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## 社会経済変化に対応する公的年金制度のあり方に関する実証研究

平成13年度 総括・分担研究報告書

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厚生科学研究費補助金政策科学推進研究事業  
「社会経済変化に対応する公的年金制度のあり方に関する実証研究」  
総括研究報告書

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### 研究要旨

今年度の研究から得られた知見は以下の通りである。第1に、既存研究サーベイからは、公的年金制度改革の方向性については議論に共通点が多いものの、給付削減をどの部分から実施するかという問題については議論が一致していないことが明らかになった。第2に、高齢者の労働供給を内生化したモデルによるシミュレーションでは、支給開始年齢の引き上げによって高齢者の就業を促進することは可能とみられるが、それが年金財政に及ぼすプラス効果は限定的であり、給付水準の切り下げのほうが直接的な効果を期待しうることが明らかになった。第3に、年金数理モデルによる分析では、非正規雇用の労働者の待遇を年金制度まで考慮に入れた形で緊急に考察する必要があることが明らかになった。第4に、女性と年金に関するアンケート調査からは、女性の公的年金制度への未加入に関して就業状態との関係が深いことが明らかになった。

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と所得保障のあり方に関する研究」、②「就労形態の変化に対応した社会保険制度設計のための実情把握と分析」、③「未納・未加入と無年金との関係に関する研究」、④「女性のライフスタイルの変化に対応した社会保険制度のあり方に関する研究」。

### B 研究方法

いずれの研究課題についても、初年度は既存研究サーベイを実施するとともに、指定・承認統計等の個票データを用い、経済学的手法を用いて個人の行動を実証的に分析する。

(倫理面への配慮)

マイクロデータを使用の際には、個人情報保護に留意し、流出のないように細心の配慮をする。

### A 研究目的

本研究は、社会経済環境の変化が公的年金制度にもたらしている影響の実態把握を行うとともに、その要因を分析し、今後の政策対応のための基盤となることを目的とする。具体的な研究課題は次の4つである：①「公的年金が労働供給に及ぼす影響

## C 研究結果

全ての課題との関連で、公的年金に関する先行研究サーベイをとりまとめ、『季刊社会保障研究』の特集として刊行した。

①「公的年金が労働供給に及ぼす影響と所得保障のあり方に関する研究」高齢期の就業・引退行動について既存のマクロデータから可能な限りパネル的データを復元し、支給開始年齢の引き上げや給付切り下げが高齢者の引退率に及ぼす影響をマイクロシミュレーションした。60歳代前半層においては、公的年金や失業給付が強い就業抑制効果を持つことが明らかになった。2000年の年金制度改革が完全に実施された場合、厚生年金被保険者に関しては、低所得層における年金額の減額が一層厳しいことも明らかになった。

②「就労形態の変化に対応した社会保険制度設計のための実情把握と分析」所得階層間の再分配効果が測定可能な年金数理モデルを作成し、これにマクロデータである人口データ、学歴別（所得階層の代理変数）就業率や賃金等を用いて所得の再分配効果を測定した。その結果、非正規雇用の労働者の待遇を年金制度まで考慮に入れた形で緊急に考察する必要があることが明らかになった。

③「未納・未加入と無年金との関係に関する研究」『ライフスタイルと年金に関するアンケート調査』を行い、その結果を用いて、女性がライフサイクルを通じてどのように公的年金と関わっているかを特に公的年金未加入・加入に着目して初期的な分析を行った。初期的な分析の結果では、女性の未加入・加入行動については、主に年齢

効果は検証されるものの世代効果は検証されなかった。

④「女性のライフスタイルの変化に対応した社会保険制度のあり方に関する研究」女性のライフスタイルによって将来の年金受給額にどのような格差が生じるかを、個人および世帯間で比較・把握するため、アンケート調査を実施した。女性の年金に関する意識としては、結婚年数に応じた年金分割を支持しており、結婚期間中に稼得された夫の所得（あるいは年金）について、妻の家事労働の貢献に応じた分配がなされるべきだという意識があるのだと考えられる。

## D 考察

社会経済環境の変化に対応する公的年金制度の設計に当たっては、分配面への影響も考慮する必要がある。また、改革が効果をもつためには、単に公的年金制度の枠内にとどまらず、他の社会保障プログラムとの関連が重要であることが明らかになった。

## E 結論

シミュレーションからは、支給開始年齢の引き上げによって高齢者の就業を促進されることが明らかになったが、それが年金財政に及ぼすプラス効果は限定的である。むしろ給付水準の切り下げのほうが直接的な効果を期待しうることがわかった。

また、年金制度がもつ分配的な効果の重要性も明らかになった。女性のライフスタイルの多様化や非正規雇用者の増加など、家族構造や就労形態の変化は、当初の制度が想定していなかった分配的な影響を及ぼしつつある。

## F 健康危険情報

なし

## G 研究発表

### 1. 論文発表

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岩本康志・大竹文雄・小塩隆士(2002)「学界展望：年金研究の現在」『季刊社会保障研究』第37巻第4号,316-349.

