4.2 Regression results

Next, we examine how the LFP of the elderly has been affected by social security programs in terms of the incentive measures.[18] The dependent variable is the employee-based LFP rate, which is defined as the share of employees in the population excluding the self-employed and family workers. This empirical analysis is based on 120 observations of males and females in the age groups of 55–59, 60–64, and 65–69 years over a period of forty years (1968 to 2007). The LFP rate, SSW, and three incentive measures are all aggregated for each age group. We estimate three regression models for SSA, PV, and OV (and for SSW, for reference), for males and females:

$$\text{Model 1: } LFP_{ya} = \alpha + \beta IM_{ya} + \sum_j \gamma_j COV_y^j + \varepsilon_{ya} \qquad (9)$$

$$\text{Model 2: } LFP_{ya} = \alpha + \beta IM_{ya} + \delta_1 D6064_{ya} + \delta_2 D6569_{ya} + \sum_j \gamma_j COV_y^j + \varepsilon_{ya} \qquad (10)$$

$$\text{Model 3: } \Delta LFP_{ya} = \alpha + \beta \Delta IM_{ya} + \sum_j \gamma_j \Delta COV_y^j + \varepsilon_{ya} \qquad (11)$$

Here, *LFP* is the employee-based LFP rate; *IM* is an incentive measure (SSA, PV, or OV); *COV*s are the covariates; *D6064* and *D6569* are the dummies for the age groups 60–64 and 65–69, respectively; and ε is an error term. We include three covariates: per capita real GDP, the share of manufacturing in nominal GDP, and the share of firms with the mandatory retirement age of 60 or above. The first two covariates are obtained from the national accounts published by the Cabinet Office, and the last from the Employment Management Survey compiled by the MHLW.[19] The per capita real GDP is a proxy for the real wage rate and is used to adjust for cyclical movements in the LFP. The share of manufacturing and that of firms with the mandatory retirement age of 60 or above are used to capture the structural changes in demand for the elderly labor force.

Model 1 is the simplest version among the three models. Although the coefficient on the

[18] Oshio and Oishi (2004) is an early example of a study that applies the incentive measures to the Japanese micro data.
[19] The Employment Management Survey concluded in 2004. We assume that the share of firms with the mandatory retirement age of 60 or above has remained at 99.3 since 2004.

incentive measure is expected to be positive, it may fail to distinguish the impact of the incentive measure from age-specific factors. Hence, Model 2 controls for these factors by including dummies of two age groups. Given that the retirement rate tends to rise as age increases, the coefficients on those dummy variables are expected to be negative. Model 3 is a difference model, which intends to control for trend as well as age-specific factors. We also attempt to use SSW as *IM* instead of incentive measures because we cannot rule out the possibility that the elderly take into account SSW itself rather than the change in it. In contrast to other incentive measures, it should be noted that the coefficient on SSW is expected to be negative.

Table 3 summarizes the regression results of each model for both males and females. We focus on the coefficients on the incentive measures and SSW to save space. In Model 1, we observe that SSA, PV, and OV have significant and positive coefficients for both males and females, as predicted. However, we should consider the possibility that this model overestimates the impact of the incentive measures, which are strongly age-specific, as suggested by Table 2.

Model 2 includes age group dummies and produces different results between males and females, while the fitness is much improved for both males and females. For males, although the coefficient on OV remains significant and positive, that on SSA or PV turns negative. The coefficient on SSA or PV is not consistent with the prediction; however, it may suggest that the weighted averages of SSA and PV over age groups are not a good indicator of the overall incentives to postpone retirement, as already inferred from Figure 2. For females, SSA, PV, and OV remain significant and positive in Model 2. The sizes of the coefficients on the incentive measures are much smaller than those in Model 1, in line with the expectation.

Model 3, which uses five-year differences of all variables, reveals the same pattern in the size and significance of the incentive measures as Model 2 does. All measures are significant and positive for females, whereas only OV is significant and positive for males.

Finally, we observe that SSW is significant and negative for both males and females in Models 2 and 3 and that the goodness-of-fit is not worse than in the cases of the incentive

measures, suggesting that the elderly may be concerned about the current SSW to almost the same extent as they are its future changes.

