

Chapter 9

Explanation of Socioeconomic Inequality Among the Male Elderly: An Approach Based on Estimated Income History



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Abstract Population aging necessitates new approaches to understanding and explaining inequality in a society. If so, what approaches should be taken to deal with social disparity issues in a society with an increasing number of elderly people? What kinds of information and research data are needed for this purpose? To address these issues, this chapter endeavors to estimate male elderly people's income history, that is, income at all age points in the past, based on their job history data. Furthermore, this chapter analyzes how the elderly people's estimated income history affects their current socioeconomic status. Through these analyses, this chapter proposes a new approach to understanding inequality among elderly people based on the perspective that employment positions, from the past to the present, determine one's socioeconomic status.

9.1 Introduction

Japan is one of the most rapidly aging countries in the world. In 2019, the proportion of the population aged 65 or older was 28.4%, which is the highest in the world. This proportion is estimated to reach 35.4% in 2040; as such, elderly people could occupy more than one-third of the entire population. (Statistics Bureau, Ministry of Internal Affairs and Communications, 2020).

How, then, does population aging impact social inequality? First, a relative increase in the elderly population in society could increase inequality in the society as a whole, because inequality is more prominent among the elderly population than it is among younger people; income inequality is a good example. Scholars have asserted that the recent deterioration in the income distribution indexes, such as the Gini coefficient in Japan, has been primarily caused by population aging—namely, an increase in the elderly population, a group that has higher internal income inequality (Otake, 2005). As this example indicates, changes in the demographic composition could affect the extent of inequality in this way.

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Another important effect is that population aging can increase the difficulty in identifying the factors to explain the occurrence of inequality in a society. For example, let us assume that we intend to clarify the causes of income inequality in society to deal with worsening inequality, as a social problem. To investigate issues regarding income inequality among younger people, we would focus on whether they are currently employed and, if so, what kind of jobs they have. This is because the majority of income inequality among younger people stems from inequality in their employment compensation. In fact, social stratification studies have so far focused on occupation and employment statuses when determining people's positions in the social hierarchy. However, as many elderly people have already left the labor market, income inequality in an aging society cannot be explained by simply focusing on whether people are employed or what kind of jobs they have.

Thus, population aging necessitates new approaches to understanding and explaining inequality. As such, what approaches should be taken to deal with social disparity issues in a society with an increasing number of elderly people? What kinds of information and research data are needed for this purpose? This chapter considers these issues by examining the effects of job history on socioeconomic disparities among male elderly people in Japan, based on the Social Stratification and Social Mobility (SSM) survey data.

We can expect an elderly person's socioeconomic status to be influenced largely by their past jobs (Kimura, 2002; Mugiyama, 2018; Shirahase, 2021). However, because the data structure of the respondents' job histories is extremely complicated, no specific method has been established for using this wealth of information to understand the current socioeconomic status of elderly people. This is particularly true for Japan, where people's status in the labor market is largely affected by not only their occupation and employment statuses but also their firms' sizes and employment type, namely, a distinction between regular and non-regular employment, as discussed later.

To address this issue, this chapter endeavors to estimate people's income history, that is, income at all age points in the past, based on their job history data. One of the major advantages of the SSM survey is that it collects detailed information on the respondents' job history throughout their careers. By utilizing this valuable information, we can expect to estimate the respondents' income, at all age points in the past, with a high degree of accuracy, enabling us to capture their entire income history.

Furthermore, the chapter analyzes how the elderly people's estimated income history affects their current socioeconomic status and provides a more detailed examination of how disparities in the elderly people's socioeconomic status unfold in Japan. Through these analyses, this chapter proposes a new approach to understanding inequality among elderly people, while also highlighting the characteristics of the Japanese labor market based on the perspective that employment positions, from the past to the present, determine one's socioeconomic status.

9.2 Socioeconomic Stratification in the Japanese Labor Market

This section examines the socioeconomic stratification in the Japanese labor market to explore the information necessary for the proper estimation of elderly people's income history using job history data. Most previous studies that attempt to explain people's socioeconomic statuses based on their employment positions have focused on employment status and occupation. This is because it has been assumed that employment status, which represents the position in the industrial relations, and occupation, which represents the position in the labor market and individuals' resources, such as their skills, have a great influence on people's socioeconomic status. In fact, conventional social class models have operationally classified people's classes based on their employment statuses and occupations.

