



Chapter 5  
Socioeconomic Status

## 5 Socioeconomic Status

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## **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, un-

willingness 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 household 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

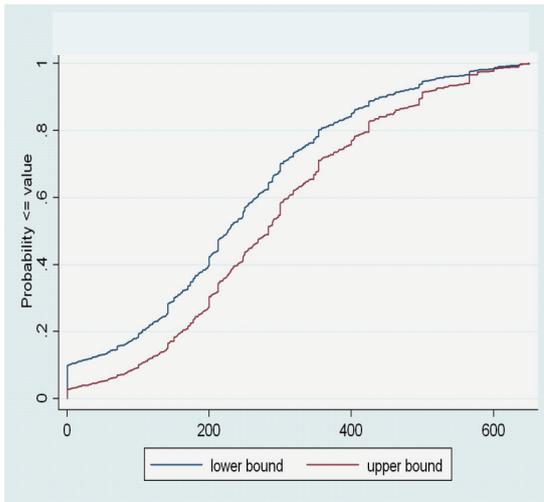


Figure 5-1-1-1 Equivalent household income (all)

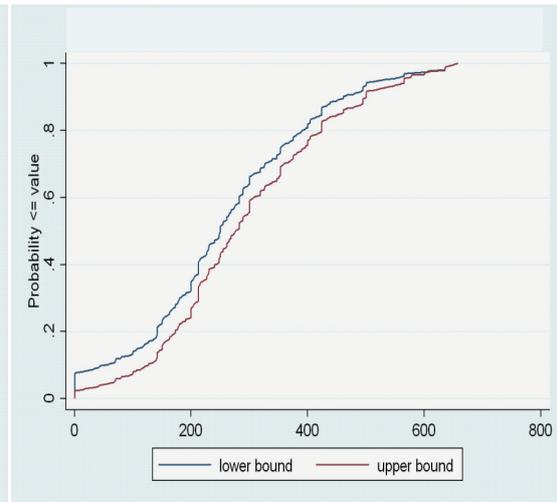


Figure 5-1-1-2 Equivalent household income (Sendai)

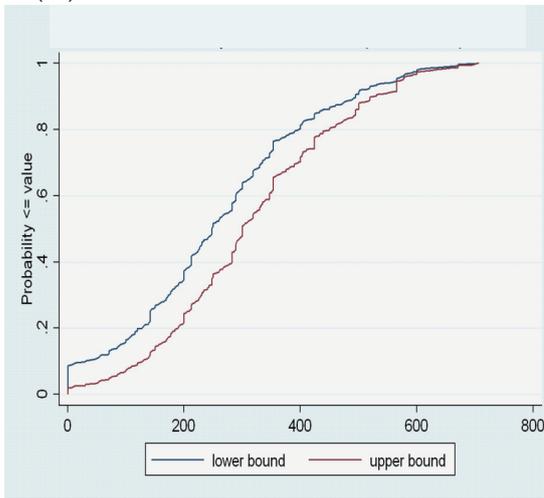


Figure 5-1-1-3 Equivalent household income (Kanazawa)

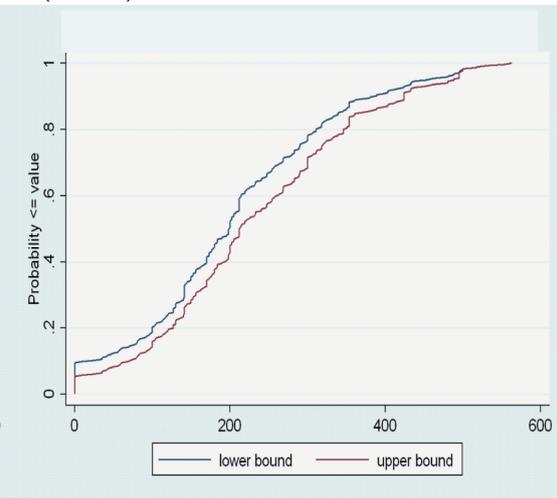


Figure 5-1-1-4 Equivalent household income (Takikawa)

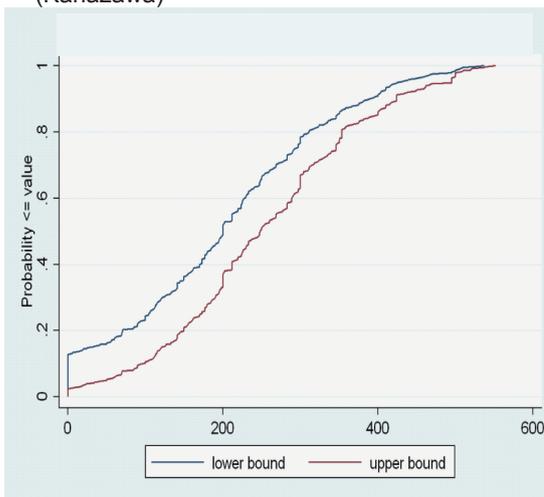


Figure 5-1-1-5 Equivalent household income (Shirakawa)

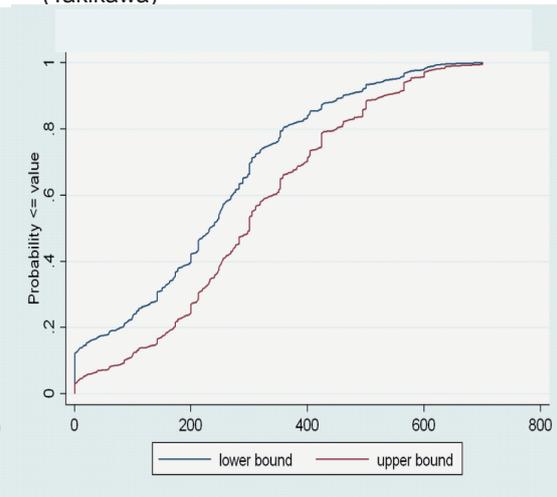


Figure 5-1-1-6 Equivalent household income (Adachi)

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.

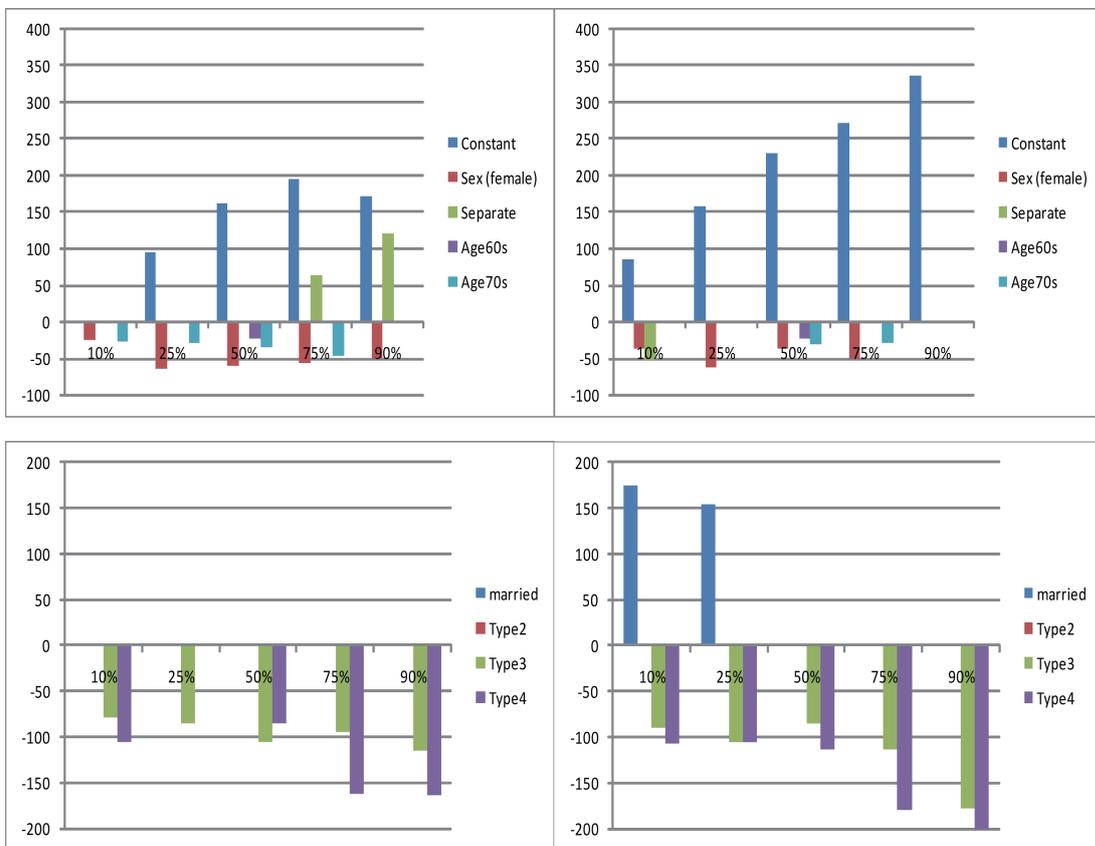


Figure 5-1-2 Difference in equivalent household income (unit: ten thousand yen)

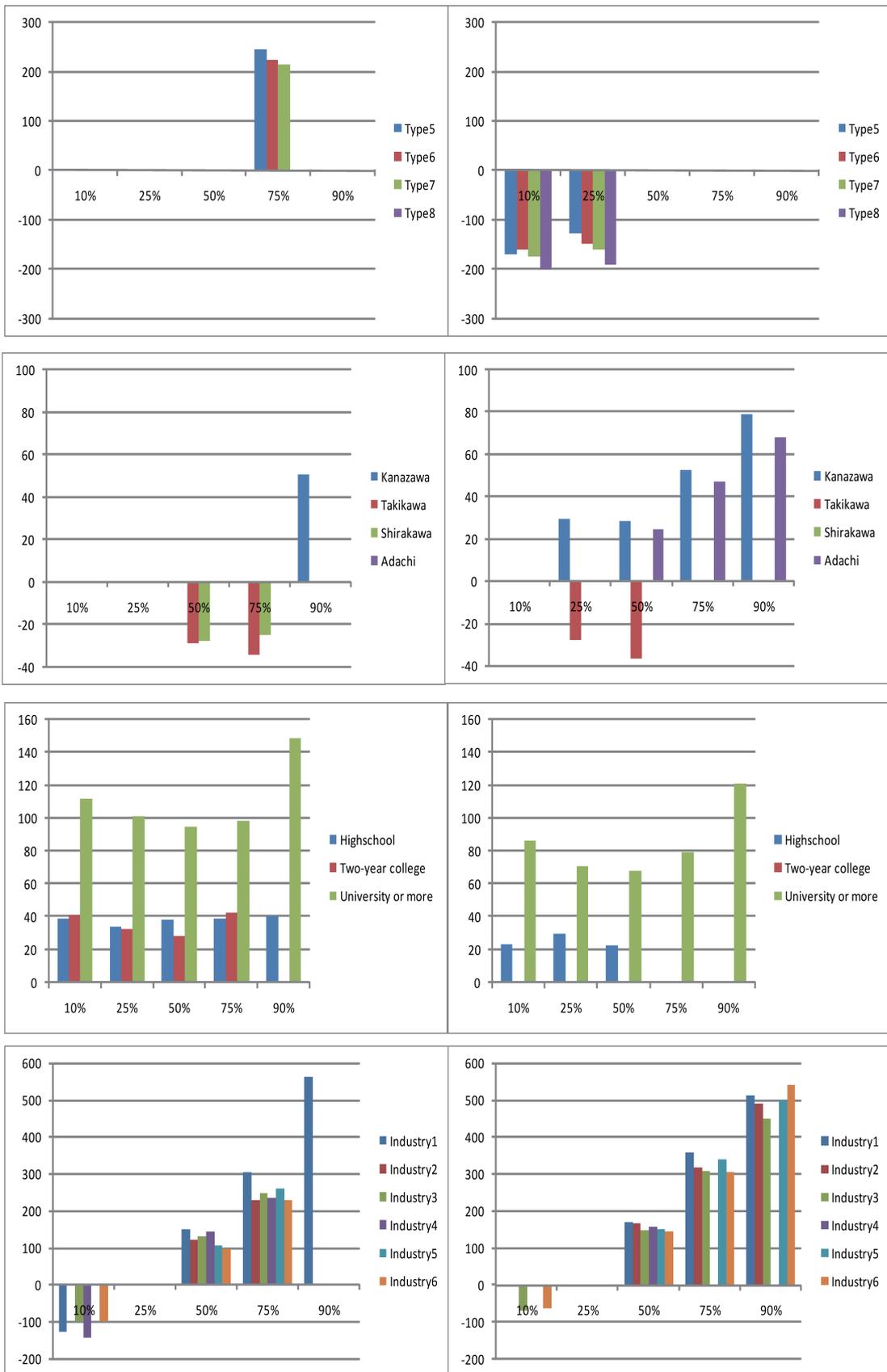


Figure 5-1-2 (con't.) Difference in equivalent household income (unit: ten thousand yen)

