations. First, older people are more likely to spend more of their time at home. Older people are less likely to have a regular job and thus spend more time in their houses and are more likely to be physically impaired and therefore forced to stay at home. Second, housing assets tend to gain more significance as a primary source of wealth of older people without labor income. This can be avoided of course by using reverse mortgage, for example, but people tend not to use these instruments. A lifecycle model describes older people as dis-savers and their wealth plays a larger role to determine consumption and living standard after retirement, and the value of housing is, in most cases, the most dominant element among the wealth of the elderly. On the flipside of the coin, loss of a house is a risk for these people, since it means loss of independence, which motivates them to keep the house as long as possible unless they have alternatives, as is described in the SHARE book.

These aspects are also related to a decision of living arrangements. Older people may spend happier time if they live close to their children or grandchildren but cohabitation may be the only feasible arrangement to live in close proximity. In particular, those people with difficulty in physical and mental functioning may find it easier to live if their children are nearby to offer help if necessary. A decision of where to live is affected also by the bequest motives. A high value of housing and land attracts children and encourages them to live together with their parents or to provide care. All in all, housing and living arrangements affect a variety of aspects of elderly lives including economic well-being, health, family/social networks, and remain main factors to determine the well-being of the elderly.

JSTAR provides information related to housing and living arrangements to explore a variety of issues including their determinants and effects on living standards of middle-aged and older people. While the basic feature of the JSTAR questionnaire resembles that of SHARE and is internationally comparable in the aspects of wealth, some questions on housing and living arrangements that are contained in SHARE are not included in JSTAR.

First, JSTAR does not ask the respondents about the number of rooms for personal use per household member including bedrooms, while SHARE does. The SHARE book found that the size of the accommodation per person increases with age in all countries.

Second, JSTAR does not ask the respondents about quality of equipment while SHARE asks them regarding availability of special provisions to assist persons with physical impairment. SHARE asked the respondents about the general impression of such equipment and the prevalence of some specific equipment (e.g., an indoor bath) as well as the quality of intermediate environment (e.g. public transport).The major reason that JSTAR does not include these questions about quality of equipment is the difference in the age group between JSTAR and SHARE. The oldest individual in JSTAR is 75 and those persons in the first half of their 70s are still less likely to need special arrangements at home. This fact will be confirmed immediately below.

Third, JSTAR does not include a question on residential mobility. SHARE measured by asking the respondents for the number of years spent in the present accommodation. Instead, JSTAR asks the respondent how many years had passed since the present accommodation was built.

In this subsection, we will focus on home ownership and years of accommodation. Before exploring these issues, we examine physical functioning along with age. The aspect of housing as nonfinancial wealth will be examined in Chapter 5.

3.1.2 Physical Functioning Along with Age

First, we preview physical functioning along with age using the first wave of JSTAR. We should keep in mind that the findings below are based on cross-sectional data and the difference in age includes both age and cohort effects. Only after the second wave will we be able to distinguish those two effects.

It is natural that physical limitations increase with age. Among a variety of measurement of health status, we use ADL (activity of daily living) as measure of disability since this is closely related with needs for housing and living arrangements. In contrast to the SHARE book, we focus on ADL only because it is directly associated with living arrangement. Instrumental Activity of Daily Living (IADL) does not decline in the first half of the 70s.

Figures 3-1-1 and 3-1-2 report the proportions of the respondents depending on the number of ADL scale limitations. We count the number of items in which a respondent reported to have limitation. While the proportion of those respondents without any limitation declined slightly along with age for both males and females, the share of no limitation exceeds 90% even for respondents aged between 70 and 75, though the figure is slightly lower for males with a larger decline for females. These observations

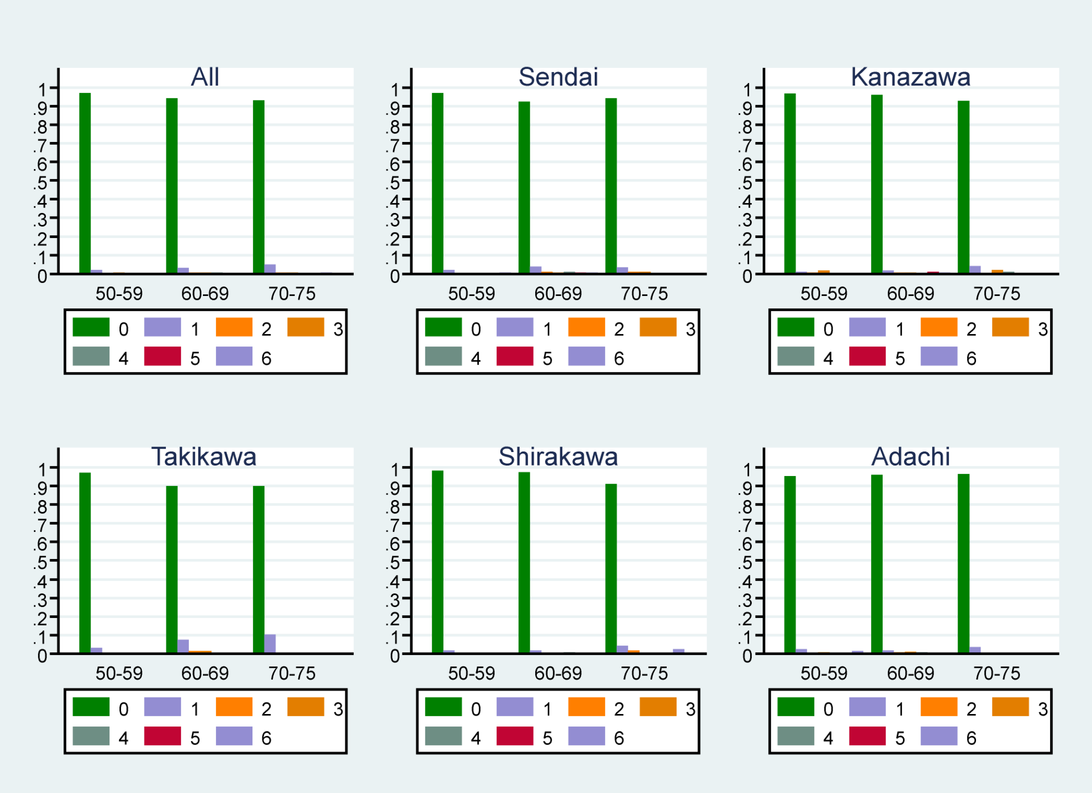

Figure 3-1-1 Number of limitations in activity of daily living (ADL): males

are comparable to those in the SHARE book. The SHARE book shows an accelerated decline in the proportion of the respondents without any limitations in those aged 80 and over, especially for females, but the baseline sample of JSTAR does not include those "oldest old" in the sample.

The remaining figures report the shares of the respondents depending on the number of limitations by sex and municipality. For males, the pattern in Kanazawa and Shirakawa tracks the overall pattern with a slight decline along with age. The proportion of respondents without any limitations is higher in those municipalities than others. In Sendai, the share declines from those in their 50s to 60s but it slightly increases for those in their 70s, and in Takikawa, the share is below 90% for both those aged in their 60s and 70s. Adachi has a slightly different pattern: the proportion of the respondents with no limitation is unchanged with age. In the case of females, again Sendai, Kanazawa, and Shirakawa have a common declining gradient though the proportion of the respondents with no limitation is slightly lower in Sendai for all age groups. Takikawa also has a similar trend with a larger decline to 85% for those aged in their 70s. Adachi does not have a declining gradient along with age.

In sum, the proportion of people with physical limitations in their daily lives is more likely to increase with age but only slightly up to 75. In general, the proportion of those with any limitation is at most 10%, even in the first half of the 70s.

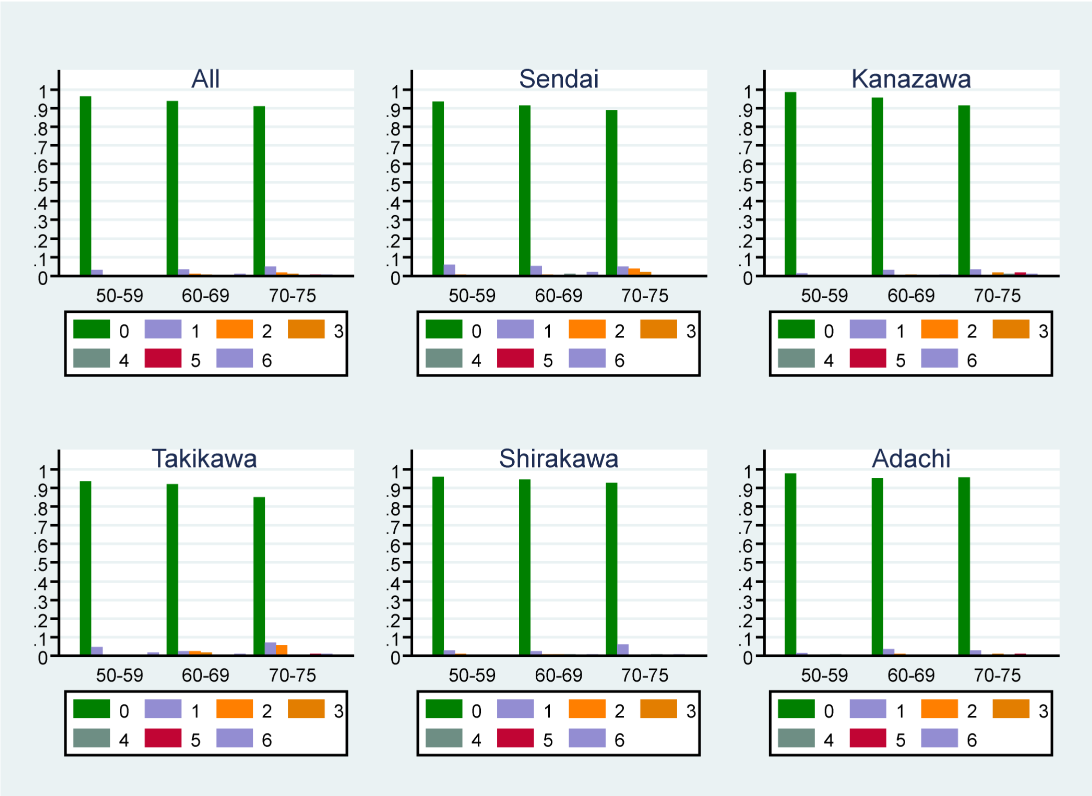

Figure 3-1-2 Number of limitations in activity of daily living (ADL): females

3.1.3 Variation of Home Ownership across Age and Municipality

As the SHARE book discusses, home ownership has many advantages for the elderly in terms of better equipment, economic and emotional security, a person's stake in his or her community, and the possibility of transferring their property to their descendants. Moreover, in Europe, home ownership is discussed in relation with the social security regime and social inequality. Some of these elements may be the case for Japan, too, and home ownership can be one of the measures of economic well-being of the elderly.

JSTAR asks the respondents to choose their tenancy status from the following categories: homeowner and land owner, home owner but land renter, or renter (both home and land). Further, JSTAR asks the home owners the value of housing (and land) and that of the mortgage and asks the renters how much the monthly rent is.

Figure 3-1-3 represents the proportion of home owners across age and municipality. We observe a substantial variation in ownership rates among the municipalities. In Sendai and Kanazawa, the ownership rate is close to 90%, though the figure is somewhat lower in those aged in their 50s and 70s in Sendai. The rate is lower in Takikawa than Sendai and Kanazawa, which are close to three quarters for those aged in their 50s. Shirakawa's ownership rate is exceptional and remarkable. In all age groups, the home ownership rate is close to 100%. Among all five municipalities, the lowest rate is found in Adachi at less than 80% for all age groups. One obvious factor to account for the difference in the ownership rate across municipalities is housing and land prices. They are very expensive in Tokyo including Adachi and inexpensive in rural areas including Shirakawa. Other municipalities, especially Sendai and Kanazawa, are in between.

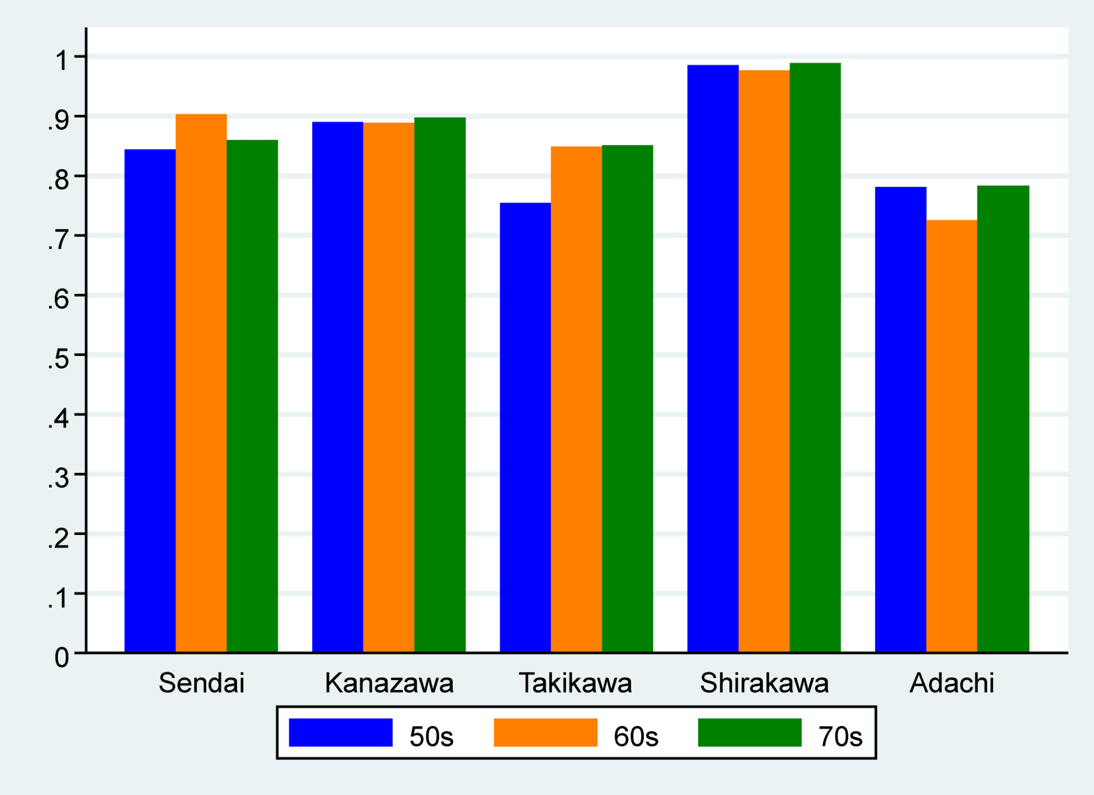

Figure 3-1-3 Homeownership rate

The SHARE book classifies European countries into three groups depending on homeownership rates and related them with welfare state regimes: high ownership rate in the Mediterranean countries (more than three quarters of the elderly population), middle rate in the north (less than three quarters) and lower rate in the central European countries (slightly more than half). The homeownership rate in Japan is comparable with that in Mediterranean countries, though we need to keep in mind the difference in age range between the two surveys. What accounts for the high rate in Japan is to be investigated in future research using variation across municipalities. One of the merits of JSTAR examining this topic is that institutions related to housing and living arrangements such as housing taxation do not differ much across municipalities.

Another interesting finding is that the homeownership rate does not decline along with age in Japan, which is also observed in the high ownership countries of southern Europe. In other European areas, ownership rates generally decrease with age, especially in the central European countries. The SHARE book speculates that homeownership is an alternative form of social security (Kurz & Blossfeld 2004) or that ownership reflects on the timing of transferring ownership from the elderly to the younger generations. Along with the higher homeownership rate in Japan, the absence of age gradient in the ownership rate should be further examined controlling for a variety of factors. Longitudinal data will allow us to exploit some social security reforms to identify a causal relationship between house ownership and public pension benefits.

Next, we turn to years passed since current accommodation was established. Figure 3-1-4 reports the distribution of vintage years of the current accommodation. We observe a clear age effect, that is, older persons are more likely to live in an "older" house. Together with the higher ownership rate in Japan, this is partly because that some people purchased or began to rent a newly-built house when they were young and continued to live in the same accommodation. Except for Shirakawa, the average of vintage years is about 20 years for those aged in their 50s, with somewhat shorter terms in Sendai and Adachi and longer terms in Takikawa and Kanazawa. The age gradient is the steepest in Kanazawa and the years reach almost 30 years for those aged between 70 and 75. The obvious outlier is Shirakawa. The average vintage year is close to 50 years for individuals in their 50s, and 60 years for those in their 60s and 70s. It is highly likely that those accommodations were purchased not by the respondents but by their parents and they live together. If this is the case, family relationship and cohabitation decision in Shirakawa might be different from that in other municipalities.

We will turn to the remaining homeownership issues again in Chapter 5. Like in the Mediterranean countries, real estate holdings make up a larger part of wealth in Japan, which might be explained by the lack of attractive alternatives or strong family tradition, and this is also examined by the pattern of property acquisition (individuals or bequests).

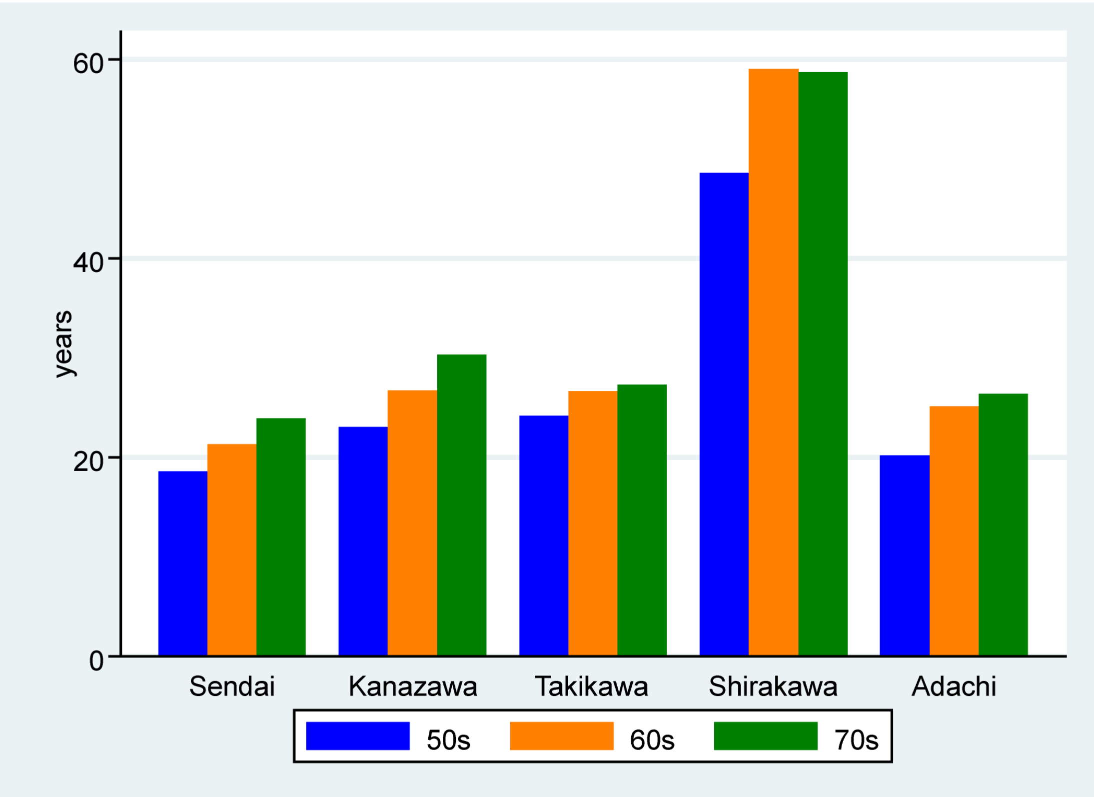

Figure 3-1-4 Vintage years of current accommodation

3.1.4 Conclusions

• Physical limitation is more prevalent for older people and may be an important determinant of housing and living arrangements. But the prevalence does not change much between the 50s and the first half of the 70s in the JSTAR sample.

• Homeownership is high in Japan but does not change much across age groups. This observation is similar to that in the Mediterranean countries.

• What accounts for the high ownership rates with no age gradient, i.e., relationship to social security generosity or family tradition, is to be investigated in future research.

3.2 The Number of Living Children

3.2.1 Introduction

This subsection describes how many children JSTAR respondents have. Children play a large role for the elderly through monetary and nonmonetary supports. The number of children and their proximity to their parents are the main determinants of availability of mutual transfers within a family, e.g., giving informal care, which improves well-being of the elderly. Moreover, older parents also provide support to their children by giving care to their grandchildren, assisting with living expenses and leaving bequests. Whether a parent is selfish or altruistic or neutral has been one of the major topics in economics and sociology to consider the unit of behavioral decision-making and there has been prolific literature on the subject.

As previewed in Chapter 1, the total fertility rate in Japan has been declining to historically low levels. At the same time, we should pay attention to the fact that the fertility rate differs across generations and regions within a country. JSTAR provides rich information on children by their parents' age cohorts and municipalities; the survey asked how many children a respondent had and then for each child his/her sex, age, marital status, geological proximity to the respondent, employment status, frequency of contacts and educational attainment. In addition, a variety of questions related to mutual transfer asks whether the respondent gave or received several types of help to or from children. Together with other related variables, JSTAR enables us to examine the role of children in the lives of middle-aged and older adults.

While the basic feature of the series of questions about children is shared by JSTAR and SHARE, we make two remarks. First, unlike SHARE, JSTAR did not distinguish whether a child is a natural child, a stepchild, an adopted, or a foster child of either or both members of the couple. The SHARE book shows that 14% of male and female respondents have no living children of any type in the sample and 96% of respondents who have any children have natural children only, implying that very few have fostered or adopted children in Europe. While the prevalence of stepchildren varies across countries, genders, and ages, the proportion is still very small. In Japan, natural children are also very dominant.

Second, JSTAR did not distinguish whether a child is the current spouse's/partner's or not. SHARE asks regarding children of the current spouse/partner only. Since the divorce rate, which is still low in Japan, has been increasing especially for aged couples, we might distinguish children of past and current spouse/partner in future. Third, in common with SHARE, JSTAR did not collect full fertility histories of female respondents and the birth years of natural children are available only for those children who were alive at the time of the interview. We also plan to consider these issues as a future agenda item for JSTAR.

3.2.2 Variations in the Number of Children across Age and Municipality

Figure 3-2-1 represents the average number of living children by age group and municipality. We note that we do not distinguish genders of the respondents in this figure. We see a substantial variation in the average number of living children across age groups. In Sendai and Adachi, the number of children increases from those in their 50s to 60s and levels off. We should note that the number of children of those aged in their 50s in Adachi is substantially lower than any other group. The number of children for those aged in their 70s is close to two. In Kanazawa and Takikawa, the pattern is U-shaped, which represents the largest number of living children in those aged in their 60s which slightly exceeds two and the numbers for those aged in their 50s and 70s are below two. Shirakawa's pattern is exceptional. The number of living children increases steeply with age. The number of children of those aged in their 50s exceeds any age group in the other municipalities and that of those aged in their 70s reaches about 2.6.

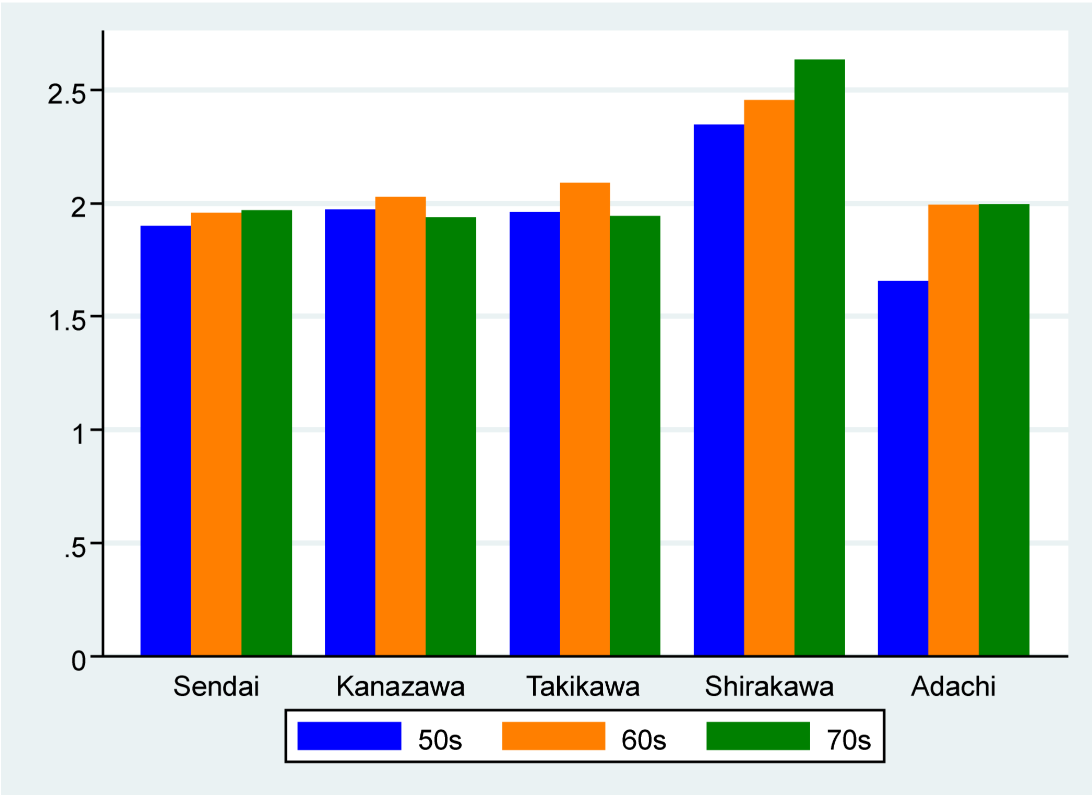

Figure 3-2-1 Natural living children by age

Since the individuals in JSTAR are aged between 50 and 75, it is not possible to perform a direct comparison of the number of the living children between JSTAR and SHARE whose age range is between 50 and 100. The SHARE book found a hump-shaped distribution of the number of natural living children in most countries and females aged 60 and 75, who belong to the baby boomers born right after the end of the World War II, have a larger number of living children. While we cannot perform a comparison in the number of children between baby boomers and the preceding generations in JSTAR, the fact that the number of children is larger for those aged in their 60s and 70s than those aged in their 50s coincide with that in SHARE. As the SHARE book points out, variations in the number of children across age groups and regions is affected by fertility behavior as well as selective attrition of respondents and differences in children's survival rate, which should be examined in JSTAR too.

Figure 3-2-2 illustrates the number of living children across gender and municipality. First, comparing males and females, the number of living children does not differ much across gender but we see a slightly larger number in Sendai of males and lower number in Takikawa, Shirakawa and Adachi. The numbers for both sexes are close to 2.5 in Shirakawa, 2 in Kanazawa and Takikawa, and less than 2 in Sendai and Adachi. The number in Shirakawa is comparable with Spain which has had the highest fertility in Europe and that in Adachi is comparable with those in Germany and Austria which belong to the lowest fertility group in Europe.

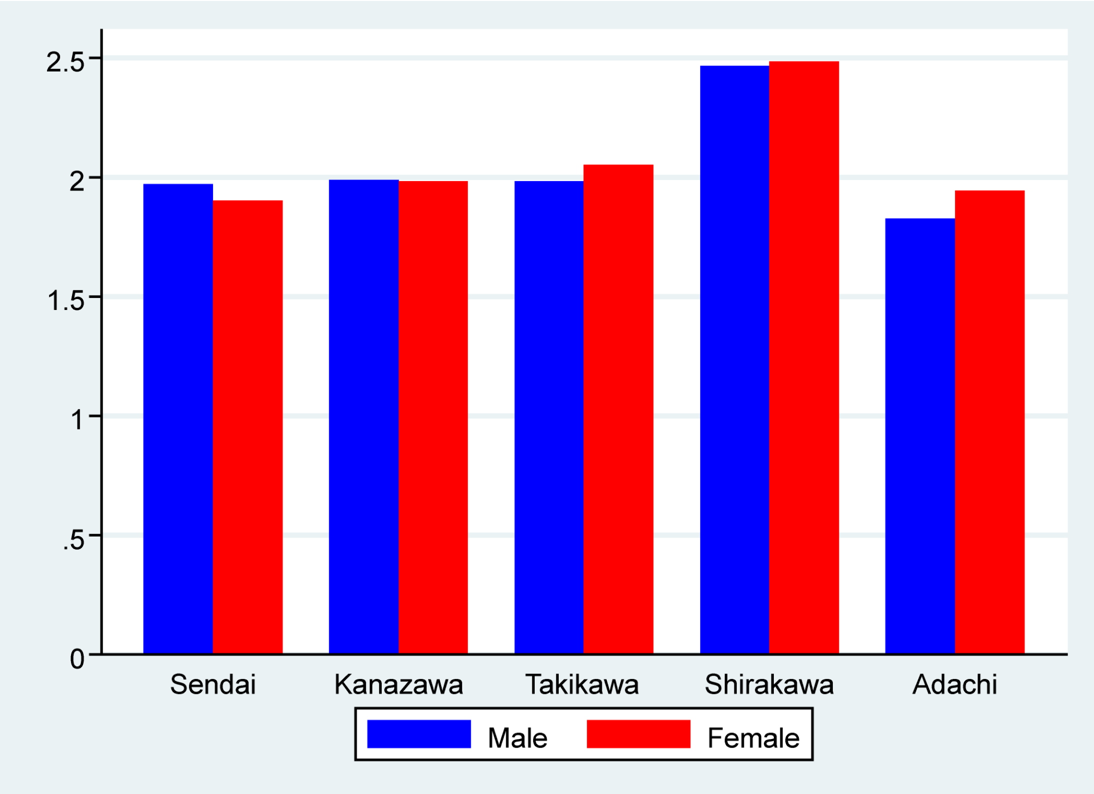

Figure 3-2-2 Natural living children by gender

Figure 3-2-3 depicts the distribution in the number of children by municipality. We should pay attention to not only the average but also the distribution of the number of living children since the distribution also affects availability of mutual transfers (including giving care) and cohabitation. We notice that the distribution has a similar shape in Sendai, Kanazawa and Takikawa, but the shape is different in Shirakawa and Adachi. First, we notice that the proportion of the respondents without any children occupies less than 10%. The share is lowest in Shirakawa and highest in Adachi, which exceed 10%. Except Shirakawa, the most dominant number of children is two. The proportion of the respondents with two children is more than half in Sendai, Kanazawa, and Takikawa. In Adachi, the most dominant number is two but the share of those respondents is less than half. It is interesting that the share of people with four or more children is the highest in Adachi. In contrast, the most dominant number of children is three in Shirakawa, followed by two.

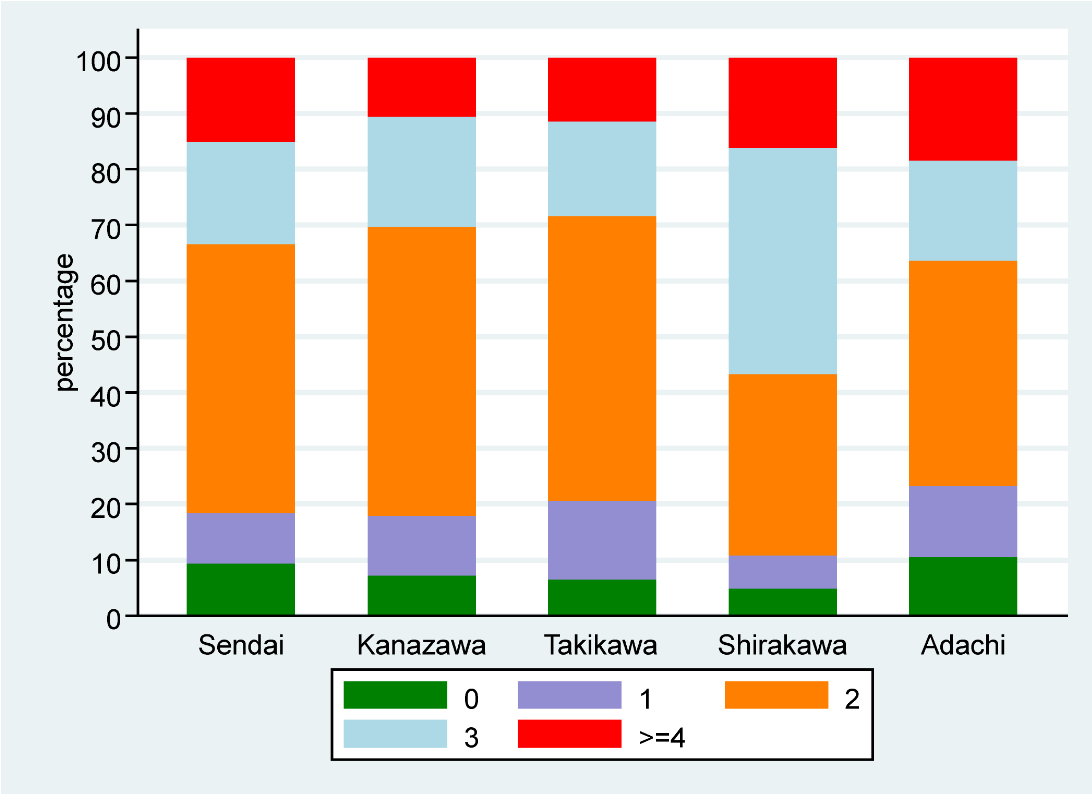

Figure 3-2-3 Distribution of number of children

3.2.3 Variations in the Number of Natural Children across Socioeconomic Status

In addition to variations of the number of children across age and municipality, we preview the relationship between the number of children and socioeconomic and health status. The large merit of JSTAR enables us to connect what interests us with a variety of socioeconomic statuses and to disentangle causal directions among a variety of variables. Figure 3-2-4 compares the mean number of natural children that are alive for males and females across three broad education categories: junior high school graduates, senior higher school graduates, and some college (university graduates or higher).

We see different patterns across municipalities for male respondents. In Sendai, the largest number is observed in male senior higher school graduates. In Kanazawa, the largest number is observed in college graduates, though the number is comparable with that for junior high school graduates. In other municipalities, we see a negative relationship between educational attainment and fertility, especially in Shirakawa and Adachi. The ambiguity of the relationship is also observed in SHARE. The SHARE book shows that the number of natural living children is the largest for male respondents with lower educational attainment, but there is no strong and robust (across countries) relationship between education and the number of children. While the largest number

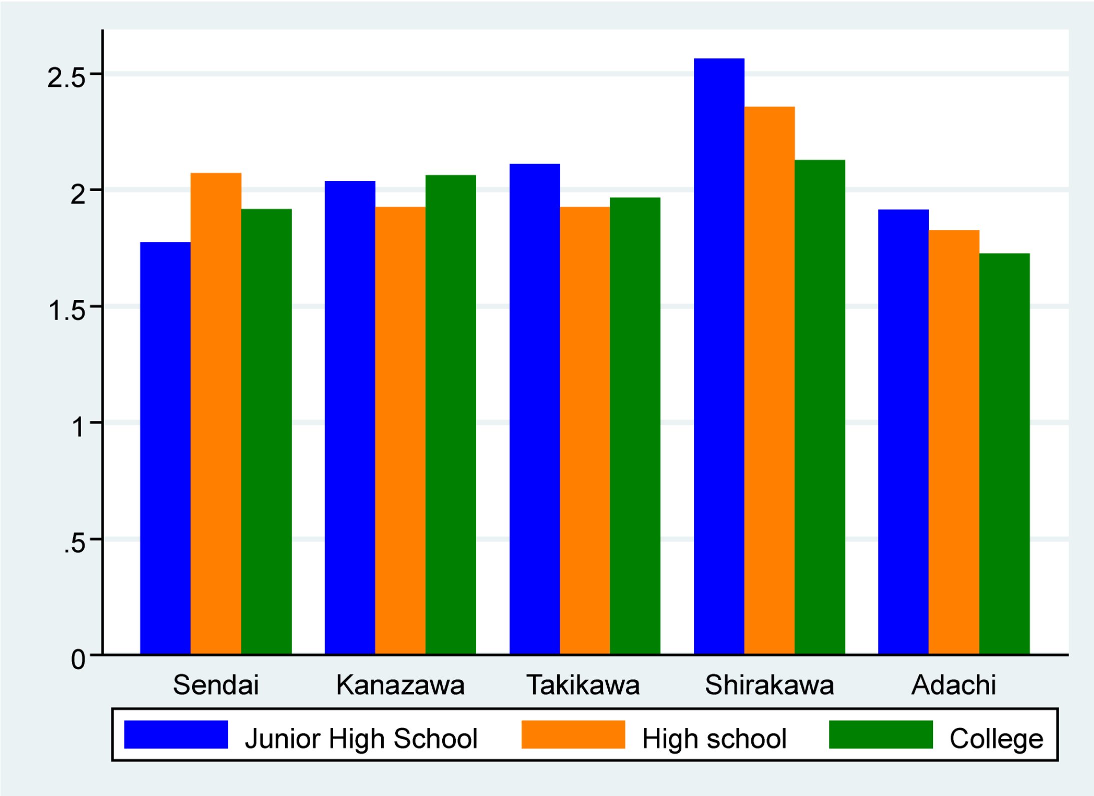

Figure 3-2-4-1 Natural living children by educational level, males

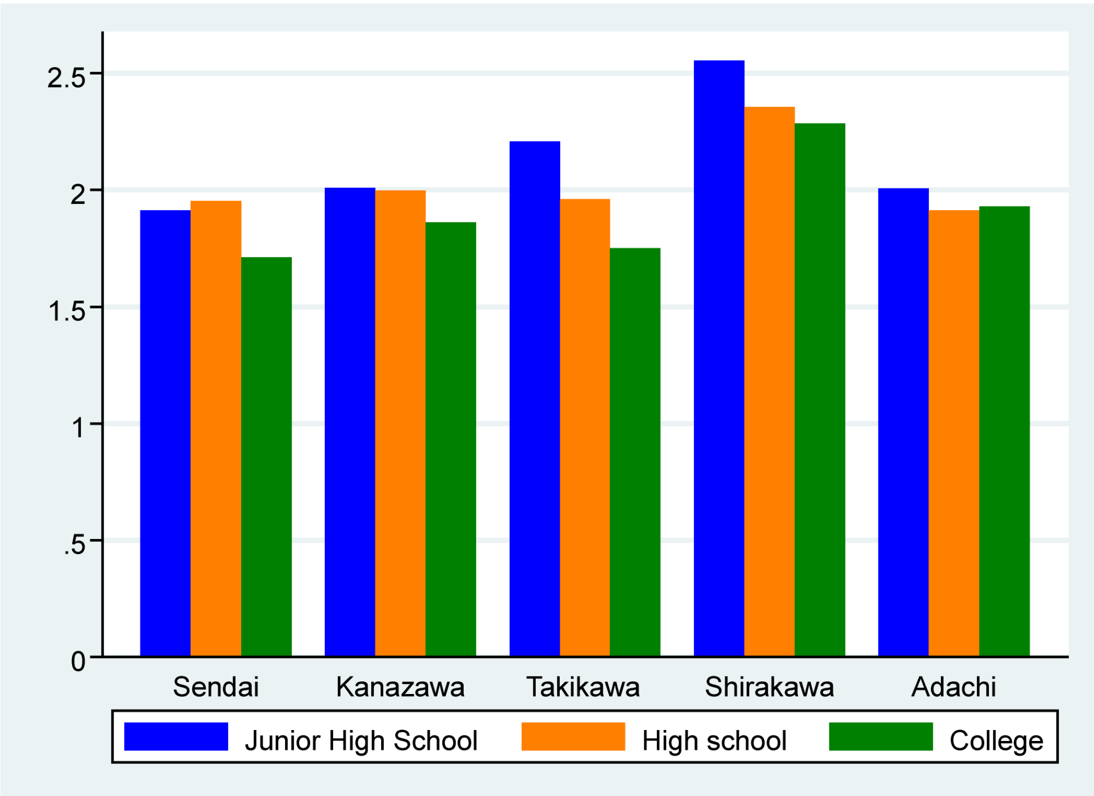

Figure 3-2-4-2 Natural living children by educational level, females of children is observed for junior high school graduates in Takikawa, Shirakawa, and Adachi in Japan, which is also the case in SHARE, this is not the case for Sendai and Kanazawa.

In contrast, the results based on female respondents show a clearer negative relationship between educational attainment and fertility. Except for a few education-municipality groups, we see a negative gradient in the figure. In this case, we see a clear negative relationship in Takikawa and Shirakawa. The negative relationship is also more clearly observed in Europe. In any case we need to control for age before we begin to understand the effect of education on the number of children.

3.2.4 Variations in the Number of Natural Children across Health Status

Lastly, we turn to the relationship between the number of living children and health status. As a health measure, we use the European version of self-perceived health status: very good or good (better health) and poor or very poor (worse health). Note that the measure of health status is a current one. We excluded the category of "fair" to contrast the better or worse health status. Figure 3-2-5 illustrates the number of living children by the two categories of health status. A male respondent with a better health status is more likely to have a larger number of children than that with worse health status in Sendai, Kanazawa, and Takikawa but this is not the case in Shirakawa and Adachi. A female with a better health status is more likely to have a larger number of children in all municipalities except Takikawa.

What we found in the figures seem not to be consistent with the finding in the SHARE book. The SHARE book found that poor self-perceived health increases with the number of natural living children for both women and men and attributes the correlation to common factors such as age or socioeconomic status which relate systematically to both health and fertility (e.g., less educated women tend to have more children and poorer health). We note that we do not control for a variety of factors to affect fertility in this subsection and we need more in-depth analysis to examine the relationship between health status and fertility including the mechanism, channels and direction of causality.

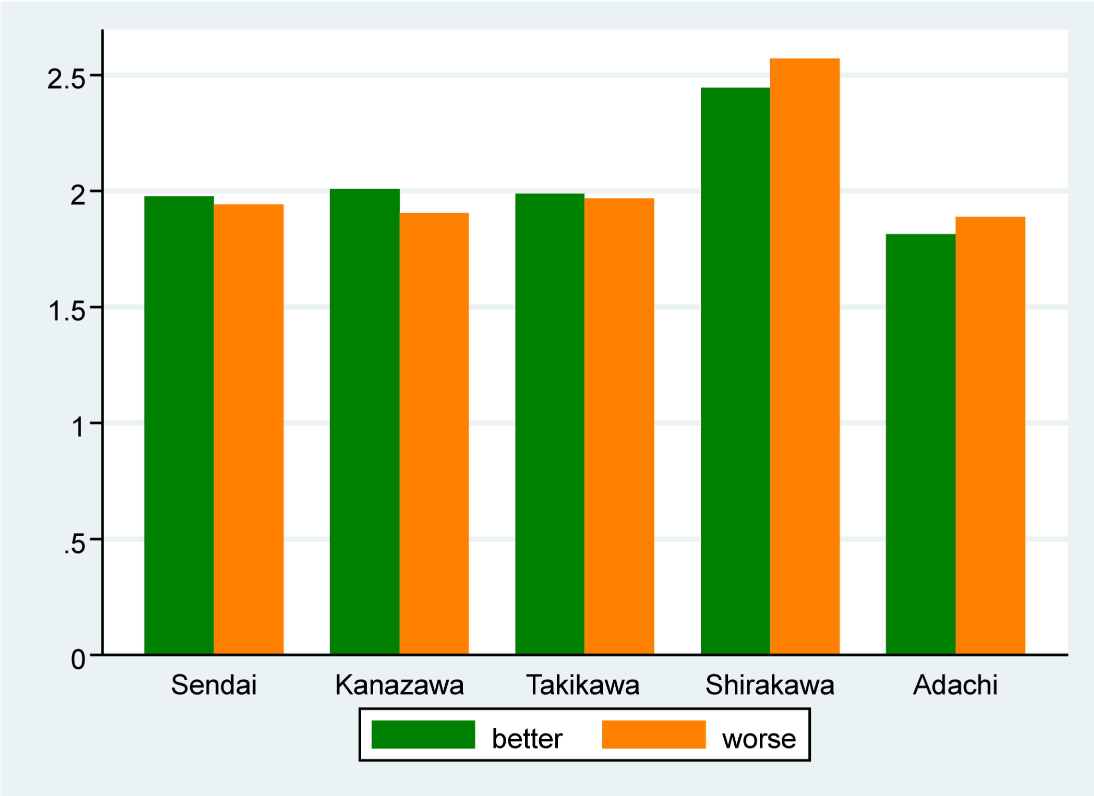

Figure 3-2-5-1-Natural living children by health status, males

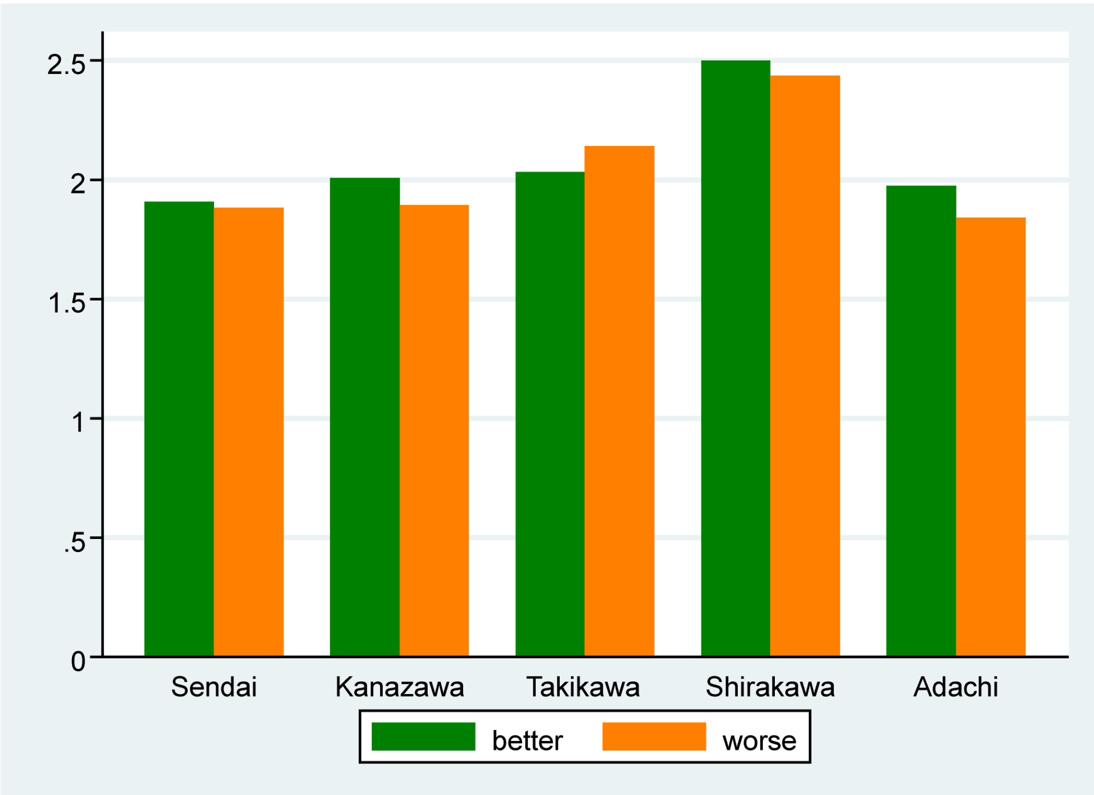

Figure 3-2-5-2 Natural living children by health status, females

3.2.5 Conclusions

• While the total fertility rate in Japan has been declining to historically low levels, JSTAR confirms that the fertility rate differs across generations and regions within the country. The larger number of children is observed in the baby boomers, a finding common to JSTAR and SHARE.

• The proportion of the respondents without any children occupies less than 10% in all municipalities. The most dominant number of children is two in all municipalities except Shirakawa where the number is three.

• We confirm the negative correlation between education and the number of natural children for females. We do not find a negative correlation between self-perceived health status and the number of natural children, which is found in the SHARE book. This issue deserves further investigation.

3.3 Family Structure, Proximity, and Contact

3.3.1 Introduction

Family structure in a country is characterized by who constitutes a family and how strong the relationship among family members is. Like most European countries, Japan has experienced substantial downsizing of family size from a traditional extended family to a nuclear unit, especially after World War II and subsequent urbanization. According to Census 2005, the average family size was 4.14 in 1960, and it decreased to 2.55 in 2005. The share of nuclear families among total households was 29.5% in 2005. Moreover, population aging leads to further change in household structure. The number of two-person and single-member households has been increasing, especially among those aged 65 and over: the number reached 29% and 35%, respectively, also in 2005.

How a structural change in family has affected family relations along the traditional generational lineage is a matter of debate. While the "boundary of family" varies in each country, Tachibanaki and Kimura (2008) argue that the scope of family in Japan is still beyond the co-residing nuclear unit, but concentrates on a direct (lineal) line (a married couple and their parents and children). In such a drastic change in family structure, two distinct phenomena are particularly relevant regarding our JSTAR sample respondents aged between 50 and 75.

One is a weakening of the marriage relationship among elderly couples. A recent phenomenon is that the number of divorces among elderly has rapidly expanded in Japan: in 1960 the divorce rate was 0.74 and it increased to 2.08 in 2005. Couples with more than a 20-year relationship are more likely to divorce, often triggered by the husband's retirement, or by the children's becoming economically independent.

Marriage still makes up a core element of the family in Japan and is considered a prerequisite for having children under a social norm colored by Confucianist culture, which is largely different from those in European countries where a large number of unmarried couples have children. Divorce among elderly couples can be seen as a flip side of this social norm, because a couple's decision to divorce may be facilitated after their role of raising children has been completed. Together with the increase in the number of never-married, the elderly without "kinship family," especially in urban areas, may pose a new challenge for social policymaking.

The other issue of interest is that intergenerational exchange including a variety of forms of transfers, whether monetary or non-monetary, and emotional support, have also changed substantially with the structural change in the family. Family members help each other in the provision of child care, elderly care, and other aspects of daily life that a family function and capacity can offer, through a variety of channels of exchange and support. In the traditional extended family, healthy grandfathers/mothers were expected to take care of their grandchildren while the grandchildren's parents were at work. When grandfathers/mothers became frail and in need of care, younger family members, traditionally the women, were obliged to provide the care. However, recent trends of the nuclear family and women's participation in the workforce make difficult the provision of care solely by the family's capacity for informal care. The introduction of the public long-term care insurance program in 2000 was planned to alleviate the burden of care, by socializing elderly care and publicly providing formal care. However, whether formal care actually replaced a family's informal care is still debatable (Shimizutani & Noguchi 2004). In addition, the rapidly growing expenditure for long-term care insurance has raised concerns about the sustainability of the program.

The rapid speed of aging further brings into focus the issue of family structure, its function, and the role of the social security system in contemporary Japan. In Europe, there has been an argument that the modern welfare state might undermine family solidarity and the family itself, and that a government should not intervene in "family matters." Although such debate is still controversial, it would be fair to accept the fact that the change in family structure invites reforms in social security policy, and in turn, those reforms affect family structure. What makes things more complicated is that the change of family structure is diverse across and within countries. As seen in this chapter, we observe a wide variety of family forms across age groups and municipalities. As the SHARE book asserts, we should not simply accept "stereotyped" facts about families (e.g. increasing childlessness, divorce, and numbers of singles and the decrease of multigenerational co-residence), but our assessments should be based on empirical examination of comprehensive data in this country to reach an in-depth understanding of the causal relationship between family and health, and economic and social issues.

This chapter will explore several aspects of family in the JSTAR sample, such as spatial and emotional closeness, frequency of contact, personal and instrumental support as well as transfers of money and goods, paying a special attention to comparability with findings in SHARE countries. In Japan, a large volume of political and academic debates on the role of the family have accumulated, though an empirical approach using comprehensive and rich micro-level data is not necessarily abundant. JSTAR provides the opportunity for researchers and policymakers to examine the current state of Japanese families from a comparative perspective with European countries. In Europe, there are considerable differences between Scandinavia, Central and Western Continental countries ("weak family countries") and those of the Mediterranean ("strong family countries") (Reher 1998). The Scandinavian countries generally have the lowest proportion of traditional family structure, the Mediterranean countries (Spain and Italy more so than Greece) hold the highest proportion, and the other continental countries lie somewhere in between (SHARE book). Some might speculate that Japan belongs to a "strong family country." In fact, Japan does share some experiences with "strong family countries." The trend of the fertility rate was high in the past but today has become the lowest, and the decline in the fertility rate is attributed to the increase of women with higher education and labor participation and consistent social norms of gender roles that prevent gender equity in the family and in public provisions for family (Kohler et al. 2002 for Europe).

3.3.2 Variations in Marital Status across Age, Gender and Municipality

The SHARE book pointed out that the institution of marriage has weakened overall among older Europeans, as observed in diminishing rates of those married and the increasing divorce rate. However, it also asserts that the current elderly have not yet been strongly touched by this evolution. How does the case of Japan compare?

Figure 3-3-1a reports the share of marital status by gender and age group. Among the 50s, 86% of males and 80% of females are currently married. Those two numbers are higher than those in European countries, especially for females. The remaining figure consists mainly of those never married or divorced. It is interesting that the share of "never married" is larger for males than females in the 50s, but the reverse was observed among those aged 60 and over. The share of "never married" is slightly lower in Japan than in Europe. The share of "divorced" among females was higher compared to that among males in all age strata. The divorce rate is less than 6% for males while it is more than 8% for females, numbers that are still slightly lower than those in European countries in the same age cohort. The share of the divorced declines, and that of the widowed rises with increasing age, both for males and females.

As in the SHARE results, in males, the share of "married" is about the same across age strata, while in females it declines with rising age, and is replaced with the share of "widowed." This pattern is presumably associated with the higher likelihood of women to be widowed, since the female spouse is younger than the male spouse on average.

Figure 3-3-1b presents the shares of marital status by municipality. While the disparity across municipalities is smaller than that across countries in Europe, we see some variations in marital status across regions even in Japan. As expected, the proportion of "never married" was the highest in the metropolitan city (Adachi), and the lowest in the rural town (Shirakawa). The proportion of "divorced" was the highest in Takikawa in Hokkaido Prefecture, which is characterized by the highest divorce rate in the country. When we stratified the sample by age and gender categories, a marginally significant difference across municipalities (p=0.052) was found in females in their 70s. In this segment, Shirakawa city showed the highest share of "married" (78%) and lowest in "widowed" (19%) and "divorced" (1.5%) categories, while Kanazawa city had the lowest share of "married" (60%), and highest "widowed" (36%) and "divorced" (4%).

The divorce rate also varies across SHARE countries. Denmark and Sweden, countries with the least traditional family structure, are at the top with 13% and 12%, respectively, of those currently divorced, followed by Germany, Austria, France and Switzerland (around 9%), the Netherlands (6%), Greece (4%), and Italy and Spain with 2% (the last three named have the most traditional family structure). The average divorce rate in JSTAR sample was 5%, between the figures of the Netherlands and Greece. When comparing across municipalities, we see that even the highest divorce rate, observed in Takikawa, is 7%, still lower than those in Germany and France. The lowest, as expected, is observed in Shirakawa, a rural and traditional municipality, at 3.5%, somewhat below the number in Greece. Since those two cities represent extremes in Japan, it may be safely said that in terms of divorce rate, Japan is classified as an in-between country.

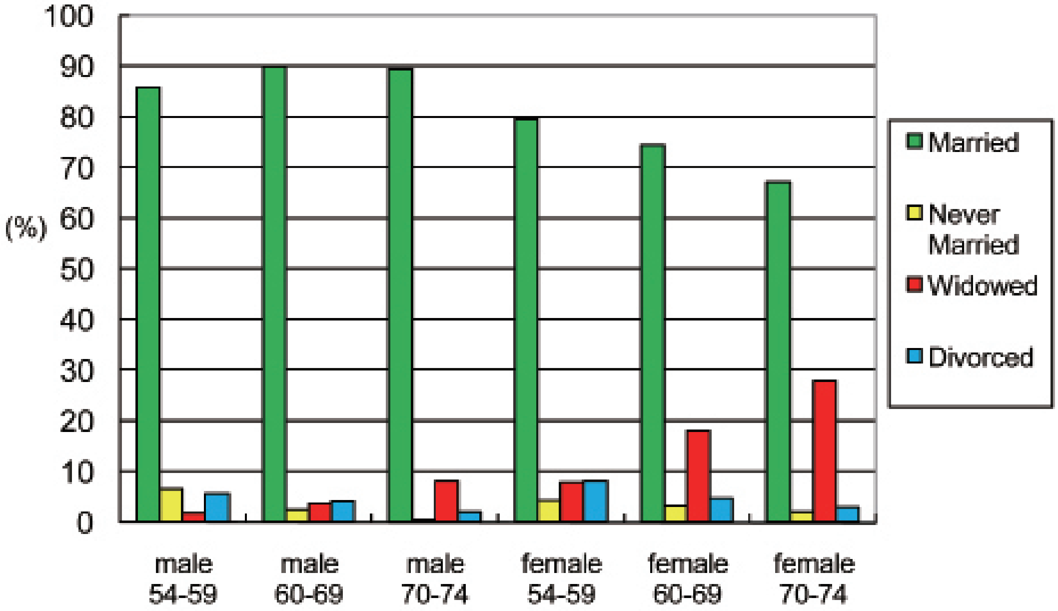

Figure 3-3-1a Share of marital status, by gender and age

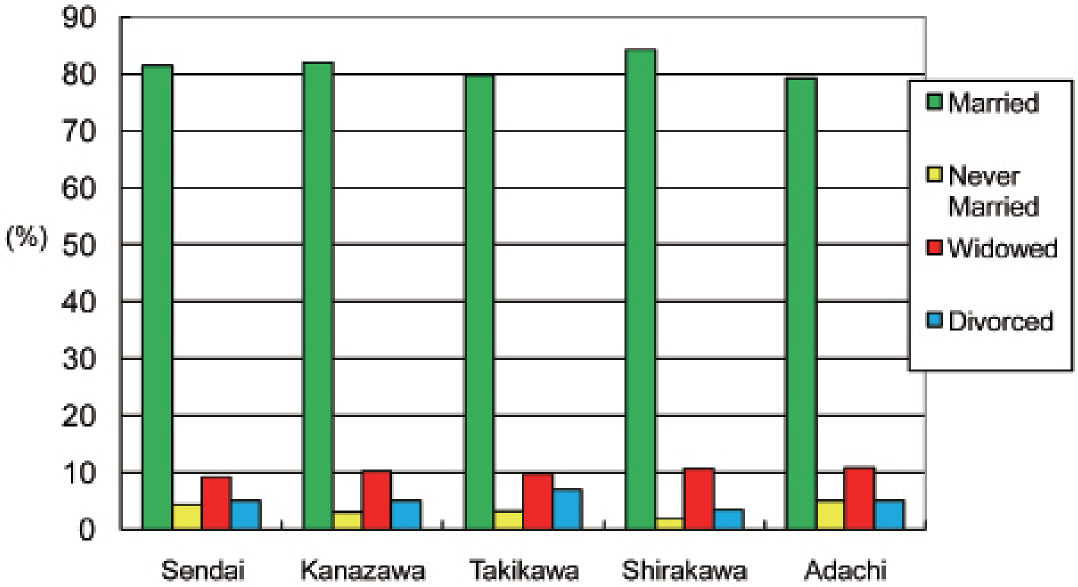

Figure 3-3-1b Share of marital status, by municipality

3.3.3 Variations in Generational Constellations across Age, Gender, and Municipality

Next, we examine generational constellations. Generational constellations are one measure of the availability of trans-generational transfer among family members through exchange and support. As already mentioned, in spite of drastic change in family structure and declining fertility rate in the past few decades, the traditional norm for a direct (lineal) line (a couple, their parents and children) is still strong in Japan, and affects the socio-economic dynamics in the family.

