Discussion Paper Series

No.40

Wages, Hours of Work and Job Satisfaction of the Elderly

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September 2004

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Abstract

This paper analyzes the effects of pension benefits, family conditions, and personal characteristics of the elderly on their labor supply, wages, hours of work and job satisfaction in the framework of the Nash bargaining that an old worker and a firm bargain over employment conditions such as wages, hours of work and job investment. It will be stressed that as workers become aged, they come to put more priority on hours of work, work circumstances, the contents of a job rather than wages, and make them improved by job investment in the form of lower wages. This paper also shows empirically, controlling the income effect of pensions, that the effects of the reduction scheme of the Employees' Pension Plan on hours worked and labor participation of the elderly had disappeared by 2000.

1. Introduction

Most of older workers who are in their sixties are in the process of retiring from the labor markets. As their physical strength, memory and work incentives decline with ages, they would adjust their way of workings such as hours of work and work circumstances even if it is accompanied by a decrease in wages. At the same time, they have to prepare for their life after retirement. If they feel unsatisfied with the preparations, they would work for higher wages. This paper aims to analyze how wages, hours of work and job satisfaction of the elderly are determined, focusing on the effects of their pensions, family conditions, and personal characteristics.

Many previous studies[1] have stressed that pensions suppress labor supply of the elderly not only because they have an income effect for leisure but because the Employees' Pension Plan, which is widely applied to the employees who have worked in private companies, adopts the reduction scheme of pension to the recipients according to their hours of work, wage and the amount of pension. Controlling the income effect of pension benefits and endogeneity, this paper will test the effect of the reduction scheme through comparing with that of the pension program having no such scheme, for instance, the Governmental Mutual Aid. It will be also focused on how the effects of pensions differ between the early sixties and the latter, taking into consideration that the reduction scheme is different between them.

In order to make their way of workings more comfortable, the elderly try to improve work circumstances, the contents of job and the human relation in their work shop by bargaining with firms over the work circumstances and the job assignment, or in some cases they move among firms. The concept of job investment, which stands for the investment to promote job satisfaction of elderly workers, is important in this paper. More precisely, there are basically two ways to improve their job satisfaction. One way is to make them assigned to a job which is favorable in job characteristics. If the assignment is difficult within a firm, then they might move among firms for a favorable job. The other way is to improve work and circumstances by investing in equipments, tools or the work shop. Brightening shops more, using a robot for physically difficult work and slowing down work speed are good examples. The important thing is that both the ways are costly. That is, transfer to a more favorable job may decrease workers' productivity and that the improvement of work circumstances requires capital investment. Therefore, the elderly and firms bargain over the job investment in

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[1] See Yamada(1990), Seike(1993), Tachibanaki and Shimono(1994), Seike and Shimada(1995), Seike et al.(1997), Ogawa(1998a, 1998b), Abe(1998), Mitani(2001) and Higuchi and Yamamoto(2002), for example.

addition to wages and hours of work and, as a result, possibly the former come to bear a part of its costs in the form of lower wages or longer hours of work.

In consideration of these, this paper will analyze how pensions and family conditions of the elderly affect their job satisfaction on the factors such as work circumstances. Since more job investment is costly, it is expected that job satisfaction is closely related with wages and hours of work and, moreover, with pensions, personal characteristics and family conditions of the elderly.

The analytical feature of this paper is to take a Nash bargaining approach. That is, it is assumed in this paper that an older worker and a firm bargain over wages, hours of work and the job investment. In turn, previous studies have usually relied on the traditional framework that an older person determines his labor supply, comparing his reservation wage with the market wage[2]. There are two main reasons why the Nash bargaining approach is taken in this paper. First, as the elderly become aged, not only their physical and mental strength but family conditions come to widely differ among them, that is, the factors affecting their disutility of work are quite different and likely to change every year, and, hence, they can not be treated uniformly. Thus their way of workings and economic conditions are needed to be changed individually and carefully through frequent renegotiations, particularly, for elderly workers reemployed after mandatory retirement. Second, in general there is a wide range of rent between a firm and an older worker possibly because he has worked for a long time at the current firm and accumulated firm-specific skills and because he has familiarity to the workplace and the job. It is also possible that the elderly settle down near the firm which they have worked.

The paper is organized as follows. Section 2 overviews the present state on the old-age pensioners and presents the distributions of the elderly among the different pension plans and hours worked. Section 3 presents the Nash bargaining model to analyze the determinations of wages, hours of work and the job investment. Section 4 explains the data and methodology used for estimations and tests the implications of the model, focusing on the effects of pensions, family conditions and personal characteristics of the elderly. In Section 5 the determinants of satisfactions concerning wages, hours worked and jobs of the elderly are discussed. Section 6 concludes the paper.

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[2] See Gordon and Blinder(1980) as a seminal work. Since their static model life cycle models of retirement behavior of the elderly have been developed, based on the dynamic programming method, by Gustman and Steinmeier(1986), Rust(1987) and Berkovec and Stern(1991). Stock and Wise(1990) formulated the option value model in a dynamic setting.

2. Present State on the Old-Age Pensioners

To begin with, this section will review the present state on the utilization of different kinds of pensions. The Japanese public pensions are basically categorized by occupation into three, that is, the Employees' Pension Plan (EPP), the National Pension Fund (NPF) and the Governmental Mutual Aid (GMA). In addition, there are private pension plans such as company pensions and individual. Concerning the public pension plans, which are supposed to widely cover the nation, it is important to note that they are different in the way how pensions are reduced when the elderly work. More specifically, the elderly who work under the application of the EPP have possibility that their pension benefits are reduced, depending on hours worked and earnings, while the ones under the GMA or the NPF have not entirely. Since the EPP covers most of the elderly who have worked as employees in private companies, it is often stressed that the Japanese pension system has a strong impact on labor supply of the elderly[3].

It should be noted here that the EPP applies the Pension System of Reduction for Elderly Workers (ZAIROU) to the older employees whose ages are from 60 to 64 and who work more than 3/4 of the normal hours of work[4]. This implies that if older employees want to avoid the application to the ZAIROU, they work for a shorter hours and possibly earn less than those who work under the ZAIROU. If they work more than 3/4 of the normal hours, their pension benefits will be reduced by 20 % or more, depending on their earnings, under the application to the ZAIROU.

Taking account of the above situation, let us check the data obtained from *the Work Survey for the Elderly*, which was conducted by Ministry of Health, Labor and Welfare (Japan) in 2000[5] for the elderly whose ages are from 55 to 69. Table 1 shows the composition of employed pensioners whose ages are in the early sixties and who worked as employees at the age of 55. It is interesting to find in Table 1 that the elderly who receive pension only from the EPP share most, that is, 40.1% of the 1,599 respondents while those only from the ZAIROU do 19.6%. This tendency does not change much even if those who receive pension from the other plans at the same time are included. This seems to imply that many older employees decrease hours of work to avoid the

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[3] See the works listed in footnote 1.

[4] Individual firms can determine the normal hours by themselves within the standard hours of work, i.e., 40 hours a week, which is regulated by the law.

[5] The survey was also conducted in 1980, 1983, 1988, 1992 and 1996. The reasons why this paper analyzes only the 2000 survey are that information concerning work satisfaction of elderly workers can not be obtained from the other surveys and that many previous studies have already analyzed them.

application to the ZAIROU. But we should not hasten to conclude because it is possible that they want to work for a shorter hours to make their way of working easier physically and mentally. The next section will deal with this problem.

Figure 1 shows the distribution of monthly hours worked by pension plan. As expected, the hours distribution of the older employees working under the ZAIROU lies higher than that of those under the EPP. More specifically, the average of monthly hours worked is 162.4 for employees under the ZAIROU and 114.0 for those under the EPP. It is interesting that the standard deviation of the former is 41.1, which is smaller than that of the latter, although the average of the former is larger. This implies that there exist many older employees who work for a long hours without applying to the ZAIROU. For example, 17.2% of the employees under the EPP work more than the regular standard hours per month, i.e., 160 hours. There can be two reasons why such older employees exist. First, it happens in the surveyed month that they work for a long hours although they usually do not. Second, they usually work for a long hours in fact, but do not report it to the Social Insurance Office to avoid the application to the ZAIROU. The problem is that the self-application system is basically taken for the EPP employees in determining the application to the ZAIROU[6].