菊池馨実(2002)「法学からみた年金研究の現在」『季刊社会保障研究』第37巻第4号,350-359.

### 2. 学会発表

Akiko Oishi and Takashi Oshio (2001) “Financial Implications of Social Security Reforms in Japan,” paper presented at the NBER Workshop on the International Social Security, September 6-8, 2001, in San Sebastian, Spain.

## H 知的所有権の出願・登録状況

### 1. 特許取得

なし

### 2. 実用新案登録

なし

### 3. その他

なし

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「社会経済変化に対応する公的年金制度のあり方に関する実証研究」  
分担研究報告書

公的年金が労働供給に及ぼす影響と所得保障のあり方に関する研究

分析1：Social Security and Retirement in Japan

分析2：Financial Implications of Social Security Reforms in Japan

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## 研究要旨

公的年金など社会保障給付が高齢者の引退行動に与える影響を各種の年金制度改革との関連で分析し（分析1）、制度改革が年金財政に及ぼす影響を分配面への影響を含めてシミュレーションした（分析2）。60歳代前半層においては、公的年金や失業給付が強い就業抑制効果を持つことが明らかになった。2000年の年金制度改革が完全に実施された場合、厚生年金被保険者に関しては、低所得層における年金額の減額が一層厳しいことも明らかになった。

### A 研究目的

本研究の目的は、公的年金や失業給付、高年齢者雇用継続給付や在職老齢年金制度など、高齢期の就業を左右する社会保障制度が引退行動に及ぼす影響を実証的に把握するとともに、各種制度改革の財政面および分配面への影響を予測することにある。

### B 研究方法

『高年齢者就業実態調査』1996年のマイクロデータに基づき、個々の労働者の社会保障資産額を推計し、その引退行動との関連を計量分析により把握する。

（倫理面への配慮）

マイクロデータを使用の際には、個人情報流出のないように細心の配慮をする。

### C 研究結果

本研究から以下のことが明らかになった。

- 社会保障資産は60歳でピークに達し、それ以降、急速に減少する。このため60歳以降の継続就業に強いディスインセンティブを与えている。
- 60歳直前の賃金にリンクしている失業給付は、65歳以降の就業にとくに強いディスインセンティブをもっている。
- 2000年の年金制度改革が完全に実施された場合、厚生年金被保険者に関しては、低所得層における年金額の減額が一層厳しい。
- 支給開始年齢の引き上げによって高齢期の就業は促進されるが、それが年金財政に及ぼすプラスの影響は限定的である。むしろ、給付水準の切り下げによる年金財政の改善効果のほうが大き

い。

Workshop on the International Social Security, September 6-8, 2001, in San Sebastian, Spain.

#### D 考察

高齢期の就業・引退行動は公的年金給付など社会保障給付からの経済的インセンティブに影響されている。各種の年金制度改革によってこうした高齢者就業を促進することは可能であるが、それらの改革の分配面への影響も考慮する必要がある。

#### E 結論

支給開始年齢の引き上げによって高齢者の就業を促進することは可能とみられるが、それが年金財政に及ぼすプラス効果は限定的である。むしろ給付水準の切り下げのほうが直接的な効果を期待しうる。

分配的な面では、支給開始年齢の引き上げは実質的に厚生年金の定額部分のウェートを引き下げることを意味し、低所得層に厳しい。他方、高所得層は支給開始年齢の引き上げによって拠出期間や標準報酬を高めることが可能となるため、給付水準切り下げのマイナス効果を相殺することが可能となる。

#### F 健康危険情報

なし

#### G 研究発表

##### 1. 論文発表

なし

##### 2. 学会発表

Akiko Oishi and Takashi Oshio  
(2001) "Financial Implications of Social Security Reforms in Japan,"  
paper presented at the NBER

#### H 知的所有権の出願・登録状況

##### 1. 特許取得

なし

##### 2. 実用新案登録

なし

##### 3. その他

なし



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「社会経済変化に対応する公的年金制度のあり方に関する実証研究」

**Social Security and Retirement in Japan: An Evaluation Using Micro-Data\***

March 31, 2002

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\* 本論文は Oishi and Oshio(2000)を大幅に改稿したものである。

## 1. Introduction

The main purpose of this paper is to analyze empirically the impact of social security incentives on retirement decisions of older employees. The more elderly people stay in the labor market, the less the demographic pressures social security programs will have to struggle with. Estimation and simulation results in this paper will provide microeconomic foundations for the impact analysis that is crucial to discussions about pension reforms.