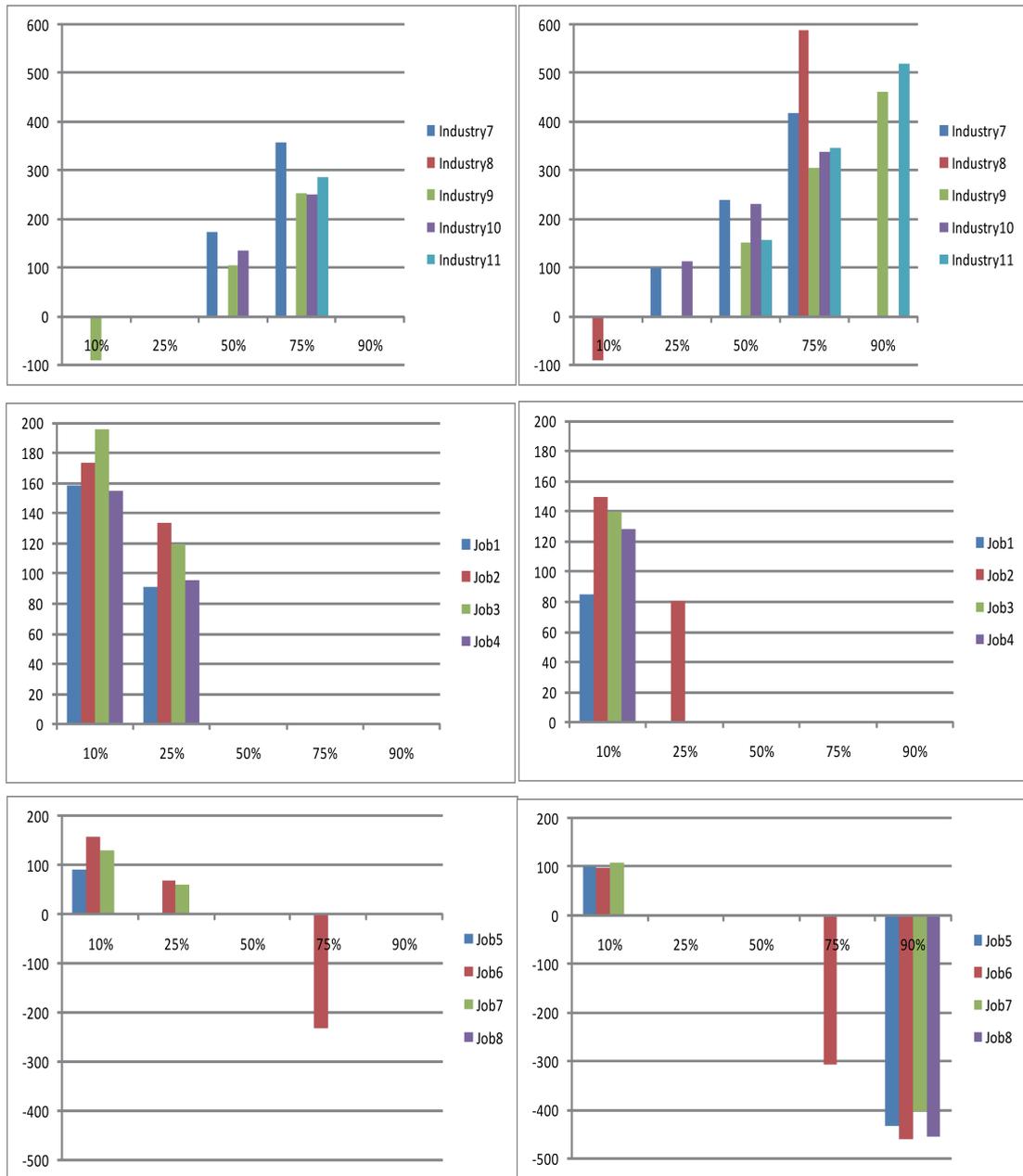


Figure 5-1-2 (cont.) Difference in equivalent household income (unit: ten thousand yen)

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  
 Industry 6: Wholesale, retail  
 Industry 7: Financial and insurance  
 Industry 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.

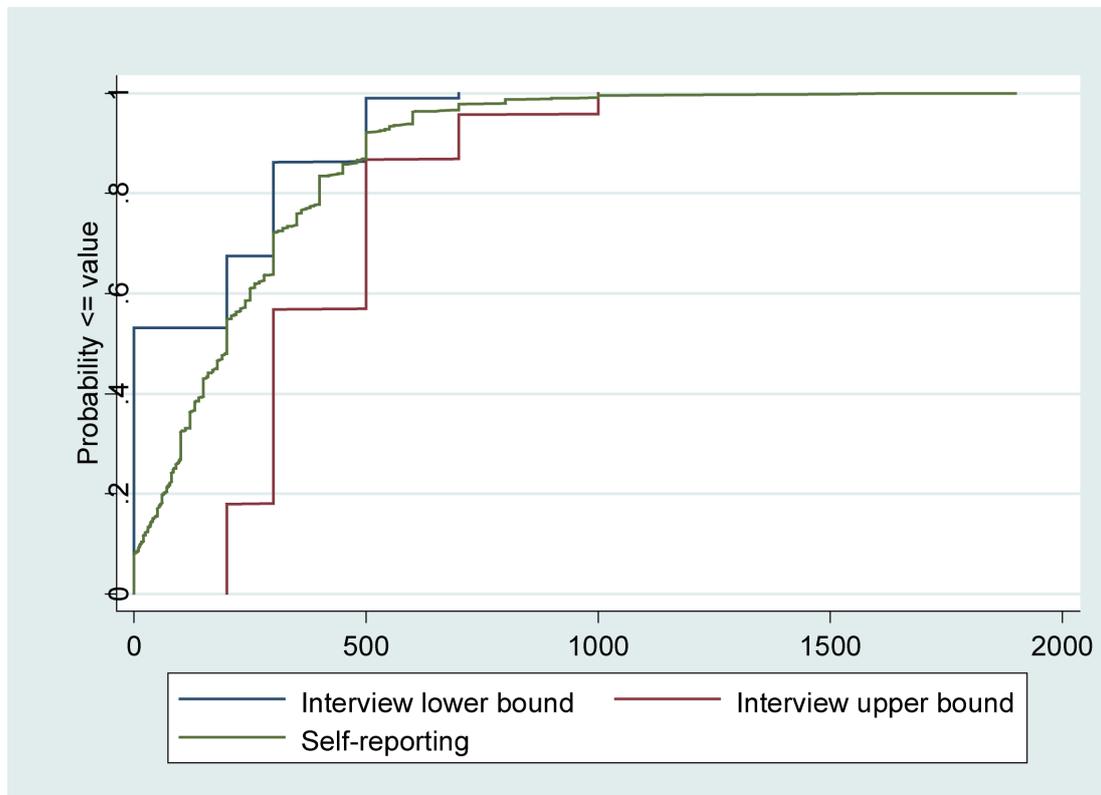


Figure 5-1-3-1 Comparison of household income between self-reporting and official tax record (respondent)

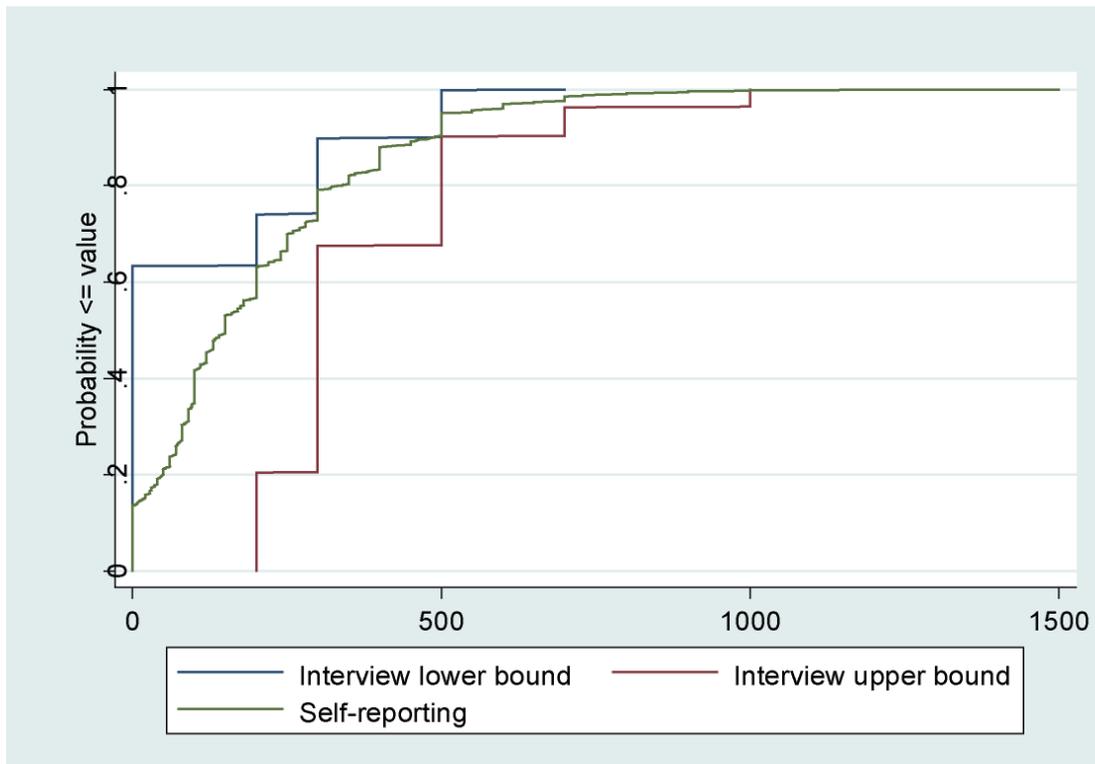


Figure 5-1-3-2 Comparison of household income between self-reporting and official tax record (spouse)

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

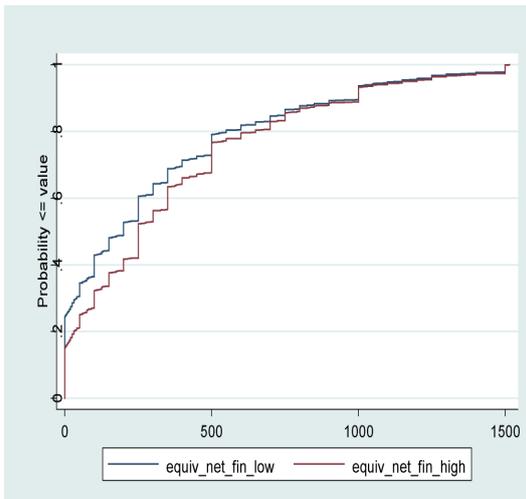


Figure 5-2-1-1 Equivalent net financial wealth (all)

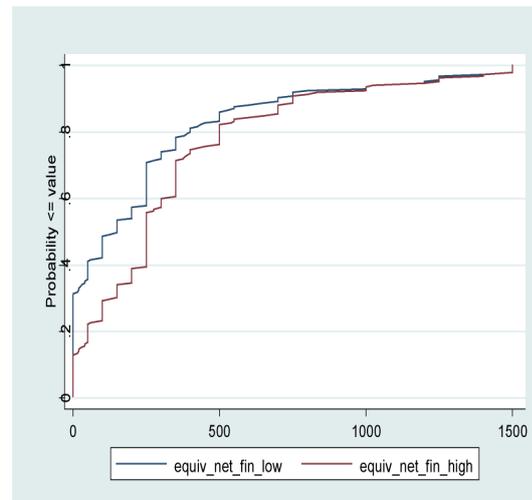


Figure 5-2-1-2 Equivalent net financial wealth (Sendai)

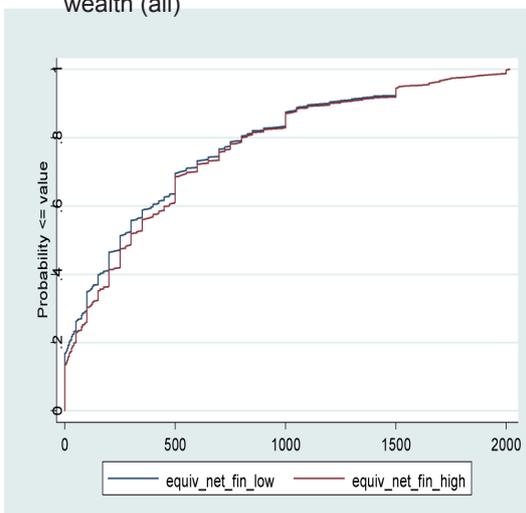


Figure 5-2-1-3 Equivalent net financial wealth (Kanazawa)

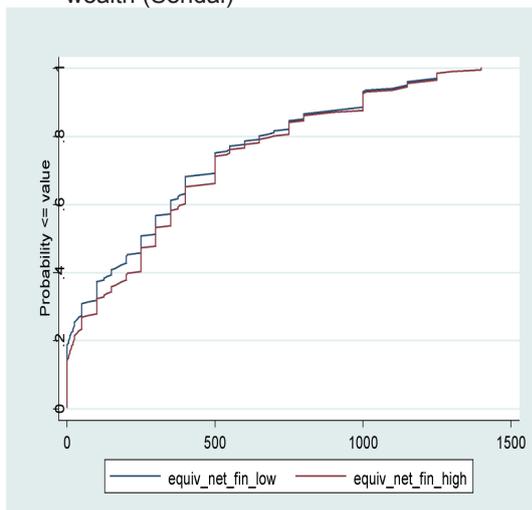


Figure 5-2-1-4 Equivalent net financial wealth (Takikawa)

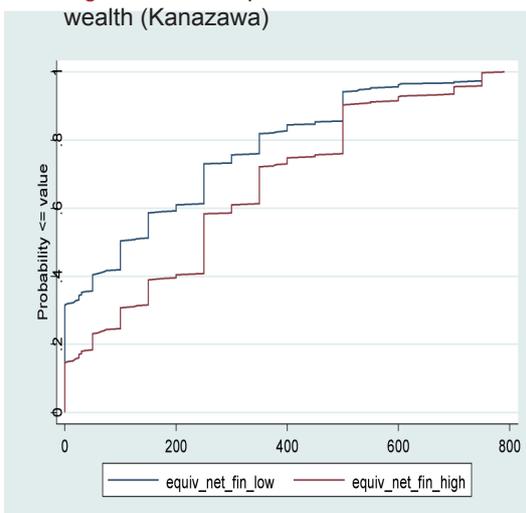


Figure 5-2-1-5 Equivalent net financial wealth (Shirakawa)

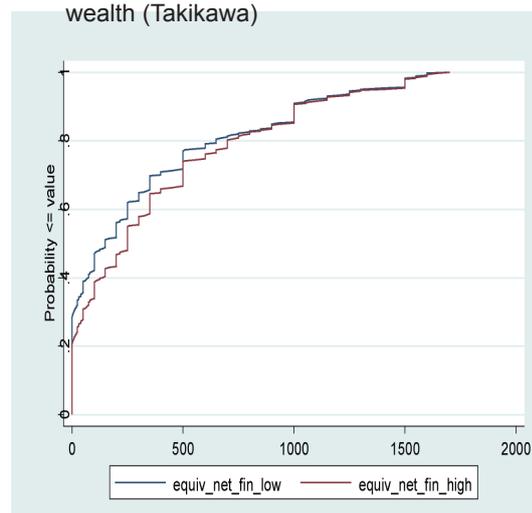


Figure 5-2-1-6 Equivalent net financial wealth (Adachi)

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.

