Revenue and Benefit Effects
of Reducing DC Pension
Salary-Reduction Caps

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July 31, 2013

Abstract

This report contains estimates of the impact of lowering maximum allowable pretax contributions to salary-reduction defined-contribution pension plans beginning in 2012. Several reforms are considered, including lowering the base contribution cap, eliminating the catchup cap, combining those two reforms, and replacing the current caps with a 20/20 cap. For each reform, estimates of the aggregate dollar decline in DC plan contributions by employees and employers are presented. In addition, an estimate of the rise in federal individual income tax revenue during the first year of the reform is provided. And finally, the retirement income effects of each reform are estimated using a cohort sample of individuals who experience the reform over their whole work career.

This report presents microsimulation estimates of the effects of reducing maximum allowable pretax contributions to defined-contribution (DC) pension plans. The analysis assumes that the policy reforms do not change employer offerings of DC pensions and the analysis does not attempt to estimate how much more affected individuals might save for retirement outside of employer-sponsored DC pension plans.

The report is organized as follows. Analysis methods and assumptions are discussed first, then estimates for current-law DC plan contribution caps are presented. Next there are sections for each reform that contain estimates of how the reform's effect on retirement income varies across lifetime earnings quintiles. Detailed estimation results for each reform are included in an appendix that begins on page 17.

Analysis Methods and Assumptions

All federal income tax and pension estimates in this report are produced using the 4/24/2013 version of PENSIM[1] in association with the other two PSG models.[2] This means that all the estimates in this report are calculated from large samples of individuals whose life histories are generated from birth using microsimulation methods. The aggregate 2012 estimates are computed from a cross-section sample that contains a 0.1 percent subsample of each of the 78 birth cohorts born between 1935 and 2012. The 2070 retirement income estimates are computed from a 2.0 percent sample of the cohort born in 2000.

All the microsimulation runs use the same set of assumptions, which include the key economic and demographic assumptions used in the intermediate-cost projection of the 2012 OASDI Trustees Report, and include the 2012 baseline PENSIM assumptions regarding employer pension offerings and employee pension behavior (except that the 2012 baseline income tax policy, which is pre-ATRA, is replaced with post-ATRA policy, which begins to take effect in 2012, and except that recent trends in pension plan freezes have been projected into the future). There are four aspects of these assumptions that deserve more explanation.

First, the assumptions regarding employer pension offerings project into the future recent trends in the freezing of defined-benefit (DB) pension plans. These DB-freeze-trend assumptions, which are based on unpublished tabulations of National Compensation Survey data by the Bureau of Labor Statistics, have been incorporated into the 2013 baseline PENSIM assumptions. The assumed trend implies that the 2000 birth cohort will have less DB plan coverage and somewhat more DC plan coverage over their lifetimes than if the DB freeze trend had not been assumed.[3]

Second, the assumptions regarding the rate of return on corporate stock used in this report imply that the geometric mean of the stochastic nominal annual rate of return is about 7.8% and its volatility is 20.2%.[4] The retirement income estimates presented in this report are based on microsimulation runs in which the whole 2000 birth cohort sample is simulated in 500 different scenarios, with each scenario

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[1]Martin Holmer, *et al.*, *PENSIM Overview*, Washington, DC: Policy Simulation Group, April 2013 (with periodic revisions) ⟨http://www.polsim.com/doc/overview.pdf⟩.

[2]Complete documentation on the most recent version of the three PSG models is available at the PSG website ⟨http://www.polsim.com⟩.

[3]See sections 10.7 and 10.8 of the *PENSIM Overview* for details on the nature and consequences of the assumed trend.

[4]These stochastic corporate stock return assumptions are similar to those used by the Department of Labor in its official, peer-reviewed, and OMB-approved regulatory impact analysis of default investment rules for defined contribution pension plans. A page on the PSG website ⟨http://www.polsim.com/well-known-users.html⟩ provides links to the final rule in the October 24, 2007, *Federal Register*, and to details of the regulatory impact analysis.

having a different annual time series of corporate stock returns. In all other respects, the cohort environment is identical across these 500 scenarios, which means that individual life histories are identical across the 500 scenarios except for DC plan asset returns, accumulated DC balances, and hence, DC-generated annuity incomes in retirement.

Third, the assumption regarding social security benefits received by cohort individuals in 2070 is that they are payable (not scheduled) benefits. In other words, current-law benefits are simulated. The report makes no assumptions about the nature of future social security reforms. The PSG models estimate that payable OASI benefits in 2070 will be about 74 percent of scheduled benefits because it is projected that there will be no trust fund balance to draw down leaving only annual tax revenue to fund benefit payments.

And fourth, the baseline PENSIM assumptions use a formula for the number of adult equivalents in a family to compute family income per adult equivalent. This computation permits the averaging of retirement incomes of single individuals and couples. The formula and its parameters have been recommended by a National Academy of Sciences panel that studied poverty thresholds.[5] The formula, which reflects economies of scale when two people live together, implies that a family consisting of a two adults without children contains about 1.62 adult equivalents, while a family consisting of a single adult contains 1.00 adult equivalents. This means that a couple with twice the income of a single individual has a higher income per adult equivalent than does the single individual.

Current-Law Estimates

Before presenting the estimated effects of several reforms that reduce maximum allowable pretax contributions to salary-reduction DC pension plans, this section of the report describes a variety of PENSIM estimates simulated using current-law DC contribution caps. The purpose of this section is to provide details on DC contributions, balances, and DC-generated benefits, in the pre-reform situation, and to provide information on the realism of PENSIM estimates.

As background, it should be said at the outset that the baseline PENSIM microsimulation run produces an aggregate 75-year demographic and economic projection that closely matches the intermediate-cost projection in the 2012 OASDI Trustees Report. Using these simulated individual life histories, one of the other PSG models can simulate annual social security payroll taxes and benefits that closely match the OASDI solvency projections in the 2012 Trustees Report.