There is another evidence showing that the reduction scheme of the ZAIROU is often exaggerated too much. The survey conducted in 2000 asked if the elderly control hours and days of work in consideration of the reduction scheme of pension by the ZAIROU. Table 2 reports the results on the respondents, separating the elderly working under the EPP and those under the ZAIROU. Among the elderly working under the application to the ZAIROU, 76.5% answered as "I do not care it at all" while 23.5% as "I control hours and days of work". In turn, 28% of the elderly under the EPP answered as "I do not care at all", 25.9% as "I control hours and days of work" and 46.1% as "I do not work at all". These results seem to indicate that the suppressing effect on labor supply of the reduction scheme of pension is large. It must be, however, cautious in interpreting the results obtained by the survey of this kind. For, according to the results from the other questions, many of the elderly who answered as "I do not work at all" actually searched for a job. That is, to the question of "why don't you work?" 45.4% of them answered as "I can not get a job although I want to work". Furthermore, to the question concerning the reason why they can not get a job, 68.6% of them replied "because I can not find a job suitable to me". These results teach us that even if the elderly do not actually care much about the reduction scheme of pension, they are likely to exaggerate

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[6] According to hearing from a staff in the Social Insurance Office, they sometimes conduct a sample survey in the area over which they have jurisdiction.

its negative effect on their labor supply. Most workers do not like their income to be reduced.

It is also noteworthy that the present pension system has the effects to promote labor supply of the elderly. One is that if they postpone receiving pensions in spite of their qualifications, they can benefit later. It is said that the rate of return to the postponed amount of pension is around 8%, which is good higher than the interest rates currently prevailing in Japan. If the elderly postpone receiving pensions to get more benefits later and try to finance their living expenses by working during the period of .postponement, then pensions are regarded as being stimulative to labor supply of the elderly. Another effect is that in order to get qualification for receiving pensions, people have to pay premiums for a certain period. Therefore, some of the elder people who have not yet satisfied this qualification try to work. Thus the present pension system has some aspects encouraging labor supply of the elderly.

3. A Bargaining Model

Now assume that a worker and a firm match and bargain over the employment conditions. The bargaining is of the Nash type so that they share a rent due to firm-specific skills and/or familiarity to the workplace. Generally speaking, the elderly become weaker with age in their physical strength and memory, and is more likely to be forced to care for their spouse. Therefore, many of the elderly are employed as non-regular workers after mandatory retirement, and bargain with firms every years, adjusting to their changing physical and family conditions. It is assumed that if there is no rent between a worker and a firm, the bargaining breaks down and the worker or quits the labor market at least for a year[7].

For simplicity of analysis, it is assumed that the worker's utility defined as U is represented by a separable function, as follows,

(1) $U = W + F - G(W, F) + Y^0 - hD(c, \alpha)$,

where W is defined as the wage, h as hours of work, F as the full amount of the pension which he can receive, $G(W, F)$ as the reduced amount of the pension, Y^0 as non-labor income, and D as the marginal disutility of hours of work expressed in the money term. The marginal disutility of hours of work is a function of the amount of job investment to improve his way of workings, c, and a shift parameter, α, in the

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[7] It is not denied that the worker will get a job in the next year by changes in economic conditions.

following way, $D_c < 0$ and $D_\alpha > 0$, where the subscript implies differentiation. The sift parameter represents the factors such as age, sex, health, the pension and the number of other income earners in his family, which are supposed to affect the marginal disutility. This simplified specification makes it easier to analyze how each of the exogenous variables affects the determinations of the wage, hours of work and the job investment without serious loss of generality[8]. If the worker does not work, then it holds that $W = 0$, $h = 0$, $c = 0$, $G = 0$ and $D = 0$. It is also assumed that $G_W \geq 0$ and $G_F \geq 0$.

Let us define the worker's marginal productivity as p, which is measured by the maximum value which he can produce through working for an hour in the firm. It is possible that if he is transferred to a physically favorable job, he can not accomplish this maximum productivity, and then his productivity is $ph - c$. It is also considered that a new job requires some training. This implies that the job investment includes not only the cost to improve the way of workings but also the reduced productivity by job transfer.

The firm's profit, Π, is given by

(2) $\Pi = ph - c - W = R_f$,

where R_f stands for the rent which the firm receives from employing the worker. Note here that the rent is equal to the profit. This is because, if the firm does not employ the worker, the profit is zero. In turn, taking into consideration that the worker can receive his full pension and $h = 0$ if the negotiation breaks down, we define his rent, R_w, as follows,

(3) $R_w = W - G(W, F) - hD(c, \alpha)$.

Then, the Nash product is given by

(4) $\log(R_f) + \log(R_w) = \log[ph - W - c] + \log[W - G - hD]$.

In the above specification it is assumed, for simplicity of analysis, that the bargaining powers are equal between them.

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[8] In particular the separable function assumed here can be criticized on the ground that the pension is assumed to affect the marginal disutility of hours of work while the wage is not. This criticism is natural as far as we focus only on the aspect that the worker uses them similarly for consumption. However, it can be considered that the worker feels security on the pension because he can obtain it even if he retires from the labor market. The income of the other family member can be interpreted as well.

The first-order conditions are given by differentiating (4) with respect to W, h and c in the following way[9],

(5) $\quad -\dfrac{1}{R_f} + \dfrac{1}{R_w}(1 - G_W) = 0$,

(6) $\quad \dfrac{1}{R_f} p - \dfrac{1}{R_w} D = 0$,

(7) $\quad -\dfrac{1}{R_f} - \dfrac{1}{R_w} h D_1 = 0$.

Rearranging the above system, we obtain

(5)' $\quad W = \dfrac{1}{1 + (1 - G_w)}[(ph - c)(1 - G_w) + G + hD]$,

(6)' $\quad D = p(1 - G_w)$

(7)' $\quad -hD_c = 1 - G_W$.

Under the current system of the Employees' Pension Plan, G_W and G_F increase stepwise as W increases. More specifically, if workers work for 3/4 of the regular hours or less, then $G_W = 0$ and $G_F = 0$, that is, the pension is fully paid. If workers work for more than 3/4 of the regular hours and F is 22 or less, then $G_W = 0$ and $G_F = 0.2$ in the range of $W < 22 - 0.8F$, $G_W = 1/2$ and $G_F = 0.6$ in $22 - 0.8F \leq W \leq 34$, and $G_W = 1$ and $G_F = 0.6$ in $W > 34$ unless $F < G$. Note here that the unit is ten thousand yen and that in the case where $F > 22$ the scheme is a little different from the above[10].

As is well known, the worker and the firm are likely to choose as a bargaining solution one of the kinked points on the pension scheme. However, this paper does not focus on the problem of which point they choose, but on how the scheme affects the wage, hours of work and the job investment for improving the working conditions, assuming that they have chosen one solution. That is, our aim is to know how these endogenous variables differ, depending on the level of G_W, where the worker decides to work, and

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[9] It is assumed here that the second-order conditions are satisfied.
[10] See Ohashi(2000) for the more precise formula of the present pension system.

on the level of F, which he is qualified to receive[11].

