

# ***Preferences of An Aging Labor Force Toward Retirement Options***

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**A B S T R A C T** \_\_\_\_\_

Some of the earlier studies have shown that Japan is likely to undergo a pronounced economic slow-down in the next several decades, in good part due to the aging of the labor force. To make this long-run economic prospect less gloomy, employment opportunities for the elderly must be expanded by changing the currently prevalent retirement age limit. Utilizing a nationwide survey on aging issues, the authors have analyzed Japanese employees' responsiveness to alternative options in connection with the extension of retirement age. One of the primary findings indicates that the improvement of the educational attainment of the Japanese labor force may facilitate the postponement of the retirement age limit. Another finding shows that because older employees have considerable flexibility in adjusting themselves for the extension of retirement age, a substantial change in retirement age may materialize in the relatively near future, depending upon policy measures to be taken by government and business.

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## I. Introduction

Subsequent to the post-war baby boom (1947-1949), Japan underwent an unprecedented decline in fertility. During the period of 1947-1957, the crude birth rate fell by approximately 50 per cent from 34.4 to 17.2. In addition, remarkable improvements in mortality were recorded from the late 1940s to the early 1960s. As a result of these drastic demographic changes, the Japanese population has been recently aging rapidly, and will accelerate its speed of aging in the next several decades.

These demographic transformations have already started to generate disturbances in the socio-economic system and thus have caused an increasing concern with population numbers and structure in both government and business sectors. For example, the Japanese Government has been increasingly aware of financial problems in its social security system due to a rapid rise in the number of the elderly, while the business circle has repeatedly pointed out various difficulties likely to arise from the slowing growth of the labor force. Furthermore, future likely changes in the expenditure of social security programs and in the labor force are expected to lead to an economic slowdown to a pronounced extent (Ogawa, 1982a).

To alleviate the magnitude of the negative impact upon economic growth, both government and business sectors have been recently paying increasing attention to the possibility of changing existing employment practices and their related institutional arrangements.

In the next section, the pattern of the aging of the Japanese population and labor force will be presented on the basis of one of the most recent population projections prepared by the Nihon University Population Research Institute (NUPRI) in June, 1982 (Ogawa, 1982b). In the following section, some of the major institutional constraints imposed upon employment practices will be briefly discussed, and their recent changes and trends will be presented. In further sections we will statistically examine, using a nationwide survey data set, differences in the pattern of individual responses to these institutional employment constraints and will identify factors contributing to such differences. In the final section, on the basis of these statistical results, several policy implications will be considered.

## II. Future Trends of the Aging of Japan's Population and Labor Force

As compared with all the past population projections prepared in Japan, the NUPRI population projection is unique in terms of its methodology; both fertility and mortality are endogenously determined within a large-scale macro-economic modelling framework. Endogenized fertility and mortality changes are employed to project the population over the period of 1980-2025, drawing upon the base population obtained from the final count of the 1980 Population Census.

Table 1. Changes in Total Population Size, Over-65 Age Group as Percentage of Total Population, Total Labor Force, and Proportion of Aged Workers as Percentage of Total Labor Force, 1980-2025

Year	(1) Total Population (million)	(2) Age 65+ (% of total population)	(3) Total Labor Force (million)	(4) Workers aged 45+ (% of total labor force)
1980	117.06	9.1	56.5	37.7
1985	120.76	10.3	58.9	41.4
1990	123.75	11.8	61.6	43.7
1995	126.69	14.1	63.5	46.8
2000	129.48	16.3	63.7	48.0
2005	131.11	18.1	62.3	47.9
2010	131.01	20.1	60.3	47.7
2015	129.51	22.8	58.9	48.4
2020	127.32	23.9	58.7	51.0
2025	124.90	23.8	57.8	52.0

Source: Nihon University Population Research Institute, Nihon Daigaku Jinko Kenkyujo Jinko Suikei (NUPRI Population Projection), Tokyo, June 1982.

As shown in Table 1, the total population continues to grow from 117.06 million persons in 1980 to 131.27 million persons in 2007, after which it is expected to shrink continuously. In the year 2025, it will be 124.9 million persons. Prospective changes in the age composition of the Japanese population are even more drastic and acute. For instance, although the proportion of the population aged 65 and over is only 9.1 percent in 1980, it will increase to a level of 23.8 percent in the year 2025. As compared with results of the most recent United Nations population projection (United Nations, 1982), this level will be the highest in the world around that time. Furthermore, Japan will reach the world's highest level of aging at an unprecedented speed. The amount of time which the proportion of the population aged 65 and over increase from a 10 percent level to a 20 percent level is only 25 years, i.e., from 1985 to 2010. To undergo the same demographic transformation, Finland, which is regarded as the second fastest aging country, will take 48 years from 1973 to 2021. The Federal Republic of Germany and Sweden are anticipated to complete the same transition in 71 years and 87 years, respectively (Ogawa, 1982b).