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[5]Both formula parameters are assumed to be 0.7; for details see Constance F. Citro and Robert T. Michael, editors, *Measuring Poverty: A New Approach*, Washington, DC: National Academy Press, 1995, pp. 161–162.

Table 1: **PENSIM Estimates of 2011 DC Plan Contributions and 2007 DC Plan Balances in Private Sector versus Historical Data from Vanguard**

Statistic	PENSIM Estimate	Historical Value
2011 Average employee contribution rate (%)	7.3	7.1
2011 Percent of employees contributing more than 10%	22	22
2011 Percent of employees reaching contribution cap	12	12
2011 Average employee+employer contribution rate (%)	11.2	10.4
2007 Average account balance all ages ($thousands)	72.1	78.4
2007 Median account balance all ages ($thousands)	25.1	25.2
2007 Average account balance age 55–64 ($thousands)	141.7	142.2
2007 Median account balance age 55–64 ($thousands)	69.9	60.7

Source: historical contribution statistics from Vanguard, *How America Saves 2012*, page 6, and balances from Vanguard, *How America Saves 2008*, page 49.

These same life histories are used by PENSIM to simulate the accumulation of pension rights in both DB and DC plans over each individual's work career. The accumulated DB pension rights generate annuity income in retirement. And the accumulated DC pension rights — that is, the sum of current and rolled over DC plan balances — are assumed to be converted into immediate life annuities at retirement. The universal annuitization of DC balances is not a realistic assumption, but it is analytically useful because it converts accumulated DC pension rights from a stock into a flow that can be added to social security and DB pension benefits.

DC contribution rates and balances simulated by PENSIM are close to various historical statistics. Table 1 shows how close PENSIM estimates of DC plan contribution rates and on-the-job balances are to historical data compiled by Vanguard. In addition, the mean of the sum of current on-the-job DC plan balances and rollover balances for families with a positive balance sum, is tabulated from the 2007 Survey of Consumer Finances to be 148.4 thousand dollars;[6] the corresponding statistic simulated by PENSIM is 149.4 thousand dollars. Chapter 11 of the *PENSIM Overview* contains a number of other validation tests of PENSIM's ability to simulate realistically the accumulation of DB and DC pension rights.

The realism of PENSIM's federal income tax estimates has also been tested.[7] In a cross-model validation, personal attributes, incomes, and deductible expenses for 200,000 tax units were randomly generated for each year between 2004 and 2013,

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[6]Craig Copeland, "Individual Account Retirement Plans: An Analysis of the 2007 Survey of Consumer Finances," *EBRI Issue Brief No. 333*, Washington, DC: Employee Benefit Research Institute, August 2009, Figure 9b.

[7]See Chapter 7 of the *PENSIM Overview* for details on the federal income tax module.

Table 2: **Selected Prices for Immediate Life Annuities Paid by Individuals in 2000 Birth Cohort (joint-and-survivor prices vary by age of spouse)**

Individual	Annuity	Average Price (Range)
Male age 62	single-life	19.35 (no variation)
Male age 67	single-life	16.86 (no variation)
Female age 62	single-life	20.62 (no variation)
Female age 67	single-life	18.12 (no variation)
Male age 62	joint-and-survivor	22.37 (20.63–23.83)
Male age 67	joint-and-survivor	19.95 (18.06–21.56)
Female age 62	joint-and-survivor	22.22 (21.43–23.98)
Female age 67	joint-and-survivor	19.74 (18.87–21.68)

Note: The price is the dollar cost to an unmarried person of buying a single-life annuity that pays one inflation-indexed dollar per year until death or the dollar cost to a married person of buying a joint-and-survivor annuity that pays one inflation-indexed dollar per year to the couple and then sixty-seven inflation-indexed cents per year to the survivor until death.

producing a total of 2,000,000 different tax units. Each of these units has been processed by the Internet version 9.2 of TAXSIM, a tax calculator maintained by the National Bureau of Economic Research.[8] And each of these tax units has also been processed by the PENSIM income tax module. The PENSIM and TAXSIM results for total tax liability, and numerous intermediate tax amounts (such as adjusted gross income, child credits, etc.), are virtually the same with differences usually being no more than a penny or two. The results of another validation test show that the aggregate revenue generated by the income taxation of 2004 social security disability insurance benefits simulated by PENSIM and the other PSG models was quite close to the actual amount collected.

As mentioned above, all the PENSIM runs described in this report assume that all DC plan and rollover account balances are used at retirement to buy an immediate life annuity. Given the assumptions described in this paragraph, the annuity prices facing simulated individuals in the 2000 birth cohort at retirement are shown in Table 2. It is assumed that married individuals buy a joint-and-survivor annuity, unmarried individuals buy a single-life annuity, and that both types of annuities are inflation indexed. The prices at which these annuities are purchased can be expressed in terms of the number of dollars required to buy an annuity that pays one dollar per year in the first year of the annuity contract. The baseline PENSIM assumption that is used in setting these prices is that the present

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[8]Daniel Feenberg and Elisabeth Coutts, "An Introduction to the TAXSIM Model." *Journal of Policy Analysis and Management* 12(1), Winter 1993, pp. 189–194. Internet TAXSIM is available at the following URL: ⟨http://www.nber.org/ taxsim/taxsim-calc9/⟩

value of the cost of annuity payments made to individuals in the 2000 birth cohort and their survivors is no more than the present value of annuity purchase revenue generated from selling annuities to individuals in the 2000 birth cohort. If the two present values were to be assumed to be equal, annuity providers would be unable to cover their marketing and administrative costs or the cost of capital on any reserves they hold against the annuity book of business, and they would earn zero profits in the annuity providing business. In order to avoid such a lack of realism, the baseline PENSIM assumption is that annuity prices are proportionally scaled up so that the present value of the revenue generated from selling annuities is eight percent higher than the present value of the cost of making annuity payments.

Given all these assumptions, what are the PENSIM estimates under current-law DC contribution caps for DC pension contributions in 2012 and for retirement income in 2070? The contribution estimates are shown in Table 3 and the retirement income estimates for the 2000 birth cohort are presented in Table 4.