Before we present the statistics of generational constellations, we should be careful about direct comparison between JSTAR and SHARE results. The JSTAR question regarding generational constellation is based on a traditional lineal system in which direct one-generational ascendants (parents) and descendants (children) from the respondent's generation make the core family structure. Accordingly, JSTAR asks respondents whether they have any children, and whether either of their parents is alive. We do not have information on the respondent's grandparents and grandchildren at this stage. Thus, we will use in the following discussion "core three-generation" to specifically refer to three generational constellations consisting of respondents, their parents, and children.

The share of those with no other generation (one generation in the figure) is about 5%, which is lower than that in SHARE results (Figure 3-3-2a). The proportion is similar across age categories. Among the respondents in their 50s, the share of those with "core three-generation" is the most dominant (58%). The "core three-generation" share declines with the rise in the respondent's age, simply because their parents are less likely to be alive. It is supposed that a share of "No living parents but living children" could have been replaced with a new three generation family with children and grandchildren.

The number of those with no other generation is higher in larger cities and lower in rural towns, as expected: the highest is 6.8% in Adachi, and the lowest 2.5% in Shirakawa (Figure 3-3-2b). The "core three-generation" structure is most prevalent in Shirakawa (37.3%), a rural farming town, followed by local large cities such as Sendai and Kanazawa (35%), and the lowest is observed in metropolitan Adachi (23.5%). Takikawa (26.8%) takes a unique position, since it is a rural farming town, yet it deviates from a conventional norm of the multi-generational family structure. Even after stratifying by age category, those in their 50s in Takikawa show a low share of "core three-generation" (54.1%), comparable to those in metropolitan cities such as Sendai (53.9%) and Adachi (46.5%), rather than local (Kanazawa, 62.2%) and rural cities (Shirakawa, 70.6%).

Since generational constellation is closely related with the availability of informal support among family members, the variation in generational constellation across age and municipality might be reflected in the variation in the form of family support exchange, which is examined in the following subsections.

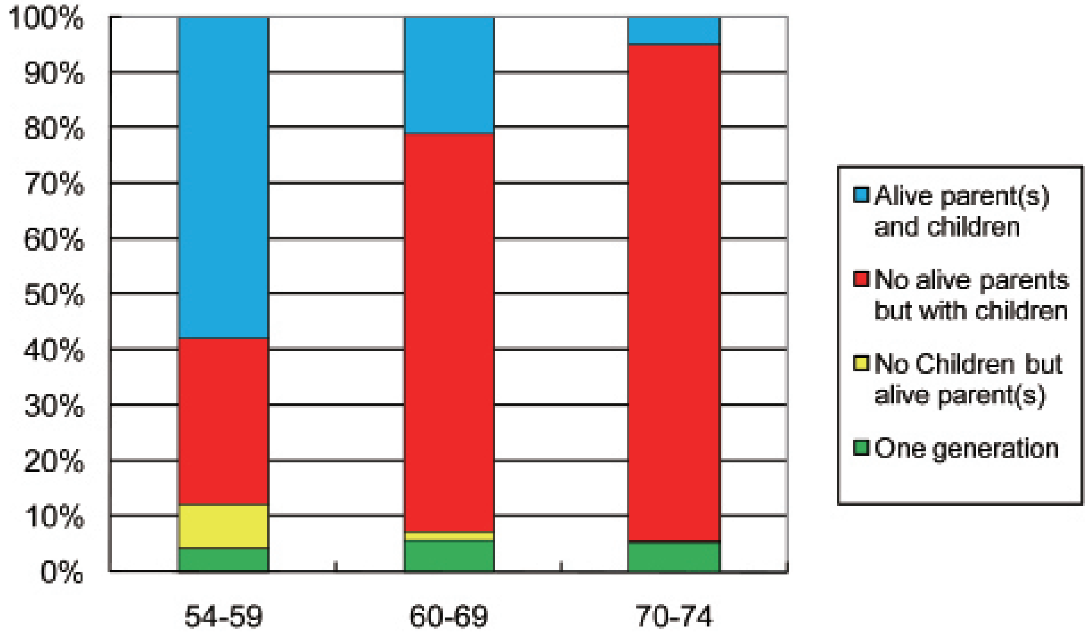

Figure 3-3-2a Share of generational constellations, by age

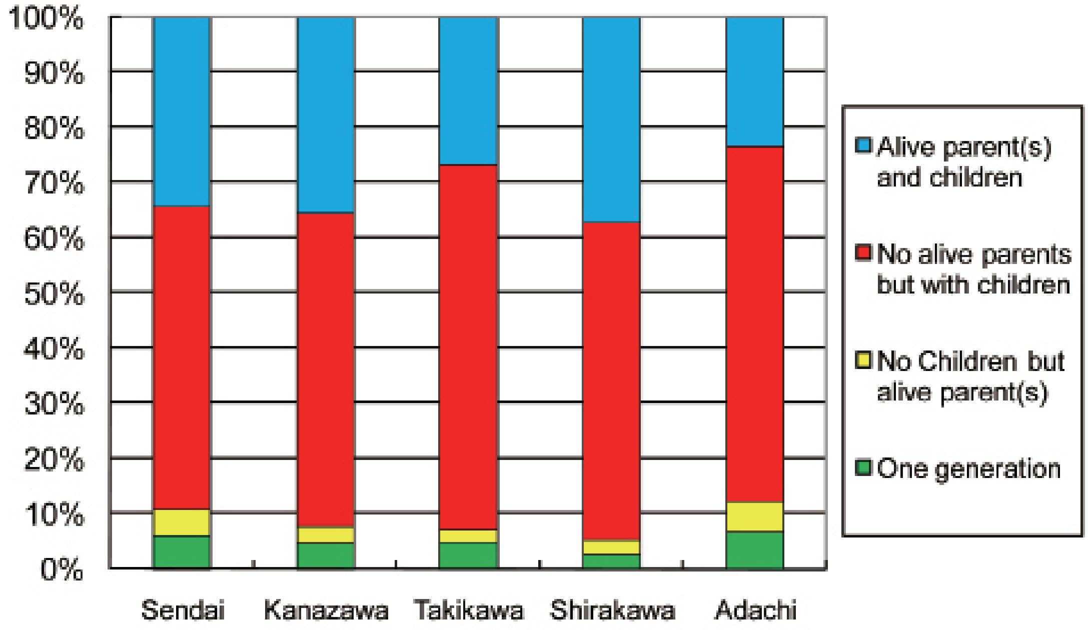

Figure 3-3-2b Share of generational constellations, by municipality

3.3.4 Variations in Co-residence and Proximity across Age, Gender, and Municipality

Further, we provide descriptive data of co-residence and geographical proximity of the nearest living children, as it also makes a determinant of the frequency and strength of inter-generational exchange/support among family members. As the SHARE book reveals, the pattern in those aspects differs across countries and even across regions within a country. We could expect that the impact of urbanization and subsequent demographic change in the past few decades would strongly appear in this aspect of the parent-child relationship, and it should vary depending on generations and regions.

Figures 3-3-3a and 3-3-3b depict the residence status of the nearest living child in our sample across age and municipality. The overall share of "same household" is 50.9%, a number quite close or even larger compared to those in "strong family countries" such as Spain and Italy. The "same household" share is 64.1% among respondents in their 50s, and the number decreases to around 40% when the respondents are older.

As is true in the Mediterranean countries, contemporary Japan is also characterized by very late (and increasing) ages of leaving the parental home among adult children. Of those children in the "same household" category, about 50%-60% are unmarried. When the respondents are in their 50s, nearly 90% of their children in the same household are unmarried. When the respondents are in their 70s, the share of unmarried children in the same household is still around 50%.

Since we do not have information whether these unmarried children have never left the parental home, or have moved back to the home, we could not differentiate whether the higher share of "same household" among nearest living children is attributed to the relative lack of opportunity in housing markets or to the cultural tendency towards closer intergenerational ties. However, if the unmarried children are more prevalent in metropolitan cities rather than in local cities, it may suggest the possibility of limited housing opportunities, since the land and accommodation price is much higher in metropolitan areas than in local areas.

The results support this view. Cross-region comparison in the JSTAR sample shows that the share of "same household" among nearest living children is highest in Adachi (57.4%), followed by Kanazawa (56.8%), Sendai (55.1%), Shirakawa (48.2%), and Takikawa (28.4%) (Figure 3-3-3b). When limited to the respondents in their 50s, 77.9% of nearest living children are in the same household in the case of Adachi, and more than 80% of them are unmarried. These findings suggest that the co-residence status of children is determined rather by children's limited opportunities in housing market conditions in the metropolitan area.

Another unique finding is that the share of nearest living children in the "same prefecture" is higher among rural towns such as Takikawa (35.5%) and Shirakawa (27.5%), compared to those numbers in urban areas (Sendai 4.1%, Kanazawa 6.1%, and Adachi 9.5%). The most plausible interpretation is that in these rural towns, the younger generation is more likely to move out to larger cities in the same prefecture. In the case of Shirakawa, Nagoya city is the third largest metropolitan area in the country and is located just two hours away by train. The younger generation is more likely to move to these larger cities for better job opportunities.

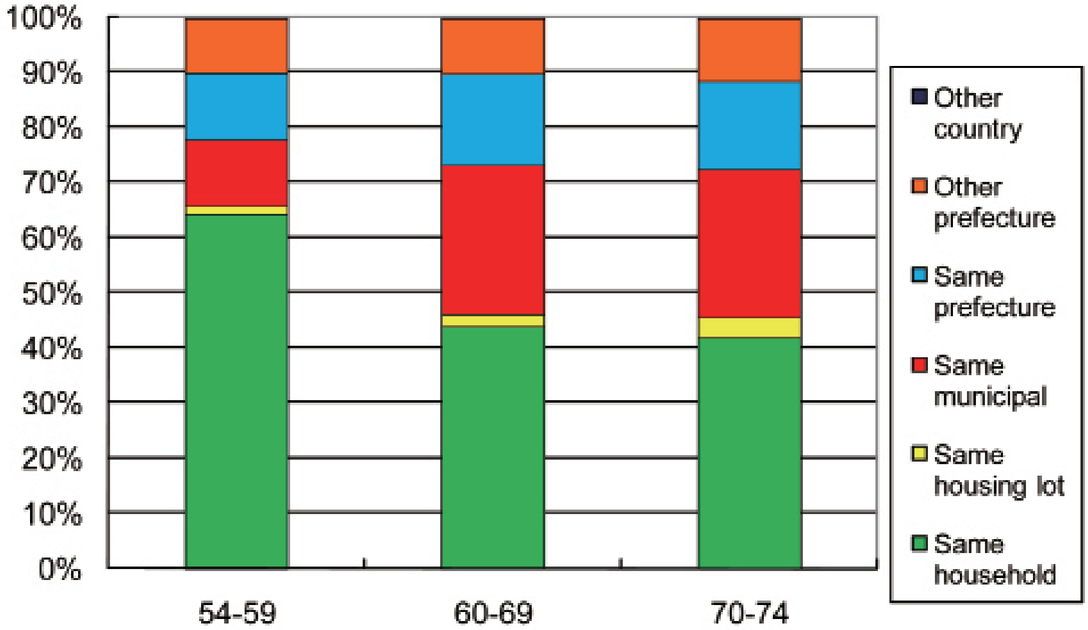

Figure 3-3-3a Residence status of nearest living child, by age

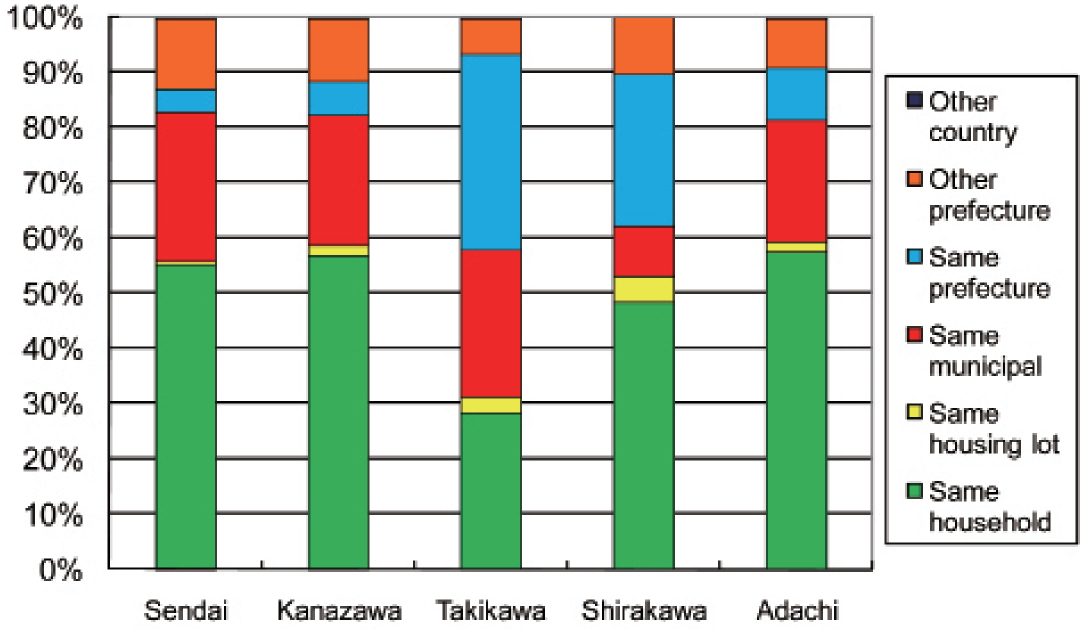

Figure 3-3-3b Residence status of nearest living child, by municipality

As such, the co-residence status of children seems to be affected more by opportunity conditions (e.g. housing market and job opportunities) rather than by the strength of socio-cultural norms on family ties. Family strength may provide only a limited scope to analyze exchange and support among family members. As the SHARE book discusses, however, living arrangements may not be very good evidence for the claim of dissociation between parents and adult children. Thus, we should take a closer look at actual frequency of parent-children interaction such as contact frequency.

Figures 3-3-4a and b present the results of the frequency of contact with children. If we put "living together" and "daily contact" together, 62.7% of the respondents have a child with whom they have daily contact. The number is somewhat closer to those in non-Mediterranean countries, rather than to the number in "strong family" Mediterranean countries. Given that more than 51% are already living with children in the same household, we could say that the share of a child with daily contact is slightly smaller than those in any SHARE countries. If we include the proportion of children with contact more often than "several times a week," 74.3% of JSTAR respondents says "yes," and the number is as low as that in the Switzerland. Thus, the frequency of parent-child contact indicates, contrary to the anecdotal belief of a Japanese "seniority" culture with a Confucianism background that suggests strong family ties, that the JSTAR sample shows a somewhat weak family relationship compared to the family ties in SHARE European countries. Actually, the correlation between the proximity of the nearest child and the frequency of contact to the most contacted child is quite high (Spearman's rho=0.916). That is, it may be speculated that opportunity conditions determine living accommodation and the frequency of contact between parents and children.

Figures 3-3-5a and b show the results on the frequency of contact with respondent's parents.

As in SHARE findings, contact with parents is less frequent compared to that with children. Those who live together or have daily contact with their parents share 41% in total. The percentage goes down as age rises: 45% in the 50s and only 28% in the 70s. The share of daily contact (including "living together") in JSTAR lies somewhat between the results of Mediterranean countries and Continental countries. Interestingly, however, the JSTAR sample shows a larger share of those who have contact "once a month or less often" (25.8%), which is higher than the number of Switzerland that has the least contact frequency among SHARE countries. Instead, the share of those having "several times a week" and "once a week or every 2 weeks" is somewhat smaller in the JSTAR sample, compared to that in SHARE countries. Thus, it seems that the contact frequency with parents is largely determined by living accommodations.

Cross-regional comparison again depicts that Shirakawa, a rural forestry municipality, fits better with the prototypical picture of conventional family tradition: the share of living together and daily contact with parents is extremely high (71.3%) (Figure 3-3-5b), a number larger than those of Spain and Italy. The largest share of those having contact "once a month or less often" or "never" is seen in metropolitan cities: Adachi (37%) and Sendai (34.2%).

This subsection previewed some findings on family and family structure obtained in JSTAR. They are summarized as follows.

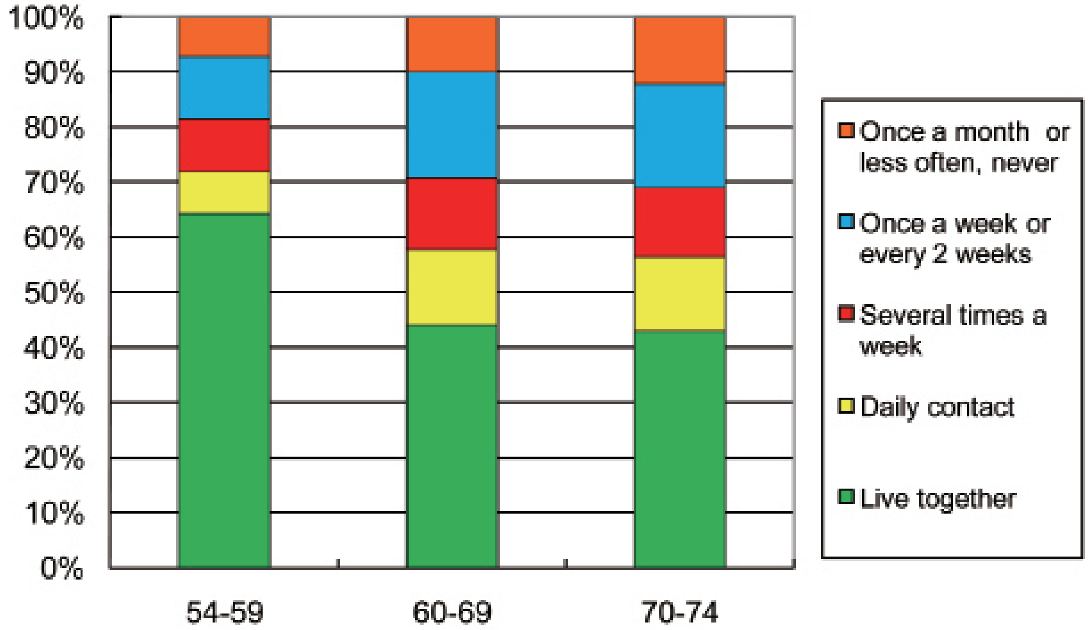

Figure 3-3-4a Frequency of contact with children, by age

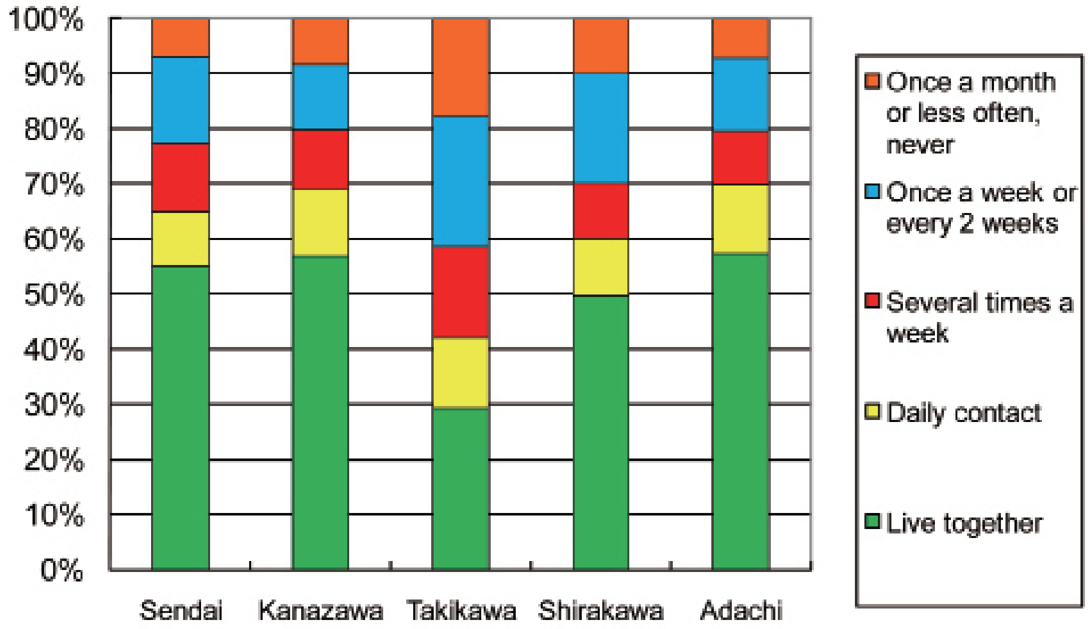

Figure 3-3-4b Frequency of contact with children, by municipality

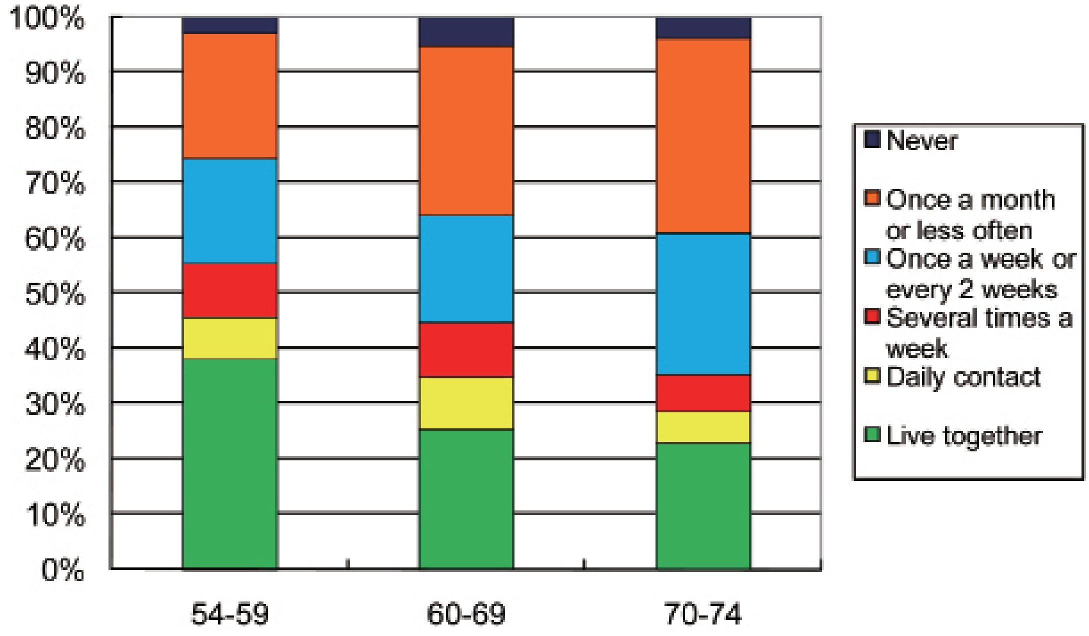

Figure 3-3-5a Frequency of contact with parents, by age

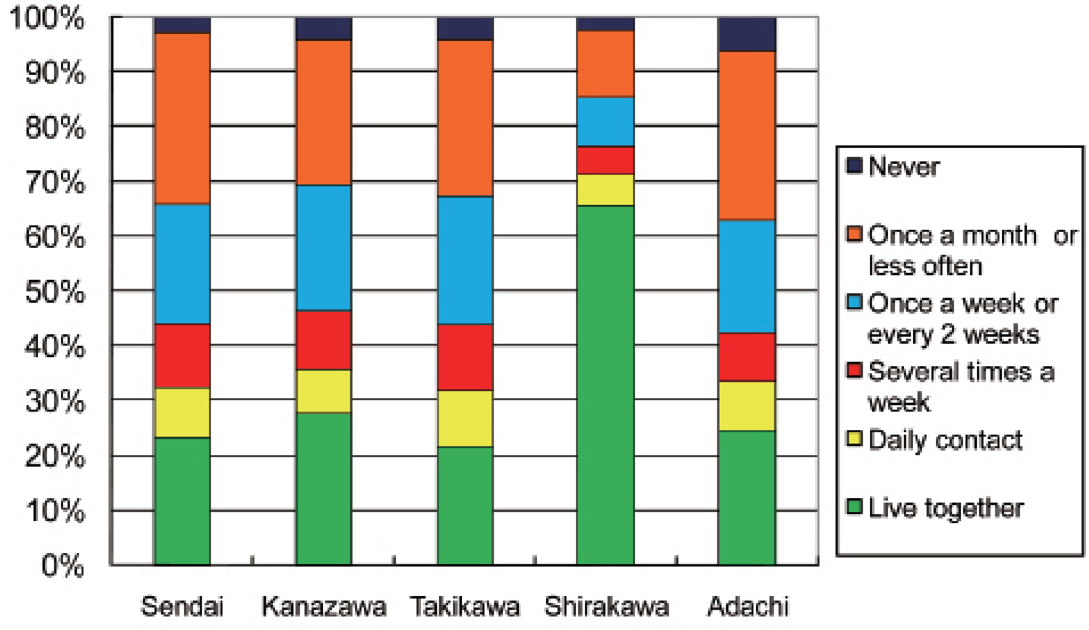

Figure 3-3-5b Frequency of contact with parents, by municipality

First, nearly 90% of males are married even in their 70s. While the share of the widowed female increases with age, the share is smaller in Japan than in Europe, implying that older people are more likely to be in a marriage relationship than those in European countries.

Second, although we see some variations in the marriage and divorce rates across municipalities, the overall divorce rate lies somewhere between Mediterranean countries and Nordic countries.

Third, the prevalence of a traditional lineal generational structure ("core three-generation" of grandparents, parents, and children) varies across regions, and the share is lower in larger cities, compared to rural municipality such as Shirakawa, though Takikawa city stands as an outlier. The finding may go along with a conventional norm of "extended and strong family."

Fourth, the share of co-residence of children in the same household is more prevalent in metropolitan and urban cities, compared to in rural farming areas. This is in contrast to the "strong family" hypothesis, and rather suggests the effect of opportunity conditions of employment and housing markets.

Fifth, the frequency of contact with children is somewhat determined by the proximity of the nearest child. The frequency of contact with parents is less than that of contact with children, and less frequent compared to that in European countries.

This preliminary evidence shows that, contrary to the prototypical view of conventional norms and seniority culture in Japan, the strength of family ties among JSTAR respondents seems at most the same as that of the family in the Continental countries rather than in Mediterranean countries. Cross-regional differences also suggest that JSTAR respondents are somewhat in a generational transition in terms of the norms from a strong-family tradition to an individual-centered weak-family culture, and that the tendency varies across urban and rural areas.

3.3.5 Conclusions

• Even for contemporary elderly Japanese, the family has remained a strong provider of institutional and everyday-life integration. The historical decline of marriage has not yet become apparent, which is similar to the cases in SHARE.

• The marriage bond is fairly strong especially for males, and maintained even into the 70s in JSTAR male respondents, compared to the elderly in SHARE countries.

• The multi-generational structure of the family remains prevalent, but with a large variety across regions in Japan. The proportion of co-residence of elderly with their adult children is seen as prevalent as in the case in Mediterranean countries. The likelihood of living accommodations and geographical proximity, and subsequent contact frequency are likely to be affected by regional difference in opportunity structures of employment and housing markets, rather than by the strength of traditional family norms.

• In contrast to the prototypical view of conventional norms and the seniority culture in Japan, the strength of family ties among JSTAR respondents seems at most to be the same as that of the family in the Continental countries, and cross-regional differences also suggest that JSTAR respondents are somewhat in transition from a strong family tradition to an individual-centered weak-family culture.

3.4 Family Support

3.4.1 Introduction

Family members are tied to each other through a variety of channels of exchange and support, including monetary and nonmonetary transfers. This subsection focuses on the non-monetary aspects of family support. Middle-aged and elderly people give to and receive from other family members non-monetary support in many ways, as described in the SHARE book. We focus here specifically on personal care for persons with health problems and the characteristics of care givers. We leave the issue of child care by grandparents behind due to data limitation in the first wave survey, though the SHARE report devoted considerable space to the topic. Instead, we put more focus on informal care for the elderly in the household. It should also be noted that SHARE only counts support exchange with respondent's own parents, whereas JSTAR counts exchange with both parents and parents-in-law, since the pattern of interaction with parents and parents-in-law is anticipated to be different according to respondent's gender, due to different gender roles under conventional "family tradition" and values for a lineal kinship.

3.4.2 Personal Care Provision to Parents

When examining this issue, we should keep in mind that the provision of informal care by family members to frail elderly parents would be influenced by traditional gender roles and related social norms, the capacity of the family, living arrangements, and the availability of formal long-term care.

Prior to the introduction of the public Long-term Care Insurance (LTCI), the family was generally obliged to provide informal care as the major source of care to the disabled elderly, unless social welfare by municipal sectors selectively provided free formal care services for those with little family support or low income (Campbell and Ikegami 2000). Even after the implementation of the LTCI, however, the family has been expected to play an important role in providing elderly care. Prevailing social norms underscored by Confucian seniority morals and the value attached to the traditional lineal family system occasionally require the first son to be responsible for taking care of his frail parents, though the actual burden of care is put on his wife. The wives of first sons, or "*yome*" in Japanese, have been put in the lowest power hierarchy of the family system, and were often normatively forced to take care of the parents-in-law. However, the situation has changed due to the increase in nuclear households and prevailing workforce participation by women. Thus, how the burden of care for elderly parents is (re-)distributed across age and gender becomes a research question among the participants of JSTAR. We would also see whether the pattern of sharing the care burden is different for parents and parents-in-law across genders.

Figure 3-4-1a presents the proportion of living parents and parents in need of care by the respondent's age and sex categories. Among those in their 50s, 64% to 67% have living parents, and 13% to 17% of them (about one fourth or fifth of those with living parents) have parents in need of care. The proportion of those who have living parents goes down to 22% among those in their 60s and 10% of them (or about half of those with living parents) have parents in need of care.

Figure 3-4-1b shows the corresponding numbers for parents-in-law. Female respondents have a higher proportion of having no living parents-in-law compared to their male counterparts in all age strata, though the share of having a parent-in-law in need of care is similar between the respondents' genders in the 50s and 60s. It is reasonable that the proportion of living parents is larger and that of living parents-in-law is smaller among female respondents, because wives are in most cases younger than their husbands. Figures 3-4-1c and 3-4-1d show the proportion of surviving parents/parents-in-law by region. Takikawa and Adachi show the highest proportion of those without living parents/parents-in-law. About 10% of respondents report having either or both parents in need of care, and the proportion is somewhat higher for parents-in-law. Kanazawa has the largest share of those who have both parents and parents-in-law in need of care.

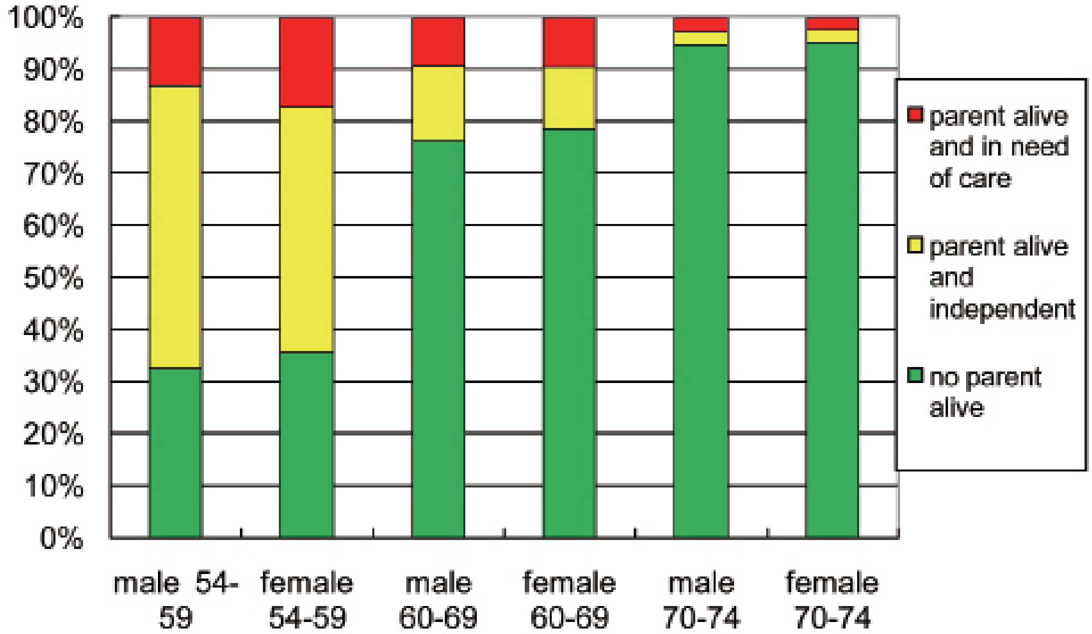

Figure 3-4-1a Proportion of surviving parents, by gender and age

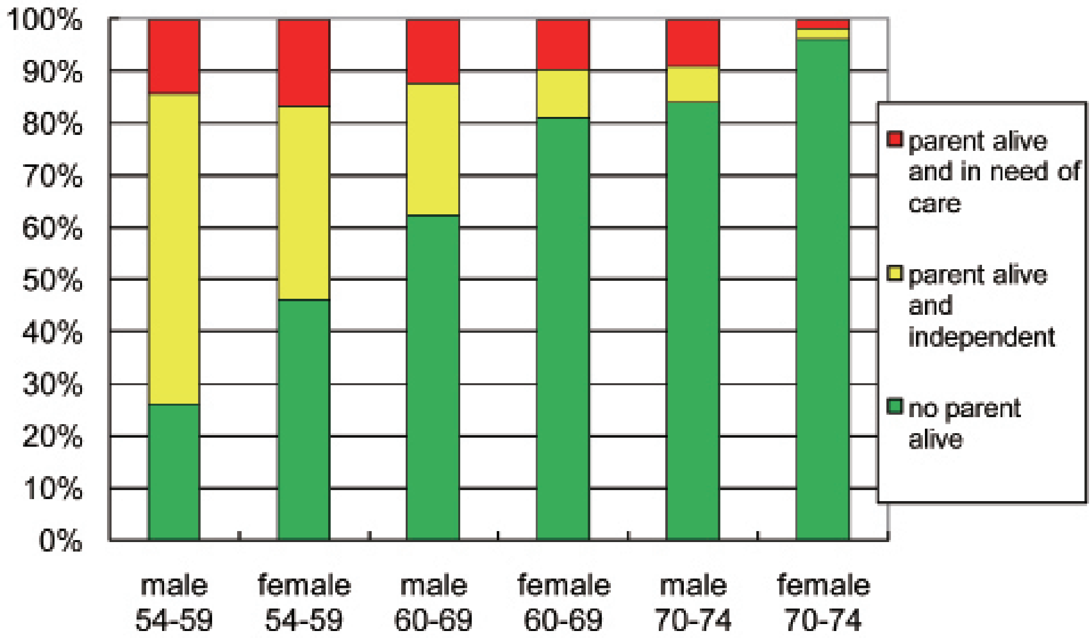

Figure 3-4-1b Proportion of surviving parents-in-law, by gender and age

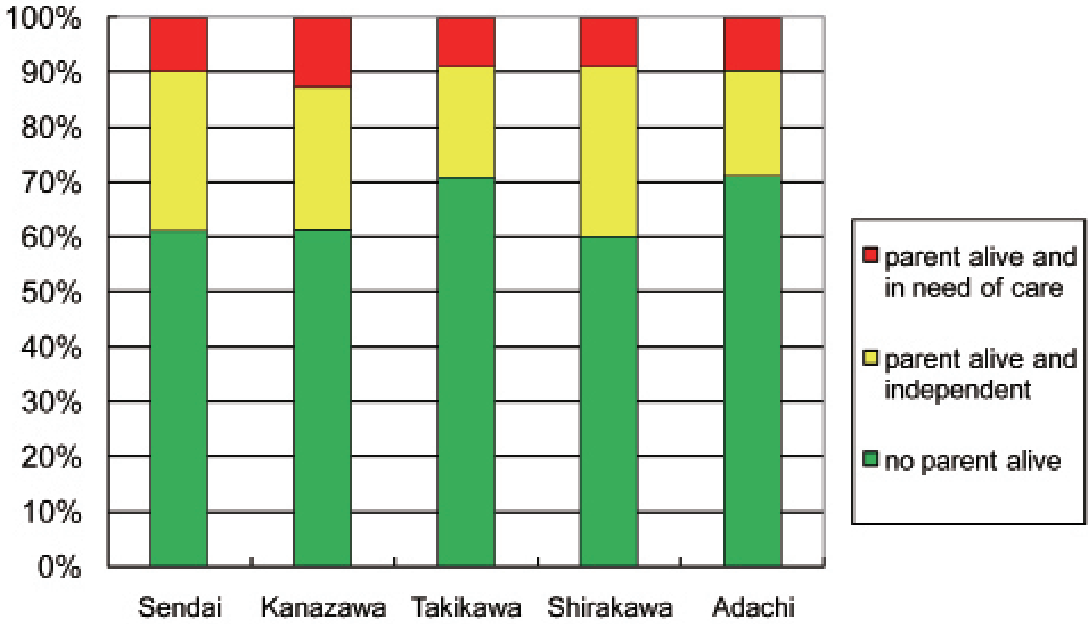

Figure 3-4-1c Proportion of surviving parents, by municipality

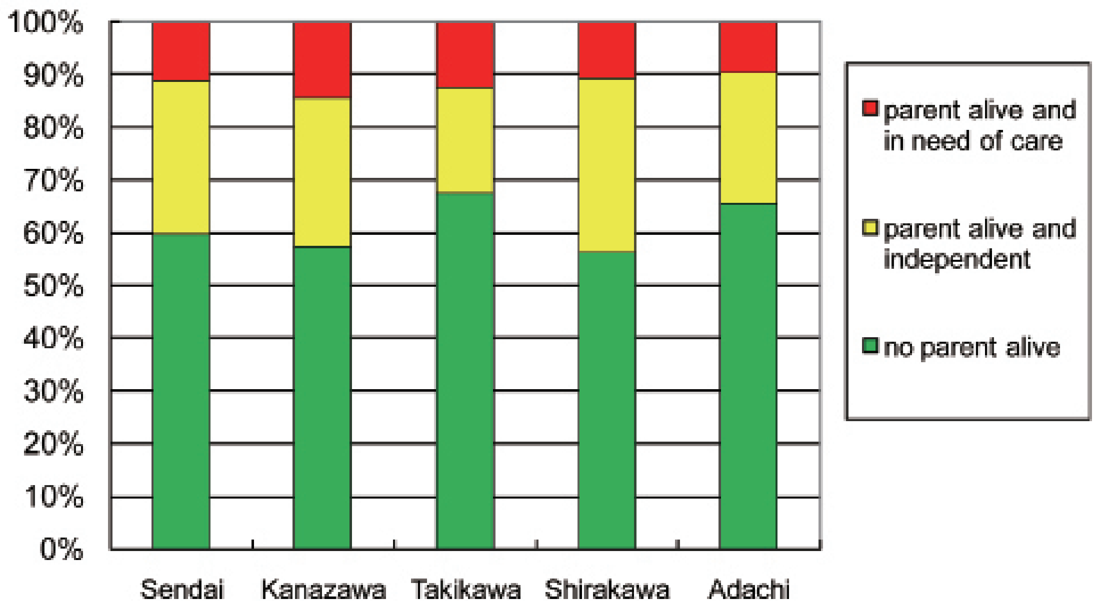

Figure 3-4-1d Proportion of surviving parents-in-law, by municipality

Figure 3-4-2a shows the proportion of reported provision of care/help to parents. Figure 3-4-2b shows corresponding numbers for parents-in-law. As is clearly depicted in these figures, females in their 60s have the largest share of providing physical care to their parents and parents-in-law. The share of reported physical care provision among males is only 5% in the 50s and gradually goes up to 8% among males in their 70s, which is comparable to the reported share among females in their 70s. However, a striking difference across gender can be seen in the provision of care/help to parents-in-law, as was expected. The share of male provision of care/help to their parents-in-law is virtually zero, while the share of female provision of care/help to their parents-in-law is even larger than the share of care provision to their own parents, especially in the older age strata. These numbers strongly suggest that the traditional family system and norms that value a lineal relationship is still influential and puts the burden of elderly care unevenly on females.

We further test whether gender difference in elderly care provision remains after taking into consideration living arrangements (living in the same household or not) and region. "Living in the same household" is independently and significantly associated with the likelihood of provision of help/care to parents as well as to parents-in-law in both genders, after controlling for age, marital status, and municipality. Interaction between gender and living arrangements was not significant, suggesting that living arrangements affect both genders in the same manner. Thus, the higher likelihood of female provision of elderly care is partly explained by their higher likelihood of living with parents-in-law. However, even after adjusting for living arrangements, gender still significantly differentiated the likelihood of care provision.

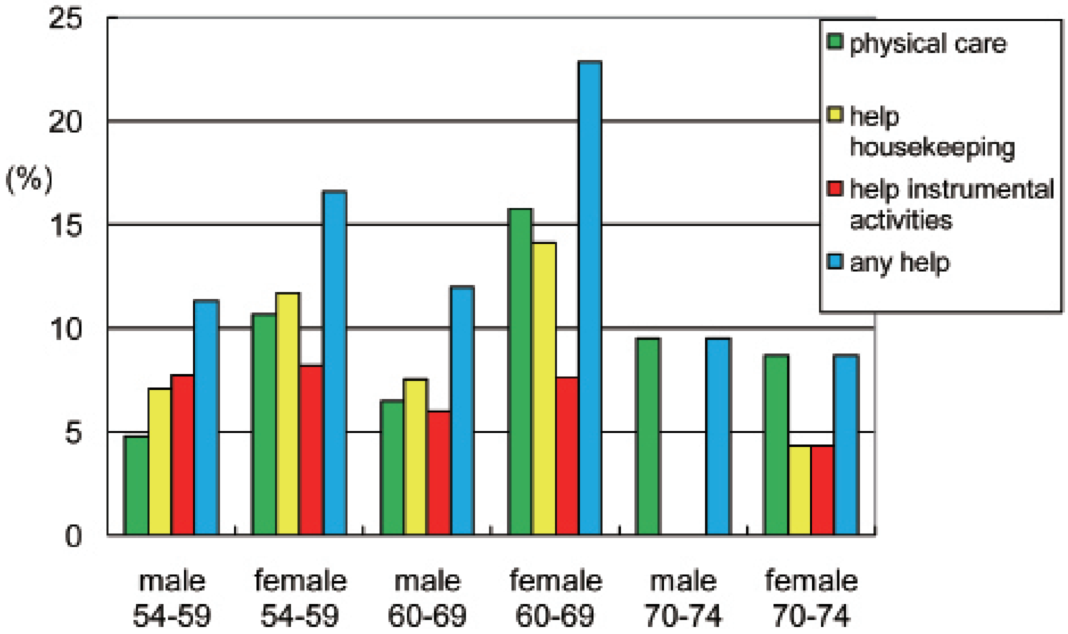

Figure 3-4-2a Proportion of reported provision of care/help to parents

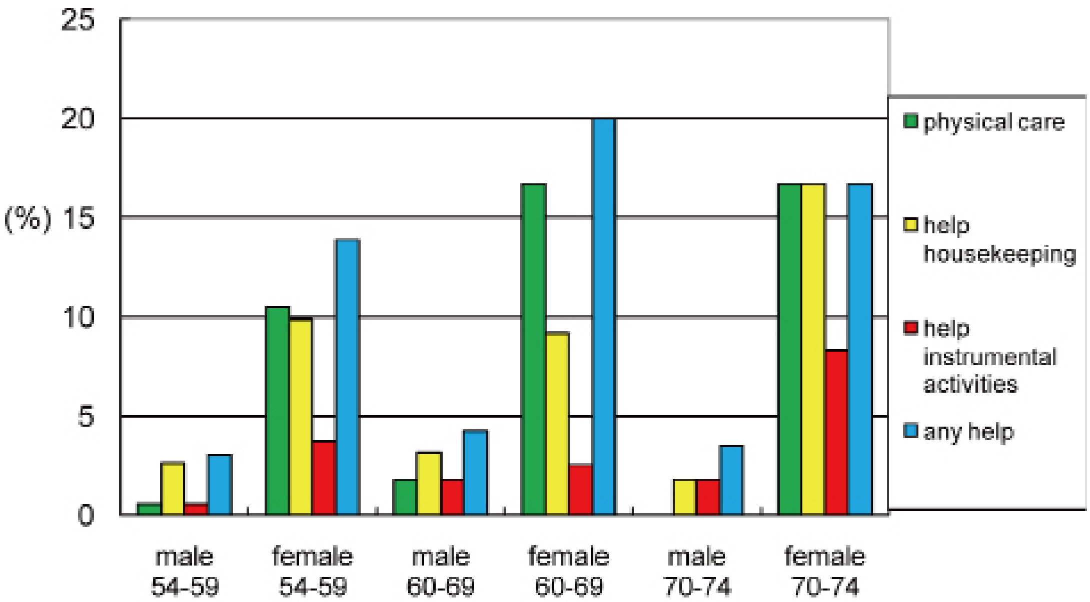

Figure 3-4-2b Proportion of reported provision of care/help to parents-in-law

Among regions, those in Shirakawa show the least likelihood of providing care/help to parents. This is a somewhat unexpected finding because Shirakawa city is a rural forestry city with the highest share of traditional three-generation households, and was expected to be most influenced by traditional norms of gender roles. We should further investigate the findings in connection with the availability and utilization patterns of formal care service across regions, since support exchange among family members is not simply private but is closely related with public services to address the needs of families.

SHARE reported limited information on care/help provision to parents, and the statistics are not provided stratified by gender. Thus, we could not discuss whether the gender role difference observed in JSTAR is similarly observed in SHARE countries, especially in Mediterranean countries with a strong family tradition. At least, however, those in the 50s and 60s are specifically exposed to the elderly care burden as we have also observed in the JSTAR case.

3.4.3 Receipt of Personal Care

Older people receive personal help from within and outside family members as informal and/or formal care. As seen in Chapter 2, only a small portion of the JSTAR sample suffers limitation in activity of daily life (or ADL) such as dressing, washing and bathing, and going to the toilet. Figure 3-4-3 represents the share of those who receive help in personal care, housekeeping, and instrumental activities such as preparing official document during the past 12 months, the share of those who have limitation in ADL, and that of those who receive personal help of any type (formal and informal) for ADL during the past 12 months.

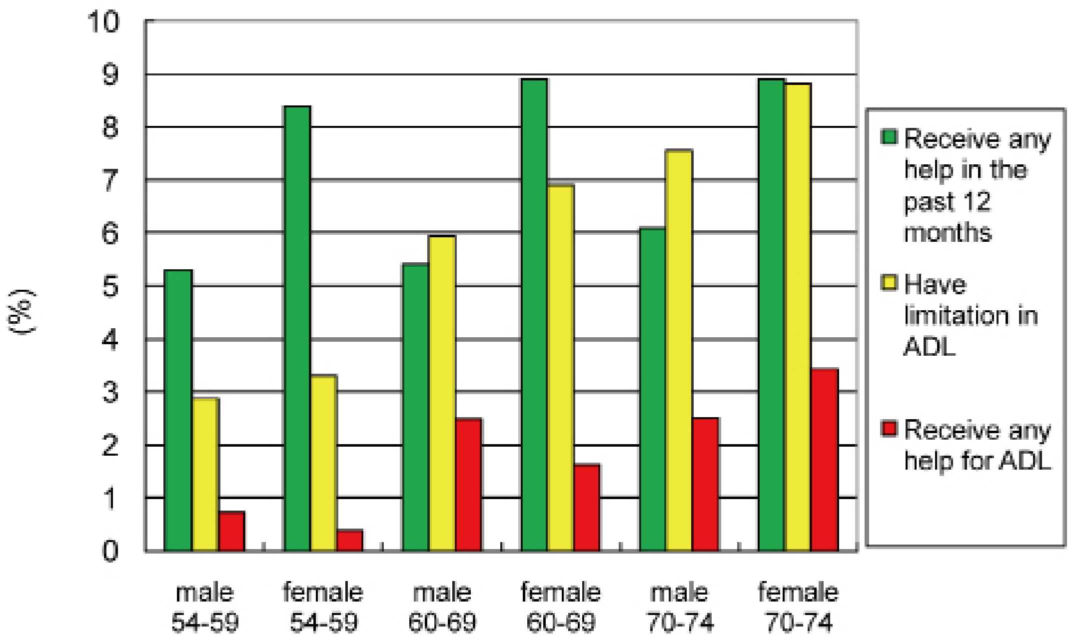

Figure 3-4-3 Proportion of those who receive care/help

First, we observe that the share of those with ADL limitation and that of those receiving personal help increases gradually with age. While the SHARE book found a steep slope after age 75, which is not available in JSTAR, the pattern up to 75 is observed commonly in Japan and European countries. We notice that the share of those receiving any type of help and personal help specifically for ADL is consistently lower in Japan than in European countries. The proportion of those persons receiving personal care for ADL is close to 30% in the 70s in SHARE while it is only less than 10% in the 70s in Japan.

We cannot simply determine whether the share of receiving help exceeds the share of those with “severely limited” function, as SHARE observed, because the SHARE report does not define “severe limitation” in the text, so comparative analysis with JSTAR is not possible. JSTAR shows that the share of those receiving any help is larger than that of those reporting ADL limitation in their 50s, which is somewhat compatible with SHARE findings. However, the share of receiving help and that of having ADL limitation is close in the 60s and 70s. Even so, the share of receiving help for ADL is smaller than that of reporting ADL limitation. Thus, even with ADL limitation, JSTAR respondents tend to ask help with housekeeping and/or instrumental activities (e.g. withdraw money and prepare official papers, etc.) rather than help with personal physical care per se.

It is worth noting that females are more likely to receive help than males, and are more likely to report ADL limitations, but less likely to receive help for ADL. Whether females tend to over-report their physical limitation, or females have less access to help for ADL is an important and interesting question for further research because policy implications should be quite different.

The observations above require us to reconsider the presumed Japanese family tradition and norms in which Japanese are very likely to provide personal care for older family members. However, this pattern might not be uniform across households since care giving is not an easy task and poses large physical and mental burdens. Naturally, the next question is who provides personal care. This issue is also associated with living arrangements. Although we should explore those issues further, a small number of those who need personal care in the JSTAR sample at this stage prohibit meaningful statistical comparison across household types, caregiver characteristics, marital status, and regions. Detailed analysis should be conducted in follow-up studies where a larger number of respondents are expected to become in need of care.

We also acknowledge that support and exchange in the case of single-member households is a crucial policy issue in welfare states with aging populations. In Europe, whether welfare states will be successful in the twenty-first century is thought to depend on both acknowledgment of changing family structures (Esping-Andersen 2003). We had only 11 respondents who have ADL limitation and in a single household, and among them, five actually receive help from family living in a separate household, non-family community members, and others. Further follow up survey in JSTAR and SHARE will provide an unusual opportunity to address exchange and support both within and between households simultaneously, relating them with social policies in an international perspective.

3.4.4 Conclusions

• Non-monetary support exchange takes a variety of forms such as giving personal care, helping instrumental daily activities, or simple contact to share socioemotional support. JSTAR and SHARE explore how the pattern of support exchange is shaped across different cultures and norms of the family.

• The pattern of provision of care to fragile parents shows a striking difference across age, gender, and region. The results from the first wave of JSTAR clearly suggests that the traditional family system and norms that value a lineal relationship are still influential and put the burden of elderly care unevenly on females.

• In contrast, females are more likely to receive help than males, and are more likely to report ADL limitations, but less likely to receive help for ADL. Whether females tend to over-report their physical limitation, or females have less access to help for ADL is an important and interesting question for further research.

• To overcome the limitation of cross-sectional data, further follow up in JSTAR and SHARE are indispensable to further investigate exchange and support within and between households for international social policy discussion.

3.5 Financial Transfers and Inheritance/Bequest

3.5.1 Introduction

Following the previous subsection dealing with nonmonetary transfers, here we examine mutual exchanges among family members in terms of monetary transfers. Monetary transfers also have a variety of forms including direct support in cash/gifts, and indirect support such as donors paying a third party on behalf of the recipient. This subsection deals first with financial transfers on a regular basis and uncovers a large amount of monetary transfer through inheritance and bequest from older to younger generations, or vice versa.

As in European countries, in Japan, most recent policy debates on social security treat older people as "receivers" of financial transfers. To be sure, under the pay-as-you-go pension program, a larger proportion of aged persons relies on pension as their single source of income and therefore puts a substantial financial burden on younger generations. These elderly people incur further social burden because they are more likely to consume a larger portion of health recourses. However, as the SHARE report pointed out, older people as "givers" of financial resources are largely ignored in policy debates, despite the fact that older people often help their children through financially difficult periods or transfer wealth or leave bequests to younger generations that help them shape a majority of wealth. These facts should be treated seriously in the debate on tax policy and other economic planning in an aging society. SHARE and HRS have provided a rich data source on this aspect of economic transfer between younger and older generations, and JSTAR now joins the international academic debate on this issue.

There has been tremendous volume of theoretical models and empirical studies on inter-generational transfers. One school argues for risk sharing within the family, and explores insurance mechanism through mutual transfers across generations (i.e. Altonji, Hayashi, & Kotlikoff 1992; Hayashi, Altonji, & Kotlikoff 1996; both of which used US data). The quantitative importance of financial transfers across generations was also confirmed and some studies have revealed their consequences for capital accumulation and wealth inequality over generations. The bulk of private money transfer between generations occurs inter vivos—in other words, from living family members and not in the form of inheritance wealth (Arrondel & Masson 2001). Altonji, Hayashi, and Kotlikoff (1997) used the Panel Study of Income Dynamics (PSID) to test whether inter vivos transfers from parents to children is motivated by altruism. Their results rejected the altruism hypothesis.

Even though Japan has a very large proportion of aged persons, there has been little empirical research on financial transfers within and across families and their implications. Hayashi (1995) is an exception to examine altruism among extended families in Japan. Private inter-generational transfer is closely related with public policy, such as social security, redistribution, and tax policies. Since these policies are expected to play a role complementary to intergenerational solidarity, research on financial transfers within and across families is quite relevant for policymakers. Obviously, the main reason of under-investigation on this important policy issue is a lack of data to examine the topic. JSTAR will provide the first opportunity for researchers to explore financial transfers and risk sharing within/across families in Japan.

JSTAR provides several variables related to private money transfer. First, the survey asked a respondent whether she/he has given or received monetary transfers for living expenses including food during the past twelve months and, if so, whether it was on regular basis. The interview also asked the amount of monetary transfer and receiver/donor of the transfer. We should keep in mind, however, that the way these questions are asked is different between JSTAR and SHARE. A conventional questionnaire would ask about the transfer amount excluding shared housing or food, which was exactly what JSTAR adopted in its interview questionnaire, while SHARE includes material gifts and indirect transfers such as payments for medical care or insurance, schooling, or a down payment for a home (loans were not included). In contrast, SHARE excludes any transfers worth less than 250 euros. In addition, SHARE asked regarding all transfers including those on an irregular basis with information about their motives, though JSTAR focuses strictly on monetary transfers on a regular basis without asking their motivation. In this section, we first focus on the transfer on a regular basis and will explore inheritance and gifts, which take place irregularly, in the next subsection.

3.5.2 Monetary Transfer on Regular Basis

In JSTAR, 10.5% of respondents answered that they received direct money transfer from outside their household by the time of the interview (Figures 3-5-3-1a and 3-5-3-1b). The number seems much higher than those reported in SHARE countries. Since SHARE ignored transfers of less than 250 euros, we cannot simply compare the results here.