Chapter 5

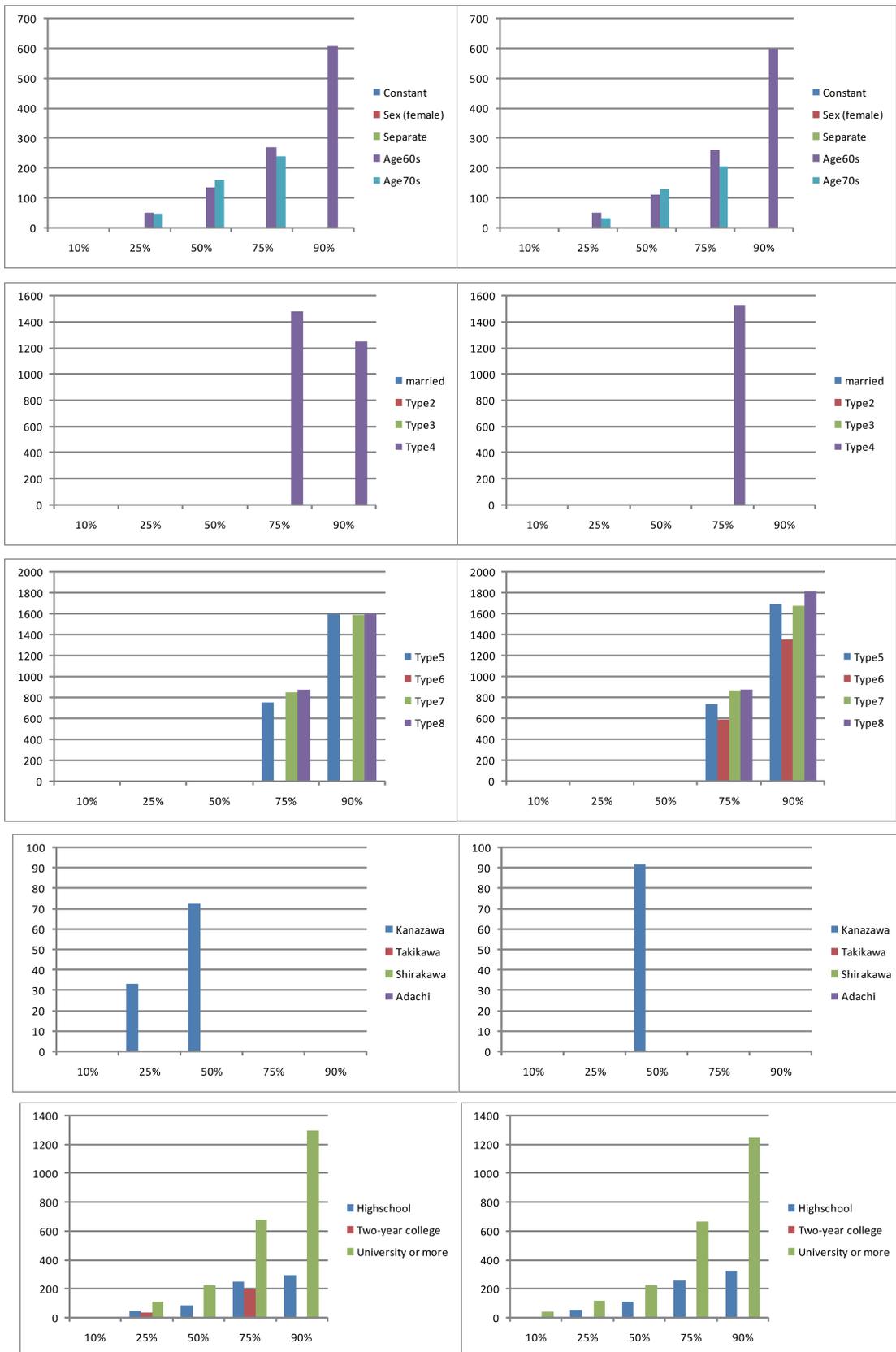


Figure 5-2-2 Difference in equivalent net financial wealth (unit: ten thousand yen)

#### **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.

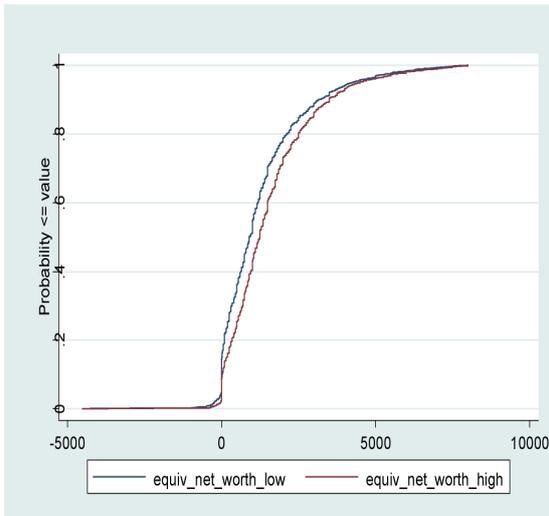


Figure 5-2-3-1 Equivalent net total wealth (all)

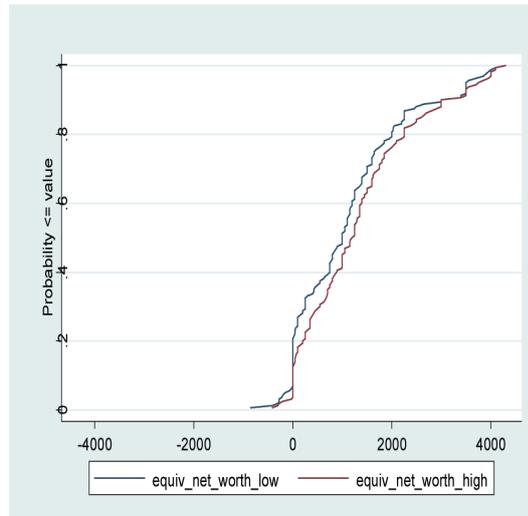


Figure 5-2-3-2 Equivalent net total wealth (Sendai)

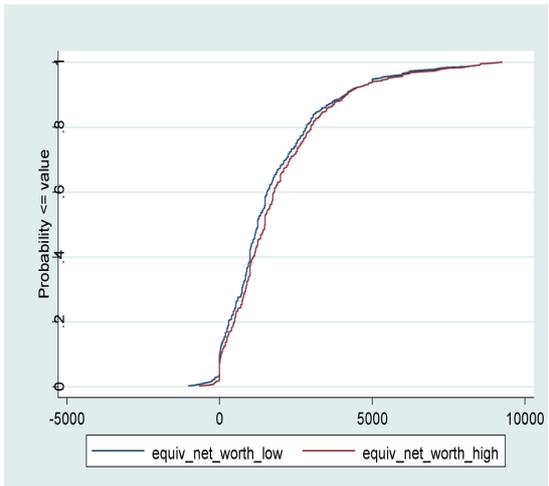


Figure 5-2-3-3 Equivalent net total wealth (Kanazawa)

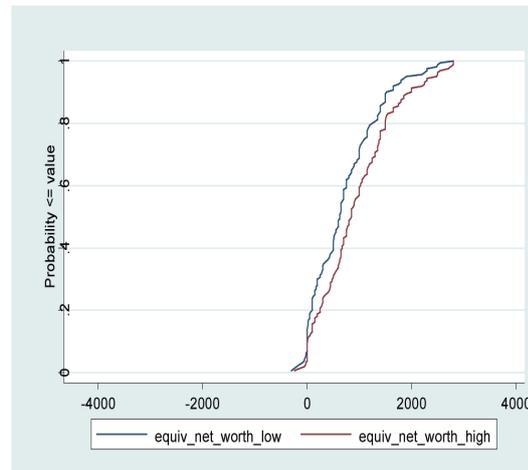


Figure 5-2-3-4 Equivalent net total wealth (Takikawa)

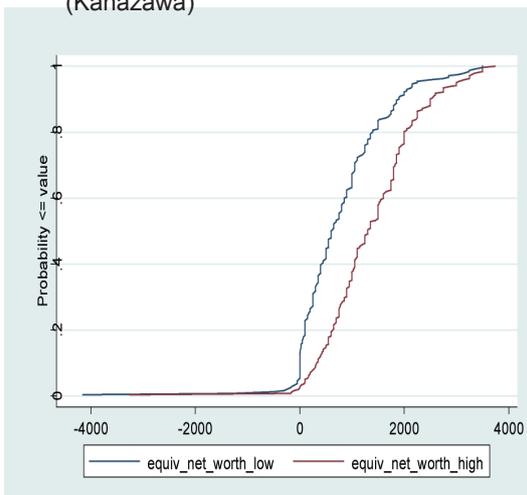


Figure 5-2-3-5 Equivalent net total wealth (Shirakawa)

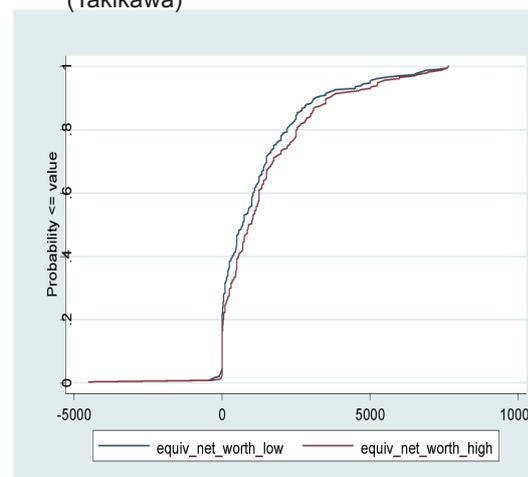


Figure 5-2-3-6 Equivalent net total wealth (Adachi)

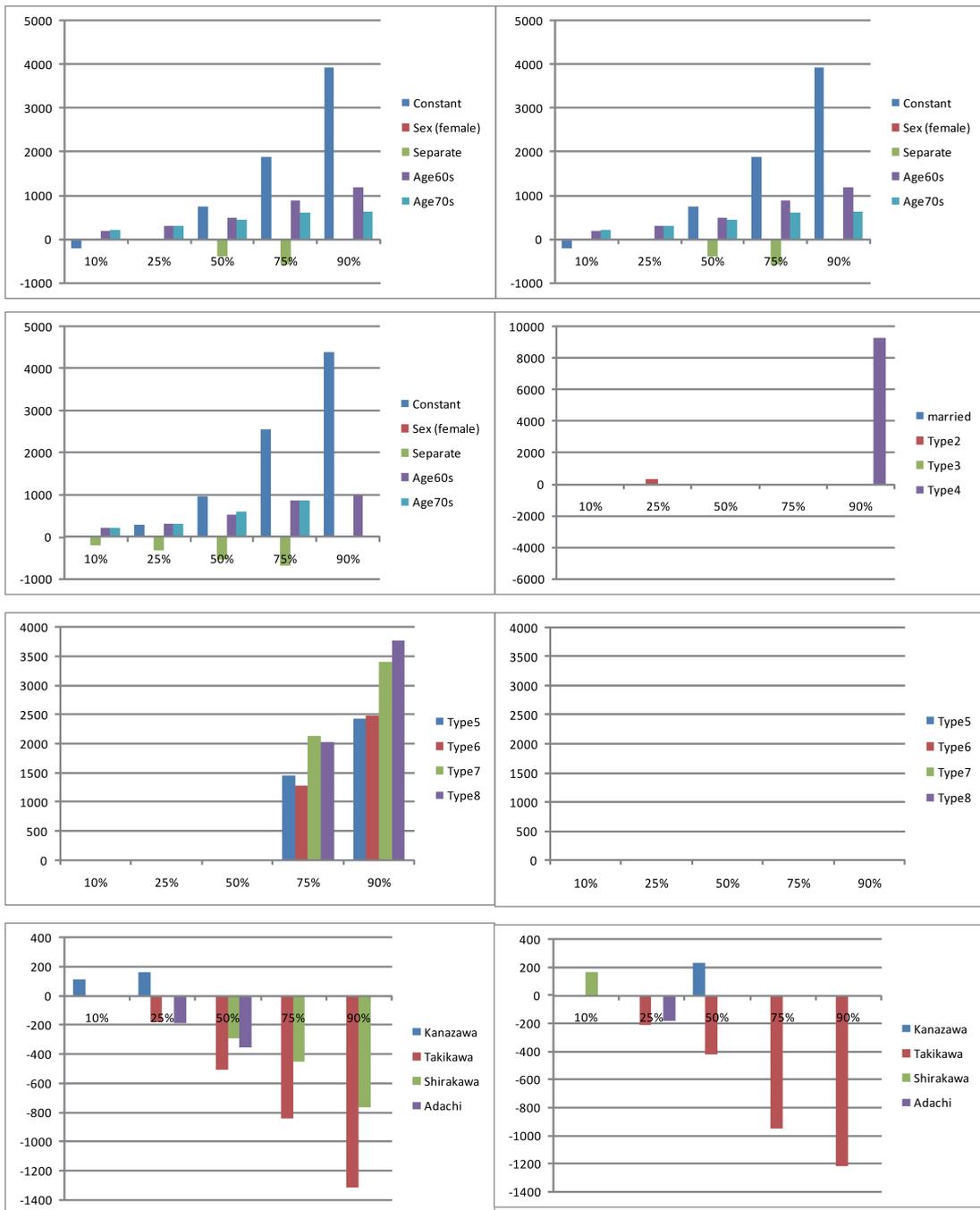


Figure 5-2-4 Difference in equivalent net total wealth (unit: ten thousand yen)