5. Policy simulations

This section performs counter-historical simulations to estimate the extent to which a series of social security reforms have affected the labor supply of the elderly since 1985. First, we explore the effects on SSW and incentive measures had the government not implemented major social security reforms. For example, to understand the impact of the 1985 Reform and subsequent reforms, we construct all the parameters in the social security programs including the benefit multiplier, premium rates, and eligibility ages fixed in 1984, and construct the paths that SSW and the incentive measures would have taken since 1985 without any reform. In the same manner, we can construct the paths without reforms since the 1989 Reform, which followed the 1985 Reform. It is also reasonable to roughly interpret the difference between these simulated paths as the impact of the 1985 Reform. We can repeat the same experiments to capture the impact of each reform.

Figure 3 illustrates the results of these counter-historical simulations in terms of SSW for males and females. For example, the curve labeled "Without reform since 1985" depicts the path that SSW would have taken if the social security reform stopped just before the 1985 Reform. In this case, SSW for males would have continued to increase and would have leveled off in the early 2000s, as all the cohorts would have adopted the scheme that was applied just before the 1985 Reform. A series of reforms since 1985 led the SSW curve to peak in the mid-1980s and then slope downward. The decline continued with all the subsequent reforms; however, the impact of the 1985 Reform has been larger than that of any other reforms.

The impact of social security reforms is also clearly observed in the case of females. The impact differs from that for males in that SSW continued to decline before rising again and

stabilizing in the early 2000s when there were no reforms since 1985. This is because the flat-rate component, which accounted for more in total benefits for females than for males, was reduced in real terms since the late 1970s, this holding the former's total benefit down. Nevertheless, the figure confirms that the generosity of social security reforms has been steadily reducing since 1985.

Based on these observations, we confirm a substantial reduction in the overall generosity of social security programs over the past two decades. Indeed, in the absence of the 1985 Reform and subsequent reforms, the average SSW for age 55–69 (evaluated at 2005 prices) would have been 1.84 million for males and 1.03 million for females in 2007, which are 31.4 percent and 45.1 percent lower than the actual levels (2.68 million and 1.88 million), respectively. In the same manner, we can construct the path which each incentive measure would have taken in the absence of social security reforms. Figure 4 shows how the OV has been affected by the reforms. Had there been no reform since 1985, OV would have kept declining until the late 1990s for males and remained a while longer at a low level for females.

Further, we estimate the impact of social security reforms on the LFP of the elderly. One reasonable way is to compute the LFP rates by substituting the values of the incentive measures obtained from each simulation as well as the values of covariates into (10) or (11) and using the estimated coefficients reported in Table 3. We use the OV results, which are most reasonable and consistent between males and females. Table 4 presents the simulation results, which are based on the estimation results from Model 2 (levels) and Model 3 (differences). The top and bottom panels are based on the OV and SSW results, respectively.

In the top panel, we observe that in Model 2, the male labor force aged 55–69 years would have been an average of 6.484 million per year during 1985 and 2007, in the absence of the 1985 Reform and subsequent reforms. Given that the baseline result is 6.697 million (which is close to the actual 6.717 million), these reforms since 1985 as a whole increased the male labor force by 214 thousand per year—equivalent to 3.3 percent of the LFP that would have been realized had

there been no reform since 1985. The size of the impact is smaller in the case of Model 3, which shows an additional 87 thousand employees or 1.3 percent of the LFP in the case of no reform. Table 4 also reports the results for females. The total impact for females is estimated to have been an average of 89 thousand (2.3 percent) in Model 2 and 25 thousand (0.6 percent) in Model 3 per year during 1985 and 2007; both figures are somewhat smaller than that for males.

The bottom panel shows that the SSW and LFP of the elderly are reasonably related to each other as in the cases of the incentive measures. This result is reasonable, given that SSW and OV moved rather symmetrically over the past 40 years, as shown in Figure 2. In fact, Table 4 states that the impact is somewhat greater than in the OV version for both Models 2 and 3 for both males and females, underscoring that the impact of a series of social security reforms since 1985 on the LFP of the elderly is not negligible.

6. Conclusion

We examined how social security programs affect the LFP of the elderly in Japan. Using publicly available data, we construct forward-looking incentive measures based on the concepts of SSW and related incentive measures. This empirical analysis covers a period of forty years (1968–2007) that have marked significant changes in social security programs. Further, we compare the impact of major social security programs in the past on the labor supply of the elderly in a consistent manner. We acknowledge that our methodology can avoid, albeit not completely, the endogeneity bias regarding social security benefits and labor supply outcomes.

Our main findings are summarized as follows. First, our calculations concerning SSW and the incentive measures reveal a substantial change in the social security policy in the mid-1980s. Although the generosity of social security programs was increasing, the 1985 Reform reversed the trend and the subsequent reforms featured a reduction in the generosity.