Japan is now facing a very rapid population aging. The share of people aged 65 years or above of total population was 16.2 percent in 1998, roughly the OECD average. Looking forward, however, the share of elderly people is expected to grow faster than in any other advanced country, reflecting a very low fertility rate which dropped to 1.34 in 1999. Indeed, the National Institute of Population and Social Security Research (NIPSSR) revised down its population projections in 1997. In its new "middle" projection, the NIPSSR assumes that the fertility rate would return to only 1.61 by 2050 -- a much more conservative figure than the previously assumed 1.80. The NIPSSR also projects that the share of people aged 65 or above would grow to 27.4 percent in 2025 and 32.3 percent in 2050. Many analysts, however, argue that NIPSSR's "pessimistic" scenario, which assumes that the fertility rate would remain as low as 1.38 even in 2050, seems to be more plausible. If this were the case, the pace of population aging would be more dramatic than is now widely anticipated.

Rapid population is a big challenge to Japan's long-term fiscal strategy. Social security expenditures including public pensions, health care, and social welfare benefits amounted to 69.4 trillion yen in 1997, equivalent to 17.8 percent of national income. Public pension benefits were 36.4 trillion yen, covering 52.4 percent of overall social security expenditures. It is likely that social security expenditures will grow substantially over the coming decades. The most recent official projection, released by the Ministry of Health and Welfare in 1998, expects social security expenditures to grow to a level of 33.5 percent of national income by 2025, assuming no change in the current social security programs.

The public pension system is the major determinant of the long-term trend in social security expenditures and fiscal balances beyond 2000. As in other industrialized countries, public pension insolvency is now one of the most serious challenges that an aging society poses to the Japanese economy. The Ministry of Health and Welfare estimates unfunded liabilities to be about 490 trillion yen -- almost equivalent to nominal GDP -- at the end of fiscal year 1999. And policy simulations conducted by the Economic Planning Agency (Yashiro *et al.* (1997)) project the public pension fund will be exhausted by 2040 if the current system is not changed. In addition, the newly introduced corporate accounting system, which became effective as of April 2000, will likely reveal substantial under-funding in corporate pensions and probably also make their reform inevitable.

It is important to understand retirement incentive effects in order to assess the economic impact of pension reforms. The labor force participation rate in Japan is

much higher than in other advanced countries: 74.8 percent for men aged 60-64 and 40.1 percent for women aged 60-64 in 1998 according to the Labor Force Survey. However, increasing social security benefits have been reducing labor force participation over the past few decades, even allowing for cyclical swings.<sup>1</sup> Moreover, various cross-sectional studies have found that the existing pension scheme tends to reduce the incentive to work for elderly people (see Section 3). It is widely recognized that an earnings-tested pension program, called the *Zaishoku Pension*, tends to discourage the elderly from working.

Retirement incentive effects will also be potentially critical for Japan's economic growth and the financial position of the public pension, since postwar baby-boomers will become eligible for public pension benefits in the next few years. With the total labor force diminishing due to a very low fertility rate, Japan's growth potential will depend much on labor force participation from the elderly. In addition, the sensitivity to social security provisions of the elderly is likely to increase in the long run, reflecting two factors. First, the shares of self-employed and agricultural workers who are less sensitive to social security programs are likely to keep declining, reflecting structural change in the Japanese economy. Second, more women will likely enter labor force and become eligible for employees' pension benefits.

The structure of this paper is as follows. Section 2 reviews the institutional background, laying out the retirement policy landscape in Japan and setting out the relevant sources of income support for the elderly. Section 3 provides the research background, with a brief review of previous studies on this topic in Japan. Section 4 sets out the data on which our estimation and simulation is based. Section 5 constructs earnings' histories and projections from our data, and Section 6 sets up incentive measures (benefit accrual, option value, and peak value). Section 7 estimates the impact of incentive measures on retirement, and Section 8 summarizes estimation results. Section 9 conducts policy simulations based on the estimated models. Section 10 concludes the paper.