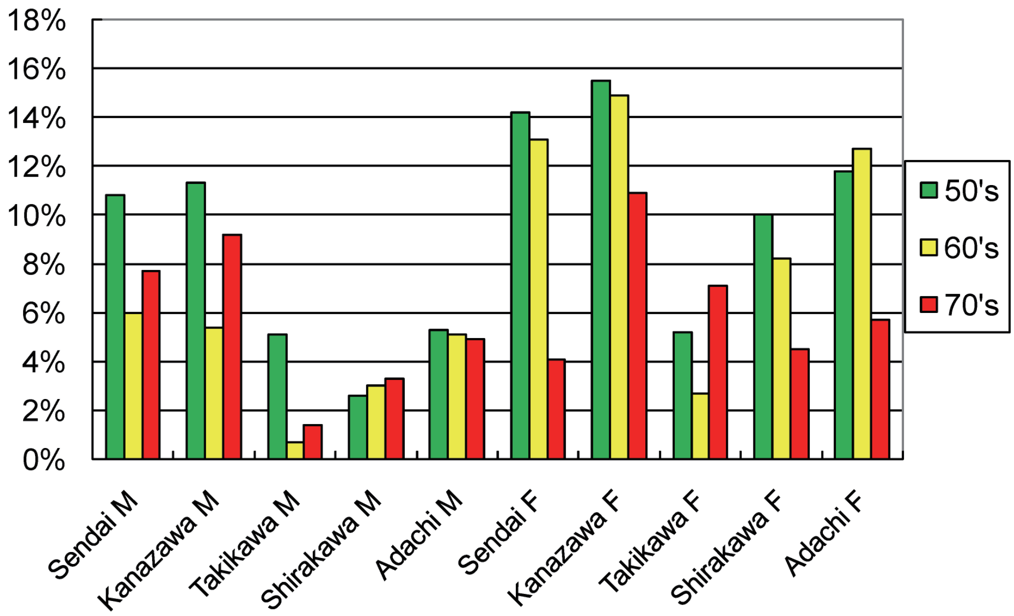

Figure 3-5-3-1a Proportion of those who received regular monetary transfer in the past 12 months, by age, gender, and municipality

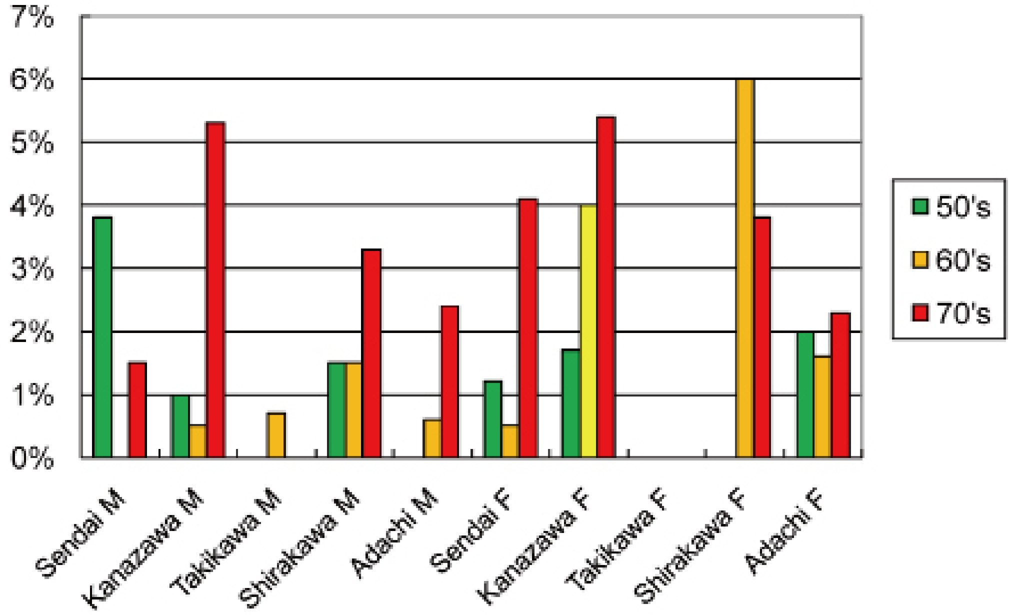

Figure 3-5-3-1b Proportion of those who received irregular monetary transfer in the past 12 months, by age, gender, and municipality

The proportion of those receiving money transfer from parents and parents-in-law is dominantly seen in those aged in the 50s (4.1%), and virtually none in aged 60 and over (Figure 3-5-4-2a). Instead, the proportion of those receiving transfer from children goes up from 7.5% in the 50s to 9.3% in the 70s (Figure 3-5-4-2b). We can also see that females are more likely to receive money transfer from outside the household, which may be partly related to limited job participation and income source among females. Gender difference in the likelihood of receiving monetary transfer, however, remains significant even after adjusting for age, educational attainment, equivalent household income, and job status. Those with lower educational attainment and lower equivalent household income are significantly more likely to receive money transfer (not shown in tables. Odds ratio: 1.72[1.32-2.25] for education, 2.05[1.60-2.62] for equivalent household income). Across municipalities, those in Kanazawa and Sendai are more likely to receive money transfer, and those in Takikawa and Shirakawa are the least likely. This cross-regional difference remains significant even after adjusting for age, gender, education, income, and employment status. Thus, the difference may be related to regional difference in the pattern of risk sharing among family members, which would deserve a closer investigation. In contrast, no clear pattern is observed for monetary transfer from non-family members (Figure 3-5-4-2c).

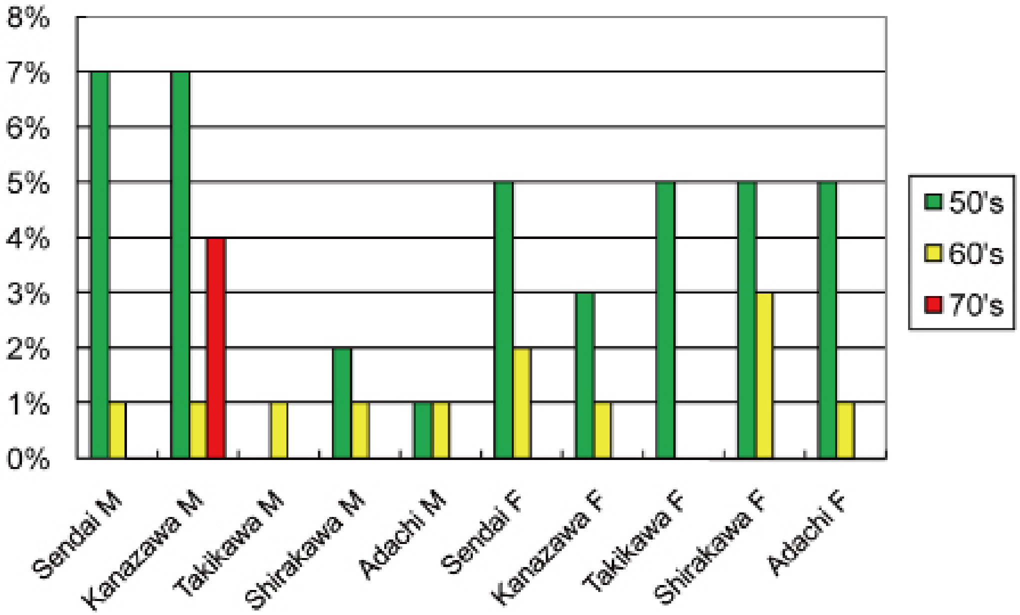

Figure 3-5-4-2a Proportion of those who received monetary transfer from parents/siblings in the past 12 months, by age, gender, and municipality

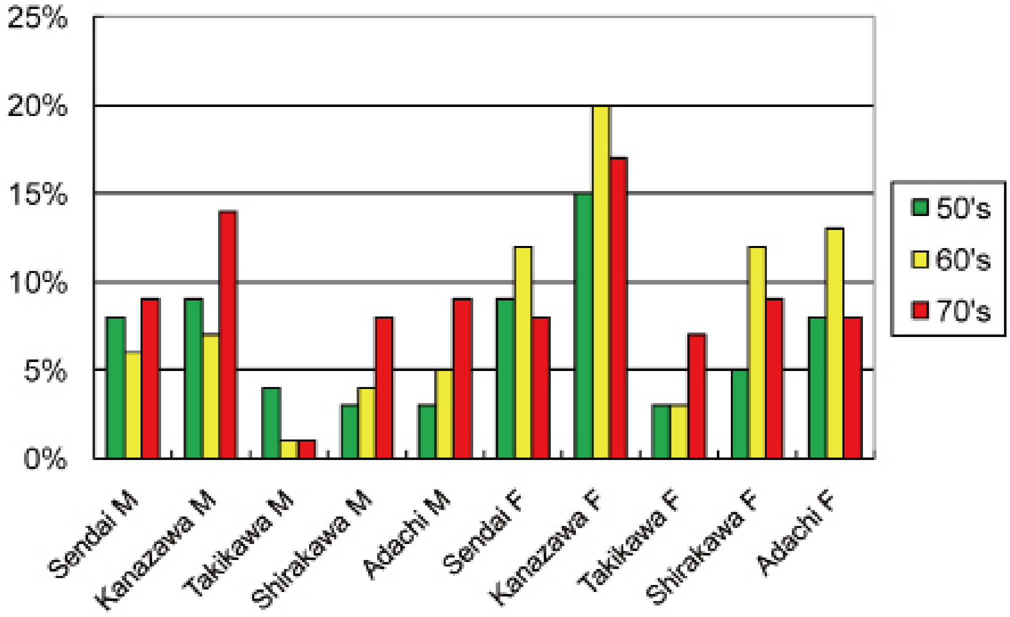

Figure 3-5-4-2b Proportion of those who received monetary transfer from children/grandchildren in the past 12 months, by age, gender, and municipality

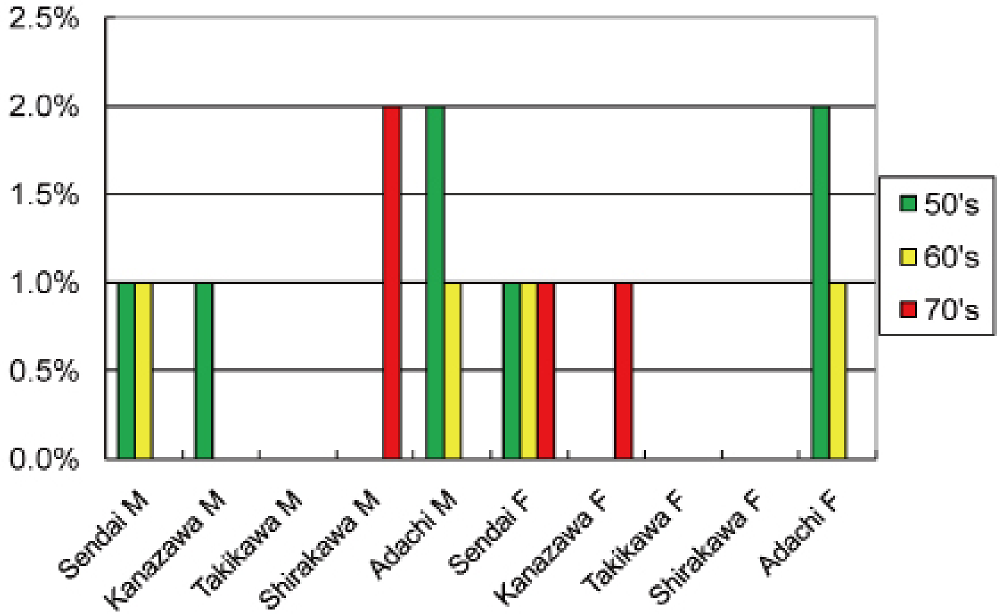

Figure 3-5-4-2c Proportion of those who received monetary transfer from non-family members in the past 12 months, by age, gender, and municipality

Giving direct money transfer to outside the household is seen in 9.8% of JSTAR respondents. The proportion is larger in the 50s (13.7%), then decreases as respondent's age goes up: 7.7% in the 60s and 7.0% in the 70s (Figures 3-5-5a and 3-5-5b). Among those in their 50s, 3.9% reported money transfer to parents or parents-in-law (Figure 3-5-6a), and 9.9% to children (Figure 3-5-6b). Among those in their 70s, the corresponding numbers are only 0.6% to parents and 6.1% to children. Thus, those in their 50s are most obliged to give money transfer to other family members. Gender difference that we have observed in incoming transfer is not as obvious as in the case of outgoing transfer. In the 50s, males rather than females are more likely to make money transfer to outside the household. Those with lower education and lower income are less likely to make money transfer out (not shown in tables). Another interesting finding is the regional difference: those in Shirakawa and Takikawa are more likely to make money transfer outside the household compared to those in Sendai and Kanazawa, which is reverse in the case of incoming transfer. A plausible explanation might be that those in rural farming/forestry towns have family members, presumably children who are students or young adults, who work or study in cities where housing and living costs are more expensive than in rural towns, and the children may have larger needs for financial assistance from their family. In contrast, no clear pattern is observed for monetary transfer to non-family members (Figure 3-5-6c).

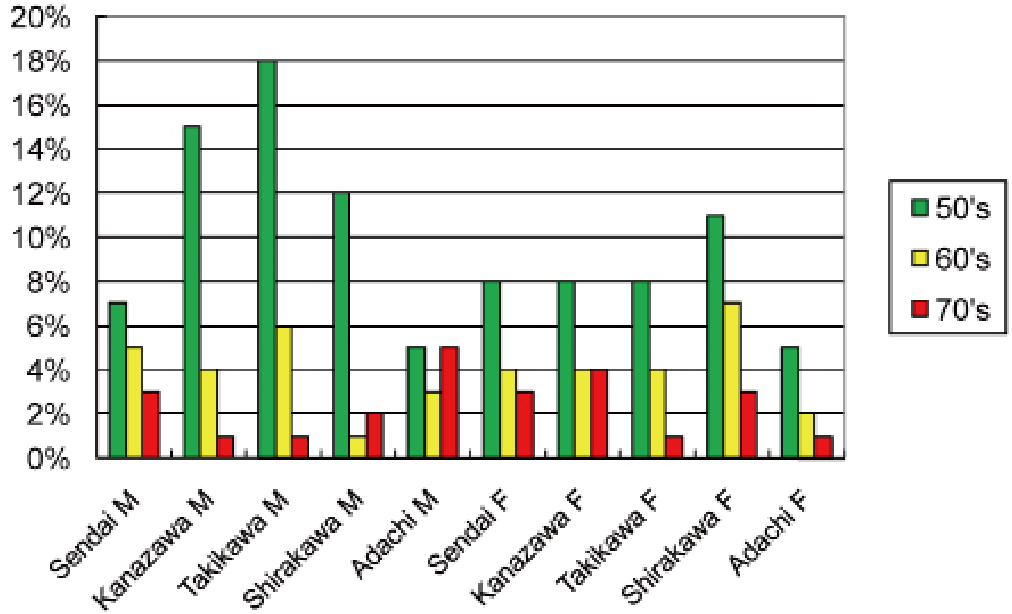

Figure 3-5-5a Proportion of those who gave regular monetary transfer in the past 12 months, by age, gender, and municipality

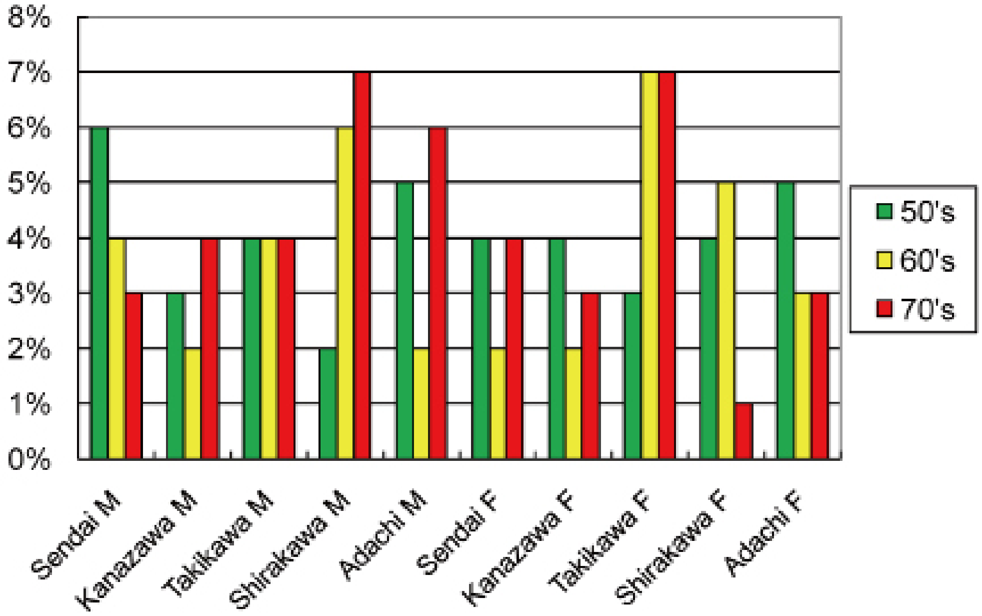

Figure 3-5-5b Proportion of those who gave irregular monetary transfer in the past 12 months, by age, gender, and municipality

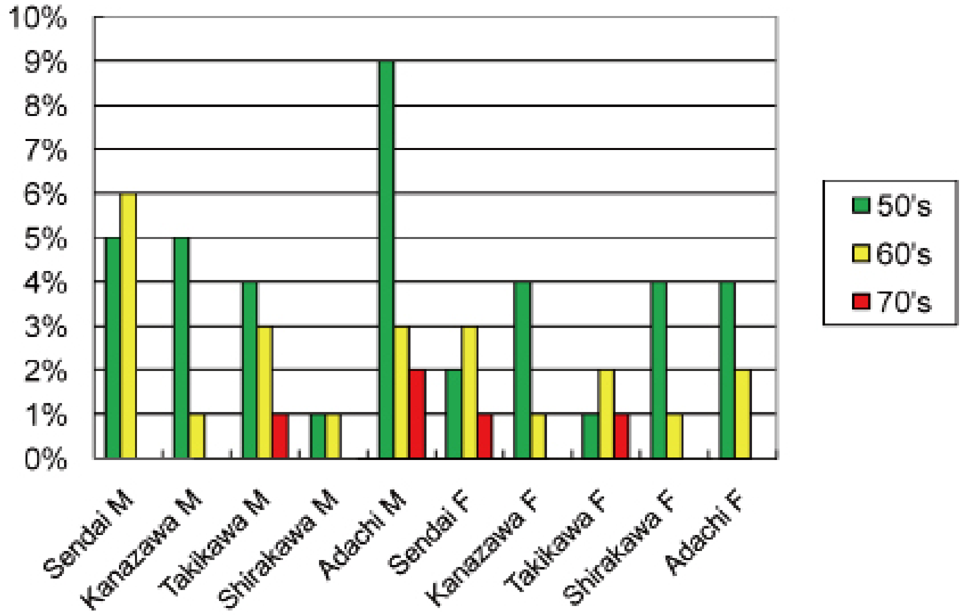

Figure 3-5-6a Proportion of those who gave monetary transfer to parents/siblings in the past 12 months, by age, gender, and municipality

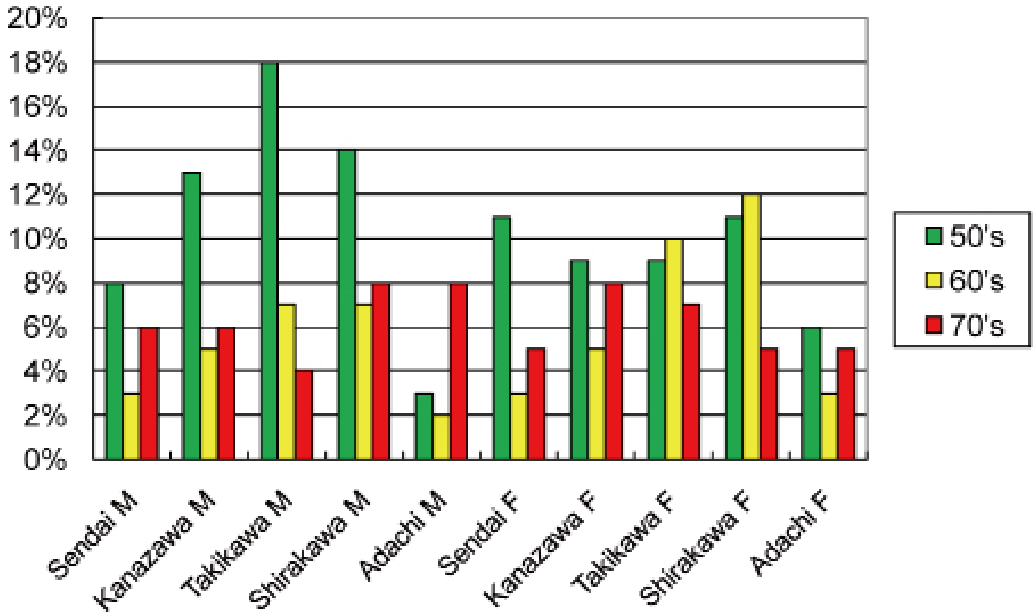

Figure 3-5-6b Proportion of those who gave monetary transfer to children/grandchildren in the past 12 months, by age, gender, and municipality

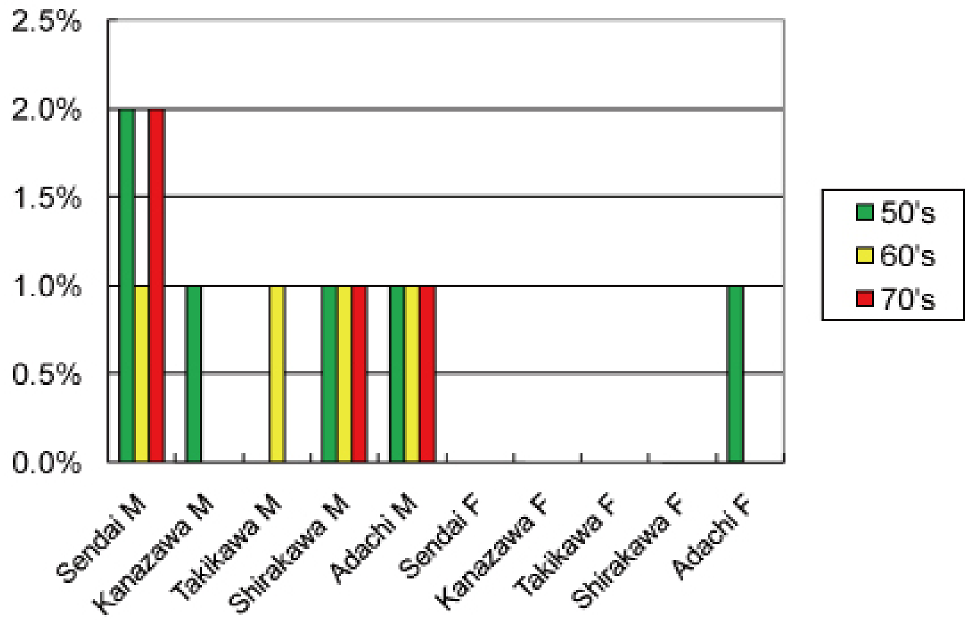

Figure 3-5-6c Proportion of those who gave monetary transfer to non-family persons in the past 12 months, by age, gender, and municipality

3.5.3 Inheritances and Bequests

In the rest of this subsection we will examine the prevalence of inheritances and bequests and their contribution to asset accumulation among Japanese elderly. Inheritances and bequests are surely one of the largest components of wealth formation. It is the major source of intergenerational wealth transmission in Japan. The SHARE book shows that most people receive bequests from parents and other relatives before they leave the labor market. SHARE also found that intergenerational transfers are potentially a major economic resource during retirement. In the European context, this fact often attracts concern among policymakers regarding expanding wealth inequality through intergenerational wealth mobility. The intergenerational wealth transmission may also affect the early retirement decision, especially for more productive individuals. While the latter is scarce in the case in Japan, the intergenerational transmission of wealth is closely related to the inequity issue and makes one of the most serious social problems in modern Japan. Thus, in-depth research on the intergenerational wealth transmission would provide relevant information for a variety of public policies regarding taxation and redistribution.

While JSTAR is not the first to provide information on inheritances and bequests in Japan, such data has been very scarce and only partial examination was possible. However, JSTAR collects data on the amount of inheritance and bequests which a respondent has already received and that which he expects in the future as well as those which he will leave. Together with a in-depth information on family structure and economic, social, and health status, JSTAR will enable us to explore determinants and consequences of inheritance and bequests in a way comparable with other developed countries including the SHARE countries.

JSTAR has in common with SHARE questions about inheritance and bequests, but the way of inquiry is slightly different. JSTAR asks a respondent whether he has received inheritance or bequests regardless of the amount and, if so, the total amount of receipt to date and from whom he received the bequest. Since JSTAR asked the total amount which a respondent has ever received, it does not ask regarding the timing of receipt. SHARE asked whether a respondent (or his/her spouse) ever received gifts or inheritance worth more than 5,000 euros in the form of money, goods, property, or large gifts at least once and, if so, how much they were at that time and when they were received. Both JSTAR and SHARE also asked a respondent whether he is expecting to receive inheritance or bequest in future.

3.5.4 Received Inheritance and Individual and Regional Variations

According to the SHARE book, one third of the respondents are reported to have received gifts or inheritances often in the form of housing from parents, parents-in-law, as well as aunts and uncles. The book also emphasizes considerable differences in the prevalence and distribution of inheritances across SHARE countries. While the respondents in JSTAR are under the same circumstances of common laws and taxes, we will observe substantial variations in inheritance and bequests across municipalities.

Figure 3-5-7a shows the proportion of those who have ever received inheritances/ bequests by age, gender, and region. The overall prevalence of having received inheritances is 30.6% for males and 20.8% for females. These numbers are relatively lower than those in SHARE where about one third of all households have ever received such a transfer. In Europe, Spain, the Netherlands, and Austria are the countries with the lowest prevalence (below 25%) and Japan's prevalence is about the same as the lowest in Europe. The distribution of transfer amounts shows that the medium was JPY5 million .

Comparison across gender and municipality tells that the proportion is the largest in Shirakawa for males and in Kanazawa for females. While the proportion for females is close to 20% in all municipalities, we see a larger disparity for males. The gap between the highest (Shirakawa 44.4%) and the lowest (Takikawa 24.7%) is close to 20%. In contrast, females in Shirakawa have the lowest proportion of ever having received inheritances (15.2%), and those in Kanazawa showed the highest (27.3%). This clearly suggests that gender difference in inheritance receipt is closely associated with the strength of the traditional family system that values male lineage and transmission of wealth to the eldest son. Figure 3-5-7b endorses such interpretation. Shirakawa males show the largest proportion of receiving inheritances from parents in any age strata.

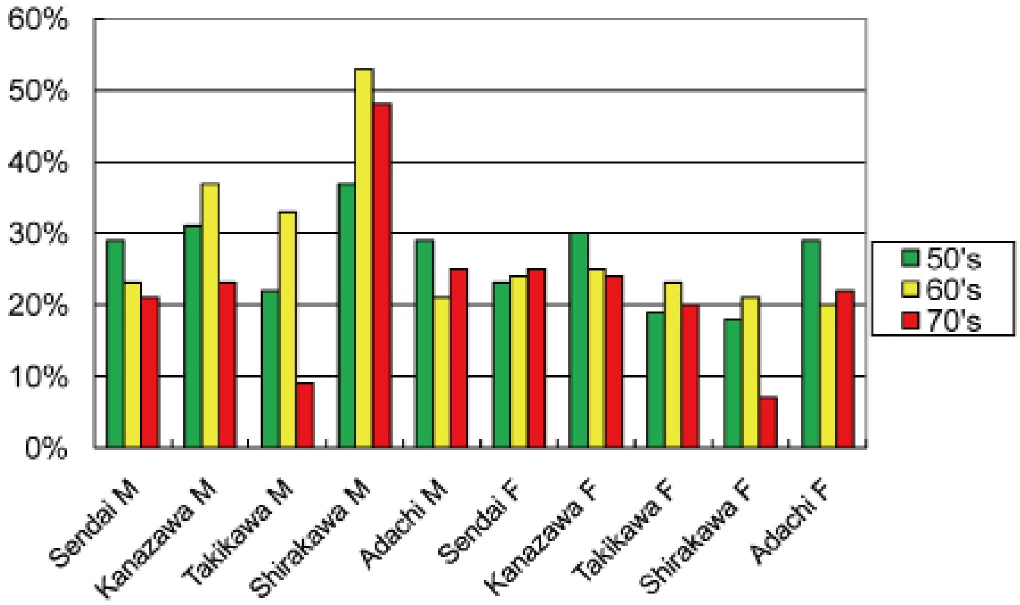

Figure 3-5-7a Proportion of those who have ever received inheritance, by age, gender, and municipality

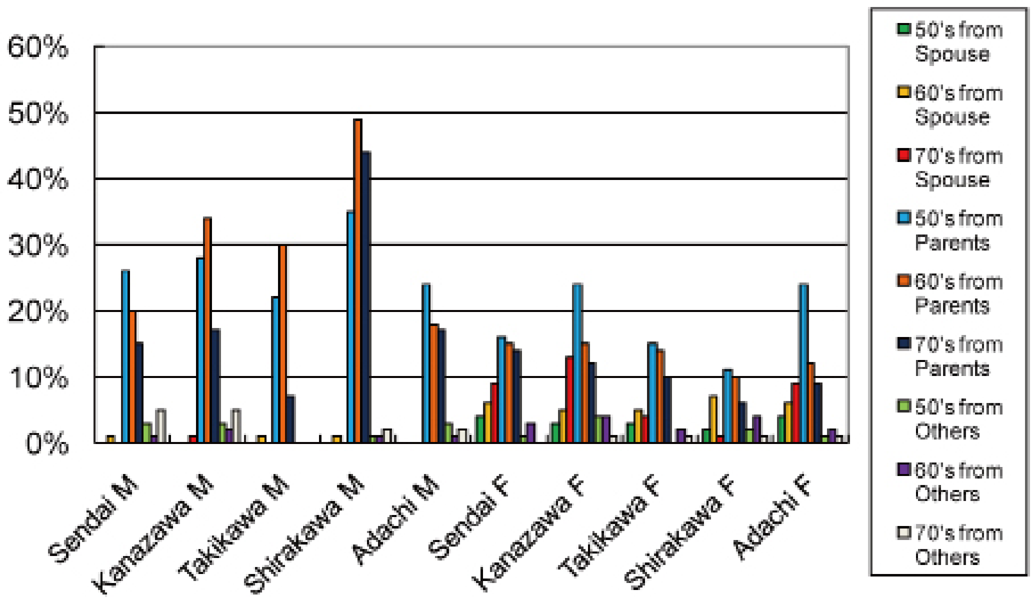

Figure 3-5-7b Proportion of those who have ever received inheritance, by age, gender, municipality, and source

The SHARE book shows that one fifth of all households have received small inheritances (between 5,000 and 50,000 euros) which are predominant in Sweden and Denmark, and only 10% have received inheritances larger than 150,000 euros, which is predominant in Switzerland, Germany, and also Italy. The SHARE book discusses two possibilities to account for large cross-national differences in bequests. One is cross-national differences in gifts and inheritance taxes, which is irrelevant for the disparity across municipalities in Japan. When decomposing the shares based on the amount of inheritances and bequests, the share of those who have received less than JPY5 million does not vary substantially across gender or municipalities. The difference comes from the share of those who have received more than JPY5 million. The share of respondents having received more than JPY15 million is larger in Kanazawa and Sendai but smaller in Takikawa.

Household wealth consists of accumulation of savings from earned income (life-cycle wealth) and receiving gifts or bequests. This issue is particularly important in terms of intergenerational wealth transmission. While there is a large volume of empirical evidence in the US, there is relatively scarce research in other countries (Davies & Shorrocks 2000). Examining the case of Japan might be attractive for researchers since Japan has one of the highest household savings and wealth accumulation among elderly households. As the SHARE book warns, however, we have to overcome some measurement issues because inheritances and gifts are likely to be underreported and the reported ratio of inherited to total wealth is probably just a lower bound.

3.5.5 Inheritance and Bequest Expectations

Finally, we examine expectations concerning future inheritances and bequests. While about 20% of the respondents in JSTAR has already received a large gift or inheritance, younger respondents whose parents are still alive will expect to receive (further) inheritances in the future. This may be especially the case for Japan where the prevalence of gifts and inheritances are lower than in European average. The lower prevalence might be explained partly by the longer life expectancy in Japan. In addition, many wealthy households expect to leave sizeable bequests to their heirs. This is particularly the case for Japanese elderly since wealth level for Japanese elderly is higher than international standards.

JSTAR asks the respondents whether they expect to have a chance to receive any inheritances in the future. If there are multiple expected inheritances, a respondent is asked to answer about the largest one. While SHARE has the same question with limits for bequests to the next ten years, JSTAR does not confine the time span. Among JSTAR respondents, 8.8% answer that they expect any inheritances in future, and three fourths of them are in their 50s. There was no gender difference. Those in Sendai and Kanazawa are more likely to have expected inheritances in future (about 12%). The likelihood of expected inheritance receipt in the future decreases over age. As is expected, the likelihood has a strong and significant interaction with living arrangements with parents. Among those with living parents, the female gender, lower education, and lower equivalent household income are independently and significantly associated with lower likelihood of expected inheritance receipt in the future, after adjusting for age, municipality, and marital status. However, among those without living parents, the female gender is associated with higher likelihood of expected inheritances. Education and household income are not significant in this case. Thus, the former case clearly suggests the transmission from parents to sons, and fixed social strata of wealth formation. The latter case seems to be more free from the traditional lineage family system, and may need further investigation.

3.5.6 Conclusions

• JSTAR provides detailed description of monetary transfers across generations that may help the policy and research on risk sharing among/across families.

• Those in their 50s are most likely to receive monetary transfer from outside of the household, and at the same time most likely to give transfer to outside the household. Thus, those in their 50s are most exposed to financial burdens of monetary transfer.

• Those in rural areas are more likely to receive monetary transfer, and those in rural areas are more likely to give transfer, suggesting that higher living cost in rural life may shape the pattern of monetary transfer across families.

• Inheritance transfer is more likely to be reported among males and those in rural areas with a stronger family tradition. Among those with living parents, the expected inheritance in future may explain wealth formation stratified by socioeconomic status.

3.6 Quality of Employment and Well-Being

3.6.1 Introduction

Together with financial incentives and health status, quality of employment may be closely associated with the decision regarding labor participation, especially among older people. As seen in Chapter 4, Japan enjoys the highest labor force participation rate among the industrialized countries. In contrast, early retirement is a major policy challenge in many European countries and puts substantial pressure on social security and health policies (Brugiavini 2001). A natural question is whether the quality of employment is higher in Japan than in European countries and how the disparity, if any, accounts for the large difference in labor force participation rate between Japan and Europe.

There are two channels of quality of employment that affect retirement decision: those that are direct and those that are indirect. The direct channel is that poor quality of work, high ergonomic exposure and physical work load, as well as mentally/cognitively stressful working conditions, e.g. high work pressure, monotonous tasks, poor incentives, and elevated job instability encourage premature departure from working life (Mein et al. 2000). On the other hand, the indirect channel is that stressful working conditions contribute to poor health, which may result in premature retirement (Ostry et al. 2003; Schnall et al. 2000). In Europe, job stress was identified as a risk factor for myocardial infarction (Karasek et al. 1988; Chandola et al. 2008), depression (Wang et al. 2008), and other health outcomes among the working population. In Japan, job stress was also identified as a risk factor of depression (Tsutsumi et al. 2001a) and absenteeism (Kondo et al. 2006).

There are two major theoretical models on work stress, and SHARE provided a good chance to examine those models on retirement decision in an internationally comparable way. The first one is the demand control model (Karasek et al. 1998; Karasek and Theorell 1990). This model identifies stressful work conditions by profiling work demand and decisional latitude. Work demand is measured as amount of work demanded, and the degree of ergonomic exposure and time pressure. Decisional latitude refers to the degree with which a worker can exercise autonomous decision on the way the job is done. This model predicts that if job demand relatively exceeds job control, it makes a stressor in the working condition. The demand control ratio is used as a summary score to depict the degree of stressful conditions, and it is known to vary across job types and job hierarchy. For example, administrators are characterized with high demand and high control, and consequently have a low demand-control ratio, while blue collar workers tend to have high demand and low control, leading to a high demand-control ratio. The theory also predicts that social support that a worker enjoys from his peers and supervisors buffers the impact from stress.

The second major model on job stress is the effort-reward imbalance model (Siegrist et al. 2004). Effort is a concept similar to job demand, and refers to the effort that a worker has to pay to finish an assigned task. Reward can be monetary (e.g. paid salary), or non-monetary (reputation, esteem, career prospects, opportunity for skill acquisition, and job security). The theory claims that an imbalance between efforts and rewards leads to stress-evoking conditions. Siegrist also argues that the third concept named "over-commitment," or an individual worker's property spent and low rewards received in return (money, esteem, career prospects, job security), adversely affects health.

This subsection employs a measurement similar to that employed in the SHARE book and performs a comparative study on quality of work between Japan and Europe. In what follows, we explore the prevalence of poor quality of employment across respondents' demographic and socioeconomic status, including job status and type. We then examine the relationship between quality of employment and self-reported health conditions such as self-rated health and depression.

3.6.2 Quality of Employment: Measurement

To measure health-related stressful work, a short battery of items derived from the Job Content Questionnaire (JCQ) measuring the demand-control model (Karasek and Theorell 1990) and from the Effort Reward Imbalance Questionnaire (ERIQ) measuring the effort-reward imbalance model (Siegrist et al. 2004) was included in both SHARE and JSTAR interviews in an almost comparable manner. Both JCQ and ERIQ have been translated and validated in Japan (Kawakami et al. 1996; Tsutsumi et al. 2001b). The original version of JCQ contains 49 items which are categorized into three sub-domains: demand, control, and support. On the other hand, ERIQ contains 46 items, which are also divided into three sub-domains: efforts, rewards, and over-commitment.

SHARE did not adopt a full scale JCQ and ERIQ questions presumably due to space limitation. Instead, SHARE selected items on the basis of factor loadings on respective original scales. Accordingly, SHARE includes 2 items for demand/efforts (physical demand and time pressure), 2 items for control (job discretion and skill opportunity), and 5 items for rewards (support, respect, monetary reward, job advancement, and job security). In addition, 1 item asks regarding job satisfaction. In JSTAR, we adopted the same set of items for comparative purposes, except for skill opportunity and job advancement.

The demand control ratio is obtained by the average score of job physical demand and time pressure divided by the score for job discretion. The effort reward ratio is computed by the average score of job physical demand and time pressure divided by the average score of support, respect, and monetary reward and job security. Following SHARE, values of effort-reward ratio greater than 1.0 were defined as indicating an imbalance between high effort and low reward, whereas values equal to or lower than 1.0 were defined as indicating a balanced state, i.e. no stressful work conditions. SHARE defined "high quality of work" in terms of "high task control" by tertiles of sum of 2 items on job discretion and control. Since JSTAR only had a single item on job discretion, we re-categorized 4 response categories of the item to make a comparable category of task control tertiles. In this JSTAR report, a response of "strongly agreed" and "agreed" indicates low quality of work (or low job discretion), "disagreed" as medium, and "strongly disagreed" as high quality of work. The data of this analysis are restricted to the respondents who are aged between 50 and 65 and still in regular employment or self-employed at the time of the interview.

The SHARE report categorized countries with more than 50% of all respondents exhibiting effort-reward imbalance (>1.0) as a country with very poor quality of employment. In countries with a percentage of imbalance ranging from 30% to 40%, the country was considered to be of medium or fair quality of work. Those countries with the prevalence of imbalance below 30% were considered as that of high quality of work. Table 3-6-2a shows the distribution of effort-reward ratio by municipality. In JSTAR, the prevalence of those with effort reward ratio >1.0 ranged 20-28% in 5 municipalities. Thus, if we follow the criterion of SHARE, Japan, like the Netherlands and Switzerland, should be categorized as a country with high quality of work. Table 3-6-2a also shows the prevalence of low quality of work in terms of effort reward ratio >1.0 by demographics and educational attainment across cities. The share of low quality of work was significantly low in Takikawa, and the difference across municipalities still remains significant even after age, gender, educational attainment, and equivalent household income were adjusted for.

Figure 3-6-2 shows the distribution of another dimension of job quality, task control, by municipality. Two things should be mentioned about this figure. Firstly, the share of "low quality of work," or the lowest level of task control is about 40%, which is somewhat closer to the situation in Italy and Germany where a medium level of control was observed. Thus, in terms of task control, Japan is not categorized as a country with a high quality of work. Secondly, the share of lowest level of task control is the largest in Shirakawa and Takikawa, rural farming and forestry towns, and the smallest in Adachi, a metropolitan city. The share of the highest level of task control is higher in Adachi and Sendai, again both metropolitan cities, and the smallest in Takikawa. Since the difference across municipalities might be due to difference in demographic and socioeconomic status, Table 3-6-2b shows the prevalence of low quality of work stratified according to gender, age, educational attainment (less than compulsory education or over), and employment status for each municipality. This difference across municipalities still remains even after adjusting for age, gender, educational attainment, and equivalent household income.

Table 3-6-2a Prevalence (%) of “Low Quality of Work” in terms of Effort-Reward Ratio >1.0

	Sendai	Kanazawa	Takikawa	Shirakawa	Adachi
N	380	471	190	340	363
Gender					
Male	27.6	23.8	17.9	32.6	26.0
Female	24.1	19.1	23.1	20.4	23.9
Age					
54-59	28.5	22.6	22.6	28.7	23.4
60-65	19.8	19.4	15.2	27.7	28.8
Educational attainment					
Low	25.7	30.0	25.8	36.4	37.8
High	26.3	20.0	18.9	23.0	21.8
Equivalent income					
Low	32.0	23.1	20.8	33.3	31.0
High	19.8	18.6	15.5	24.4	21.9

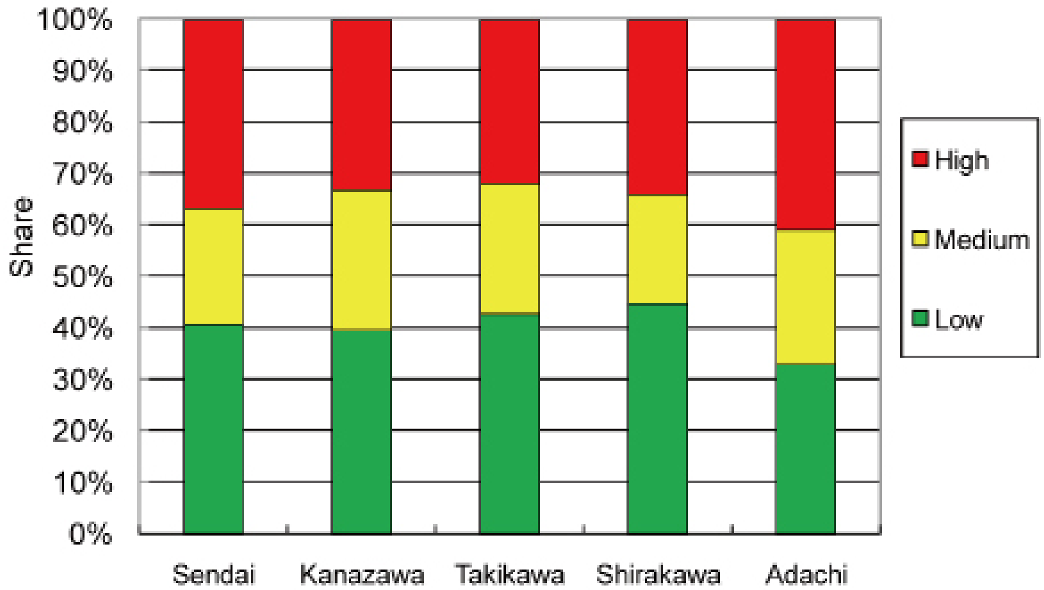

Figure 3-6-2 Distribution of task control, by municipality

With regard to effort-reward imbalance, low quality of work is significantly more prevalent among employees with low education and low equivalent household income, which was similarly seen across municipalities. Males are more likely to be in low quality of work compared to females, which was unique compared to SHARE findings, where no consistent gender differences were observed. Although differences across age groups were not consistent in SHARE, JSTAR subjects showed that older respondents are less likely to face low quality in work conditions, which can be explained by the healthy worker effect among older workers who could continue to work at their ages. Adachi was the exception where older respondents show the larger share of low quality of work compared to younger respondents.

When comparing these differences in quality of work with respect to task control, a different situation appears as the SHARE report also found. Lower education and lower household income are more drastically associated with low quality of employment, if compared to the effort-reward imbalance. Moreover, older respondents are more likely to engage in a low quality of work, which is contra to the healthy worker effect as we have seen in the case of effort-reward imbalance. Furthermore, the prevalence of low job control is significantly higher among females. These findings are quite similar with those in the SHARE report, and may imply an important cross-country lesson on the dimension of job quality and its relationship with a worker's demographic/socioeconomic status.

Table 3-6-2b Prevalence (U%) of "Low Quality of Work" in terms of Low Job Discretion

		Sendai	Kanazawa	Takikawa	Shirakawa	Adachi
N		383	485	192	342	369
Gender						
	Male	44.7	36.3	42.5	41.9	30.9
	Female	31.4	39.9	50.6	57.5	35.2
Age						
	54-59	41.8	35.6	44.4	45.7	32.0
	60-65	34.4	43.9	48.5	53.0	34.5
Educational attainment						
	Low	37.1	42.5	61.3	49.0	32.9
	High	40.0	37.0	42.9	46.0	32.8
Equivalent income						
	Low	38.1	42.3	44.4	55.7	33.9
	High	39.7	35.1	44.7	39.1	32.7

3.6.3 Strong Association between Quality of Employment and Well-Being

The third question concerns the frequency and strength of associations between quality of employment and well-being, as measured by level of self-rated health and mental health status. As in Chapter 2 section 5, here again we rely on self-rated health measured in a single US version Likert scale, and dichotomize it into good health (very good or better) and poor health. Although SHARE adopted EURO-D for comparative purpose across European countries with different measure of depression, we used CES-D and dichotomize responses into “Yes” (CESD score >=16) and “No.”

Tables 3-6-3 and 3-6-4 depict the distribution of “poor quality of work” by the strata of self-rated health and depressive status. As was seen in SHARE and previous empirical studies (Marmot & Siegrist 2004), JSTAR also found statistically a significant difference in quality of work conditions according to self-related health and depression status. Even after adjustment for age, gender, educational attainment, and municipality, poor quality of work condition remains significantly related to poor self-reported health status. Since this is a cross-sectional observation, however, we could not identify any causal relationship at this stage. As already discussed in Chapter 2, it may be due to health selection (poor health status leads to downward social mobility and higher likelihood of job with poor quality) or due to social selection (poor quality of job leads to poor health outcomes). Since both the quality of work and self-reported health status are strong predictors of retirement decisions, follow-up surveys and subsequent panel data are indispensable to tackle how work conditions and health affect and are affected by each other, and how they lead to the likelihood of job participation.

Table 3-6-3 Prevalence (%) of "Low Quality of Work" in terms of Effort-Reward Ratio>1.0

	Sendai	Kanazawa	Takikawa	Shirakawa	Adachi
Self-rated health					
Bad	35.5	24.0	21.3	34.8	27.0
Good	20.0	19.5	19.1	25.2	23.5
Depression (CESD>16)					
Yes	41.4	25.4	20.7	33.3	32.8
No	22.7	20.5	18.8	27.3	23.2

Table 3-6-4 Prevalence (%) of "low quality of work" in terms of low job discretion

	Sendai	Kanazawa	Takikawa	Shirakawa	Adachi
Self-rated health					
Bad	40.7	38.6	39.5	42.4	37.5
Good	39.5	37.3	50.0	49.6	28.9
Depression (CESD>=16)					
Yes	42.4	39.7	43.3	52.3	32.2
No	39.7	37.5	45.8	46.4	32.1

3.6.4 Conclusions

• Quality of employment in terms of (im)balance between perceived effort and reward was observed similarly in JSTAR as was seen in Northern European countries with "high quality of work." Quality of employment in terms of task control, however, was as poor as that of medium-fair level countries. Our results may raise a question as to which measure expresses which aspects of job quality in cross-country comparison.

• Quality of employment is strongly associated with socio-economic status (educational degree) in JSTAR as was true in almost all SHARE participating countries.

• Quality of employment is strongly associated with self-reported well-being, again as was also observed in all SHARE participating countries: lower quality of employment goes along with higher prevalence of poor self-rated health and depression. Since job environment and quality of work is a strong predictor of a worker's health, longitudinal observation and further investigation are required to identify the impact of job conditions and health on job participation among Japanese and European elderly, a subject which deserves high policy priority in our aging society.

3.7 Quality of Life and Well-Being

Achieving a good quality of life in one's later life stage is a societal ideal in our aging society. How to assess the quality of life, however, is not straightforward, since the construct of "quality of life" is apparently multi-faceted. Widely used "generic quality of life" measures, such as Medical Outcomes Study Short Form 36 (or SF36) actually measure physical and mental functioning. The WHO Quality of Life scale includes happiness and life satisfaction. Since determinants of happiness and satisfaction are broad and vague, the usefulness of the scales may be limited in policy planning and evaluation.

The English Longitudinal Study of Ageing (ELSA) includes a quality of life measure called CASP-19 (Hyde et al. 2003). The scale has been developed to assess 4 constructs hypothesized to compose basic needs of human life: control, autonomy, self-realization, and pleasure. SHARE also adopted a derived scale CASP-12, which was a shortened version of CASP-19 based on a result of secondary factor analysis. The recent SHARE book reports that the score of CASP-12 is highly correlated with socioeconomic and health status across participating countries, and that the average score showed the North-South gradient across Europe.

In the first wave of JSTAR, we chose to give up including CASP-19 because the scale needs rigorous cross-cultural adaptation and subsequent scale validation. The concept of autonomy and control is not self-evident across cultures. As Markus and Kitayama (2003) show in their studies on cross-cultural psychology, American and European people have a sense of self-focused agency, while East Asians including Japanese tend to perceive the sense of agency in the context of social relationship with surrounding others. Currently, an independent study on cross-cultural adaptation of CASP19 is to be conducted with a small sample of Japanese elderly other than JSTAR respondents. In this study, we also adopt an additional set of psychological well-being such as sense of coherence (Antonovsky 1987; Togari et al. 2007). In the second wave of JSTAR, these measurements will be newly administered to the JSTAR respondents, and the data will provide another unique opportunity of cross-cultural comparison in psychological well-being and life achievement in later life among Japan, the UK, and SHARE countries.

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Japanese Study of Aging and Retirement

Chapter 4
Work and Retirement

4 Work and Retirement

4.1 Labor Force Participation of the Elderly in Japan: Unique Position

4.1.1 Introduction

The speed of aging in Japan is unprecedented in industrialized countries. Combining the longevity of the population with a historically lower birth rate, there have been serious concerns and policy debates on the decline of the labor force in the future and its negative effect on long-term economic growth. In a most recent quasi-official estimate of future demographics, the labor force aged 20 to 59 will decline from 55.85 million in 2006 to 48.16 million in 2030 (13.8% decline). See National Institute of Population and Social Security Research (NIPSSR) (2008).

The most feasible solution to compensate for the decline in labor force participation is to encourage more workers to be in the labor force and to remain there longer. It is often asserted that the most effective policy is to stimulate female and elderly labor supply. Allowing more immigrants to work in Japan should be considered as well.

Japanese workers are already in the labor force longer than those in most of the other OECD countries. OECD (2004) shows that the effective retirement age, which is defined as the average age at which workers aged 40 or above retire, is 70 and 66 years old for Japanese males and females, respectively, for the 1997-2002 period. Those figures are the second highest among the OECD countries. It is vital we keep the current high level of labor force participation among the elderly group in the future. Thus it is important for Japan to understand why Japanese elderly tend to stay in the workforce longer than their counterparts in OECD countries. The answer may also offer hints to other countries suffering from declining labor force as to how the labor force participation could be raised.

We believe that examining retirement behavior by the Japanese elderly offers opportunities to draw useful lessons for other industrialized countries that have witnessed increase in longevity and at the same time prevalence in early retirement. Research on retirement behavior in Japan has international policy implications.

While economic and social activities including retirement decisions of the elderly are debated, especially in the context of pension reform in Japan, they are not based on the quantitative studies assessing what accounts for the late retirement among the elderly in Japan. Relative health, low savings, and low pension income could all contribute to later retirement. Some of the larger firms provide job opportunities at the related companies after retirement from the company. This institution itself may contribute to later retirement. If a worker's elderly parents need to be cared for, he or she may decide to switch jobs to increase flexibility of time and in some cases may induce early retirement. Compared with other married couples in other OECD countries, Japanese couples may plan to do things together less after retirement, which could contribute to later retirement. Also, work may be regarded not only as the means to earn a living but in Japan it may be regarded also more as a way to fulfil the objective of life. Quantitative assessment of all these and other factors would require comprehensive data which cover many aspects of the elderly’s life and views. JSTAR is exactly such a data set.

In other countries a volume of economic research has explored the determinants of retirement by emphasizing the role of economic incentives embedded in social security and pension systems (See Gruber and Wise 1999, 2004). In Japan, Abe (1998), Iwamoto (2000), Ogawa (1998), Oishi and Oshio (2000), Oshio (1997), Oshio and Oishi (2004), Oshio, Shimizutani, Oishi (2008), Seike (1991), Takayama et al. (1990), Yashiro and Nikami (1996), and Yashiro and Oshio (1999) study the relationship between the generosity of the pension plan and the labor supply of the elderly and show that an elderly person with larger social security wealth is more likely to exit the labor force in Japan. But the effects attributed to pension may be underestimated partly due to larger firms' institutional arrangement, for example. As discussed above, there are a multitude of other factors than the pension generosity we need to evaluate.

Clearly, in order to analyze these issues, we need data on labor status as well as their economic, social, health, family conditions, and preferences for leisure and time discounting. While there are some data sets to include some related variables in Japan, all previous works suffer from lack of a comprehensive data set on variables related to the retirement decision in Japan. In addition, in order to examine the pathways to retirement, it is essential to make use of the panel data. A longitudinal sample will allow us to examine dynamic change in labor status, i.e. transition from work to retirement, and to evaluate policy effectiveness. JSTAR thus contributes to uncover what factors really matter so that it can provide new scientific evidence on retirement behavior and draw useful lessons for other countries.

4.1.2 Work Status

First of all, we focus on the self-reported current work status of the respondents, which is elicited by presenting mutually exclusive categories. First, JSTAR asked a respondent whether he/she currently works at all. If a respondent does not work at all, then, he/she is asked whether he/she is a job seeker and, if this is the case, the person is categorized “unemployed.” If a respondent is neither a worker nor a job seeker, then, he/she is asked about the current status: retired, homemaking, sick or disabled, and other. As a result, we distinguish six possible cases: “worker,” “retired,” “unemployed,” “homemaker,” “sick or disabled,” and “other.” In this subsection, we focus on workers and retired individuals and group all other activities into “all other.”

Figure 4-1-1 illustrates some stylized facts. First, the share of workers declines along with age. The share exceeds 50% for people aged 55-57 and it decreases to a quarter for those aged 73-75. While this declining process is considered quite natural, two interesting findings are obtained. One is that the declining pace of the share along with age is not gradual. The decline is large between people aged 61-63 and aged 64-66 and between those aged 67-69 and those aged 70-72. Although we need further investigation, some thresholds like age 65 or 70 might affect the retirement behavior. The other is that a quarter of those aged 73-75 is still categorized in “work.” This is quite different from those in European countries. The SHARE book shows that the “work” share is close to zero for persons aged 67 and over.

The second stylized fact is that the share of “retirement” is close to zero for people aged 55-57 and those aged 58-60. The figure is on a gradual upward trend and reaches close to 30% in persons aged 73-75. We should note that this share is much lower than that in European countries. The SHARE book reports that the share of “retired” is close to 80% for persons aged 65 and over.

Figure 4-1-1 Self-reported economic activity by age

Third, the share of “all other” occupies less than 20% for persons aged 55-57 and the figure increases to 50% for those aged 73-75. This shows that, when examining retirement behavior, we should not rely on the dichotomy between “work” and “retirement” and take account of a variety of routes or pathways in transition from work to retirement. Moreover, we should note that the share of “all other” is much more dominant than European countries with about 20% of all the respondents in the similar age range. This shows that it is more important to consider the intermediate retirement process in Japan.

These results show a quite unique pattern of the elderly labor force participation in Japan. We next ask what matters for the retirement behavior of Japanese elderly. The possible candidates for those differences include institutional differences, social norms, and other factors as discussed earlier. In what follows, we focus on three relevant dimensions of variability in economic activities, which is common to the SHARE book: age, gender, and municipality, and then correlate with health conditions.

Figure 4-1-2 reports the share of workers by municipality-age-gender. Even within Japan, a municipality-level analysis uncovers the heterogeneity between region and gender. For male workers, we find a different pattern across municipalities. While a large decline occurs in 65+ across all five municipalities, Sendai experiences a steady decline compared to Kanazawa, Takikawa, Shirakawa, and Adachi. In Kanazawa, Takikawa, and Shirakawa there is not much decline until 60-64. Adachi is an outlier:

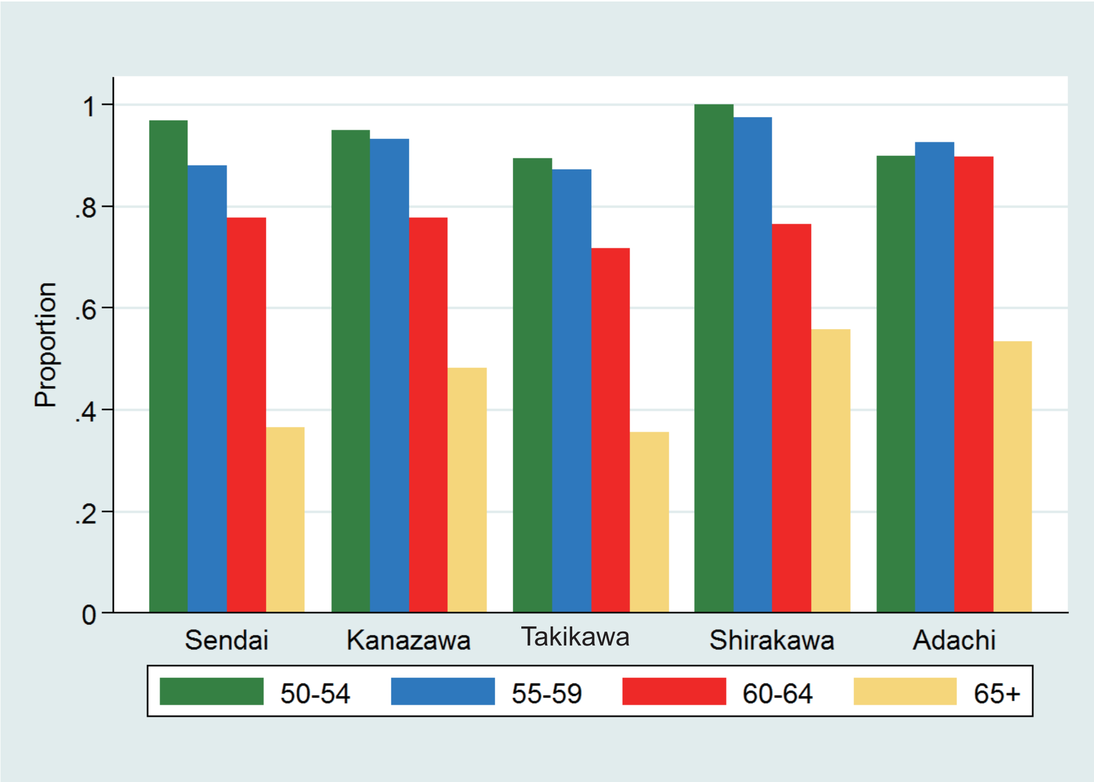

Figure 4-1-2-1 Employment status: males

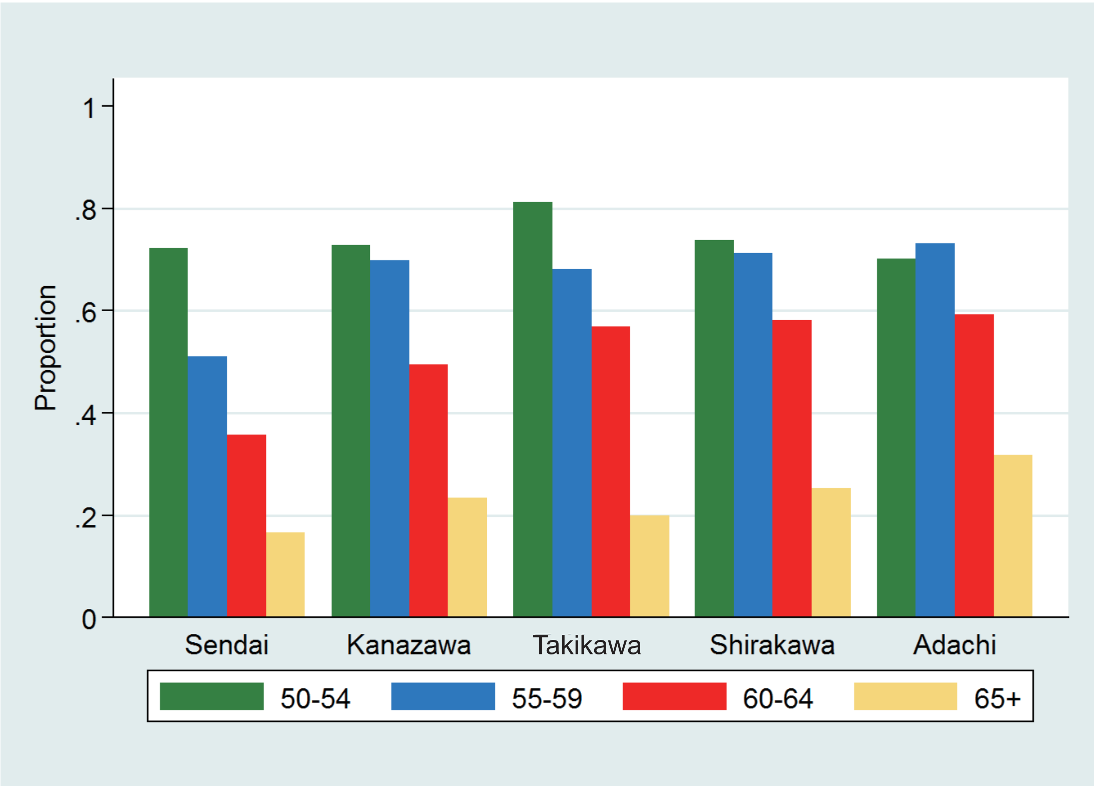

Figure 4-1-2-2 Employment status: females the “work” share is almost unchanged between persons aged 50-54 and those aged 60-64. The share declines sharply for those aged 65 and above but the level is higher than that in other large cities. An overall decline in Sendai is the largest from more than 95% for persons aged 50-54 to less than 40% for those aged 65+. Takikawa has a similar pattern but the drop is attenuated as the workers' proportion is lower for the 50-54 category at about less than 90%.

