Table 1 reports these four inequality measures for each of pre-SS pre-tax, post-SS pre-tax, and post-SS post-tax income in two surveyed years. Three facts should be noted. First, we confirm that for society as a whole, social security significantly reduced income inequality, even though its magnitude differs by the inequality measure and they cannot be compared with each other. We also recognize that the distributive impact of social security was much larger than that of taxation, judging from the change in the values of inequality measures caused by additional redistribution by taxation. These two facts are in line with what the official SIR reports mention on a household income basis, although the degree of income inequality is much higher on an individual income basis.

Second, income redistribution was concentrated on the elderly rather than the young in both 1992 and 2001. For all inequality measures, the elderly experienced a substantial reduction in income inequality. For the young in contrast, the distributive impact was quite limited, and even a rise in inequality was observed in the case of SCV in line with the discussion in Section 2.1.

Third, we find that a rise in inequality in post-SS income was quite limited compared to pre-SS pre-tax income over the period from 1992 to 2001. More interestingly, post-SS income became more evenly distributed among the elderly. These facts suggest that social security succeeded in preventing income inequality from increasing between the two survey years. One plausible reason is a rise in social security benefits, reflecting a rise in the average years of contributions among EPI beneficiaries.

However, we should be cautious in interpreting these results. Discussions in Section 2 suggest that the distributive impact of social security is limited on a lifetime income basis, especially if it depends much on income transfer from the young to the elderly. Unfortunately, we cannot estimate lifetime income, because no longitudinal information is available from the SIR. To address this issue, however, it is useful to decompose the distributive

impact of social security into the effect of income transfer from the young to the elderly and the effect of income redistribution within each group.

3.2 Decomposing redistribution effects

We focus on MLD, with which it is easy to decompose redistribution effects (see Mookherjee and Shorrocks, 1982). MLD is defined as

$$MLD = \frac{1}{n}\sum_i \ln\left(\frac{\bar{y}}{y_i}\right) = \ln \bar{y} - \frac{1}{n}\sum_i \ln y_i,$$

where y_i, $\bar{y}$, n are each individual's income, average income, and number of individuals, respectively. When individuals are divided into m groups, the conventional way of decomposing the effects of redistribution policies—which is expressed as a change in MLD from pre-SS to post-SS income—to take

$$\Delta MLD = \sum_{g=1}^{m} \alpha_g \left(MLD_g^* - MLD_g\right) + \sum_{g=1}^{m} \alpha_i \left[\ln\left(\frac{\bar{y}^*}{y_g^*}\right) - \ln\left(\frac{\bar{y}}{y_g}\right)\right],$$

in which we compare MLD and other variables between pre-SS and post-SS in each group (α_g is a share of the g-th group). The first term of the right-hand side refers to the within-age effect (income redistribution within each age group), and the second term refers to the between-age effect (income transfers between age groups).

This decomposition, however, could be misleading because the within-age effect is affected by income transfers between age groups. For the elderly, net income transfer from the young tends to raise their mean income, causing a reduction in within-age MLD, even without any within-age income redistribution among the elderly. For the young, on the contrary, net income transfer reduces their mean income, and increases their within-age MLD. In this sense, the decomposition mentioned tends to overestimate the within-age effect for the elderly, and underestimate it for the young.

To avoid this bias, we divide the overall within-age effect into two

components: the component that is caused by between-age income transfer, and the *pure* within-age effect that is caused solely by income redistribution within the age group. The first component is calculated for the g-th age group as

$$\frac{1}{n_g}\sum_{i\in g}\ln\left(\frac{\bar{y}_g^*}{y_i+\bar{y}_g^*-\bar{y}_g}\right)-\frac{1}{n_g}\sum_{i\in g}\ln\left(\frac{\bar{y}_g}{y_i}\right),$$

which grasps the change in within-age inequality, assuming that each household receives the difference between the mean of disposable income ($\bar{y}_g^*$) and the mean of initial income ($\bar{y}_g$) for this age group. This component would probably be negative (positive), and indicate that income transfer reduces (raises) income inequality among the elderly (young).