Insofar as the labor force is concerned, it will continue to expand from 56.5 million in 1980 to 63.8 million in 1998. After 1998, however, it starts diminishing gradually and continuously, thus reaching a size of 57.8 million workers in 2025. More importantly, the age compositional shift of the labor force will be considerably fast; the proportion of workers aged 45 and over relative to the total labor force rises from 37.7 percent in 1980 to 48.0 percent in 2000 and 52.0 percent in 2025. These projected results indicate the rapid aging of the labor force.

These future changes in the Japanese population and labor force are likely to adversely affect the performance of her future economy (Ogawa, 1982a and 1982b). To minimize the magnitude of these undesirable long-term economic effects, it has been often advocated by the Government of Japan that the size of the labor force be augmented by increasing the participation of the elderly in productive activities. At the same time, keeping older workers in the labor force may contribute to an increase in total national output as well as the reduction of social security expenditures. Apart from these macro-economic considerations, at an individual micro-level, the elderly can stabi-

lize their incomes and increase their psychic well-being through prolonged participation in the labor force. There are, however, a number of institutional stumbling blocks to such policy considerations. In the following section, we will briefly discuss some of the institutional deterrents and their recent changing patterns and trends.

### III. Institutional Deterrents to Increasing Employment Opportunities for Older Workers

From the late 1960s to the mid 1970s, there was increased attention to "balanced growth" rather than "industrial growth." At the same time, the public awareness of various problems of population aging, coupled with increased resources due to the miraculous economic growth in the 1960s, contributed to the great expansion of governmental provision for the elderly in the 1970s. Despite these governmental efforts, there have been only limited successes in bringing about large adjustments needed in Japanese employment patterns for older workers (Campbell, 1979).

The Japanese employment practices are, by and large, characterized by the lifetime employment system as well as the seniority-based system of remuneration and separation grants (Furuya and Martin, 1981). Permanent employment tends to facilitate job stability, which in turn, leads to the lifelong loyalty of employees. These employees are, however, required to retire at a certain specified age, normally between age 55 and 60. This mandatory retirement age system was instituted when life expectancy was only 50 years or so. Now that life expectancy has remarkably improved, this traditional retirement age has been adversely affecting the well-being of old workers. In addition, because the eligible age for males under the Employees' Pension Scheme (EPS) is 60, the discrepancy between retirement and pensionable ages further aggravates the economic conditions of retirees.

In recent years, however, there has been a gradual increase in the number of business enterprises adopting a higher retirement age, due partly to the demands for a heterogenous work force with a wide-range of experience, skills, education and interest, as well as partly to government policy measures for facilitating the rise in retirement age. In 1965, for instance, the average age of compulsory retirement

was 55.5 years. It continued to rise, thus reaching a level of 56.9 years in 1976.

It should be emphasized, however, that not all business enterprises have a retirement age. According to the 1980 Employment Management Survey, 82.2 percent of the enterprises had their established retirement age. More importantly, it differs considerably with the business size (Furuya, 1982). More than 99 percent of the enterprises with more than 1,000 workers have their retirement age limit, while small-scale businesses with a range of 30 to 100 employees show a substantially lower percentage, namely, 76.5 percent. Hence, workers for large-scale businesses are more likely to be affected by this age limit than those working for small-scale businesses.

As opposed to this institutional deterrent to the employment opportunities of old workers, their desire to work is intense and manifest. According to the Survey on Aging Problems conducted by the Ministry of Health and Welfare in 1980, 58 percent of the workers expressed their desire to continue to work, at least, up to age 65. More than half of those at ages 60-69, who were working at the time of the Survey, wanted to continue working, at least, up to age 70.

In spite of their strong desire to work, older workers have been facing extreme job difficulties. In 1980, the ratio of job openings to job seekers for the age group 55 and over was 0.17, while that for the young age group 24 or less, 1.40 (Furuya, 1982).

To partially cope with the perceived desire of the elderly to work, the business sector established the following two employment programs for old workers: the re-employment program and the employment extension program (Furuya and Martin, 1981). Of all business enterprises with a specified retirement age, 81.6 percent used the programs of re-employment and employment extension. These programs offer employment opportunities only to selected employees of a company after they reach retirement age. Furthermore, this selectivity applies more strictly to employees in large-scale businesses than in small-scale business. For this reason, they often provide large-scale business management with a greater flexibility in their manpower planning. In 1980, 67 percent of all the business establishments with 30 or more employees were equipped with, at least, one of these programs. Of these establishments, 60.5 percent utilized the former program, and 26.4 percent, the latter program. The remaining 13.1 percent used

both programs.<sup>2/</sup>

One possible policy measure to facilitate a large increase in employment opportunities for aged workers is to greatly extend the retirement age limit. Note, however, that this policy option has a central impediment, i.e., the widely-prevalent seniority-based compensation system in which the postponement of retirement age causes a substantial increase in personnel costs.