In order to know the effects of G_W, we now conduct a comparative statics analysis on the system consisting of equations (5)', (6)' and (7)'. To begin with, differentiating (6)' with G_W, we obtain

$$\frac{dc}{dG_W} = -\frac{p}{D_c} > 0,$$

where $D_c < 0$, as assumed before. Thus we can easily know that it is rational for the worker who works at a higher level of G_W to invest more on the improvement of the working conditions. We next differentiate (7)' with G_W, and get

$$\frac{dh}{dG_W} = -\frac{1}{D_c}(hD_{cc}\frac{dc}{dG_W} - 1).$$

This shows that the effect of G_W on h depends on D_{cc}. Although it is an empirical question how it is, let us assume that D_{cc} is negligibly small, then the effect of G_W on h is negative. As for the effect of G_W on W, differentiating (5) with G_W, we can obtain

$$(2 - G_W)\frac{dW}{dG_w} = -p - (ph - c - W) + (1 - G_w)\frac{dh}{dG_w} - (1 - G_w)\frac{dc}{dG_w} < 0.$$

That is, an increase in G_W has an effect to decrease W directly through changing the income share between the firm and the worker and indirectly through raising c and decreasing h. This result implies that the worker who work at the point of high G_W since he can receive a high wage due to his high productivity has an incentive to work for a short hours and to improve his working conditions even if he has to accept a lower wage relatively to his productivity.

The full amount of pension does not explicitly appear in the system, but can affect the bargaining solution thorough the effect on the disutility of labor. That is, since an increase in F can be considered to make the worker prefer reducing the disutility of labor more, it means an increase in the shift-parameter whose effects are assumed to be $D_\alpha > 0$ and $D_{c\alpha} < 0$. We now analyze the effects of the shift-parameter by conducting a comparative statics analysis on the system. Differentiating (6)' with α, we obtain

$$\frac{dc}{d\alpha} = -\frac{D_\alpha}{D_c} > 0.$$

This implies that an increase in F accompanied with an increase in α raises the job investment.

Next, the differentiation of equation (7)' with α gives us that

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[11] See Ohashi(2000) for the analysis on the Nash bargaining solutions.

$$\frac{dh}{d\alpha} = -\frac{1}{D_c}(hD_{c\alpha} + hD_{cc}\frac{dc}{d\alpha}).$$

The effect of α on hours of work is ambiguous because $D_{c\alpha} < 0$ is assumed here, that is, an increase in α strengthens the decreasing effect of the job investment on the disutility while an increase in c brought about by an increase in α raises hours of work, as shown in the second term in the parenthesis. It is an empirical question which effect is dominating. The next section will show that the effect of pension on hours worked is negative and statistically significant at the ordinary level of confidence. If the effect of α on hours worked is negative, then it is decisively determined from equation (5)' that an increase in F accompanied with an increase in α decreases the wage through increasing the job investment and decreasing hours of work.

The number of income earner in the worker's family, the non-labor income and the housing loan, which are used as explanatory variables in the empirical sections, also do not appear explicitly in the system, but they are assumed to affect the bargaining solution through α as well as the pension. In turn, sex, age, tenure and health are assumed to affect labor productivity.

The social rent which is shared between the worker and the firm is defined as R. If this social rent is negative, then the bargaining breaks down. Therefore, R must be non-negative for the bargaining to reach an agreement, as follows,

(8) $\qquad R = R_f + R_w = ph - c - hD(c,\ \alpha) \geq 0$.

If this relation does not hold, we can not observe employment relation[12]. That is, we can observe wages and hours worked only for the bargaining in which equation (8) holds. Thus this relation will be used to remove selection bias in the empirical analysis.,

4 Empirical Results on Wages, Hours worked and Labor Supply of the Elderly

This section will analyze how wages, hours of work and labor supply of the elderly are determined, focusing on the effects of not only the ordinary factors, such as age, sex, health, education, tenure, industry and occupation, but also pension and family factors. The micro data used are from *the Work Survey for the Elderly*, which were conducted by Ministry of Health, Labor and Welfare (Japan) for the elderly whose ages are from 55 to 69. Since the main aim of this paper is to analyze the effects of pension, it focuses on the

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[12] Note in equation (8) that $G(W,\ F)$ does not appear. This is because it is effective only for the elderly who work more than 3/4 of the normal hours, that is, as far as the right-hand side in equation (8) is negative, it is difficult for the elderly to get a job in any level of hours of work.

elderly whose ages are 60 or more. The sample size is 12,752 in this stage, but the elderly who were not participating in the labor markets are dropped from the analysis. More precisely, we drop the elderly who did not work for the following reasons: "because I can not work physically", "because I have family members who need care", and "because I want to devote myself solely to enjoying my hobby or doing volunteer work". This data restriction leads our sample size to 8,581. Furthermore, the elderly who were working as company executives or self-employed persons are dropped. This is because their positions are determined not only by their discretionary choices but also by the other uncontrollable factors such as company decisions, their own assets and family conditions, because their incomes are biased downward due to tax measures, and because hours worked are ambiguous and determined by their own. Thus the sample size is 5,172 in this stage.

Since the aim of this paper is to analyze how elderly workers retire in the process of their aging, the elderly who did not worked at the age of 55 are deleted from our sample, regarded as they had not mainly been in the labor force. This leads the sample size to 5,125. It should be noted here that there are 232 elderly persons who did not worked at the age of 55, but they respond as they are "working usually" at the time of being surveyed[13].

In the empirical analysis below two points should be noted. One is that wage and hours equations will be estimated in the reduced form. This is because the Nash bargaining model simultaneously determines wages, hours of work and the job investment, and gives us the reduced form equations for the dependent variables. The other is that, since the dependent variables are incidentally selected and observed only when the social rent is positive, the sample selection bias can be generated. Thus Heckman's two-step estimation procedure will be used. In so doing, equation (8) with a random term added is used as a selection equation. The precise form of our estimation equation for wages is as follows,

(9) $\qquad W_i = \beta' X_i + u_i$,

(10) $\qquad R_i = \alpha' Y_i + v_i$,

(11) $\qquad W_i > 0 \quad if \ R_i \geq 0 \quad and \quad W_i = 0 \quad otherwise$,

where β' and α' are the row vectors of coefficients for the wage and the selection equations, respectively, X_i and Y_i are the column vectors of the independent

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[13] Since the number of these persons is relatively small, the inclusions of them did not change our results essentially.

variables, and u_i and v_i are the random terms which are assumed to have a bivariate normal distribution with $E(u_i) = 0$ and $E(v_i) = 0$. If the correlation between the two random terms is zero, there will be no sample selection bias. But it is theoretically expected that the correlation between two random terms is positive because the Nash bargaining determines the wage at a higher level as the social rent is larger. Thus we expect that the estimated coefficient of the inverse Mills ratio defined as *lambda* is positive. Similarly we can also estimate hours equations, but in this case it is ambiguous whether the correlation between the two random terms is positive or not. This is because the theoretical effect of the social rent on hours of work is not straightforward.

On estimating wage and hours equations, the data is separated into the elderly whose ages are between 60 and 64 and those between 65 and 69. Summary statistics on the variables used for analyzing two groups are reported in Table 3. Table 4 shows the estimated results of wage and hours equations for the early sixties, and Table 5 for the latter sixties. Each of the related selection equations are shown in the lower part of the tables. In the estimations of equation 1 in Table 4 and equation 4 in Table 5 the logarithm of *wage* whose data is the total amount of wages paid in September, 2000, including taxes, is used as the dependent variable, and in equations 6 and 7 in Table 6 the logarithm of hourly wage rate is used as the dependent variable to make it easy to interpret the results of the bargaining. The data used for *hours* is the total hours worked in September (worked days $\times$ hours worked per day).