The *pure* within-age effect is obtained by subtracting this component from the conventional, overall within-age effect, assuming that the government redistributes the sum of initial income and net income transfer receipts among the age group. Also, we define the sum of the within-age effect caused by between-age income transfer and the conventionally defined between-age effect as the *total* between-age effect.

We apply this methodology of decomposition to our dataset in both 1992 and 2001. The estimation results are summarized in Table 2. In 2001, MLD for society as a whole was reduced from 2.229 for pre-SS pre-tax income to 1.395 for post-SS pre-tax income, meaning that social security dampens MLD by 0.893 (39%). This redistribution effect is decomposed into 0.782 as the (conventionally defined) within-age effect and 0.112 as the between-age effect, which suggests that the within-age effect dominated the overall redistribution.

By decomposing this within-age effect into the within-age effect caused by between-age income transfer and the pure within-age effect, however, we find that the former reduced MLD by 1.189, whereas the latter raised MLD

by 0.408 in 2001. This means that income redistribution within each age group, if excluding the effect of income transfer between age groups, was regressive rather than progressive. This structure is already described in terms of SCV in Section 2.1, mainly reflecting the wage-proportional benefit, as well as the gap between NPI and EPI benefits.

The regressive feature of the pure within-age effect is not revealed by the conventional methodology of decomposing the impact of redistribution policies. Indeed, the total between-age effect reduced overall income inequality by 1.301, more than offsetting the regressive pure within-age effect. Moreover, this structure of offsetting effects became clearer in 2001 than in 1992; both the progressivity and the regressivity of social security increased reflecting the increasing *maturity* of public pension programs, that is, increasing pension beneficiaries and benefit receipts.

The bottom part of Table 2 also reports the distributive impact of a combination of social security and tax. We confirm that income redistribution due to tax reduced somewhat the regressive impact of social security on within-age income distribution. However, the progressivity of tax failed to offset the regressivity of tax.

The within-age distributive impact of social security can also be assessed by age group, as shown in Table 3 for each survey year. The following three facts observed in this table are noteworthy. First, we confirm that income redistribution among the elderly, the magnitude of which was much greater than that for the young, was entirely due to income transfer from the young. Pure within-age income distribution increased their income inequality somewhat, but its regressive impact was more than offset by the progressive impact of income transfer from the young.

Second, within-age income redistribution among the young was quite limited. Also, income transfer to the elderly increased inequality among them, presumably because it reduced the average level of post-SS income. In contrast, pure within-age redistribution added to inequality somewhat.

This fact is not consistent with the regressive structure of social security contributions due to the flat-rate NPI premium. The main reason seems to be that non-working spouses of employed workers, who earn virtually no wage income, are not required to pay any premium, preventing the overall social security system from being regressive.

Third, tax did not substantially change this age pattern of income redistribution. To be sure, tax reduced the regressive within-age redistribution for the elderly, and added to the progressive within-age redistribution for the young, reflecting its progressive structure. In contrast, tax reduced progressive redistribution due to between-age income transfer for the elderly, and added to regressive redistribution due to it for the young, because tax reduced mean income for both the elderly and the young. These impacts were, however, so limited that social security dominated the overall picture of income redistribution.

Altogether, we confirm that income redistribution on an annual income basis is concentrated on the elderly, and that it is mostly due to income transfer from the young. More importantly, the fact that income redistribution among the elderly is regressive if the impact of income transfer is excluded points to the risk that redistribution within the same generation on a lifetime income basis is not very progressive.

4. Empirical analysis on a lifetime income basis

4.1 Data

Discussions in the previous section strongly suggest that we need to empirically examine the extent to which social security redistributes lifetime income. Unfortunately, the SIR and other household surveys do not provide any longitudinal information about wage income, premium contributions, and tax payments. Indirect ways of assessing lifetime income distribution include examining inequality of consumption, on the

assumption that individuals maximize lifetime utility (see Ohtake and Saito, 1998), and extracting cohort effects from the repeated cross-sectional data (Oshio, 2006).

As far as we know, the only way of directly estimating lifetime income in Japan—even if only for (male) EPI beneficiaries—is to use information about public pension benefits in the "Annual Report of the Social Insurance Agency." This report, which covers all EPI and NPI beneficiaries and contributors in Japan, shows the distribution of initially claimed EPI benefits in each year. We can thus estimate lifetime income backward, based on the values of these benefits.