Table 2 presents the changing pattern of the wage systems in recent years. One can note that the work-oriented wage system has been increasingly adopted by businesses over the period of 1970-1980. In 1970, 27.9 percent of the business enterprises had the system in which wages were basically tied to work requirements. In 1979, the percentage of businesses based on this wage system increased to 45.1 percent. More importantly, the percentage of companies which adopted the strictly work-oriented wage system increased from 19.3 percent in 1970 to 33.1 percent in 1979.

In addition to wages, lump-sum separation grants are also heavily linked to length of services. Although the ratio of the separation

Table 2. Changes in Basic Wage Systems, 1970-1979

(unit: %)

Year	Total	Wages Tied to Work			Wages Based on Personal Elements	Mixed Wage System
		Total	Single Type	Combined Type		
1970	100	27.9	19.3	8.6	17.8	52.7
1972	100	37.8	26.5	11.3	11.4	50.8
1974	100	47.9	36.9	10.9	11.3	40.9
1977	100	43.6	31.8	10.8	11.5	45.9
1979	100	45.1	33.1	12.0	9.3	45.7

Source: Ministry of Labor, Comprehensive Survey on Wage and Working Hours Systems, various years

grant to final regular salary has declined in recent years, the average amount of the retirement benefit still corresponds to two or three times the worker's annual earnings (Furuya and Martin, 1981). Moreover, recipients of the retirement allowance often have very specific plans for the immediate expenditure of the allowance, e.g., building a house or paying for a wedding, in addition to providing daily living costs.

It is, therefore, conceivable that changes in the compensation system in connection with the extension of retirement age would be perceived differently by different segments of the labor force; certain groups of workers are more responsive and agreeable to the changes than others. In the next section, we will analyze the responsiveness of employees to alternative retirement-related options, by heavily drawing upon a nationwide survey on issues related to population aging.

#### IV. Individual Responses to Alternative Retirement Options

##### A. Data Source and Methodology

The data set which we use in the present analysis has been derived from the Survey on Japan's Aging Society conducted by the Opinion Survey Division of the Mainichi Newspapers in April of 1978.<sup>3/</sup>

In this Survey, 2176 males and females responded by completing the questionnaire. Because the present analysis deals with employment options, a total of 864 respondents who held the status of current employees at the time of the survey have been selected for statistical treatment.

In the questionnaire, the respondents were asked about their preferences with regard to the following three retirement and remuneration practices:

1. Which wage system for employees do you think most desirable: payment according to the number of years worked? Or payment according to ability and type of job?
2. Which would you prefer: a larger retirement grant at an early retirement age? Or a smaller grant with later retirement?
3. Which would you prefer: later retirement age, but with no wage increases after a certain age? Or the present retirement

age with wage increases up to retirement?

Each of these questions has been treated as a dependent variable in the present analysis. To account for the variation in each dependent variable, we have selected the following explanatory variables: sex (MALE and FEMALE), age (20-29, 30-39, 40-49, 50-54, 55-59, and 60+)<sup>4/</sup>, and education (LOW, MEDIUM and HIGH)<sup>5/</sup>.

In addition to education, respondents' monthly income and occupation are also available in the data set. Because education tends to serve as an intermediate variable for these socio-economic variables, both income and occupation have been excluded from analytical deliber-

Table 3. Distribution of Employees Currently Working

Variable	No. of Cases	Percentage (%)
Sex		
MALE	620	71.8
FEMALE	244	28.2
Age		
20-29	228	26.4
30-39	250	29.0
40-49	214	24.8
50-54	88	10.2
55-59	37	4.3
60+	47	5.5
Education		
LOW	235	27.2
MEDIUM	415	48.0
HIGH	214	24.8

Note: cases in the total sample = 864

ations. (In fact, preliminary statistical results show the existence of high multicollinearity among these three variables.) The frequency distribution of the sampled data set is shown in Table 3.

In the statistical analysis which follows below, all the dependent variables are of a dichotomous nature. To handle variables of this type, the probit analysis seems in order. However, the probit analysis tends to produce statistical results quite comparable to those of ordinary least squares (OLS) (Gunderson, 1974). Moreover, the latter method is considerably less expensive in terms of computing costs than the former method. It should be noted, however, that the latter method tends to encounter the problem of heteroskedasticity when the dependent variable takes values only 0 and 1. For these reasons, we have used a weighted regression for the present analysis.<sup>6/</sup>

Insofar as the explanatory variables are concerned, due to their qualitative nature we have arbitrarily selected one group for each predictor as the reference group for forming dummy variables. The group "FEMALE" has been chosen as the reference group for sex, "40-49" for age, and "MEDIUM" for education.