Table 4 and 5 provide us some interesting findings. First, the effects on wages and hours worked of *pension*, which stands for the total amount of pension benefits[14], are negative and statistically significant at the 5% level of confidence. These are consistent with those obtained by many previous studies such as Seike(1993), Tachibanaki and Shimono(1994) and Abe(1998). There can be three explanations for the negative effects. The first one is given by the traditional theory of labor supply. That is, if leisure is a normal good, an increase in the older worker's pension raises his non-labor income and makes him prefer more leisure to wages and reduce hours of work. On defining this income effect, it is assumed in the traditional theory that the hourly wage rate is fixed. But equation 7 in Table 6 shows that the effect of *pension* on the wage rate for the early sixties is negative and statistically significant at the 10% level of confidence, and equation 8 that it is negative for the latter sixties although not significant. These

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[14] The total amount of pensions means the full amount which the elderly are qualified to receive. *The 2000 Survey* reports the reduced amount of the pension due to the application to the ZAIROU.

results are not inconsistent with the standard theory of labor supply if marginal productivity decreases with a decrease in hours of work. But, if marginal productivity remains constant or increases as hours worked decrease, the wage rate will not decrease in the framework of the standard theory. The second explanation is that, according to the bargaining model developed here, the elderly who found that his non-labor income was raised by an increase in the pension and decided to work in favor of more job investment would accept the wage rate to decrease. In the bargaining mode the wage rate can decrease as far as marginal productivity is not assumed to increase in a larger extent with a decrease in hours of work. Thus in the bargaining model which incorporates job investment the pension can have a negative effect on the wage rate. The third explanation which was stressed by previous studies focuses on the reduction scheme of pension, as explained in Section 2. It is an empirical question whether this explanation is effective or not, and will be discussed below.

Second, as shown in Table 4, the effect on wages and hours worked of the dummy variable, i.e., *zairou_d*, which represents whether each elder employee works under the application to the ZAIROU, is positive and statistically significant at the ordinary level of confidence. This implies that elder employees working under the application to the ZAIROU work for a longer hours and earn more than those who work without their pensions reduced. Note here that the dummy variable, *s_EPP_d*, showing the recipients of the EPP without reduction has a negative effect on hours worked which is statistically significant at the 1% level. These are not interesting because the pension system requires the elderly to work for a short hours if they want to avoid pension reductions. That is, the introduction of *zairou_d* as an explanatory variable is not appropriate since it is an endogenous variable in the determinations of wages and hours of work.

In turn, it is interesting to know in Table 4 that the cross term, *cross_pz*, by *zairou_d* and *pension*, is not statistically significant at the 10% level of confidence in the hours equation and, moreover, its coefficient is positive. This means that the reduction scheme of the ZAIROU has no effect to reduce hours worked on the condition that the elderly accept to work under the application to the ZAIROU. But we should not hasten to conclude. The reason is that the application of the ZAIROU automatically reduces the pension by 20 percents regardless of the wage level, and hence elderly workers would decrease their hours worked to 3/4 of the standard hours. That is, the effect of the automatic reduction of pension still remains to be discussed.

In order to ascertain the effect of the 20% reduction of pension, we focus on the pension system of the Governmental Mutual Aid, which is applied to the elderly who

have worked as civil servants. The pension receivers under this system are exempt from any reduction even if they work at any level of hours worked and wage. Therefore, comparing the effects of the EPP and the GMA makes sense. In equation 3 the dummy variable showing the recipients of the GMA, *GMA_d*, is introduced as an explanatory variable with that of the EPP, *EPP_d*, which combines *zairou_d* and *s_EEP_d* to see the total effect of the EPP as a whole[15]. As shown in equation 3, the effect of *GMA_d* on hours worked is positive and significant at the 10% level of confidence while that of *EPP_d* is not significant. It is also interesting to know form the selection equation of equation 3 that the recipients of the GMA are more likely to participate in the labor markets. These imply that the elderly workers who are under the GMA work more than the other elderly. It can be guessed that since civil servants can find favorable jobs after mandatory retirement, they work more. It is noteworthy in equation 7 that the effects of *zairou_d* and *s_EPP_d* on hourly rates of wage are negative and statistically significant at the ordinary level of confidence while that of GMA is positive although it is not significant. In addition, many of the GMA recipients work at the governmental sectors where relatively high wages are paid. This is shown in the positive and large coefficient of *public_scale*, which is the dummy variable showing that the elderly work as civil servants. According to our data, 42% of the GMA recipients work as civil servants. But it is interesting that these effects seem to disappear in the latter sixties. See equation 8 where the effect of *GMA_d* on hourly wages is negative and not significant at the ordinary level of confidence. At the same time its effect on labor supply also disappears as is shown by its selection equation.

The reduction scheme of the EPP is also applied to the recipients whose ages are 65-69, but less restrictive. More specifically, if 80% of the full pension plus earnings of the elderly under the EPP exceed 480 thousand yen, their pensions are reduced by half of the amount exceeded. Therefore, it is meaningful to compare the effects of the EPP between the early sixties ant the latter. Interestingly, the findings are against our expectation. That is, from equations 3 and 6 it is found that the effects of *EPP_d* on hours work and labor participation are positive for the early sixties while negative for

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[15] As is known form Table 1, there are some elderly parsons who receive pensions from both the EPP and the GMA. They are classified to either of the funds from which they receive more. The reference group consists mainly of the recipients from the NPF and the elderly who are not receiving pensions, including those having qualification. Seike and Shimada(1995) and Abe(1998) paid attention to the existence of those who are not receiving pensions although they have qualification because the number of them is not small. According to our data, among the early sixties who have qualification to the EPP, 19% of them is not receiving pensions, and its 76% is working. In the reference group who is working they share 34%.

the latter sixties although both are not statistically significant at the ordinary level. If the reduction scheme is effective, the above relation should be reversed.

Two points should be stressed here. One is that since *EPP_d* and *GMA_d* represent the feature of each pension system when the income effect is controlled by *pension*, their effects on wages and hours worked can be positive or negative *a priori*. The other is that the reduction scheme of the EPP does not work when hours worked are shorter. That is, it does not affect the decisions on labor participation of the elderly as far as the hours restrictions imposed by firms are less than 3/4 of the normal standard of hours.

To sum up, we can not find any strong indication showing the suppressive effects of the reduction scheme of the EPP in the period of 2000. Abe(1998) found that the impact of the reduction scheme of the EPP was in the trend of decreasing form 1983 to 1992. The findings in this paper are in line with it, and imply that the effect of the reduction scheme of the EPP had disappeared by 2000. A part of this trend is possibly due to the reforms of reduction scheme in the EPP[16].

Third, it is often argued that pensions function as a subsidy to employment of the elderly, but its theoretical meaning is delicate[17]. In particular, this interpretation is difficult to understand how the subsidy is used by workers and/or firms. If it means a subsidy to firms paying wages, then pensions are supposed to have a positive effect on elderly employment[18]. But, pensions have a negative effect not only on the hourly wages of the elderly but also on their labor supply, as shown in Tables 4, 5 and 6. The bargaining model in this paper does not regard pensions as a subsidy, but simply a kind of non-labor income which makes the elderly prefer to more leisure and job investment. Note here that pensions have no effect to increase the social rent in equation (8) and, hence, to promote elderly employment. Thus our bargaining model can rationalize the negative effects of pensions on both labor supply and the hourly wages of the elderly.

Forth, Tables 4 and 5 show that the number of the income earners other than the elderly in their family, *n_earn*, plays an important role for the elderly in determining their labor supply. More specifically, it has a negative effect on wages and labor market participation, and their effects are statistically significant at the ordinary level of confidence. But the effect of *n_earn* on hours worked can not be ascertained statistically for both the early sixties and the latter. It is easily guessed that more income earners

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[16] The reduction scheme of the EPP was reformed in 1986、1989 and 1994, so as to mitigate the suppressive effect on labor supply of the elderly.

[17] See Tachibanaki and Shimono(1994), Ogawa(1998b)and Mitani(2001), for example.

[18] One of the reasons why they propose the subsidy hypothesis is that in the estimated equations of hours worked or labor supply *zirou_d* has a positive effect. But, as discussed above, *zairou_d* is endogenous.

decrease the economic need for the elderly to work and necessitates someone to devote solely to housework or at least not to need extra care. But it seems that *n_earn* has some effects which are different from the income effect of pensions. For example, a wife can easily obtain understanding of work from her working husband[19]. It is also interesting to find from Table 6 that the effect of *n_earn* on the hourly wage is negative and statistically significant at the 5% level for the early sixties. This can be interpreted as indicating that the elderly with other income earners invest in jobs to raise job satisfaction in the same way as pensions.