On the other hand, scholars have focused on other conditions of employment opportunities in the Japanese labor market. One of these is firm size. Late industrialization resulted in Japan's two-tier economic structure between modern large firms and traditional small-to-medium-sized firms, resulting in large wage gaps between sectors with different firm sizes (Kalleberg & Lincoln, 1988; Sakamoto & Powers, 1995). The large wage gaps, based on firm size, have been maintained due to the Japanese employment practices, characterized by long-term secure employment, which prevent frequent job changes across firms, and the social norm that corporate profits, which vary based on firm size, should be distributed to employees of the firm. Thus, firm size is considered as one of the major determinants of the socioeconomic statuses of workers in the Japanese labor market. For instance, the SSM Comprehensive Job Classification, which is the job classification scheme frequently used in Japan, classifies workers' statuses based on not only their occupation and employment statuses but also firm size (Hara & Seiyama, 2005).

Furthermore, employment type has become an important factor for socioeconomic status in the Japanese labor market. In Japan, a large disparity in rewards exists between regular employees, who are treated as core members of the firm, and non-regular employees, who are not. Under the male breadwinner model and the social norms that firms should provide employees' households with livelihood security, regular employees, who are mainly males assumed to be their households' breadwinners, are rewarded generously to sustain their families, while non-regular employees, who are exemplified by fixed-term and part-time workers and assumed to be supplementary earners in their households, are given only small rewards (Imai, 2011; Osawa, 2011). Considering the large reward difference between regular and non-regular employees in Japan, some scholars assert that employment type should be considered when classifying employees' status, in addition to occupation, employment status, and firm size (Hashimoto, 2009; Tarohmaru, 2009).

In summary, both employment status and occupation, as well as firm size and employment type, namely, the distinction between regular and non-regular employment, have significant impacts on stratification in the Japanese labor market. The effects of employment position on socioeconomic status are multidimensional in

Age	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	...	55	56	57	58	59	60	61	62	63	64	65
Workplace				Firm A								Firm B								Firm B								
Employment status	In school	Regular full-time employee								Family worker								Company director								Not in employment		
Firm size		100-299								10-29								30-99										
Industry		Metal product manufacturing								Metal product manufacturing								Metal product manufacturing										
Occupation		Sheet metal worker								Metal welding worker								Corporate manager										
Managerial title		No managerial title				Foreman				No managerial title				President														
Years of experience		1	2	3	4	5	6	7	8	9	10	11	12	13				38	39	40	41	42	43					
Tenure		1	2	3	4	5	6	7	8	1	2	3	4	5				30	31	32	33	34	35					
Applying the income function		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓				↓	↓	↓	↓	↓	↓					
Estimated income at each age		?	?	?	?	?	?	?	?	?	?	?	?	?				?	?	?	?	?	?					

Fig. 9.1 Example of estimation of income history based on individual job history. *Note* Educational attainment and unemployment experience are also used for the estimation

nature; meaning, the various conditions of individuals’ employment positions independently affect their status in Japan (Arita, 2016, 2017; Kanomata, 2001). Therefore, when examining the effect of job history on the socioeconomic status of elderly people, throughout their working years, it is necessary to not only focus on employment status and occupation, but also on the effect of firm size and type of employment.¹ We believe that reducing the multidimensional conditions of a job to a single variable—estimated income—is a suitable method to understand the effects of job history on the socioeconomic status of the elderly in the Japanese labor market.

9.3 Data and Methods

9.3.1 Methods for Estimating Income History

The SSM survey collects details regarding employment status, occupation, industry, firm size, employment type, and managerial title for each job a survey respondent has held and for each workplace, as well as the respondent’s age when starting and leaving each job. No long-term panel surveys track individuals throughout their entire careers in Japan; therefore, retrospective survey data regarding past jobs is the only available source for analyzing the respondents’ entire job histories and the effects on the current socioeconomic status of elderly people.

As shown in Fig. 9.1, the respondents’ job history data contains extensive information for the analysis, because of the accumulation of the various conditions for each job a person has held at all ages. Furthermore, there are many categorical variables among the job conditions, such as occupation and employment status, which

¹ The amount of retirement allowance and pension also largely vary according to their type of employment and firm size. This is another reason that we should pay special attention to the effects of these employment conditions in the job history on the socioeconomic status of elderly people.

makes it difficult to represent these conditions on a one-dimensional scale; it also makes it difficult to analyze all of them in a comprehensive manner. Therefore, most previous studies regarding the effect of job history on elderly people's socioeconomic statuses have concentrated on past employment at a particular age or on a person's "primary job" in the past; even when using the entire job history information, these studies focused on just one of the many possible job conditions, such as occupation or employment status.

However, limiting the analysis to employment at a particular age or job condition may not adequately capture the effect of entire job histories on the socioeconomic statuses of elderly people. In other countries, one's occupation has a greater effect on socioeconomic status than other job conditions do; any conditions other than occupation may not need to be considered. However, in Japan, other job conditions, such as firm size and employment type, have a major effect on socioeconomic status, as discussed in the previous section. Considering these distinctive features of the Japanese labor market, this chapter analyzes the influence of job history, not by simply focusing on a job at a specific age or a specific employment condition, but rather by using all job conditions available in the SSM survey data to investigate the effects of those factors comprehensively.