Table 3 shows that the employee contribution rate in 2012 is estimated to average 7.3 percent of earnings, but varies widely with almost 40 percent of DC plan participants contributing less than six percent of earnings and almost 22 percent contributing more than ten percent. Furthermore, 12.2 percent of participants have contributions that are capped. In all, PENSIM estimates that about 267 billion dollars in employee contributions flowed into DC pension plans during 2012.

When adding both matching and non-matching employer contributions, Table 3 shows that the average total contribution rate rises to 11.1 percent of earnings. The total contribution rate is below nine percent of earnings for 41 percent of DC plan participants and at or above nine percent for the remaining 59 percent. Aggregate DC contributions from both employees and employers in 2012 is estimated to be slightly more than 413 billion dollars.

Estimates in Table 4 reveal how the size and composition of retirement income vary across lifetime family earnings quintiles. Individuals in the 2000 birth cohort who are in the bottom quintile are estimated to have average retirement income that is less than one-fifth that of individuals in the top quintile. The bottom quintile is estimated to receive almost 75 percent of its retirement income in the form of social security benefits, while the top quintile is estimated to receive only 35 percent from social security. (Remember that these estimates are of payable social security benefits, which are more than a quarter below scheduled benefits, with actual benefits being limited to those that can be paid with trust-fund tax revenue in 2070.) The relatively high reliance on social security in retirement by individuals in the bottom quintile of lifetime family earnings is caused primarily by two factors: the progressive nature of the social security benefit formula and the accumulation of few pension rights, mostly because their employers' did not offer pensions.

Table 3: **PENSIM Estimates of DC Pension Contributions in 2012 under Current-Law DC Contribution Caps**

Average employee contribution rate (%)	7.3
Percent of participants contributing <6%	39.9
Percent of participants contributing 6–10%	38.5
Percent of participants contributing >10%	21.6
Percent of participants whose contributions are capped	12.2
Aggregate employee contributions ($ billion)	267.0
Average employee+employer (ee+er) contribution rate (%)	11.1
Percent of participants with of ee+er contribution rate <9%	41.0
Percent of participants with of ee+er contribution rate >=9%	59.0
Aggregate employee+employer contributions ($ billion)	413.5

Note: contribution rates are expressed as a percent of earnings.

Table 4: **PENSIM Estimates of Components of Average Family Retirement Income in 2070 under Current-Law DC Contribution Caps for All of 2000 Birth Cohort and for Each Lifetime Family Earnings Quintile (with amounts expressed in thousands of 2012 dollars per adult equivalent in the family)**

Cohort Group	Age 70 Retirement Income ($K)				Percentile DC-Pen Amounts		
	Total	Soc-Sec	DB-Pen	DC-Pen	5th	50th	95th
All	50.1	23.3	8.9	18.0	10.0	16.6	31.4
Q1	16.9	12.6	1.3	3.0	1.6	2.7	5.4
Q2	29.0	18.2	3.4	7.4	4.0	6.8	13.0
Q3	44.3	23.5	6.8	14.0	7.8	12.9	24.2
Q4	65.3	28.9	12.0	24.4	13.6	22.5	42.1
Q5 (top)	94.9	33.2	20.7	41.0	22.8	37.7	71.2

Note: Social security amounts are payable benefits; DB pension amounts reflect projecting recent DB freeze trends into the future; DC pension amounts are payments from annuities bought with DC plan and rollover account balances at retirement; and total retirement income is defined as the sum of the three. Social security and DB pension amounts do not vary across scenarios; the DC pension amounts on the left are averages over all 500 corporate stock return scenarios and on the right are selected percentile values from the scenario distribution.

Also evident in Table 4 is the wide variability in retirement income generated by DC plans, which is strongly influenced by the pattern of corporate stock returns experienced over the lifetimes of cohort individuals.

Lower Base Contribution Cap

The first reform considered in this report lowers the base employee contribution cap in 2012 from $17,000 to $12,000, leaving the catchup cap, which applies only to those age fifty or more, unchanged at $5,500. All caps are inflation indexed in years beyond 2012 under both current-law policy and under this reform.

This reform is estimated to cause in 2012 a decline in employee contributions of 10.9 percent and a rise in the percent of DC participants who are contributing at the cap from 12.2 to 16.2 percent. Employer contributions decline by 1.0 percent. And federal individual income tax revenue rises by $8.4 billion in 2012.[9]

Figure 1 shows the size of the decline in retirement income for the whole cohort and for each lifetime family earnings quintile after individuals born in 2000 work their whole careers under this reform. For the median corporate stock return scenario, the percentage decline in DC-generated retirement benefits varies widely from about one percent for the bottom quintile to almost fourteen percent for the top quintile. This difference is caused by the fact that those in the bottom lifetime family earnings quintile are rarely affected by the lowering of the annual contribution cap while those in the top quintile are more likely to be affected because their employers are more likely to offer DC plans and those individuals are more likely to be contributing large dollar amounts because of their high earnings.

Figure 1 also shows that the reform's effect on total retirement income ranges from essentially zero for the bottom quintile to almost six percent for the top lifetime earnings quintile. These size of these median percentage declines is determined by the size of the percentage decline in DC benefits (which is the only component of retirement income that changes with the reform) and by the importance of DC benefits in retirement income before the reform. The bottom quintile experiences a very small decline in DC benefits, which are a relatively small fraction of retirement income before the reform. The top quintile experiences a such larger percentage decline in DC benefits, which represent nearly half of total retirement income before the reform.