For males, the SHARE book finds that, with the exception of Sweden, most countries experience a sharp decline of the workers’ proportion at age 60-64. This is similar to the findings in Japan but the workers’ proportion for the 60-64 category is 20%-60% higher for Japan. Another difference is that, as discussed above, the proportion of workers above 65 is almost zero for the SHARE countries, whereas more than 35%-55% work in Japan.

For women the “work” share is lower than for men, mostly because of the relatively large fraction of women who report their status as “homemaker.” This is the same as the findings in the SHARE book. Sendai and Takikawa show a more gradual decline of the workers’ proportion compared to those in Kanazawa, Shirakawa, and Adachi where the sharper decline for the 60-64 category is observed compared to the decline observed for the 55-59 category. For women, Adachi is not much different from Kanazawa and Shirakawa, although we note the workers’ share is the highest in Adachi for the 65+ category.

We find that the proportion of Japanese women working is comparable to the northern European countries (Sweden, Denmark, and Germany) which have a higher fraction of working women among the SHARE countries. Analogously to men, 60-64 and 65+ categories have a higher fraction of workers in Japan than other SHARE countries with the exception of Sweden where the 60-64 category has a comparable workers fraction to that in Takikawa, Shirakawa, and Adachi. Even Sweden has almost zero percentage women workers in the 65+ category.

The SHARE book suggests that difference across countries in self-reported work status is largely attributed to difference in the pension policies and thus the pension policies are considered as an important determinant of labor force participation decision of the elderly. In contrast, there is little variation in the pension program in Japan, which suggests other factors, such as availability of job opportunities and difference in industries, are responsible for the difference across municipalities.

Since these finding are based on self-reported work status, they need to be investigated further through hours worked, for example, which we now address.

4.1.3 Work Status and Working Hours

We compare the "work" share of all people and that of people who work 15 hours or more per week. This analysis corresponds to the distinction between full-time and part-time workers in the SHARE book. Figure 4-3 shows that the share of persons who work 15 hours or more per week is higher for men than women, which parallels the share of self-reporting "work." But the relative share of those who work 15 hours or more per week to persons who identified themselves as a worker is about 90%, which is common to gender and municipality. This observation suggests that the higher "work" share compared to European countries is not accounted for by the different perception of "work" between Japan and those countries. However, partial or gradual retirement could be an important feature of the labor market in some countries including Japan.

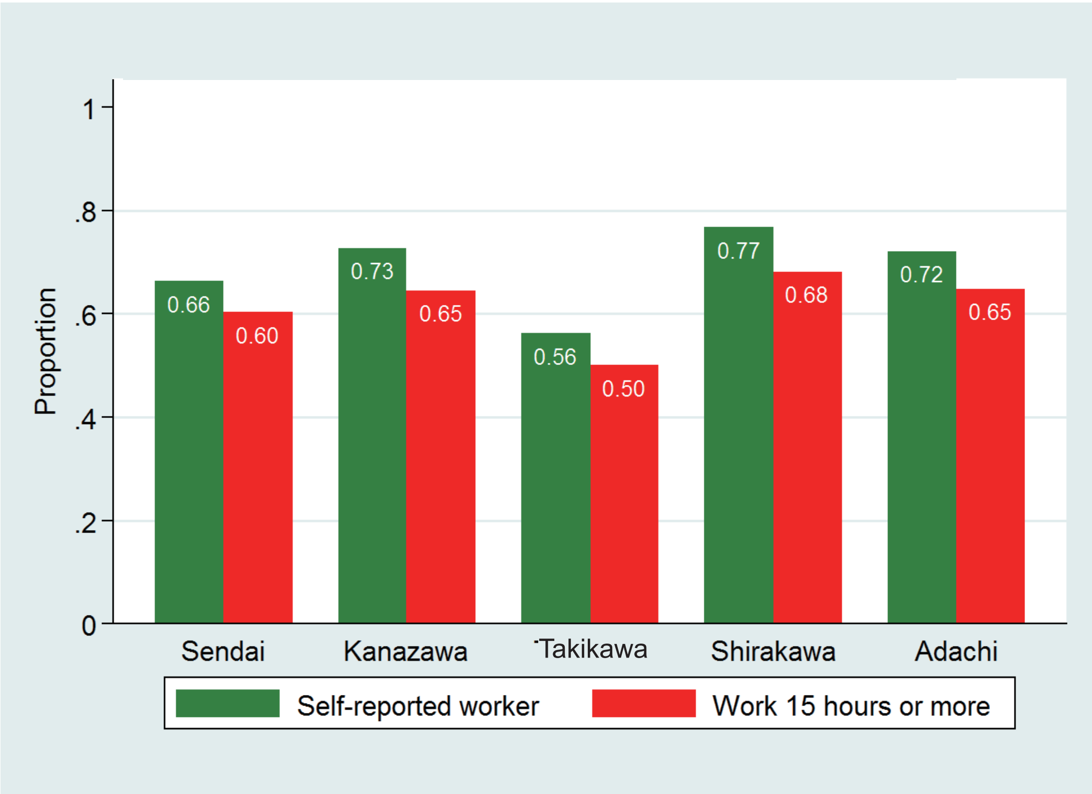

Figure 4-1-3-1 Employment status: males

4.1.4 Work Status and Health Condition

Next, we turn to the relationship between self-reported employment status and individual health conditions. Figure 4-1-4 shows the distribution of actual work and retirement by confining the sample to the respondents in "good health." Since self-reported employment status is endogenously correlated with self-reported health status, "good health" is defined on the basis of two indicators: (i) self-reported absence of limitations in daily activities; (ii) self-reported "functioning," i.e., counting zero limitations out of 14 daily activities (ADL and IADL), which are identical to the SHARE book analysis. In order to compare the results with the SHARE book, we focus on three groups of individuals defined in the same way: those who are self-reported working and are ac-

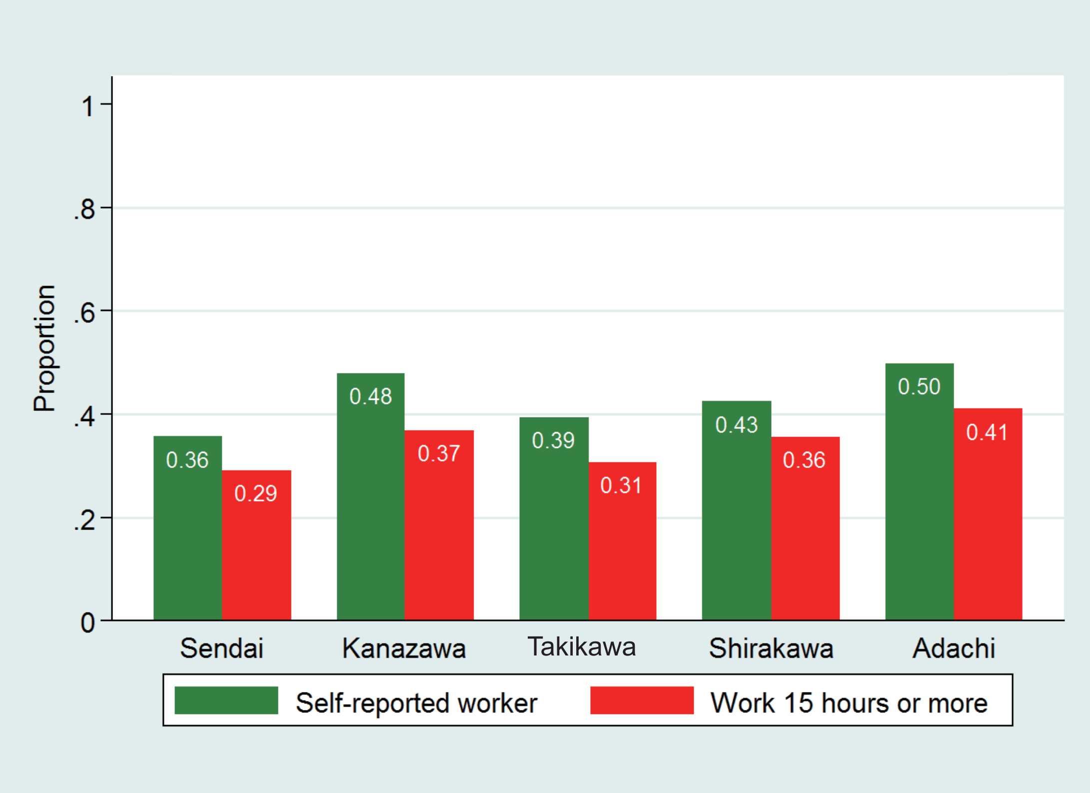

Figure 4-1-3-2 Employment status: females

tually currently active, those who are self-reported retired and have no hours of work (retired), and those who are self-reported retired but do some hours of work (retired but work).

The results based on the first definition show a large variation in employment status across municipalities even when we confine the analysis to "healthy" persons only. The share of "work" is relatively lower in Sendai and higher in Kanazawa, Shirakawa, and Adachi, which is analogous to the results in Figure 4-1-2.

Shirakawa has a higher share probably due to the agricultural sector. It is interesting to see the high "work" share in Kanazawa compared to that in Sendai. We also see the same pattern in the results based on the second definition. We note that the share of "retired" among healthy persons is much lower than those in European countries, especially compared to a strikingly high frequency of people with no limitations who report themselves fully retired in Austria, France, and Italy.

This subsection provided a preview of the results based on the baseline data which is cross sectional. One of the important lessons in the literature is that the determinants of retirement behavior are complex and the nature of retirement process is dynamic. The longitudinal data set after the second wave permit us to use the panel data to investigate the retirement decision among Japanese elderly. For example we can examine whether one's work status changes as an individual faces health shocks.

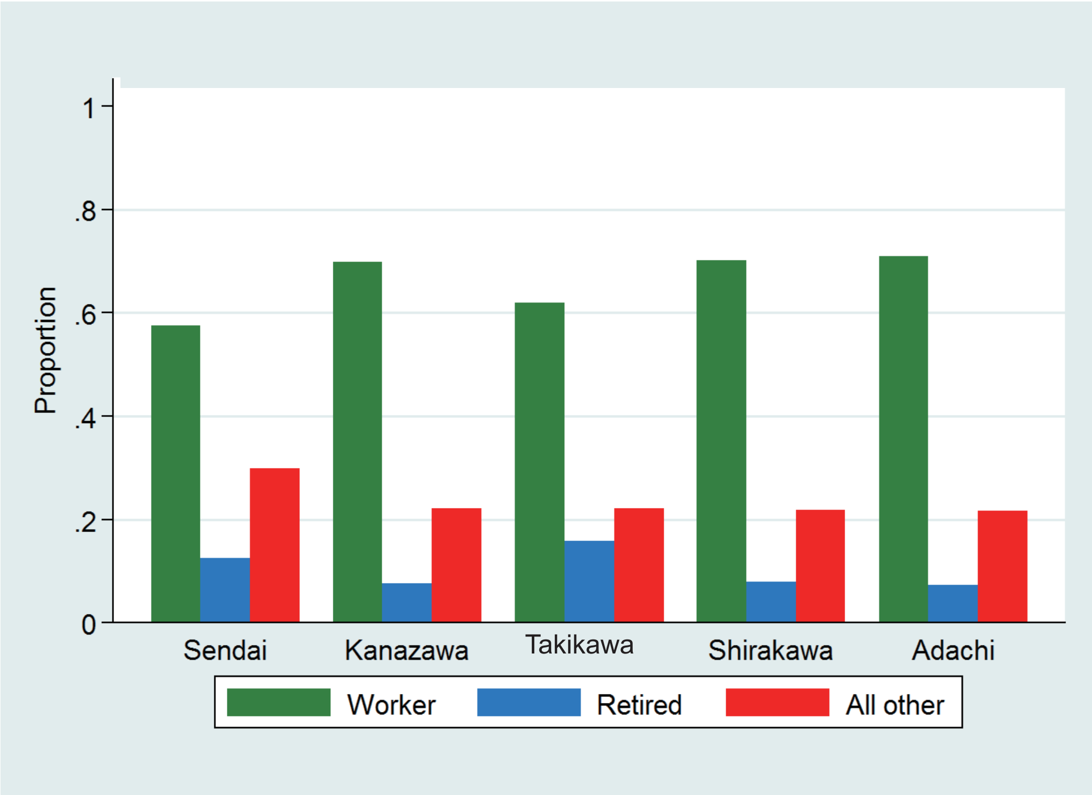

Figure 4-1-4-1 Economic activity of healthy respondents

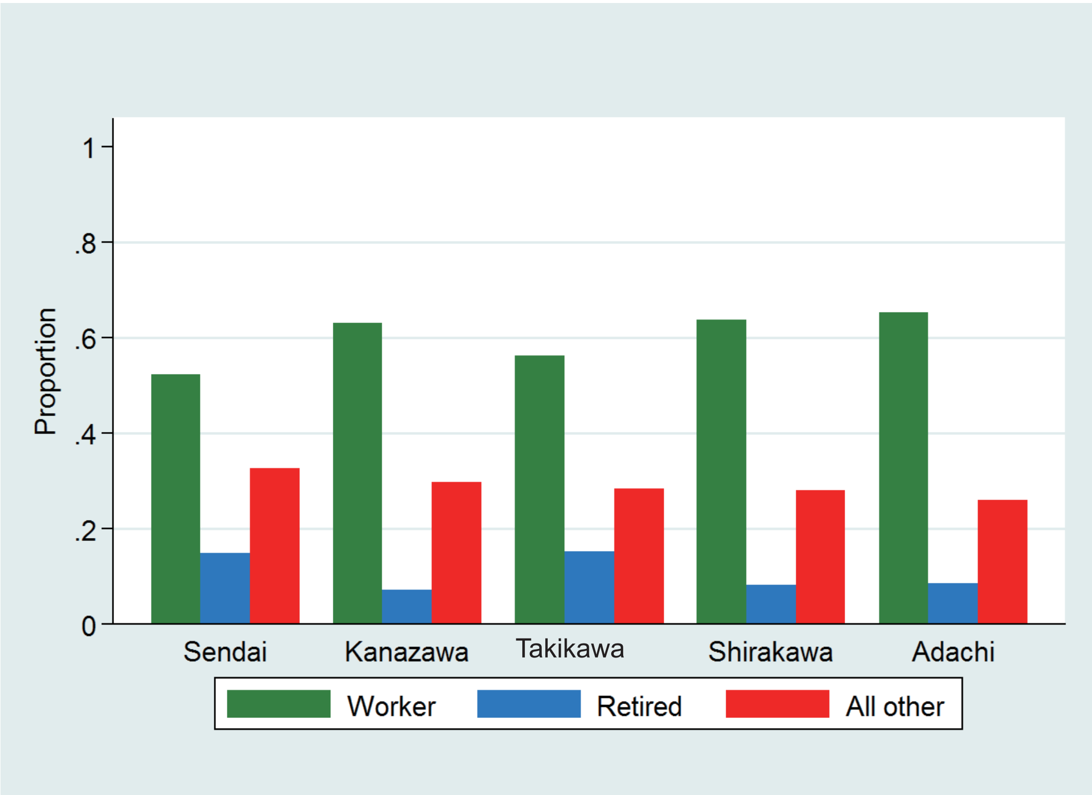

Figure 4-1-4-2 Economic activity of respondents whose ADL and IADL are zero

4.1.5 Conclusions

• The Japanese elderly hold a unique position in retirement behavior. They retire later than those in most OECD countries and keep high labor force participation rate.

• We see a large variation in self-reported employment status across municipalities under the same pension program. Other factors might be more responsible for the different retirement behavior.

• Even among "healthy" persons, we see a large variation in the labor force participation.

• Further detailed analysis using longitudinal data is necessary to explore the determinants on the late retirement in Japan.

4.2 Public and Private Pension Claims

4.2.1 Introduction

Pension benefit is a primary source of spending after retirement and a reform of pension programs is likely to alter retirement behavior. At the same time, the rapid speed of population aging put substantial pressures on pay-as-you-go social security programs in Japan and raised serious concern about financial sustainability of the current program. By nature, the pay-as-you-go system is exposed to drastic demographic change. Recent discussions of pension reform in Japan focus on the financial aspect: an increase in contributions and a decrease in benefits. The 2004 reform, the latest fundamental reform, set an upper ceiling on the payroll contribution rate of 18.3%, a five-percentage point increase from the current level, and holds down total pension benefits within total contributions and government subsidies. In addition, the reform introduced macroeconomic indexation to automatically adjust benefits in response to demographic and macroeconomic changes. See Oshio and Shimizutani (2005).

While financing the social security program is surely critical, we should emphasize that any discussion only on financing program that ignores the heterogeneity of the elderly is insufficient and does not produce any effective policy direction. What is more important is to examine how the public pension program could contribute to improving pensioners' living standards, if possible, without lowering prime age workers' welfare. At the same time, the contribution of benefits in cash provided by the pension program is closely related with that of benefits in kind such as medical and long-term care services provided both formally and informally, and other monetary benefits in cash like private pensions which are established on a full-funded basis.

Instead of the traditional approach emphasizing how to finance the social security program, we take an individual-level and integrated approach ("comprehensive view" in the term of the SHARE book) to examine the role of pensions so that we contribute to improving the effectiveness of pension policy. JSTAR enables us to take this new approach since it contains several variables that are necessary to evaluate the effectiveness of social security programs. As in SHARE, retired respondents are asked about the eligible pension program and the amount of benefits while active persons are asked about entitlement to future pensions.

Unlike the SHARE book analysis which encompasses different countries with different pension programs, the respondents in JSTAR are under a homogenous pension program. However, in Japan, pension schemes are different for pensioners with different occupations. Thus, we are able to examine the variation across occupations to examine the role of pension program for both retired and active persons. Clearly this will require some methods to account for occupational selection issues, however.

4.2.2 Japanese Public Pension System

We provide a brief overview of the Japanese pension programs and discuss characteristics emphasizing the comparison with pension programs in European countries. The description of the Japanese pension program heavily utilizes Oshio and Shimizutani (2005).

The Japanese public pension system consists of three programs, depending mainly on occupation. The first is the National Pension Insurance (NPI) (Kokumin Nenkin) whose pensioners consist of self-employed workers, farmers, and other non-employed workers. The second is the Employees Pension Insurance (EPI) (Kosei Nenkin) for employed workers in the private sector. The EPI forms the main body of the Japanese public pension programs. The third is the Mutual Aid Insurance (MAI) (Kyosai Nenkin) for employed workers in the public sector and private schools. The scheme of the MAI program is quite similar to that of the EPI program. The large difference between the NPI program and the other two is that the NPI has a flat benefit only while the EPI and MAI have both flat and earnings-related components of benefits. Since the 1986 Pension Reform, all beneficiaries in these programs have received a common flat-rate benefit, which is now called the Basic Pension benefit, and the NPI benefits and the flat components of EPI and MAI are identical.

For the NPI, the eligibility age for the full benefit is 65. More than one-fourth of the insured, however, start to receive actuarially reduced benefits between the ages of 60 and 64 years, because average household income of the NPI pensioners, especially self-employed workers, is relatively low. An actuarial addition to the benefit is also available for those who choose to receive pensions between 65 and 70 years but the number of applicants is small. Under the current program, eligibility to receive any NPI benefits requires a minimum of 25 years of contributions, and eligibility to receive full benefit requires 40 years of contributions. The benefits are price-indexed to reflect changes in the Consumer Price Index in the previous year.

In contrast, the EPI benefits consist of a flat component (Basic Pension benefit) as the first tier and an earnings-related component as the second tier. In principle, the eligibility age for the flat component was 65 and a special legal provision was in effect to allow employees to receive full benefits from age 60. The eligibility age has been extended by one year for every three years (age 62 in 2007). The eligible age will eventually be extended to age 65 in 2013, which is accommodated with that of the mandatory retirement age. The earning-related component of the EPI benefit is calculated by multiplying the career average monthly income (CAMI) by a certain accrual rate, which depends on the birth year. The CAMI is counted over all coverage years of a worker and adjusted by increases in average wage rate. Both flat and earnings-related benefits are CPI-indexed.

The eligibility age for earnings-related benefits is currently 60. Upon reaching age 60, an individual who has not fully retired is entitled to receive reduced benefits with an earnings test (Zaishoku). In addition, non-working dependent wives of EPI beneficiaries are eligible to receive Basic Pension benefits without any contributions. Therefore, an elderly couple whose husband is an EPI beneficiary is entitled to receive earning-related benefits and two flat components (for both the husband and his wife). The EPI contributions are shared equally by employees and employers, based on monthly earnings. The contribution base was shifted completely from monthly earnings to annual earnings including bonuses in 2003.

In sum, the NPI pensioners are eligible for only the first pillar and the EPI and MAI pensioners are eligible for both the first and the second pillar. The first pillar is mandatory whether employed or self-employed while the second pillar is occupation-related. The third pillar comprises purely private pensions (insurance company or post office).

4.2.3 Eligible Pension Programs across Municipalities

Figure 4-2-1 reports the eligibility of a variety of pension programs across municipalities. As stated, the first pillar is mandatory and the second pillar pension program in Japan depends mainly on occupation in the prime earnings age and the difference in industrial structure reflects in the share of eligibility for each program. In Sendai, Kanazawa, and Takikawa, the share of EPI (including MAI) is dominant and accounts for about three quarters while the remaining is largely occupied by NPI. In contrast, in Shirakawa and Adachi, the share of NPI is larger since Shirakawa has a large agricultural sector and Adachi has a large number of self-employed.

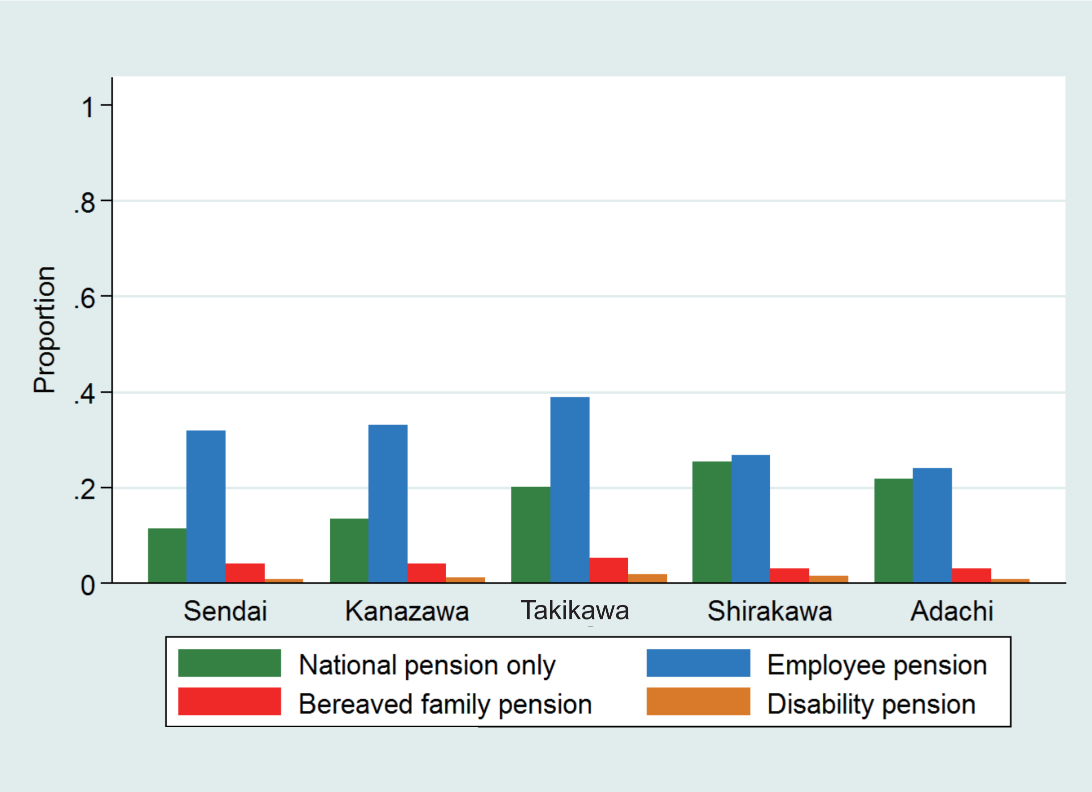

Figure 4-2-1 Public pension by municipality

In comparing with the results in the SHARE book, the Japanese Pension coverage seems to be comparable to the German system which is less than the Swedish, Danish, or Swiss system but more than other SHARE countries.

Figure 4-2-2 reports the replacement ratio by municipality and age category. The replacement ratio is defined as the share of pension income relative to income before retirement and this figure is often used in policy debates on the benefits level of public pension programs. JSTAR asked the respondent about the replacement ratio directly for both retired and active persons. For men, we find that for the 70-75 age category, there are two peaks, one around 50% and the other around 30%. About 30% to 50% answer the replacement rate to be 30%, and 10% to 25% answer the replacement ratio to be about 50%. While the clear twin peaks disappear for the other age categories, the majority of men answer the replacement ratio to be around 30% to 50%. For women, there is no clear peak common across any age category or municipality. The answers seem to be almost uniformly distributed across 10% to 100%.

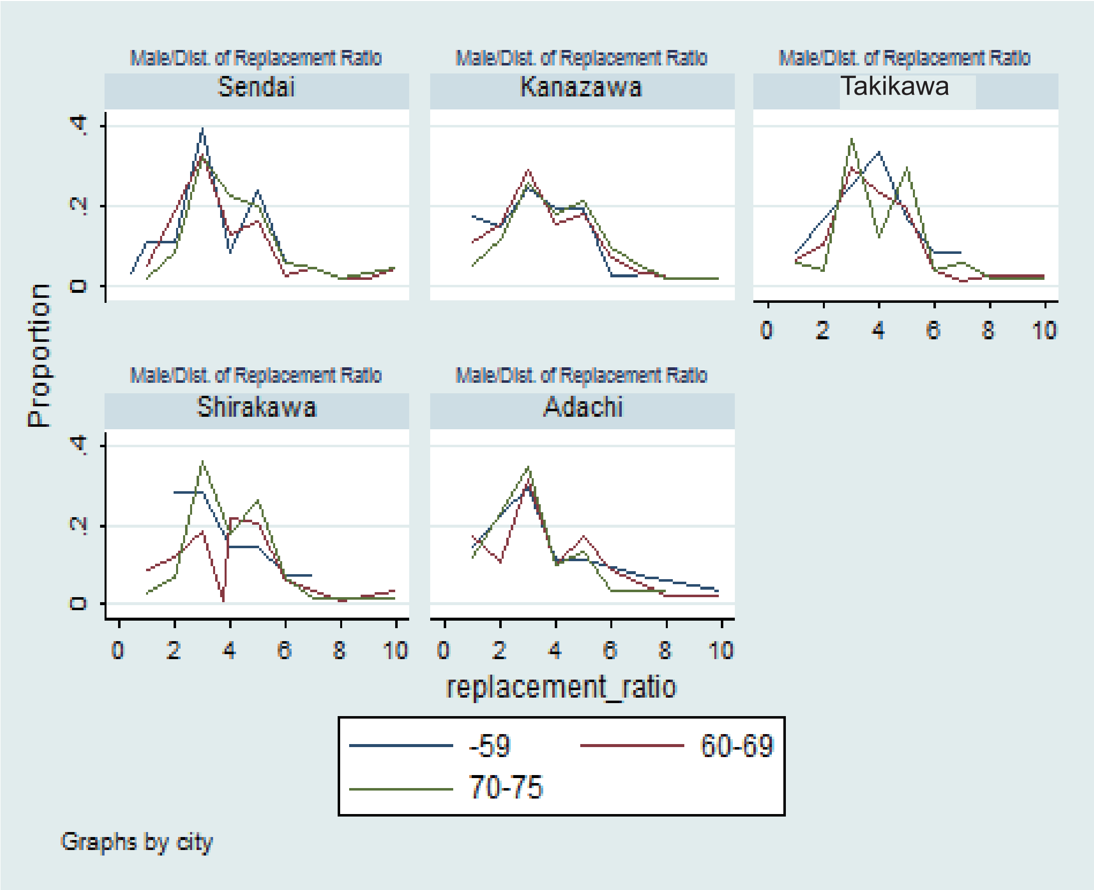

Figure 4-2-2-1 Replacement ratio by age and municipality, males

Lastly, we provide some figures on the third pillar program. While the SHARE book finds the average of 10% or lower participation in Europe, non-public pension claims are much higher for most municipalities across different cohorts. In Japan the participation rate for individuals in their 50s are about 40% and typically the rates are lower for older cohorts but are around 20% for individuals between 70 and 75.

This subsection focused on the eligibility of different pension programs. We make two remarks. One is that the role of pension claims is unarguably associated with income and assets of the elderly, which is examined in the next chapter. Moreover, it is related with private transfers examined in the previous chapter. The comprehensive role of the pension program should be considered in an integrated way incorporating these other factors. The other remark is that the results in this subsection are based on cross sectional baseline data and panel data is necessary to evaluate the effect of pension reforms.

Figure 4-2-2-2 Replacement ratio by age and municipality, females

4.2.4 Conclusions

• Similarly to European countries, public pension programs play a large role in Japan. While the first pillar is mandatory for all residents in Japan, the second pillar is occupation-related and varies across individuals.

• The replacement ratio for men varies around 30% to 50%. For women it varies between 10% to 100% almost uniformly.

• Compared to the SHARE countries, the participation rate for the third pillar comprising purely private pension is much higher at 20% to over 40% for men and women in Japan except for the 70-75 age category in Shirakawa and Adachi. In Shirakawa for both men and women in that age group the participation rate is about 10% and for the same group in Adachi, it is about 15%. Even those groups' participation rate was higher than the rates observed among SHARE countries of about 10% or less.

4.3 Pathways to Retirement: Role of Mandatory Retirement

4.3.1 Introduction

One of the important lessons from the self-reported labor status is that work and retirement are not exclusive (Figure 4-1-1). In other words, work and retirement are not dichotomous and there are a variety of intermediate labor statuses in the middle (Gruber & Wise 2004). In Japan, a quarter of persons aged 73-75 are still staying in "work" and another quarter are "retired." This means that the remaining half of these elderly are neither in "work" nor "retired." The figure is much larger than in Europe with an average of 20%. The dichotomy of active and fully employed elderly and inactive and retired elderly is very misleading and this is especially the case in Japan.

However, this wedge between full work and retirement has largely been ignored probably due to a lack of data on the transition of labor status. As a result, there has been little research on the routes to retirement in Japan. Some elderly are unemployed and receiving unemployment insurance while others are sick and receiving disability pensions. Moreover, some elderly are earning wages under the threshold of the social security earnings test on pension benefits while others are homemaking and participating in volunteer work. JSTAR provides detailed labor status and when longitudinal data are compiled, we will be able to examine the dynamic process of retirement and examine the determinants of the transition process. In what follows, we will perform descriptive analysis and focus on cross sectional insights on the prevalence of a variety of routes to retirement, which is available from the self-reported labor status in the data.

4.3.2 Unemployment and Disability as Forms of Pre-Retirement

As in the SHARE book, we examine three routes between employment and retirement. The first category is unemployment. Some people lose a job before being eligible to receive pension benefits and spend some period in unemployment. We note that persons aged 60-64 are entitled to receive reduced benefits of the fixed component of the public pension before the eligible age. If a person aged 60-64 receives pension benefits, he/she is not entitled to receive unemployment insurance, and vice versa. One of the distinct characteristics in Japan is the prevalence of mandatory retirement age. In most cases, larger firms provide an opportunity for re-employment in the same firm or their affiliated ones after reaching mandatory retirement age. But for a short period of transition, many people apply for unemployment insurance.

The second category is disability pension. As the SHARE book discusses, this is not a voluntary transition process to retirement but many European countries provide a generous disability insurance program to manage uneasiness about work or even obsolescence of the worker's human capital. This route is further examined in the next subsection. The third category is pre-retirement programs which allow early exit from the labor force. In most cases, these are nationwide programs. This route seems to be mostly irrelevant in Japan and thus we focus on the first two routes as the intermediate process.

Unlike SHARE which includes different countries with different institutional arrangements on these routes, the programs are uniform in Japan across all the regions and are supposed to operate in the same way. However, some small variations are observed across municipalities. There are some municipality-specific provisions and diversity in labor demand, industrial sector, and firm size. These factors together with individual factors (health or family status, etc.) produce different patterns of the transition under the same arrangements.

First, we examine "unemployment" as a route to retirement by municipality-age cohorts. Figure 4-3-1 reports the distribution of job seekers. It is interesting that even under a homogeneous program we observe a striking difference across municipalities. In Sendai and Kanazawa the share of job seekers declines gradually along with age starting at about 4% for 55-57 and reaches close to 1% for persons aged 73-75. Shirakawa has lower ratio of around 1% to 2% throughout all age cohorts except age 67-69 probably due to the dominant share of agriculture. In contrast, the remaining two municipalities have different shapes. Both Takikawa and Adachi have about 6% job seekers among the age 58-60 or 64-66. While the share is close to zero for persons aged 73-75 in Takikawa, the figure for Adachi for the same age group exceeds 3%. These observations reflect the higher share of people in the labor market in late years in Japan. The share of the unemployed in their 50s is lower in Japan than in European

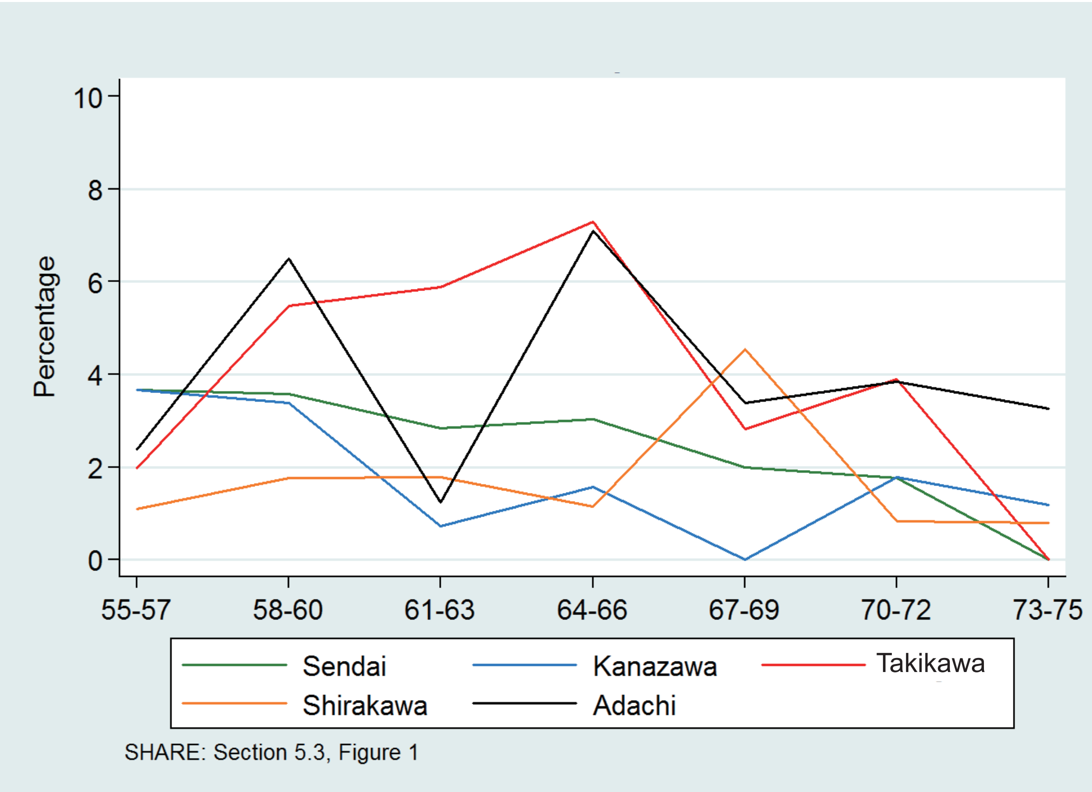

Figure 4-3-1 Distribution of job seekers

countries because the unemployment rate is higher in Europe. In contrast, the share of the unemployed is close to zero in the second half of the 60s in all regions in Europe while the figure exceeds 2% in four out of five municipalities in Japan. Even in the 70s, the share of job seekers is positive in Japan. Overall, the route to retirement via unemployment is much higher in Japan compared to the SHARE countries especially after 65.

Next, we turn to "disabled" as a route to retirement. Figure 4-3-2 reports the distribution of disabled individuals. Disabled individuals are defined as those who are officially certified as needing help. The share of the disabled is below 1% in cohorts up to 63 except persons aged 55-57 in Adachi. In general, the figures increase with age for all municipalities and reach around 4%-6% in the 73-75 age cohort. This finding contrasts sharply to that in European countries. The SHARE book shows that the share of disabled in the 50s and the first half of the 60s is larger than that in Japan but it declines to zero before age 70 because the disabled persons move to the "retired" category. Only some countries like the Netherlands or Spain have some positive share after 70s and Greece has an upward trend in the share of the disabled persons. While the SHARE book concludes that the case of Greece is a puzzle, Japan has a similar pattern. One speculation is that the distinction between retired and disabled is different from other European countries due to some institutional differences.

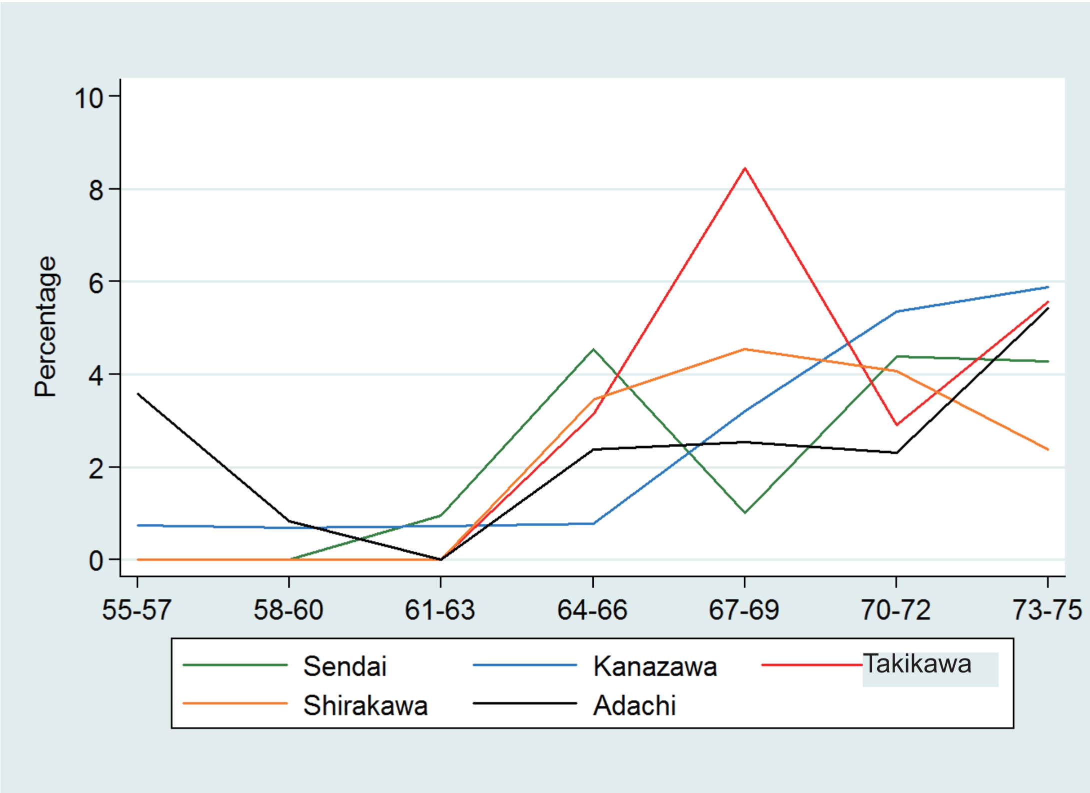

Figure 4-3-2 Distribution of disabled individuals

4.3.3 Partial or Gradual Retirement

Next, we turn to partial or gradual retirement. The SHARE book defines partial or gradual retirement as situations where an individual simultaneously receives earnings and draws resources from pension benefits. Some people have an opportunity to work at the same or affiliated corporations in a part-time status (shorter working hours) after mandatory retirement while others seek a different job for diverse reasons including health maintenance or earning additional income. The Japanese public pension program presumes a coexistence of work and retirement and has an earnings test on the receipt of pension benefits (*zaishoku*). The prevalence of the joint work and retirement might be more important in Japan with the higher labor force participation rate than European countries.

We disregard people reporting themselves as "unemployed," "permanently sick or disabled" and confine the sample to those who identify themselves "employed," "retired," or "homemaker" and examine how the fraction of these groups differs across different municipalities and age groups.

The actual amount of work varies significantly so we classify work hours into three categories: 40 hours or more per week, between 15 hours and 40 hours per week, and less than 15 hours per week. Table 4-3-1 gives overall results for all people aged between 55 and 75.

Table 4-3-1 Working hours per week

	Work	40 hours or more%	15 hours or more%	less than 15 hours%	Retired%
Sendai	53.11	36.07	14.05	2.99	46.89
Kanazawa	60.87	39.6	16.69	4.58	39.13
Takikawa	49.67	31.65	14.51	3.52	50.33
Shirakawa	60.31	44.89	11.91	3.51	39.69
Adachi	65.38	39.15	22.25	3.98	34.62
		40 hours or more%	15 hours or more%	less than 15 hours%	Retired%
		55-60			
Sendai	79.52	60.95	16.19	2.38	20.48
Kanazawa	85.78	60.78	18.53	6.47	14.22
Takikawa	82.11	61.05	18.95	2.11	17.89
Shirakawa	91.98	74.33	14.44	3.21	8.02
Adachi	88.95	61.05	25.58	2.33	11.05
		61-64			
Sendai	62.96	39.26	22.22	1.48	37.04
Kanazawa	69.68	43.23	19.35	7.1	30.32
Takikawa	74.36	44.87	24.36	5.13	25.64
Shirakawa	73.13	58.21	7.46	7.46	26.87
Adachi	80.18	51.35	24.32	4.5	19.82
		65-70			
Sendai	37.86	17.96	16.02	3.88	62.14
Kanazawa	41.27	17.99	19.05	4.23	58.73
Takikawa	36.89	20.49	11.48	4.92	63.11
Shirakawa	52.21	28.68	17.65	5.88	47.79
Adachi	61.31	30.65	25.63	5.03	38.69
		71-75			
Sendai	15.79	6.77	5.26	3.76	84.21
Kanazawa	23.2	13.6	8	1.6	76.8
Takikawa	19.33	11.76	5.88	1.68	80.67
Shirakawa	22.3	12.16	8.11	2.03	77.7
Adachi	32.9	13.55	14.84	4.52	67.1

For both men and women there is a gradual shift from the 40 hours or more category to fewer hours of work as we examine across older cohorts. Whether this is an age effect or a cohort effect will become clearer as we collect panel data. The shift occurs much more rapidly for women than for men.

4.3.4 Conclusions

• Examining the variety of transition paths to retirement is especially important in Japan but there is little research on the intermediate period between work and retirement. JSTAR enables us to explore the nature and the determinants of the transition process at a micro-level.

• The patterns in the share of the self-assessed unemployed or the disabled have different shapes between Japan and European countries. This is also the case for people who are "partially retired." Possible factors including institutional arrangements or health status should be examined to account for the difference.

• Panel data after the second wave will begin to allow us to examine the dynamic transition process among a variety of transition paths.

4.4 Work Disability and Health: Strict Eligibility

4.4.1 Introduction

Disability insurance is used heavily in some European countries and forms a substantial part of social security benefits in many countries. For example, among those who are aged 50 to 65, Sweden and Denmark have approximately 16% and the Netherlands over 14% of persons receiving disability insurance benefits. But the fraction varies greatly across European countries. For example the same figures for Germany, France, and Spain are about 5%, 4.5%, and 9%, respectively, and for Austria and Greece, the numbers are both less than 3%. While disability insurance provides a safety-net for health-related income losses, it is often debated that generosity of disability insurance gives people incentive to retire early and the misuse unnecessarily puts considerable pressure on the social security system.

Japanese public pension programs have a similar insurance against the loss of ability to work called "disability pension." The eligibility for receiving disability pension benefits requires that (1) the person has become disabled when he/she is a pensioner (precisely, he/she must be a pensioner on the first day of the doctor visit regarding the loss of ability), (2) the person has paid contributions for more than the minimum required years, (3) the person is disabled enough to be rated over the criteria, and (4) the person is aged under 65 at the time of the first claim. A person applying for the disability pension must file to municipalities with a doctor's medical certificate and self-reported records of illness and employment. A decision is made within three months and the eligibility is reviewed every year with a new medical certificate. An eligible person is entitled to receive benefits even if he/she has a paid job. The process is mostly similar to both NPI pensioners and EPI/MAI pensioners.

Figure 4-4-1 reports the enrollment rate of disability pension across municipalities in JSTAR. The figures reported are below the lowest level in European countries. Among the municipalities, the highest rate is close to 2% in Takikawa and the figure is less than 1% in Sendai and Adachi. We note that the samples in the figure are persons aged 50-75, instead of those aged 50-65, but a person should claim for disability insurance before age 65 in Japan, which makes these figures comparable.

4.4.2 Potential Causes for Disability Insurance Enrollment

The SHARE book explores three possible factors for variations in the enrollment rate in European countries: demographics, health, and institutions. In order to explore these factors, the SHARE book employs some econometric methods to adjust for difference in age or health and predict enrollment ratio if demographics or health status are equal across countries. We describe the prevalence of disability pensions in Japan using simple summary statistics.

First, older persons are more likely to be disabled. However, Japan as a country adds to the finding in the SHARE book: the demographic differences are not responsible for variations in enrollment rates across municipalities. That is, while Japan has a larger share of elderly in the population than European countries, the enrollment ratio is below the minimum in Europe.

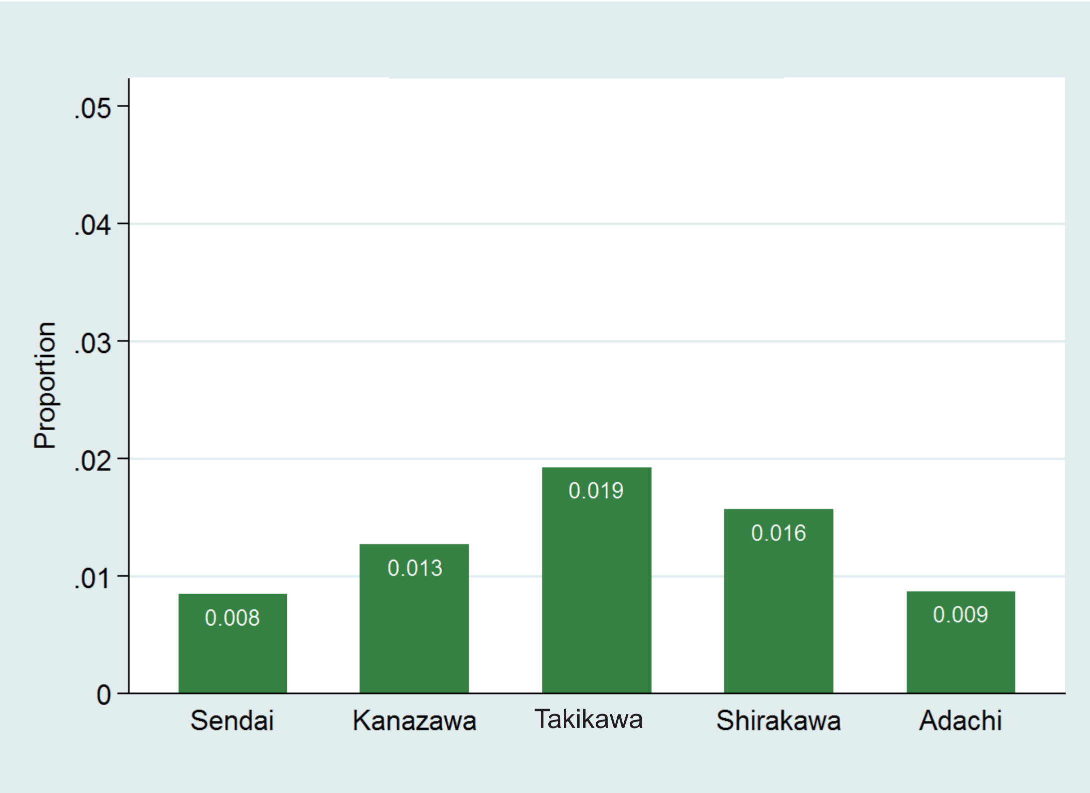

Figure 4-4-1 Disability pension by municipality

The same observations hold true at the municipality level within Japan. Figure 4-4-2 illustrates the enrollment ratio by age-municipality. While we see small jumps in age 58-60 and age 67-69, the enrollment ratio is not correlated with age except for Kanazawa and Sendai. In Europe, a large drop in the disability insurance enrollment rate between age 65 and 70 is observed since disability insurance benefits are automatically converted to old-age pension benefits at age 65 in most countries. We do not see such a drop across age cohorts in Japan due to a difference in institutional arrangements between Japan and European countries. We emphasize that at this point we cannot distinguish the age effect and the cohort effect and the interpretation of these findings.

The second potential cause is health status. While the consideration clearly depends on how we measure health status (see Chapter 2), the disparity in health status seems not to be responsible for the difference in the disability pension enrollment rate. There is no distinct evidence that health status is worse in Takikawa with the highest rate among municipalities. The SHARE book also concludes that differences in health are not able to account for variation in the European disability insurance enrollment, which seems to be consistent with the finding in JSTAR.

The third cause is institutional difference. While the disability insurance scheme, including eligibility and benefits, is set uniformly by the central government and is supposed to be operated in the same way in all regions in Japan, we do not exclude the possibility that there exists disparity of operation across municipalities which affects the disability pension enrollment. This is surely an interesting topic but, for this, we need to collect information about the details of the disability pension administration.

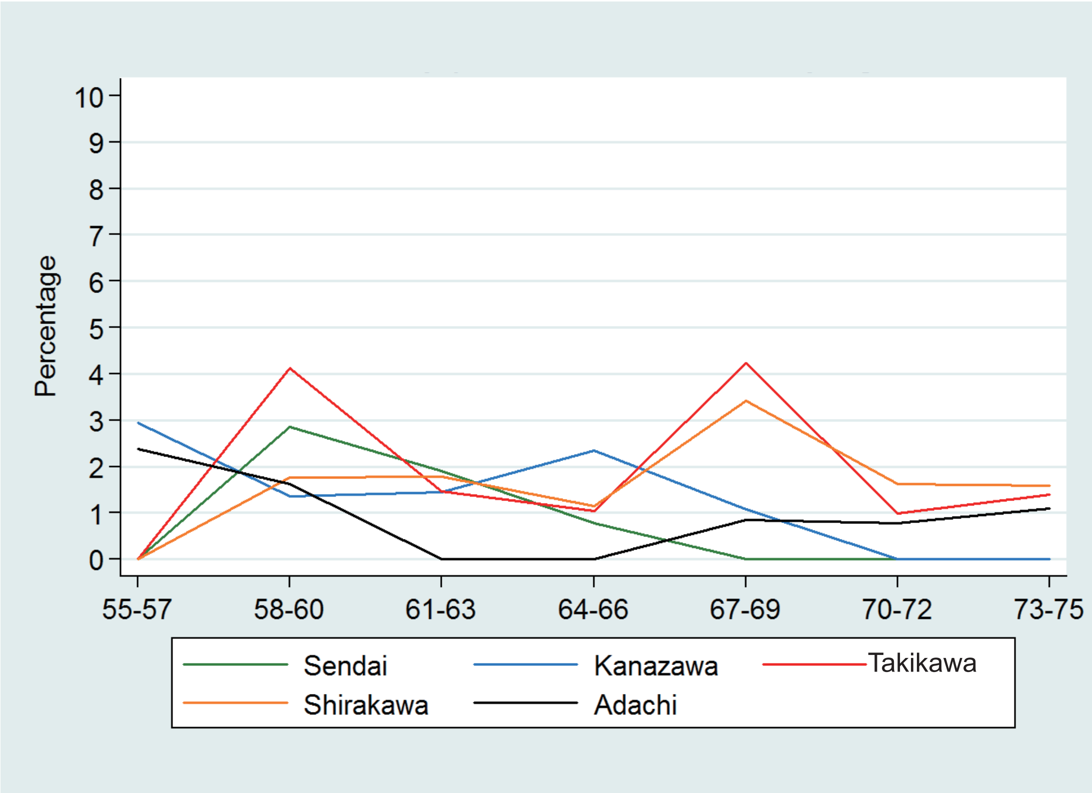

Figure 4-4-2 Disability pension enrollment by age

In sum, we find that disability pension enrollment rate is very low in Japan compared to the European standard. In European countries, disability insurance may work as a labor market exit route to early retirement (Börsch-Supan 2001). In contrast, there has been little argument on early retirement in Japan and the low take-up rate in Japan has not invited much attention to the relationship between disability pension program and early retirement. One possible explanation is the strict eligibility. In Japan, a person applying for disability pension must submit a medical certificate, but this is not the case in European countries. We do not exclude other possibilities like cultural difference or provision of workplace for the disabled persons. Moreover, in future, it is possible that Japan will have a higher take-up rate for disability insurance. In contrast to causes for the late retirement in Japan, experience on disability insurance and early retirement from other countries surely provides useful lessons for Japan.

4.4.3 Conclusions

• The disability pension enrollment is very low in Japan at a range of 1%-2%, which is lower than the minimum in European countries.

• There is a very small variation in the enrollment ratio across municipalities. Difference in age or health status seems not to be responsible. Institutional factors are a more likely explanation but the variation across municipalities is still small.

• Examination of the reasons for the extreme difference in the enrollment ratios of European countries and that of Japan may be fruitful for all countries.

4.5 Volunteer Work

4.5.1 Introduction

In the previous subsections, we examined the retirement process of Japanese elderly focusing on paid work. This is just one side of daily lives of the elderly. The remaining aspects include volunteer (unpaid) work and non-working life. The next two sections explore these two activities. Volunteer work is defined as “unpaid work provided to parties to whom the worker owes no contractual, familial, or friendship obligations” (Wilson & Musick 1997). Previous studies revealed that older volunteers are more highly committed than other age groups (Gallagher 1994) and that the productive nature of volunteering should be particularly beneficial for older people's life satisfaction or health (e.g. Siegrist et al. 2004).

Both Japan and European countries lack an internationally-comparable data set on volunteer engagement. Moreover, volunteer activity is affected by a broad social context and comprehensive information on all aspects of the elderly life, including socioeconomic and health status. Further, family and cultural background are necessary to understand the nature and effect of volunteering activities. Otherwise, research is forced to focus on a narrow aspect of volunteering. JSTAR provides a wide variety of variables related to unpaid work and also permits international comparison of volunteer engagement as it is designed comparably with SHARE.

In this subsection, we focus mainly on elderly participation in volunteer work using a binary indicator, which is available in the leave-behind-questionnaire of JSTAR. Moreover, we try to relate participation in volunteer work with some factors including health or socioeconomic status.

4.5.2 Measuring Volunteer Work in JSTAR

JSTAR contains information on whether the respondent has been actively engaged in voluntary or charity work during the month before the interview, which is comparable with SHARE. Similar to the analysis in the SHARE book, we do not focus on membership which is highly correlated with activity but often is likely to overestimate the activities. As the SHARE book noted, volunteering in the previous month is a conservative way to measure volunteer activity since volunteer work is often performed irregularly and some studies use retrospective questions regarding participation covering a longer period of time (e.g. the previous year). But we use the definition for comparability with SHARE.

The SHARE book provides an interesting finding that European countries are divided into three groups based on participation rate in volunteering: the low participation countries (the Mediterranean), the middle participation countries (Germany, France, Switzerland, and Austria) and the high participation countries (Sweden, Denmark and the Netherlands). Figure 4-5-1 reports the average shares of participants in volunteering in each municipality. While the share of engagement varies across municipalities, the highest in Shirakawa (17%) and the lowest in Adachi (7%), the average of all municipalities is close to 10%, which is comparable with the level in the “middle participation” countries in Europe, such as Germany, France, Switzerland, and Austria.