Fifth, as for the wage equations estimated by the Heckman's two-step estimation procedure in Tables 4, 5 and 6, the inverse Mills ratio defined as *lambda* is positive and statistically significant at the ordinary level of confidence for both the early and the latter sixties. This implies that the random term of the wage function is positively correlated with that of the selection equation because the wage level and the hourly wage are likely to be higher as the social rent is larger, as expected theoretically. In turn, *lambda* in the hours equations are positive but not statistically significant. Accordingly, it can be said that the selection bias is serious in the estimations of the wage functions while not in the hours equations.

Sixth, Tables 4 and 5 show that the experience of mandatory retirement, *m_retire*, has negative effects on wages, hours worked and labor supply of the elderly, among which those on wages and labor supply are statistically significant at the ordinary level of confidence. According to Table 6, it also decreases hourly wages, implying that its effect on hours worked is weaker than that on wages. In turn, as shown in Table 4 and 5, the dummy variable, *same_j*, which represents whether elderly employees work at the same occupation as their ages are 55, has positive effects on wages, and they are statistically significant at the 10% level. It is interesting that its effect on hours worked is positive for the early sixties while negative for the latter sixties. This may lead to the result that the positive effect of *same_j* on hourly wages of the latter sixties is statistically significant while that on the early sixties is not. That is, the early sixties who work at the same occupation as before earn more by working for a long hours and the latter sixties by high hourly rates.

Finally, workers' physical and economic conditions, which are shown by the dummy variables, i.e., *b_health* (taking 1 for the elderly in bad health and 0 otherwise), and *h_loan* (taking 1 for the elderly paying a house loan and 0 otherwise) have the expected effects on wages, hours worked and labor supply of the elderly which are

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[19] See Chuma(1991) for joint retirement decision of old couples in Japan.

consistent with the results of previous studies such as Seike(1993) and Higuchi and yamamoto(2002). In turn, the effects of *edu_cost* (taking 1 for the elderly bearing educational costs and 0 otherwise) are not clear except for the positive effect on wages. This seems to imply that the elderly do not play an important role to earn for educational costs in their family.

5 Determinants of Job Satisfaction

Work satisfaction of elderly employees depends on many factors such as the contents of a jobs, work circumstances, the human relation in their shop flour and the economic conditions, in addition to wages and hours of work. It is quite possible that as they become aged, they prefer short hours of work, jobs worth doing, good work circumstances and favorable human relations more, that is, job satisfaction becomes more important than wages for elderly employees. Among the factors affecting job satisfaction the determinants of hours of work were analyzed in the former section because hours of work are observable and explicitly related to the social rent and the wage in the model. In turn, the other factors such as the contents of a job, which can be improved by the job investment, are unobservable. Furthermore, job investment is also unobservable. Therefore, to test the implications of the model we will focus on job satisfaction which job investment affects.

The survey used in this paper asked to elderly employees how they are satisfied with work circumstances, the human relation in their work shop, the use of their ability and knowledge, work worth doing, hours of work and the wage level of their current job. They answered one out of the four choices; "very satisfied", "somewhat satisfied", "not too satisfied" and "not at all satisfied". Using the answers on these questions, this section will analyze the determinants of each satisfaction.

Table 7-1 and 7-2 indicate the results estimated by ordered probit models on satisfactions. The interesting findings can be summarized in the following way. First, the effect of the total amount of pensions on work satisfaction is positive and statistically significant at the 1% level of confidence except for satisfactions on wages and the use of ability and experience. These results are consistent with the implications of the bargaining model developed in this paper. That is, the elderly who receive higher pensions can obtain more job satisfaction by scarifying wages. They search for a more satisfying job and good human relation, or demand firms to invest more in their workplaces in compensation for lower wages. Based on equation 13, it is also possible that since they are not fully using their ability and experience on the current job, their wages are lower.

Second, according to Tables 7-1 and 7-2 the number of the income earners other than the elderly respondent plays an important effect on work satisfaction similarly to those of the pension. That is, it has generally a positive effect on work satisfaction although the positive effects on the human relation and the use of ability and experience are not statistically ascertained. In particular, it is interesting that the effect of *n_earn* on wage satisfaction is large and statistically significant at the 5% level of confidence while *pension* is not. This seems to imply that the elderly who live with more income earners have a higher acceptance level of wage to work and afford to search for a better job than those receiving high pensions, as far as they decide to participate in the labor market.

Third, Tables 7-1 and 7-2 indicate that the effects of the dummy variable showing the elderly employees who receive pensions form the EPP are generally negative and statistically significant at the 10% level of confidence on work satisfaction except on hours worked. One of the reasons is that in general the EPP pensioners receive lower pensions than the other. More specifically, from our data, the average amount of pensions of the EEP pensioners employed, including the ZAIROU, is about 146 thousand yen per month while the GMA pensioners is 219 thousand yen. A part of the effect of this difference seems to be captured by *EPP_d* although the amount of pension is controlled in the estimations. Another reason is that the EPP pensioners earn lower hourly wages than the other elder employees including non_pensioners, as was shown in Table 6. These factors make the EPP pensioners not only unsatisfied with wages but less invested in their jobs.

Forth, the need to pay house loan has negative effects on work satisfaction. Specifically, the effects on satisfaction concerning wages, hours of work and circumstances are statistically significant at the 5% level of confidence while those concerning the human relation, the use of ability and experience and work worth doing are not significant. As was shown in Tables 4 or 5, the elderly who have to pay house loan are more likely to participate in the labor markets and to work for a longer hours. It is possible that they are urged to earn more in order to pay house loan, and work even for a longer hours and in unfavorable circumstances. These make them feel dissatisfactions on wages, hours of work and circumstances. As for the effects of the educational costs we can expect that they are the same as those of house loan, but the obtained results are vague. This is probably due to that the role of the elderly whose ages are more than 60 is only to supplement the educational costs for grown-up or grandchildren and hence the need to earn more for educational costs seems to be not strong for them.

Fifth, as was indicated in Tables 4 or 5, the elderly who have a health problem are more likely to retire from the labor markets. Unfortunately, if they have to work for some reasons such as economic motives, their choice on work conditions must be quite limited and, accordingly, their work satisfaction becomes lower. Tables 7-1 and 7-2 show that the effects of *b_health* on work satisfaction are widely negative and statistically significant at the 5% level of confidence except for satisfaction on hours worked.

6 Conclusions

This paper attempted to analyze the effects of pension benefits, family conditions, and personal characteristics of the elderly on their labor supply, wages, hours of work and work satisfaction in the framework that the elderly and firms bargain over employment conditions including job investments. It was stressed in the analysis that as workers become aged, they come to put more priority on hours of work, work circumstances, the human relation in the workshop and the contents of a job rather than on wages, as far as their economic constraint allows. The main results obtained in this paper can be summarized as follows.

(1) It was shown that pensions and income earners other than the elderly in their family have an income effect not only to make hours of work shorter but to increase job investment for obtaining higher satisfaction on job characteristics. Evidence that pensions and other income earners have an effect to decrease hourly rates of wages can be interpreted as indicating that more job investment is bargained.

(2) Many previous studies have explained the suppressive effect of public pensions on labor supply, based on the reduction scheme of the Employees' Pension Plan, that is, the ZAIROU. However, as far as the elderly work under the application to the ZAIROU, not only their hours worked are longer than those of the recipients of the other pensions, but also the suppressive effect of the reduction scheme on hours worked can not be ascertained statistically. The ZAIROU is supposed to be applied if the elderly whose ages are from 60 to 64 work more than 3/4 of the normal hours. Therefore, there is a possibility that the elderly avoid the application to it by reducing hours worked. To ascertain this possibility the paper compared the suppressive effects of the EEP for the early and the latter sixties since the reduction scheme is less restrictive in the latter. In addition, it also focused on the effects of the Governmental Mutual Aid which do not reduce pensions at all even if its recipients work. Our results did not show any indication that the reduction scheme of the EEP is suppressive to labor supply of the elderly. That is, it seems that the suppressive effect of the reduction scheme had

disappeared by 2000.