## **2. Institutional Background**

### **2.1 The Retirement policy landscape**

This section describes the retirement policy scheme as it existed for the years used in our analysis. Japan's public pensions operate a two-tier system: one pays flat-rate Basic Pension (*Kiso Nenkin*) benefits to all residents including the self-employed and unpaid family workers; the other pays earnings-related benefits only for private and public employees.<sup>2</sup> Employees thus receive two forms of pension benefits: Basic Pension benefits and earning-related benefits. This Basic Pension, which is mainly for non-employees, has little impact on retirement decisions because its benefits are relatively small and subject to no earnings criterion. The eligibility age of full Basic Pension benefits is 65 years old, with no earnings test. It incorporates a flat-tax and flat-benefit structure, and it is organized on an individual unit basis.<sup>3</sup>

The principal program for private sector employees is the *Kosei-Nenkin-Hoken*

(KNH), which covers about 85 percent of all employees. Government employees, private school teachers, and employees in agriculture/forestry/fishing organizations are covered by special programs provided by *Kyosai-Kumiai* (mutual aid associations), but those programs have almost the same structure as the KNH. Thus our analysis of public pensions in this paper mainly focuses on the KNH, and treats *Kyosai-Kumiai* members as KNH members. In what follows, we provide brief descriptions of the KNH as well as other incomes support for elderly employees -- including *Zaishoku Pension*, Unemployment Insurance, and Wage Subsidy.

#### **a. Kosei-Nenkin-Hoken (KNH)**

Under the KNH scheme, an individual's benefits are calculated according to the following steps. First, an individual's monthly wage (excluding semi-annual bonus payments) is converted into the "standard monthly earnings," and graded into one of thirty levels. Second, the "career average monthly earnings" are calculated over his/her entire period of coverage (up to age 64), adjusted by wage income growth and converted into the current earnings level. Finally, benefits are calculated as the "career average monthly earnings" \* the number of contribution years \* 0.0075 (the accrual rate). For instance, 40-year contributors will earn 30 percent of the career average monthly earnings. In addition, benefits are inflation-indexed every year in terms of consumer prices, and adjusted for net-wages every five years.

The normal eligibility age for full KNH benefits is currently 60, with some exceptions,<sup>4</sup> while it is scheduled to increase gradually to 65 from 2001. A male KNH recipient currently gets both the full Basic Pension and earnings-related benefits at age 60.<sup>5</sup> In addition, his dependent wife (full-time housewife) can get her Basic Pension benefit with no contribution when she becomes 65. Thus, total benefits that a typical couple receives are two Basic Pension benefits (for the husband and wife) plus earnings-related benefits (for the husband), which in total replace slightly less than 70 percent of average monthly earnings -- for about 50 percent of average annual wages including bonus payments -- of currently active male workers. Between the ages of 60 and 64, one can get partial pension benefits (*Zaishoku*, see below) with an earnings test if one chooses to keep working. Beyond 65, one gets full pension benefits without any earnings test, while one has the option of delaying the receipt of pension benefits with some actuarial adjustment. In addition, survivors' benefits are available, but our analysis neglects them for simplicity.

Contributions are based on the employee's monthly standard earnings and shared equally by the employee and employer. The total contribution rate for KNH and Basic Pension is currently 17.35 percent, meaning that an employee and employer contribute 8.675 percent each. A female employee pays premiums at the same contribution rate, while a dependent housewife does not need to contribute.

#### **b. Zaishoku Pension (Earnings-tested KNH for elderly workers)**

The *Zaishoku Pension*, which is a part of the KNH scheme, is a partial and earnings-tested pension for employees. On reaching age 60, and until age 64, a KNH

recipient who keeps working can receive reduced KNH benefits subject to an earnings test. This scheme is roughly equivalent to the early retirement system in many other OECD countries. The formula of the *Zaishoku Pension* is summarized as follows. If an individual earns even a small wage, benefits are reduced by 20 percent. If earnings are above 220,000 yen per month, benefits are reduced by one yen for each additional two yen increment in wages: that is, the marginal tax rate is 50 percent. If earnings are above 340,000 yen, benefits are reduced by the same amount of additional wage earnings: that is, the marginal tax rate is 100 percent. One of the key elements of the 1994 Reform Act was to make the formula of the *Zaishoku Pension* more favorable to elderly. Also note that one has to pay KNH contributions as long as he/she keeps working, though he/she can expect an increase in future pension benefits.