To achieve this goal, this chapter uses a method in which the various job conditions in the individuals' job histories are reduced to a single continuous variable: estimated income at each age. More specifically, information in the SSM survey on current employment and income was first used to estimate an income function. Next, personal income at each age in the past is estimated by applying the income function to an elderly person's job information, at a specific age. Linking this estimated income at specific ages in the past produces an individual's income history.² This chapter uses this method to capture the overall picture of an elderly person's job history and investigate its effects on their current socioeconomic status. From a different perspective, this analysis is equivalent to evaluating people's jobs and their histories from the perspective of the "income-generating power" of those jobs.

9.3.2 Procedure and Data

The analyses performed in this chapter are summarized again in the three processes described below. First, the income function is estimated using the information on

² Some countries allow government information on income and taxation to be used for academic purposes. For example, Guvenen et al. (2017) used sample data extracted from an income list belonging to the US Social Security Administration to directly calculate people's actual lifetime incomes. However, as Japan does not yet permit such data usage, the method described in this chapter is the only way to analyze an individual's income history. In this chapter, the attempt to estimate income history based on a person's past employment at various ages is similar to that by Sato & Yoshida (2007) and Lefranc, Ojima, & Yoshida (2014), with which they estimated fathers' incomes, based on their employment information, to analyze intergenerational income mobility in Japan.

current personal income, for those in the working generation (aged 65 and under). Second, income at specific ages in the past is estimated by applying the income function to elderly people's job history data (person-year data from age 15 to 65).³ Third, the income history obtained was used to explain the socioeconomic status of the elderly. The elderly people analyzed in this chapter are those aged 65 or older, a life stage in which most people's vocational careers have ended.

Data on the job history of elderly people were obtained from the 2015 SSM survey. Available elderly samples in past SSM surveys were small, because the maximum age of respondents was 70; therefore, the maximum age was raised to 80 for the 2015 SSM survey, making it possible to obtain an adequate sample size for conducting such an analysis. Additionally, in the 2015 SSM survey, it was not common for women aged 65-or-older to continue working after marriage or after having children; thus, the scope of this analysis is limited to men.

In this analysis, it is assumed that the shape of the income function is the same for different time points, and the same income function is applied to job history at specific ages in the past.⁴ Data from the 2015 and the 2005 SSM surveys, which used nearly the same questions and categories, were used to estimate the income function.

9.4 Estimating and Applying the Income Function

9.4.1 *Estimating the Income Function*

First, this section estimates the income function using responses on current income and employment, in the SSM survey data. The income function is estimated by applying OLS to individual annual incomes at the time surveyed, and to various conditions of the male respondents' current employment, for those aged 65 and under, using the pooled data from the 2005 and 2015 SSM surveys. The natural logarithm value of individual income is used as the dependent variable. The independent variables are educational attainment, employment status with the distinction of employment type for employees, occupation, industry, firm size, managerial title, years of experience, tenure, and unemployment experience.⁵ Among these, years

³ To compile person-year data, the SPSS syntax for person-year-data conversion (ver. 2.0 for SSM 2015 v070 data) by Professor Tokio Yasuda was modified and used. I would like to express my gratitude to Professor Yasuda.

⁴ However, it has been demonstrated that the effects of various job conditions, as well as age and education, on income are somewhat different at different points in time (Kanomata, 2001, 2008; Yoshida, 2005). The differences in the shape of the income function at different times should be considered in the future research.

⁵ Years of experience were calculated as the number of employment years, starting from a person's first job, minus the number of unemployment years, while tenure was calculated as the number of employment years at the current workplace. Experience of unemployment was ascertained based on job history data. The timing of the survey was controlled for by incorporating a 2005 dummy variable.

of experience and tenure were incorporated into the model as continuous variables, while the other conditions were incorporated as dummy variables corresponding to the categories (see Table 9.1). Furthermore, for these variables, the main effect terms