(3) There is an interpretation that pensions work as a subsidy to employment. If this interpretation is correct, pensions should increase labor supply of the elderly and hence employment. But it was shown in this paper that pensions have a negative effect on labor supply while they decrease hourly wage rates. Pensions can be interpreted as a "subsidy" to the elderly to increase job satisfaction as well as the number of the income earners other than the elderly.

(4) The elderly who pay house loan work for a longer hours and earn more, but generally they are dissatisfied with wages, hours worked and job characteristics. It is also found that the elderly who have a health problem work at a lower wage and for a shorter hours while their work satisfaction is lower. These imply that those who are forced to work for some reasons in spite of bad health are likely to have dissatisfaction on their work.

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Table 1 Employed Pensioners of Early Sixties

unit: number（%）

Type of Pension	Employees' P.P	ZAIROU	National P. F.	Mutual Aid P.	Company P.P.	Private P.P.	Total (100%)
Employees' P.P.	654 (40.1%)	0	0	27 (1.7%)	80 (5.0%)	13 (0.8%)	774 (48.1%)
ZAIROU		315 (19.6%)	0	10 (0.6%)	51 (3.2%)	4 (0.2%)	380 (23.6%)
National P. Fund			55 (3.4%)	0	0	1 (0.0%)	56 (3.5%)
Mutual Aid P.				206(12.8%)	6 (0.4%)	1 (0.0%)	213 (13,2%)
Company P.P.					152 (9.5%)	8 (0.5%)	160 10.0%)
Private P.P.						25 (1.6%)	25 (1.6%)

Note 1: Each of the diagonal elements of the table shows the number(%) of pensioners receiving benefits onlty from the one coresponding plan and
the nondiagonal elements those receiving from the two plans.

Note 2: Emploees' Pension Plan includes plans for the injuried and the survivors, and Incumbent Pension Plan for those who postphone to receive benefits.
National Pension Fund excludes the pensioners receiving benefits from the other plans. Company Pension Plan stands for pension plans idiosyncratic
to companies, including retirement pensions. Workmen's compensations are included in Private Pension Plan.
The total number of the employed respondents of early sixties is 1,599, but there are 9 elders who receive benefits from three different types of
pensions among them. They are double counted in this cross table..

Table 2 Suppresive Effects of the Reduction Scheme
on Labor Supply of the Early Sixties

unit: number (%)

Answer	ZAIROU recepients	EPP recepients
I do not care it at all	186(76.5%)	183(28%)
I control hours and days of work	57(23.5%)	169(25.9%)
I do not work at all		301(46.1%)

Table3 Summary Statistics

Observation	The early sixties				The latter sixties			
Variable	Mean	Std. dev	Min.	Max	Mean	Std. dev	Min.	Max.
wage	16.06	15.19	0	166	10.88	11.71	0	125
hours	138.58	56.44	2	312	118.8	59.93	2	300
sex	0.621	0.485	0	1	0.678	0.467	0	1
age	61.92	1.420	60	64	66.80	1.401	65	69
tenure	14.77	13.89	0	49	13.73	14.06	0	53
school_u	0.112	0.315	0	1	0.134	0.341	0	1
school_j	0.422	0.494	0	1	0.468	0.499	0	1
b_health	0.196	0.397	0	1	0.232	0.422	0	1
m_retire	0.517	0.499	0	1	0.620	0.485	0	1
prof	0.013	0.117	0	1	0.009	0.095	0	1
manage	0.019	0.137	0	1	0.035	0.184	0	1
office	0.008	0.093	0	1	0.004	0.067	0	1
sale	0.021	0.143	0	1	0.021	0.146	0	1
service	0.009	0.094	0	1	0.009	0.095	0	1
maint	0.039	0.195	0	1	0.028	0.166	0	1
trans	0.053	0.225	0	1	0.038	0.191	0	1
commu	0.084	0.278	0	1	0.062	0.242	0	1
dig	0.019	0.139	0	1	0.026	0.160	0	1
agri	0.085	0.279	0	1	0.057	0.233	0	1
l_scale	0.065	0.247	0	1	0.029	0.170	0	1
g_scale	0.058	0.235	0	1	0.044	0.206	0	1
m_scale	0.133	0.340	0	1	0.098	0.297	0	1
h_loan	0.193	0.395	0	1	0.153	0.361	0	1
edu_cost	0.077	0.267	0	1	0.076	0.266	0	1
zairou_d	0.102	0.302	0	1				
kyou_d	0.096	0.295	0	1	0.144	0.351	0	1
pension	10.16	10.30	0	54	15.81	9.289	0	59
n_earn	1.318	0.940	0	5	1.384	0.974	0	5
zairou_d	0.102	0.303	0	1				
s_EPP_d	0.452	0.498						
EPP_d	0.530	0.499	0	1	0.622	0.627	0	1
GMA_d	0.095	0.294	0	1	0.132	0.338	0	1

Note1: The units of wage and pension are ten thousand yen, and those of tenure .
    and age are years.
Note2: The definitions of the variables which are not explained in the text are the
    following. school_u is the dummy variable taking 1for university graduates and
    the like, and school_j for junior high school graduates and the like, respectively.
    prof, manage, office, sale, service, maint, trans, commu, dig and agri are the.
    dummy variables representing occupations of old workers. Professional and
    technical work is abbreviated as prof, managerial as manage, security related as
    maint, transportation related as trans, communication as commu, mining as dig
    and agricultural as agri. The reference occupation is manufacturing work.
    l_scale and m_scale are the dummy variables showing the size of the private
    company at which each old worker is emplyed. L_scale represents the companies
    which employ more than 1,000 employees and m_scale the ones employing
    between 300 and 999 employees. g_scale shows governmental officers including .
    local. The reference group is the old workers who are employed at the
    small-scaled companies with employees less than 299.

Table 4
Determinants of Wages and Hours of Work of the Early Sixtes

equation	equation 1			equation 2			equation 3		
depend. va.	ln wage			ln_hours			ln_hours		
	Coef.	Std. Err.	P−value	Coef.	Std. Err.	P−value	Coef.	Std. Err.	P−value
sex	0.765	0.071	0.00	0.289	0.054	0.00	0.298	0.057	0.00
age	−0.019	0.014	0.17	−0.004	0.010	0.66	−0.010	0.010	0.33
tenure	0.011	0.001	0.00	0.004	0.001	0.00	0.006	0.001	0.00
b_health	−0.312	0.101	0.00	−0.213	0.078	0.01	−0.226	0.079	0.00
school_u	0.204	0.069	0.00	−0.117	0.050	0.02	−0.111	0.050	0.03
school_j	−0.068	0.045	0.13	0.036	0.033	0.27	0.031	0.033	0.35
m_retire	−0.288	0.096	0.00	−0.077	0.075	0.30	−0.096	0.076	0.21
same_j	0.096	0.043	0.02	0.060	0.038	0.11	0.091	0.039	0.02
prof	0.343	0.110	0.00	0.128	0.091	0.16	0.080	0.093	0.39
manage	0.410	0.129	0.00	−0.029	0.110	0.79	−0.044	0.114	0.70
office	0.199	0.129	0.13	−0.456	0.112	0.00	−0.456	0.116	0.00
sale	0.158	0.099	0.11	−0.195	0.086	0.02	−0.251	0.089	0.01
service	0.002	0.133	0.99	−0.047	0.117	0.69	−0.023	0.120	0.85
maint	0.404	0.070	0.00	0.136	0.060	0.02	0.149	0.062	0.02
trans	0.184	0.077	0.02	0.039	0.066	0.56	0.039	0.068	0.57
commu	0.063	0.061	0.30	0.054	0.053	0.31	0.052	0.055	0.35
dig	0.110	0.095	0.25	0.128	0.084	0.13	0.142	0.086	0.10
agri	0.239	0.055	0.00	0.034	0.048	0.48	0.033	0.050	0.51
public_scale	0.193	0.126	0.13	0.045	0.112	0.68	−0.054	0.116	0.64
l_scale	0.153	0.056	0.01	0.064	0.049	0.19	0.027	0.050	0.59
m_scale	0.147	0.042	0.00	0.049	0.036	0.17	0.061	0.037	0.10
h_loan	0.283	0.073	0.00	0.100	0.055	0.07	0.096	0.058	0.10
edu_cost	0.143	0.075	0.06	0.087	0.053	0.10	0.086	0.053	0.11
n_earn	−0.219	0.079	0.01	−0.065	0.062	0.30	−0.066	0.062	0.29
pension	−0.023	0.005	0.00	−0.015	0.004	0.00	−0.013	0.005	0.00
zairou_d	0.194	0.051	0.00	0.230	0.073	0.00			
cross_pz				0.005	0.004	0.23			
s_EPP_d	−0.250	0.041	0.00	−0.122	0.036	0.00			
EPP_d							0.034	0.043	0.43
GMA_d							0.183	0.100	0.07
_cons	3.103	0.873	0.00	4.899	0.621	0.00	5.181	0.642	0.00
selection									
sex	0.314	0.064	0.00				0.329	0.065	0.00
age	−0.004	0.020	0.85				−0.005	0.020	0.79
school_u	0.121	0.090	0.18				0.054	0.092	0.56
school_j	−0.020	0.059	0.73				0.002	0.060	0.97
b_health	−0.473	0.068	0.00	same as equation 1			−0.469	0.068	0.00
m_retire	−0.497	0.059	0.00				−0.501	0.059	0.00
h_loan	0.326	0.075	0.00				0.351	0.076	0.00
edu_cost	0.098	0.105	0.35				0.065	0.106	0.54
pension	−0.021	0.003	0.00				−0.026	0.004	0.00
n_earn	−0.413	0.029	0.00				−0.408	0.030	0.00
EPP_d							0.028	0.082	0.73
GMA_d							0.485	0.125	0.00
_cons	1.432	1.205	0.24				1.500	1.219	0.22
lambda	0.857	0.345	0.01	0.195	0.280	0.49	0.203	0.281	0.47
Wald chi2	1198.42			749.40			650.88		