Second, our regression analysis confirms that the LFP of the elderly is significantly affected

by forward-looking incentive measures for inducing retirement. In particular, the option value model of Stock and Wise (1990) appropriately explains the relation between social security and LFP for both the male and female elderly population.

Third, our counter-historical simulations show that social security reforms encourage the elderly to continue working and postpone retirement via reduced generosity and increase in the eligibility age. The option value model estimates that the 1985 Reform and subsequent reforms increased the elderly labor force by 1.3–3.3 percent for males and 0.6–2.3 percent for females during the past two decades, as compared to the levels that would have been realized in the absence of a reform since 1985. The magnitude of the impact is sizable, given that Japan has already entered the phase of a declining population growth rate.

This analysis can be extended in a variety of respects, provided the micro data with longitudinal information and family background are available. First, we can explicitly examine the impact of social security programs on multiple pathways to retirement (see Clark and Ogawa (1992)), which has been disregarded in many Japanese studies including our analysis. Second, we can analyze the impact of social security reforms by taking into account the simultaneous relations among LFP, benefit receipts, and living arrangements (see Raymo *et al.* (2004)). Third, we can compare social security programs with health status, financial support from children, and other factors in terms of the effect on the retirement decisions of the elderly. Finally, we can also discuss the impact of the changes in the generosity of social security programs on the overall well-being of the elderly, which covers health, poverty, and other socioeconomic aspects as well as income itself.

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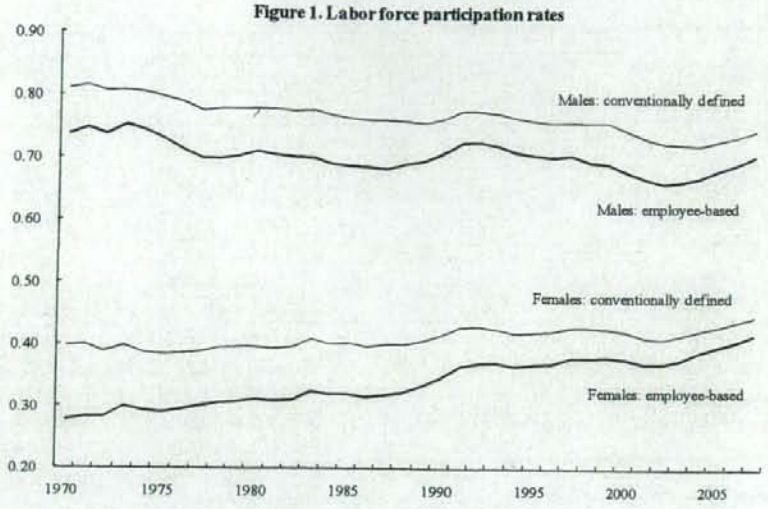
Table 1. Overview of key social security reforms in terms of benefits

Social security reform	Employees Pension Insurance			National Pension Insurance	
	Wage-proportional benefit	Flat-rate benefit (yen, annual) per year of contribution		Flat-rate benefit (annual, yen) per year of contribution	
	Benefit multiplier (/1000)	Nominal	2005 prices	Nominal	2005 prices
1954	5	24,000[a]	[127,292]	-	-
1959	6	24,000[a]	[127,620]	900/1,200[b]	[4,786/6,381]
1965	10	3,000	[11,835]	2,400	[9,468]
1969	10	4,800	[15,602]	3,840	[12,482]
1973	10	12,000	[29,630]	9,600	[23,704]
1976	10	19,800	[32,459]	15,600	[25,574]
1980	10	24,600	[31,990]	20,160	[26,203]
1985	7.5	15,000	[17,026]	15,000	[17,026]
1989	7.5	16,650	[18,237]	16,650	[18,237]
1994	7.5	19,500	[19,345]	19,500	[19,345]
2000	7.125	20,105	[19,672]	20,105	[19,672]
2004	7.125	20,105	[20,045]	20,105	[20,045]

(Note) a. Constant regardless of years of contributions. b. 900 yen for less than 20 years and 1,200 yen for 20 years and above. Male EPI pensioners receive the Additional Pension benefit for their dependent spouses.

Figure 1. Labor force participation rates



(Source) Ministry of Internal Affairs and Communications, Labor Force Survey.