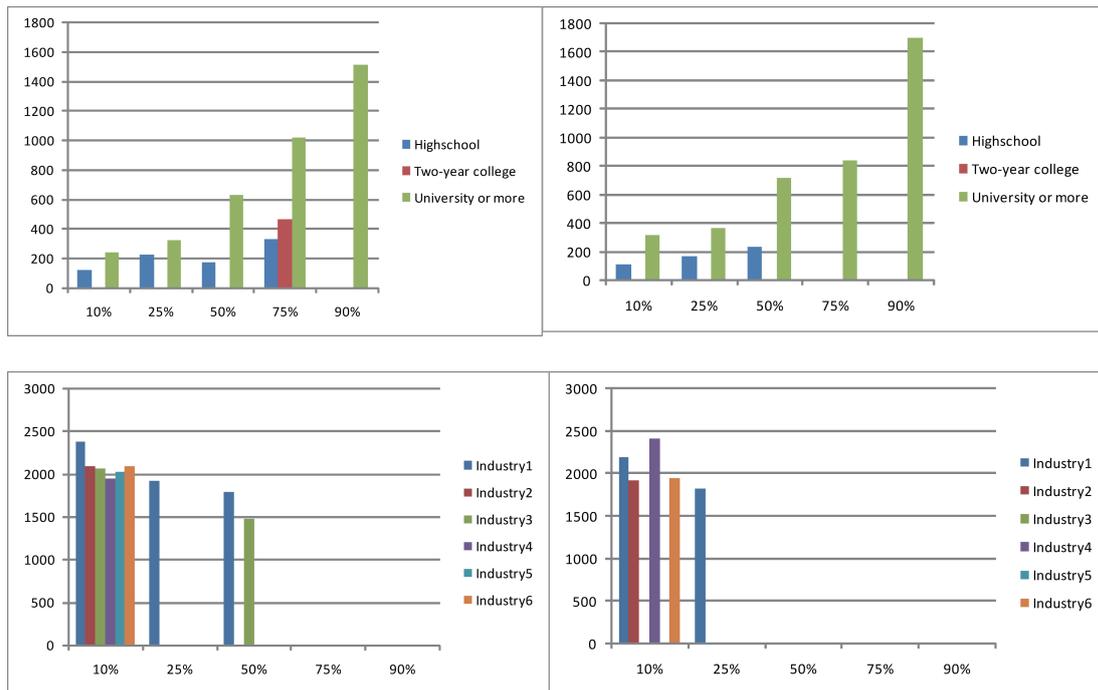


Figure 5-2-4 (con't.) Difference in equivalent net total wealth (unit: ten thousand yen)

- 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
- Industry 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 while household 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 yen 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

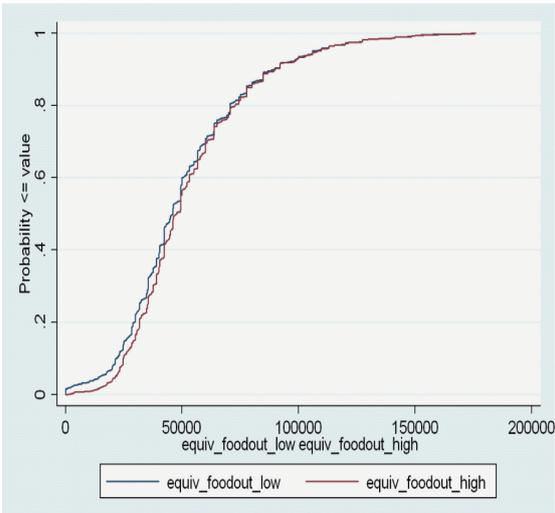


Figure 5-3-1-1 Equivalent food expenditure (all)

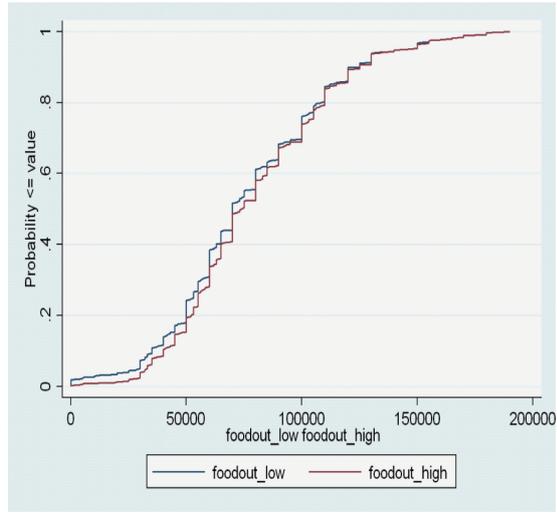


Figure 5-3-1-2 Equivalent food expenditure (Sendai)

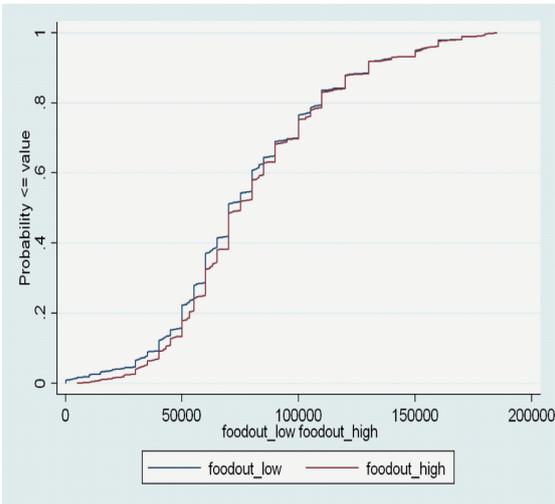


Figure 5-3-1-3 Equivalent food expenditure (Kanazawa)

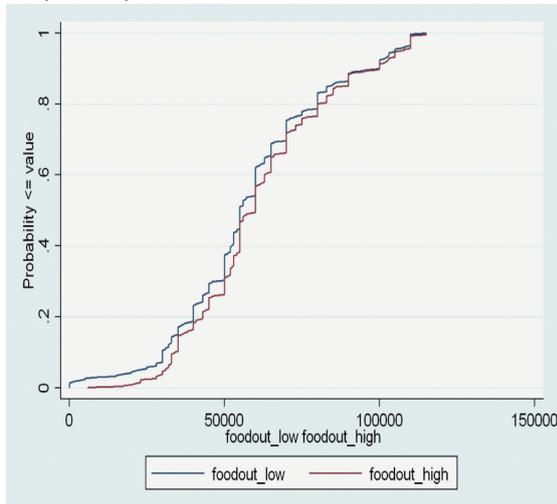


Figure 5-3-1-4 Equivalent food expenditure (Takikawa)

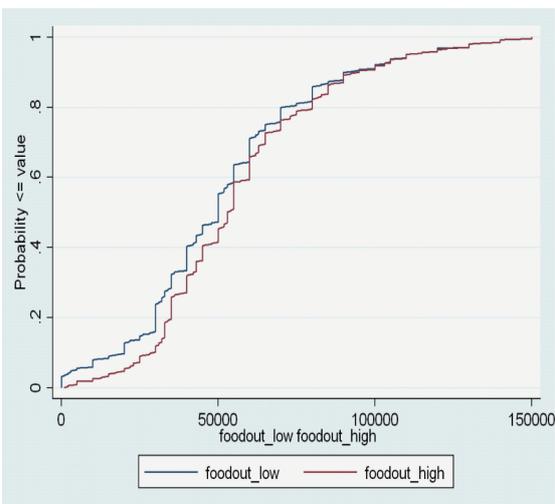


Figure 5-3-1-5 Equivalent food expenditure (Shirakawa)

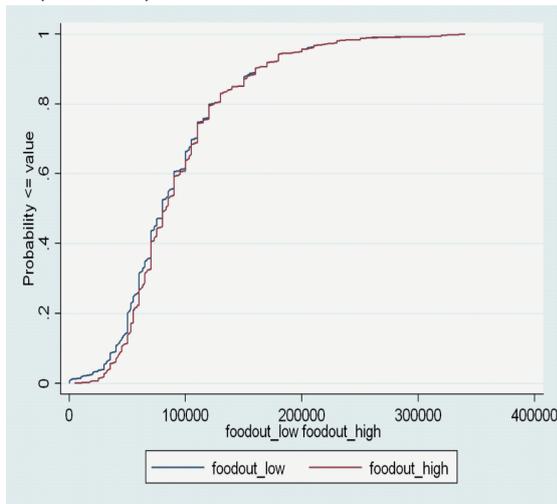


Figure 5-3-1-6 Equivalent food expenditure (Adachi)

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).

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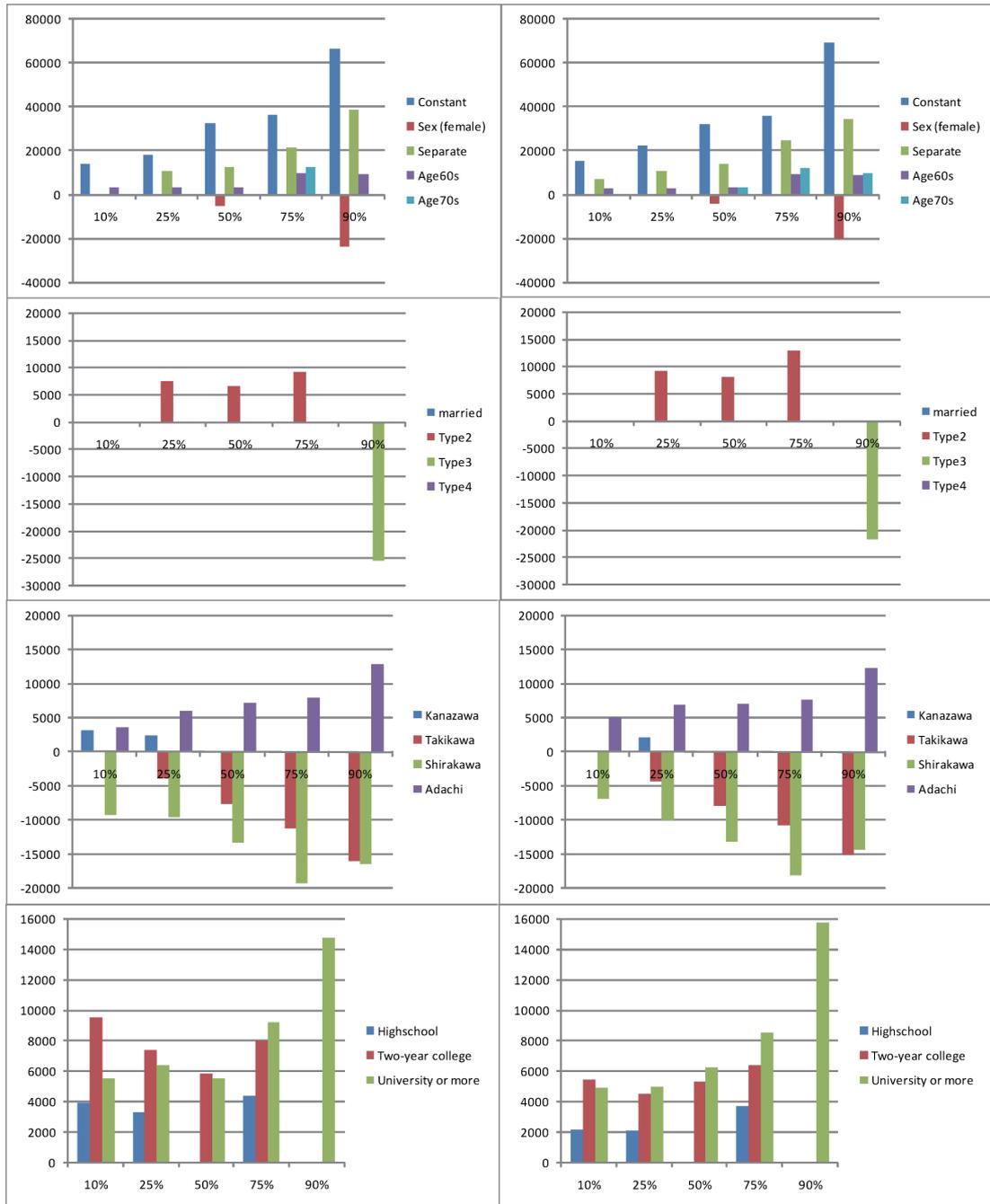


Figure 5-3-2 Difference in equivalent food expenditure (unit: yen)

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 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, 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

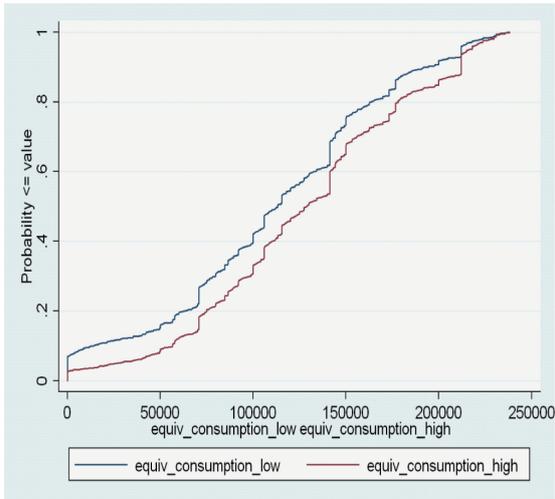


Figure 5-3-3-1 Equivalent total expenditure (all)

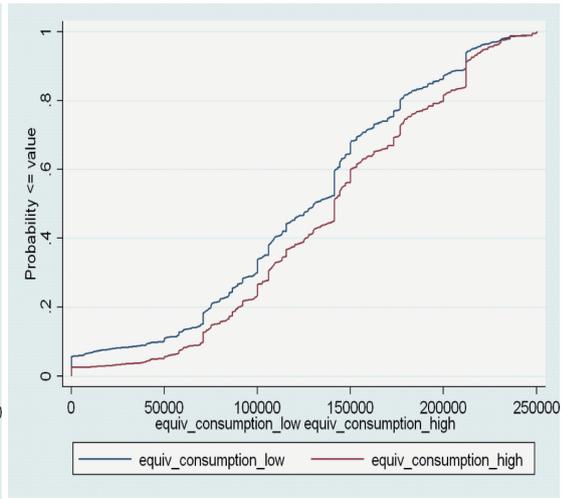


Figure 5-3-3-2 Equivalent total expenditure (Sendai)