These results suggest that much of the effect of lowering the 2012 base contribution cap from $17,000 to $12,000 is caused by the impact on high earners. This impression is reinforced by the results, not shown in the text or appendix, of an alternative reform that lowers the cap from $17,000 to $12,000 only for those individuals who earn $110,000 in 2012 and leaves the cap unchanged for those whose

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[9]Detailed estimates of the effects of this reform are in the appendix table on page 18.
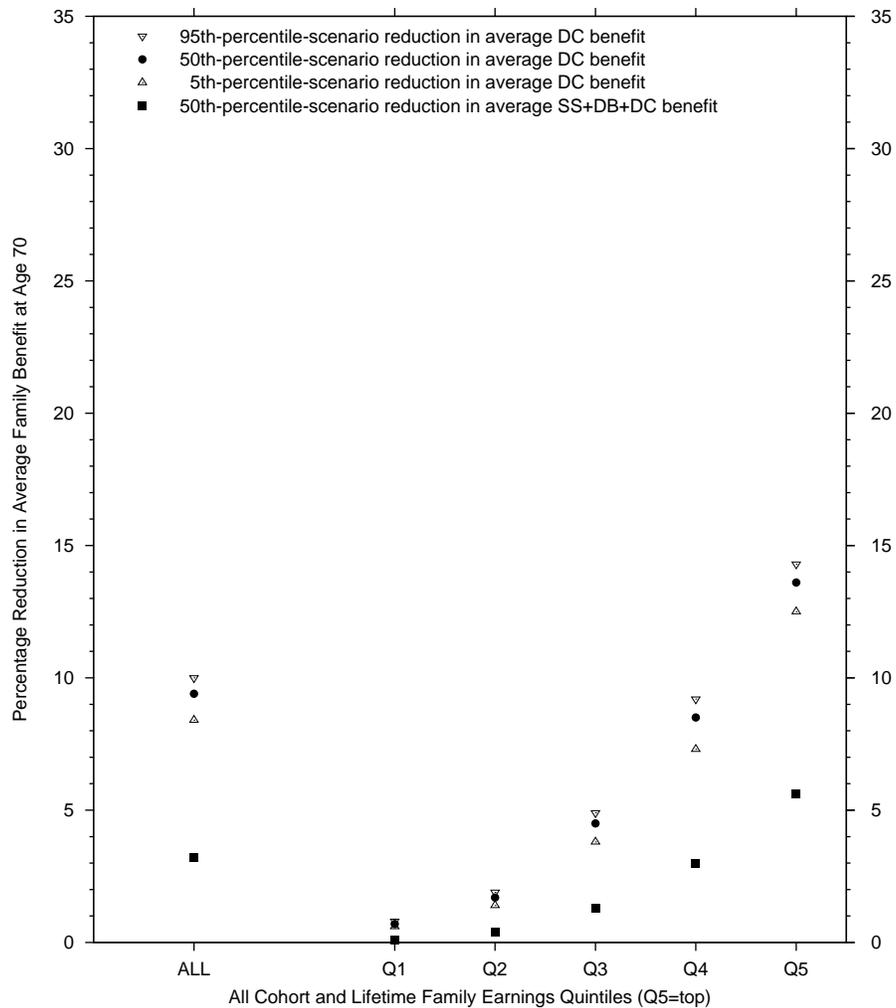
Figure 1: ***Percentage Reduction in Average Family Benefit Received at Age 70 by Cohort Born in 2000 Caused by Lower Base Contribution Cap Reform in 2012.*** *Average benefit includes individuals whose family benefit is zero. Average benefit reduction computed from PENSIM (4/24/2013 version) projections assuming (a) payable social security (SS) benefits, (b) continuation of recent DB freeze trends into future, and (c) stochastic corporate stock returns, which makes average DC benefit vary across 500 different time-series scenarios of simulated returns. All other aspects of the cohort's lifetime experience, including social security and DB pension benefits, are exactly the same across the 500 scenarios.*

2012 annual earnings are below $110,000. This alternative reform has almost as large an impact on 2012 pension contributions and tax revenues as does the reform that lowers the cap for everybody. Aggregate DC plan contributions decline by $28.7 billion rather than $30.5 billion when the cap is lowered for everybody. And 2012 federal income tax revenue rises by $8.0 billion, which is almost as large as the $8.4 billion rise when the contribution cap is lowered for everybody. These results indicate that the bulk of the aggregate effects of the reform are produced by the reform's effect on those with high annual earnings.

Zero Catchup Contribution Cap

The second reform considered in this report lowers the catchup contribution cap (for those age fifty or more) in 2012 from $5,500 to zero, leaving the base contribution cap unchanged at $17,000. All caps are inflation indexed in years beyond 2012 under both current-law policy and under this reform.

This reform is estimated to cause in 2012 a decline in employee contributions of 5.4 percent and a rise in the percent of DC participants who are contributing at the cap from 12.2 to 13.7 percent. Employer contributions decline by 0.1 percent. And federal income tax revenue rises by $4.1 billion in 2012.[10]

Figure 2 shows the size of the declines in retirement income for the whole cohort and for each lifetime earnings quintile when individuals in the 2000 birth cohort work their whole careers under this reform. The percentage decline in DC-generated retirement benefits varies widely from about one percent for the bottom quintile to almost six percent for the top quintile. These quintile differences are caused by the same factors discussed above with regards to the first reform.

Figure 2 also shows that the reform's effect on total retirement income ranges from essentially zero for the bottom quintile to slightly more than two percent for the top lifetime earnings quintile.

For the cohort as a whole, the percentage decline in DC benefits at the median of the scenario distribution is about four and a half percent, while the median percentage decline in total retirement income is about one and a half percent.

Lower Base and Zero Catchup Contribution Caps

The third reform considered in this report is a combination of the first and second reforms. This reform lowers the base employee contribution cap in 2012 from $17,000 to $12,000 and eliminates the $5,500 catchup cap. All caps are inflation indexed in years beyond 2012 under both current-law policy and under this reform.