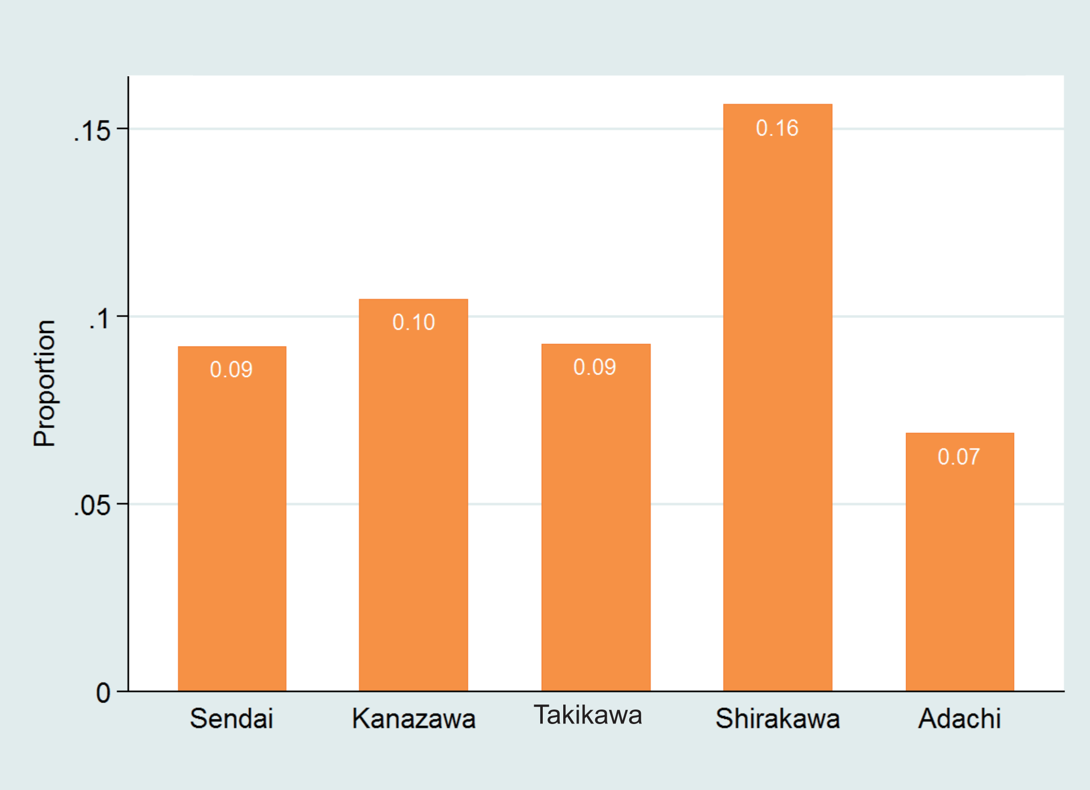

Figure 4-5-1 Participation in volunteer work by municipality

Next, we turn to the demographic characteristics of volunteers. Figures 4-5-2 and 4-5-3 report the volunteer participation rates for different age cohorts for men and women, respectively. Like in SHARE countries, gender differences in volunteering are mostly small and there is not much systematic age gradient across cohorts observed among the municipalities. Exceptions are the 70-75 cohort in Takikawa. Almost 20% of males in the 70-75 cohort volunteer but slightly less than 10% of women in the same cohort volunteer in Takikawa.

In many of the SHARE countries, Spain being an exception, the age gradient of volunteer activity was observed clearly. Figure 4-5-4 examines the relationship between volunteering and health status. The SHARE book reports much lower activity rates among those who perceive their current health status as fair or worse (6%), compared to those who report a good or better health condition (13%).

In contrast, the relation is ambiguous in Japan. In Shirakawa with the highest participation in volunteering among the five municipalities, the share of participation is higher for those who identify themselves as more healthy. This is probably because the volunteering activities are closely related to agriculture and requires participants to be healthy (otherwise, they cannot participate in the activities). Excepting Shirakawa, we do not see any clear pattern between volunteering and health status.

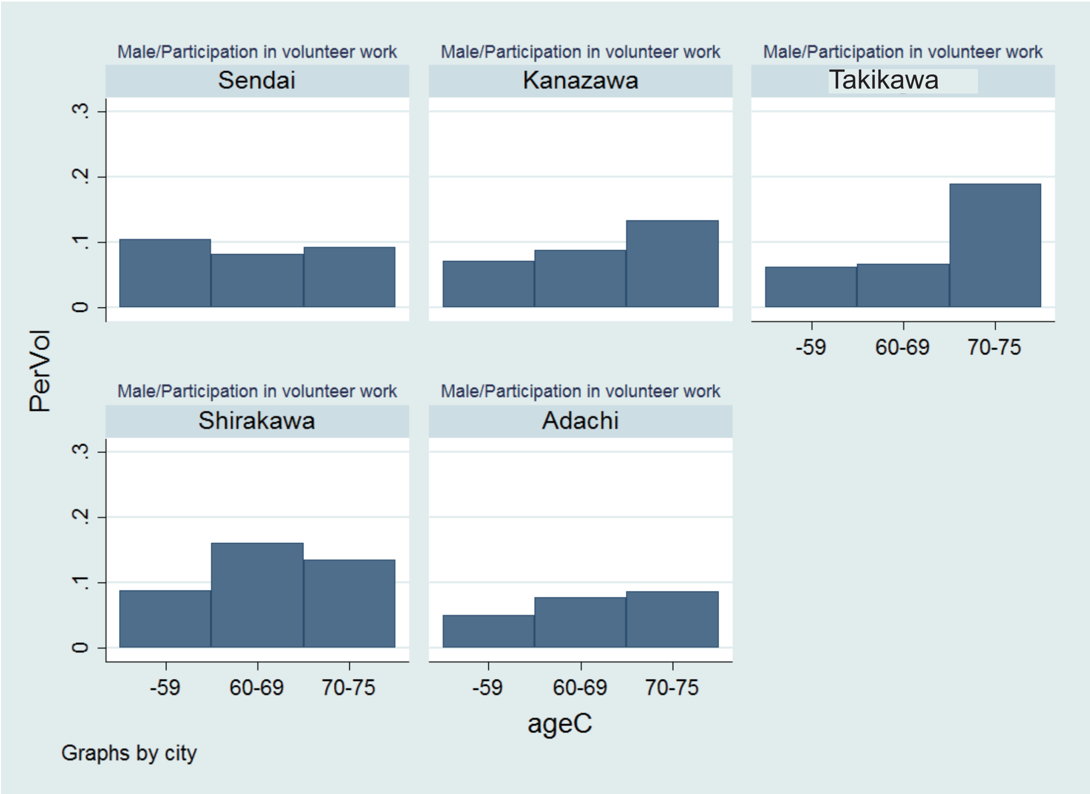

Figure 4-5-2 Participation in volunteer work by municipality, males

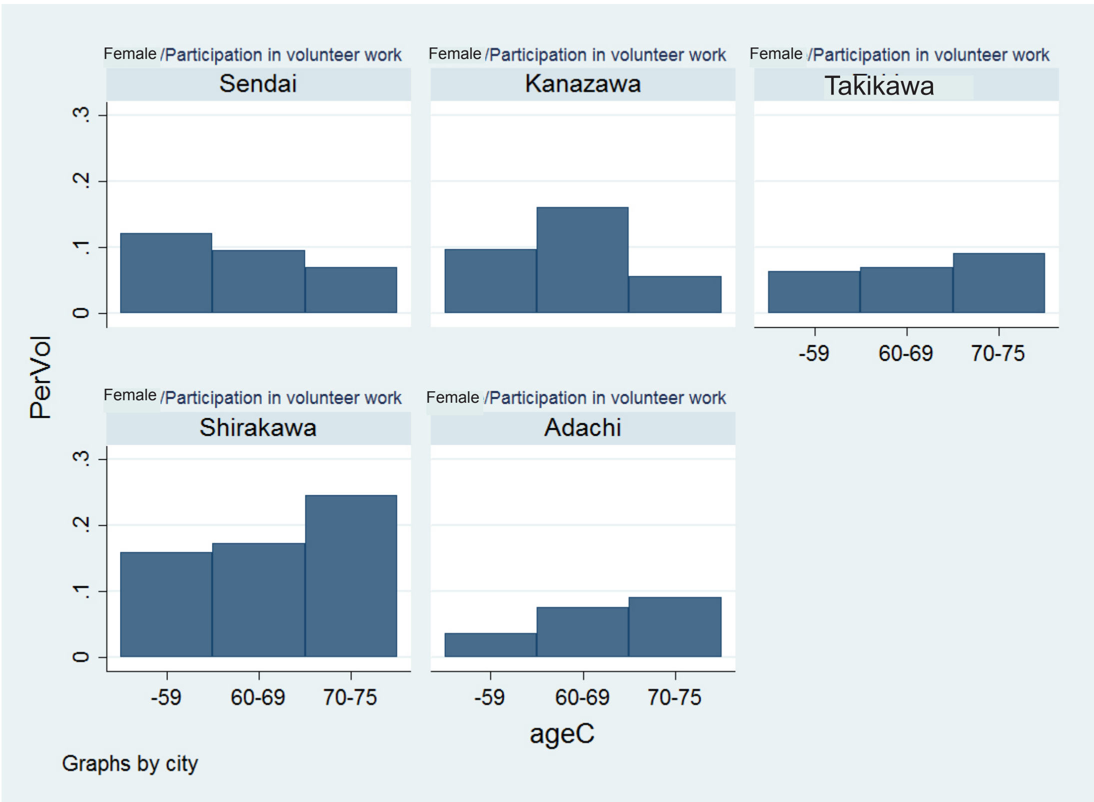

Figure 4-5-3 Participation in volunteer work by municipality, females

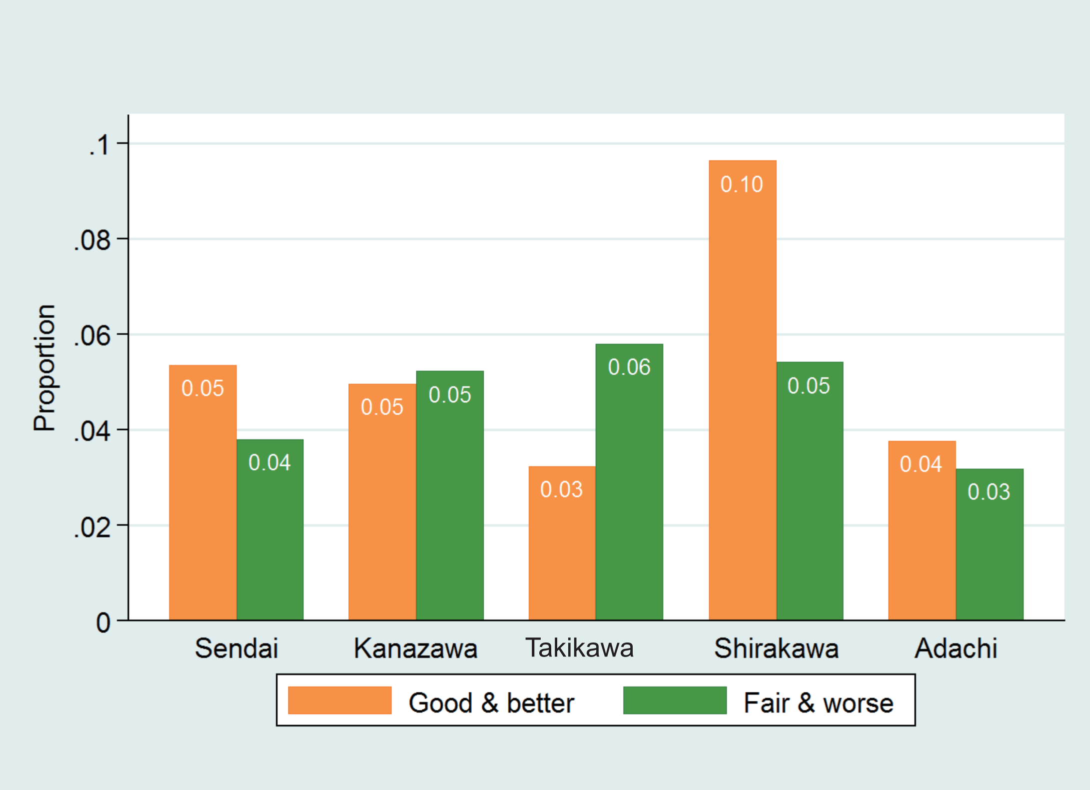

Figure 4-5-4 Participation in volunteer work by self-reported health by municipality

4.5.3 Lessons from Voluntary Engagement in the Elderly

While most economic analysis focuses on individual-level supply of "paid" work, volunteering as an unpaid work holds a large position in elderly daily life. Our preview on volunteering activities across five municipalities indicates, like in European countries, the relevance of the social, institutional, and cultural background for private voluntary engagement. For example, the high participation rate in Shirakawa is plausibly associated with agriculture which often calls for collective actions for work, cultural events, and mutual transfers among households. In this sense, it is natural that some urban areas like Sendai or Adachi have lower participation in volunteering activities. While we rely on a preview of JSTAR results, the SHARE book refers to strong indication for contextual effects on the probability to participate in voluntary work and, at the same time, a remarkable consistency in the association of individual characteristics with volunteering activities.

Further research is needed for more in-depth examination on determinants of participation in volunteering work (social responsibility, consciousness, health, personal joy, etc.), especially in an international or inter-regional perspective, and on the relationship between paid and non-paid work in the elder generation and on the effect of volunteering work on quality of life for the elderly. Moreover, suggestions for policy direction towards volunteering work in the future are needed in Japan. In Europe, the European Union has taken initiative to promote greater participation in voluntary work (cf. Commission of the European Communities 1997). While policy direction of the Japanese government toward volunteer work seems to be largely motivated by temporal help for victims of natural disasters (the Kobe earthquake in 1995 was an epoch-making event to stimulate volunteering activities), the number volunteering has rapidly increased in recent years and it is possible that unpaid work done by the elderly will gain more importance in an aged society. Since the nature of volunteer work is "voluntary," government intervention should be executed carefully. In this sense, we need to exploit the panel nature of JSTAR after the second wave to examine what motivates the elderly to engage in unpaid work and what they receive from those activities as well as how participation in volunteer activities improve quality of life for the elderly and how policies toward those activities should be designed.

4.5.4 Conclusions

• The average share of participation in volunteer work in Japan is close to 10%, which is comparable with the middle group in Europe.

• Male and female differences in the volunteer participation rate for most cohorts are at most about 5%, although there are a few exceptions.

• The volunteer participation rate in Japan is not correlated with age or health status. In Europe, across all SHARE countries, there is a remarkable consistency in the association of a broad range of individual characteristics, such as age or health, with volunteering.

• Future research should examine the motivations of the elderly to engage in unpaid work and what they receive from those activities as well as how participation in volunteering activities improves quality of life for the elderly and how policies toward those activities are designed.

4.6 How Do Japanese Older Adults Use Their Time?

4.6.1 Introduction

This chapter previewed work and retirement behavior which emerged from the baseline data of JSTAR. One of the important findings is that Japanese elderly retire in very late years and the share of those people in the intermediate process which is neither work nor retirement is larger than that in European countries. This last subsection of the chapter provides a bird's-eye view on time allocation of Japanese older adults to understand their daily activities comprehensively.

Time allocation, which is the manifestation of the daily activities of individuals, is surely critical for understanding individual and societal economic behavior and calls for interdisciplinary research. Choice between labor and leisure or that between personal and social activities, for example, determines quality of life and important considerations for the design of related public policies. Since time allocation covers all aspects of daily life, analysis requires information on accurate measure of time allocation of individuals as well as a variety of variables including health and socioeconomic and demographic status. As in European countries, an individual-level dataset with comprehensive variables has not been rich in Japan. JSTAR provides comprehensive variables which are comparable with SHARE and enables us to examine disparity in time use across countries and draw policy implications with an international perspective. At this point, JSTAR data is cross sectional and analysis does not distinguish between age and cohort effects but the panel structure after the second wave will overcome that limitation.

Figure 4-6-1 illustrates the proportion of respondents who engaged in several activities in the month prior to the interview across municipalities. While many Japanese people are active workers in late years, they are also engaged in non-work activities. We see a remarkably similar pattern across municipalities except Shirakawa. The most popular activity is hobby including traveling, which occupies about 20% of all persons, followed by participation in community activity.

About 10% are engaged in volunteering (including charity work) and also 10% in sports activities. The share of those who are providing help to people in the neighborhood, religious activities, politics, or learning (attending educational or training courses) is lower, each less than 5% in most municipalities. Among four municipalities, we see slightly higher shares in those activities in Sendai and Kanazawa than in Takikawa and Adachi. The picture of Shirakawa, which is located in a mountainous area where most people are engaged in agriculture and forestry, is different from that of other municipalities. The highest share of activities is community activities (25%), followed by hobby (18%). The shares of volunteering and sports activities are also higher than other regions. There are some differences in the distribution of those activities between Japan and European countries. While the share of working (which is omitted in this figure) is much higher in Japan, that of providing help or care, club activities, and religion is higher in Europe. Although the difference may be partly accounted for by cultural differences, the lower share of providing help reflects the larger share of work as seen below. As regards the relationship between volunteering activities examined in

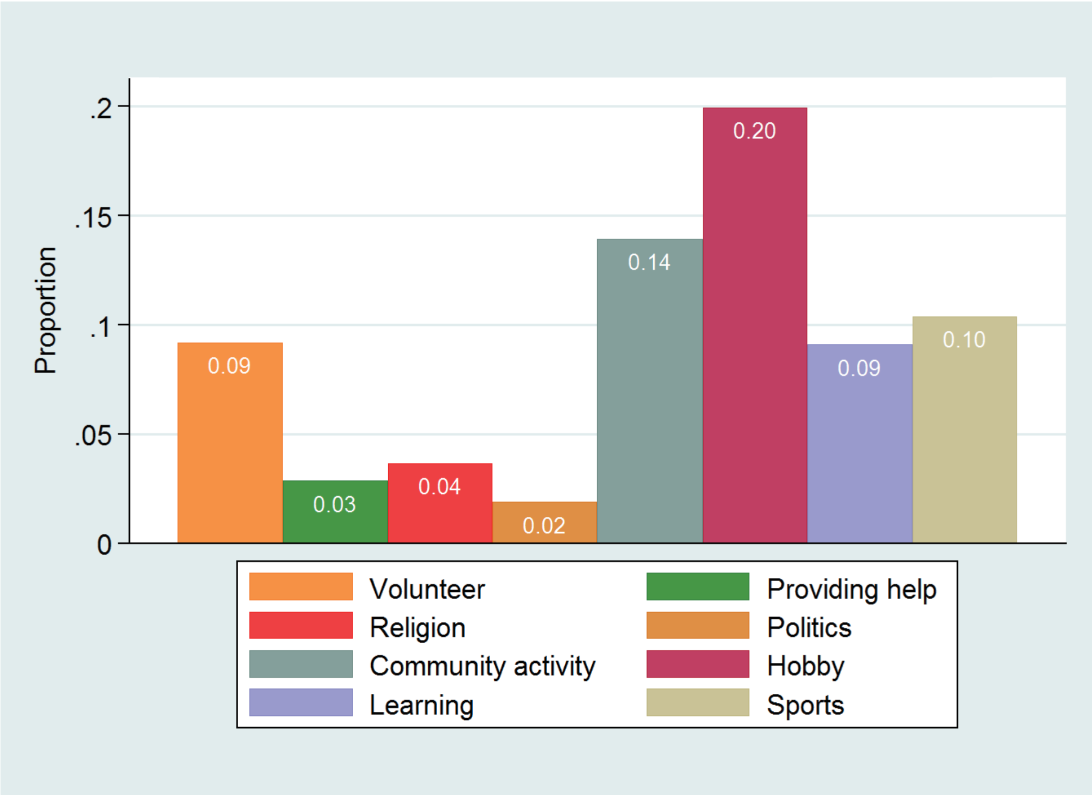

Figure 4-6-1-1 Participation in activities: Sendai

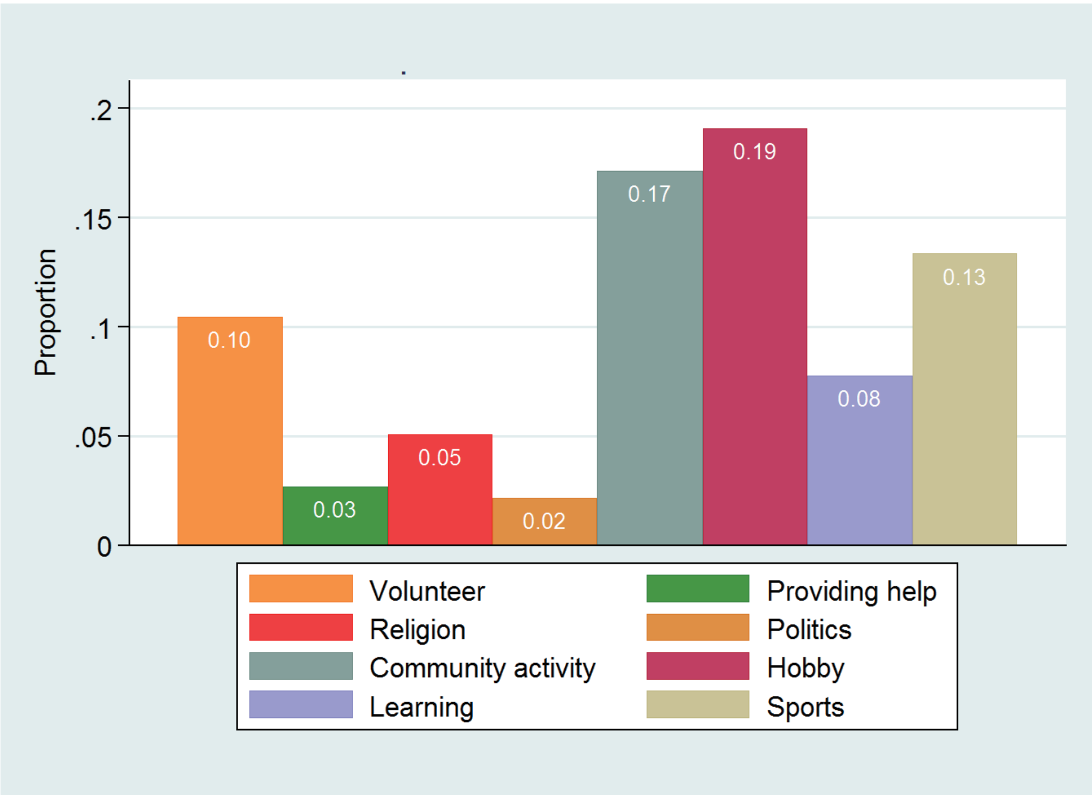

Figure 4-6-1-2 Participation in activities: Kanazawa

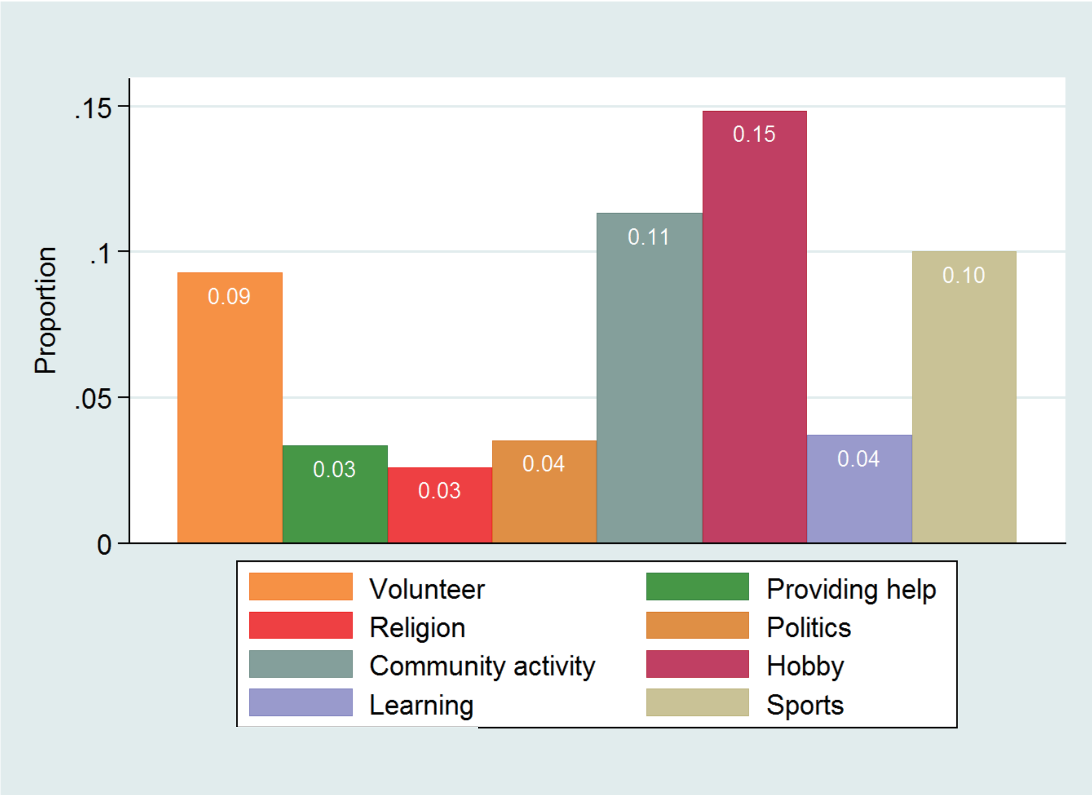

Figure 4-6-1-3 Participation in activities: Takikawa

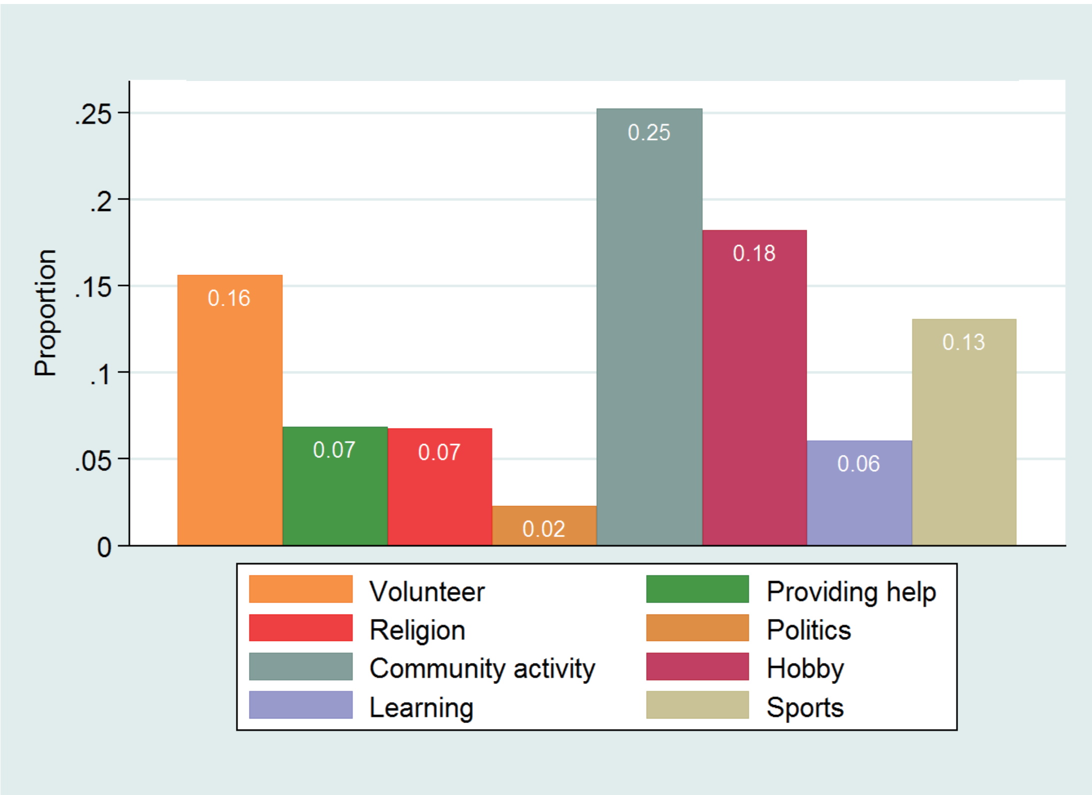

Figure 4-6-1-4 Participation in activities: Shirakawa

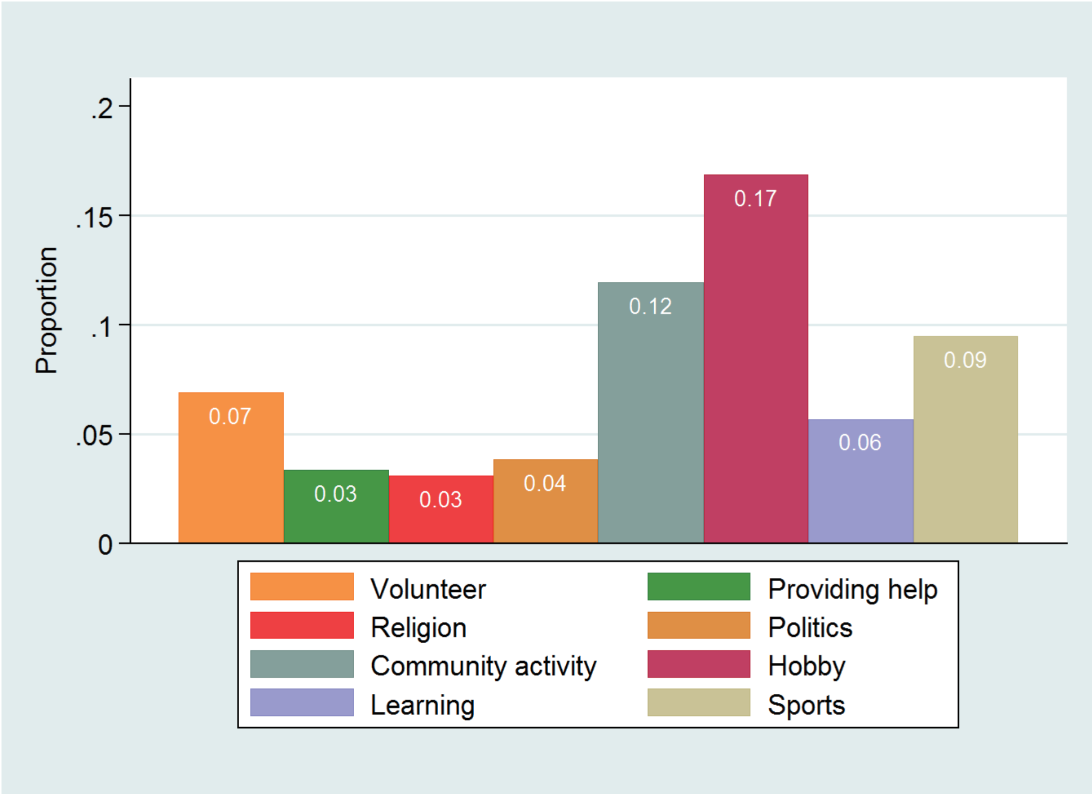

Figure 4-6-1-5 Participation in activities: Adachi

the previous section and these other social activities, the SHARE book points out that a country with a higher share of people engaged in provision of informal help or care also have a higher share of people participating in volunteer activities: there is a higher share in Nordic countries and a lower share in the Mediterranean countries. The share of those participating in volunteer activities in Japan is comparable with those in the middle European countries (Germany, France, etc.), but the share of those providing help is much lower in Japan than in those countries. Although Shirakawa has higher rates both in volunteering and providing help among municipalities, a higher share of providing help or care among those who report to have volunteered is not necessarily observed in Japan.

In what follows, we focus on the prevalence and time devoted to two activities: market work and provision of help to relatives outside the household, friends, and neighbors during the past 12 months. JSTAR does not have an explicit question on providing care for grandchildren, which will be collected in the second wave.

4.6.2 Time Allocation by Japanese Older Adults: Prevalence

JSTAR asks a respondent whether he/she is a worker and also asks he/she provides co-resident family members, non-co-resident relatives, or friends/neighbors with personal care, practical household help, or help with paperwork, during the past 12 months.

Figure 4-6-2 shows the proportion of those who are engaged in market work or provision of help by gender-municipality. We observe a common pattern across municipalities and across gender. First, the share of those who are working (market activities) ranges between 80% and 90% for males and between 70% and 80% for females. On the other hand, the share of those who provided help (non-market activities) is much smaller, less than 5%, and the figure does not differ between males and females. This is strikingly different from the finding in the SHARE book. The SHARE book finds that the proportion of men working for pay ranges from 30% in France and Austria to more than 60% in Switzerland while that proportion of men providing help varies from 50% in Denmark to 13% in Spain. The prevalence of work is much more dominant in Japan than the maximum in Europe and the prevalence of providing help is much less in Japan than the minimum in European countries. While we discussed the high share of working in Subsection 4.1, the SHARE book pointed out that the reason for the lowest prevalence of provision of help among Mediterranean countries is that the household size is large in those countries and there is crowding out between helping friends and relatives inside and outside the household. However, it seems this is not the case in Japan since the highest share of those providing help is observed in Shirakawa where a large family size is more prevalent than in other countries.

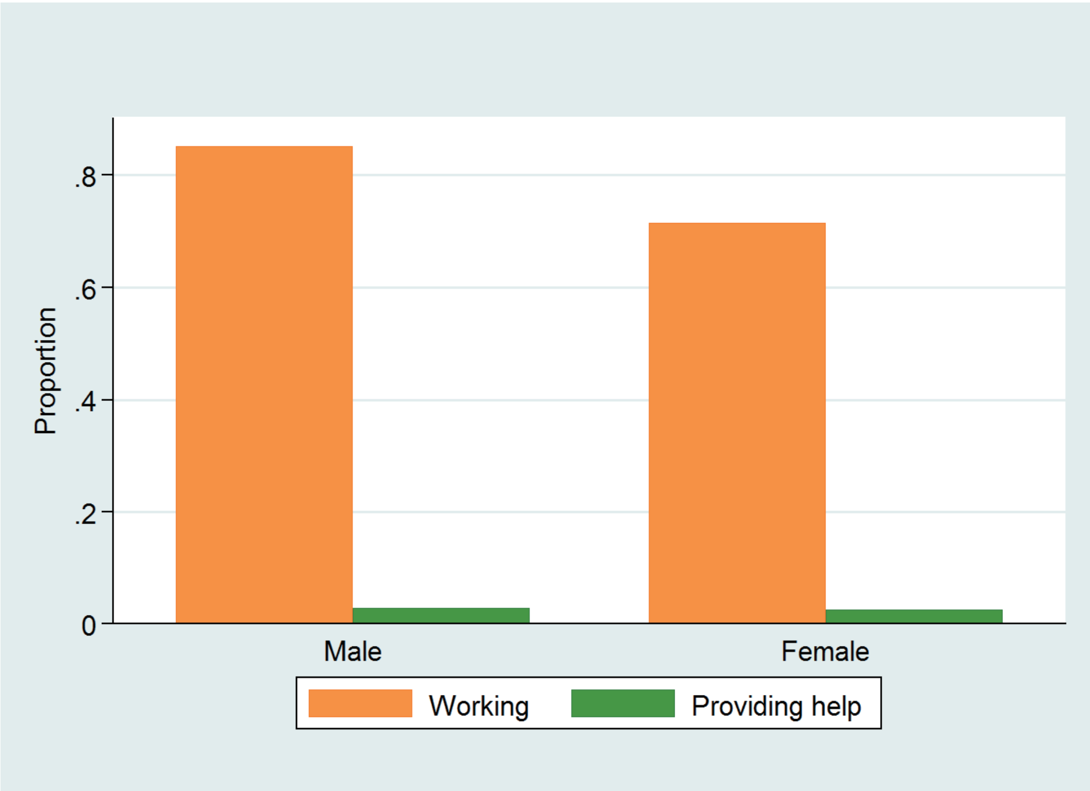

Figure 4-6-2-1 Prevalence of market and non-market activities: Sendai

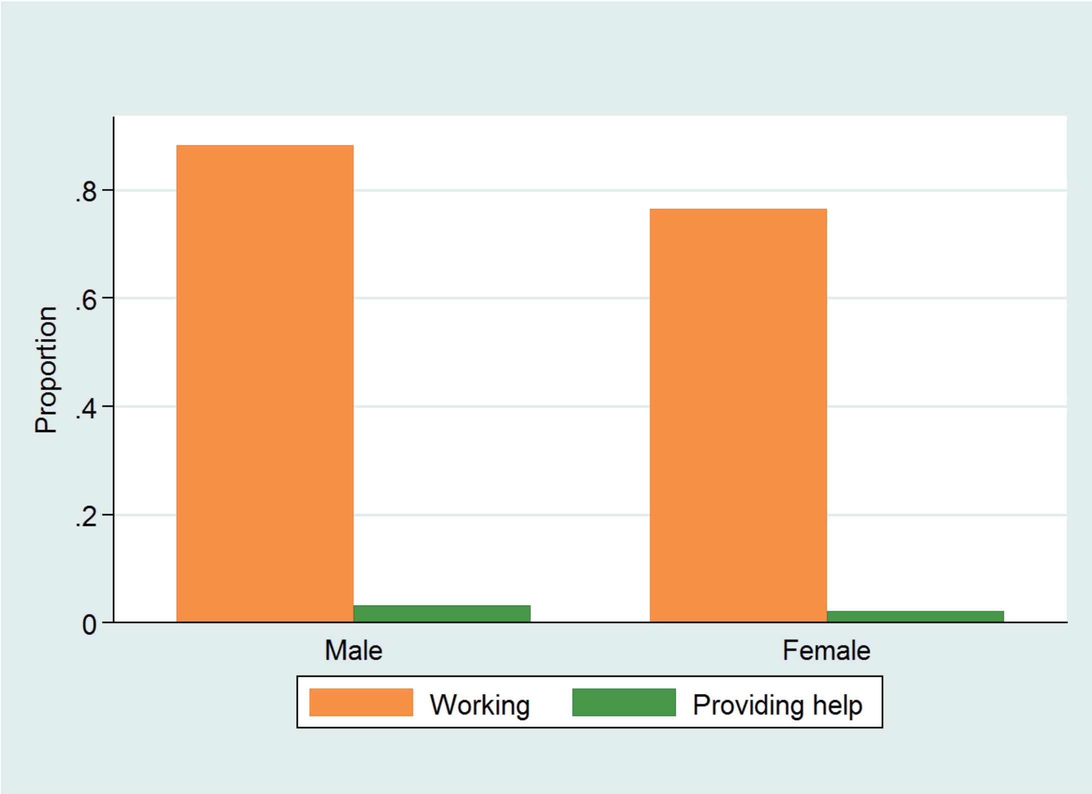

Figure 4-6-2-2 Prevalence of market and non-market activities: Kanazawa

Figure 4-6-2-3 Prevalence of market and non-market activities: Takikawa

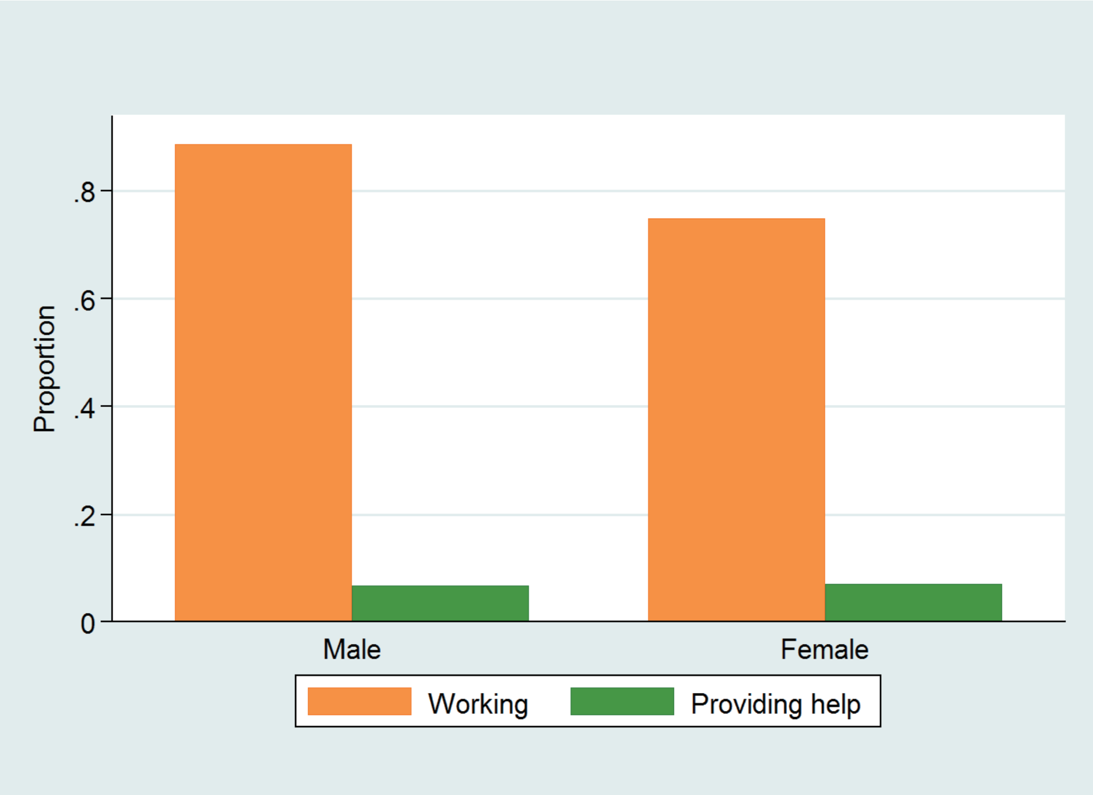

Figure 4-6-2-4 Prevalence of market and non-market activities: Shirakawa

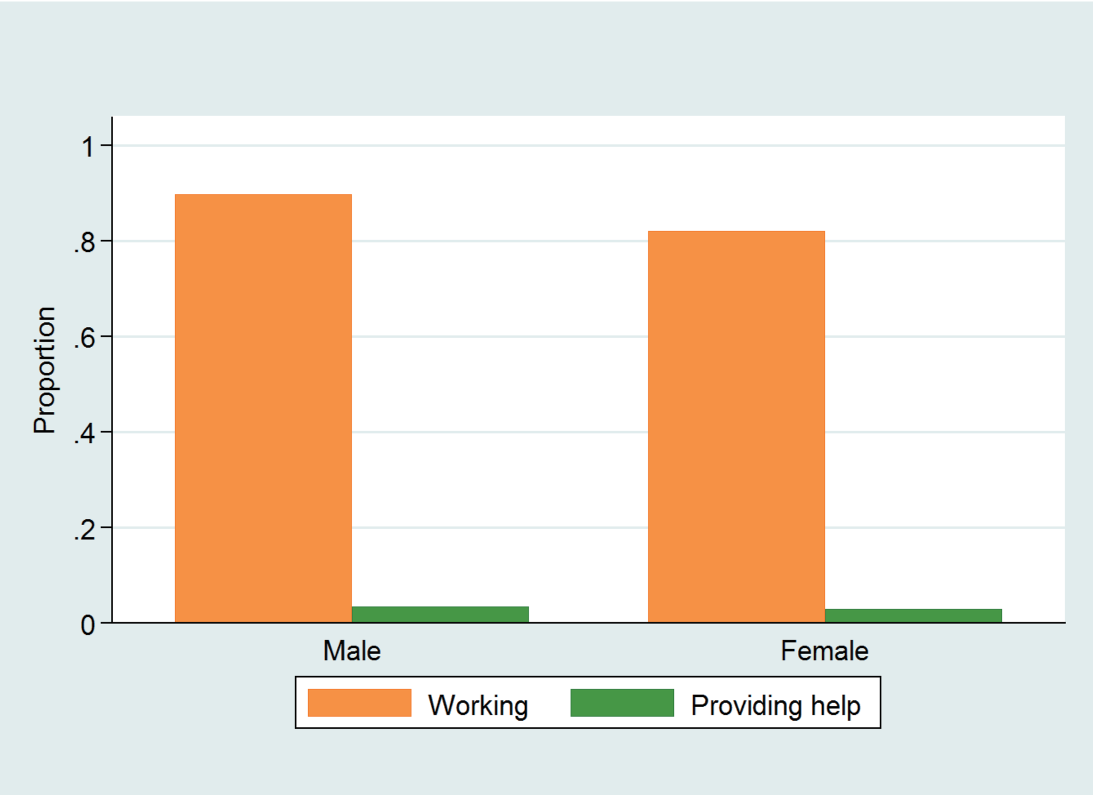

Figure 4-6-2-5 Prevalence of market and non-market activities: Adachi

The homogeneous share of those who are providing help between males and females might also be somewhat unexpected since females are less likely to be active in the labor market and more likely to have an opportunity to provide help. We may need to look into various possibilities including a possibility that the way we phrased the question inadvertently led to under-reporting of providing help to others. We need further investigation on this issue by examining the difference in age cohorts or frequency of those activities and the type of care receivers. JSTAR does not have an explicit question on care for grandchildren. The SHARE book shows that younger grandparents display noticeable gender differences in the patterns of caring for grandchildren, with younger grandmothers more likely to look after grandchildren than grandfathers while older grandfathers are more likely to care for grandchildren. Casual observation suggests that this is also the case in Japan but we need explicit data on this issue. We plan to collect the information in the second wave.

Next, we turn to the effect of health status on ability to engage in these activities. Figure 4-6-3 reports the prevalence of market and non-market activities by gender-municipality-health status.

Figure 4-6-3-1 Prevalence of market and non-market activities by health status: Sendai

Figure 4-6-3-2 Prevalence of market and non-market activities by health status: Kanazawa

Figure 4-6-3-3 Prevalence of market and non-market activities by health status: Takikawa

Figure 4-6-3-4 Prevalence of market and non-market activities by health status: Shirakawa

Figure 4-6-3-5 Prevalence of market and non-market activities by health status: Adachi

Health status in the figure refers to physical functioning measured by ADL (Activities of Daily Life). We divide the sample into those who have no difficulty in the ADL items and those with at least one item with which a respondent has difficulty. First, we observe that the proportion of males who are working is smaller for those with limitation of physical functioning except Takikawa. There is no clear pattern between physical functioning and probability to work. In contrast, in three municipalities, the proportion of females who are working is larger for those with limitation of physical functioning. Moreover, the share of females who are engaged in non-market activities is also larger for those with any functioning limitation. As seen above, the share of workers is larger than in European countries even if a person suffers from any physical limitation. The results on females are somewhat counter-intuitive, and need further investigation.

4.6.3 Conclusions

• Activities of those aged 55 to 75 show a remarkably stable relationship among four out of five municipalities in JSTAR. About 20% engage in hobbies, 15% in community activities, 10% in volunteering, 10% in sports, 5%-9% in learning, and less than 5% in religious activities, providing help to others, and also politics.

• Market work in Japan is much higher and activities to provide help to others are much lower than SHARE countries. This is true for both men and women and common across all municipalities in JSTAR data.

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Chapter 5
Socioeconomic Status

5 Socioeconomic Status

5.1 Household Income

5.1.1 Introduction

Household income and wealth are the important economic resources for consumption in old age. There has been a tremendous volume of research on income and the relationship between income and variables of interest in economics and other fields of science. Here are some examples closely related with people aged 50 and over.

First, the canonical life cycle/permanent income hypothesis (LC/PIH) claims that an individual optimizes his/her consumption path dynamically over the life cycle and consumption is unchanged unless permanent income changes. However, even in the LC/PIH framework, current consumption is affected by current available resources for those who are under liquidity constraint. Moreover, there are many empirical evidences against the prediction of the hypothesis and current income is closely associated with current consumption. Famous empirical evidence is the "retirement consumption puzzle" (Banks, Blundell, & Tanner 1997): consumption declines along with a decrease in current income after retirement even though permanent income is unchanged. While the phenomenon is still a "puzzle," there are empirical evidences that current income matters for current consumption and thus the living standard of the elderly.

Second, current income is often used as a measure of economic inequality and poverty. This aspect attracted attention in recent Japan. Although Japan was often considered as an egalitarian country compared to other developed countries, there has been a large volume of debates on expanding income inequality and economic disparity within Japan after the decade-long recession since the 1990s. The government reports that expanding inequality is associated with the rapid speed of aging. The elderly who have a larger economic disparity than the younger cohort now occupies a larger share of the population. While there is still no consensus on the degree and causes of economic inequality, one consensus is that economic disparity is larger among the elderly than the young and thus more attention should be paid to the economic inequality among the elderly.

Third, current income is closely related with health status and family and social networks. There is a consensus in social epidemiology that socioeconomic factors are closely related with individual health status. Although the size of the effect of socioeconomic status depends on specific health problems, some results previewed in Chapter 2 also confirm the association. Measuring income as well as other socioeconomic factors including wealth accurately is critical to understand the association between health status and socioeconomic factors at the individual level and therefore important for the public policies. This is also the case for family and social networks. For example, education is strongly associated with lifetime earnings. Family provides informal education and typically provides means for formal education beyond the compulsory education. Bequests are also an important element in transferring wealth from one generation to the next.

At the same time, it is well known that measurement of income is not easy. There are various reasons for the difficulty: understanding questions, recalling errors, unwillingness to answer (which is likely to invite dishonest responses), and other factors. The measurement of income deserves careful investigation on its own. JSTAR aims to measure income in a variety of dimensions to make the income measure as accurate as possible to be comparable from both national and international perspectives.

Before an in-depth description of income measures in JSTAR, we note that in contrast to other HRS/ELSA/SHARE type surveys, the unit of JSTAR is the individual, not the family or a couple, which is suitable to modern Japanese society. At the same time, JSTAR collects information which enables us to compute household income. In this chapter we examine household level income, wealth, and consumption data.

5.1.2 Measuring Net Annual Income in JSTAR

As in SHARE, JSTAR has several variables to capture individual or household income. The individual income contains earnings (including business income), pension income, and private transfers. If finances are kept jointly, a respondent is asked to answer the spouse's earnings too. The household level income includes rents and housing benefits received as well as business income. In this subsection, we will focus on the results on the main income question—annual net income for a respondent and spouse if keeping the finances jointly. In addition, JSTAR has other questions on some specific items such as gross labor income, public pension income (that of a spouse as well when keeping finances jointly), income transfers (both giving and receiving at a household level), and rents at a household level.

First, in order to collect accurate income data, a respondent is asked to fill in net income and payments of tax and social security premiums in the self-reporting questionnaire. The net income includes labor income, pension income and capital gains from financial assets, and real estate investment. The amount is adjusted by income transfers (from children or parents, etc.) and estimated value of benefits in kind.

Then a respondent is asked to fill in the total amount of tax payment and social security contribution from annual income during the past 12 months. Those payments include tax on income and residence, business, real estate, cars, and inheritance as well as social security premium including pension, mandated health, and long-term care insurance. If the division between tax payments and social security contribution is available, the respondent is further asked to fill in both amounts (if unknown, the total of tax and social security payments only). If household expenses are managed separately, net income and tax payments are asked only for the respondent. If household expenses are managed jointly, those figures are also filled in for the spouse.

Each respondent is asked to fill in the figures in the self-administered questionnaire by looking at the official tax record each respondent retains at home. While JSTAR has not succeeded in linking official data held at municipalities which is utilized in the medical and long-term care use, the method of JSTAR is able to mitigate the measurement errors of income.

In the interview which comes after filling in the income questions in the self-reporting questionnaire, the interviewer asks the respondent whether those income items were indeed filled in or not. If this is not the case, the interviewer asks the value of annual net income and the sum of tax payments and social security contribution in the past 12 months. Some people respond "don't know" or "refuse to respond." If a respondent is willing to answer but he/she does not provide exact numbers for net annual income and tax/social security payments, he/she is asked a sequence of the unfolding bracket questions (was this income higher/lower than a certain threshold?, etc.) up to three thresholds. These answers place the income in a certain range.

We should keep in mind that the procedure to measure income in JSTAR is different in some aspects from SHARE. First, the basic definition used in SHARE reflects money income before taxes on a yearly base (2003) and includes regular payments only. Thus, household income in SHARE does not include capital gains on financial or real assets nor does it include lump-sum payments and financial support provided by parents, relatives, or other people. Second, when calculating capital income (interest and dividend income), SHARE records it at the household level, not at an individual level while JSTAR records capital income separately between a respondent and a spouse.

5.1.3 Variations in Net Annual Income across Municipalities and Demographics

We present net annual income across municipalities and household demographics. We make three remarks on the construction of the household income. First, the household income is calculated as the sum of annual income of the respondents and their spouses if household expenses are managed jointly. If the household expenses are managed separately then the respondent's income is reported. For the jointly managed household, if the income data for both husband and wife are not available, we regard the information on household income as missing and exclude them from the sample used in this section. In the case of a household whose living expenses are managed separately, the income of the spouse is not available in JSTAR. A limited number of households responded household management in a different way from the self-administered questionnaire and interview and thus are excluded from the sample.

Second, if a respondent gave us the information on his/her income (and that of his/her spouse) both in the leave-behind questionnaire and the interview, we took the information in the leave-behind questionnaire since we expect it to contain more precise information. Third, we have a point value of income data in the leave-behind questionnaire but we have only information on the range of income for those who answered the unfolding brackets questions in the interview. Thus, we present the household income in terms of the upper and the lower limits. For the respondents who gave us the point figure in the self-administered questionnaire, the upper and the lower limits are identical.

We examine net annual income across a variety of household attributes and municipalities. To do so, we set up eight "household types." Table 5-1-1 reports the classification and the number of the respondents for each category. Household Type 1–4 are those who are not married while Type 5–8 are married. Type 1 and 5 are those who live with neither a parent nor a child. Type 2 and 6 are those who live with a child/children but not with a parent. Type 3 and 7 are those who live with a parent/parents but not with a child. Finally, Type 4 and 8 are those who live with both a child/children and a parent/parents. Tables show that the most dominant are Type 5 (living with a spouse) and Type 6 (living with a spouse and a child/children), which exceed 30%, respectively. The proportion of other household types is less than 10%.

Table 5-1-1 Shares of family type

Family Type	Definition	Number of respondents	%
Type 1	Live alone	376	8.8%
Type 2	Not married, live with a child/children	286	6.7%
Type 3	Not married, live with a parent/parents	80	1.9%
Type 4	Not married, live with a child/children and a parent/parents	21	0.5%
Type 5	Live with spouse only	1413	32.9%
Type 6	Live with spouse and a child/children	1357	31.6%
Type 7	Live with spouse and a parent/parents	244	5.7%
Type 8	Live with spouse and a child/children and a parent/parents	342	8.0%
Missing	Others	172	4.0%
All		4291	100.0%

JSTAR asked whether household expenses are managed jointly by a husband and wife or if they are managed separately. Table 5-1-2 reports the proportions of those two groups confining the sample to the married. The proportion of the individuals who manage the household expenses jointly is about 93% on average and that of the individuals who manage those separately occupies 7%. At a closer look, the share of joint management is slightly larger in Sendai and Takikawa, which exceed 95%, and lower in Adachi (92%) and Shirakawa (91%). While a large difference is observed across household types, the share is slightly lower for households whose husbands' ages are in the 50s or those living with spouse, a child (children), and a parent (parents). In what follows, all single households are considered to manage a household separately.

First of all, we estimate the level of annual household income. The medians of the lower limit and the upper limit in all municipalities are 3.6 million yen and 4.4 million yen, respectively. Looking at those figures by municipality, the lower limit is 4.0 million yen and the upper limit is 4.3 million yen in Sendai, 4.0 and 5.0 million yen in Kanazawa, 3.0 and 3.5 million yen in Takikawa, 3.2 million yen and 4.0 million yen in Shirakawa, and 3.5 million yen and 4.5 million yen in Adachi. The household income at the median seems to be higher in Kanazawa and lower in Takikawa and that for Sendai, Adachi, and Shirakawa is located in between.

Table 5-1-2 The number of samples whose household is managed jointly or separately

	Total	Share of those whose household is managed jointly	Share of those whose household is managed separately
Sendai	706	95.0%	5.0%
Kanazawa	813	93.1%	6.9%
Takikawa	451	96.2%	3.8%
Shirakawa	672	91.1%	8.9%
Adachi	663	91.7%	8.3%
Live with spouse only (Type 5)	1385	93.1%	6.9%
Live with spouse and child/children (Type 6)	1326	94.0%	6.0%
Live with spouse and a parent/parents (Type 7)	240	93.8%	6.3%
Live with spouse, a child/children and a parent/parents (Type 8)	333	91.3%	8.7%
Respondent in 50s (husband if married and managing household jointly)	977	91.5%	8.5%
Respondent in 60s (husband if married and managing household jointly)	1302	93.9%	6.1%
Respondent in 70s (husband if married and managing household jointly)	1009	94.0%	6.0%
All	3305	93.3%	6.7%

However, we should keep in mind that this comparison is based on a simple average of each municipality and does not adjust for the difference in family type and family members. Thus, we compute the equivalent household income, household income per household member, that would be more appropriate to discuss the living standard of the middle-aged and elderly persons. The equivalent income is defined as the annual net household income (the sum of the respondent's and the spouse's income if household expenses are managed jointly, otherwise, that of the respondent) divided by the square root of number of family members. The number of family members includes the respondent, the spouse, and their dependent children (children who are economically independent of the parents are excluded) as well as co-resident parents in the same house. We excluded grandchildren or other dependent relatives from the family size. We should note that if household expenses are managed separately, we subtract one from the number of family members since the spouse has a different household.

First, we represent the CDFs (cumulative density functions) of equivalent house hold income for each municipality. When depicting these graphs, we exclude any samples whose equivalent household income exceeds the 90 percentile since the shape of the figure is dense in the left due to the outliers. However, when discussing the median in the text, we include those samples to compute those figures.

Figure 5-1-1 illustrates the CDFs of equivalent household income by municipality. While omitted, the median for all municipalities is 2.5 million yen at the lower limit and 3.0 million yen at the upper limit. Naturally, we observe regional disparity in net annual income. The corresponding values for Sendai and Adachi are comparable with those for all municipalities. The lower and upper limits are 2.7 and 3.0 million yen for Sendai, and 2.5 and 3.1 million yen for Adachi, which are comparable with those for all municipalities. These figures are slightly higher in Kanazawa with the lower limit of 2.8 million yen and the upper limit of 3.3 million yen. In contrast, the upper limit at the median for Takikawa is 2.5 million yen, which is less than the lower limit at the median for all municipalities and the lower limit is 2.1 million yen. Those figures in Shirakawa are 2.1 and 2.7 million yen, which are comparable with those in Takikawa but lower than those in Sendai, Kanazawa and Adachi.

However, those CDFs do not control a variety of household characteristics. Thus we examine equivalent household income, controlling for a variety of attributes of households: age, sex, marital status, management of household (jointly or separately), household type, municipality, educational attainment, industry, and job type if employed. Note that age, sex, educational attainment, industry, and job type are those of the husband if household expenses are managed jointly. In order to adjust for those factors, we employ quantile regression at the 10, 25, 50, 75, and 90 percentiles. Concretely, pooling all the households in the sample, we regress equivalent gross annual income on sex (male is the reference), management of household (joint management takes one otherwise zero), age brackets (age 60s, age 70s; age 50s is the reference), marital status (being not married is the reference which includes those who are never married, widowed, or divorced), household type (8 types; Type 1 (not married not living with a child or a parent) is the reference), municipality (Sendai is the reference), educational attainment (high school graduate, two-year college graduate, and university or more graduate; junior high school graduate is the reference) and industry (11 categories) and job type (8 categories). Among these variables, sex, age, educational attainment are of the respondents and of the husbands if household expenses are managed jointly.