## B. Statistical Results

### 1. Seniority-based vs. Work-oriented Wage System

As discussed earlier, one of the primary difficulties in extending the retirement age limit is the prevalence of the seniority-based wage system. Table 4 shows the computed probability of employees who prefer the seniority-based wage system to the work-oriented one. As opposed to female employees, male employees have a slightly lower probability of choosing the seniority-based wage system. This difference, however, is very small and statistically insignificant.

As regards the age effect, although there are some irregularities in its pattern, young cohorts prefer the work-oriented wage system while old cohorts are more likely to choose the seniority-based wage system. One may possibly offer the following two explanations for this result. Firstly, under the seniority-based wage system, the age-earnings profile tends to deviate from the age-productivity profile due to wages based on longevity of services. When they were younger, older cohorts accepted wages lower than the value of their marginal

Table 4. Probability of Employees' Preference for Seniority-based Wage System to Work-oriented Wage System

Variable	Coefficient	Standard Error	Coefficient Std. Error	F-value
MALE	-0.0138	0.0363	-0.38	0.14
AGE 20-29	-0.0978	0.0063	-2.11	1.60
AGE 30-39	-0.0329	0.0450	-0.73	
AGE 50-54	-0.0193	0.0621	-0.31	
AGE 55-59	0.0750	0.0890	0.84	
AGE 60+	0.0543	0.0800	0.68	
EL	-0.0117	0.0420	-0.27	5.50*
EH	-0.1231	0.0383	-3.22	
INTERCEPT	0.4286	0.0476	9.00	81.02*

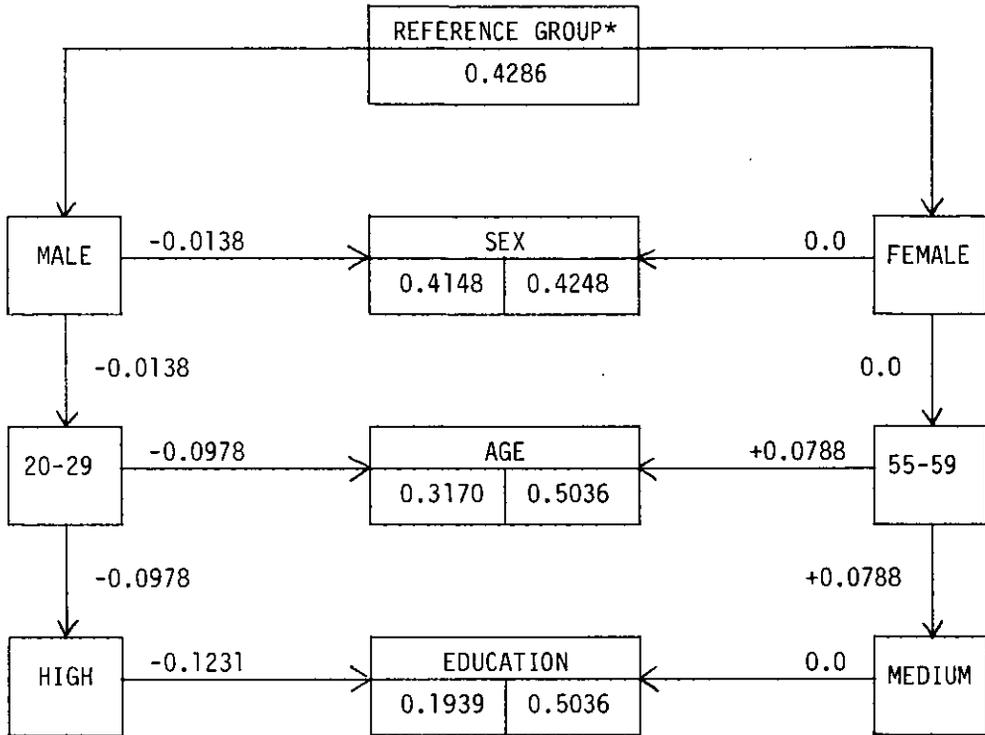
Note: \* statistically significant at the 1 percent significance level

product, in hopes of being compensated in their old age. Secondly, older cohorts tend to face the increasing risk of deterioration of human capital stock.

It should be noted that the employees at ages 50-54 show a slightly weaker preference for the traditional wage system, as compared with other cohorts such as the age groups 40-49 and 55-59. Because this cohort is very close to the conventional retirement age limit, his behavior might be sensitively affected by numerous factors in the labor market.<sup>7/</sup> One may hypothesize that a considerable portion of the employees of this cohort wishes to continue to stay in the labor force even after reaching retirement age, thus being willing to accept lower wages under the work-oriented compensation system.