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[10]Detailed estimates of the effects of this reform are in the appendix table on page 19.
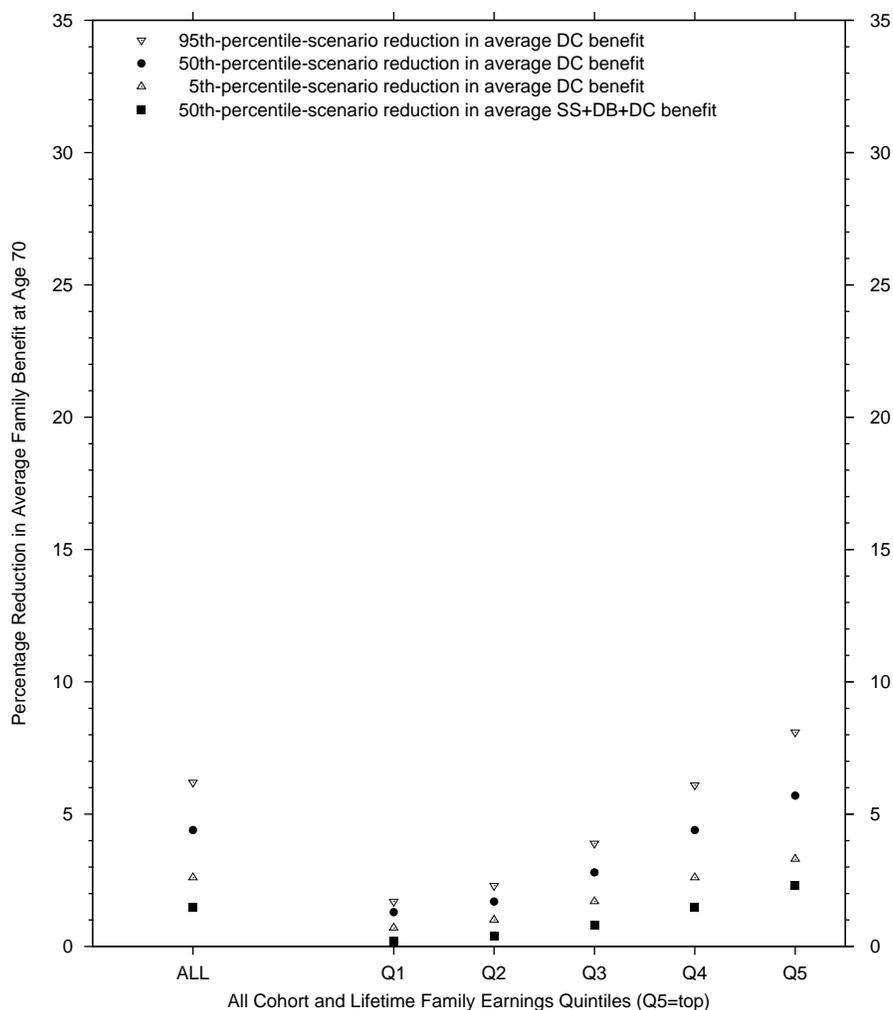
Figure 2: ***Percentage Reduction in Average Family Benefit Received at Age 70 by Cohort Born in 2000 Caused by Zero Catchup Contribution Cap Reform in 2012.*** *Average benefit includes individuals whose family benefit is zero. Average benefit reduction computed from PENSIM (4/24/2013 version) projections assuming (a) payable social security (SS) benefits, (b) continuation of recent DB freeze trends into future, and (c) stochastic corporate stock returns, which makes average DC benefit vary across 500 different time-series scenarios of simulated returns. All other aspects of the cohort's lifetime experience, including social security and DB pension benefits, are exactly the same across the 500 scenarios.*

It is worth noting that the actual DC contribution caps in 2001, when inflation indexed to 2012, are roughly similar to the caps specified in this reform. In 2001, the base cap was $10,500 and there was no catchup contribution. Scaling up these 2001 amounts, using a 1.3038 CPI-W inflation factor, produces 2012 values of $13,690 and $0, which are only slightly more generous than the $12,000 and $0 contribution caps specified in this reform. The reform considered in this section of the report can be viewed, therefore, as simply rolling back the new DC pension contribution tax breaks provided since 2001 and then reducing the base contribution cap by a relatively modest $1,690 in 2012.

Figure 3 shows the size of the declines in retirement income for each lifetime family earnings quintile after individuals born in 2000 work their whole careers under this reform. The percentage decline in DC-generated retirement benefits in the median corporate stock return scenario varies from about two percent for the bottom quintile to just over twenty percent for the top quintile. For the cohort as a whole the median percentage decline in DC-generated retirement benefits is about fifteen percent. But because social security and DB pension benefits are unchanged by this reform, total retirement income declines by only five percent for the whole cohort in the median scenario. As for the other reforms, the median percentage decline in total retirement income varies substantially across the lifetime earnings quintiles: the bottom quintile experiences a decline of less than one-half percent while the top quintile experiences a decline of almost nine percent. Again these quintile differences are rooted in the fact that individuals in the higher earnings quintiles are more likely to have had jobs that offered DC plans and are more likely to have been contributing large dollar amounts to those plans because of their high earnings.

These considerations, along with the progressive nature of the social security benefit formula, imply that before the reform individuals in the top lifetime earnings quintile receive the largest fraction of their retirement income from DC pensions. As shown in Table 4 on page 7, DC-generated benefits in the median scenario make up 43 percent of retirement income for the top quintile, but only 18 percent for the bottom quintile.