### **c. Unemployment insurance**

Unemployment insurance adds temporary income support to retired employees. In many cases, an individual who reaches age 60 leaves the firm where he/she has been working, and starts to receive KNH benefits. At the same time, it is normal to apply for UI benefits when quitting one's previous job, regardless of one's wish to find a new job. UI benefits for those of age 60 to 64 replace 50-80 percent of wage earnings at age 60 for 300 days at most. Thus, there are many cases in which the total replacement rate -- adding KNH and UI benefits together -- is effectively more than 100 percent of income at the first retirement age, probably reducing the incentive to work. And many people tend to stay out of the labor force after receiving UI benefits, meaning that UI is used now in a way far from what was originally conceived (see Yashiro and Nikami (1996)). Under a new law effective as of April 1998, however, an individual cannot receive UI and KNH benefits at the same time: as long as one is receiving UI benefits, one has to postpone receipt of KNH benefits.

### **d. Wage subsidy for elderly workers**

Another income support that potentially interacts with public pension programs is the wage subsidy to elderly workers (referred to as WS below). This program was introduced in 1994 as a part of the public employment insurance scheme to replace the aforementioned UI benefits, which are considered to work ineffectively for elderly workers. WS equivalent to 25 percent of the current wage is provided to an employee -- subject to a certain wage ceiling -- on condition that he/she is 60-64 years old and his/her wage earnings are less than 85 percent lower than his/her pre-retirement wage at age 60.

This WS program is independent from the public pension scheme, but its economic implications are similar to those of the *Zaishoku Pension*. Both programs are applicable to the same age group (aged 60-64) and subject to certain earnings criteria. The WS can be treated as a "negative" premium in calculating social security incentives. The WS equivalent to 25 percent of wage earnings well exceeds the employee's share of KNH contributions (8.675 percent). The combination of the WS and pension premium thus would add to an individual's net pension wealth, although it

may not be enough to offset the negative effect from postponing receipt of pension benefits.

#### **e. Disability Pension**

The disability pension, unlike in some European countries, is not used as interim income support for elderly workers who are on the path to retirement. The disability pension is strictly for those who are physically unable to work. Benefits are calculated in almost in the same way as those of KNH, while additional benefits of 25 percent are given to those who are categorized as having more serious disabilities.

The eligibility conditions for the disability pension are generally strict: most disabilities must originate from injuries, which prevent disability pension benefits being used as a source for financing earlier retirement in Japan. There are about 285 thousand recipients of the disability pension, covering only three percent of total old-age pension recipients. Thus, the disability pension will be neglected in our social security incentive calculations.

#### **f. Employer-provided pension**

In addition to public pension benefits and other income support, employer-provided pension programs -- the *Kosei-Nenkin-Kikin* (Employees' Pension Fund) and Tax-Qualified Plans -- cover about two-thirds of KNH participants. Employees can choose lump-sum retirement benefits and/or annuities at retirement. In the case of the KNK, about 40 percent of recipients choose lump-sum benefits, 55 percent choose annuities, and 5 percent choose both in 1996. Benefits of employer-provided pensions are paid on top of public pension benefits, reflecting additional contributions that have been paid in addition to KNH premiums until retirement. In the model case of KNK, benefits from employer-provided pensions are assumed to be equivalent to about 27 percent of KNH benefits for each couple. Lump-sum retirement benefits vary substantially by firm size and tenure, but they are at a level of 20-30 million yen in the case of average employees in large firms.

These employer-provided pension and lump-sum retirement benefits work differently from public pension benefits. Their payments are closely linked to "mandatory retirement"<sup>6</sup> at age 60, regardless of an employee's working status after that age. In fact, these benefits add to the incomes of an individual -- wages, pension, and others -- after the mandatory retirement, and increase the disincentive to work through income effects. However, their present discounted value added over a lifetime is basically unchanged even if they continue to work, and they are thus unlikely to affect the timing of retirement for people beyond the age of 60. Rather, as pointed out by Seike (1993), firms tend to adjust the amount of lump-sum retirement benefits to make their employees retire earlier than the mandatory retirement age. This is because middle-aged workers tend to levy heavy labor costs on firms under Japan's seniority system. Seike argues that the present discount value of retirement benefits peaks in the early 50s and falls thereafter in some industries. Our analysis of social security incentives does not explicitly include the incentive effect of employer-provided pension

or lump-sum retirement benefits.

## 2.2 1999 Pension Reform Act

The 1999 Pension Reform Act incorporated measures to lower contributions paid by future generations, making it inevitable that eligibility conditions and benefit system would become less generous than scheduled in the 1994 Pension Reform Act. In particular, the Act proposed (1) a five percent reduction in pension benefits, (2) an increase in the eligible age to 65 from 60, and (3) the abolition of wage indexation for pension benefits. If these proposals are implemented as scheduled, the final contribution rate for KNH will be pushed up to 25.2 percent, from the current 17.35 percent, in contrast to the previously scheduled 34.5 percent. At the same time, the government plans to introduce US 401(k)-style defined-contribution private pensions to supplement the public pension scheme. The combination of these proposals, however, is not expected to solve insolvency problems, and whether and when the fertility rate will turn around remains an open question. Further policy measures thus remain to be discussed ahead of the next round of pension reforms.