Here, it is useful to overview the structure of the EPI benefit. It consists of a wage-proportional component and a flat-rate component (Basic Pension benefit). The eligibility age for both these benefits used to be sixty. However, the 2000 Pension Reform called for a rise in the eligible age for the flat-rate component by one year from sixty every three years from 2001. Hence, since 2001, the initially claimed benefits reported in the Survey have only been the earnings-proportional component for male beneficiaries. The level of this component is based on lifetime income, which is calculated by multiplying the product of carrier average monthly income (CAMI) by the number of months of contributions. It should be noted that lifetime income is revaluated by average wage growth when it is claimed.

Hence, it is a straightforward task to estimate (revaluated) lifetime income backward, based on the released data on the newly claimed benefits. More specifically, lifetime income is estimated by dividing the initially claimed benefit by the benefit multiplier, which is applied to that cohort. In addition, we know that most male EPI beneficiaries initially claim the benefit at the age sixty as mentioned later. Hence, we can estimate income distribution among almost the same cohort.

However, this methodology has three limitations. First, we cannot get any information about lifetime income for *female* EPI beneficiaries. The

1999 Reform called for a rise in the eligibility age for the wage-proportional component for females starting from 2006, five years later than in the case of males. Hence, the initially claimed EPI benefits for female beneficiaries cannot be decomposed into wage-proportional and flat-rate components[2], meaning that we cannot estimate their lifetime income. Second, the Annual Report does not provide any longitudinal information about wage profiles and premium payments. This makes it impossible to assess income redistribution under current and previous social security programs, because the premium rate has been changed. These two limitations allow us only to estimate the potential distributive impact of some alternative social security polices on lifetime income among male EPI members. The third limitation, which is related to the second, is that lifetime income estimated in this way excludes social security premiums paid by employers. We cannot estimate premiums paid by employers, because the premium rate has been changing, and no information about wage profiles is available.

Our empirical analysis is based on the 2004 Annual Report. The data on initially claimed benefits are mostly for male EPI beneficiaries who were born in 1944. In fact, 81.2% of new male EPI beneficiaries were sixty years old in 2004. The Report shows the distribution of beneficiaries by income class with a width of 120,000 yen, and we assume for simplicity that all individuals in each income class receive the middle value of the upper and lower bounds of the income class to which they belong.

Then, based on the current benefit multiplier, 5.418/1000, we estimate their lifetime income. Figure 1 illustrates the pattern of their distribution. At 2004 prices (revaluated by wage growth), their mean income is estimated to be 233.9 million yen with a standard deviation of 87.5 million yen. The distribution is concentrated in the range of 200-300 million yen (with the

[2] The flat-rate benefit is based on the number of months of contributions, which is not available in the Annual Report.

median of 220.9 million yen), with a flat tail to the right. SCV and MLD are calculated as 0.140 and 0.072, respectively, which are well below the figures calculated on an annual income basis reported in Table 1, even though they cannot be simply compared with each other. We use this estimated lifetime income redistribution as a benchmark for policy simulations in the following section.

4.2 Distributive impact of post-2004 Reform EPI program

In this section, we estimate the distributive impact of the social security scheme after the 2004 Reform. This Reform calls for a gradual increase in the EPI premium rate from 13.58 percent to 18.3 percent by 2017, and plans to keep it at that level later. In addition, the Reform incorporates a gradual increase in the share of transfers from the general account of the central government in payments of the Basic Pension benefit from the current one-third to a half. This implies a rise in the consumption and/or income tax rate to sustain the fiscal balance of the social security programs. Finally, the Reform plans a gradual rise in the eligibility age of EMI benefits (both flat-rate and wage-proportional components) to sixty-five by 2025.

We first roughly estimate the extent to which the EPI program after the 2004 Reform will potentially redistribute lifetime income in the steady state, where both the premium and tax rates have completed their adjustment, and the eligibility age has been completely raised to sixty-five. The estimation strategy is summarized as follows.