Figure 5-1-2 illustrates the results. The graphs in the left hand side show the results for the lower bound while those in the right hand side report those for the upper bound. We present only the coefficients which are estimated at 10% significance and do not show any coefficients which are not significantly estimated. We have several observations. First, annual income is generally smaller for females. While annual income presumably declines with age due to shorter working hours or retirement, family size also becomes smaller since dependent children are more likely to be independent and the relationship between equivalent income and head of household age is ambiguous. The annual income decreased for those aged in their 70s at the 50 and 75 percentiles. Second, turning to household type, equivalent household income is significantly smaller for Type 3 (not married living with a parent/parents) or Type 4 (not married living both a parent/parents and a child/children). As regards other household types, we do not see consistent results between the lower and upper bounds. Third, looking at municipalities, annual income is significantly lower in Takikawa at the 50 percentile and larger in Kanazawa at the

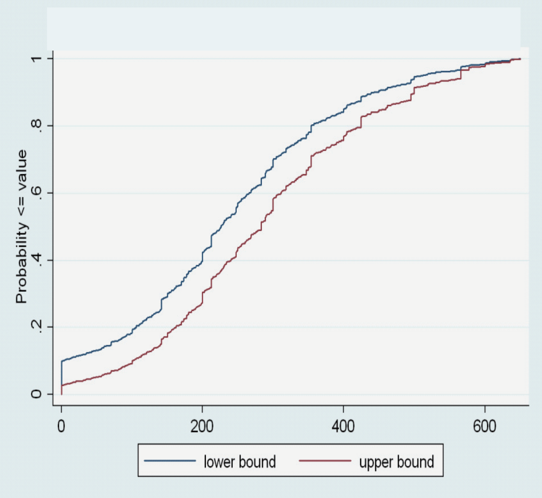

Figure 5-1-1-1 Equivalent household income (all)

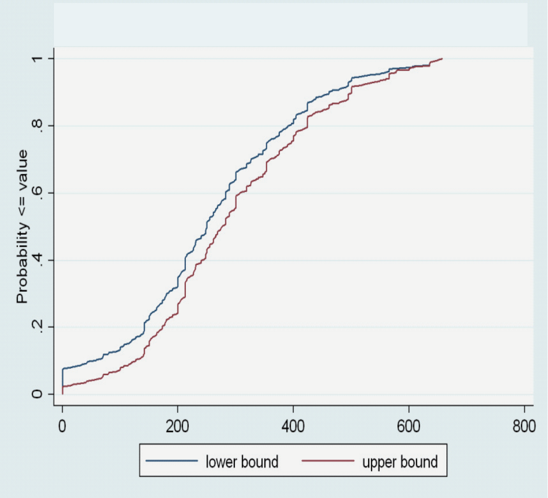

Figure 5-1-1-2 Equivalent household income (Sendai)

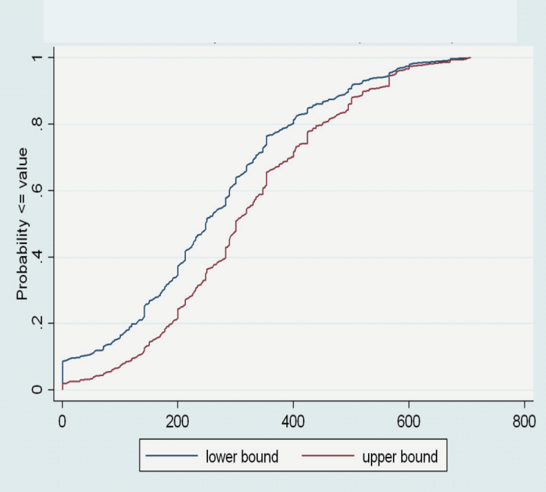

Figure 5-1-1-3 Equivalent household income (Kanazawa)

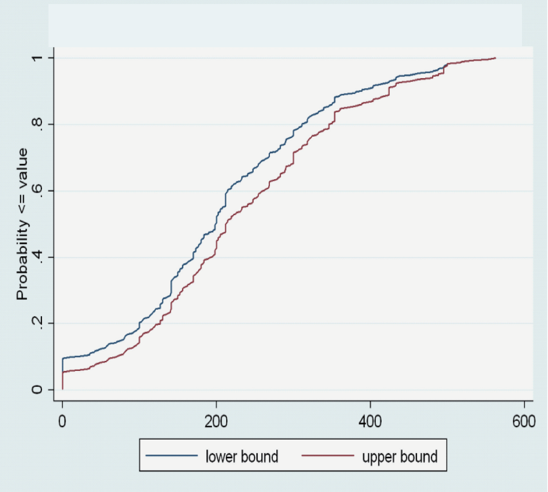

Figure 5-1-1-4 Equivalent household income (Takikawa)

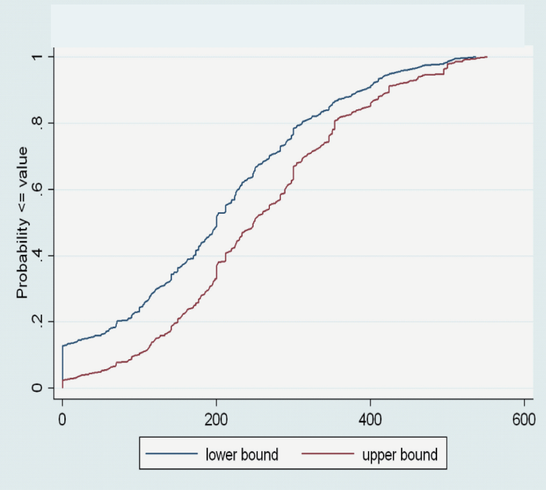

Figure 5-1-1-5 Equivalent household income (Shirakawa)

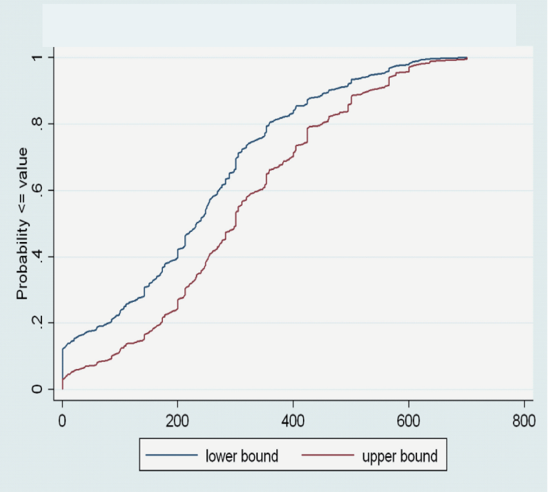

Figure 5-1-1-6 Equivalent household income (Adachi)

90 percentile. Fourth, university or more graduates receive a higher annual income at every percentile for both lower bound and upper bound. We also see that annual income is higher for senior high school graduates than for junior high school graduates at 10, 25, and 50 percentiles. We notice the size of the difference from junior high school graduates is larger at higher percentiles, implying that education is a more important factor among the rich. Lastly, most of the coefficients on industry are significant at 50 and 75 percentiles (the reference is no job). In addition, "work" in all job types except production enjoy a higher income at the 10 percentile. These observations show that we need to pay attention to household characteristics as well as municipalities when discussing household income. In particular, we see some systematic differences in the equivalent household income in age, specific household types, some municipalities and educational attainment.

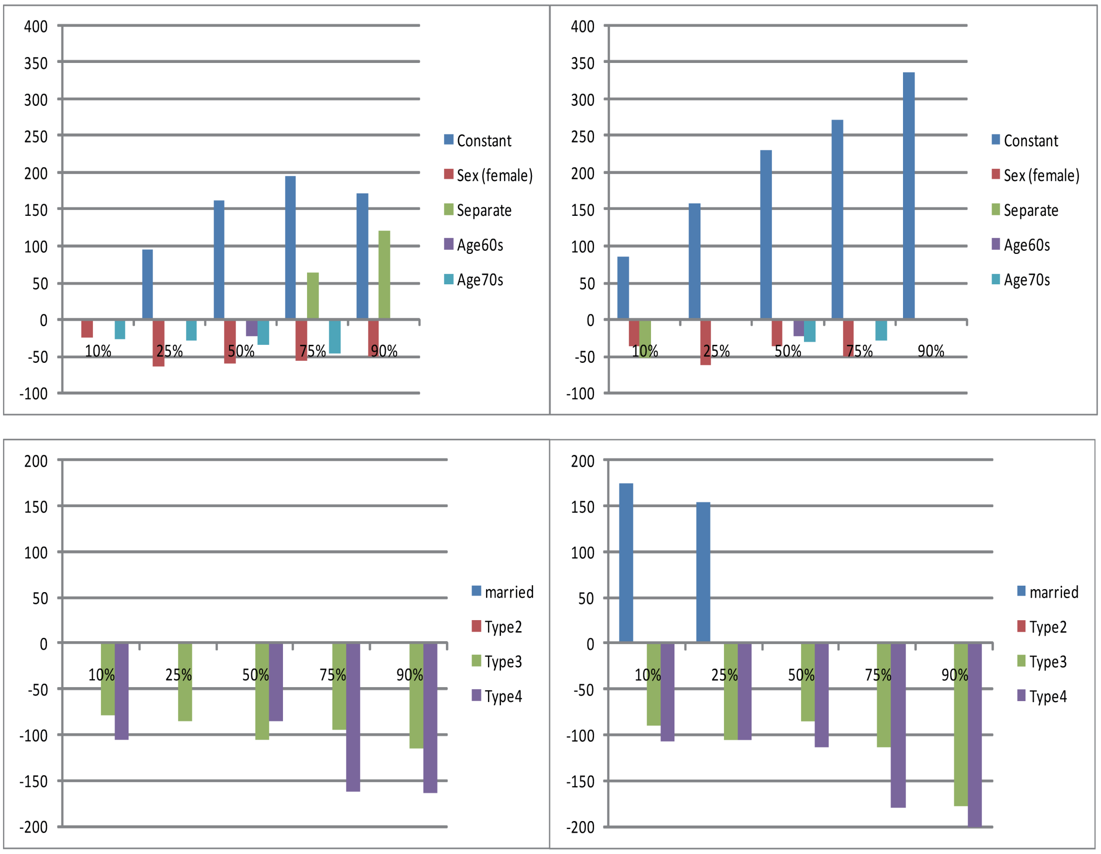

Figure 5-1-2 Difference in equivalent household income (unit: ten thousand yen)

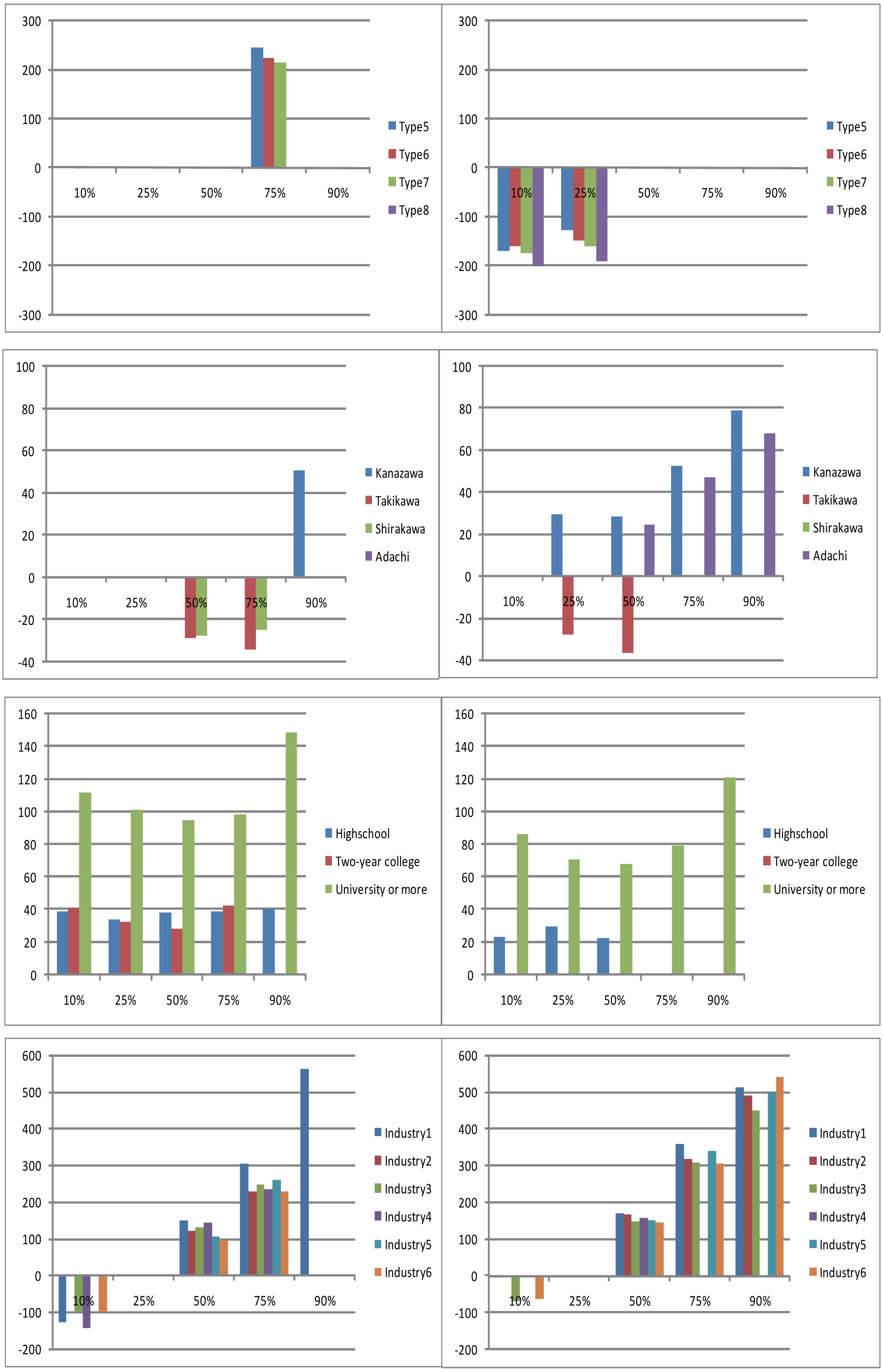

Figure 5-1-2 (con't.) Difference in equivalent household income (unit: ten thousand yen)

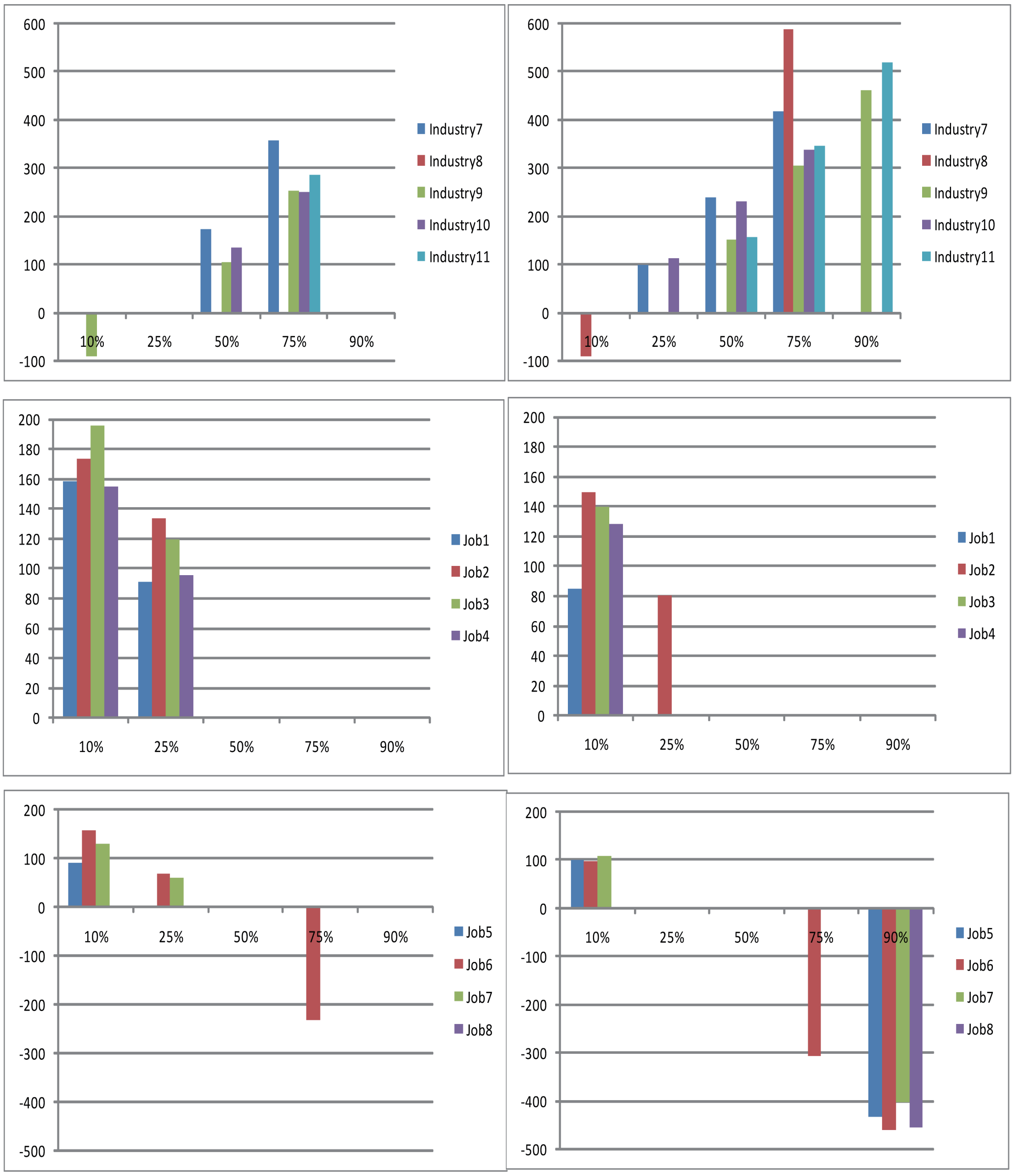

Figure 5-1-2 (con't.) Difference in equivalent household income (unit: ten thousand yen)

Industry 1: Agriculture, lumber, fishery and mining
Industry 2: Construction
Industry 3: Manufacturing
Industry 4: Electricity, gas, water or heat supply
Industry 5: Transportation and communication
Indsutry 6: Wholesale, retail
Industry 7: Financial and insurance
Indsutry 8: Real estate
Industry 9: Services
Industry 10: Government
Industry 11: Missing

Job 1: Expert or technical
Job 2: Management
Job 3: Administration
Job 4: Sales
Job 5: Services
Job 6: Security guard
Job 7: Agriculture, forestry and fishery
Job 8: Transportation and communication
Job 9: Production

5.1.4 Comparison of Income between Self-reporting and Official Record

The protocol of the JSTAR calls for asking a respondent to fill in the leave-behind questionnaire and then interviews the respondent on a later day. The interview asks about income using unfolding brackets in the case the respondent did not answer the question in the leave-behind questionnaire. However, sometimes a respondent is interviewed first before filling in the leave-behind questionnaire. In this case, respondents are asked to mail in the leave-behind questionnaire. In both cases we expect the information on income either from leave-behind questionnaire or interview. However, some respondents who first answered their income in the interview returned the self-filling questionnaire later filling in the income information. For these individuals we have income information from two sources. While we need to keep in mind the selection bias of the respondents, we utilize the figures for validation of household income data.

Figure 5-1-3 presents comparison of net annual household income between self-reporting and official records retained at home. The income data is not converted to an equivalence scale. The upper panel shows the comparison for the respondent and the lower panel for the spouse. First, we examine the disparity in both income measures for the respondent. We observe that the self-reported income is located between the lower and the upper bound for all income ranges. At a close look, the self-reported income is close to the upper bound obtained in the interview, rather than the lower bound, especially in lower income ranges. Second, the pattern for the spouse’s income is similar to that for the respondent's.

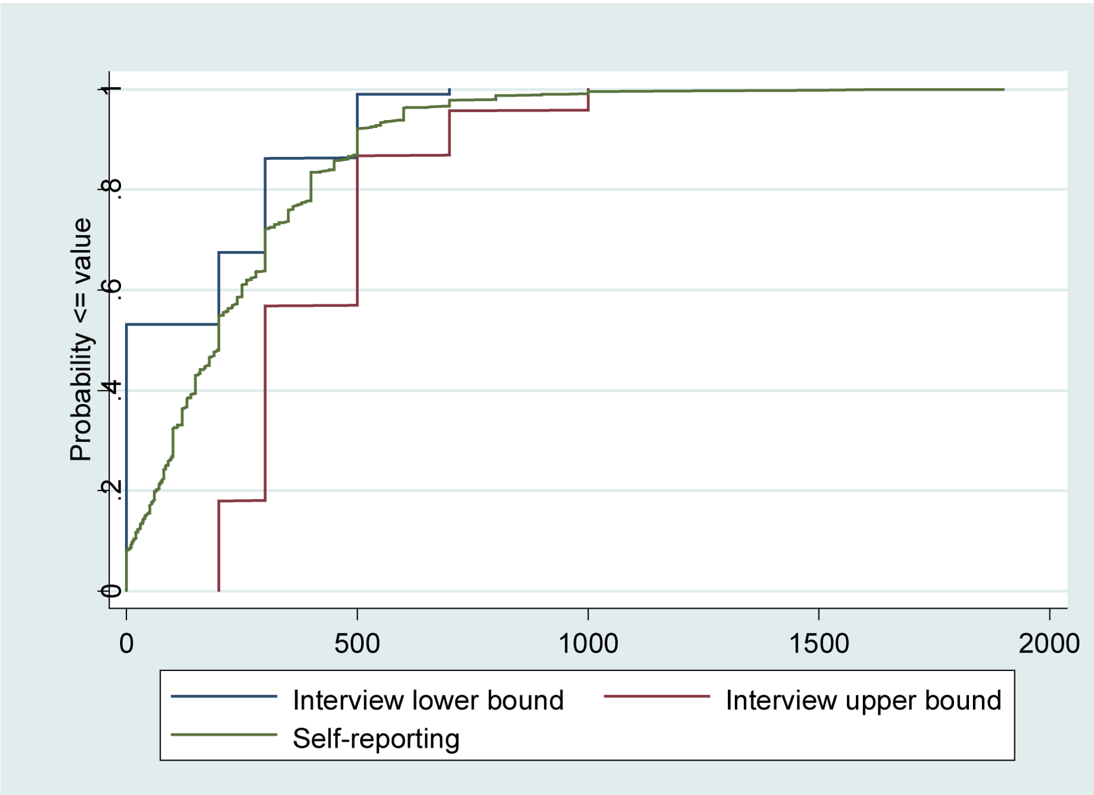

Figure 5-1-3-1 Comparison of household income between self-reporting and official tax record (respondent)

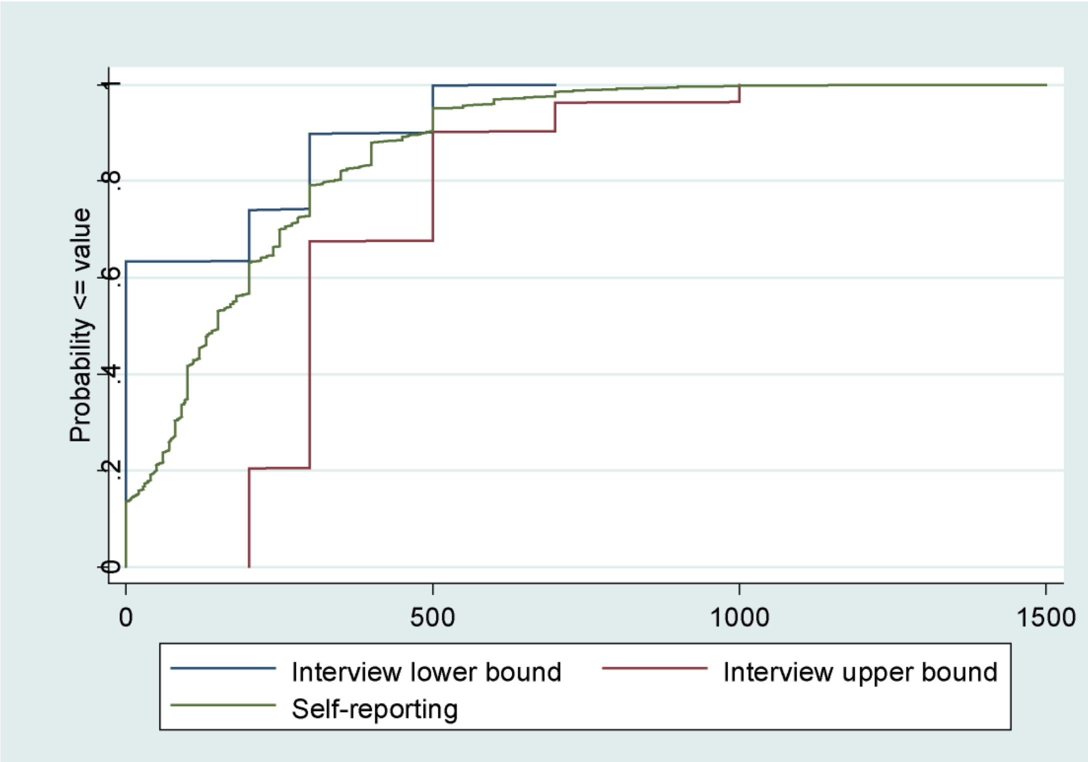

Figure 5-1-3-2 Comparison of household income between self-reporting and official tax record (spouse)

While we need to further work on the validation of income data, a preliminary analysis implies that we do not observe a large difference in household income between the self-reported based on tax records and unfolding brackets.

5.1.5 Towards a Better Income Measure

This section previewed income data in JSTAR, focusing on gross annual household income adjusted for household demographics and several income items. We observe systematic differences in the equivalent household income. There are further issues we need to address. First, we need to examine whether annual household income matches the sum of each income item. While we use the samples whose annual income data is available in this section, imputations and corrections using a variety of variables are needed for missing or extraordinary responses for total income and each component of expenditure. This is especially the case for pension income and imputed rents, which is a large resource for middle-aged and elderly persons and requires a careful examination to measure the well-being of the elderly. If the gap remains after these adjustments, we should identify main factors to account for the difference and improve the income measure. Indeed, the SHARE book reveals a large disparity in each component for each country. A preliminary analysis shows that the imputed rent is the highest in Adachi, which is located in the center of Tokyo, and the second highest in Sendai and Kanazawa and, if imputed rents are included, the gap in gross household income between those two municipalities and

Adachi will be smaller. In contrast, the imputed rents are lower in Takikawa and Shirakawa. This means that if we include imputed rents for total household income, the difference will be larger between the three municipalities (Sendai, Kanazawa, and Adachi) and Takikawa and Shirakawa. Second, unlike SHARE, we do not have to compute purchasing power parity (PPP) across different currencies but we may still have to adjust for the difference in price level so that we construct the income measures in real terms. Third, we need to impute a point value of income when we know only the range of household income based on the unfolding brackets. One particular way to impute household income in JSTAR is to employ the income data both in terms of official records and self-reporting. We provide some preliminary results in this section but we need to pursue a better measure for income using this unique information.

5.1.6 Conclusions

• JSTAR contains a variety of income measures. When focusing on net annual household income, we observe systematic differences in the equivalent household income across age, sex, education, household type, industry, and job type, as well as municipality.

• The household income data in JSTAR should be elaborated through imputation and correction of each income item, evaluation in real terms using price difference across municipalities and computation of a point value for the income range based on the unfolding brackets.

• Imputations are particularly important for some large items like pension income and imputed rents to measure the well-being of middle-aged and elderly people.

5.2 Wealth and Portfolio Composition

5.2.1 Introduction

Along with current income, accumulated wealth is one of the main determinants of the well-being of the elderly. According to the standard life-cycle/permanent income hypothesis, people compensate for their consumption after retirement by dis-saving their wealth which is accumulated before retirement (Modigliani 1986). Thus, wealth is a key factor for well-being in later life, especially for the retired. At the same time, it is not an easy task to obtain a precise amount of wealth. In addition to a large variation of the amount of wealth across individuals, wealth takes a variety of forms including financial assets, real estate, and others. This section provides an overview of the wealth amount and portfolio composition in JSTAR, focusing on the differences among municipalities and household characteristics.

When considering the role of wealth and analyzing the wealth holding for the elderly, we should pay attention to two aspects. One aspect is adequacy of savings at retirement. It is not an easy task to determine the adequacy, i.e. whether the wealth at retirement (and interest income) can finance the flow of consumption in later life together with other resources since it depends on a variety of factors: amount of accumulated labor income, expected non-labor income (i.e. pension income), retirement age as well as time preference, expected life expectancy, risk aversion, and bequest motives. In particular, wealth is also a buffer for unexpected health shocks (e.g. hospitalization or institutionalization) for the elderly. How public pensions programs and health and long-term care insurance can substitute or complement private wealth is one of the most important policy issues to reconsider the role of public insurance program and appropriateness of current benefits. While these issues should be investigated in-depth later, we provide a basic picture of wealth amount and composition in JSTAR. The other aspect is the distribution of wealth. While we observed some systematic differences in equivalent household income in the previous section, we see a disparity of wealth across individuals, too. We will turn to this point in a later section (Section 4 of this chapter).

The Japanese government collects data on financial wealth in the Family Income and Expenditure Survey (since 2001; Family Savings Survey before 2001) on a monthly basis and in the National Survey on Family Income and Expenditure every five years. In addition to the difficulty for researchers to access micro-level data from those sources, the sample size of the Family Income and Expenditure Survey is not large (9,000 in total) and the sample for those aged between 50 and 75 is relatively small. The sample size of the National Survey on Family Income and Expenditure is large (approximately 50,000) but the data is cross-sectional and collected every five years. In this sense, JSTAR provides a nice opportunity to explore dynamic process of wealth accumulation for an individual.

5.2.2 Measuring Wealth in JSTAR

Similar to SHARE, the questionnaire in JSTAR covers a wide range of financial and real assets. Financial assets include three broad categories: deposits, bonds, and stocks.

Deposits include bank and postal ordinary deposits as well as time deposits and postal saving certificates in any financial institution. Bonds include government and corporate bonds and investment trust (e.g. money market funds). Liabilities include mortgage and consumer loans, but contribution and benefits from life insurance is not included. Note that the number of categories of financial assets is larger in SHARE (seven) than in JSTAR (three). The methodology to measure those three aspects of financial wealth is similar to that of household income. In the self-filling questionnaire, JSTAR asks the respondents to report their financial assets by type: deposits, bonds, and stocks separately. For each financial asset category respondents are asked whether they hold any assets in this category or not (a choice of "don't know" is also provided), and if they have, then they are asked to give a value for their total holdings in the category (see Juster, Smith, & Stafford 1999; and Juster & Smith 2000 for the HRS case). JSTAR asks a respondent to fill in the three types of financial wealth under his/her name. For example, if a respondent is the wife and all the deposits are accumulated under her husband's name, the amount for the respondent is zero. After asking the amounts for each of the three types of financial assets, the respondent is also asked to report those under the name of the spouse if they are managing household assets jointly.

In the interview, the respondent is asked whether he/she filled in the financial asset items or not. If he/she did, an interviewer asks a point value of each item of financial assets. Some people respond with an exact number, respond "don't know," or refuse to respond. If a respondent is willing to answer but she does not provide an exact value for financial assets, she is asked unfolding brackets questions for each of the three types of financial assets up to three thresholds. These answers place the financial assets in a certain range. We should keep in mind that, in the interview, a respondent who is married is also asked to report the amount under his/her name if household assets are managed separately and the amount under either the respondent or the spouse if household assets are managed jointly.

While JSTAR and SHARE have a common structure on measurement of the financial assets, there are some differences between them. First, the number of financial wealth items is smaller in JSTAR. However, as the SHARE book shows, financial assets other than bonds, stocks and mutual funds are less widely held, and especially individual retirement accounts and contractual savings for housing are common in only several countries. Second, respondents of the financial and housing sections are those household members most responsible for financial and housing matters, respectively, in SHARE, while respondents in JSTAR are not necessarily the persons in the household with most responsibility for the matter.

In addition to financial assets, JSTAR asks the respondents about household liabilities and real assets. As regards household debts, the respondent is asked whether the household has any mortgage on the current residence (primary residence) and, if so, how much of the mortgage remains. If the respondent has multiple mortgages, he/she is expected to report the largest one. Unlike financial assets, JSTAR asks those variables at the household level, not on an individual basis. Then, the respondent is also asked whether the household has any debts other than mortgage and if so, how much. Household liabilities except mortgage include cars, motorcycles, durable goods, and borrowing from relatives and friends. If a respondent is not able to provide a point value, he/she is routed to the unfolding bracket questions. As for the real assets, a respondent is asked to report the tenancy status, and the house and land size if the respondent is a member of a homeowner household. Then he/she is requested to provide an estimated value of the real asset if it were sold today and its ownership status. When the point value is not available, he/she is again routed into the unfolding bracket questions.

In what follows, we will review several types of wealth indicators. First, we show the ownership proportion of financial assets holdings by type of each component, i.e., deposits, bonds, stocks and non-mortgage liabilities, which are liquid in the market. Second, we depict the CDFs of net financial assets (the sum of deposits, bonds and stock minus non-mortgage liabilities) and perform quantile regression to explore the factors affecting the shape of CDFs of net financial assets. Third, we expand the same analyses to real assets which are less liquid than financial assets in the market and compute net total assets, which are defined as total assets (financial plus real assets) minus total liabilities (mortgage or non-mortgage loans). While the importance is acknowledged, we confine the real assets to real estate excluding automobile or durable goods, and consider current monetary values, but not the present value of the future income flows to use the assets. Imputations of those variables remain as a future task.

5.2.3 Variations in Household Financial Assets and Non-mortgage Liabilities Across Municipalities and Demographics

First of all, we present household financial assets and their components as well as non-mortgage loans. Similar to household income, JSTAR asked the respondent whether household financial assets (not specific type of financial assets) are managed jointly or separately. Table 5-2-1 reports the share of the households whose financial assets are being managed jointly or separately for the married households. By municipality, we see the highest share of households managing assets jointly in Shirakawa (87%) and lowest in Adachi (69%). The share of households managing financial assets jointly is slightly higher for households whose head is aged in their 60s. By family type, we see a higher share of managing financial assets jointly for households living with parents (Type 7) and lower shares for those living with children (Type 6 or 8).

Like in household income, some respondents gave us the information on household financial assets both in the leave-behind questionnaire and the interview, depending on the order of those surveys. If this is the case, we took the information in the leave-behind questionnaire since we expect more precise information, though the data on financial assets do not come from an official record. A point value of financial asset is given in the leave-behind questionnaire but we just have a point value or a range of the financial assets for respondents who were routed to the unfolding brackets questions. Thus, we present the household financial assets in terms of the upper and the lower limits.

Table 5-2-1 The number of samples whose assets are managed jointly or separately

	Total	Share of those whose household assets are managed jointly	Share of those whose household assets are managed separately
All	1451	77.7%	22.3%
Sendai	221	78.7%	21.3%
Kanazawa	423	73.5%	26.5%
Takikawa	177	83.1%	16.9%
Shirakawa	344	86.6%	13.4%
Adachi	286	69.2%	30.8%
50s	414	77.8%	22.2%
60s	587	79.0%	21.0%
70s	424	75.5%	24.5%
Live with spouse only (Type 5)	623	78.3%	21.7%
Live with spouse and a child/children (Type 6)	552	76.4%	23.6%
Live with spouse and a parent/parents (Type 7)	118	82.2%	17.8%
Live with spouse and a child/children and a parent/parents (Type 8)	153	76.5%	23.5%

Table 5-2-2 shows the proportions of financial asset holdings by asset type. First, the average share of deposit holders is 93%. Looking at municipalities, the proportion is close to 95% in Sendai, Kanazawa, and Takikawa, while it is 91% in Shirakawa and Adachi. The share also depends on household type. The share is higher for the married (Type 5-8) than the unmarried (Type 1-4). The smallest share is found for an unmarried respondent living alone (84%) and the largest is for a married respondent living with both a child/children and a parent/parents. By age group, the share is slightly smaller for those in their 50s. Second, the share of bond holders is much smaller than that of deposit holders and also varies across municipality and household type. The average share is 18%. By municipality, the largest is found in Kanazawa (27%), followed by Sendai (19%), and the lowest is in Shirakawa (7%), which presents a 20% gap between Kanazawa and Shirakawa. Again, the share of holders is larger for the married (Type 5-8) than the unmarried (Type 1-4). In contrast to deposit holding, the share is smaller for those who are in their 70s. Third, the average proportion of stock holders is 16%, which is slightly smaller than that of bond holders. Again, a large regional discrepancy is observed. The highest is Kanazawa, which exceeds 20% and the lowest is Takikawa (7%). A similar pattern is observed for different household types, though the share is higher for the unmarried than the married if living with both a child/children and a parent/parents. The share of stock holders is smaller for those aged in their 70s, which is the same pattern observed in the bond holders.

Table 5-2-2 Shares of asset holdings

	Deposits	Bonds	Stocks	Financial Liabilities
All	93.3%	17.7%	15.7%	12.0%
Sendai	94.6%	19.2%	18.0%	15.3%
Kanazawa	95.1%	27.2%	21.6%	12.4%
Takikawa	94.8%	8.8%	6.9%	9.0%
Shirakawa	90.7%	7.2%	8.7%	9.3%
Adachi	91.0%	18.5%	18.2%	12.4%
Single; Live alone (Type 1)	83.5%	13.0%	12.1%	8.6%
Single; Not live with spouse but with a child/children (Type 2)	85.3%	16.0%	11.4%	11.9%
Single; Not live with spouse but with a parent/parents (Type 3)	93.0%	19.4%	14.3%	15.6%
Single;Not live with spouse but with a child/children and a parent/parents (Type 4)	81.3%	5.9%	23.5%	25.0%
Married; Live with spouse only (Type 5)	94.4%	19.1%	16.1%	9.7%
Married; Live with spouse and a child/children (Type 6)	96.5%	17.0%	16.1%	13.1%
Married; Live with spouse and a parent/parents (Type 7)	95.0%	20.9%	21.1%	11.7%
Married; Live with spouse, a child/children and a parent/parents (Type 8)	96.7%	21.7%	18.1%	18.2%
Respondent in 50s (husband if married and managing assets jointly)	92.6%	18.0%	17.2%	19.0%
Respondent in 60s (husband if married and managing assets jointly)	95.3%	20.1%	18.8%	11.4%
Respondent in 70s (husband if married and managing assets jointly)	95.3%	14.7%	13.1%	6.5%

The SHARE book shows a large variation in total financial wealth per household: higher in the North (Denmark and Switzerland) and lower in the south (Italy, Greece, France, Spain, and Austria), reflecting small ownership of any financial assets other than bank accounts (e.g., Greece) or higher weight of real assets (Italy and Spain). The SHARE book also reports that the ownership rate of bonds and stocks increases from south to nNorth. The proportion of households holding bonds ranges from close to 0% in Spain to 24% in Denmark and that of households holding stocks varies from 3% in Spain to 38% of Sweden. While we should note the difference in the definition between JSTAR and SHARE (mutual funds are excluded in the SHARE analysis), JSTAR reveals that the share of bond holders in Japan belongs to a higher group in SHARE (the second highest is 16.5% in Sweden) while the share of stock holders belongs to the middle (close to 16.3% of the Netherlands, the 4th highest in SHARE).

The last column of Table 5-2-2 reports the proportions of the individuals who hold the liabilities except mortgages (see the definition of non-mortgage loans above). The average share is 12%. The share is slightly higher in Sendai, Kanazawa, and Adachi, and lower in Takikawa and Shirakawa. By household type, the highest share is found for Type 4 (not married living with a child/children and a parent) which reaches one quarter, while smaller for households not living with a child/children or a parent/parents (Type 1 and 5) which registers less than 10%. Moreover, the share of non-mortgage liability holders decreases along with age: 19% in the 50s to 7% in the 70s.

In what follows, we focus on net financial assets held by a household, and they are defined as the sum of deposits, bonds, and stocks minus non-mortgage liabilities. We should keep in mind that the way to convert the net financial wealth to an equivalent scale is different from that for household income or expenditure. In the case of net financial wealth, we divide the amount by 2 if household financial assets are managed jointly by a husband and wife and use the amount itself if a respondent is a single or manages household assets separately. The basic idea is that household financial assets are fully disposed by a couple, not by a child or a parent, though it is possible that the assets are used for a child or a parent through financial transfers including bequests. Moreover, the data in the graphs and the text is different since we exclude any samples whose equivalent household financial assets exceed the 90 percentile since the shape of the CDF is sensitive to the outliers. The outliers are more extreme in household financial assets than income or expenditure. However, we include all the samples to compute statistics in the text and the estimation.

Figure 5-2-1 illustrates the CDFs of household net financial assets by municipality. The median of the lower limit and the upper limit in all municipalities are 2.5 million yen and 3.0 million yen, respectively. By municipality, those figures are 2.5 million yen (both upper and lower) in Sendai, 3.3 and 3.5 million yen in Kanazawa, 3.0 and 3.5 million yen in Takikawa, 1.5 and 2.5 million yen in Shirakawa, and 2.0 and 2.5 million yen in Adachi. The average amount of net financial assets is slightly higher in Kanazawa and Takikawa and is slightly lower in Shirakawa than the average for all municipalities.

Next, we turn to examine equivalent net financial assets, controlling for a variety of attributes of households and municipalities. In order to adjust for those factors, we employ quantile regression at 10, 25, 50, 75 and 90 percentiles, which is exactly the same in Section 1 and 3 of this chapter. Concretely, pooling all the households in the sample, we regress equivalent gross annual income on sex (male is the reference), management of household (joint management takes one otherwise zero), age brackets (age 60s, age 70s; age 50s is the reference), marital status (being unmarried is the reference which includes those who are never married, widowed, or divorced), household type (8 types; Type 1 (unmarried not living with a child or a parent) is the reference), municipality (Sendai is the reference), educational attainment (high school graduate, two-year college graduate, and university or more graduate; junior high school graduate is the reference) and industry (11 categories; the reference is not working) and job type (8 categories; the reference is not working). Among these variables, sex, age, and educational attainment, industry, and job type are of the respondent and of the husband if household expenses are managed jointly.

Figure 5-2-2 illustrates the results. The graphs on the left hand side show the results for the lower bound while those on the right hand side report those for upper bound. We present only the coefficients which are estimated at 10% significance. First, the amount of net financial assets is significantly larger for a household aged in the

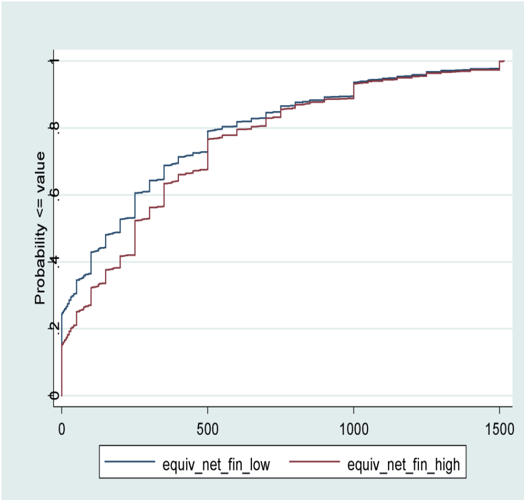

Figure 5-2-1-1 Equivalent net financial wealth (all)

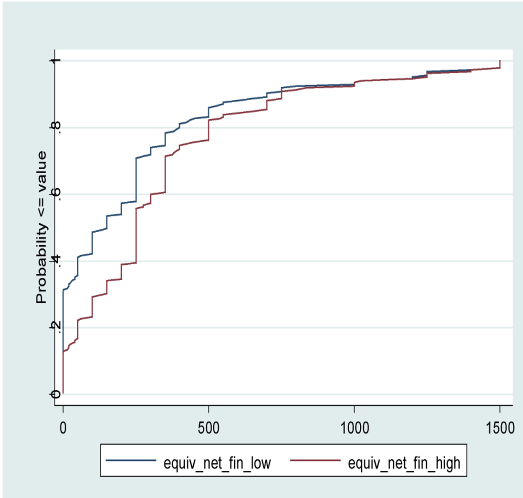

Figure 5-2-1-2 Equivalent net financial wealth (Sendai)

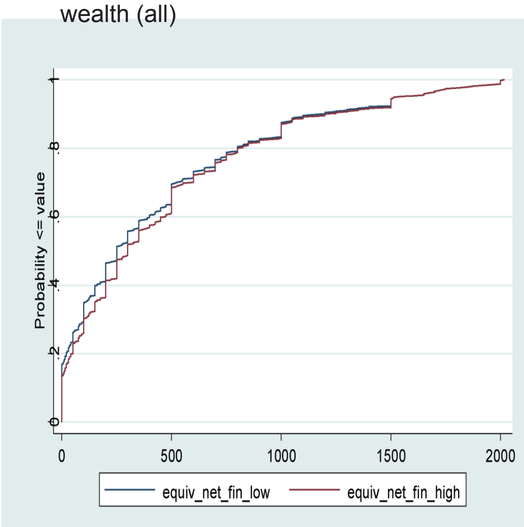

Figure 5-2-1-3 Equivalent net financial wealth (Kanazawa)

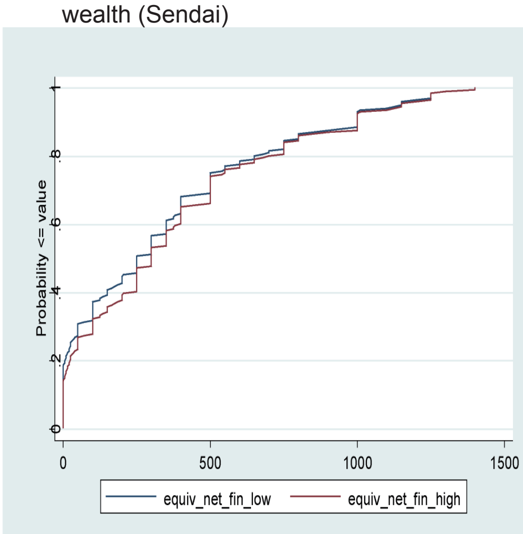

Figure 5-2-1-4 Equivalent net financial wealth (Takikawa)

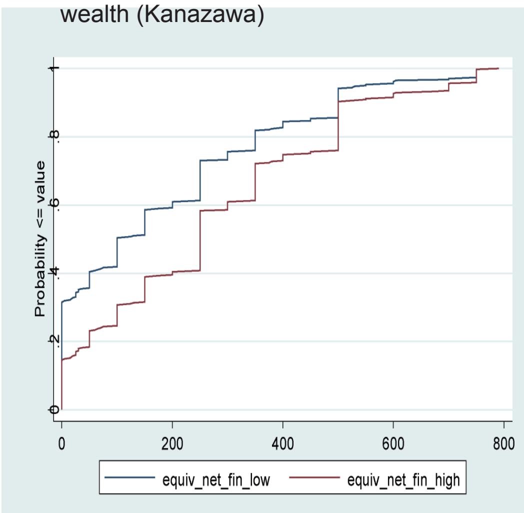

Figure 5-2-1-5 Equivalent net financial wealth (Shirakawa)

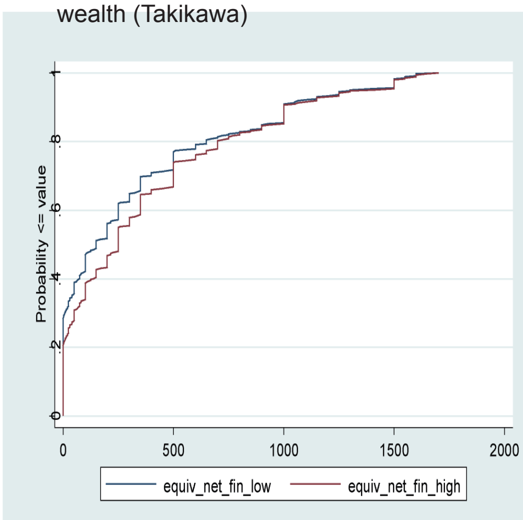

Figure 5-2-1-6 Equivalent net financial wealth (Adachi)

60s for all the percentiles except the 10 percentile and the size of the effect increases with higher percentiles and this is also the case for a household aged in the 70s at 25, at 50 and 75 percentiles. There is no significant difference for whether financial assets are managed jointly or separately. Second, the amount of net financial assets is larger for Type 4 household (a single living with a child/children and a parent/parents) at 75 percentile and the married (Type 5-8) at 75 and 90 percentiles except Type 6 (living with a child/children but not a parent/parents). Third, the amount of net financial assets is larger in Kanazawa than in Sendai at the 50 percentile but there is no other significant difference across municipalities. Fourth, the amount of net financial assets depends on educational attainment. The amount is larger for university or more graduates at all the percentiles except the 10 percentile. Fifth, there is no coefficient on industry or job types are not statistically significant (the results are omitted from the graph).

These observations show that the effect of a variety of household demographics and municipalities are different between household income and net financial assets. First, net financial assets are larger for those in their 60s or 70s while there is no significant difference across age groups in household income. Second, household income is smaller for the unmarried living with a parent/parents and/or a child/children but this is not the case for net financial assets. Third, household income is significantly smaller in Takikawa (50 and 75 percentiles) while net financial assets are significantly larger in Kanazawa (50 percentile). Fourth, both household income and net financial assets are larger for university or more graduates.

While we provided a brief description of the wealth data and their quantile regression results in this section, we need to further investigate the financial asset data. Even if the total financial assets are the same, the wealth portfolio might be different and the mixture of safe and risky assets may differ across individuals, depending on risk attitudes, discount factors, as well as mortality and morbidity risks, which are generally higher for the elderly, and the amount of real assets. The SHARE book provides some interesting patterns in the financial wealth composition. First, as stated, the ownership of bonds, stocks, and mutual fund increases from south to north. Second, the total risky assets ratio, defined as the ratio of direct holding of stocks and indirect holdings through mutual funds and investment accounts out of total financial assets, are mostly between 10% and 20% and the share of risky assets held by people around retirement age is higher than those of older ages who have an increased health risk and a decreased investment horizon to recover from negative returns (Hurd 2001). Third, stock market participation is affected by financial sophistication and literacy of individual investors, though the information is not available in the first wave of JSTAR. More in-depth investigation of household financial assets in JSTAR will provide more insights on the household portfolio.

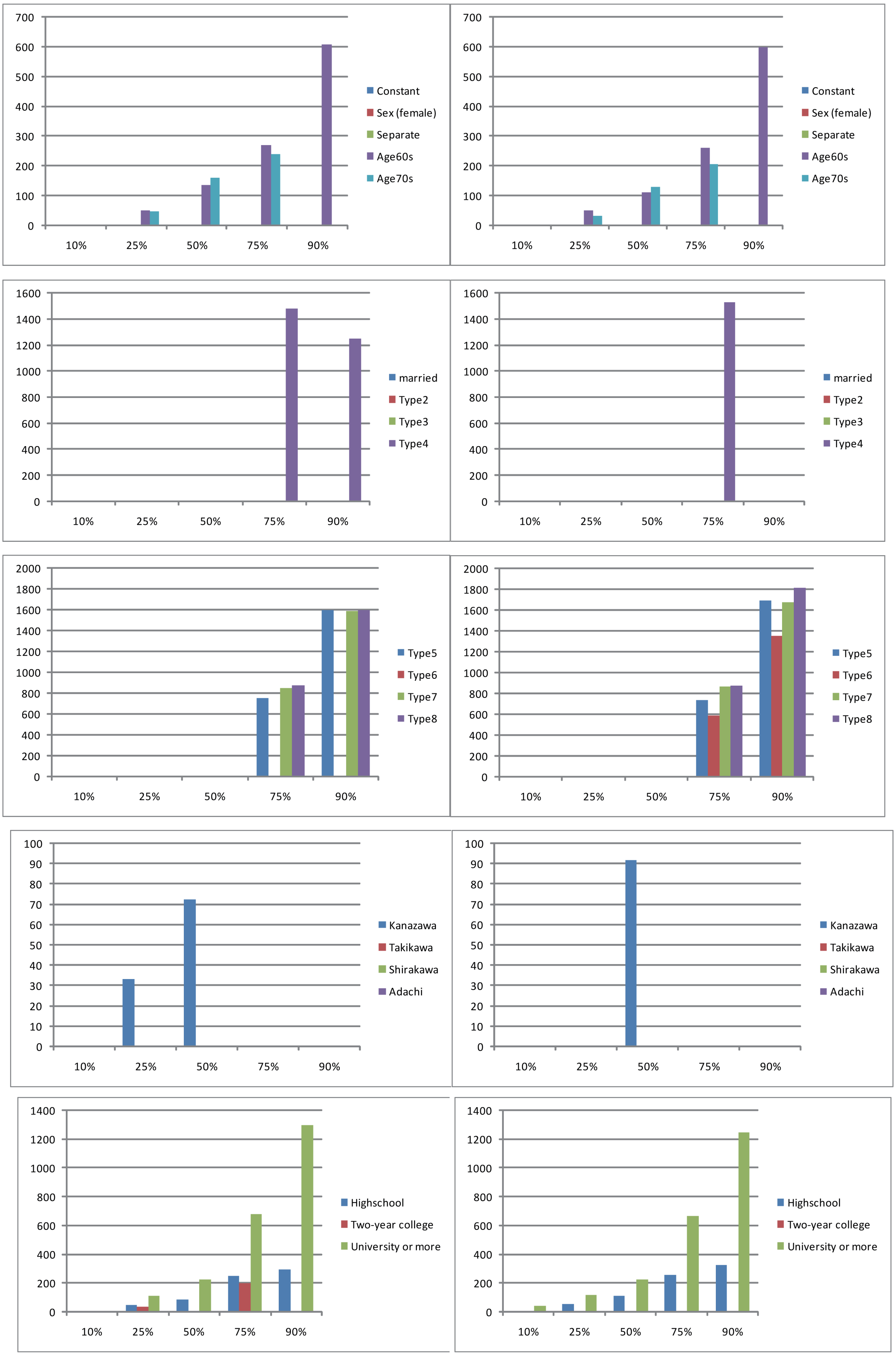

Figure 5-2-2 Difference in equivalent net financial wealth (unit: ten thousand yen)

5.2.4 Variation in Household Real Assets and Mortgage Loan and Total Net Assets across Municipalities and Demographics

Lastly, we present the total net worth considering all types of assets including real assets (land and housing) and household liabilities (mortgages) and compare the pattern of gross financial assets and net worth. The important message in the SHARE book is that the cross-country distribution of gross financial assets does not parallel that of net total assets, depending on the importance of real assets. While the SHARE book used a terminology "net worth" defining the sum of financial and real assets minus mortgage/non-mortgage loans, we use "net total assets" since the present value of the future income flows to use the assets are not considered in this section. Moreover, we keep in mind that real assets refer to land/housing assets only and exclude automobile or durable goods.

The SHARE book illustrates that the median net total assets varies across European countries and divides those into (1) high wealth group (Switzerland, Spain, and Italy), (2) higher wealth group (France and the Netherlands), (3) lower wealth group (Austria, Denmark, and Greece) and (4) low wealth group (Germany and Sweden), though the relative rank depends on the purchasing power adjustment. In Italy and Spain where real estate consists of a larger share in all the wealth, the amount of the financial wealth is smaller but that of net total assets is higher.

Before computing net total assets, we examine the shares of holders of real assets (land and house) and liabilities (mortgages only). Table 5-2-3 reports that the share of real asset holders is 31%. First, naturally, we see a large variation across municipalities. The share is highest in Shirakawa (70%) and lowest in Adachi (17%), reflecting a large variation in real asset prices and industrial structure. Second, the share of real asset holders increases along with age from 18% in the 50s to 30% in the 70s. Third, we see a generally larger share of real asset holders for those who are not married (Type 1-4) than those who are married (Type 5-8). In contrast, the share of mortgage holders among real asset holders is largest in Adachi (26%) whose share of real asset holders is the smallest while the proportions for Takikawa (14%) and Shirakawa (17%) are smaller. This finding may reflect that land and housing price is much higher in Adachi, located in the center of Tokyo, which discourages households from purchasing real assets but once they have those assets, they owe a large amount of liabilities. The average for all municipalities is close to 20%. The share is higher for those who are not married (Type 1-4), which coincides with the higher share of real asset holders among them. In contrast to the share of real asset holders, the share of mortgage holders is smaller for those aged in their 60s or 70s than the 50s since many of them completed repayment of those mortgages. The share of mortgage holders is higher for those living without a spouse (Type 1-4), except those living with a child/children (Type 6) but not with a parent/parents.

In what follows, we convert net total assets to an equivalent scale. As stated, equivalent net financial assets are computed by dividing the amount by two if household financial assets are managed jointly by a husband and wife (otherwise, equivalent net financial assets are equal to the amount of net financial assets). On the other hand, net real assets are defined as the value of housing and/or land minus the current stock of mortgage loans and converted to an equivalent scale by dividing the amount by two if a respondent is married (for the non-married, equivalent net real assets are equal to the amount of net real assets). JSTAR does not ask a respondent whether he/she manages real assets jointly or separately but instead asks under whose name real assets are held. We assume that real assets are managed jointly if a respondent is married. Finally, net total assets are the sum of net financial assets and net real assets.

Table 5-2-3 Shares of real asset and mortgage loan holdings

	Real Assets	Mortgages (among real asset holders)
All	30.7%	21.7%
Sendai	19.1%	25.5%
Kanazawa	25.3%	23.4%
Takikawa	22.0%	14.4%
Shirakawa	70.2%	16.7%
Adachi	17.0%	26.4%
Respondent in 50s (husband if married and managing assets jointly)	17.8%	29.2%
Respondent in 60s (husband if married and managing assets jointly)	22.2%	9.1%
Respondent in 70s (husband if married and managing assets jointly)	30.0%	14.5%
Single; Live alone (Type 1)	29.3%	28.3%
Single; Not live with spouse but with a child/children (Type 2)	52.7%	27.4%
Single; Not live with spouse but with a parent/parents (Type 3)	48.2%	32.2%
Single; Not live with spouse but with a child/children and a parent/parents (Type 4)	33.1%	22.7%
Married; Live with spouse only (Type 5)	20.2%	14.6%
Married; Live with spouse and a child/children (Type 6)	29.1%	44.0%
Married; Live with spouse and a parent/parents (Type 7)	30.7%	18.9%
Married; Live with spouse, a child/children and a parent/parents (Type 8)	36.7%	8.0%

Figure 5-2-3 depicts the CDFs of household total net assets by municipality. As in the CDFs of net financial assets, we exclude any samples whose equivalent household financial assets exceed the 90 percentile (80 percentile for Adachi) since the shape of the CDF is sensitive to the outliers but includes all the samples to compute statistics in the text and the estimation. The median of the lower limit and the upper limit in all municipalities are 9.3 million yen and 12.5 million yen, respectively. Looking at those figures by municipality, those figures are 11.0 and 12.5 million yen in Sendai, 12.5 and 14.8 million yen in Kanazawa, 6.5 and 8.9 million yen in Shirakawa, 6.8 and 13.5 million yen in Takikawa, and 7.5 and 10.3 million yen in Adachi. The average amount of net financial assets is slightly higher in Kanazawa and Takikawa and is slightly lower in Shirakawa than the average for all municipalities.