## 2.3 Labor market participation of the elderly

Figure 1 and Table 1 provide a rough picture of labor market participation and benefit program participation for elderly people in 1996. The labor market participation rate is relatively high in Japan among OECD countries, but it drops sharply at age 60 because most employees have mandatory retirement and start receiving public and/or private pension benefits at that age. Also, beyond the age of 60 there are limited chances that they can get a full-time job: after leaving the firm at 60, most people move to the secondary labor market and/or become part-time employees with lower wage earnings.

The bottom part of Table 1 summarizes benefit receipt measures, the pattern of which roughly corresponds to that of labor force withdrawal. Of people aged between 60 and 64, 35.4% receive KNH benefits, 7.6% receive Kyosai-Kumiai benefits, and 11.5% receive Basic Pension benefits only. Recipients of *Zaishoku Pension* benefits and WS are not a majority in the group of 60 to 64 year olds. This suggests that the earnings test for the *Zaishoku Pension* does not work effectively, especially for part-time workers. And those who continue to work as self-employed after retiring from company jobs can receive full KNH benefits, while they do not need to pay the premium. And the WS, which was introduced in 1995, seems not to have been widely recognized yet despite its relatively strong incentives to work.

Table 1 poses an important question: that is, how should we define *retirement*: the status of somebody who has stopped working or that of somebody who has started to claim benefits? Our preferred definition of retirement in Japan is the former, i.e., the absence of wage earnings. The receipt of public pension benefits is not an effective criterion for retirement in Japan. This is because pension benefits are given unconditionally to most citizens aged 65 years and older, and also because a large portion of pension beneficiaries aged 60-64 remains in the labor market.

Another question is how we should deal with self-employed workers. There are some cases where one may become self-employed after retiring from a firm. Indeed, self-employed contribute significantly to the high labor participation rate of the elderly in Japan. In what follows, we categorize the self-employed (who have been employees) as retired even if they continue to receive self-employed income, because their working behavior seems quite different from that of employees.

That said, there is still a “gray zone” between working and retirement. The narrowest definition of working should be “being employed full-time (and receiving no pension benefits).” However, many people prefer to work part time and receive reduced pension benefits to supplement their wage income. Another question is whether people who say that they cannot find a job should be categorized as “retired.” We treat them as retired if they receive any pension benefits. Table 2 summarizes the combination of working status and public pension benefits for three groups, those aged 55-59, 60-64, and 65-69. The relationship between working status and benefit claiming is so complicated that a clear-cut definition of retirement cannot be established.

So, let us consider the following three tentative definitions of retirement:

- (1) Definition I: Those who are not employed. In this definition, executives are assumed being employed;
- (2) Definition II: Those who are categorized as retired according to the Definition I, excluding the self-employed and family workers;
- (3) Definition III: Those who are categorized as retired according to the Definition II, excluding jobseekers that are not receiving any public pension benefits.

Table 3 summarizes the share of the retired according to these three definitions, based on the matrix of Table 2. The share of retired to the total population is quite sensitive to these definitions, since many working people receive pension benefits. For the group aged 60-64, for example, 67.4 percent of the sample is defined as the retired according to the Definition I, while the shares of the retired are much lower according to the Definitions II and III (44.3 percent and 39.3 percent, respectively). In addition, the difference between Definitions I and II indicates the importance of the self-employed in assessing the labor force participation of the elderly in Japan. It should also be remembered that Definition I might overstate the actual number of the retired for the younger group, because income from self-employment is likely to be their major source of income.

### **2.3 Pathways to retirement**

For those who have been employed until age 60, retiree categories are divided into two groups; that is, those receiving public retirement benefits (KNH and/or other public pension benefits), and those receiving public *and* employer-provided retirement benefits. Some become self-employed but are covered by public and/or employer-provided benefit programs (with no earnings test).



There are a variety of pathways to retirement due to a multiplicity of social security incentives. With a lack of longitudinal data, however, it is nearly impossible to trace all paths that are taken by individuals. So we roughly estimate major options and their probabilities based on the cross-section data in the survey (see in Section 4) and using simple assumptions. We assume an individual had been employed (with no public pension benefits or other public assistance program) until the age of 60. Then, we trace major paths that he/she is likely to take through public assistance programs over the following ten years.