Table 9.1 Categorical variables used in income estimation

Educational attainment	Junior high school, High school, Junior or technical college, College/University, Graduate school
Employment status (with distinction of regular and non-regular employment)	Company director/Company executive, Regular full-time employee, Temporary employee/Part-time employee, Employee dispatched by a temporary employment agency, Contract employee/Employee on a short-term contract, Self-employment/Freelance worker, Family worker
Occupation	Professionals and technicians, Managerials, Clerks, Sales workers, Service workers, Security workers, Agricultural and fishery workers, Transport and communication workers, Metal/Chemical/Mechanical manufacturing workers, Other manufacturing workers, Machinery operators and electricity workers, Mine workers and construction workers, Laborers
Industry	Agriculture/Forestry/Fishing, Construction/Mining/Quarrying, Electricity/Gas/Water supply, Manufacturing, Information and Communications, Transport, Finance/Insurance/Real estate/Renting and business activities, Scientific research professional and technical services, Wholesale and retail trade, Hotels and restaurants/Living-related services, Education learning support, Medical health care and welfare, Other community/social/personal services/DK
Firm size	1, 2–4, 5–9, 10–29, 30–99, 100–299, 300–499, 500–999, 1000 or more, Government or other public office, DK
Managerial title	No managerial title/DK, Supervisor/Foreman/Group leader, Subsection chief, Section chief, Department head, President/Director/Executive officer/Board of directors

as well as the interaction terms and squared terms were incorporated into the model.⁶

To fit the age range for income history estimation, the income function was estimated from male samples in employment aged 65 or under at the time of the survey ($N = 3836$). The number of parameters in the model was 103, and the coefficient of determination was 0.479. This means that the independent variables explain about half of the dispersion of their logarithmic personal income.⁷

Next, we provide an overview of the relative strength of the independent variables' effect on the estimated income function. The effects of educational attainment and employment conditions were estimated using dummy variables corresponding to each of the categories in Table 9.1. Because educational attainment and employment conditions comprise several to a dozen categories, each of which corresponds to a dummy variable, it is impossible to discern the strength of the effect of each employment condition or educational attainment as a whole on individual income simply by examining the estimated coefficient of individual dummy variables; for example, discerning which condition, between occupation and firm size, has a larger effect on income is impossible. To address this issue, this section compares the relative magnitudes of the effects of employment conditions and educational attainment by focusing on the extent to which the determination coefficient increases when a group of dummy variables, corresponding to each condition, is added. Specifically, this analysis focuses on the increase of the determination coefficient at the initial and final addition to the model. The increase when dummy variables are added first represents the total effect, including the correlations arising from the effects of underlying confounding variables and the mediating effects through the other variables, while the increase when they are added last represents the original independent effect, not including the confounding and mediating effects.⁸

Table 9.2 shows the increase in the determination coefficients, when dummy variables corresponding to categories of each condition are added. Comparing the amount of increase at the final addition, based on the table, shows that employment status—including differences in the type of employment for employees—and firm size have a large original effect on income. Regarding the amount of increase at the initial

⁶ The following interaction terms and squared terms are incorporated: educational attainment \times years of experience, educational attainment \times the square of years of experience, status in employment \times tenure, occupation \times tenure, industry \times tenure, firm size \times tenure, the square of years of experience, the square of tenure.

⁷ This coefficient of determination is almost as high as those in previous studies in Japan are, such as Sato and Yoshida (2007). Furthermore, when solely using the data for a single survey year, the model's coefficient of determination rises further; for 2015, it exceeds 0.5 (Arita, 2018).

⁸ Given the hierarchy of variables in the model, in the initial addition, the interaction terms for years of experience/tenure are not included and only the main effect terms are added to the base model, which only includes the 2005 dummy variable. In the final addition, interaction terms for years of experience/tenure are added simultaneously with the main effect terms.

Table 9.2 Increase in the coefficient of determination when dummy variables are added (ΔR^2)

	Educational attainment	Employment status	Occupation	Industry	Firm size	Managerial title
Increase at the initial addition	0.071	0.185	0.176	0.074	0.091	0.193
Increase at the final addition	0.012	0.045	0.015	0.009	0.033	0.015

addition, employment status, occupation, and managerial title have a strong effect.⁹ These results indicate the multidimensional nature of stratification in the Japanese labor markets discussed earlier. However, the effects of educational attainment and industry are relatively weak.

9.4.2 Estimating Income History

Next, the income function estimated above is applied to the respondents’ job histories to estimate individual income history. Specifically, logarithmic personal income at ages 15–65 is estimated by applying the income function obtained in the section above to the jobs at specific ages in the past and the educational attainment of respondents. The logarithmic income values are then exponentially transformed back to non-logarithmic income amounts.¹⁰ Income is estimated by applying the function only when a subject is in employment, and the estimated income at times of unemployment is set to 0.