(1) Regarding pre-SS pre-tax lifetime income, we use the estimated lifetime income in 2004 as a benchmark. Here, we should remember that it indicates income after employers' premium payments, which cannot be estimated retrospectively. For simplicity, we assume that each individual receives the same amount of this estimated income from their employers even after the 2004 Reform. In addition, we ignore the impact of the raised eligibility age on wage income, assuming zero

income between ages sixty-one and sixty-four. This assumption, even if unrealistic, does not seem to substantially change the overall pattern of income distribution and the distributive impact of the EPI program. We also assume no wage growth after 2004, so all of the figures are evaluated at 2004 prices.

(2) To estimate post-SS (and post-tax) lifetime income, we need lifetime social security benefits, premiums, and tax. Annual benefits are calculated as the sum of flat-rate and wage-proportional components. The flat-rate benefit is 804,200 yen per year (67,017 yen per month) at 2004 prices. We assume that each individual receives the full amount for simplicity, meaning that they have contributed premiums for forty years. The wage-proportional annual benefit is the product of the expected lifetime income and the benefit multiplier (5.481/1000). Lifetime benefits are total annual benefits over a lifetime, discounted by average mortality rates (released by the MLHW) and the long-term interest rate, 3.2 percent per annum, which is assumed in the 2004 Reform.

(3) Regarding the premium rate, we assume that EPI members pay 9.15 percent—half of 18.3 percent incorporated in the 2004 Reform—from their estimated lifetime income. The remaining half is paid by employers, and we define pre-SS lifetime income as the sum of estimated lifetime income and the premium paid by employees. This adjustment does not affect post-SS income and its inequality, but raises net social security contributions (or reduce its net benefit) over a lifetime. In addition, we have to consider tax payments required to finance transfers from the general account of the central government. The 2004 Reform requires this transfer to finance half of the Basic Pension benefit. If the government chooses a proportional income tax to

finance it, the tax rate is estimated to be around 6.1 percent in 2050[3]. We assume that this additional tax will be equally levied on their wage income and social security benefits.

The estimation results are summarized in Table 4, which compares pre-SS and post-SS lifetime incomes, and assesses the distributive effect of the EPI program in the steady state after the 2004 Reform. Before assessing income distribution issues, we compare the mean incomes before and after social security transfer. Mean Pre-SS income is 233.9 million yen as mentioned above, and it becomes 255.3 million yen if we add employers' premium contributions to it. In comparison, mean post-SS income is 234.7 million yen, which is 8.1 percent lower than 255.3 million yen. Also, if we subtract tax payments to finance the Basic Pension benefit, mean post-SS lifetime income is reduced to 220.4 million yen, 13.7 percent lower than 255.3 million yen. These estimation results suggest that future EPI members will be required to pay more than they receive over a lifetime, in contrast to the current elderly who receive more than they pay. This pattern and the size of intergenerational inequality are roughly consistent with the results of preceding analyses, which confirm intergenerational income inequality in the EPI program.

Then, to what extent will the 2004 Reform redistribute lifetime income? Considerations about employers' premium contributions and additional tax payments for the Basic Pension benefit do not affect income inequality measures, because these premiums and taxes are proportional to income. MLD and SCV of post-tax lifetime income are calculated to be 0.066 and 0.130, respectively, which are only 8.2 percent and 7.1 percent lower than those of pre-SS lifetime income. These magnitudes of income redistribution are well below those on an annual income basis, which are shown in Table 1,

[3] According to MHLW estimates, transfers from the central government will be 15.7 trillion yen, compared to premium revenues of 47.2 trillion yen, which will be collected with the premium rate of 18.3 percent. Hence, we can roughly estimate the tax rate to finance the transfer as 6.1 percent (=18.3 percent *15.7/47.2).

although the figures in Tables 1 and 4 cannot be compared directly.

4.2 Alternative reforms

The previous section shows that the potential impact on lifetime income redistribution of the 2004 Reform is much more limited than when assessed on an annual income basis. In this section, we estimate the impact of some alternative reforms. In each reform, we keep intact the contribution structure, which is assumed to be income-proportional, as well as the sum of premium revenues and benefit payments. Instead, we focus on how reform on the benefit side can affect income redistribution.