It is also important to note that employees at ages 60 and over are less likely to prefer the traditional seniority-based wage system than those at age 55-59. This pattern may be partially explained by

Figure 1. Illustration of Computed Probabilities of Employees' Preference for Seniority-based Wage System



\* Females aged 40-49 with the medium level of education

the selectivity bias. That is, most of the employees in the oldest age group have already passed the retirement age limit, and are more likely to be concerned about the participation in the labor force rather than the remuneration system.<sup>8/</sup>

It should be also added that age is not statistically confident as the F-value indicates. The effect of age appears to be mediated through education to a substantial extent.<sup>9/</sup>

Education shows an interesting result. In contrast to low education (LOW) and medium education (MEDIUM), high education (HIGH) has a considerable large negative coefficient. This implies that the high educational group has a very marked preference for the work-oriented wage system. Because the age-productivity profile varies with differ-

ences in patterns of investment in human capital, highly-educated employees have more comparative advantages than the poorly-educated ones under the work-oriented wage system.

Drawing upon these statistical results, we have illustrated the differences in the preference probabilities among the Japanese employees, as presented in Figure 1.<sup>10/</sup> The reference group of employees shows a probability of 0.4286 for preferring the seniority-based wage system. In comparison, the employees who are male at ages 20-29 with high educational attainment have a very low probability of 0.1939 for choosing this wage system, while the employees who are female at ages 55-59 with medium education show a considerably high probability of 0.5036. This implies that four out of the five young, well-educated male employees prefer the work-oriented wage system, and that half of the female employees in their late fifties with a medium level of education prefer the seniority-based wage system.

## 2. Extended Retirement Age vs. Continuously Rising Wages

Another difficulty with regard to the extension of retirement age is the increasing wage bill. Table 5 presents the results with respect to the choice between the postponement of retirement age with no increase in wages beyond this age limit and no postponement of retirement age with rising wages up to the age limit. Male employees are more likely to choose the extension of retirement age with no increase in wages than female employees. This may probably reflect the difference in the mentor role in Japanese society; men tend to be the breadwinners while women are often marginal workers.

The age factor has a great deal of explanatory power. Except for the age group 55-59, the probability that employees prefer the extension of retirement age at the sacrifice of wage increases becomes larger as they become older. The employees aged 55-59 constitute a unique group. They are in the middle of the transitional period from retirement age to pensionable age. Also, some of the employees are presumably about to retire while the others either have prolonged their contracts or have been re-employed. The interpretation of the result for the age group 60 and over needs certain caution. As in the previous case, the selectivity mechanism is in operation with respect to this age group.

Table 5. Probability of Employees' Preference for Extension of Retirement Age with No Increase in Wages to No Extension of Retirement Age with Increasing Wages

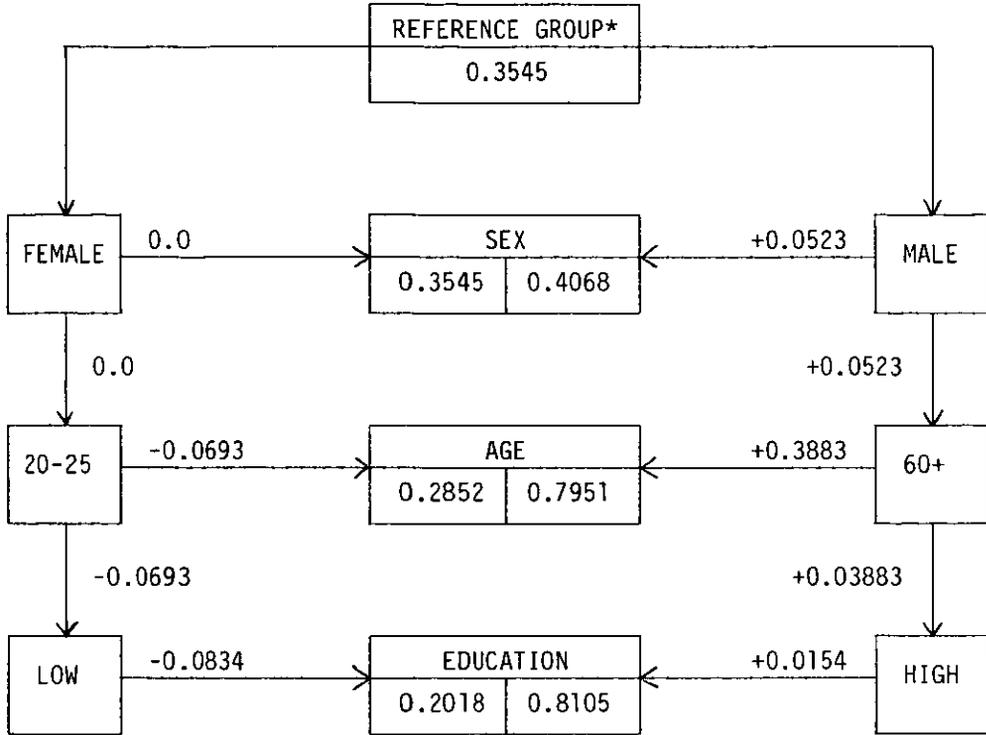
Variable	Coefficient	Standard Error	$\frac{\text{Coefficient}}{\text{Std. Error}}$	F-value
MALE	0.0523	0.0363	1.44	2.08
AGE 20-29	-0.0693	0.0469	-1.47	10.77*
AGE 30-39	-0.0061	0.0451	-0.14	
AGE 50-54	0.2138	0.0627	3.41	
AGE 55-59	0.0852	0.0881	0.97	
AGE 60+	0.3883	0.0712	5.46	
EL	-0.0834	0.0404	-2.06	2.72
EH	-0.0154	0.0407	-0.38	
INTERCEPT	0.3545	0.0471	7.52	56.57*