Figure 9.2 shows the average estimated annual income by age for men aged 65 years or older, when they were between the ages of 15 and 65. The target estimation sample consists of 1091 cases, without omissions in the job history information during that period. The solid line in the figure represents the respondents’ average income, including those who were not in employment at each age (the estimated income of unemployed people is zero), while the dashed line represents the average income using only the sample of people who were in employment. Both lines indicate that the average estimated income steadily increased, peaking in their early 50s, after which it gradually decreased and dropped off dramatically in their 60s. The average of total estimated income, calculated by adding the estimated incomes at specific ages

⁹ The large effect of managerial title on income in Japan was also indicated by Kanomata (2001). Few surveys, other than the SSM surveys, have asked for a detailed history of the managerial titles held by an individual; therefore, SSM survey data is extremely useful for estimating people’s income histories in Japan.

¹⁰ Because income is estimated based on information concerning jobs held at specific ages in the past, this chapter essentially estimates earned income. The analyses estimate the income earned in jobs as the value in 2015.

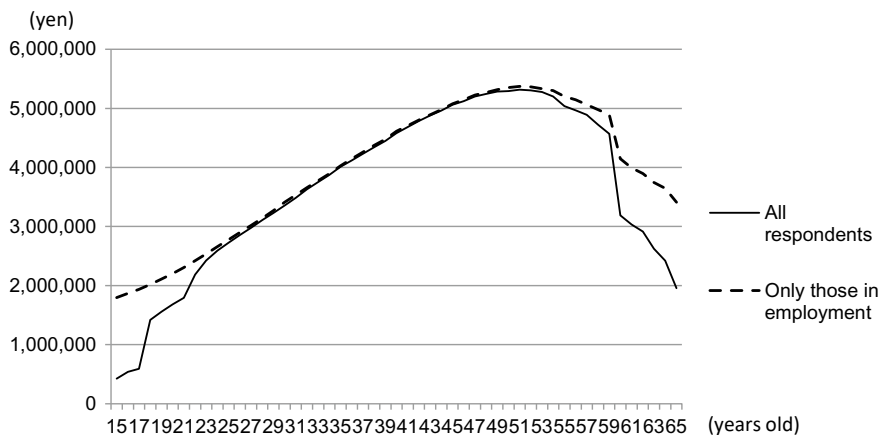


Fig. 9.2 Average estimated income by age for men 65 or over

for each individual, was 190.78 million yen (minimum: 58.53 million yen, maximum: 392.58 million yen), with a standard deviation of 57.27 million yen. Adding to the retirement allowance, whose analysis is not conducted in this chapter, and the earned income after age 65 results in a value consistent with the lifetime earned income of individuals.

The solid line in Fig. 9.2 shows that the average estimated income increased considerably at ages 18 and 22, and decreased considerably at age 60. The increase at ages 18 and 22 are due to the large number of people who start working when they graduate from high school and college, respectively. The decrease occurs at age 60 because many companies and organizations in Japan had chosen 60 as the age of mandatory retirement. The zigzagging at ages 18 and 22 disappears almost entirely, as shown by the dashed line, which represents the average estimated income only for those in employment at that period. Meanwhile, at age 60, the income shown by the dashed line still decreases by approximately one million yen. This major drop in the average estimated income implies that even when people continue working after age 60, their employment situation changes considerably upon reaching the retirement age, with many people likely transitioning from being regular employees to non-regular employees, such as fixed-term employees, leading to a major decrease in income.

9.5 Explaining the Socioeconomic Status of the Male Elderly Using Income History

9.5.1 Socioeconomic Disparities Among the Male Elderly

This section investigates how well the current socioeconomic status of the male elderly can be explained using the estimated income history. Here, the socioeconomic status of the elderly people is assessed in three ways: (a) subjective identification of social status, (b) total assets, and (c) monthly living expenses. Subjective identification of social status is an indicator of the social status of elderly people, while total assets and monthly living expenses are indicators of economic status in terms of stock and flow, respectively. For the subjective identification of social status, respondents were asked to rate their social position on a ten-point scale. Reversing the original values, a higher number indicates a higher social position. Total assets are the total monetary value of a household’s assets, including all financial assets and real estate, while monthly living expenses are the monetary value of living expenses per household per month, excluding occasional expenses.

Table 9.3 shows the averages and standard deviations of dependent variables for male respondents in both the elderly group and other age groups. As shown in the table, although the averages and standard deviations for the subjective identification of social status do not differ considerably, there is a great deal of dispersion for total assets and monthly living expenses overall, between the age groups that are 49 years and below and those with 50 years and above. A comparison between those aged 50–64 and those aged 65–79 shows that the standard deviations of total assets and monthly living expenses in the latter group are larger than in the former, indicating a great deal of dispersion for those aged 65 and above. Comparing the average and standard deviation of personal income, which is not included in the table, despite the average personal income for men being lower in the 65–79 age group than the 50–64

Table 9.3 Summary statistics of dependent variables (by age group)