For simplicity we divide the period after the age of 60 into two stages: that at 60-64 and that at 65-69. We then estimate the paths that are taken by an individual who retires in the second stage, based on the observed probabilities of receiving each public benefit in the cross-section data. With the lack of data, however, we cannot know how those who are still working in the second stage will behave beyond age 70. We assume that they will follow the same pattern observed for actual retirees. Thus it should be remembered that our estimation does not provide a full picture of retirement behavior in Japan. The procedure of our estimation is summarized as follows.

We start with the *second* stage, ages 65-69, where a retiree has two major options: to receive public pension benefits (referred to as SS hereafter) with *or* without employer-provided pension benefits (referred to as Pension hereafter). SS here includes not only KNH but also *Kyosai* benefits, the latter of which are those paid to employees in the public sector and other special occupation groups. In addition, there are two possible forms of retirement: staying out of the labor force *or* becoming self-employed -- a retiree receives SS and/or Pension benefits in either case. There is a very small group of non-beneficiaries in each type, probably due to eligibility problems.

For the *first* stage, ages 60-64, some people will have already retired (or become self-employed) while others will have continued working. We roughly estimate the working/retirement status of an individual who is retired in the second stage as follows: If one had already been retired in the first stage, he/she must have started to get SS benefits (with or without Pension benefits); that is, he/she must have chosen the option of going directly to SS. If one remained employed, he/she could choose among the following five options:

- (1) To be employed with no public assistance (that is, going directly to SS);
- (2) To be employed with SS benefits;
- (3) To be employed with SS and Pension benefits;
- (4) To be employed with SS benefits and WS;
- (5) To be employed with SS and Pension benefits and WS.

It should be noted here that the SS in options (2) to (4) include not only *Zaishoku* but also (full) KNK benefits, while the choice of being employed with WS only is neglected because of its minority. Full KNH benefits cannot be received when working and earnings tests should be applied. However, there seem to be many cases in which

people do not distinguish *Zaishoku* and KNH benefits, or where earnings tests do not work effectively, especially for part-time jobs. The cases in which one is employed and obtains Pension benefits only, or is employed with Pension benefits and WS, can be ruled out as firms that provide Pension benefits are usually covered by the KNH program.

In addition, as indicated in Table 1, a significant proportion of retirees receive UI benefits at the first year of retirement. Hence, each option mentioned above has a pair of sub-options: to receive or not to receive UI at the first retirement age, meaning that there are ten (five times two) pathways to retirement in total. Combined with the probabilities of retiree categories in the second stage, we can estimate joint probabilities of pathways to retirement and retiree categories. If one retires in the first stage, he/she is assumed to remain retired in the second stage (although his/her retiree category may change). However, some combinations of the first-stage and second-stage options can be ruled out *a priori*: for instance, if an individual is employed without employer-provided Pension benefits in the first stage, he/she is unlikely to get them in the second stage. This is because Pension benefits, if applicable, must be paid at the mandatory age of 60 in most cases.

Table 4 illustrates the major categories of retirees and their respective pathways to retirement, which are estimated from our cross-section data. As shown in this table, the most common pathway to retirement for Japanese employees is going to the SS program and receiving UI benefits (at the first retirement age). About one-third of retirees take this route. Adding the case of receiving no UI benefits -- which is slightly less common than the direct path to SS -- and the path to a public pension program with no public/private income assistance until retirement covers about 64 percent. Becoming self-employed after having been employed is a minority choice, covering only five percent of total retirees.

Table 4 also reveals that about 26 percent of people choose to keep working while receiving SS benefits -- which are earnings-tested *Zaishoku* or even full KNH benefits -- before retirement. However, low probabilities for receiving WS confirm that this newly introduced plan has not been widely used so far. Another finding (not shown in the table) is that women depend less on employer-provided benefits than men, probably because women's tenure as a full-time employee is generally shorter than men's.

### **3. Research Background**

There have been many empirical analyses of retirement incentives for the elderly in Japan, in spite of the limited availability of longitudinal data. Most of these draw on cross-section data from the National Survey on Family Income and Expenditure and/or the Survey on Labor Market Participation of Older Persons. These analyses can be divided into the following two groups.

The first group, which includes Takayama *et al.* (1990b), Seike (1993), Abe (1998), Ogawa (1998), and Iwamoto (2000), has estimated how social security benefits raise the probability of retirement. They have all found that, after excluding the

sample selection bias, social security benefits create significant retirement incentives for the elderly. Recent research by Abe, Ogawa, and Iwamoto focuses on the negative impact of *Zaishoku Pension* benefits on labor supply. Each finds that the 1989 Pension Reform Act -- which aimed to reduce the marginal tax rate of *Zaishoku Pension* benefits -- failed to significantly encourage the elderly to work. These analyses, however, treat social security benefits only on a flow basis, without a dynamic framework that considers how additional work changes benefits and, correspondingly, their wealth.