Next, we turn to examine equivalent net total assets, controlling for a variety of attributes of households. Pooling all the households in the sample, we employ quantile regression to adjust for those factors. The methodology is exactly the same as the estimation of net financial assets in this section except the dependent variables. Figure 5-2-4 illustrates the results. The graphs on the left hand side show the results for the lower bound while those on the right hand side report those for the upper bound. We present only the coefficients which are estimated at 10% significance. First, the amount of net total assets is significantly larger for a household in age 60s at all percentiles and in age 70s at 25, 50, and 75 percentiles, and the size of the effect increases with higher percentiles, a pattern similar to that of net financial assets only. There is no significant difference in different management or gender. Second, the difference in total net worth by household type is little observed except Type 4 (a single living with a child/children and a parent/parents) at the 90 percentile. Third, net total assets is smaller in Takikawa than in Sendai except at the 10 percentile. In addition, the amount is larger in Kanazawa at 50 percentile. Fourth, the amount of net total assets is larger for university or more graduates and the size increases along with age. Fifth, most of the coefficients on industry are positive and significant at the 10 percentile (and some at the 25 percentile) while those are cancelled out by negative effect of job type.

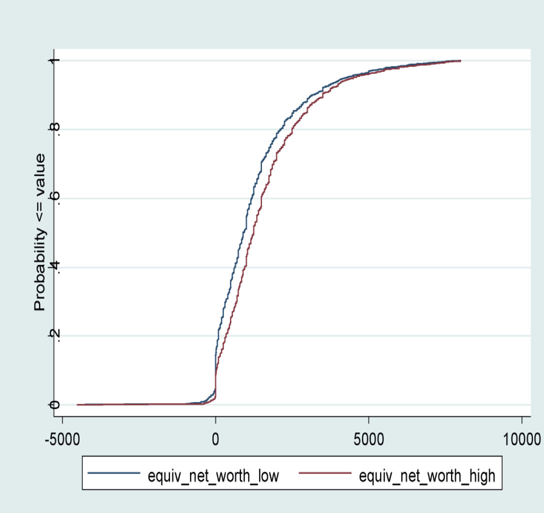

Figure 5-2-3-1 Equivalent net total wealth (all)

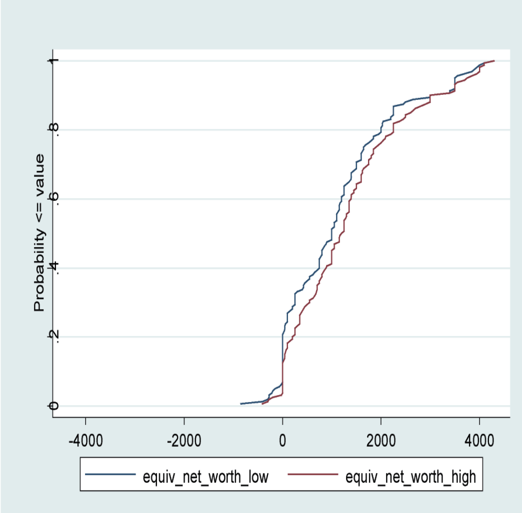

Figure 5-2-3-2 Equivalent net total wealth (Sendai)

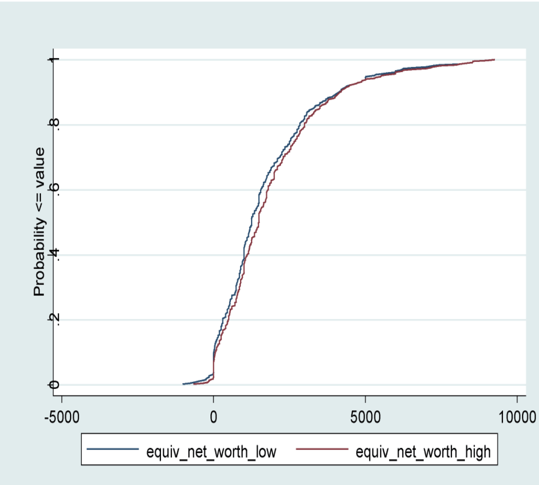

Figure 5-2-3-3 Equivalent net total wealth (Kanazawa)

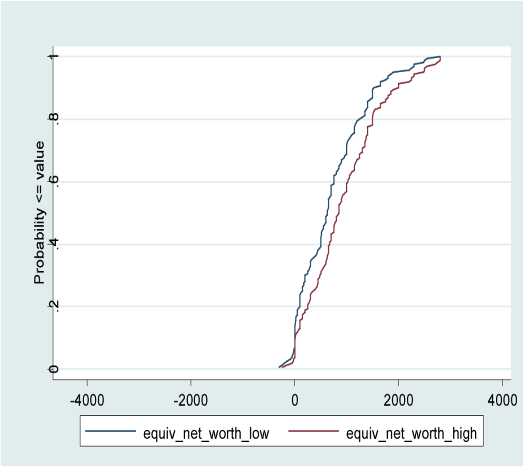

Figure 5-2-3-4 Equivalent net total wealth (Takikawa)

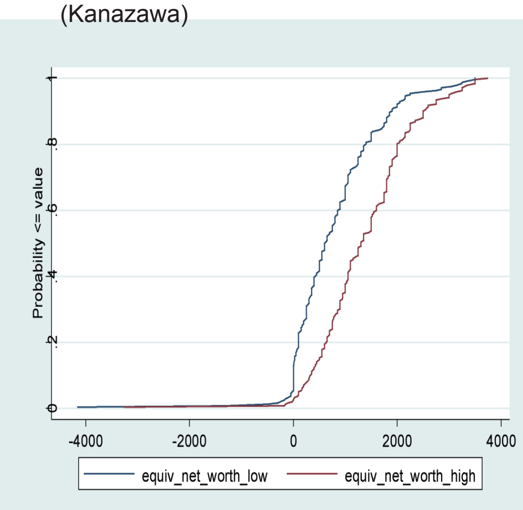

Figure 5-2-3-5 Equivalent net total wealth (Shirakawa)

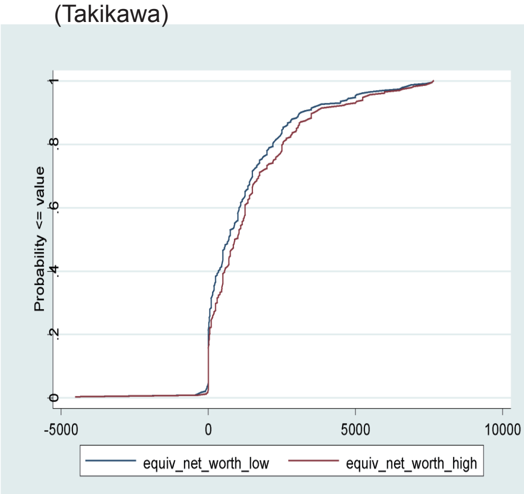

Figure 5-2-3-6 Equivalent net total wealth (Adachi)

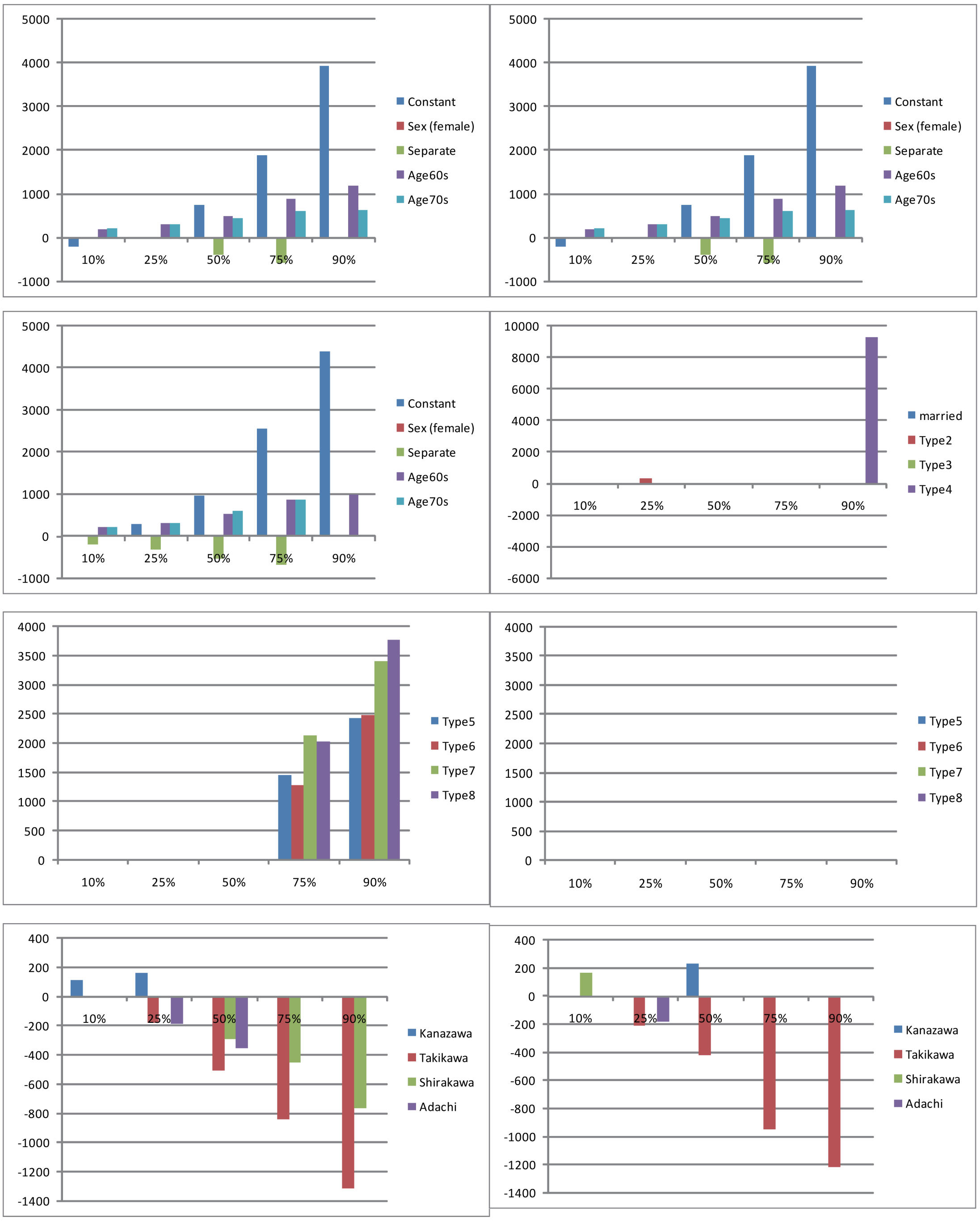

Figure 5-2-4 Difference in equivalent net total wealth (unit: ten thousand yen)

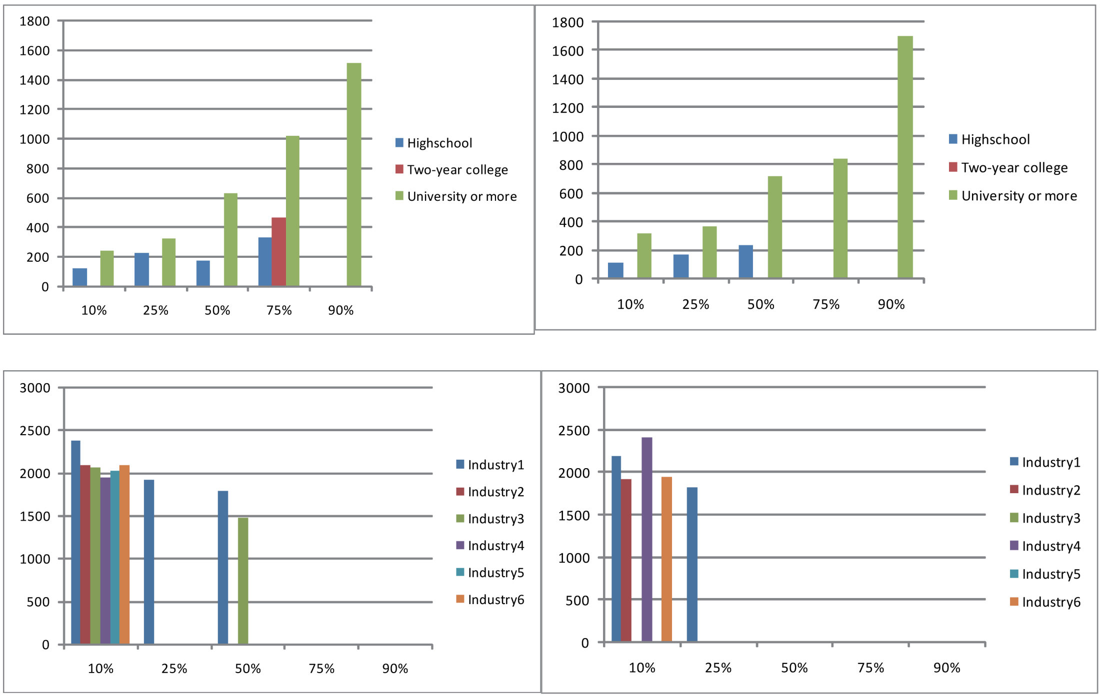

Figure 5-2-4 (con't.) Difference in equivalent net total wealth (unit: ten thousand yen)

Industry 1: Agriculture, lumber, fishery and mining
Industry 2: Construction
Industry 3: Manufacturing
Industry 4: Electricity, gas, water or heat supply
Industry 5: Transportation and communication
Indsutry 6: Wholesale, retail

In this section, we construct several wealth variables using JSTAR data. It seems that JSTAR was effective in producing the ownership rate of each financial item and the data on the amount of each component and we need to further investigate the data to construct more precise information on net total assets. Furthermore, we concur with the SHARE book discussion on the adequacy of saving. It depends on attitudes toward saving as well as intensity of bequest motives, features of the mortgage markets, transaction costs in housing markets, and availability of reverse mortgage markets. Further analysis should tackle those issues together with the role of public pension program and health insurance in later life.

5.2.5 Time Patience, Risk Aversion and Expectations

So far, we provided some description of financial and real assets across household characteristics and municipalities in JSTAR. In addition to information on the amount of asset holding, JSTAR used a block of hypothetical questions to infer discount factor and risk aversion, which are fundamental parameters governing individual decision-making. Moreover, JSTAR asked the respondents about their beliefs about future events such as mortality risks as well as expected value on their wealth (including public pension benefits) and bequests, which are indispensable to examination of forward-looking behavior. We provide a very brief description of those variables below.

First, JSTAR has a series of unique and explicit questions to measure discount factor. The question is to compare receipt of one million yen now for certain versus receipt of a varying amount (X) in 13 months' time; respondents were asked to choose one of the two options. The amount of X was assigned 11 different numbers, starting with 0.95 million yen (annual interest rate is negative 5%) and ending with 1.40 million yen (annual interest rate is 40%) in the eleventh month.

We expect that a more impatient respondent is more likely to choose to receive cash in the earlier months and a more patient respondent is more likely to choose to receive a higher reward in the future. We observe a large variation among gender-municipality groups. By gender, females are more time impatient. This pattern is observed in all the municipalities except Takikawa in Hokkaido, which is a relatively newly-developed area since the second half of the nineteenth century, where time patience is similar in both sexes.

Second, JSTAR provides a series of hypothetical questions to measure risk aversion. There are two sets of questions directed to each respondent. Before starting those questions, the interviewer reminds the respondent that the questions are unrelated to whether the respondent indeed has a job or his/her company actually offers such options in reality. The respondent is asked to choose one of the two options regarding receipt of salary. In the first set of questions (we call this set "risk aversion 1"), the first choice is an uncertain case and allocates a variety of probability to higher reward (probability of X) and lower reward (probability of 1-X) where X ranges from 90% to 10%. The second choice is always the same (the certain case). The first choice in the second question is an increase by 50% with probability of 90% and an increase 5% with probability of 10%. The choice in the last question is an increase by 50% with probability of 10% and an increase of 5% with probability of 90%. We expect a more risk averse respondent to be more likely to choose a certain case when the probability to receive a higher reward is low. The questioning is stopped when a respondent first chooses the certain case. The series of questions in the second set of the questions are similar to the first set of the questions but the change in increase in the certainty case is 20%, not 10% (we call this set "risk aversion 2"). We asked two sets of the questions with different changes in reward for identification.

If we compare the results of “risk aversion 1” between males and females, males are more likely to choose a risky choice than females. If we compare municipalities, the gender gap is much smaller in Kanazawa than in Sendai and diminishes further in Takikawa and Adachi. In contrast, the respondents in Shirakawa are more risk averse than those in other municipalities. The results using “risk aversion 2” reveal that the gap between the lines of CDF for males and females widens, which is particularly the case for Sendai. Together with the observations of time patience, we have a general observation that females are more impatient and more risk averse while males are more time patient and more risk loving. At the same time, we should keep in mind that there are some discrepancies in the degree of the gap between males and females and among municipalities too. Further research should relate the differences in time patience and risk aversion with a variety of the life aspects in this book, which are represented by health behavior, employment status or wealth portfolio.

Third, JSTAR asks the respondents who were not eligible at the time of interview but would be in future about the probability that pension benefits would be reduced more than 10%. One of the most serious concerns in Japan is public distrust in the sustainability of current public pension programs. Since pension benefits are the primary source for many people, their beliefs regarding future pension reforms are an important component for life design at an individual level and, at the same time, reliability of the program as a public policy at the national level. The choices include “none,” “don’t know,” and “refuse to answer.”

Very interestingly, we observe a large variation across municipalities, though the public pension program is uniform in Japan. The share is 45% in Sendai, close to 40% in Shirakawa, and 37% in Adachi. While Sendai and Kanazawa have in common a long tradition as cultural cities and are not different in time patience and risk aversion, the share is 28% in Kanazawa. The figure is the lowest in Takikawa at 24%, which is about half that in Sendai. SHARE found that younger respondents report higher probabilities of their expectations for future pension cuts. Japan has a uniform pension program in the country and the share in Takikawa with the youngest average age of the respondents among the five municipalities has the lowest proportion. What accounts for the regional disparity in “anxiety” for a reduction in future pension benefits should be further examined.

Fourth, JSTAR has questions on subjective survival probabilities in a different way from SHARE. JSTAR asks all respondents to reveal their views on probability to live at ages 75, 80, 85, 90, 95, 100, 105, 110, 115, and 120. We put two devices in the question to reveal survival probabilities properly. One is that the probability to live at a certain age is always smaller than that to live at a younger age. The other is that we put official statistics for survival probabilities for each age on the card shown in person by the interviewer to the interviewee. In other words, each respondent answers his/her probability to survive at different ages knowing the “averages” of each age based on government statistics.

We extract several interesting findings. First, the gap between the probability of self-reporting duration of lifetime is always lower than the official life tables, both for males and females. Second, the gap between the self-reporting probability and the national average is larger for females than males. In other words, females are more likely to underreport their life expectancy. Third, regional discrepancies in the subjective life expectancy are large. In the case of males, the self-reporting life expectancy is the lowest in Kanazawa and the highest in Shirakawa. In Shirakawa, there is little gap between the subjective and the official expectancy. The patterns in Takikawa and Adachi are slightly higher than those in Kanazawa. In the case of females, we see a similar pattern: the highest in Shirakawa and the lowest in Kanazawa. Further research should explore what accounts for the regional difference in life expectancy and how it is related with health status. Then, how the difference in the subjective life expectancy affects household consumption and wealth portfolio should also be examined to understand the economic aspects of the elderly in Japan.

5.2.6 Conclusions

• JSTAR covers a wide range of financial and real assets and allows us to construct a variety of types of wealth. This section examines net total financial assets (the sum of deposits, bonds and stocks minus non-mortgage liabilities) and net total assets (the sum of net financial assets and net real assets).

The estimation results using quantile regression show (1) the amount of net financial assets is larger for those aged in their 60s or 70s whilehousehold income declined for a household aged in the 70s, (2) household income is smaller for the unmarried living with a parent/parents and/or a child/children but this is not the case for net financial assets, (3) household income is significantly smaller in Takikawa while net financial assets are significantly larger in Kanazawa and (4) both household income and net financial assets are larger for university or more graduates.

• The ownership rate for real assets (land and houses) is 31% with a large variation across municipalities (70% in Shirakawa and 17% in Adachi) and household demographics. After controlling for a variety of factors, the amount of net total assets is significantly larger for a household in aged in the 70s, or in Kanazawa, or university or more graduates.

5.3 Consumption

5.3.1 Introduction

Consumption is often used as a measure of a longer term material well-being of individuals. Despite the importance of consumption as a measure of living standard, measuring consumption is a very difficult task. Usually measuring consumption is more difficult to measure precisely than income. Like other countries, the Japanese government collects monthly consumption data based on a diary, called the Family Income and Expenditure Survey (FIES) and the National Survey on Family Income and Expenditure (NSFIE). In addition to the difficulty to access micro-level data from those sources, data is collected in a rather short period (six months for FIES and three months for NSFIE) and infrequently (NSFIE is performed every five years). There are other data sources including consumption data in a specific period (i.e., September in every year) but they are based on respondents' recall without a diary. Moreover, the sample for those aged between 50 and 75 is not necessarily large in those surveys. (The number of the sample is about 9,000 for FIES and 50,000 for NSFIE.)

JSTAR provides rich information on consumption and expenditure in an internationally comparable way including the sequence of questions and the composition of expenditure items. Similar to other "family" surveys, JSTAR does not require the respondent to keep a diary since keeping a diary places a large reporting burden on respondents and possibly discourages them from cooperating in a survey. While we need to validate the data comparing with government statistics in Japan, which is based on a diary, we believe that JSTAR's consumption data is one of a few useful datasets for measuring the well-being of the middle-aged and elderly people from an international perspective. Moreover, JSTAR is the only available source on consumption in Japan together with a variety of other information such as information on wealth, health status, family and social networks, as well as expectation on life expectancy, among others.

SHARE has a question on the self-reported economic situation of the households which simply asks the respondents whether they are able to make ends meet under their household's total monthly income. SHARE found a higher proportion of people with difficulty in the southern European countries and there is no correlation at all between the percentage reporting difficulty in making ends meet and the level of food consumption. JSTAR does not have this question and we cannot compare self-reported economic situation between JSTAR and SHARE.

5.3.2 Measuring Consumption in JSTAR

Following Browning, Crossley, and Weber (2003), JSTAR asks the respondents about their expenditure in the four sub-groups, food consumption at home, eating out, and total amount of expenditure on nondurable goods and services (excluding housing payments such as rents or mortgage payments and the purchase of durable goods such as televisions or refrigerators) in a usual month during the past twelve months as well as durable goods purchased in the past twelve months. For these questions, a respondent is asked to answer the exact amount spent in each category with the options of "don't know" and "refuse to answer." If the amount is not uncertain, an interviewer employs unfolding brackets up to three times to ask the range of expenditure in each category. In addition, JSTAR asks the respondent the number of cars owned and the frequency of change and the value. Moreover, before asking the amount for each expenditure category, JSTAR asks who is in charge of managing living expenses and who makes a final decision of spending for living expenses, food at home, eating out, and durable goods. On the other hand, JSTAR does not have a specific question on telephoning which is included in SHARE.

5.3.3 Measuring Food Expenditure

First, we examine the sum of expenditures on food and eating out (henceforth, we call it "food expenditure" for simplicity) in a usual month across municipalities which are not adjusted for the number of family members. We note that all the patterns presented in this section are not altered if we confine our analysis to food expenditure and exclude expenditure on eating out. The median for the lower limit for all municipalities is 70,000 yen and that for the upper limit is 80,000 yen. We see a large variation among the five municipalities and probably can classify those into two groups. The average expenditure is large in urban area including Sendai, Kanazawa and Adachi. The lower and upper limits at the median are 70,000 and 83,000 yen for Sendai, 74,000 and 85,000 yen for Kanazawa and 80,000 and 100,000 yen for Adachi. The figures in Takikawa and Shirakawa are smaller. The lower and upper limits are 60,000 and 63,000 yen in Takikawa and 52,000 and 57,000 in Shirakawa. These discrepancies may be accounted for by the difference in food price and dominance of the agricultural sector associated with a larger self consumption.

Next, we estimate equivalent household food expenditure including eating out. It is natural that food expenditure depends on a variety of household characteristics including the number of family members and family types. Thus we use the equivalent scale below. Similar to the equivalent household income, the equivalent household consumption is defined as monthly household consumption (either food expenditure or total expenditure) divided by a squared root of number of family members. The definition of the family members is same in the case of the household income; the number of family members includes the respondent, the spouse and their dependent children (children who are economically independent of his/her parents are excluded) as well as co-resident parents who are living in the same house. We excluded grandchildren or other dependent relatives from the family size. The CDFs (cumulative density functions) of equivalent household expenditure presented in this section (both food expenditure and total expenditure) are based on the sample excluding any outliers which exceeds the 90 percentile since those samples extend the upper tail of a CDF to the right. However, we include all the samples for the discussion in the text and the estimation.

Figure 5-3-1 illustrates the CDFs of food expenditure by municipality. The median for all municipalities is 46,000 yen at the lower limit and 53,000 yen at the upper limit. Again, we observe regional disparity in food expenditure. The corresponding values for Sendai, Kanazawa and Adachi exceed the median for all municipalities. The lower and upper limits at median are 50,000 and 57,000 yen for Sendai, 50,000 and 58,000 yen for Kanazawa and 53,000 and 66,000 for Adachi. The figures for Adachi are the largest among all the municipalities. In contrast, the lower and upper limits at the median are 40,000 and 45,000 yen for Takikawa and those are even lower in

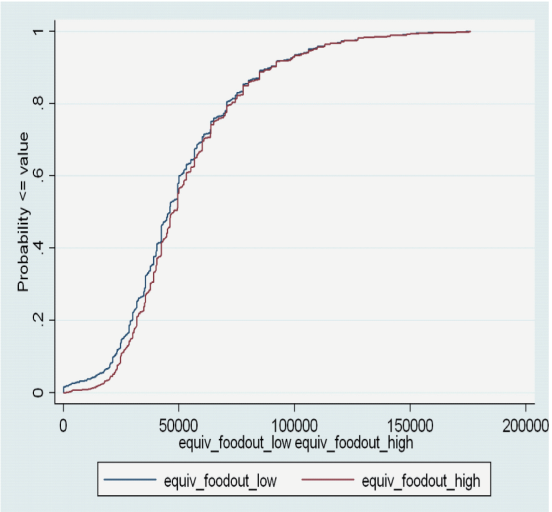

Figure 5-3-1-1 Equivalent food expenditure (all)

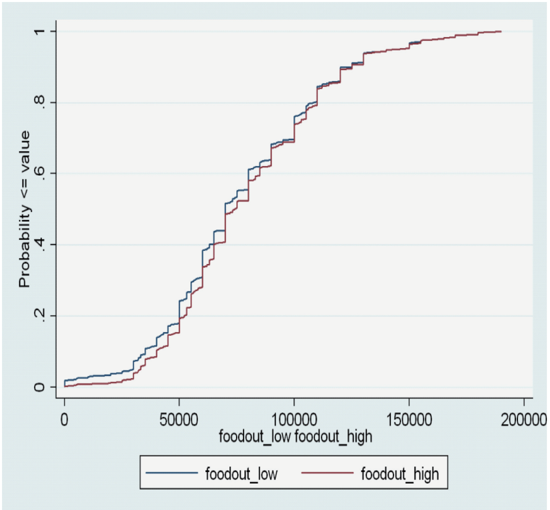

Figure 5-3-1-2 Equivalent food expenditure (Sendai)

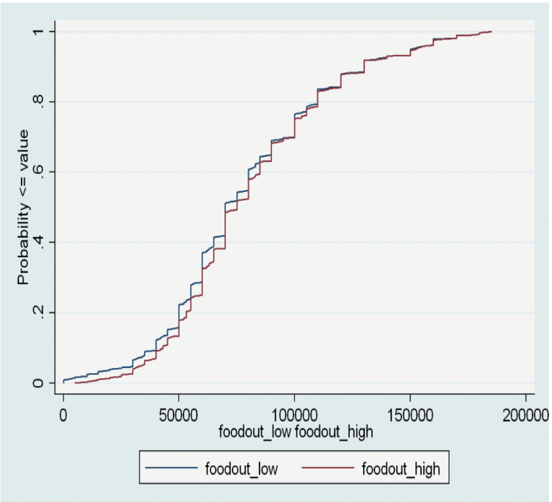

Figure 5-3-1-3 Equivalent food expenditure (Kanazawa)

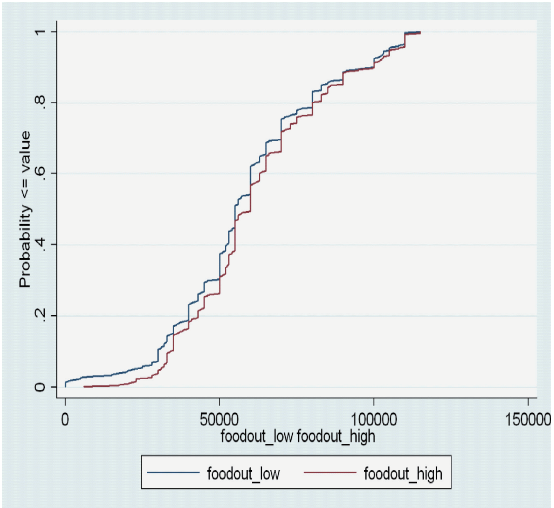

Figure 5-3-1-4 Equivalent food expenditure (Takikawa)

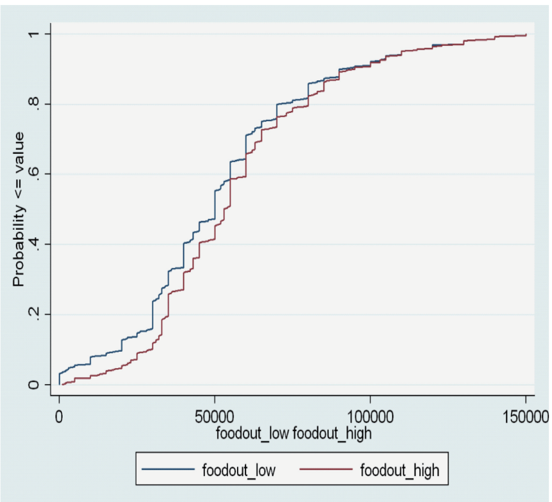

Figure 5-3-1-5 Equivalent food expenditure (Shirakawa)

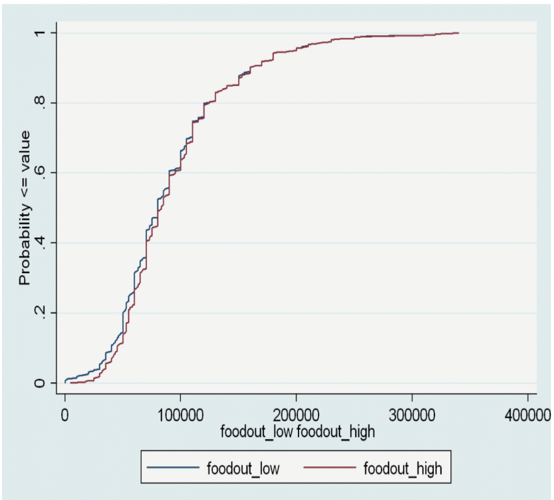

Figure 5-3-1-6 Equivalent food expenditure (Adachi)

Shirakawa: 32,000 and 38,000 yen, respectively. The difference between the higher expenditure group (Sendai, Kanazawa, and Adachi) and lower group (Takikawa and Shirakawa) may be accounted for by the difference in self consumption of agricultural products which is not included in food expenditure. Considering the relationship between equivalent household income and consumption, the share on food consumption (the Engle coefficient) out of household income seems to be large in Adachi.

However, those CDFs do not control a variety of household characteristics. Thus we employ the same methodology as equivalent household income, quantile regression, to examine equivalent household food expenditure at the 10, 25, 50, 75, and 90 percentiles, controlling for a variety of attributes of households. We regress equivalent food expenditure on the same explanatory variables used in the estimation of equivalent household income; sex (male is the reference), management of household (joint management takes one otherwise zero. See Table 5-1-2), age brackets (age 60s, age 70s; age 50s is the reference), marital status (being not married is the reference which includes those who are never married, widowed or divorced), household types (see Table 5-1-1), municipality (Sendai is the reference), educational attainment (high school graduates, two-year college graduates and university or more graduates; junior high school graduates is the reference) and industry (11 categories) and job types (8 categories). Among those variables, sex, age, educational attainment, industry and job type are of the respondents but of the husbands if household living expenses are managed jointly.

Figure 5-3-2 illustrates the results. The graphs in the left hand side show the results for lower bound while those in the right hand side report those for upper bound. We present only the coefficients which are estimated at 10% significance and do not show any coefficients which are not significantly estimated. We have several observations. First, food expenditure is larger for a household whose living expenses are managed separately at all percentiles except the 10 percentile. In addition, food consumption is larger for a household whose respondent (or a husband if managing household expenses jointly) is aged in the 60s at all the percentiles and for a household whose respondent (or a husband if managing household expenses jointly) is aged in the 70s at the 90 percentile. Second, food expenditure is larger for Type 2 household (not married living with a child/children) at 25, 50 and 75 percentiles while smaller for Type 3 household (not married living with a parent/parents) at 90 percentile. No coefficient is significantly estimated for the married (Type 5-8; the results are omitted from the graph), implying that food expenditure is not statistically different from the base group (living alone). Third, regional discrepancy is observed. Food expenditure is consistently larger in Adachi than in Sendai while smaller in Shirakawa and Takikawa (except at 10 percentile), which was also found in Figure 5-1-1. The larger food expenditure in Adachi may be accounted for by higher food prices in the center of Tokyo and the smaller food expenditure in Takikawa and Shirakawa by lower food prices and self consumption. Fourth, food spending is larger for higher educated households especially university graduates or more. The difference in food spending between junior high school graduates (the reference) and university or more graduates expands along with a higher percentile. Fifth, all dummies on industries or job types are not statistically significant (not shown in the figure).

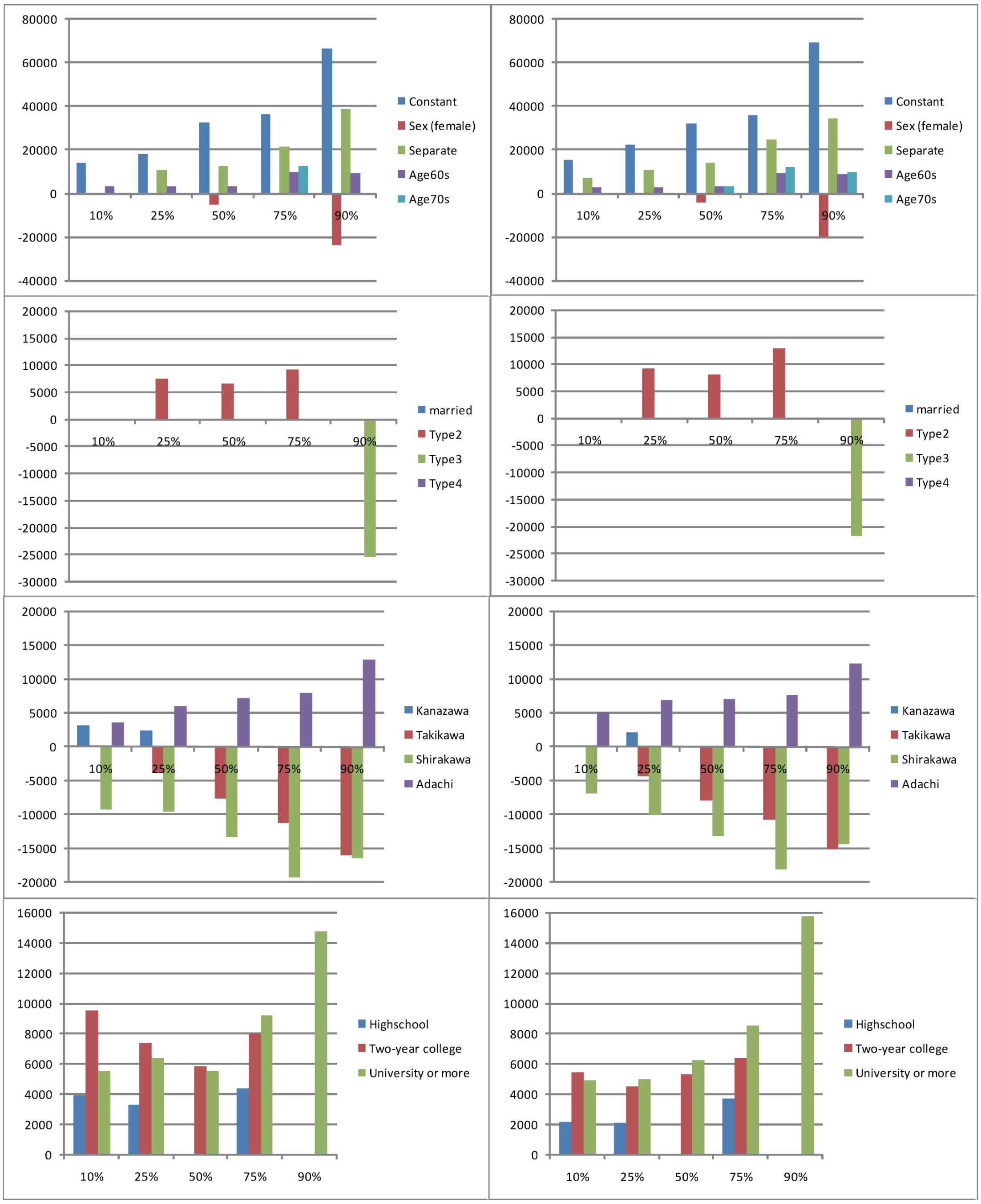

Figure 5-3-2 Difference in equivalent food expenditure (unit: yen)

However, those CDFs do not control a variety of household characteristics. Thus we examine equivalent household income, controlling for a variety of attributes of households: age, sex, marital status, management of household (jointly or separately), household type, municipality, educational attainment, industry, and job type if employed. In order to adjust for those factors, we employ quantile regression at 10, 25, 50, 75 and 90 percentiles. Concretely, pooling all the households in the sample, we regress equivalent gross annual income on sex (male is the reference), management of household (joint management takes one otherwise zero), age brackets (age 60s, age70s; age 50s is the reference), marital status (being not married is the reference which includes those who are never married, widowed, or divorced), household type (8 types; Type 1 (not married not living with a child or a parent) is the refer ence), municipality (Sendai is the reference), educational attainment (high school graduate, two-year college graduate, and university or more graduate; junior high school graduate is the reference) and industry (11 categories; the reference is "not working") and job type (8 categories; the reference is "not working"). Among these variables, sex, age, educational attainment are of the respondents and of the husbands if household expenses are managed jointly.

In sum, we observe that the equivalent food expenditure varies across management of household expenses, some specific household types (not married), municipalities as well as educational attainment. As regards regional discrepancy, we acknowledge that food spending is smaller in Shirakawa and Takikawa where agricultural industry is dominant and indicates a need to impute self consumption of foods for comparison across municipalities but this is not necessarily true for food consumption. The estimate of the gap between food expenditure and food consumption remains a future task.

5.3.4 Measuring Total Expenditure

We continued our analysis on total expenditure using the same methodology. The total expenditure is defined as the sum of nondurable expenditure plus annual durable expenditure divided by 12. The median for the lower limit for all municipalities, which is not adjusted for the number of family members, is 200,000 yen for both upper and lower limits. We observe a pattern similar to that on food expenditure in the gap among the municipalities. The average monthly spending is larger in urban area including Sendai, Kanazawa and Adachi. The lower and upper limits at the median are 200,000 and 217,000 yen for Sendai, 200,000 and 204,000 both for Kanazawa and Adachi. In contrast, those figures in Takikawa and Shirakawa are smaller and the lower and upper limits are 158,000 and 180,000 yen in Takikawa and 150,000 and 200,000 yen in Shirakawa.

Next, we turn to examine equivalent household monthly expenditure. The methodology is same as the equivalent food expenditure. First, we depict CDFs by municipalities cutting at the 90 percentile for presentation. Then, we perform quantile regression to examine the factors affecting household expenditure. Figure 5-3-3 represents the CDFs of total expenditure by municipality. The median for all municipalities is 120,000 yen at the lower limit and 141,000 yen at the upper limit. We observe regional disparity again in equivalent total monthly expenditure. The corresponding values are largest for Sendai and they exceed the upper limit at median for all municipalities; 141,000 and 147,000 yen. Those values are second highest in Kanazawa (130,000 and 141,000 yen) or Adachi (130,000 and 144,000 yen). In contrast, the lower and upper limits at the median for

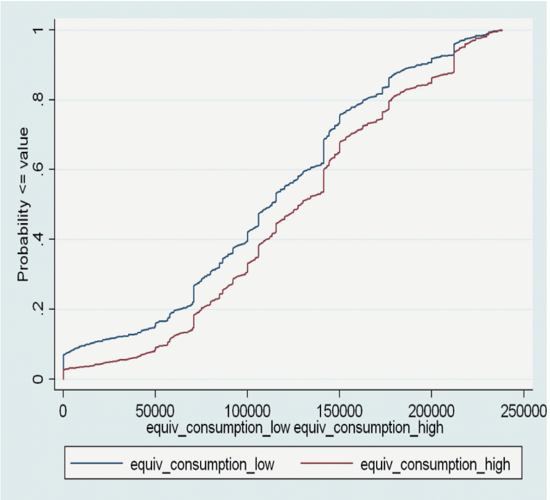

Figure 5-3-3-1 Equivalent total expenditure (all)

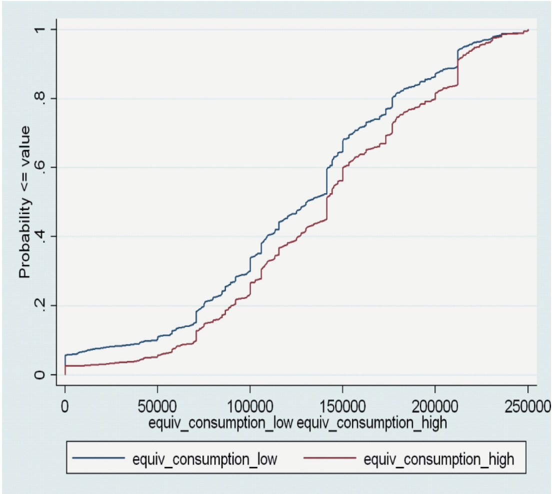

Figure 5-3-3-2 Equivalent total expenditure (Sendai)

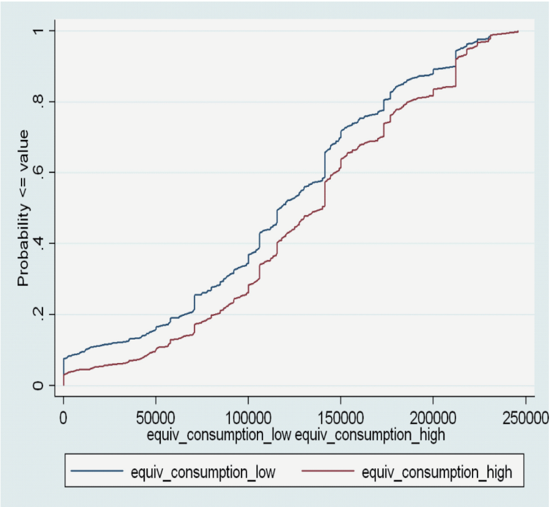

Figure 5-3-3-3 Equivalent total expenditure (Kanazawa)

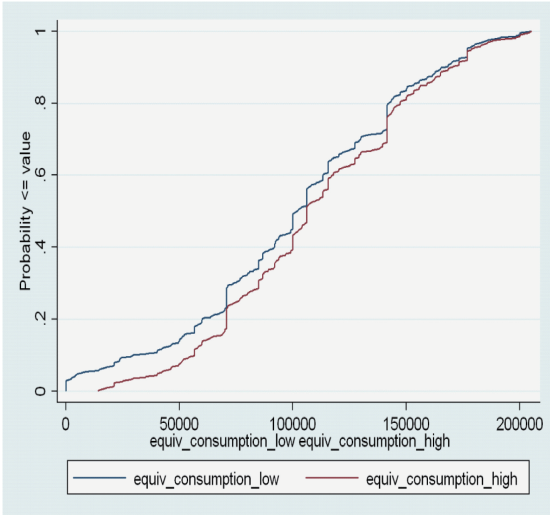

Figure 5-3-3-4 Equivalent total expenditure (Takikawa)

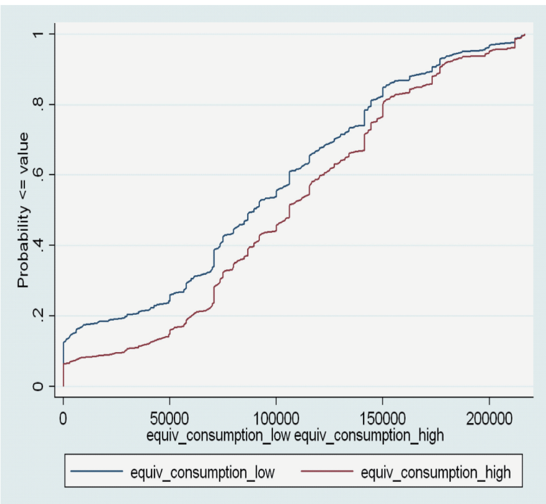

Figure 5-3-3-5 Equivalent total expenditure (Shirakawa)

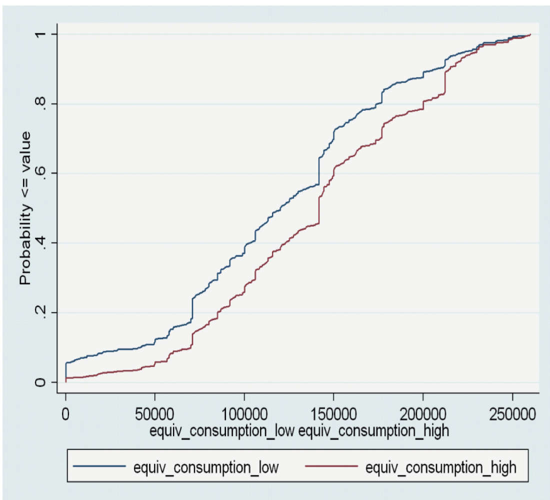

Figure 5-3-3-6 Equivalent total expenditure (Adachi)

Takikawa and Shirakawa are lower than the lower limit for all municipalities; 106,000 and 115,000 yen for Takikawa and 99,000 and 115,000 yen for Shirakawa, respectively.

Figure 5-3-4 reports the estimation results of quantile regression. The way of presentation is the same as those for the equivalent food consumption. The graphs in the left hand side show the results for lower bound while those in the right hand side report those for upper bound. We present only the coefficients which are estimated at 10% significance. We have several observations. First, total household expenditure is larger for a household whose living expenses are managed separately at 75 and 90 percentiles but unlike for food consumption, not at the other percentiles. Moreover, total expenditure is not correlated with age ranges. Second, total spending is larger for Type 2 household (not married living with a child/children) at 25, 50, and 75 percentiles while smaller for Type 3 household (not married living with a parent/parents) at 50, 75 and 90 percentiles. This pattern is similar to that for household food expenditure. In addition, total consumption is smaller for the married (Type 5-8) at the 10 percentile. Third, regional discrepancy is also large. Total household expenditure is consistently smaller in Shirakawa at all percentiles and Takikawa (except at the 10 percentile), which is also observed in food expenditure, but a larger expenditure in Adachi is not found in the case of total spending. Fourth, unlike food expenditure, total household spending is consistently larger for university graduates or more, and is for senior high school graduates except at the 10 percentile and for two year college graduates at 50, 75 and 90 percentiles. Fifth, no coefficient on the dummy variables on industry and job types are statistically significant for both the lower and upper bounds (omitted from the figure).

In sum, we again observe that the equivalent monthly total expenditure differs across municipalities and household characteristics; management of household expenses, some specific household types and educational attainment. However, we see some difference in the pattern of food and total expenditure. While food expenditure is larger in Adachi, total expenditure in Adachi is not significantly different from Sendai (the reference). Moreover, while the difference in total spending between university or more graduates and junior high school graduates (the reference) increases with higher percentiles, this is not the case for food spending.

A preliminary analysis of JSTAR provides some interesting findings on household expenditure, which are evident in the difference observed across household demographics and municipalities. Similar to household income, several important issues should be addressed. First, we need to examine whether total household spending matches the sum of each spending items. We use the samples whose expenditure data is available in this section. Imputations and corrections using a variety of variables are needed for missing or extraordinary responses. This task includes the estimates of self consumption of foods, which is not revealed in food expenditure, especially in Shirakawa and Takikawa. Second, we need to adjust for the difference in price level so that we convert nominal spending data to real one. Third, we need to impute a point value of expenditure when we know only the range of household income based on the unfolding brackets. Fourth, which is unique for consumption data, we need to further develop a better measure for consumption including estimates of service flow of durables.

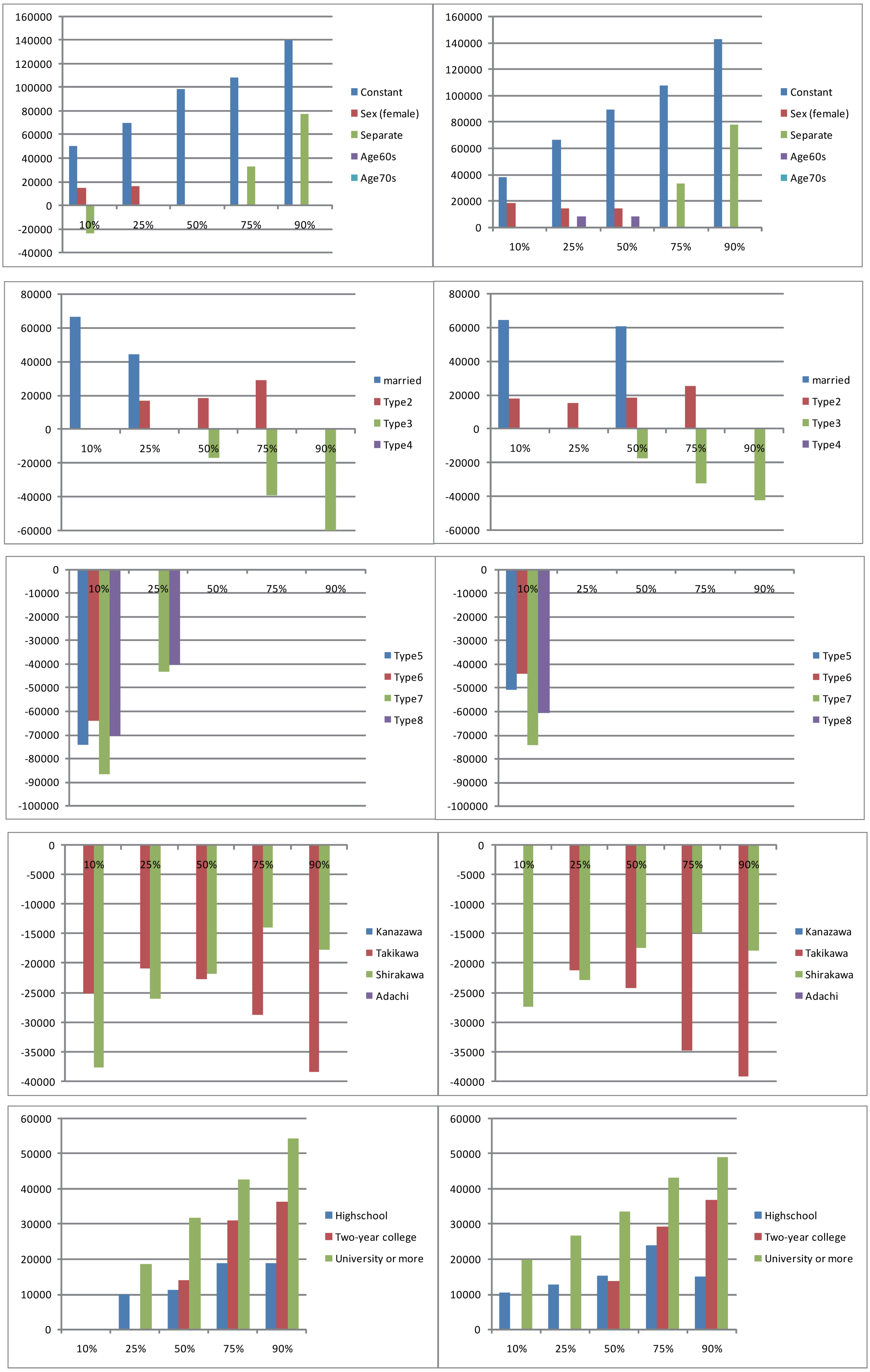

Figure 5-3-4 Difference in equivalent total expenditure (unit: yen)

5.3.5 Conclusions

• JSTAR contains a variety of consumption measures. When focusing on equivalent food expenditure (foods and eating out) and total expenditure including durables, we observe systematic difference across household demographics and municipalities.

• The equivalent food spending is larger in Adachi and smaller in Takikawa and Shirakawa. Food expenditure also differs across management of household expenses, some specific household types (not married), municipalities, as well as educational attainment. The estimate of the gap between food expenditure and food consumption remains a future task.

• The equivalent monthly total expenditure is smaller in Takikawa and Shirakawa, and also differs across household characteristics including management of household expenses, some specific household types, and educational attainment.

5.4 Income, Wealth, and Consumption Inequality

5.4.1 Introduction

One of the most frequently debated social issues in modern Japan is inequality. Traditionally, especially in the post World War II period, there was a prevailing view that Japanese do not suffer from severe inequality. However, since the 1990s, issues of inequality and distribution have been taken up after historically low economic growth, particularly since 2001, in a market-oriented economic policy with an emphasis on pursuit of economic efficiency.

Despite a tremendous volume of debate on inequality, it is fair to say that there is no consensus on the trend of inequality in Japan. Some insist that a larger proportion of the elderly with a large inequality in the population is responsible for the expanding inequality and others claim that current data are insufficient to capture the reality of inequality, and those socially excluded are also excluded from official statistics. It is important to keep in mind that inequality depends on the timing (ex ante or ex post) and the scope (income, wealth, employment, education, etc.). Moreover, even though we observe that inequality has been on an expanding trend in Japan, the inequality, in terms of any measure, seems to be smaller in Japan than other developed countries, implying that we need to distinguish clearly between change and level of inequality issues.

The SHARE book focuses on income, wealth, and consumption inequality simultaneously and examines the expected correlation among those three dimensions based on the simple life-cycle/permanent income hypothesis (LC/PIC) for those aged 50 and over across countries and socioeconomic categories. In order to examine inequality issues, they employ Lorenz curves and Gini coefficients. Those measures of inequality are often considered the best instruments to study distributive issues. Lorenz curves have the cumulative percentage of the population on the horizontal axis, ordered from those with the lowest amounts to those with the highest, and the accumulated percentage of variable of interest on the vertical axis. The closer the curves are to the diagonal, the smaller inequality, while the closer the curves are to the bottom-right corner, the larger inequality. The Gini coefficient is proportional to the area between the Lorenz curve and the diagonal, ranging from 0% (equal distribution) to 100% (full concentration: one takes all).

The SHARE book provides some interesting findings. First, consumption is more evenly distributed than income, and income more evenly distributed than wealth, which is expected from the life-cycle/permanent income hypothesis. Second, in northern countries income and consumption distributions are rather equal compared with central and southern European regions as a consequence of the efficient old-age coverage provided by social protection. Third, those patterns are confirmed by the Gini coefficients. Those coefficients for food consumption, income, and wealth are 24, 33, and 60%, respectively, for northern countries; 35, 46, and 63% for central Europe; and 41, 47, and 65% for southern countries. Fourth, in central and southern European regions, wealth inequality increases dramatically with age, while income inequality tends to decrease. In northern European countries the low rate of income inequality is observed across all age categories, though age and cohort effects cannot be distinguished in the first wave data.

This section takes the same approach as SHARE and reveals the reality of consumption, income, and wealth inequality in Japan using JSTAR data. We make some remarks on the differences between SHARE and JSTAR. First, while the SHARE book confines the sample to those with all three components, consumption, income, and wealth, and converts them into equivalent units using the OECD equivalence scale, we use all data. Second, the income, consumption, and wealth data is converted to equivalent basis using the methodology different from the OECD scale. Third, although the SHARE book examines net income, food consumption (in and outside the home), and net total assets (the sum of financial and financial wealth, net of debts), we present also the results using total consumption and total net financial wealth.

While we focus on the three dimensions related to economic inequality in this section, one notable advantage of JSTAR is to explore inequality issues not only in terms of economic status but also in terms of health status. Chapter 2 of this report emphasized the relationship between health and socioeconomic status and uncovered a strong correlation among them. Moreover, Chapter 3 examined the relationship between family structure and transfers and socioeconomic status. Future research should examine the impact of health status and family relationship on economic inequality.

5.4.2 Lorenz Curves and Gini Coefficients for Income, Consumption, and Wealth

Figure 5-4-1 reports Lorenz curves for equivalent net household income, equivalent food consumption, equivalent total consumption, equivalent total net financial wealth, and equivalent net total assets for all municipalities. At a glance, the deviation from the 45 degree line seems to be smaller for equivalent consumption and equivalent household income and larger for equivalent net financial wealth and net total wealth.