Note: \* statistically significant at the 1 percent significance level

As compared with age, the effect of education on the probability of the employees' preference for the postponement of retirement age is considerably limited. As opposed to the medium and high educational categories, the low educational group shows a stronger preference for no extension of retirement age and continuously rising wages up to the age limit. This may be partially explained by the fact that this group, having been in the labor force for a longer period than other educational groups, tends to have different valuations of income and leisure.

Figure 2 highlights a sharp contrast of the preference probability among the respondents. As compared with the reference group with a probability of 0.3545, the male employees aged 60 and over with high education show a very high probability of 0.8105 for choosing the extension of retirement age rather than continuously rising wages. That is, four out of the five employees having these characteristics prefer

Figure 2. Illustration of Computed Probabilities of Employees' Preference for Extension of Retirement Age to Higher Wages



\* Females aged 40-49 with the medium level of education

the postponement of the retirement age limit. In contrast, only one out of the five female employees at ages 20-29 with a low level of education prefer the extension of retirement age to higher wages. From this graphical presentation, one can note that the age factor plays the most dominant role in determining an employees' choice.

### 3. Extended Retirement Age vs. Larger Separation Grant

Another stumbling block to the postponement of retirement is the provision of lump-sum separation grants. Table 6 contains the computed results. In this table, one can easily observe that both sex and education have only limited explanatory power and are statistically

Table 6. Probability of Employees' Preference for Extension of Retirement Age with Reduced Separation Grant to No Extension of Retirement Age with Larger Separation Grant

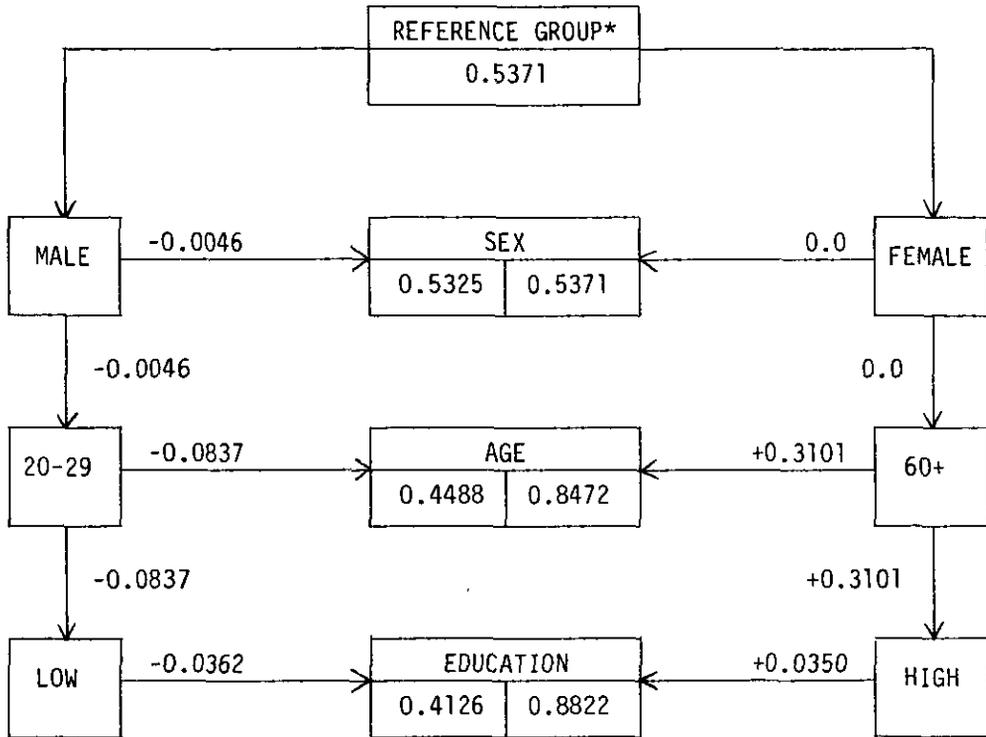
Variable	Coefficient	Standard Error	Coefficient Std. Error	F-value
MALE	-0.0044	0.0377	-0.12	0.01
AGE 20-29	-0.0839	0.0493	-1.70	8.63*
AGE 30-39	-0.0059	0.6469	-0.13	
AGE 50-54	0.1514	0.0614	2.46	
AGE 55-59	0.0971	0.0875	1.11	
AGE 60+	0.3101	0.0646	4.80	
EL	-0.0362	0.04177	-0.87	1.08
EH	0.0351	0.0412	0.85	
INTERCEPT	0.5371	0.0490	10.97	120.24*