Given these features of the employer-sponsored pension system, it is to be expected that the bulk of the reform-induced reductions in DC pension contributions, and hence, DC-generated retirement benefits, would be experienced by those with high earnings. But it is worth noting that this reform causes only a modest decline in the ratio of total retirement income in the top quintile to retirement income in the bottom quintile. Detailed results for this reform in the appendix table on page 20 show that this ratio drops from about 5.6 before the reform to about 5.2 after the reform. But even this small compression in retirement income dispersion is unlikely to occur after such a reform because many high earners would probably save more
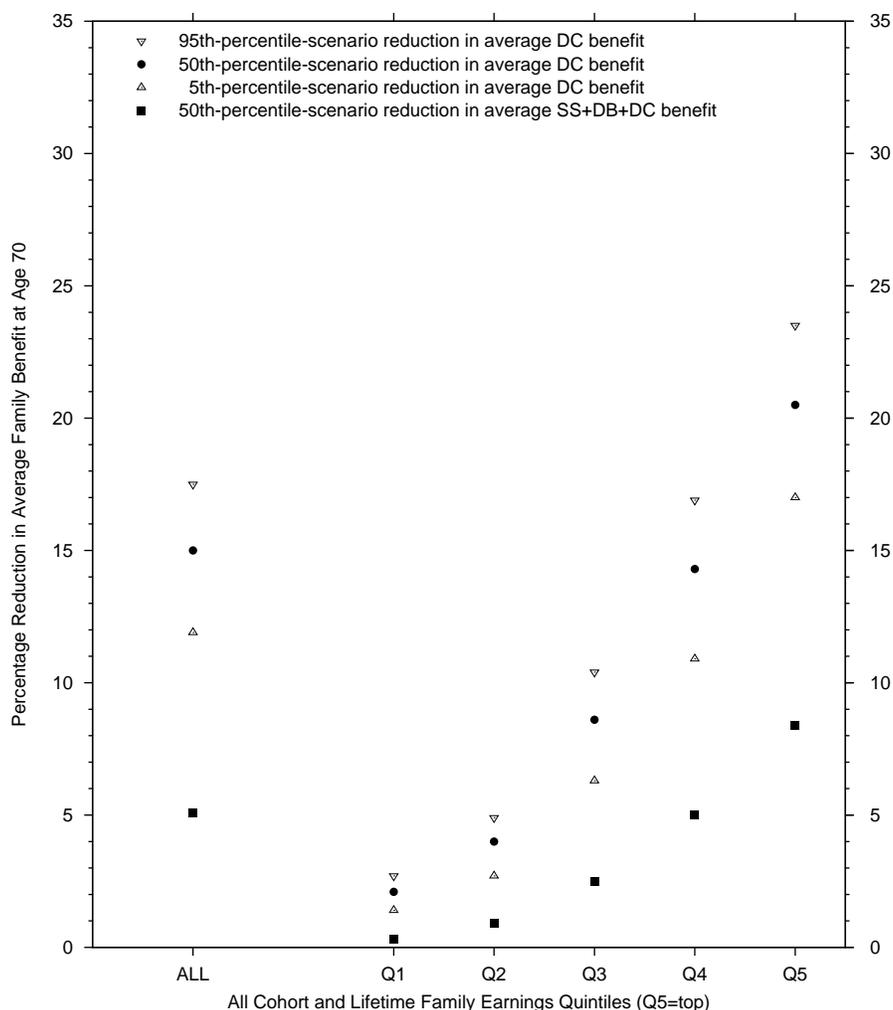
Figure 3: ***Percentage Reduction in Average Family Benefit Received at Age 70 by Cohort Born in 2000 Caused by Lower Base and Zero Catchup Contribution Caps Reform in 2012.*** *Average benefit includes individuals whose family benefit is zero. Average benefit reduction computed from PENSIM (4/24/2013 version) projections assuming (a) payable social security (SS) benefits, (b) continuation of recent DB freeze trends into future, and (c) stochastic corporate stock returns, which makes average DC benefit vary across 500 different time-series scenarios of simulated returns. All other aspects of the cohort's lifetime experience, including social security and DB pension benefits, are exactly the same across the 500 scenarios.*

in taxable accounts to offset the reform-induced decline in their DC-plan account balances. This report makes no attempt to simulate reform-induced changes in contributions to taxable accounts.

Replace Current Contribution Caps with 20/20 Caps

The final reform considered in this report eliminates the current caps on base and catchup employee contributions and replaces them with caps on combined employee and employer contributions to DC pension plans. This reform establishes combined contribution caps of $20,000 in 2012 or 20% of earnings, whichever is less. The $20,000 cap on combined employee and employer DC contributions is inflation indexed in 2013 and beyond. This reform is similar to ideas suggested in recent years by Erskine Bowles and Alan Simpson.

This 20/20 reform is estimated to cause in 2012 a decline in employee contributions of 11.7 percent and a rise in the percent of DC participants who are contributing at the cap from 12.2 to 15.7 percent. These changes are smaller than for the prior reform because the employee contribution cap is much higher: $20,000 rather than $12,000. Employer contributions decline by 15.7 percent, which is a much larger decline than under the other reforms considered in this report.[11] The decline in employer contributions — much of which are non-matching contributions to DC profit-sharing plans — are not assumed to translate into higher employee earnings in this report. This means that much of the reduction in employer contributions does not produce an increase in federal individual income tax revenue (and PENSIM does not simulate the federal corporate income tax). As a result, the federal individual income tax revenue increase estimated by PENSIM for the 20/20 reform, which is $8.6 billion for 2012, is much less than the increase of $13.7 billion estimated for the prior reform.

Figure 4 shows the size of the declines in retirement income for the whole cohort and for each lifetime earnings quintile after individuals born in 2000 work their whole careers under the 20/20 reform. The percentage decline in DC-generated retirement benefits for the whole cohort in the median corporate stock return scenario is almost 21 percent with the bottom quintile experiencing about a 7 percent decline and the top quintile experiencing a 28 percent decline in DC benefits. These declines translate into smaller percentage declines in total retirement income with the whole cohort experiencing a 7 percent decline, the bottom quintile a 1 percent decline, and the top quintile experiencing almost a 12 percent decline in total retirement income.