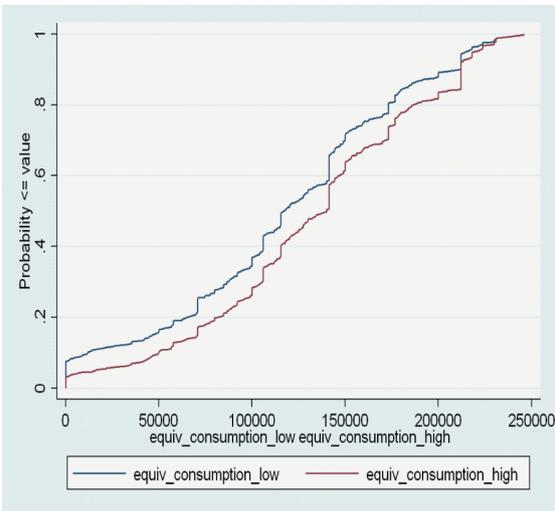


Figure 5-3-3-3 Equivalent total expenditure (Kanazawa)

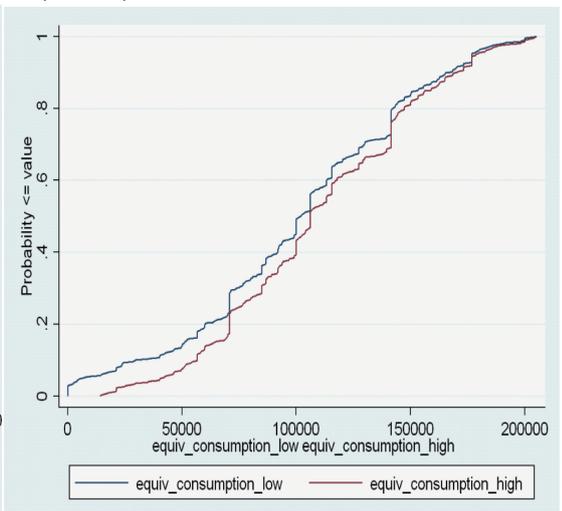


Figure 5-3-3-4 Equivalent total expenditure (Takikawa)

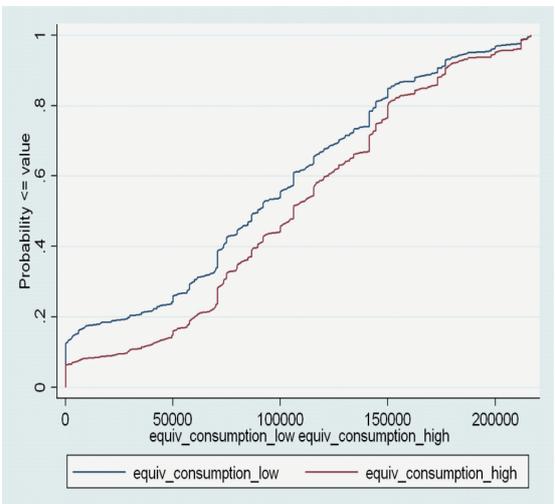


Figure 5-3-3-5 Equivalent total expenditure (Shirakawa)

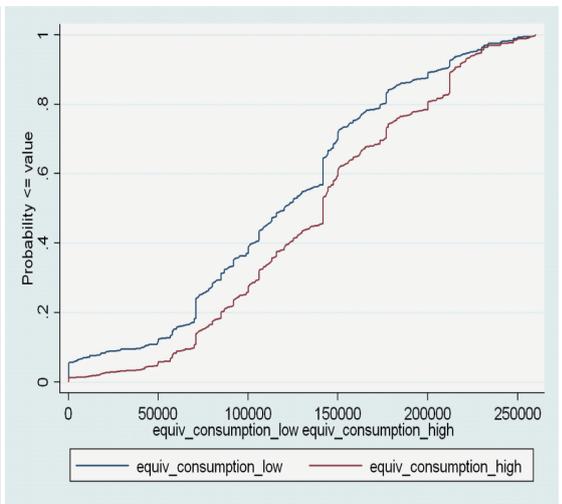


Figure 5-3-3-6 Equivalent total expenditure (Adachi)

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.

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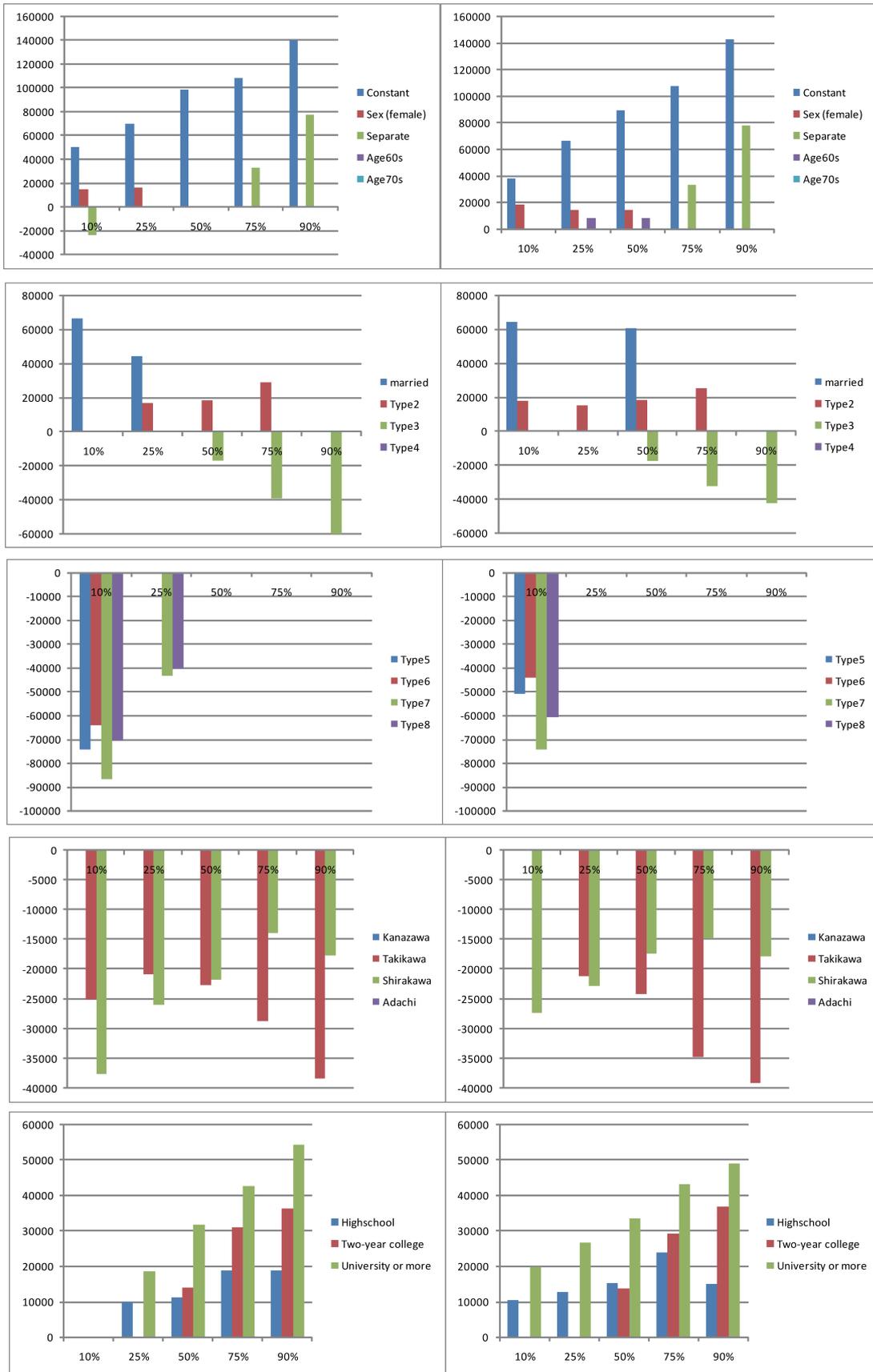


Figure 5-3-4 Difference in equivalent total expenditure (unit: yen)

### **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 possibilities 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

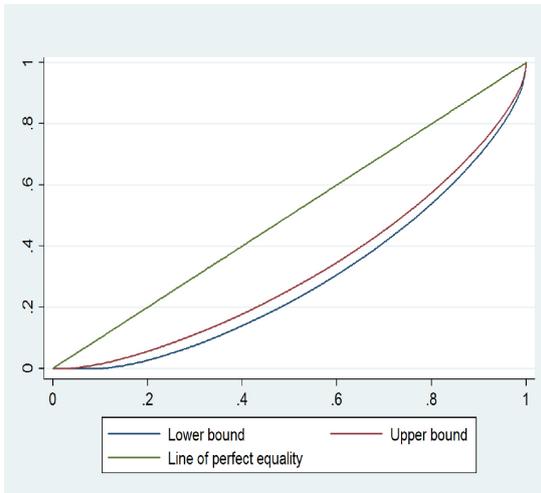


Figure 5-4-1-1 Equivalent household income

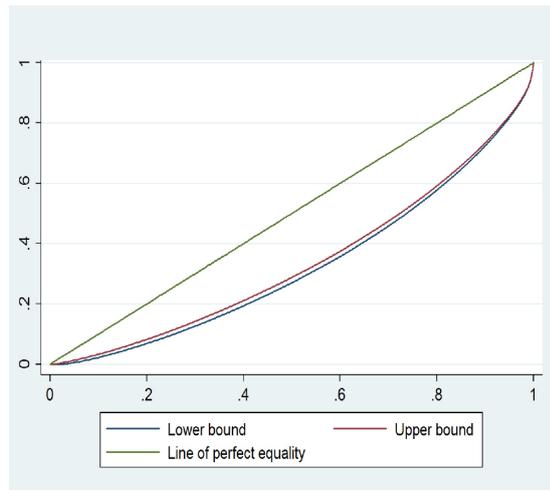


Figure 5-4-1-2 Equivalent food consumption (all)

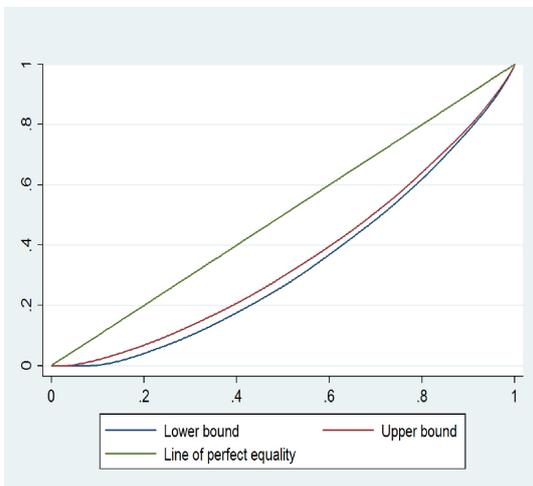


Figure 5-4-1-3 Equivalent household consumption (all)

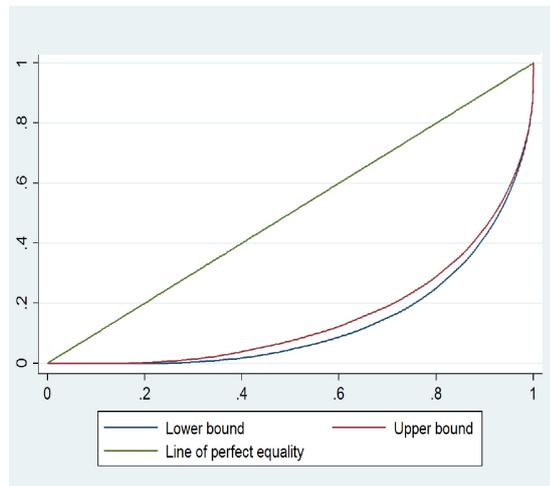


Figure 5-4-1-4 Net financial assets (all)

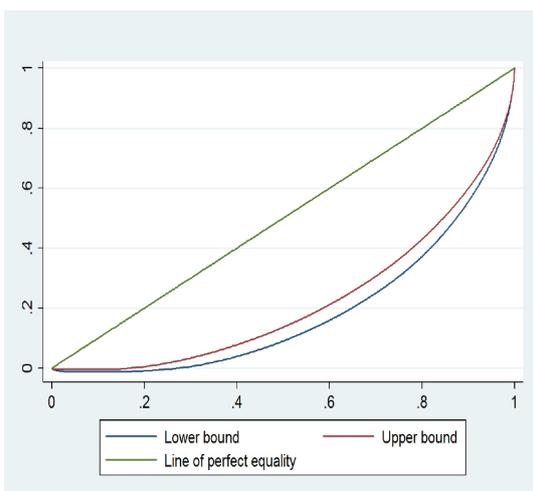


Figure 5-4-1-5 Net total assets (all)

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 Northern 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

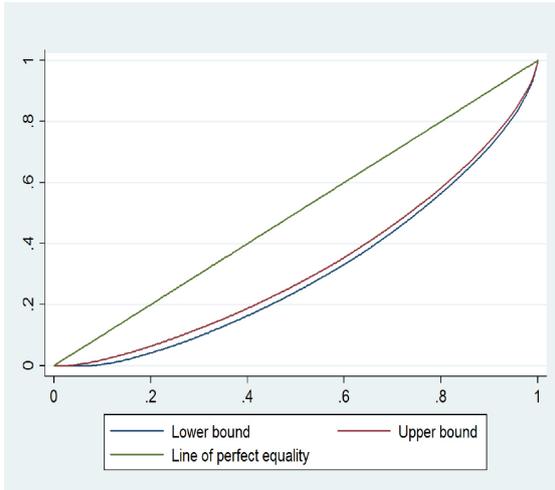


Figure 5-4-2-1 Equivalent household income (Sendai)

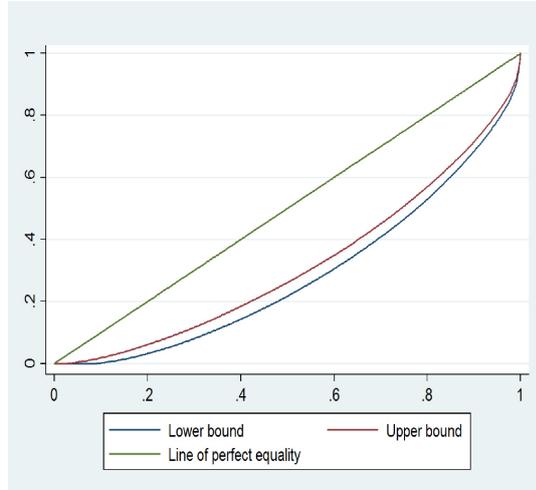


Figure 5-4-2-2 Equivalent household income (Kanazawa)