Table 2. SSW and incentive measures in 1970, 1985, and 2005

Males

Age	1970				1985				2005			
	SSW	SSA	PV	OV	SSW	SSA	PV	OV	SSW	SSA	PV	OV
55	13,544	430	2,197	4,428	22,163	711	3,630	3,596	16,947	323	1,712	4,007
56	13,974	511	1,766	3,795	22,874	718	2,919	2,930	17,271	333	1,389	3,399
57	14,485	625	1,255	3,172	23,592	726	2,200	2,286	17,604	343	1,056	2,813
58	15,110	630	630	2,553	24,318	733	1,474	1,664	17,947	352	713	2,246
59	15,740	-539	-539	1,956	25,052	741	741	1,062	18,299	361	361	1,699
60	15,202	-685	-685	1,380	25,793	-1,440	-1,440	480	18,660	-505	-505	1,172
61	14,516	-709	-709	1,190	24,353	-1,451	-1,451	415	18,155	-501	-501	974
62	13,807	-729	-729	1,019	22,902	-1,458	-1,458	364	17,654	-347	-347	789
63	13,078	-746	-746	863	21,444	-1,460	-1,460	325	17,306	-825	-825	699
64	12,332	-758	-758	724	19,984	-1,458	-1,458	299	16,481	-830	-830	621
65	11,573	-534	-534	598	18,526	-1,007	-1,007	283	15,652	-686	-686	552
66	11,039	-508	-508	438	17,519	-959	-959	211	14,966	-777	-777	391
67	10,531	-483	-483	285	16,560	-911	-911	143	14,189	-801	-801	257
68	10,048	-458	-458	140	15,650	-863	-863	79	13,388	-577	-577	139
69	9,590	-458	-458	0	14,786	-863	-863	0	12,811	-577	-577	0

Females

Age	1970				1985				2005			
	SSW	SSA	PV	OV	SSW	SSA	PV	OV	SSW	SSA	PV	OV
55	11,709	-247	-247	3,463	21,890	-246	-246	2,923	9,355	456	2,302	3,460
56	11,462	-272	-272	3,045	21,644	-315	-315	2,446	9,811	458	1,846	3,024
57	11,190	-178	-178	2,640	21,329	-379	-379	1,983	10,270	460	1,388	2,600
58	11,012	-106	-106	2,227	20,950	-439	-439	1,532	10,730	463	927	2,189
59	10,907	-150	-150	1,806	20,511	-494	-494	1,093	11,193	465	465	1,790
60	10,756	-198	-198	1,398	20,017	-614	-614	667	11,657	-23	-23	1,402
61	10,558	-237	-237	1,180	19,403	-659	-659	534	11,635	-65	-65	1,223
62	10,321	-272	-272	979	18,744	-699	-699	418	11,570	-104	-104	1,059
63	10,049	-305	-305	795	18,045	-735	-735	318	11,466	-141	-141	909
64	9,744	-335	-335	627	17,310	-768	-768	232	11,325	-175	-175	772
65	9,409	188	707	473	16,542	246	928	160	11,150	-308	-308	648
66	9,597	180	520	348	16,788	237	682	117	10,842	-331	-331	466
67	9,777	173	339	227	17,025	227	445	77	10,511	-352	-352	298
68	9,951	166	166	111	17,252	218	218	38	10,159	-371	-371	143
69	10,117	166	166	0	17,470	218	218	0	9,788	-371	-371	0

(Notes) 1) This table summarizes SSW and incentive measures (evaluated at 2005 prices) which the "typical person" experienced at age 55 in each year under the existing social security programs.

2) In SSA and PV calculations, we tentatively assume that their values at age 69 are the same as those at age 68, because we do not calculate SSW beyond 69.

3) In OV calculations, we tentatively assume that the indirect utility is maximized at age 69, because it keeps rising even beyond age 69.

4) The shadowed figures show the maximum SSW in each year.