We consider three reforms, taking the 2004 Reform as a baseline for comparisons. The first (Reform I) is to raise the level of the Basic Pension benefit to 100,000 yen per month (from the current 67,017 yen) and correspondingly reduce the share of the wage-proportional component. The benefit multiplier is implicitly calculated to keep the total benefits unchanged from the 2004 Reform. It is reasonable to expect that a shift of weight to the flat-rate benefit from the wage-proportional one will increase the distributive impact.

Reforms II and III reflect one of the features of the Norwegian pension scheme; they introduce the flat-rate minimum benefit as 100,000 yen and 150,000 yen, respectively, per month, regardless of lifetime income. Also, the Basic Pension benefit in these Reforms is adjusted according to lifetime income in such a way that:

Basic Pension benefit

=max[Minimum benefit-k*Lifetime income, 0],

where the adjustment factor, k, shows the pace of the reduction of the Basic Pension benefit. We also assume that the benefit multiplier of the wage-proportional component is the same as that incorporated in the 2004

Reform[4].

In this framework, individuals with no lifetime income receive the minimum pension benefit as the Basic Pension benefit. Also, the level of the basic pension benefit is reduced as lifetime income increases, and an individual whose income is higher than (minimum pension benefit)/k receives no Basic Pension benefit. The adjustment factor, k, is implicitly calculated to keep the total amount of pension benefits unchanged from the 2004 Reform[5].

The simulation results are summarized in Table 5 and Figures 2 and 3. The following results are noteworthy. First, Reform I, which raises the level of the Basic Pension Benefit to 100,000 yen from the current 67,017 yen, raises the distributive impact on lifetime income, as it reduces the multiplier of the wage-proportional benefit to 3.789 from the current 5.481. MLD and SCV fall by 12.0 percent and 10.6 percent, respectively, to post-SS lifetime income from pre-SS pre-tax income. These magnitudes of redistribution are somewhat larger than in the case of the 2004 reform.

Second, Reform II, which has the minimum benefit of 100,000 yen with the adjustment factor—which is implicitly calculated as 1.692/1000—does not differ from Reform I, because all individuals receive positive basic pension benefits. This means that a Norwegian system with a low minimum benefit does not differ from the current double-decker system.

In comparison, Reform III, which has a minimum benefit of 150,000 yen, has some impact on income redistribution. MLD and SCV are reduced by 17.1 percent and 14.7 percent, respectively, which are larger than in the cases of the 2004 Reform, as well as Reforms I and II. The adjustment factor—which is implicitly calculated as 4.319/1000—of the Basic Pension

[4] Some argue that this minimum benefit should be financed entirely by tax. But, this makes no difference in our model in terms of income distribution, because we assume that both tax and the EPI premium are wage-proportional, and that the total amount of benefits (which are equal to the sum of tax and premiums) is unchanged from the 2004 Reform.

[5] k should be less than the multiplier of the wage-proportional benefit.

benefit largely offsets the wage-proportional benefit, which adds to the progressivity of the system. An individual whose lifetime income is higher than around 460 million yen—which roughly corresponds to the top five percentile of lifetime income—does not receive any basic pension benefits.

Figures 2 and 3 are useful for interpreting the simulation results shown in Table 5. Figure 2 compares the patterns of the total social security benefit by lifetime income under each reform. Reforms I and II, which are equivalent to each other, make the curve flatter compared to the 2004 Reform, reflecting a lower benefit multiplier. In contrast, Reform III makes the curve kink at around 460 million yen, at which the Basic Pension benefit becomes zero. All curves cross each other at around 250 million yen, which is not far from the median of lifetime income (around 270 million yen). Individuals with lower lifetime income, who share about 55 percent of total EPI members, receive more benefits under the three reforms, while the other 45 percent receive less.

Figure 3 illustrates net lifetime tax in terms of EPI benefits and contributions (including employers' contributions and tax to finance transfers from the general account of the central government). All curves confirm the progressivity of the EPI program. The tax rate is negative for the lowest income group, rises sharply as lifetime income increases to around 300 million yen, and then becomes almost flat for individuals with higher incomes. This pattern is almost unaffected by any additional reform, but the effects of the reforms are concentrated on individuals with lower incomes; they face a substantial reduction in the tax rate (or increase in the subsidy rate), while individuals with higher incomes (of lifetime income of above about 250 million yen) face a quite limited increase in the tax rate. A small increase in the tax rate for higher income individuals can finance a large increase in pension benefits for lower income individuals.