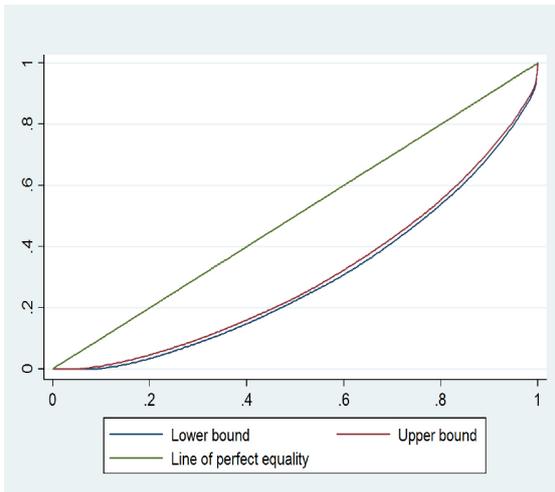


Figure 5-4-2-3 Equivalent household income (Takikawa)

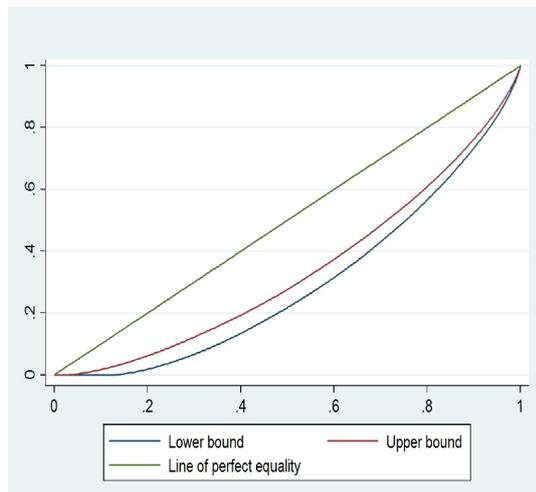


Figure 5-4-2-4 Equivalent household income (Shirakawa)

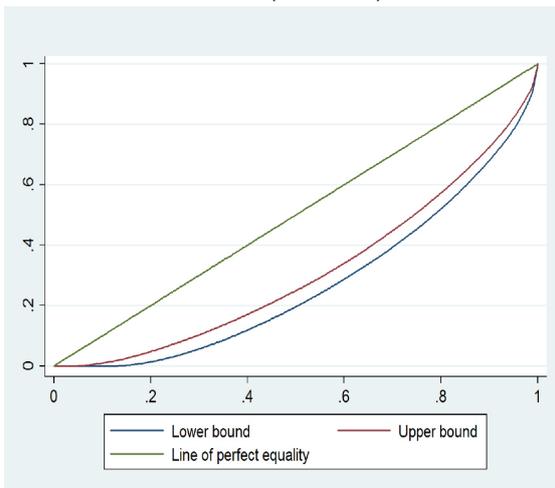


Figure 5-4-2-5 Equivalent household income (Adachi)

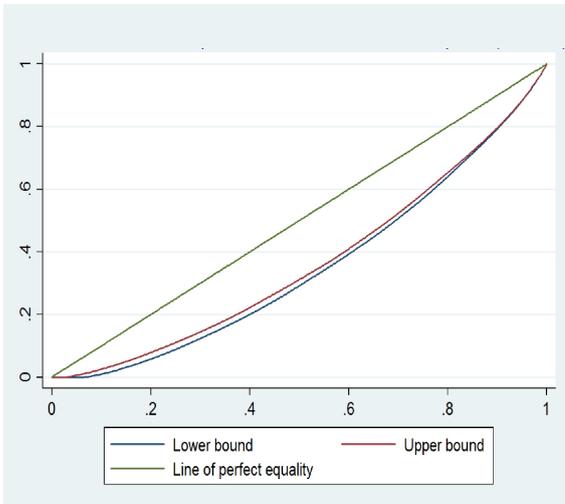


Figure 5-4-3-1 Equivalent household total consumption (Sendai)

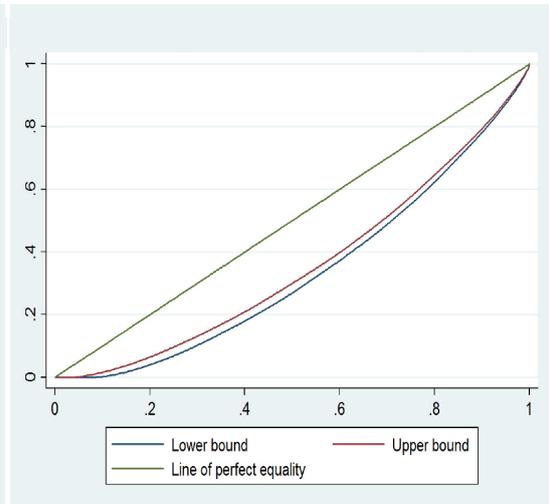


Figure 5-4-3-2 Equivalent household total consumption (Kanazawa)

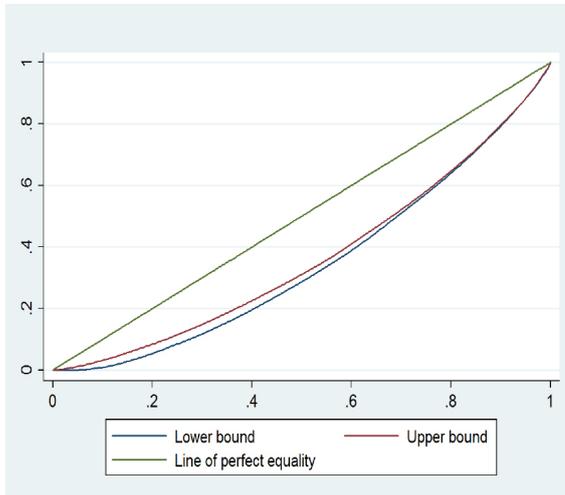


Figure 5-4-3-3 Equivalent household total consumption (Takikawa)

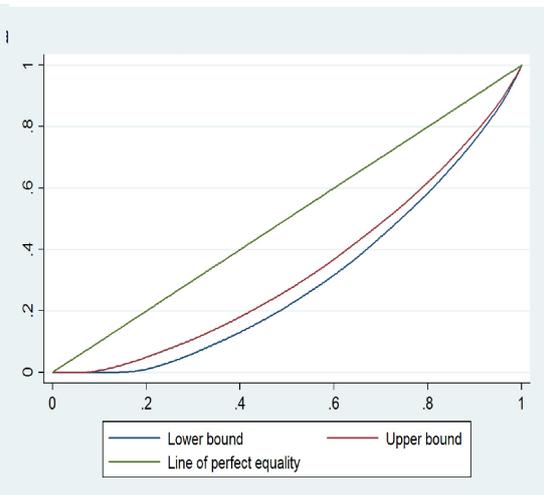


Figure 5-4-3-4 Equivalent household total consumption (Shirakawa)

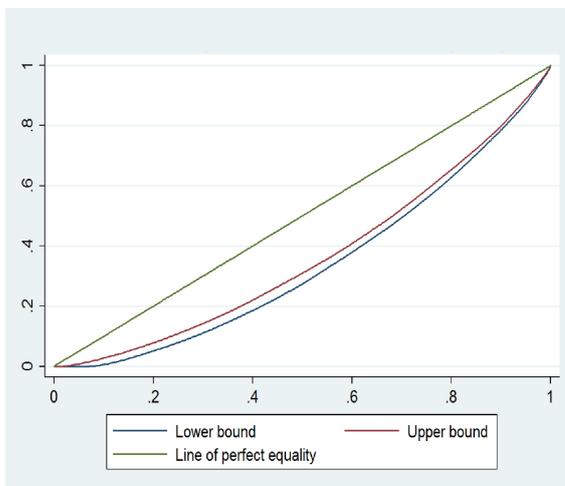


Figure 5-4-3-5 Equivalent household total consumption (Adachi)

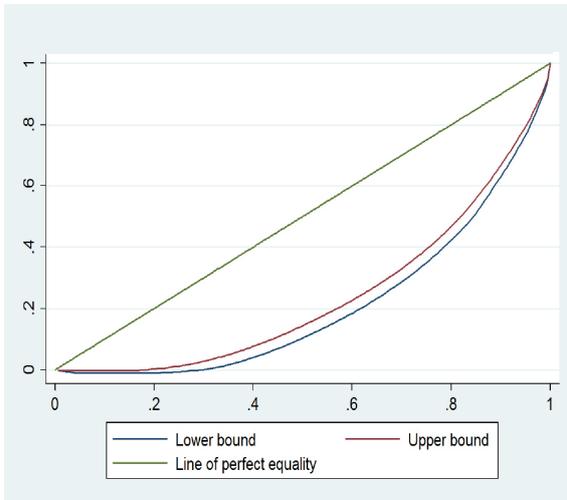


Figure 5-4-4-1 Equivalent net total assets (Sendai)

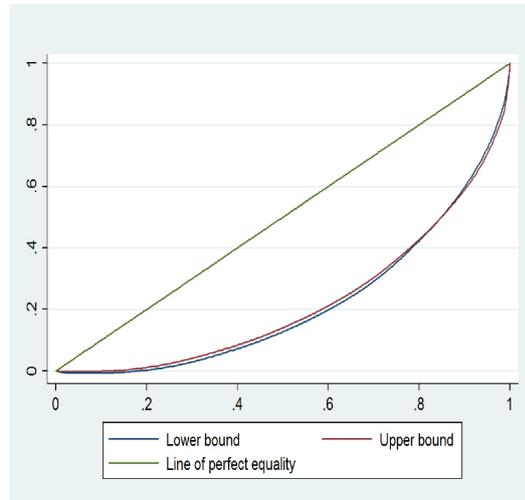


Figure 5-4-4-2 Equivalent net total assets (Kanazawa)

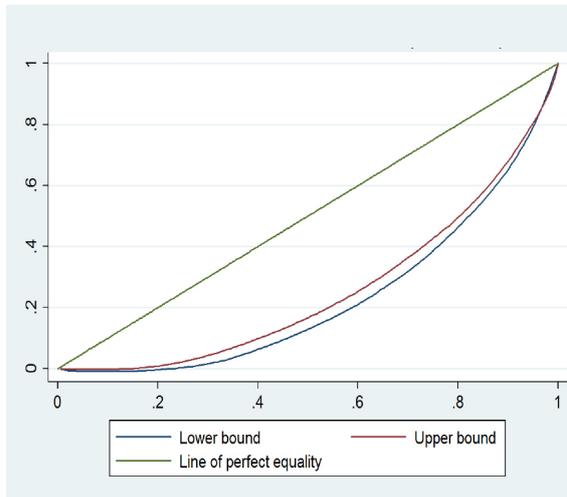


Figure 5-4-4-3 Equivalent net total assets (Takikawa)

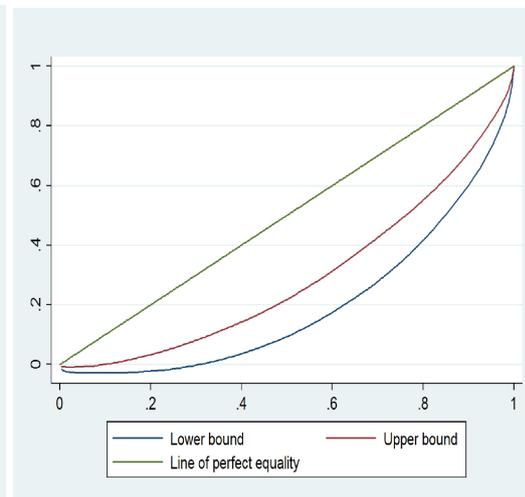


Figure 5-4-4-4 Equivalent net total assets (Shirakawa)

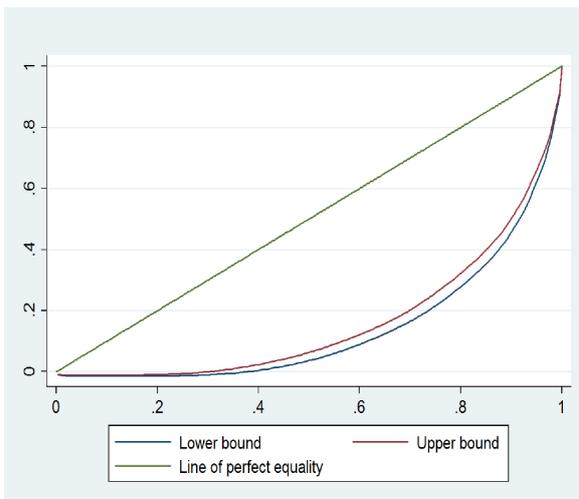


Figure 5-4-4-5 Equivalent net total assets (Adachi)

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 smaller 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 identical 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.