		20–34	35–49	50–64	65–79	Total
(a) Subjective identification of social status	Average	5.25	5.37	5.54	5.40	5.41
	Standard deviation	1.78	1.63	1.70	1.61	1.67
	N	562	888	972	1075	3497
(b) Total assets (10 million yen)	Average	1.16	1.68	2.55	2.97	2.27
	Standard deviation	2.02	1.91	2.92	3.07	2.71
	N	308	604	697	711	2320
(c) Monthly living expenses (10 thousand yen)	Average	15.67	19.68	21.69	21.56	20.22
	Standard deviation	9.60	9.72	11.70	13.22	11.63
	N	472	798	888	964	3122

age group, the standard deviation was larger for those aged 65 and up.¹¹ The above results also indicate that socioeconomic disparities in the elderly population tend to be greater than the disparities among younger people.

9.5.2 Analysis Using the Total of Estimated Income

This section investigates the extent of the dependent variables' dispersion that can be explained by individual income history. For this purpose, a regression analysis is performed using the above three socioeconomic status variables, as dependent variables for male samples aged 65 and over, with no missing job history data from the age of 15–65 years.

To conduct the analysis, we need to establish a form in which individual income history should be integrated into the regression model. Here, a straightforward form is chosen; we use the simple total estimated income at ages 15–65 as the independent variable. The estimation is also performed with models using educational attainment and age, factors that are often used to explain the socioeconomic status of elderly people who are not in employment, as the independent variables. Subsequently, the fitness of the models was compared.

Table 9.4 shows the regression analysis results of the socioeconomic status of elderly men. First, the coefficient of determination for (a) subjective identification of social status was much larger in Model 2, which included the total estimated income, than in Model 1, which included age and educational attainment. The subjective identification of social status among the elderly is largely determined by the amount of income each subject has earned thus far. Additionally, although the coefficient of determination for Model 3, which incorporates all of these factors, was slightly larger than that for Model 2, the effects of the dummy variables for educational attainment were not statistically significant in Model 3. A considerable portion of these effects in Model 1 can be attributed to the correlation between educational attainment and income history.¹²

The analysis results of (b) total assets are nearly the same. Model 2 had a larger coefficient of determination than Model 1, and total estimated income explained 14% of the dispersion in the total assets of the male elderly. Concerning (c) monthly living expenses, although Model 1 had a larger coefficient of determination than Model 2, the difference was small. Based on the above results, we can conclude that the total estimated income is a good indicator of the socioeconomic status of elderly people.

¹¹ Average personal income was 4.86 million yen and 3.31 million yen for the 50–64 age group and 65–79 age group, respectively, and the respective standard deviations for the groups were 3.58 million yen and 4.12 million yen.

¹² Compared to Model 3, Model 2 has a smaller AIC and BIC, indicating better model fitness.

Table 9.4 Regression analysis of socioeconomic status using total estimated income

	(a) Subjective identification of social status			(b) Total assets (10 million yen)			(c) Monthly living expenses (10 thousand yen)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	4.632***	3.648***	3.628***	-2.080	-1.307**	-4.116*	22.092**	9.990***	17.022*
Age	0.006		0.001	0.054*		0.042	-0.061		-0.080
Education (ref. Junior high school)									
High school	0.355**		0.102	1.164***		0.574*	3.730***		2.459*
Junior college	0.905*		0.347	3.102***		1.860*	4.758		2.057
College	0.871***		0.240	2.365***		0.883*	8.220***		5.108***
Total estimated income (10 million yen)		0.094***	0.085***		0.226***	0.189***		0.612***	0.414***
N	1069	1069	1069	713	713	713	966	966	966
R ²	0.039	0.086	0.088	0.086	0.139	0.152	0.053	0.055	0.070
Adj. R ²	0.036	0.085	0.084	0.081	0.138	0.146	0.049	0.054	0.065
AIC	4001.8	3942.7	3948.0	3569.2	3520.7	3517.5	7668.8	7660.8	7652.8
BIC	4026.7	3952.6	3977.9	3592.1	3529.8	3545.0	7693.2	7670.6	7682.0

Note The subjects of this analysis were male respondents aged 65 and over with no omissions in their job histories from age 15–65

9.5.3 *A Comparison with Models Based on Information at Specific Ages*

This section compares the results from the previous model using total estimated income, with models based only on occupation or estimated income at a particular age. Specifically, subjective identification of social status, total assets, and monthly living expenses are estimated using the SSM Comprehensive Job Classifications and the occupational prestige score at ages 40 and 50, which are commonly used in previous studies as ages in which individuals hold their main jobs, in addition to the estimated income at those ages. Afterward, the results are compared with those from a model based on the total estimated income. This confirms whether income history that incorporates an entire job history is an indicator that is truly better than occupation or estimated income at only a specific age in explaining the current socioeconomic status of the male elderly.