As with the other reforms, the detailed estimates in the appendix table on page 21 show that the top twenty percent of individuals (ranked by lifetime fam-

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[11]Detailed estimates of the effects of this 20/20 reform are in the appendix table on page 21.
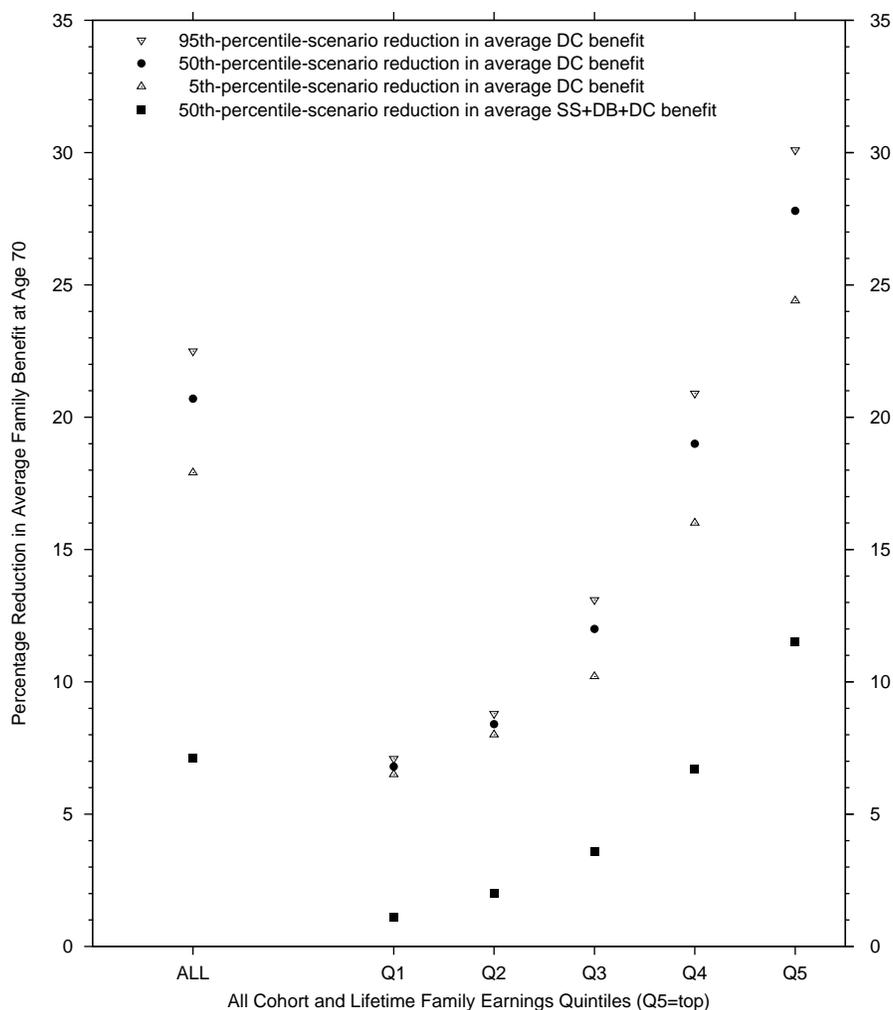
Figure 4: **Percentage Reduction in Average Family Benefit Received at Age 70 by Cohort Born in 2000 Caused by 20/20 Contribution Cap Reform in 2012.** *Average benefit includes individuals whose family benefit is zero. Average benefit reduction computed from PENSIM (4/24/2013 version) projections assuming (a) payable social security (SS) benefits, (b) continuation of recent DB freeze trends into future, and (c) stochastic corporate stock returns, which makes average DC benefit vary across 500 different time-series scenarios of simulated returns. All other aspects of the cohort's lifetime experience, including social security and DB pension benefits, are exactly the same across the 500 scenarios.*

ily earnings) experience almost 62 percent of the whole-cohort reduction in retirement income. And the second highest twenty percent experience nearly 25 percent, leaving only 13 percent of the whole-cohort reduction in retirement income to be experienced by the bottom sixty percent of the lifetime earnings distribution.

Appendix: Details of Reform Estimates

There is a table containing detailed reform estimates on each page starting after this short explanation of the table statistics and their units.

The **top panel** in each table contains values of 2012 cap parameters under current-law and under the reform. The base employee contribution cap is denoted by `basecap` and the increase in the base cap for those age fifty or more is denoted by `catchup`. The 2012 values for the cap parameters are inflation indexed beginning in 2013 under both current law and all the reforms.

The **first panel of results** in each table contains estimates for 2012 of aggregate employee DC contributions, percent of DC plan contributors whose employee contribution amount is capped, aggregate employer DC contributions, and aggregate federal individual income tax revenue, with all monetary statistics expressed in billions of 2012 dollars.[12] The number in square brackets is the magnitude of the reform-induced change in the statistic (expressed in dollars or percentage points). The number in parentheses is the proportional change in the statistic (expressed in percent).

The **second panel of results** in each table contains estimates of average retirement income and average DC pension benefits at age 70 for the birth cohort born in 2000, both expressed in thousands of 2012 dollars and averaged over the 500 corporate stock return scenarios. *Retirement income is the sum of pretax social security benefits, pretax DB pension benefits, and pretax DC pension benefits, all measured for the cohort individual's family and adjusted for the number of adult equivalents in the family.* Social security benefits are payable benefits, which are projected to be 26 percent below scheduled benefits in 2070. DB pension benefits are simulated by projecting recent freeze trends into the future as described above. Social security and DB benefits are unchanged by the DC cap reforms, so any difference between the reform-induced dollar change in retirement income and the dollar change in DC benefits is caused solely by rounding error. The numbers in square brackets and in parentheses are computed in the same way is they are in the first panel of each table.[13] The second panel also contains these two statistics for each lifetime family earnings (LTFE) quintile. The quintile results have an additional statistic in angle brackets: the share of the all-cohort change in aggregate retirement income or DC pension benefits that is experienced by that quintile.

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[12]Tax revenues are somewhat underestimated because individuals born before 1935, who were over 77 years old in 2012, are not simulated in PENSIM. The reform effect on tax revenue is not biased by these missing cohorts because few, if any, people over 77 have pension contributions.

[13]Note that the reform-induced percentage change in scenario means shown in parentheses in these appendix tables are conceptually different from median scenario percentage change shown in the figures in the body of the report.