Note: \* statistically significant at the 1 percent significance level

insignificant. In contrast, the age factor is the most important explanatory variable. Except for the age group 55-59, older cohorts are more likely to choose the extension of retirement age with reduced separation grants rather than no extension of retirement age with larger separation grants. This result may be attributable to a net effect of the following two opposite considerations. Firstly, because the separation grant is linked with the seniority-based concept and it is paid in a lump-sum form, the older cohorts may prefer such retirement benefits to the postponement of retirement age. Secondly, considering the recent trend of the declining ratio of retirement allowance to final regular salary, the older cohorts may feel that the extension of retirement age is more beneficial to them. Our empirical result seems to suggest that the latter dominates the former.

Figure 3 describes differences in the preference probability among the sampled employees. The female employees who are in their

Figure 3. Illustration of Computed Probabilities of Employees' Preference for Extension of Retirement Age to Larger Separation Grant



\* Females aged 40-49 with the medium level of education

sixties with high educational attainment show a high probability of 0.8822 for selecting the extension of retirement age rather than a larger lump-sum separation grant. On the other hand, the male employees aged 20-29 with low education show a low probability of 0.4126 for the postponement of the retirement age limit. The former group's probability of choosing the extension of retirement age is more than twice as high as the latter group.

#### V. Policy Implications and Concluding Remarks

In the present study, we have analyzed Japanese employees' responsiveness to institutional alternatives connected with extending

the age of compulsory retirement. As regards the choice of the compensation system, young, well-educated male employees have a very strong preference for the work-oriented wage system rather than the traditional seniority-based system. Education is the strongest determinant in the preference for the work-oriented wage system.

We have also identified the characteristics of the employees who were in favor of the postponement of retirement age rather than the continuously rising wage structure and/or lump-sum retirement benefits. They were older and better educated male employees. Among these characteristics, age is the most dominant factor. In addition, education contributes to the greater preference for the extension of the retirement age limit, though it is a considerably weaker factor.

These findings may lead to the following two policy implications. Firstly, the improvement of the educational attainment of the Japanese labor force may facilitate a switch from the seniority-based wage system to the work-oriented one. Due to Japan's post-war rapid expansion of education, the human resource stock of the labor force is expected to continue to improve in the next few decades, consequently increasing the acceptability of the work-oriented wage system on the part of the employees. Because the work-oriented wage system is more agreeable to management in extending retirement age, human resource development may indirectly contribute to the solving of one of the problems related to Japan's aging labor force. Secondly, because older employees have considerable flexibility in adjusting themselves for the sake of the postponement of retirement age, a substantial extension of the retirement age limit may materialize in the relatively near future, depending upon policy measures to be taken by the government and businesses.

It has been quantitatively demonstrated by some of the recent studies that Japan is very likely to undergo a pronounced economic slow-down in the next several decades, in good part due to the aging and subsequent shrinking of the labor force. To make this long-term economic prospect less gloomy, employment opportunities for the elderly must be urgently expanded by changing the currently prevalent employment practices, including the retirement age limit. It seems ironic, however, that in order to cope with the problems of the aging labor force, Japan must move away from her traditional employment practices, especially at a time when she is being looked upon as a

model for other industrial societies to follow.