Figure 2. Incentive measures averaged for age 55-69

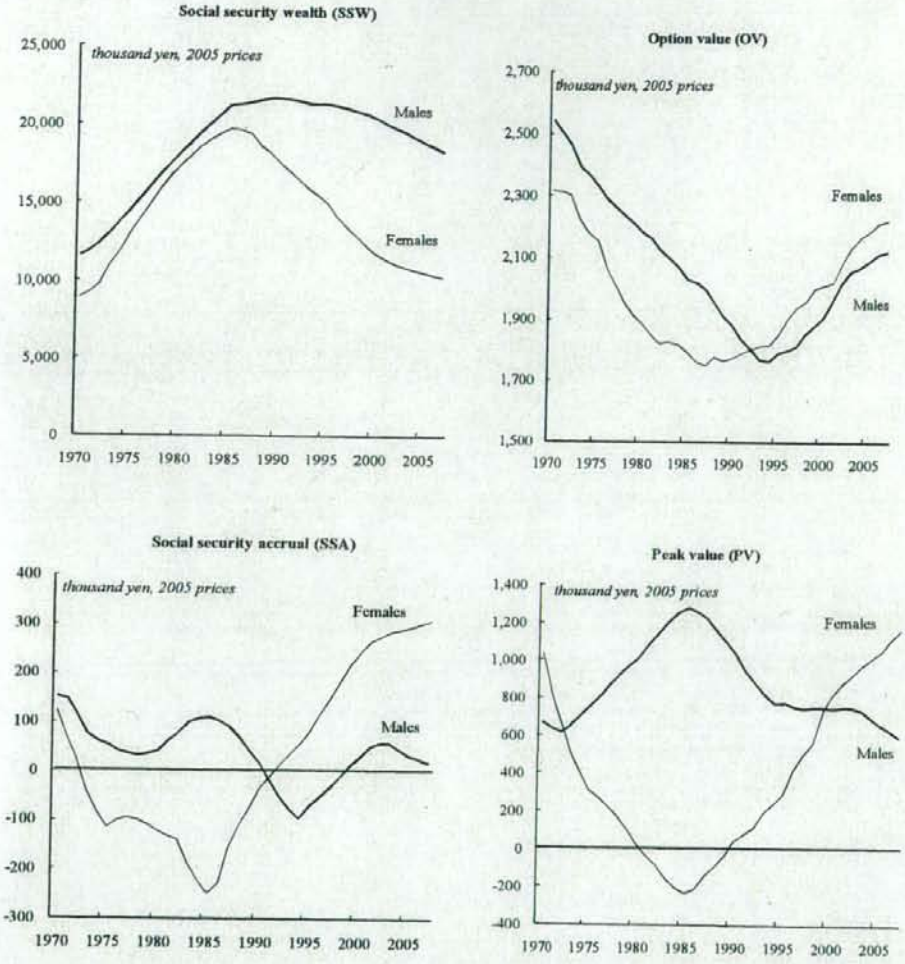


Table 3. Regression results

Incentive measure	Males			Females		
	Model 1 Levels without age dummies	Model 2 Levels with age dummies	Model 3 Five-year differences	Model 1 Levels without age dummies	Model 2 Levels with age dummies	Model 3 Five-year differences
SSA	0.488 **	*-0.082* **	*-0.041*	0.311 **	0.079 **	0.023 **
(S.E.)	(0.019)	(0.030)	(0.026)	(0.042)	(0.010)	(0.008)
Adj. R^2	0.845	0.966	0.301	0.366	0.971	0.295
PV	0.167 **	*-0.069* **	*-0.046* **	0.091 **	0.028 **	0.009 **
(S.E.)	(0.009)	(0.008)	(0.008)	(0.015)	(0.003)	(0.003)
Adj. R^2	0.743	0.979	0.454	0.304	0.975	0.306
OV	0.225 **	0.076 **	0.103 **	0.211 **	0.073 **	0.033 **
(S.E.)	(0.007)	(0.017)	(0.015)	(0.007)	(0.011)	(0.009)
Adj. R^2	0.906	0.969	0.515	0.908	0.968	0.324
SSW	*0.011*	-0.010 **	-0.010 **	*-0.002*	-0.004 **	-0.002 **
(S.E.)	(0.007)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)
Adj. R^2	-0.002	0.978	0.630	0.067	0.970	0.301
No. of observations	120	120	105	120	120	105

(Notes) 1) The dependent variable is the level of employee-based LFP rate in Models 1 and 2, and its five-year difference in Model 3.

2) All models include real GDP per capita, the share in manufacturing, and the share of firms which have mandatory retirement age of 60 or above as covariates.

3) The estimation period is 1968-2007 for Models 1 and 2 and 1973-2007 for Model 3.