5. Concluding remarks

We have examined how social security programs affect income distribution within the same generation in Japan. To address this issue, we have done two empirical analyses. First, we assessed income redistribution under the current social security and tax schemes based on micro-data from the "Survey on Income Redistribution." Second, we examined the potential impact of the 2004 Reform, as well as some alternative reforms, on lifetime income distribution, based on data from the Annual Report of the Social Insurance Agency. The key results are the following.

(1) Social security substantially reduces inequality among the elderly on an annual income basis, but it is mostly due to income transfer from the young. Income redistribution among the elderly is even regressive if the impact of income transfer is excluded. This pattern of redistribution has become more apparent in recent years under population aging, which raised the income transfer to the elderly via social security programs.

(2) The distributive impact of the EPI program on a lifetime income basis is quite limited, compared to what is implied by the analysis based on annual income. This is largely because income transfer from the young to the elderly is largely offset over a lifetime.

(3) A combination of a rise in the flat-rate benefit and a reduction in the benefit multiplier for the wage-proportional benefit can add to the distributive impact of the EPI program. Introducing a Norwegian-type minimum pension benefit also can redistribute lifetime income within the same generation.

To be sure, the desirable degree of income distribution always depends on value judgments about the equity-efficiency trade-off. However, our estimation results suggest that we should more cautiously look at income distribution and the impact of redistribution policies on a lifetime income basis. Population aging increases the magnitude of income transfers from the young to the elderly, raising the risk that the impact of the existing

redistribution policies is overstated.

There are many limitations in our analysis and outstanding issues. First, for example, we have to extend the analysis to grasp income redistribution across employees in the private sector (EPI members), employees in the public sector, and self-employed workers (NPI members), and also between males and females. Second, we have to examine more explicitly the distributive impacts of income and other taxes, because tax should be a more direct measure to redistribute income than social security. Third, we have to take into account the impact of social security on people's incentives to work and wage income, which have been empirically examined by preceding research (see Yashiro and Oshio, 1999, and Oshio and Oishi, 2004). These issues can and should be addressed in future research, if more comprehensive datasets that include rich longitudinal information are available.

Endnote

The micro-data from the "Surveys on Income Redistribution" used in this paper were provided to the author by the Ministry of Health, Labour and Welfare of Japan, the notice number No.0822005 dated August 22, 2005, under the project: "Research on Social Inclusion in the Social Security System in Japan" of the National Institute of Social Security and Population Research.

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Table 1: Income inequality trends: 1992-2001

(1) 1992

	Total			Young (aged 20-59)			Elderly (aged 60+)		
	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax
SCV	2.407	2.037	1.605	1.560	1.597	1.434	10.371	3.947	2.177
		(-15.4)	(-33.3)		(2.4)	(-8.1)		(-61.9)	(-79.0)
LV	2.641	2.310	2.274	2.479	2.435	2.396	2.444	1.943	1.920
		(-12.6)	(-13.9)		(-1.8)	(-3.4)		(-20.5)	(-21.4)
Gini	0.634	0.579	0.561	0.558	0.556	0.540	0.826	0.618	0.592
		(-8.7)	(-11.6)		(-0.3)	(-3.3)		(-25.1)	(-28.3)
MLD	1.832	1.326	1.273	1.428	1.387	1.337	2.651	1.128	1.064
		(-27.6)	(-30.5)		(-2.9)	(-6.4)		(-57.4)	(-59.8)

(2) 2001

	Total			Young (aged 20-59)			Elderly (aged 60+)		
	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax	Pre-SS pre-tax	Post-SS pre-tax	Post-SS post-tax
SCV	2.563	1.794	1.604	1.621	1.650	1.563	8.494	2.050	1.562
		(-30.0)	(-37.4)		(1.8)	(-3.6)		(-75.9)	(-81.6)
LV	2.922	2.459	2.428	2.784	2.731	2.695	2.552	1.839	1.818
		(-15.9)	(-16.9)		(-1.9)	(-3.2)		(-27.9)	(-28.8)
Gini	0.684	0.581	0.567	0.587	0.583	0.572	0.844	0.544	0.524
		(-15.0)	(-17.1)		(-0.7)	(-2.6)		(-35.6)	(-37.9)
MLD	2.289	1.395	1.352	1.729	1.668	1.625	2.945	0.886	0.845
		(-39.0)	(-40.9)		(-3.5)	(-6.0)		(-69.9)	(-71.3)

(Note) Individual basis.
(Souce) The author's calculation based on the micro-data from the Surveys on Income Redstribution 1993 and 2002.