In Table 9.5, the results of these models are summarized. Model 1 shows the estimation results for Model 2, from Table 9.4, that is, the model that incorporates only the total estimated income. Models 2 and 3 are the models that only incorporate estimated income (0 when unemployed) at ages 40 and 50, respectively. Models 4 and 5 are the models that incorporate dummy variables for the eight-category version of the SSM Comprehensive Job Classifications, which is commonly used in Japan, and an unemployment dummy variable at these ages.¹³ Models 6 and 7 show the estimation results for the models that incorporate occupational prestige scores¹⁴ and an unemployment dummy variable at ages 40 and 50, respectively.

This table shows that the models based on occupational prestige scores at ages 40 and 50 (Models 6 and 7) have a substantially smaller coefficient of determination, compared to the other models. Given that the occupational prestige score is an indicator focused solely on occupation, it is reasonable to posit that the socioeconomic status of elderly people is determined not only by their past occupations but also by conditions such as employment status, employment type, and firm size. Such results reflect the multidimensional nature of the hierarchy of employment opportunities in Japanese society.

The coefficient of determination for Models 4 and 5, based on the SSM Comprehensive Job Classifications, is larger than that of the models based on occupational prestige scores; however, it is less than that of the models based on estimated income (Models 2 and 3). This is likely because although SSM Comprehensive Job Classifications account for employment conditions, other than occupation, such as employment status or firm size, the classifications are fairly rough and the distinction between

¹³ The eight categories of SSM Comprehensive Job Classifications are as follows: professionals, white-collar in large firms, white-collar in middle to small firms, self-employed white-collar, blue-collar in large firms, blue-collar in middle to small firms, self-employed blue-collar, and farmers. The unemployment dummy variable in the models also applies to cases in which occupation is unknown.

¹⁴ Unemployment was assigned a value of 0. However, the effect of being unemployed is estimated by the unemployment dummy variable that is also incorporated into the model.

Table 9.5 Regression analysis using estimated income and job information at specific ages (Summary of results)

Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Total estimated income	Estimated income at 40	Estimated income at 50	SSM job class at 40	SSM job class at 50	Occupational prestige at 40	Occupational prestige at 50
(a) Subjective identification of social status (N = 1069)	R ²	0.086	0.079	0.045	0.063	0.021	0.033
	adj. R ²	0.085	0.078	0.038	0.056	0.019	0.032
	AIC	3942.7	3951.5	4003.3	3983.8	4018.6	4004.5
	BIC	3952.6	3961.4	4048.1	4028.6	4033.5	4019.4
	Number of parameters	2	2	9	9	3	3
(b) Total assets (N = 713)	R ²	0.139	0.114	0.070	0.091	0.020	0.043
	adj. R ²	0.138	0.112	0.059	0.081	0.017	0.040
	AIC	3520.7	3539.8	3541.3	3589.8	3614.7	3598.0
	BIC	3529.8	3548.9	3550.4	3630.9	3628.4	3611.7
	Number of parameters	2	2	9	9	3	3
(c) Monthly living expenses (N = 966)	R ²	0.055	0.050	0.061	0.031	0.045	0.024
	adj. R ²	0.054	0.049	0.060	0.023	0.037	0.022
	AIC	7660.8	7666.1	7654.7	7698.7	7684.8	7693.7
	BIC	7670.6	7675.8	7664.5	7742.6	7728.7	7708.3
	Number of parameters	2	2	9	9	3	3

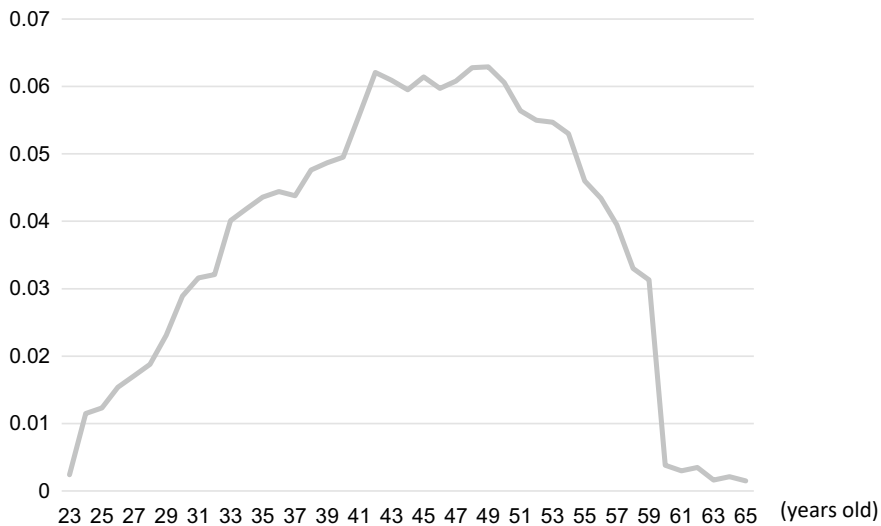


Fig. 9.3 Coefficient of determination of models for monthly expenses using estimated income at specific ages

regular and non-regular employment is not considered.¹⁵ Thus, the estimated income history, which reduces a respondent's multidimensional job history to a single quantitative variable, based on its income-generating power, is a convenient and useful indicator.