Number of obs = 2544, Censored obs. = 987, Uncensored obs> = 1557
Note: Although the estimated results are not reported in the table for saving space, industry dummies are used in estmating wage and hours equattions but seclection.

Table 5
Determinats of Wages and Hours of Work of the Latter Sixties

equation	equation 4			equation 5			equation 6		
depend. va.	ln_wage			ln_hours			ln_hours		
	Coef.	Std. Err.	P−value	Coef.	Std. Err.	P−value	Coef.	Std. Err.	P−value
sex	0.856	0.121	0.00	0.364	0.089	0.00	0.364	0.089	0.00
age	−0.031	0.026	0.23	−0.023	0.019	0.23	−0.023	0.018	0.21
tenure	0.013	0.002	0.00	0.010	0.002	0.00	0.010	0.002	0.00
b_health	−0.490	0.197	0.01	−0.225	0.148	0.13	−0.215	0.147	0.15
school_u	0.290	0.115	0.01	0.055	0.086	0.52	0.053	0.085	0.53
school_j	0.113	0.120	0.35	0.069	0.088	0.43	0.063	0.088	0.48
m_retire	−0.282	0.106	0.01	−0.123	0.079	0.12	−0.125	0.078	0.11
same_j	0.132	0.067	0.05	−0.009	0.057	0.87	−0.006	0.057	0.92
prof	0.510	0.198	0.01	0.164	0.168	0.33	0.156	0.168	0.35
manage	0.703	0.157	0.00	0.279	0.138	0.04	0.272	0.139	0.05
office	0.262	0.249	0.29	0.000	0.219	1.00	−0.014	0.219	0.95
sale	0.329	0.154	0.03	−0.664	0.130	0.00	−0.677	0.131	0.00
service	−0.391	0.207	0.06	−1.079	0.179	0.00	−1.075	0.179	0.00
maint	0.480	0.122	0.00	0.248	0.105	0.02	0.245	0.105	0.02
trans	0.108	0.134	0.42	0.215	0.113	0.06	0.207	0.113	0.07
commu	0.069	0.103	0.50	0.135	0.087	0.12	0.135	0.087	0.12
dig	0.306	0.137	0.03	0.259	0.116	0.03	0.256	0.116	0.03
agri	0.399	0.098	0.00	0.116	0.083	0.16	0.104	0.084	0.22
public_scal	−0.500	0.200	0.01	−0.425	0.167	0.01	−0.441	0.168	0.01
l_scale	0.029	0.121	0.81	0.098	0.103	0.34	0.096	0.103	0.35
m_scale	0.078	0.073	0.28	0.050	0.062	0.41	0.056	0.062	0.37
h_loan	0.345	0.177	0.05	0.268	0.130	0.04	0.259	0.129	0.05
edu_cost	0.267	0.160	0.10	0.139	0.115	0.23	0.137	0.114	0.23
n_earn	−0.317	0.169	0.06	−0.159	0.126	0.21	−0.152	0.126	0.23
pension	−0.020	0.009	0.03	−0.014	0.007	0.04	−0.015	0.007	0.03
EPP_d	−0.122	0.062	0.05	−0.117	0.046	0.01	−0.072	0.068	0.29
GMA_d							0.123	0.134	0.36
_cons	3.472	1.756	0.05	5.895	1.281	0.00	5.946	1.271	0.00
select									
sex	0.273	0.083	0.00						
age	0.024	0.024	0.31						
school_u	−0.003	0.106	0.98						
school_j	0.274	0.076	0.00						
b_health	−0.525	0.079	0.00						
m_retire	−0.223	0.074	0.00	same as equation 4			same as equation 4		
h_loan	0.507	0.097	0.00						
edu_cost	0.308	0.139	0.03						
pension	−0.025	0.005	0.00						
n_earn	−0.485	0.036	0.00						
EPP_d	−0.102	0.092	0.27						
GMA_d	−0.056	0.180	0.76						
_cons	−0.615	1.576	0.70						
lambda	1.125	0.571	0.05	0.533	0.434	0.22	0.505	0.432	0.24
Wald chi2	569.75			518.13					

Number of obs = 1665, Censored obs = 856, Uncensored obs. = 809
Note: see the note in Table 4.

Table 6
Determinats of Hourly Wage Rates

equation	equation 7			equation 8		
object	early sixties			latter sixties		
	Coef.	Std. Err.	P−value	Coef.	Std. Err.	P−value
sex	0.461	0.059	0.00	0.492	0.075	0.00
age	−0.014	0.011	0.22	−0.008	0.016	0.60
tenure	0.006	0.001	0.00	0.003	0.002	0.08
b_health	−0.074	0.080	0.36	−0.268	0.123	0.03
school_u	0.296	0.054	0.00	0.236	0.072	0.00
school_j	−0.097	0.036	0.01	0.045	0.074	0.54
m_retire	−0.182	0.078	0.02	−0.158	0.066	0.02
same_j	0.034	0.037	0.36	0.141	0.045	0.00
prof	0.222	0.093	0.02	0.348	0.131	0.01
manage	0.447	0.111	0.00	0.426	0.106	0.00
office	0.652	0.112	0.00	0.266	0.168	0.11
sale	0.367	0.086	0.00	0.997	0.102	0.00
service	0.052	0.115	0.65	0.687	0.138	0.00
maint	0.264	0.060	0.00	0.233	0.081	0.00
trans	0.148	0.066	0.02	−0.104	0.089	0.24
commu	0.004	0.053	0.95	−0.065	0.068	0.34
dig	−0.016	0.083	0.84	0.048	0.091	0.60
agri	0.207	0.047	0.00	0.286	0.065	0.00
public_scale	0.140	0.058	0.02	−0.071	0.132	0.59
l_scale	0.091	0.048	0.06	−0.068	0.080	0.39
m_scale	0.096	0.036	0.01	0.026	0.048	0.59
h_loan	0.173	0.061	0.00	0.080	0.110	0.47
edu_cost	0.050	0.059	0.40	0.129	0.098	0.19
n_earn	−0.131	0.063	0.04	−0.160	0.106	0.13
pension	−0.008	0.005	0.07	−0.006	0.006	0.32
zairou_d	−0.122	0.053	0.02			
s_EPP_d	−0.133	0.044	0.00			
EEP_d				−0.018	0.059	0.76
GMA_d	0.071	0.099	0.47	−0.035	0.115	0.76
_cons	−1.840	0.696	0.01	−2.438	1.084	0.03
select						
sex	0.329	0.065	0.00	0.273	0.083	0.00
age	−0.005	0.020	0.79	0.024	0.024	0.31
school_u	0.054	0.092	0.56	−0.003	0.106	0.98
school_j	0.002	0.060	0.97	0.274	0.076	0.00
b_health	−0.469	0.068	0.00	−0.525	0.079	0.00
m_retire	−0.501	0.059	0.00	−0.223	0.074	0.00
h_loan	0.351	0.076	0.00	0.507	0.097	0.00
edu_cost	0.065	0.106	0.54	0.308	0.139	0.03
pension	−0.026	0.004	0.00	−0.025	0.005	0.00
n_earn	−0.408	0.030	0.00	−0.485	0.036	0.00
EEP_d	0.028	0.082	0.73	−0.102	0.092	0.27
MGA_d	0.485	0.125	0.00	−0.056	0.180	0.76
_cons	1.500	1.219	0.22	−0.615	1.576	0.70
lambda	0.559	0.280	0.04	0.600	0.359	0.09
Wald chi2	966.3			705.61		
	Number of obs = 2544			Nm. of obs = 1665		
	Censored obs = 987			Cencored obs = 856		
	Uncensored obs = 1557			Uncensored obs. = 809		