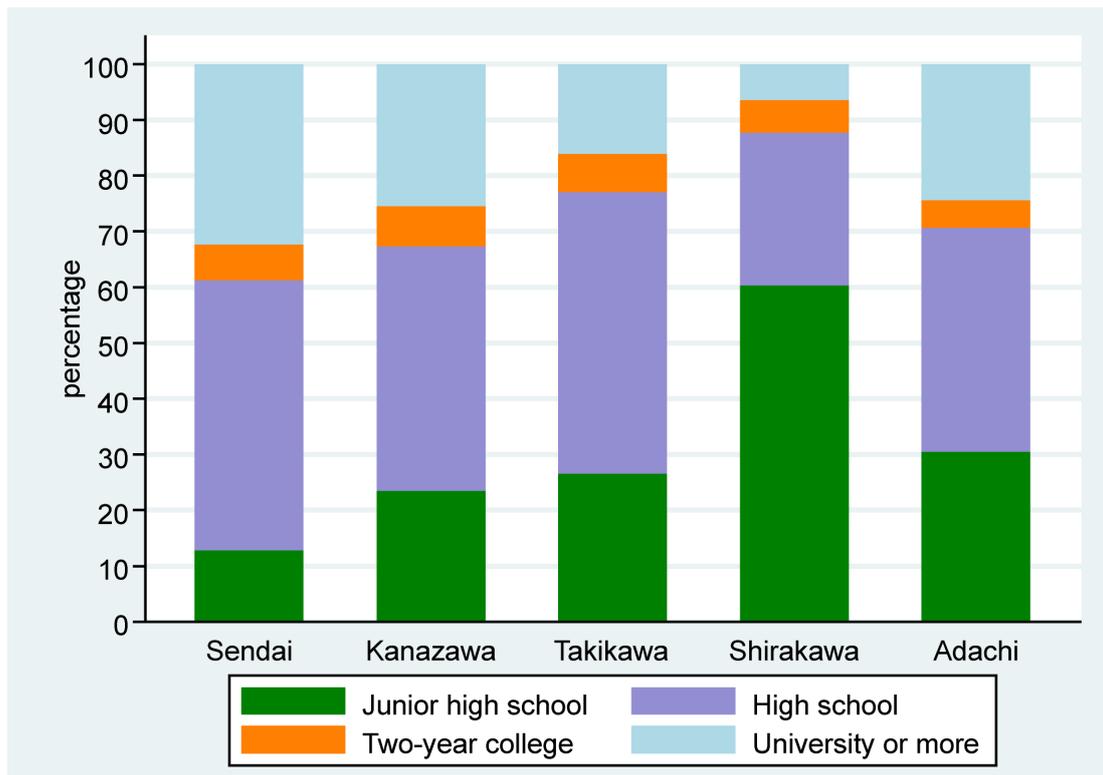


Figure 5-5-1 Educational attainment by municipality for males

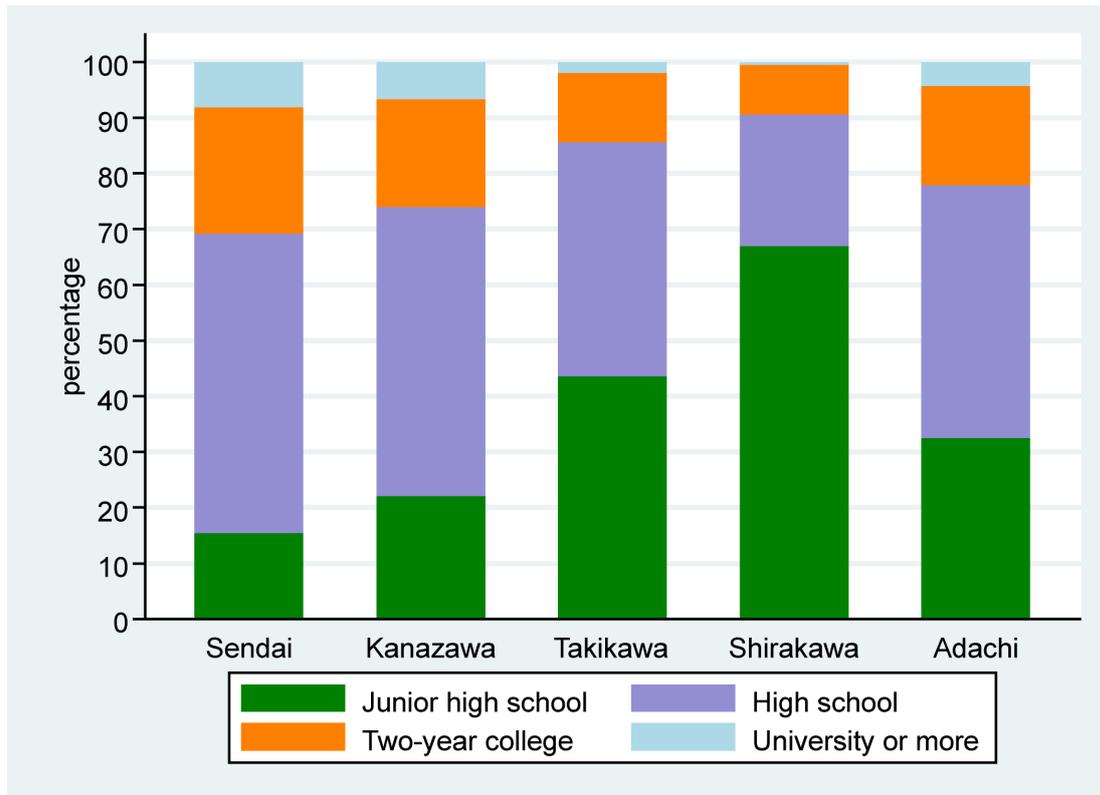


Figure 5-5-2 Educational attainment by municipality for females

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.

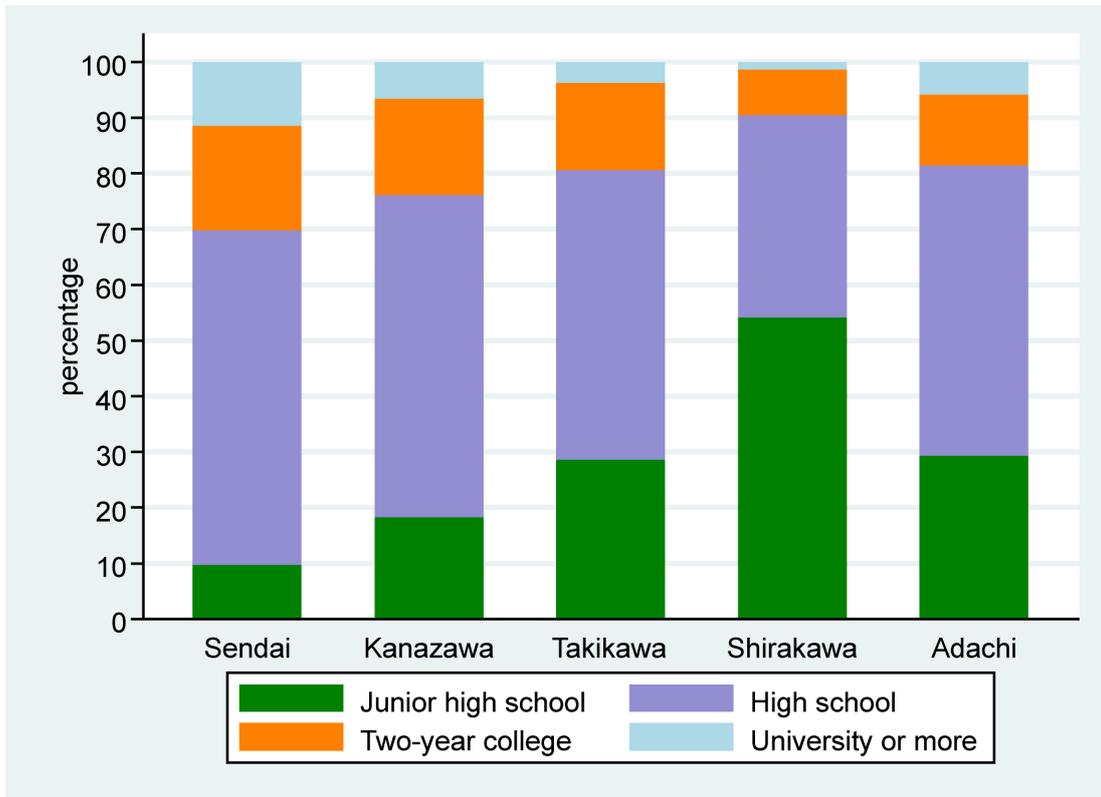


Figure 5-5-3 Spouse's educational attainment by municipality (male spouse)

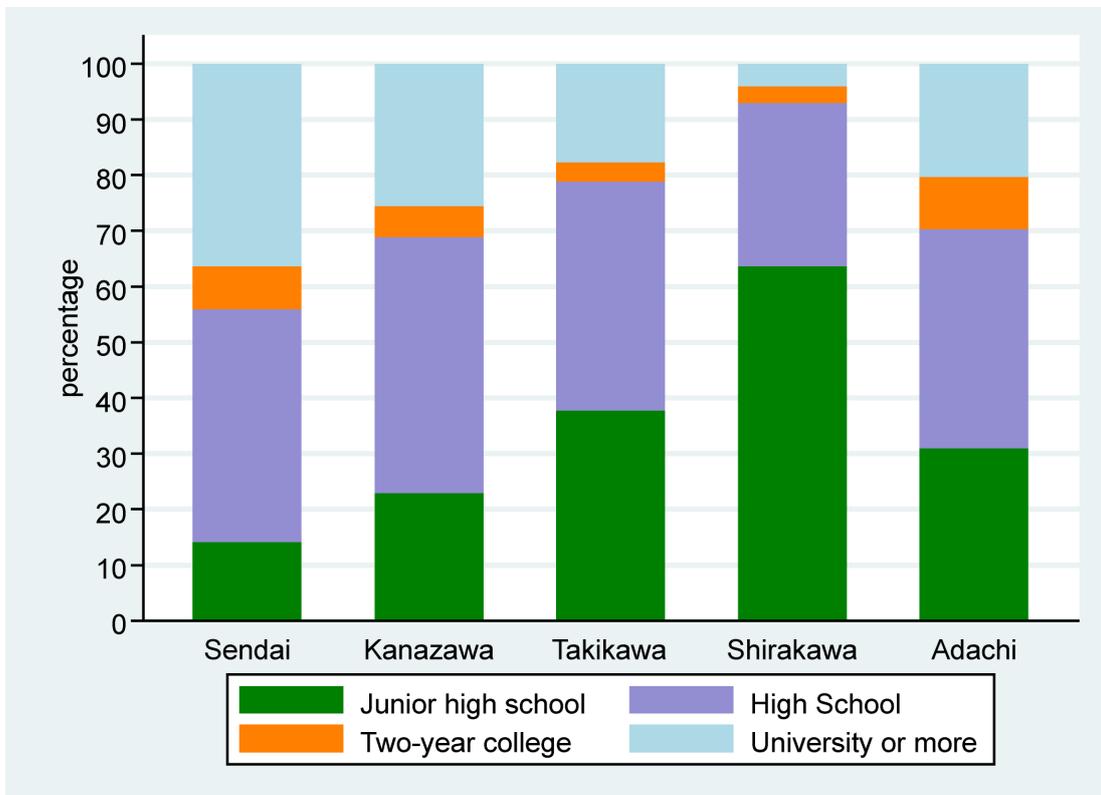


Figure 5-5-4 Spouse's educational attainment by municipality (female spouse)

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.

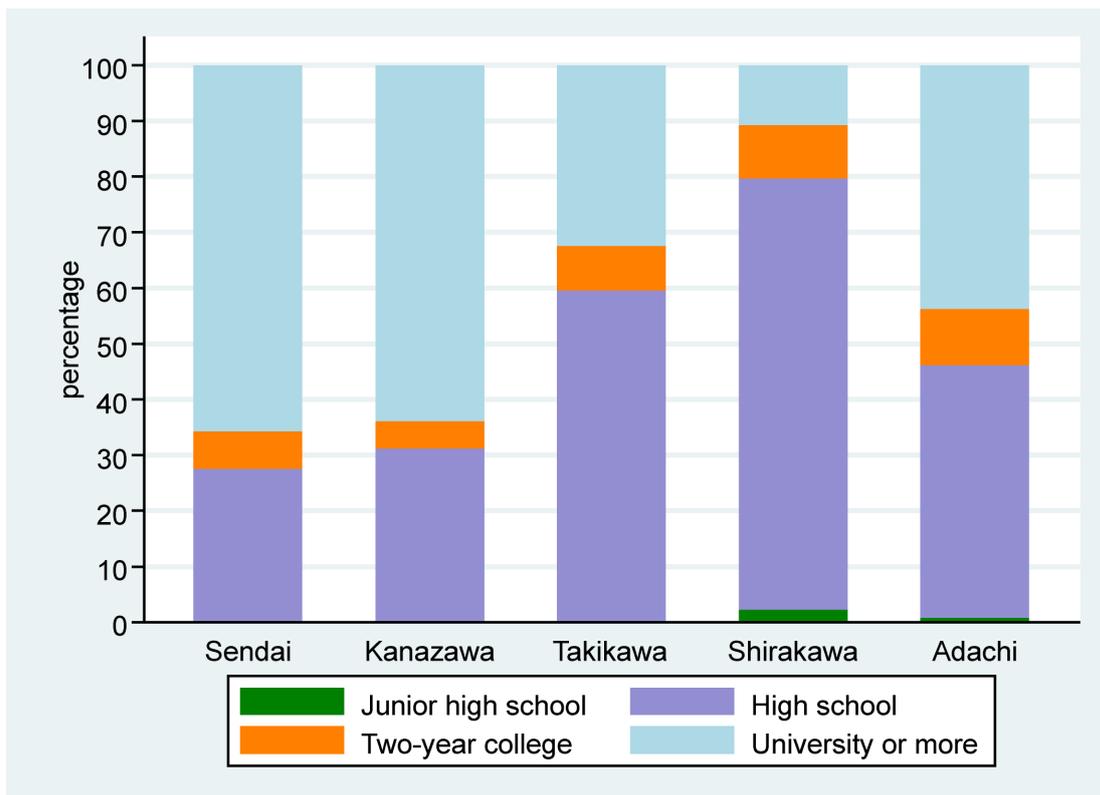


Figure 5-5-5 Children's (aged 25+) educational attainment by municipality for males