Lastly, we compare the fitness of Models 2 and 3, based on the estimated income at a specific age, with the fitness of Model 1 containing the sum of estimated incomes at all ages. Model 1 has a larger coefficient of determination for the subjective identification of social status and total assets, and the difference is particularly noticeable for total assets. It is understandable that the stock aspect of economic status is more strongly affected by cumulative income than by the estimated income for a single point in time. Meanwhile, the results for monthly living expenses are slightly different in that the coefficient of determination is slightly larger for Model 3 that only includes estimated income at age 50 than the model based on total estimated income (Model 1).

To investigate the fitness of models on monthly living expenses further, models using estimated income at each of ages 15–65 were estimated. Figure 9.3 shows the coefficients of determination for the model based on the estimated income at an age from 15 to 65 years.¹⁶ As this figure shows, starting from the model based on estimated income during youth, the coefficient of determination increases as age increases, peaking in the late 40s (0.063 at ages 48 and 49). Afterward, the

¹⁵ Additionally, because the SSM Comprehensive Job Classifications are categorical variables, applying them to respondents' entire job histories is not practically useful.

¹⁶ The coefficients of determinant are shown only for the period from age 23 to age 65, when the estimated income at the age has a positive coefficient in the model.

coefficient of determination steadily decreases to almost zero in the 60s. In other words, monthly living expenses in old age are affected most strongly by the level of estimated income in the 40s and the early 50s, while estimated income in other periods, particularly in the 60s and beyond, does not make much of a difference. As demonstrated in Fig. 9.2, the period from the 40s to the early 50s is close to the period in which the estimated income by age peaks. This is interpreted to mean that people's income and consumption in a person's most productive years determines their level of consumption even after they enter old age with a lower income.

9.6 Discussion and Conclusion

This chapter has attempted to explain socioeconomic disparities among the male elderly by respondents' income history, estimated based on detailed job history data from SSM surveys. Based on the analysis results in this chapter, this approach—which captures the overall picture of individual job history, from the perspective of income-generating power, and uses that to explain the socioeconomic status of elderly people—is highly effective for understanding inequality among elderly people. As an indicator that represents a respondent's multidimensional job history, the estimated income is useful in explaining the socioeconomic status of the male elderly. The total estimated income calculated by adding all of the estimated incomes at each age can better explain the socioeconomic status of the elderly, particularly economic conditions in terms of stock (e.g., total assets). This is the case even when compared to models based on educational attainment, occupational prestige scores, and comprehensive job classifications at specific ages. Additionally, estimated income during a person's most productive years is effective in explaining the monthly living expenses of the elderly.

As argued in this chapter, one reason why individual income history has a stronger effect on the socioeconomic status of elderly people, compared with factors such as educational attainment or past occupational prestige scores, is the multidimensional nature of the hierarchy of employment opportunities in the Japanese labor market. In Japan, socioeconomic status is strongly affected not only by the conditions focused on by social stratification studies, employment status, and occupation (or education levels, which are closely related to them) but also by firm size and employment type. The estimated income used in this chapter makes it possible to ascertain the comprehensive picture of a person's position, within this kind of multidimensional social stratification structure, qualifying it in a highly descriptive manner.

Japan has the most rapidly aging population in the world, and this chapter endeavors to provide a Japanese-based answer to one of the big questions in social stratification studies: how to determine an elderly person's status in the social hierarchy. Evidently, most elderly people are not in employment, and it is often impossible to apply the conventional approach of social stratification studies to the elderly population: using an individual's job as the key to understanding inequality. However, this holds true only when focusing on current employment among the elderly. Few people

have been unemployed throughout their entire job histories, and explanations that use past employment information have plenty of potentials. Of course, the approach adopted in this chapter—reducing multidimensional job history at various ages to a single quantitative variable of estimated income, from the perspective of its income-generating power—is only one of the many methods that could be used to achieve this. There will likely be a great accumulation of research on how and why people’s job histories affect them later in life. This will enable us to better understand issues of inequality in a rapidly aging society and develop better solutions for these issues.

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