The second group, which includes Takayama *et al.* (1990a), Seike (1991), Oshio (1997), and Yashiro and Oshio (1999), has been interested in the magnitude of social security wealth. Takayama *et al.* discuss how the public pension scheme affects the distribution of human capital through social security wealth. Seike finds that social security accrual turns negative at age 60, consistent with a sharp drop in labor force participation at that age. Oshio estimates how the 1994 Pension Reform Act affects social security wealth and its accrual pattern. These analyses, however, do not empirically predict how retirement incentives based on social security wealth affect the retirement decisions of the elderly.

One purpose of this paper is to build a bridge between these two groups; we aim to estimate how retirement incentives based on social security wealth affect the probability of retirement, following Oishi and Oshio's (2000) tentative research on the option value model (see Section 6.1). In addition, policy simulations in this paper provide useful information about how social security reform affects labor force participation for the elderly.

#### 4. Data Overview

Our analysis is based on the Survey on Labor Market Participation of Older Persons, which was conducted in October 1996 and published in December 1997 by the Ministry of Labor. The survey covers men and women of aged 55 to 69 who were employees, company executives, self-employed, and not working. Due to data limitations, our analysis centers on those who used be employees at age 55 *and* had been working until 1995 (see Section 7.1). The size of the sample we use is 4,088 out of about 22,000 in the survey.

The major problem is that the data from this survey are cross-sectional and not longitudinal. What we know from the survey is an individual's age, current working status, wage income, pension benefits, and so on at the survey date. The survey asks each individual what kind of firm (industry and size) he/she was working for at 55, whether and when he/she would face mandatory retirement, and when he/she wanted to retire (if working at the time of the survey). However, any other longitudinal information, including wage profiles and the actual date of retirement, is not available: what we know from the survey is simply whether an individual was retired or still working in the survey year of 1996. Moreover, data on an individual's background, such as education, and family situation, are limited.

The most important quantitative information available from the survey relates to

an individual's current wage earnings and his/her social security and other benefits, on which our incentive calculations are based. It is, however, difficult to capture the diversity of incentives in employer-based pension policies, and information about lump-sum retirement benefits is not available. Moreover, answers about the category and amount of benefits seem at times to be unreliable, probably due to inaccurate and/or limited knowledge among respondents about social security programs. We estimate the "theoretical" value of social security benefits based on projected wage profiles, and make some adjustment if the discrepancy between "theoretical" and "actual" figures is too large to be ignored.

## **5. Earnings Histories and Projections**

Backward and forward projections of wage earnings are required to analyze the impact of social security incentives on retirement decisions. With little longitudinal information available and uniqueness of the wage curve in Japan, our approach differs from the "norm" applied to other countries. Our projections of the age-earnings profiles depend largely on the cross-sectional data. Also, we use reported individual characteristics observed in the survey as well as information obtained from the Wage Census. To summarize our methodology, we use (1) current wage earnings as a benchmark, (2) average age-wage profiles obtained from the survey for the ages 55-69, and (3) cohort-specific age-earnings profiles in backward projections starting the age 55 and below. An additional procedure required in the case of Japan is to estimate the timing of retirement for those who have already retired at the survey year on the basis of limited longitudinal information.

### **5.1 Projections for the ages 55-69**

In Japan, we observe that earnings for full-time work are likely to decline with age mainly due to the transition from the primary firm with the seniority-based wages to the secondary labor market with market-based wages; thus it is not reasonable to assume zero real growth in earnings into the future. For earnings projections for the ages 55-69, we rely on average wage growth rates observed from the survey because cohort-specific information is not available. In addition, the strong sample selection bias for elderly workers in the Wage Census prevents us from applying cohort-specific age-wage profiles for the workers aged 55 and above. It should be noted that earnings projections of this type cannot separate age effects from cohort effects and thus are inconsistent with backward projections based on cohort-specific information. We neglect this problem for simplicity.

To calculate average wage growth, we regress the logarithm of monthly earnings (for males and females, separately) on an individual's age, experience of mandatory retirement, job categories, firm size at the employee's age of 55, whether a private or public employee at 55, and residential areas. All independent variables are dummies. We do not apply any linear or parabola form for a wage curve, due to its discontinuity between, before, and after the mandatory retirement age; instead we apply dummies for