But in order to have a more precise evaluation of the distributions, the Gini coefficients will be more informative. First, the Gini coefficient for equivalent household income is 0.37-0.43 (depending on the upper or lower bound). While we need to keep in mind the difference in the definition of household income (see Section 1) and the converting to an equivalent scale, the size of the coefficient in JSTAR is slightly larger than that in northern European countries (0.33 for Sweden and 0.32 for Denmark) but smaller than those in the other European countries. The countries whose coefficients are comparable with JSTAR in SHARE are Germany (0.42) and Italy (0.41). Second, the Gini coefficient for food consumption both at and outside home is 0.32-0.35 while that for equivalent household total consumption is 0.29-0.34, both of which are smaller than that for household income. The size of the coefficient for food consumption is comparable with those for central Europe reported in the SHARE book (0.24 for northern Europe, 0.35 for central Europe and 0.41 for southern Europe). The fact that the Gini coefficient is smaller for food consumption than household income is common in JSTAR and SHARE. While there are some possbilities to account for the slightly smaller Gini coefficients for equivalent total household consumption, one explanation is that the food consumption data used to produce the Gini coefficient in JSTAR is not adjusted for

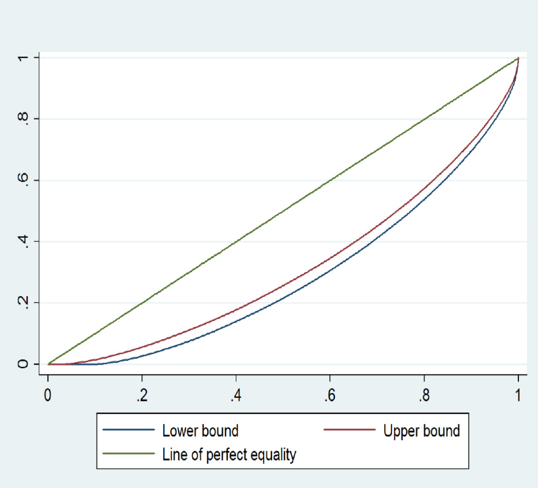

Figure 5-4-1-1 Equivalent household income

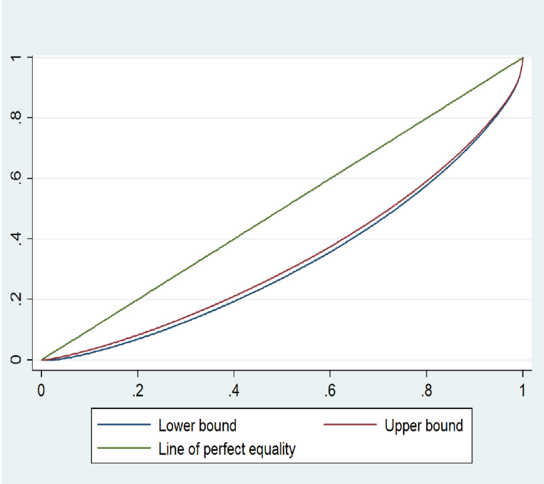

Figure 5-4-1-2 Equivalent food consumption (all)

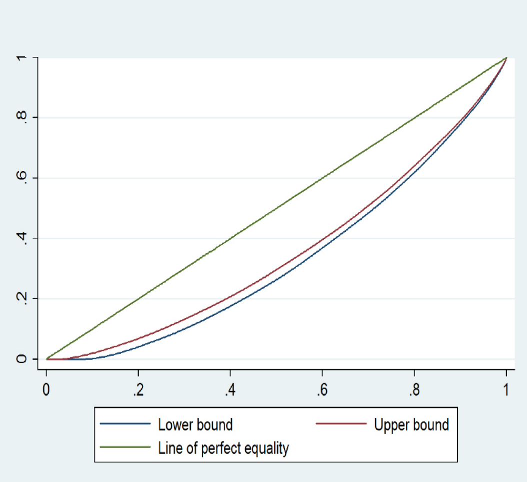

Figure 5-4-1-3 Equivalent household consumption (all)

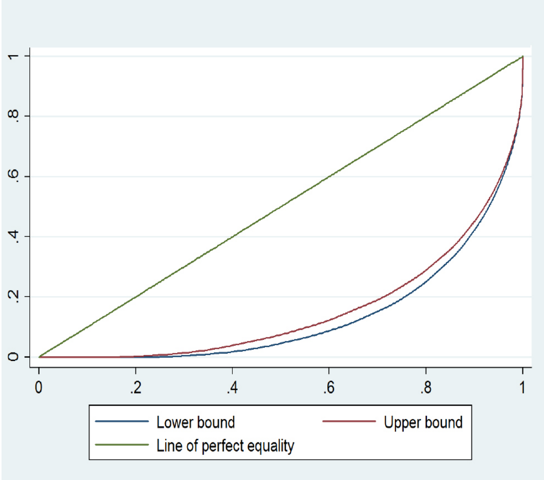

Figure 5-4-1-4 Net financial assets (all)

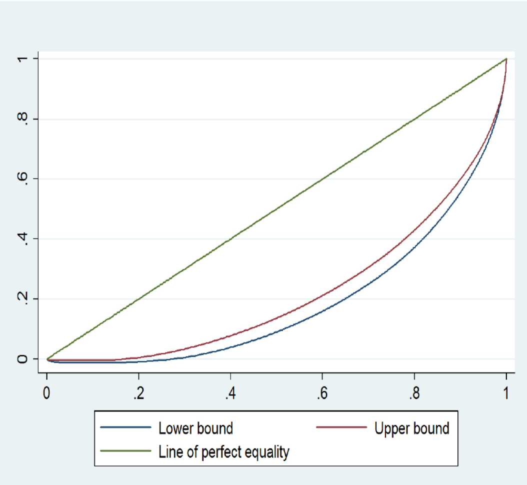

Figure 5-4-1-5 Net total assets (all)

self food consumption. As described in Section 3, the food expenditure is smaller in Takikawa and Shirakawa where the agricultural sector is dominant. Third, the Gini coefficient for net total financial assets is 0.69-0.73 and that for net total assets is 0.56-0.63, both of which are much larger than that for household income or total consumption. This pattern is observed in the results reported in the SHARE book, too. While the coefficients for net total financial assets is not reported in the SHARE book, that for net total assets is roughly comparable with those reported in the SHARE book and close to those in northern European countries (0.60 for Sweden and 0.62 for Denmark) and smaller than those in southern European countries (0.64 for Italy and 0.68 in Spain). In sum, the inequality observed in JSTAR is comparable with those in Central Europe in terms of equivalent household income and consumption and with those in Northen European countries in terms of equivalent household wealth.

5.4.3 Lorenz Curves and Gini Coefficients for Income, Consumption, and Wealth by Municipality

We turn to examine the difference in inequality across municipalities. First, we examine the difference in income inequality across municipalities. Figure 5-4-2 depicts Lorenz curves for equivalent household net income by municipality. We see some variations across municipalities. As stated, the overall Gini coefficient is estimated to be 0.37 (the upper bound) and 0.43 (the lower bound). The coefficients for Sendai are 0.35 and 0.39, which are smaller than those for Adachi (0.38 and 0.46). Those coefficients for Kanazawa and Takikawa are located in between; 0.37 and 0.43 for Kanazawa, 0.40 and 0.42 for Takikawa. The coefficient for Shirakawa is small at 0.33 for the upper bound, while it is 0.41 for the lower bound.

Second, we turn to the difference in consumption inequality across municipalities. Figure 5-4-3 reports Lorenz curves for equivalent household total consumption. Those for equivalent food consumption are omitted since the shape is very similar to those for equivalent household total consumption. The overall Gini coefficient for food consumption is 0.32-0.35. The coefficient is slightly higher in Shirakawa (0.37-0.42) and slightly smaller in Sendai (0.28-0.30) and Adachi (0.28-0.30) while that is comparable with the average in Kanazawa (0.30-0.32) and Takikawa (0.33-0.36). The variation in the Gini coefficient for equivalent net total household consumption is also small and similar to that for equivalent food consumption. The overall coefficient is 0.29-0.34; that for Shirakawa is slightly higher (0.33-0.42) and slightly smaller in Sendai (0.27-0.30), Takikawa (0.27-0.31), and Adachi (0.27-0.32) and that is comparable with the average in Kanazawa (0.29-0.33). Lastly, we explore the difference in inequality in terms of wealth. Figure 5-4-4 illustrates Lorenz curves for net total assets by municipality. The curves for net financial assets are not presented since they resemble the shape of the curves of net total assets. The overall Gini coefficient for net financial assets is 0.69-0.73. The coefficients are larger in Adachi (0.78-0.81) and smaller in Takikawa (0.61-0.63) and Shirakawa (0.57-0.62), implying that inequality in financial asset holdings is larger in Adachi. The coefficients for Sendai (0.66-0.75) and Kanazawa (0.66-0.68) lie in between. Turning to net total assets including both financial and real assets, the

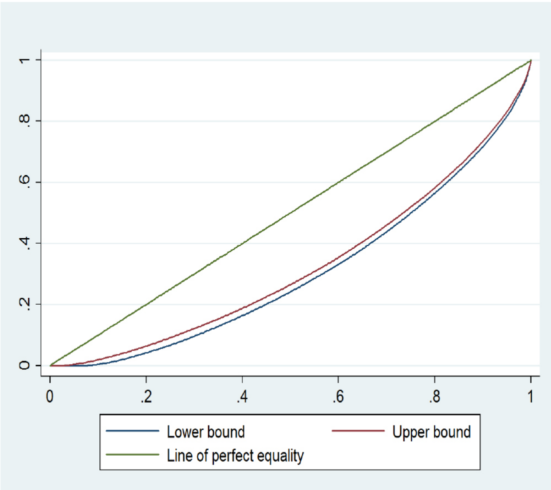

Figure 5-4-2-1 Equivalent household income (Sendai)

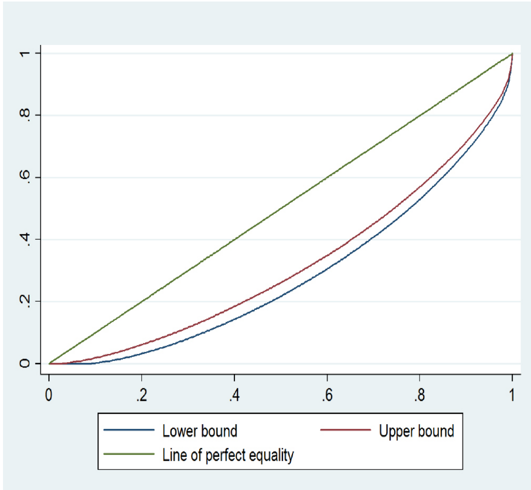

Figure 5-4-2-2 Equivalent household income (Kanazawa)

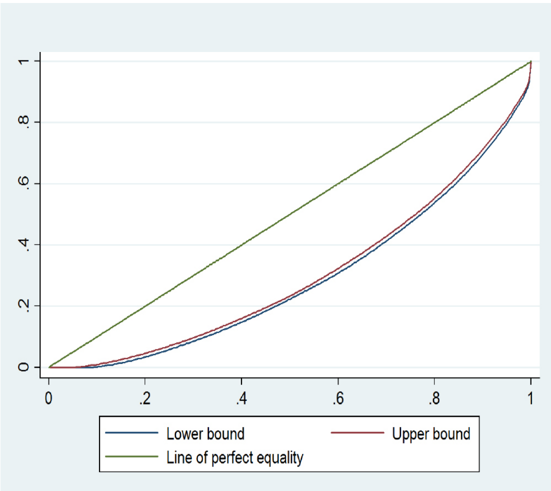

Figure 5-4-2-3 Equivalent household income (Takikawa)

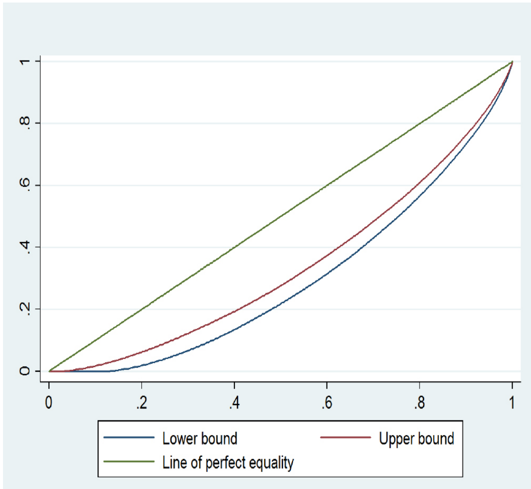

Figure 5-4-2-4 Equivalent household income (Shirakawa)

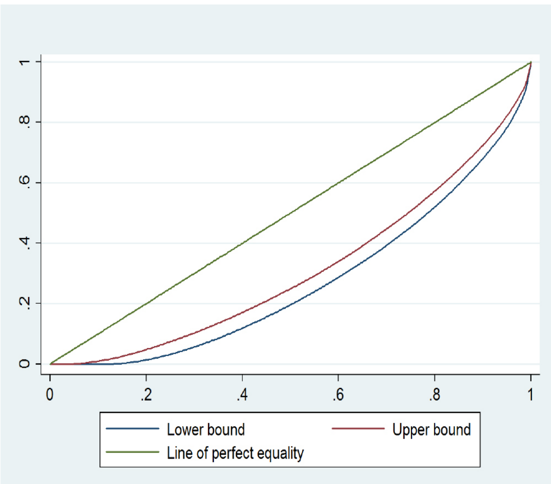

Figure 5-4-2-5 Equivalent household income (Adachi)

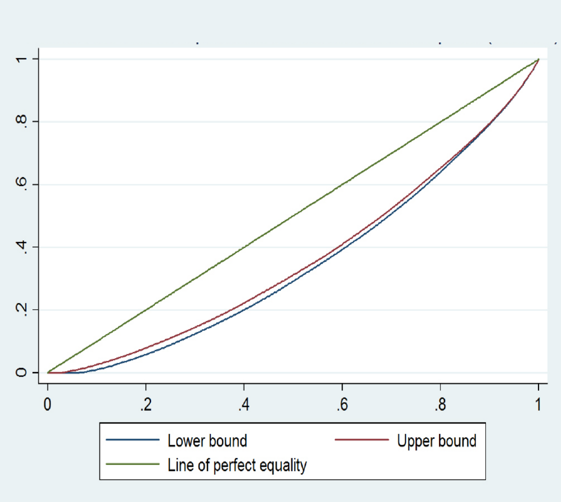

Figure 5-4-3-1 Equivalent household total consumption (Sendai)

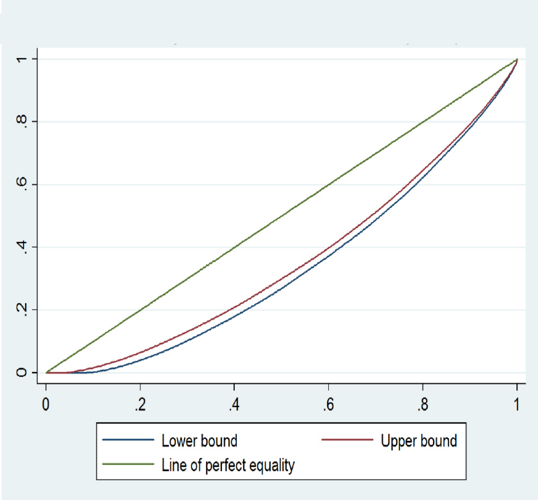

Figure 5-4-3-2 Equivalent household total consumption (Kanazawa)

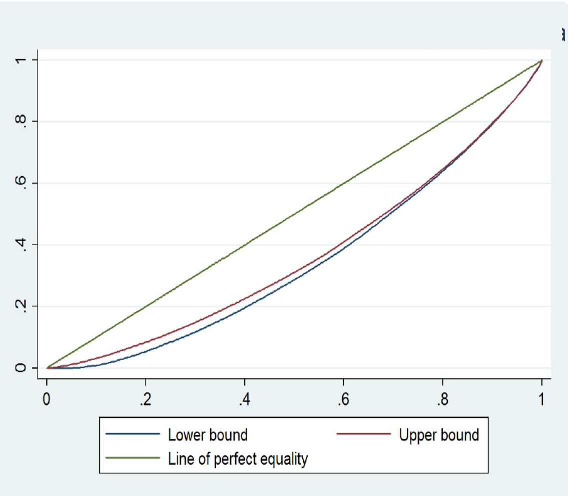

Figure 5-4-3-3 Equivalent household total consumption (Takikawa)

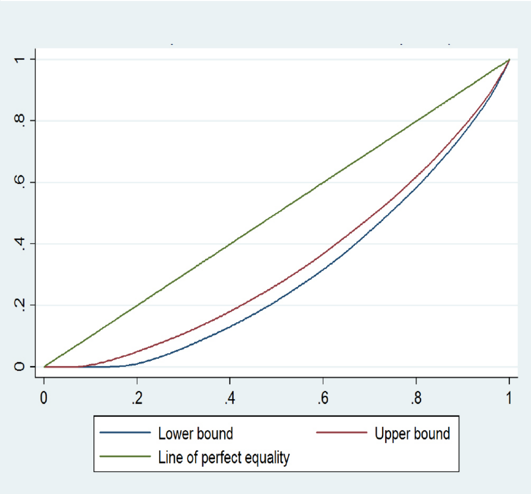

Figure 5-4-3-4 Equivalent household total consumption (Shirakawa)

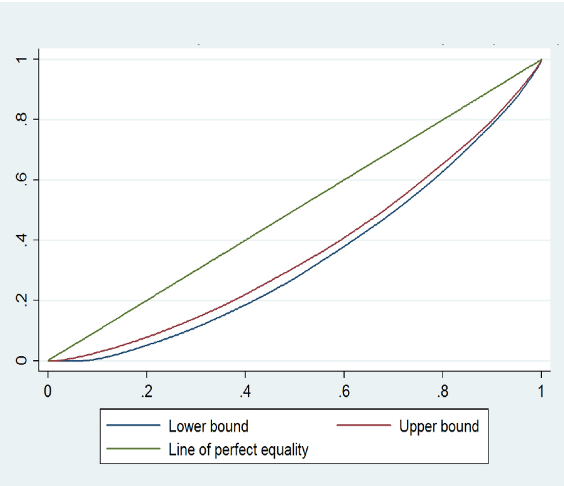

Figure 5-4-3-5 Equivalent household total consumption (Adachi)

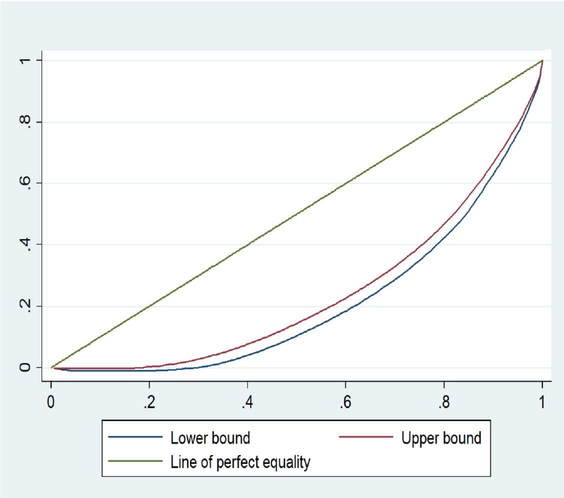

Figure 5-4-4-1 Equivalent net total assets (Sendai)

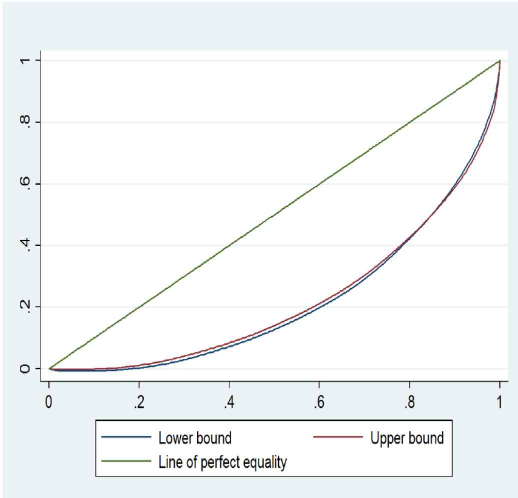

Figure 5-4-4-2 Equivalent net total assets (Kanazawa)

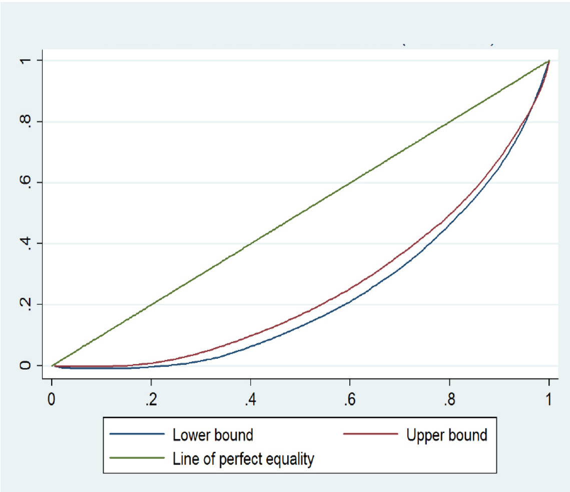

Figure 5-4-4-3 Equivalent net total assets (Takikawa)

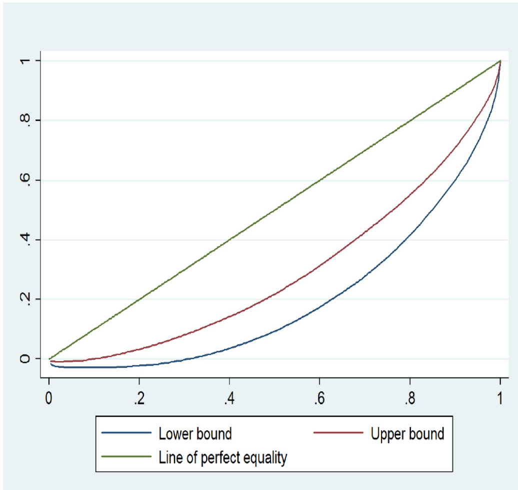

Figure 5-4-4-4 Equivalent net total assets (Shirakawa)

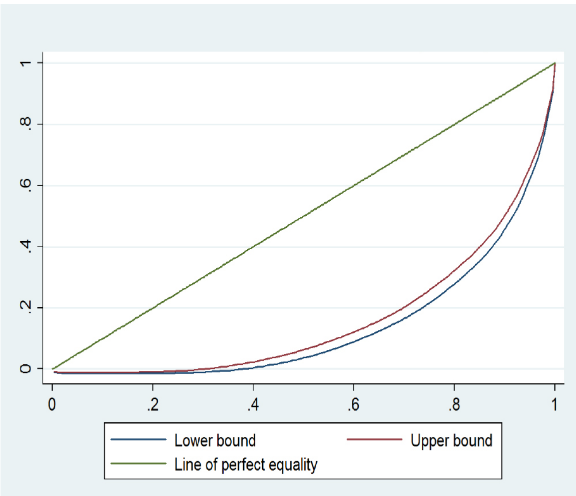

Figure 5-4-4-5 Equivalent net total assets (Adachi) overall Gini coefficient is 0.56-0.63, which is smaller than that for net financial assets. Again, the coefficient is larger in Adachi (0.68-0.72) and small er in Takikawa (0.49-0.54) and Shirakawa (0.42-0.61). The coefficients for Sendai (0.52-0.58) and Kanazawa (0.56-0.57) again lie in between. In sum, we see some variations in inequality across municipalities.

5.4.4 Conclusions

• JSTAR enables us to measure inequality of income, consumption and wealth for those aged between 50 and 75 and provides an opportunity to relate it with health status and family relationship, which was not available in Japan.

• Consistent with the SHARE book, JSTAR reveals that wealth inequality is larger than income inequality and income inequality is larger than consumption inequality. Moreover, the degree of inequality in JSTAR is comparable with that in Central European countries in terms of income and wealth and with that in Northern European countries in terms of wealth.

• There are some variations in inequality across municipalities. Further research should examine the determinants of inequality of income, consumption and wealth, which holds important policy implications for distribution policy.

5.5 Educational Attainment

5.5.1 Introduction

Along with household income and wealth, educational attainment has been considered one of the most important components of socioeconomic status because education is closely related to many dimensions of people's lives. There are three main reasons why educational attainment is frequently used as a representative socioeconomic status.

First, it is often considered that educational attainment stands for an individual's ability in a variety of aspects including work, communication, and skills in understanding and cognition. While an individual' s ability is not wholly measured by education, educational attainment is indeed closely related to many of life's domains including health and health care, as examined in detail in Chapter 2. Second, educational attainment is a proxy for lifetime income or earnings ability. JSTAR collects information on income in a variety of forms: labor income, pension income, and monetary transfers, all of which are current, not lifetime, earnings. A standard economic theory emphasizes individual dynamic decision-making which expands the time horizon to the lifetime and thus education is frequently used as representative of economic status. Lastly, education is an important social status that affects social life in such areas as human relationships with friends and acquaintances. This is especially the case in Japan where there is a long tradition emphasizing educational attainment in Japanese social norms.

While income or wealth is also frequently used as a measure of socioeconomic status, the information content contained in educational attainment is not idential to that of those economic variables. Indeed, as discussed in Chapter 2, the relationship between health care and educational attainment is not identical to that between health care and income. Thus, we need to discuss educational attainment separately from income/wealth variables and explore the implications of different measures of socioeconomic status.

In this subsection, we will preview educational attainment by age, gender, and municipality. While the proportion of students who go to high school exceeds 90% and that of those who go on to a higher stage of education (university or more) exceeds 50% in Japan, educational attainment varies across age and regional groups. Moreover, we will briefly explore the relationship of educational attainment between husbands and wives and between parents and children, which are frequently discussed in Japan regarding marriage and intergenerational transfers.

5.5.2 Variations in Educational Attainment by Gender, Age, and Municipality

JSTAR asks the individuals in the sample about their educational attainment in seven categories: elementary (6 years) or junior high school (3 years), senior high school (3 years), two-year college, special training school, university, graduate school (masters degree), and graduate school (doctorate). In Japan, elementary and junior high school (9 years) comprise compulsory education. JSTAR further asked whether the respondent graduated or dropped out of the school he/she attended last. In the analyses in this subsection, we rearrange the seven categories into four: (1) elementary and junior high school (compulsory education only), (2) senior high school, (3) two-year college or special training school, and (4) university or higher.

Figures 5-5-1 and 5-5-2 show the distribution of educational attainment of the respondents by sex. First, we look at educational level for male respondents. We observe a substantial difference across municipalities. Sendai and Kanazawa have a similar distribution of educational attainment. The share of high school graduates is less than half, followed by university graduates. We notice that the share of university graduates is the largest in Sendai among all municipalities while the share of compulsory education only is larger in Kanazawa than in Sendai. Takikawa's distribution is also similar but the second largest is the respondents with compulsory education only and the share of university graduates is smaller than in Sendai and Kanazawa. In Shirakawa, the distribution is unique and varies from other municipalities in that the share of the elementary/junior high school graduates exceeds 60%, followed by high school graduates. The share of university graduates is the smallest among the municipalities. Adachi's share of the distribution resembles that in Takikawa but the shares of elementary/junior high school graduates and university graduates are larger in Adachi.

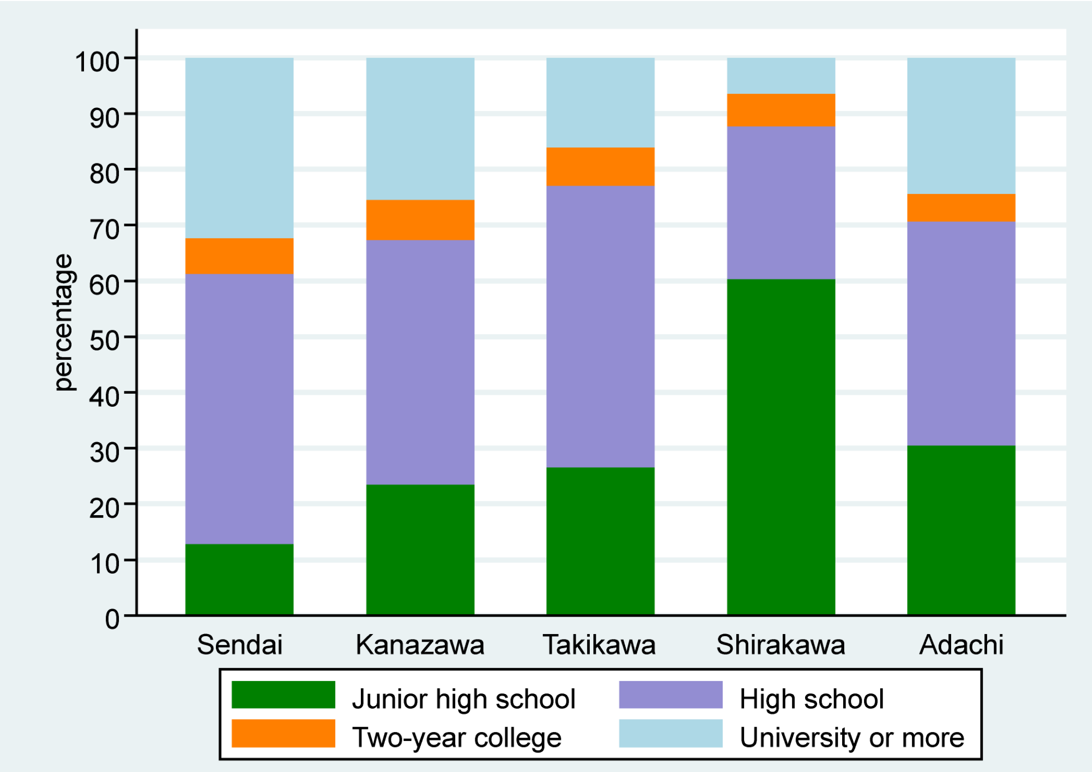

Figure 5-5-1 Educational attainment by municipality for males

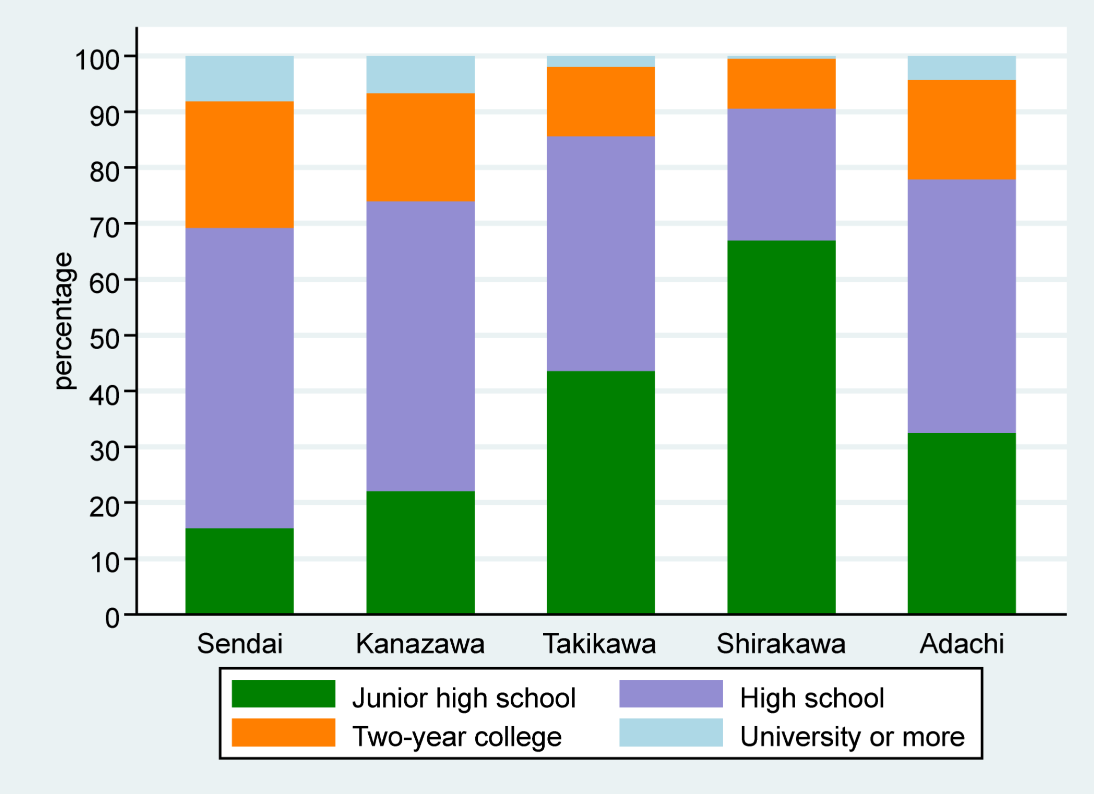

Figure 5-5-2 Educational attainment by municipality for females

Next, the educational attainment of female respondents is different from that for males. In Sendai and Kanazawa, the share of the individuals with compulsory education only or high school graduates is comparable between males and females but that of university graduates is much smaller for females than males. In Shirakawa and Takikawa, the most dominant is elementary/junior high school graduates: the share in Takikawa exceeds 40% and that in Shirakawa is larger for females than that of males. In both municipalities, the proportion of university graduates is small. Adachi's distribution is similar to those of Sendai and Kanazawa but the share of individuals with compulsory education only is larger in Adachi than in Sendai and Kanazawa.

The diversity in educational attainment is again confirmed by the spouse's educational level. Figures 5-5-3 and 5-5-4 report the educational attainment of the respondent's spouse. While we see some deviations from the pattern in 5-5-1 and 5-5-2, the pattern observed for the respondents' educational attainment is again observed for that of their spouses. Part of difference is because the individuals in Figures 5-5-1 and 5-5-2 include singles but those in Figure 5-5-3 and 5-5-4 are couples only.

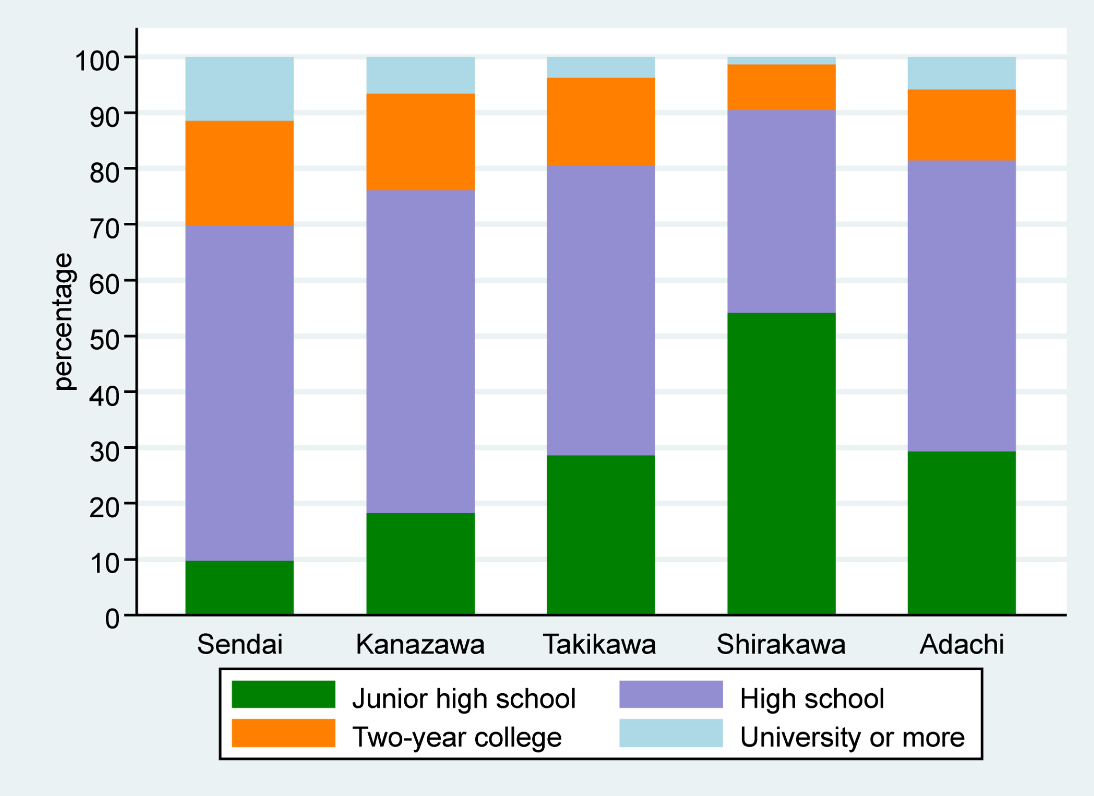

Figure 5-5-3 Spouse's educational attainment by municipaity (male spouse)

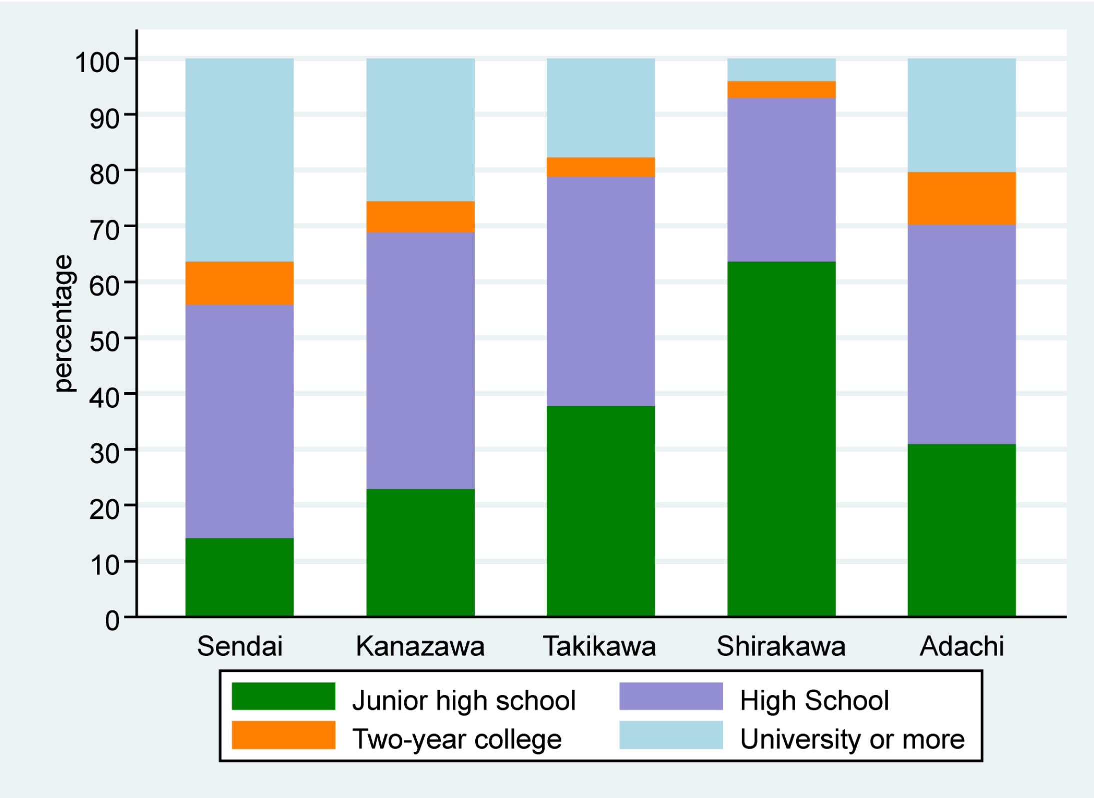

Figure 5-5-4 Spouse's educational attainment by municipality (female spouse)

Figures 5-5-5 and 5-5-6 report educational attainment by children. We confined the sample in the figure to children aged 25 or over since it is difficult to predict the final educational level of younger children. We again observe substantial variations across gender and municipality. First, the educational level is higher for males than for females. The share of university graduates or more is much higher for males in all municipalities. In a mirror image, the shares of high school graduates and two-year colleges/training schools for females are higher than males in all municipalities. The sum of the shares of university graduates and two-year/training college is comparable between males and females. The share of junior high school graduates is very limited in both sexes. Second, we see a large disparity across municipalities. In Sendai and Kanazawa, the share of university graduates for males exceeds 60% while the share is lower in Adachi (44%), Takikawa (33%), and lowest in Shirakawa (11%). In those municipalities with fewer university graduates, the most dominant is high school graduates whose share is 77% in Shirakawa, 60% in Takikawa, and 45% in Adachi. This is also the case for females. The share of university graduates for females exceeds 30% in Sendai, is close to 20% in Kanazawa and Adachi, while it is close to zero in Takikawa and Shirakawa.

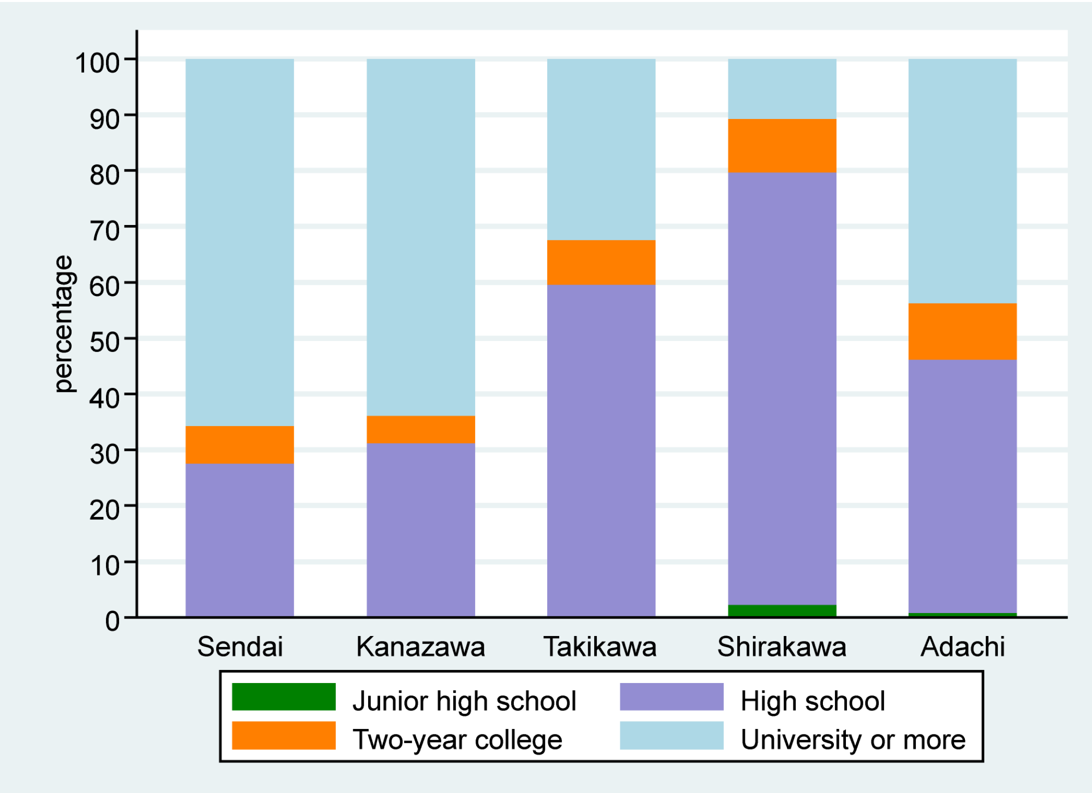

Figure 5-5-5 Children's (aged 25+) educational attainment by municiaplity for males

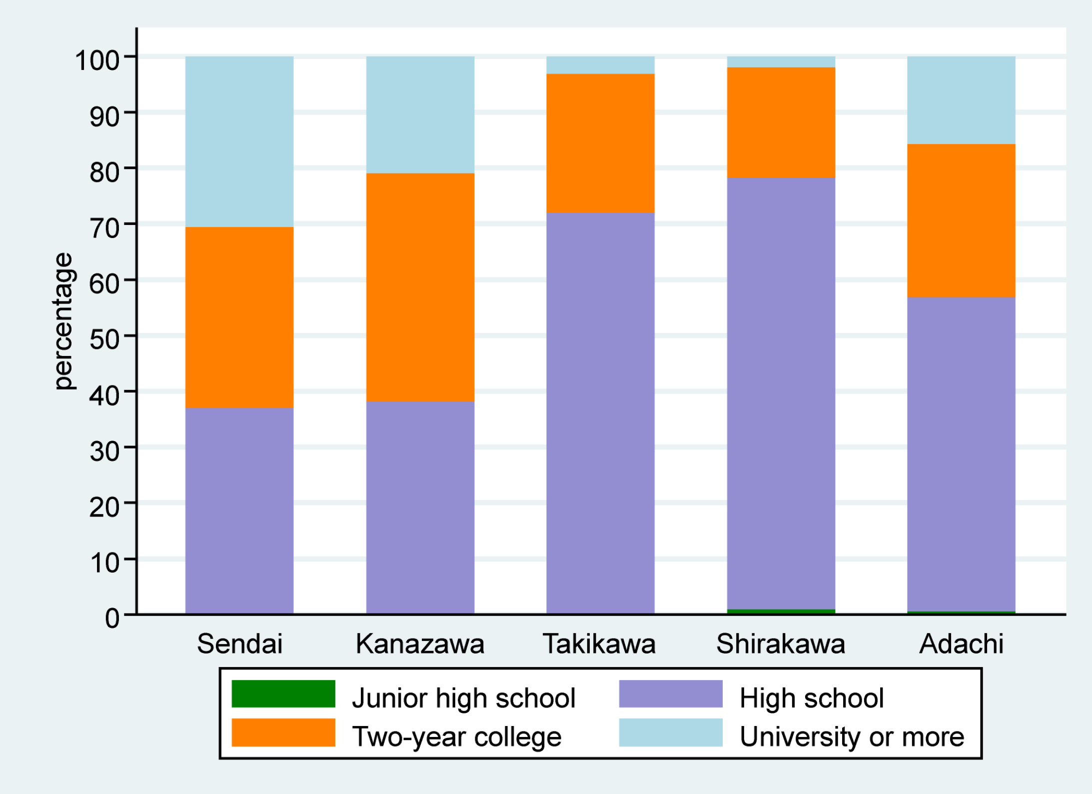

Figure 5-5-6 Children's (aged 25+) educational attainment by municipality for females

5.5.3 Relationship in Educational Attainment between Spouses and Children

It is well known that educational level is correlated between husband and wife and between parent and child (Shida et al. (2000) shows the former and Kikkawa (2006) shows the latter). Since educational attainment is also closely related to economic and health status, educational linkage between husband and wife and between parents and children should be emphasized in terms of class formation and intergenerational mobility.

Figures 5-5-7 and 5-5-8 report the relationship of educational attainment between husband and wife. By definition, singles are excluded from the sample in these figures. We see a clear pattern that a husband with a higher educational level marries a wife with a higher educational level. The share of wives who are university or two-year/ training college graduates is just 5% for husbands who graduated from junior high school and about 50% for husbands who graduated from university or higher. In contrast, the share of wives who are junior high school graduates is close to 70% for husbands who graduated from junior high school and just 2% for husbands who graduated from university or higher. This pattern is more obvious in the case of wives. The share of husbands who are university graduates is just 3% for wives who graduated from junior high school and about three quarters for wives who graduated from university or higher. In contrast, the share of husbands who are junior high school graduates is close to 70% for wives who graduated from junior high school and just 3% for wives who graduated from university or higher.

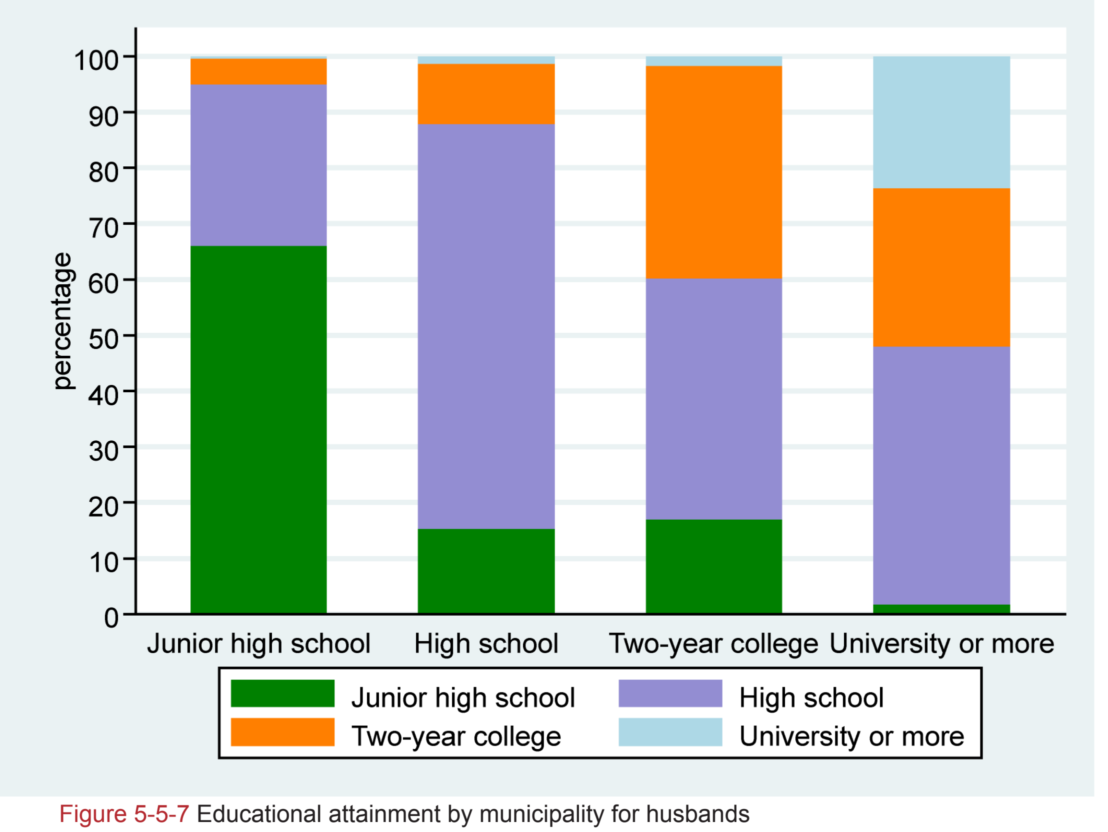

Figure 5-5-7 Educational attainment by municipality for husbands

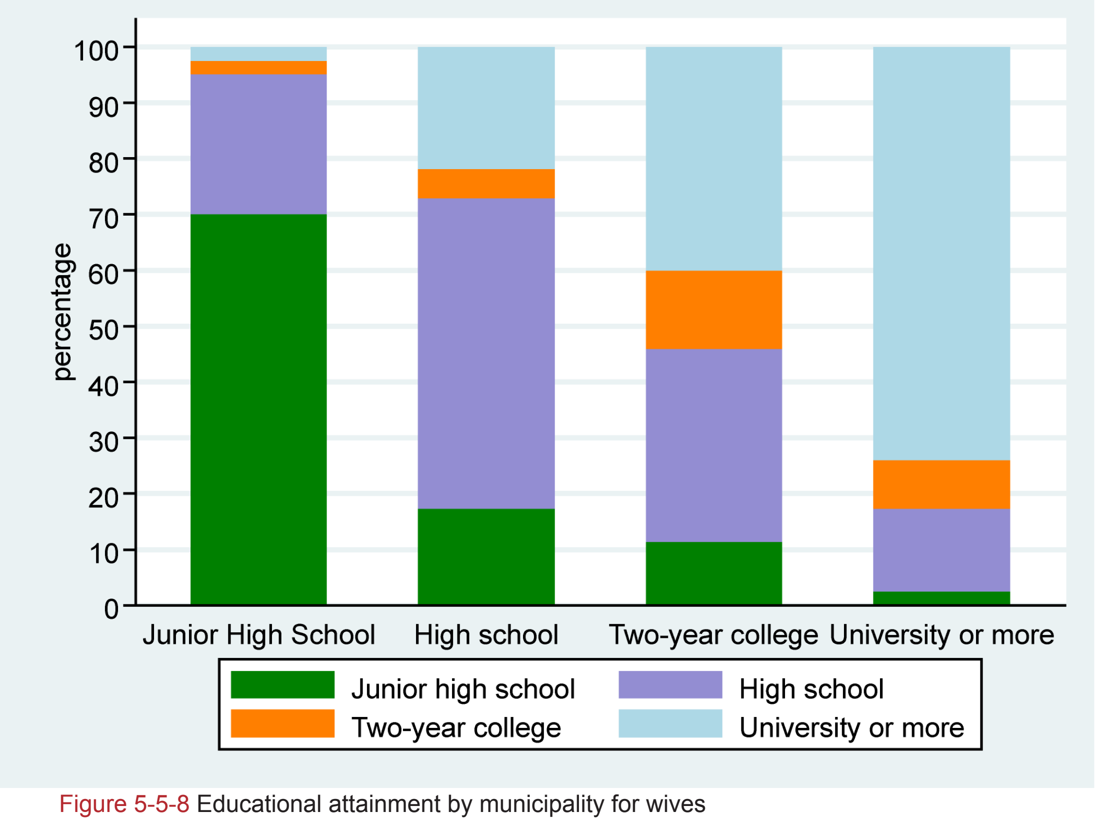

Figure 5-5-8 Educational attainment by municipality for wives

Figure 5-5-9 and 5-5-10 show the relationship of educational attainment between fathers and children aged 25 or over. The figure presents the shares of educational level of male and female children separately. In the case of the male children, it is clear that children are more likely to have higher educational level when their father also attained higher educational level. It is remarkable that the share of university graduates for children is 90% when their fathers are university graduates and the share is close to only 10% when their fathers are junior high school graduates. The share of high school graduates for children exceeds 80% when their fathers are junior high school graduates and the share is close to only 5% when their fathers are university graduates. This pattern is also the case for female children. The share of university graduates for children is 60% when their fathers are university graduates and the share is close to only 1% when their fathers are junior high school graduates. The share of high school graduates for children is close to 90% when their fathers are junior high school graduates and the share is close to 10% when their fathers are university graduates.

These figures demonstrate a strong relationship in educational level between a husband and a wife and between parents and children in Japan. We need to consider this close linkage in educational level when we analyze family relationships in both monetary and nonmonetary aspects in the following sections, especially in terms of inequality.

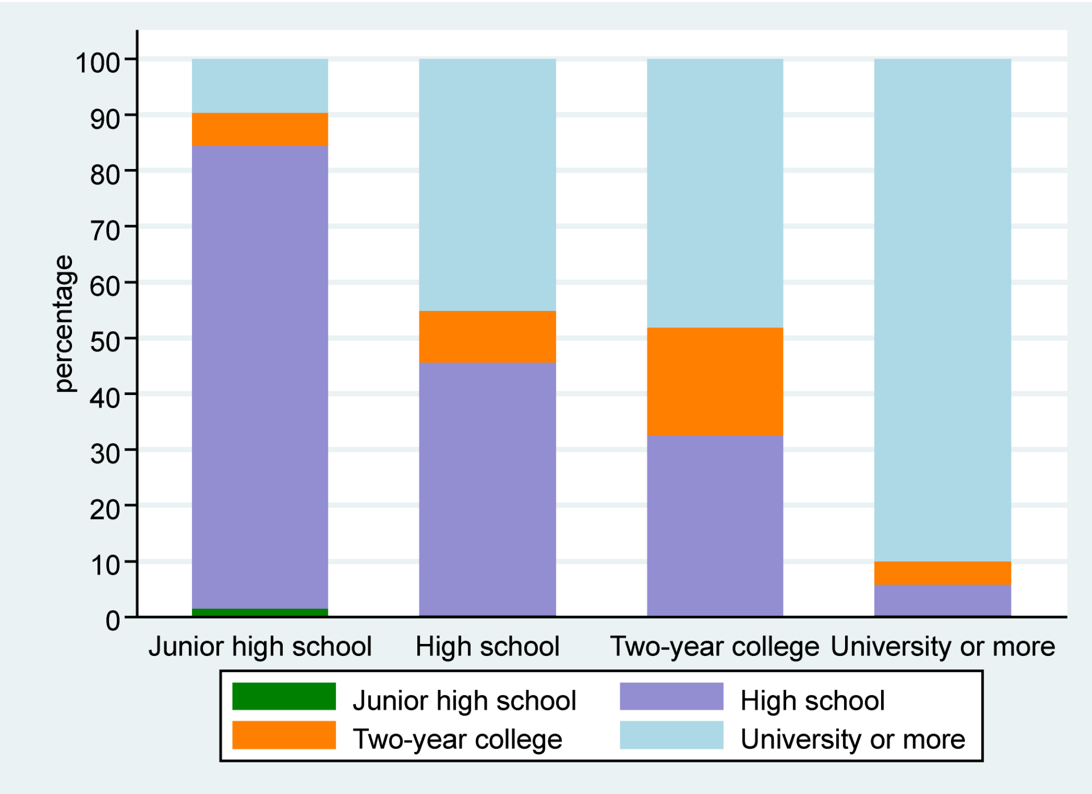

Figure 5-5-9 Relationship of male children's (age 25+) educational attainment to that of father

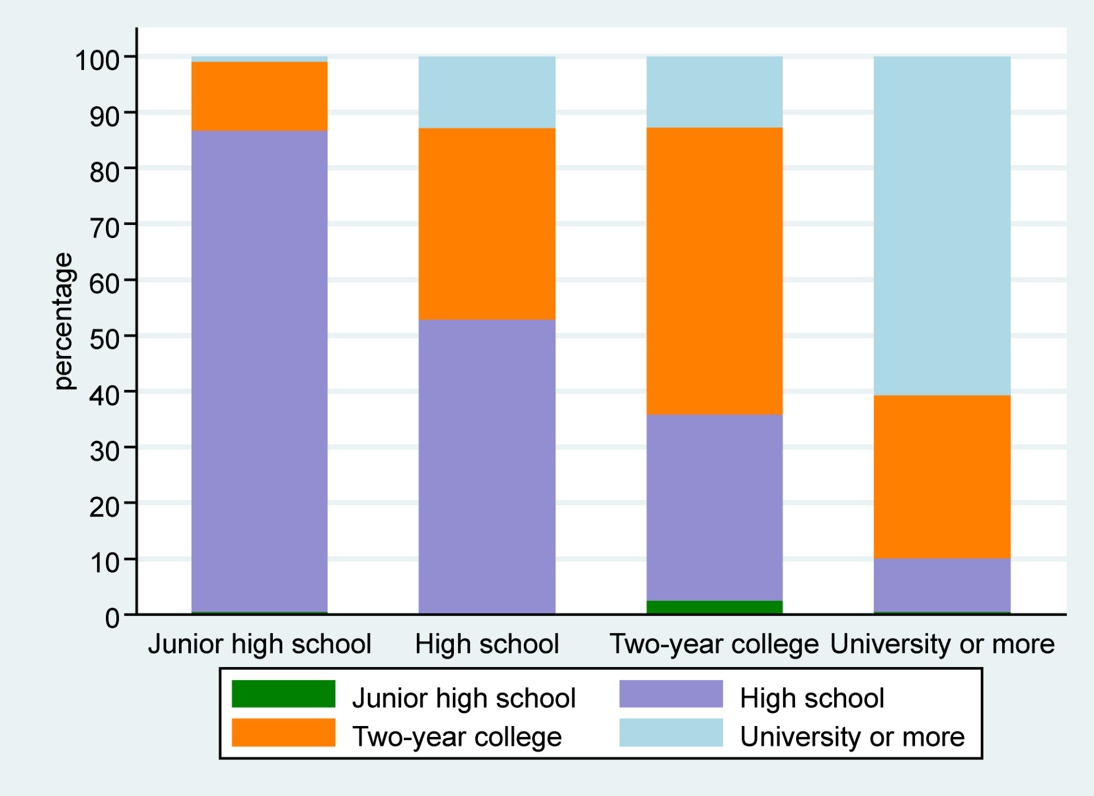

Figure 5-5-10 Relationship of female children's (age 25+) educational attainment to that of father

5.5.4 Conclusions

• We observe that the males' educational level is higher than that of females in all municipalities and there is a large disparity in educational attainment across municipalities. This pattern is also observed in children's educational level.

• We confirm the strong correlation in educational attainment between husband and wife and between parents and children. The effect of this linkage on family relationship should be investigated.

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