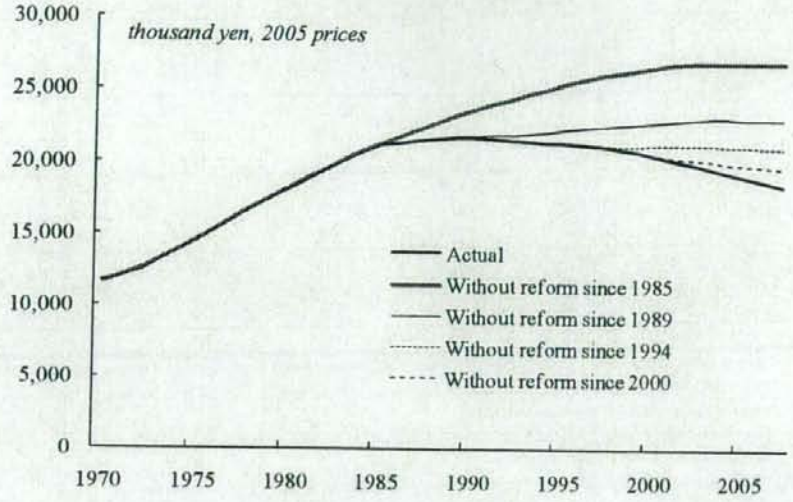
4) Incentive measures are expressed in terms of 1 million yen.

5) Italic numbers are inconsistent with prediction and/or insignificant at the 10 percent significance.

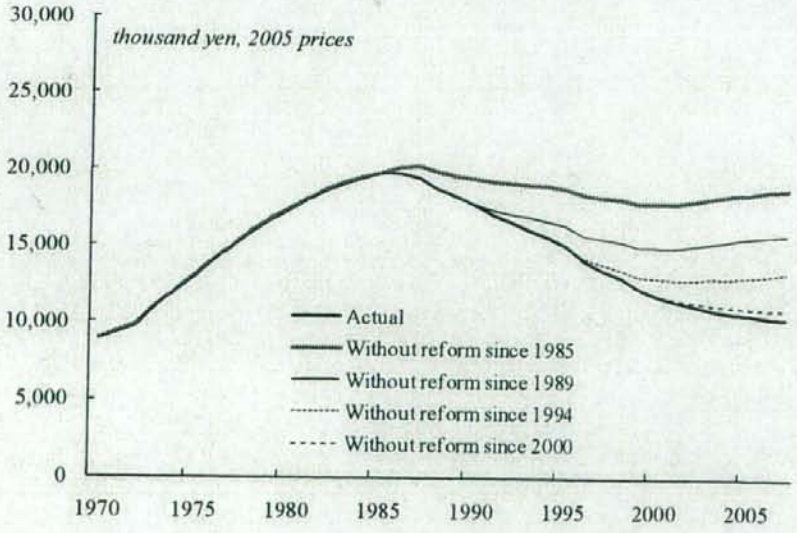
6) * and ** are significant at five and one percent levels, respectively.

Figure 3. The impact of social security reforms on social security wealth (SSW)

Males (average for age 55-69)



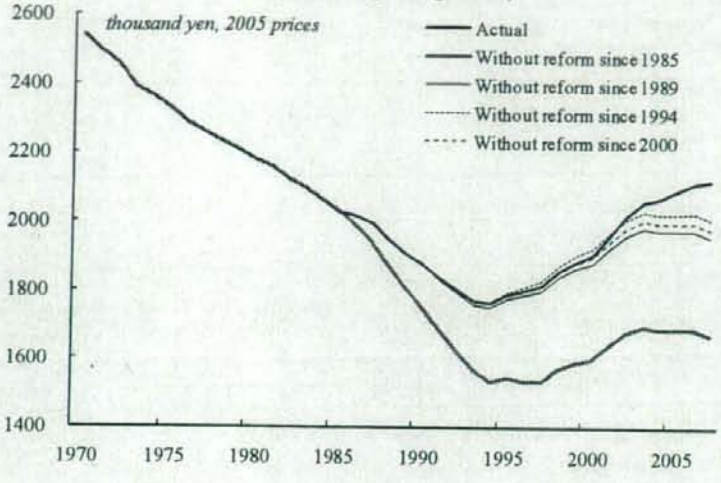
Females (average for age 55-69)