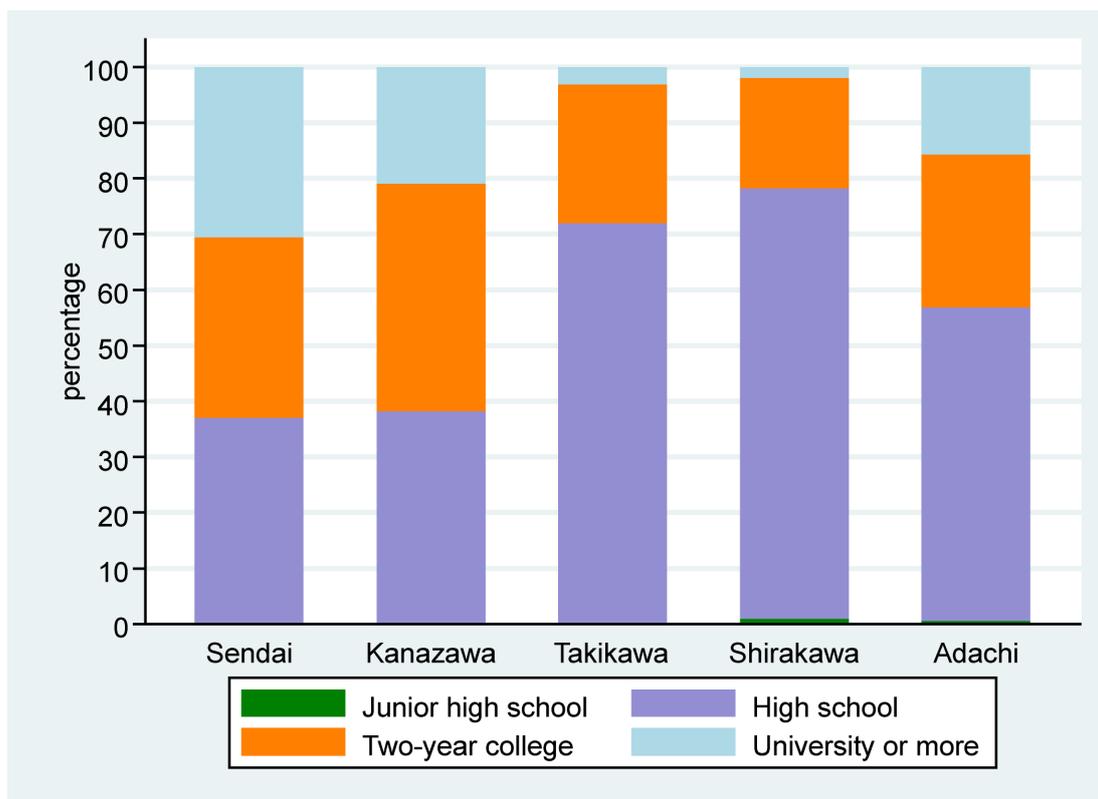


Figure 5-5-6 Children's (aged 25+) educational attainment by municipality for females

### 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.

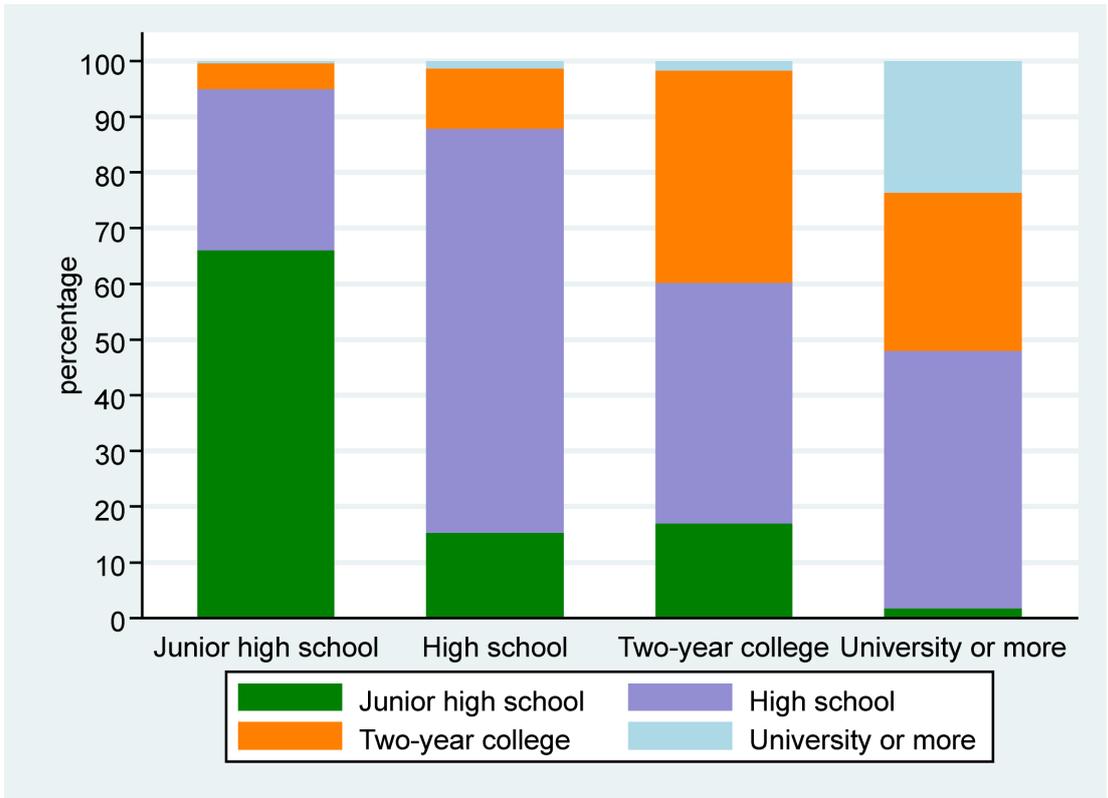


Figure 5-5-7 Educational attainment by municipality for husbands

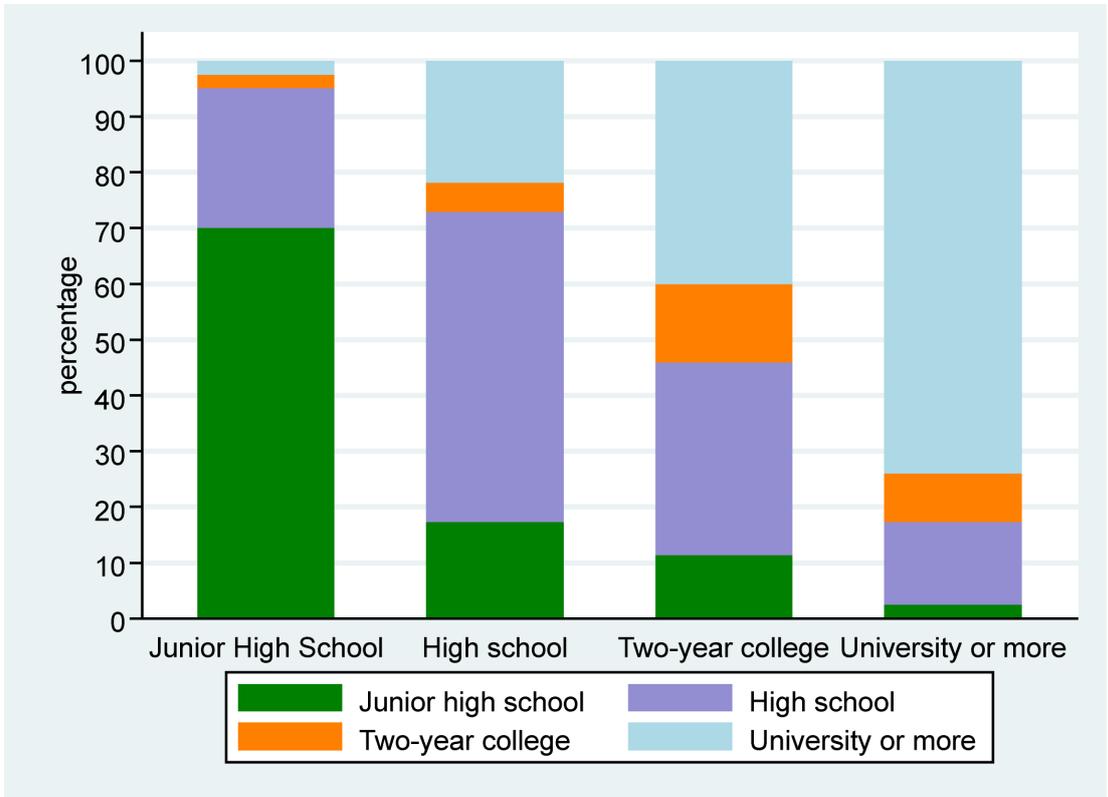


Figure 5-5-8 Educational attainment by municipality for wives

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.

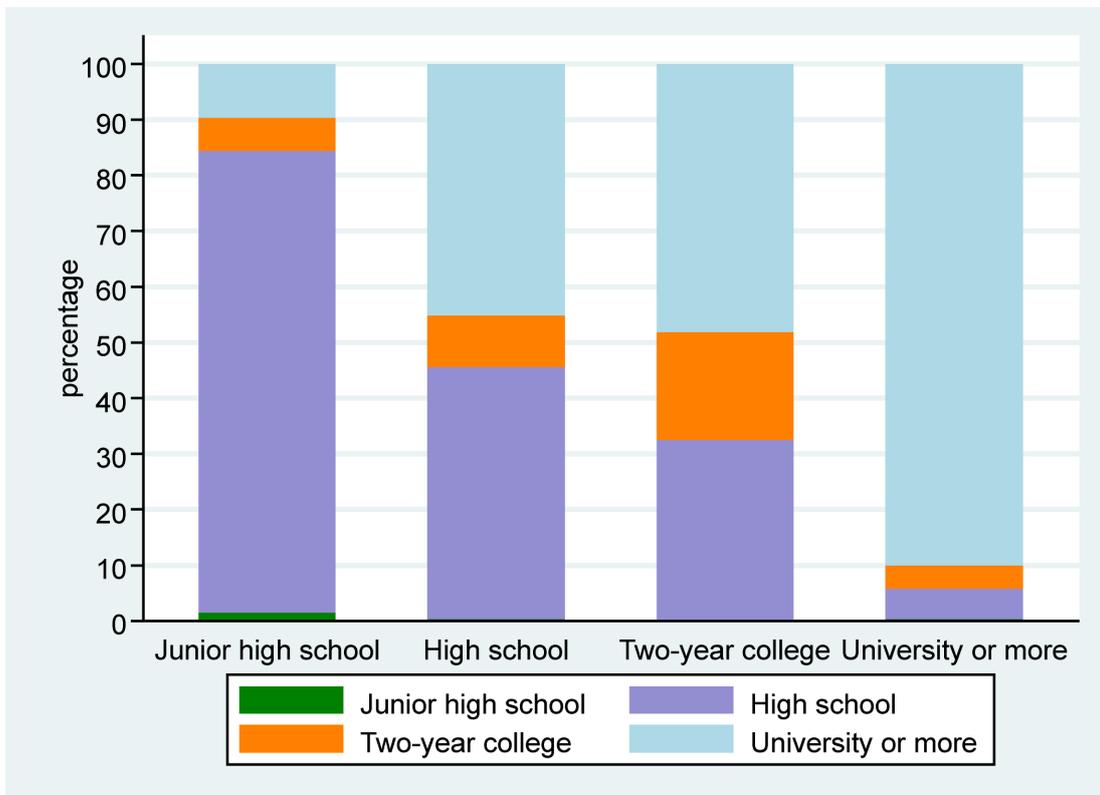


Figure 5-5-9 Relationship of male children's (age 25+) educational attainment to that of father

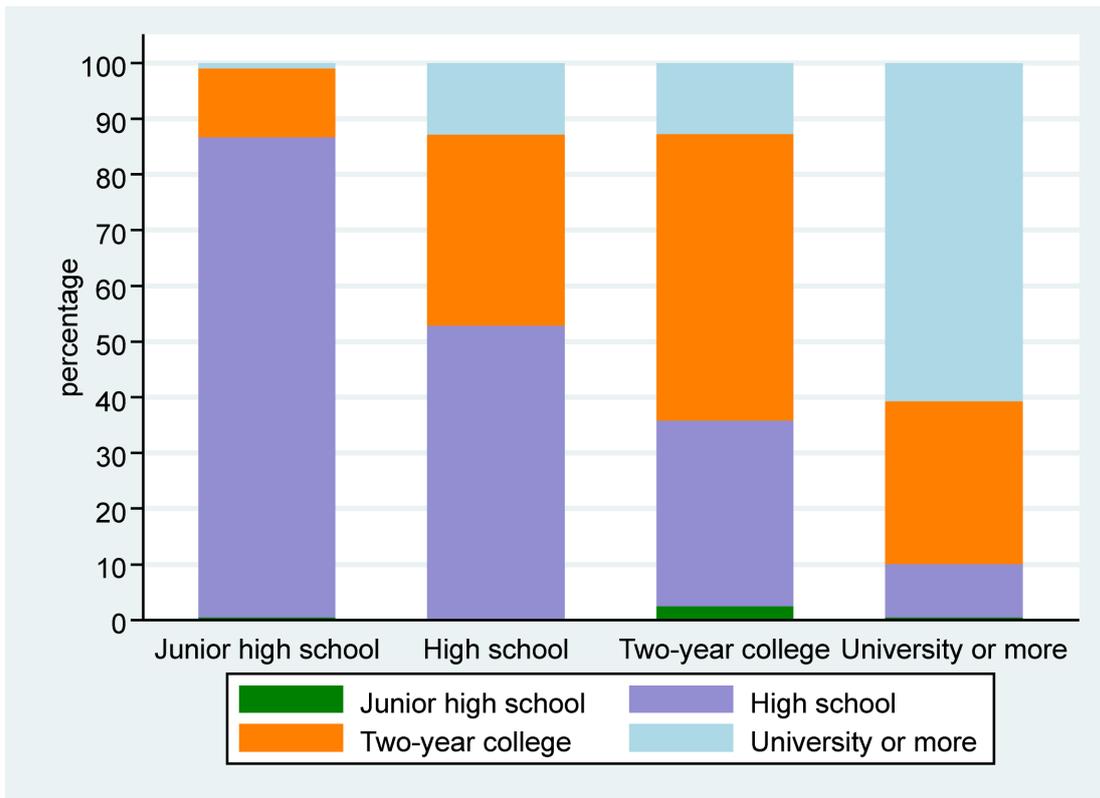


Figure 5-5-10 Relationship of female children's (age 25+) educational attainment to that of father

### 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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