Note: see the note in Table 4.

Table 7-1 Analysis of Work Satisfaction - Ordered Probit Models -

equation	equation 9			equation 10			equation 11		
depnd. va.	satis. on wages			satis. on hours worked			satis. on circumstances		
	Coef.	Std. Err.	P-value	Coef.	Std. Err.	P-value	Coef.	Std. Err.	P-value
sex	−0.104	0.060	0.08	−0.124	0.064	0.05	−0.152	0.064	0.02
age	0.034	0.009	0.00	0.001	0.010	0.91	0.000	0.010	0.99
tenure	0.001	0.002	0.66	0.002	0.002	0.32	0.003	0.002	0.15
b_health	−0.135	0.062	0.03	−0.104	0.065	0.11	−0.248	0.064	0.00
school_j	0.103	0.078	0.19	0.019	0.082	0.82	0.071	0.081	0.38
school_u	0.063	0.053	0.24	0.060	0.056	0.28	−0.010	0.055	0.85
m_retire	−0.044	0.053	0.41	0.005	0.056	0.92	−0.037	0.055	0.51
same_j	−0.026	0.060	0.67	−0.005	0.063	0.94	−0.092	0.063	0.14
prof	0.173	0.154	0.26	0.096	0.163	0.55	0.261	0.162	0.11
manage	0.418	0.162	0.01	0.193	0.169	0.25	0.374	0.167	0.03
office	0.406	0.195	0.04	0.532	0.208	0.01	0.437	0.203	0.03
sale	0.535	0.137	0.00	0.195	0.145	0.18	0.358	0.143	0.01
service	0.053	0.187	0.78	0.362	0.196	0.06	0.333	0.196	0.09
maint	0.372	0.100	0.00	0.147	0.106	0.17	0.411	0.105	0.00
trans	0.168	0.110	0.13	0.074	0.116	0.52	0.091	0.116	0.43
commu	−0.095	0.087	0.27	−0.119	0.091	0.19	−0.088	0.091	0.33
dig	−0.209	0.128	0.10	−0.347	0.134	0.01	0.175	0.133	0.19
g_scale	0.106	0.085	0.21	0.136	0.090	0.13	0.160	0.089	0.07
m_scale	0.030	0.060	0.61	0.039	0.063	0.54	0.058	0.063	0.36
h_loan	−0.106	0.057	0.06	−0.131	0.060	0.03	−0.129	0.059	0.03
edu_cost	−0.059	0.083	0.47	0.086	0.087	0.32	−0.114	0.085	0.18
n_earn	0.062	0.027	0.02	0.113	0.028	0.00	0.046	0.028	0.10
pension	0.004	0.003	0.20	0.011	0.003	0.00	0.014	0.003	0.00
EPP_d	−0.104	0.055	0.06	−0.016	0.058	0.78	−0.111	0.058	0.05
cross_zai	−0.150	0.081	0.07	−0.005	0.086	0.95	−0.154	0.085	0.07
Num. of obs	2367			2360			2352		
Log Likelihood	−3029			−2468			2567		
Pseudo R2	0.021			0.020			0.032		

Note: Industry dummies are used for estimations, but most of them are not statistically significant at the 10% level of confidence.

Table 7-2 Analysis of Work Satisfaction - Ordered Probit Models -

equation	equation 12			equation 13			equation 14		
depnd. va.	satis. on human relation			satis. on use of exp.			satis. on worth doing		
	Coef.	Std. Err.	P-value	Coef.	Std. Err.	P-value	Coef.	Std. Err.	P-value
sex	−0.169	0.064	0.01	−0.010	0.063	0.87	−0.119	0.063	0.06
age	0.012	0.010	0.23	0.018	0.010	0.07	0.022	0.010	0.02
tenure	0.003	0.002	0.19	0.002	0.002	0.20	0.002	0.002	0.32
b_health	−0.275	0.065	0.00	−0.182	0.065	0.01	−0.276	0.064	0.00
school_j	0.048	0.081	0.56	−0.078	0.080	0.33	−0.025	0.080	0.75
school_u	−0.056	0.055	0.31	−0.020	0.055	0.71	−0.061	0.055	0.26
m_retire	0.002	0.056	0.97	0.021	0.056	0.71	−0.042	0.055	0.45
same_j	−0.107	0.063	0.09	0.016	0.062	0.80	−0.091	0.062	0.14
prof	0.153	0.164	0.35	0.385	0.159	0.02	0.460	0.159	0.00
manage	0.275	0.169	0.10	0.524	0.170	0.00	0.824	0.169	0.00
office	0.391	0.206	0.06	0.598	0.205	0.00	0.595	0.203	0.00
sale	0.215	0.143	0.13	0.647	0.141	0.00	0.646	0.141	0.00
service	0.536	0.199	0.01	0.809	0.196	0.00	0.791	0.195	0.00
maint	0.196	0.104	0.06	0.249	0.104	0.02	0.157	0.102	0.12
trans	0.089	0.116	0.44	0.056	0.115	0.63	0.177	0.114	0.12
commu	−0.083	0.091	0.36	−0.079	0.091	0.38	−0.099	0.090	0.27
dig	0.044	0.134	0.74	−0.305	0.134	0.02	−0.080	0.131	0.54
agri	0.311	0.084	0.00	0.315	0.083	0.00	0.276	0.083	0.00
g_scale	0.070	0.089	0.43	0.165	0.088	0.06	0.080	0.088	0.36
m_scale	0.011	0.063	0.86	−0.002	0.062	0.98	0.039	0.062	0.53
h_loan	−0.032	0.059	0.59	−0.053	0.059	0.37	−0.008	0.058	0.89
edu_cost	−0.138	0.086	0.11	0.027	0.085	0.75	−0.053	0.085	0.53
n_earn	0.041	0.028	0.14	−0.007	0.028	0.80	0.070	0.028	0.01
pension	0.011	0.003	0.00	0.001	0.003	0.84	0.007	0.003	0.03
EPP_d	−0.098	0.058	0.09	−0.118	0.057	0.04	−0.111	0.057	0.05
cross_zai	0.031	0.085	0.71	0.019	0.085	0.82	0.087	0.084	0.30
Num. of obs	2350			2359			2360		
Log Likelihood	−2580			−2622			−2708		
Pseudo R2	0.024			0.025			0.032		

Note: See the note in Table 7-1

Figure 1 Distributions of Monthly Hours Worked