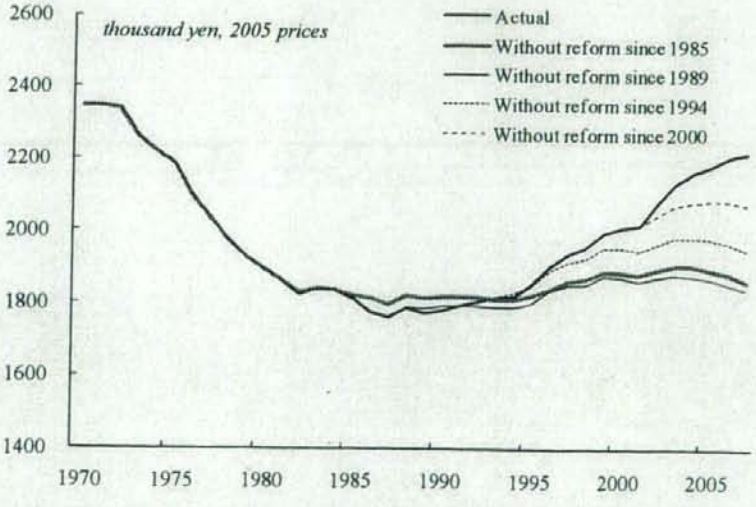
(Note) "Without reform since 2004" curve is omitted because of its negligible impact.

Figure 4. The impact of social security reforms on the option value (OV)

Males (average for age 55-69)



Females (average for age 55-69)



(Note) "Without reform since 2004" curve is omitted because of its negligible impact.

Table 4. The estimated impact of social security reforms on elderly labor force

(annual average for 1985-2007, in thousands)

Based on OV	Actual	Baseline	Without reform since:				
			1985	1989	1994	2000	2004
Males-Model 2							
Labor force per year	6,717	6,697	6,484	6,657	6,679	6,663	6,693
Difference from baseline			Δ 214	Δ 40	Δ 18	Δ 34	Δ 4
			[3.3]	[0.6]	[0.3]	[0.5]	[0.1]
Males-Model 3							
Labor force per year	6,717	6,678	6,591	6,640	6,650	6,642	6,673
Difference from baseline			Δ 87	Δ 58	Δ 48	Δ 55	Δ 24
			[1.3]	[0.9]	[0.7]	[0.8]	[0.4]
Females-Model 2							
Labor force per year	3,947	3,941	3,852	3,826	3,875	3,914	3,940
Difference from baseline			Δ 89	Δ 115	Δ 65	Δ 27	Δ 1
			[2.3]	[3.0]	[1.7]	[0.7]	[0.0]
Females-Model 3							
Labor force per year	3,947	4,114	4,089	4,086	4,095	4,104	4,114
Difference from baseline			Δ 25	Δ 28	Δ 19	Δ 10	Δ 0
			[0.6]	[0.7]	[0.5]	[0.2]	[0.0]

Based on SSW	Actual	Baseline	Without reform since:				
			1985	1989	1994	2000	2004
Males-Model 2							
Labor force per year	6,717	6,717	6,199	6,504	6,620	6,677	6,713
Difference from baseline			Δ 518	Δ 214	Δ 97	Δ 40	Δ 5
[percent]			[8.4]	[3.4]	[1.6]	[0.6]	[0.1]
Males-Model 3							
Labor force per year	6,717	6,716	6,557	6,619	6,656	6,686	6,712
Difference from baseline			Δ 159	Δ 98	Δ 61	Δ 31	Δ 5
[percent]			[2.6]	[1.6]	[1.0]	[0.5]	[0.1]
Females-Model 2							
Labor force per year	3,947	3,948	3,707	3,822	3,896	3,940	3,947
Difference from baseline			Δ 241	Δ 126	Δ 52	Δ 8	Δ 1
[percent]			[6.5]	[3.4]	[1.4]	[0.2]	[0.0]
Females-Model 3							
Labor force per year	3,947	4,114	4,084	4,094	4,103	4,112	4,114
Difference from baseline			Δ 30	Δ 20	Δ 11	Δ 2	Δ 0
[percent]			[0.7]	[0.5]	[0.3]	[0.1]	[0.0]

(Note) The figures in [ ] is a percetage of the level of "Without reform since 1985" case.

Does Social Security Induce Withdrawal of the Old from the Labor Force and Create Jobs for the Young?: The Case of Japan*

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Abstract

This paper examines whether social security programs induce a withdrawal of the elderly from the labor force and create jobs for the young in Japan. The key messages are summarized as follows. First, our historical overview suggests that young unemployment issues have not motivated social security reforms and that changes in provisions are not endogenous. Second, employment of the young tends to be positively, not negatively, associated with the LFP of the old. Third, an increase in the inducement to retire significantly discourages the old from staying in the labor force, but does not create jobs for the young.