Table 2: Decomposition of the redistributive impact of social security and tax

(1) Social security

Year	Pre-SS pre-tax income (a)	Post-SS pre-tax income (b)	Changes (b)-(a)	Income redistribution				
				Within-age effect			Between-age effect (d)	Total between-age effect (c)+(d)
				Total	Pure	Due to between-age transfer (c)		
1992	1.832	1.326	-0.506	-0.451	0.151	-0.602	-0.055	-0.657
2001	2.289	1.395	-0.893	-0.782	0.408	-1.189	-0.112	-1.301
Δ: 1983-2001	0.457	0.069	-0.387	-0.331	0.257	-0.587	-0.057	-0.644

(2) Social security and tax

Year	Pre-SS pre-tax income (a)	Post-SS post-tax income (b)	Changes (b)-(a)	Income redistribution				
				Within-age effect			Between-age effect (d)	Total between-age effect (c)+(d)
				Total	Pure	Due to between-age transfer (c)		
1992	1.832	1.273	-0.559	-0.504	0.033	-0.537	-0.055	-0.592
2001	2.289	1.352	-0.936	-0.824	0.221	-1.045	-0.112	-1.158
Δ: 1983-2001	0.457	0.079	-0.377	-0.320	0.188	-0.508	-0.057	-0.565

(Note) Individual basis.
(Souce) The author's calculation based on the micro-data from the Surveys on Income Redstribution 1993 and 2002.

Table 3: Decomposition of within-age income redistribution

(1) 1992

Age group	Pre-SS pre-tax income (a)	Post-SS pre-tax income (b)	Changes (b)-(a)	Due to between-age transfer	Pure within-age redistrubution
Elderly	2.651	1.128	-1.522	-2.214	0.692
Young	1.428	1.387	-0.042	0.013	-0.055

Age group	Pre-SS pre-tax income (a)	Post-SS post-tax income (c)	Changes (c)-(a)	Due to between-age transfer	Pure within-age redistrubution
Elderly	2.945	1.064	-1.586	-2.094	0.508
Young	1.729	1.337	-0.091	0.057	-0.148

(2) 2001

Age group	Pre-SS pre-tax income (a)	Post-SS pre-tax income (b)	Changes (b)-(a)	Due to between-age transfer	Pure within-age redistrubution
Elderly	2.945	0.886	-2.059	-3.425	1.366
Young	1.729	1.668	-0.061	0.071	-0.132

Age group	Pre-SS pre-tax income (a)	Post-SS post-tax income (c)	Changes (c)-(a)	Due to between-age transfer	Pure within-age redistrubution
Elderly	2.945	0.845	-2.100	-3.291	1.191
Young	1.729	1.625	-0.104	0.221	-0.326

(Note) Individual basis.
(Souce) The author's calculation based on the micro-data from the Surveys on Income Redstribution 1993 and 2002.

Table 4: The estimated impact of post-2004 Reform EPI program on lifetime income

Pre-SS	Mean (mil. yen)	MLD	SCV
Employers' contributions not included (a)	233.9	0.072	0.140
Employers' contributions included (b)	255.3		
Post-SS	**Mean (mil. yen)**	**MLD**	**SCV**
Tax not subtracted (c)	234.7	0.066	0.130
Tax subtracted (d)	220.4		
Impact	**Mean**	**MLD**	**SCV**
Changes from Pre-SS to post-SS (%)	-8.1 (b-c) -13.7 (b-d)	-8.2	-7.1

(Note) 1. Based on the estimated income distribution for the male 1994 cohort.

2. "Tax" means tax to finance transfers from the general account of the central government.

(Source) The author's calculation based on the Annual Report of the Social Insurance Agency 2004.