## VI. Acknowledgements

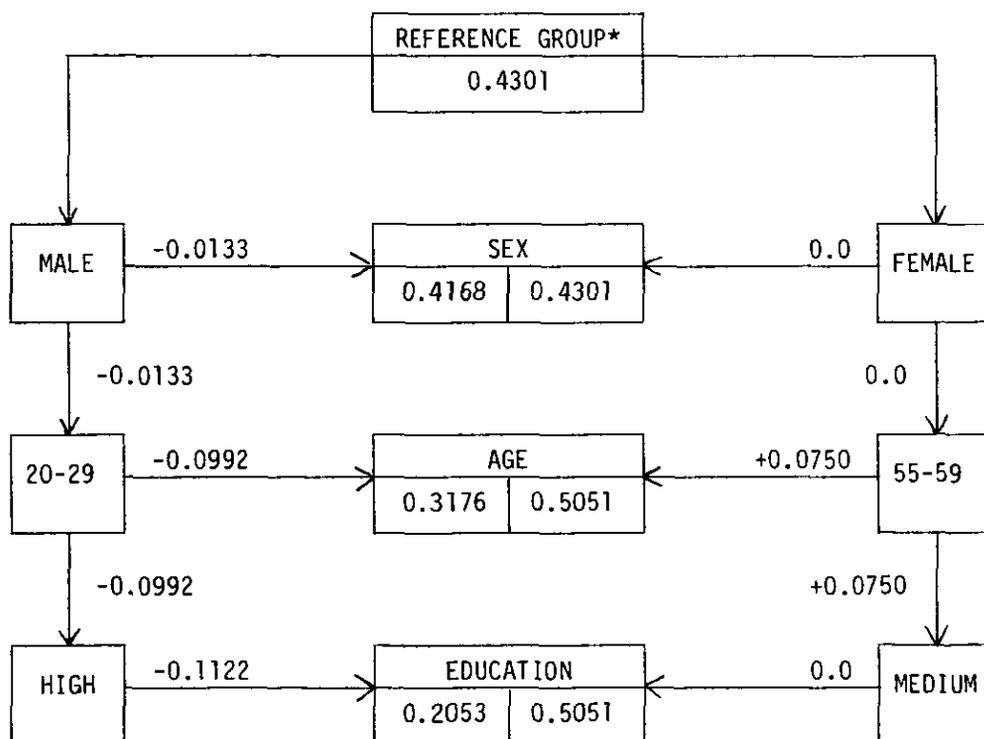
We are grateful to the Population Problems Research Council of the Mainichi Newspapers for permitting us to utilize the data of the Survey on Japan's Aging Society conducted in 1978. Thanks are also due to both Yasuhiko Saito and Masaki Ohkubo for their skillful programming assistance. This research has been undertaken as part of the project entitled "A Comparative Study of the Impact of the Aging of the Labor Force: Japan and the United States" under the auspices of Nihon University and the University of Hawaii.

## Notes

- 1/ In addition to their strong desire to work, it has been found, though it is based upon only fragmented evidence, that most of the elderly in their 50s and 60s are physically and mentally competent enough to work. For example, one of the surveys done in 1978 on the job performance (covering a total of 600 companies) indicates that in almost all professional categories older workers can perform very satisfactorily (Furuya, 1982).
- 2/ According to the 1980 Employment and Management Survey, as compared with the case of uniform increases in retirement age, both re-employment and employment extension programs are more likely to force old workers to accept jobs substantially different from pre-retirement ones. Although only 7.3 percent of old workers change their jobs in the case of extended retirement age, the percentage of the old workers who are engaged in jobs of a different nature is 31.1 percent under the re-employment program, and 14 percent under the employment prolonging program. In addition, in the latter two programs, both functional positions and remunerations are pronouncedly lowered. In the case of employment prolonging, those whose earnings fall amount to 41 percent of pre-retirement earnings, and in the case of re-employment, 71.8 percent. In contrast, only 19.7 percent of the aged workers face reduced earnings in the case of the postponement of retirement age. Interestingly, the fact that the re-employment program is more widely prevalent in large-scale establishments, may reflect that large-scale enterprises are in a better position to recruit old workers.
- 3/ Details of the sampling procedure are available elsewhere. See Population Problems Research Council of the Mainichi Newspapers: Koreika Shakai, Rogomondai ni Kansuru Zenkoku Yoron Chosa (Tokyo, March 1979).
- 4/ As regards age, employees who are between 20 and 49 years old have been classified on the basis of the 10-year interval. However, because the retirement age limit currently prevalent is somewhere between 55 and 59, employees who are in their 50s have been categorized by a 5-year grouping. Although employees who are in their 60s and 70s should be divided into more detailed groups, due to the scanty number of cases they have been treated as one group.
- 5/ The low educational level (LOW) represents elementary school, higher primary schools under the old educational system or junior high school under the new system; the medium level (MEDIUM) includes junior high school under the old system and senior high school under the new system; and the high level (HIGH) refer to both junior colleges and universities.
- 6/ We have computed the weight for each observation on the basis of the first OLS regression, and then have run the second OLS regression, by assigning the weight to each observation. The weighting formula is given by  $1/\sqrt{p(1-p)}$  where p stands for the expected probability of each respondent choosing the value of 1.

- 7/ The relatively large value of the standard error may reflect this point.
- 8/ Although we have added to the present data set those who held no job at the time of the survey in a separate analysis, we have still obtained very similar results.
- 9/ Although we tested the interaction effect between age and education, we could not detect any significant interaction between them. This result supports the validity of our linear model analyses.
- 10/ We have also computed the preference probabilities of various groups of the sampled employees, by using a probit analysis. The results have been presented in Figure A. By comparing this Figure with Figure 1, one may conclude that there is hardly any difference in computed probabilities between OLS and probit analyses.

Figure A. Illustration of Computed Probabilities of Employees' Preference for Seniority-based Wage System (By Probit Analysis)



\* Females aged 40-49 with the medium level of education

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