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1. Introduction

The current speed of aging in Japan is unprecedented, and is far more rapid than in other developed countries. The proportion of the old defined as those aged 65 and over was 4.9 percent of the total population in 1950, increased to 12.5 percent in 1990, and further reached 20.2 percent in 2005, implying that one-fifth of the population is currently occupied by the old (National Institute of Population and Social Security Research (NIPSSR), 2007)[1]. Population aging will continue into the future, and even accelerate. According to the latest population projection released by the NIPSSR in December 2006, the share of those aged 65 years and above is expected to reach 30.5 percent of the total population in 2025, and further increase to 39.6 percent in 2050.

The rapid pace of population aging has raised concerns about the sustainability of the current programs and stimulated a series of major pension reforms since the mid-1980s, which called for a rise of eligibility ages, a reduction of benefit levels, and a rise of contribution rates. The latest reform in 2004 has extended the eligibility age from 60 to 65 by 2025, and introduced an automatic adjustment of benefit levels, due to demographic and macro-economic factors, to cope with the expected increase of benefits and deteriorating fiscal balances.

Naturally, these reforms are likely to have affected the labor supply of the elderly, and possibly of the non-elderly. Thus, an interesting question is to quantify the effects of social security programs on labor market outcomes for both the old and the young: Does a generous social security program provide jobs for the young by encouraging the old to exit the labor market? Does a rise in the eligibility age make the old stay longer in the work

[1] The United Nations defines a society in which people aged 65 and above account for more than seven percent as one that is aging, and a society in which this age group shares more than fourteen percent as one that is aged. It took only twenty-four years for Japan to move from being an aging society to an aged one, while it took more than fifty years for most Western countries.

place and crowd out the young? When addressing these issues, we have to keep in mind the possibility of the endogeneity of changes in social security programs with respect to the employment or unemployment of the young. Fortunately, it is unlikely that endogeneity is an issue in Japan because the timings of reforms are exogenously determined regardless of economic and demographic circumstances.

This paper examines whether social security programs in Japan induce a withdrawal of the elderly from the labor force, and create jobs for the young. Our discussions proceed as follows. Section **2** provides a historical overview of social security reforms and employment policies toward the elderly. Section **3** presents the long-term employment and unemployment trends of both the old and the young, and performs a regression analysis to examine the direct relationship between the employment of the young and that of the old. Section **4** examines whether changes in social security programs are associated with the employment of the young or the old using measures for the inducement to retire. Section **5** concludes. The two appendices provide a detailed description of data construction and sources of the main variables used in this study.

2. Background

2.1 Social security reforms

This section provides historical information on social security reforms and employment policies for the elderly. We focus on what their main purposes have been and whether the prospect of creating jobs for the young has played a large role in the policy debate.

Table 1 overviews the directions of past social security reforms in terms of the benefits of the Employees' Pension Insurance (EPI; *Kosei Nenkin*) and National Pension Insurance (NPI; *Kokumin Nenkin*), which are at the core of the public pension scheme in Japan (see

Section **4** for more details).[2] Both EPI and NPI Laws require benefit and contribution schemes to be reviewed every five years (at least) from the viewpoint of financial balances and their sustainability, so the timing of social security reform is exogenously determined regardless of economic, demographic, and other conditions.

Until the early 1970s, the main purpose of the major social security reforms had been consistently to raise benefits levels, aiming to improve income levels of elderly persons in line with the rising average standard of living under rapid economic growth. The government had continued to raise the benefit multiplier for the wage-proportional benefit and/or the benefit unit for its flat-rate benefit, and it also introduced wage and price indexation to the benefits in 1973.

However, slower economic growth from the mid-1970s and a rapid and continuous drop in the fertility rate raised concerns about the financial sustainability of social security programs. The 1985 Reform was revolutionary in that it incorporated a reduction in the benefit multiplier and flat-rate benefit for the first time, aiming to hold down an increase in total pension benefits. Under rising concerns about demographic pressures, subsequent reforms have continued to seek to improve the financial balances of the programs by reducing the benefit multiplier, scaling down benefit indexations, and extending eligibility ages, as well as raising the premium rate.

Figure 1 depicts the eligibility ages for EPI benefits: the top panel applies to male beneficiaries and the bottom panel to female beneficiaries. In the case of male pensioners, the eligibility age for both flat rate and wage-proportional benefits was raised to 60 in 1973 from the previous 55, and then stayed there until 2000. Since 2001, the eligibility age for the flat-rate component has been scheduled to increase by one year for every three years

[2] See Komamura (2007) for more details. EPI and NPI cover 48.0 and 45.5 percent of the population insured by public pension programs. The Mutual Aid Insurance (*Kyosai Nenkin*) covers the remaining 6.5 percent, most of whom are employees in the public sector and private schools.