Appendix Details of Reform:
Lower Base Contribution Cap

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--------------------------------------------------------------------
 PARAMETER         CURRENT-LAW   REFORM
  basecap             17000      12000
  catchup              5500       5500
--------------------------------------------------------------------
 2012 Agg EE DC Cont    267        238 [ -29.0]  (-10.9%)
 2012 Pct EEC Capped    12.2       16.2 [   4.0]  ( 32.8%)
 2012 Agg ER DC Cont    147        145 [  -1.5]  ( -1.0%)
 2012 Agg IncTax Rev   1026       1034 [   8.4]  (  0.8%)
--------------------------------------------------------------------
 ALL INDIVIDUALS:
 2070 Avg Ret Income    50.1       48.4 [ -1.66]  ( -3.3%) <100.0%>
 2070 Avg DC Benefit    18.0       16.3 [ -1.66]  ( -9.2%) <100.0%>
 ------------------
 LTFE QUINTILE 1:
 2070 Avg Ret Income    16.9       16.8 [ -0.02]  ( -0.1%) <  0.2%>
 2070 Avg DC Benefit     3.0        3.0 [ -0.02]  ( -0.7%) <  0.2%>
 ------------------
 LTFE QUINTILE 2:
 2070 Avg Ret Income    29.0       28.9 [ -0.12]  ( -0.4%) <  1.4%>
 2070 Avg DC Benefit     7.4        7.3 [ -0.12]  ( -1.6%) <  1.4%>
 ------------------
 LTFE QUINTILE 3:
 2070 Avg Ret Income    44.3       43.7 [ -0.61]  ( -1.4%) <  7.4%>
 2070 Avg DC Benefit    14.0       13.4 [ -0.61]  ( -4.4%) <  7.4%>
 ------------------
 LTFE QUINTILE 4:
 2070 Avg Ret Income    65.3       63.3 [ -2.03]  ( -3.1%) < 24.4%>
 2070 Avg DC Benefit    24.4       22.4 [ -2.03]  ( -8.3%) < 24.4%>
 ------------------
 LTFE QUINTILE 5:
 2070 Avg Ret Income    94.9       89.4 [ -5.52]  ( -5.8%) < 66.5%>
 2070 Avg DC Benefit    41.0       35.5 [ -5.52]  (-13.5%) < 66.5%>
--------------------------------------------------------------------
```

See page 17 for explanation of table entries.

Appendix Details of Reform:
Zero Catchup Contribution Cap

```
-----------------------------------------------------------------
 PARAMETER         CURRENT-LAW   REFORM
  basecap             17000      17000
  catchup              5500          0
-----------------------------------------------------------------
 2012 Agg EE DC Cont    267        253 [ -14.3] ( -5.4%)
 2012 Pct EEC Capped   12.2       13.7 [   1.5] ( 12.3%)
 2012 Agg ER DC Cont    147        146 [  -0.2] ( -0.1%)
 2012 Agg IncTax Rev   1026       1030 [   4.1] (  0.4%)
-----------------------------------------------------------------
 ALL INDIVIDUALS:
 2070 Avg Ret Income   50.1       49.3 [ -0.74] ( -1.5%) <100.0%>
 2070 Avg DC Benefit   18.0       17.2 [ -0.74] ( -4.1%) <100.0%>
 ------------------
 LTFE QUINTILE 1:
 2070 Avg Ret Income   16.9       16.8 [ -0.03] ( -0.2%) <  0.9%>
 2070 Avg DC Benefit    3.0        2.9 [ -0.03] ( -1.1%) <  0.9%>
 ------------------
 LTFE QUINTILE 2:
 2070 Avg Ret Income   29.0       28.9 [ -0.12] ( -0.4%) <  3.1%>
 2070 Avg DC Benefit    7.4        7.3 [ -0.12] ( -1.6%) <  3.1%>
 ------------------
 LTFE QUINTILE 3:
 2070 Avg Ret Income   44.3       43.9 [ -0.37] ( -0.8%) < 10.1%>
 2070 Avg DC Benefit   14.0       13.7 [ -0.37] ( -2.7%) < 10.1%>
 ------------------
 LTFE QUINTILE 4:
 2070 Avg Ret Income   65.3       64.3 [ -1.00] ( -1.5%) < 27.0%>
 2070 Avg DC Benefit   24.4       23.4 [ -1.00] ( -4.1%) < 27.0%>
 ------------------
 LTFE QUINTILE 5:
 2070 Avg Ret Income   94.9       92.8 [ -2.18] ( -2.3%) < 58.9%>
 2070 Avg DC Benefit   41.0       38.8 [ -2.18] ( -5.3%) < 58.8%>
-----------------------------------------------------------------
```

See page 17 for explanation of table entries.

Appendix Details of Reform:
Lower Base and Zero Catchup Contribution Caps

```
--------------------------------------------------------------------
 PARAMETER          CURRENT-LAW   REFORM
  basecap              17000      12000
  catchup               5500          0
--------------------------------------------------------------------
 2012 Agg EE DC Cont    267        219 [ -47.6] (-17.8%)
 2012 Pct EEC Capped    12.2       18.3 [   6.1] ( 50.0%)
 2012 Agg ER DC Cont    147        144 [  -2.4] ( -1.7%)
 2012 Agg IncTax Rev   1026       1039 [  13.7] (  1.3%)
--------------------------------------------------------------------
 ALL INDIVIDUALS:
 2070 Avg Ret Income    50.1       47.5 [ -2.59] ( -5.2%) <100.0%>
 2070 Avg DC Benefit    18.0       15.4 [ -2.59] (-14.4%) <100.0%>
 ------------------
 LTFE QUINTILE 1:
 2070 Avg Ret Income    16.9       16.8 [ -0.06] ( -0.3%) <  0.5%>
 2070 Avg DC Benefit     3.0        2.9 [ -0.06] ( -2.0%) <  0.5%>
 ------------------
 LTFE QUINTILE 2:
 2070 Avg Ret Income    29.0       28.7 [ -0.28] ( -0.9%) <  2.1%>
 2070 Avg DC Benefit     7.4        7.1 [ -0.28] ( -3.7%) <  2.1%>
 ------------------
 LTFE QUINTILE 3:
 2070 Avg Ret Income    44.3       43.1 [ -1.14] ( -2.6%) <  8.8%>
 2070 Avg DC Benefit    14.0       12.9 [ -1.14] ( -8.2%) <  8.8%>
 ------------------
 LTFE QUINTILE 4:
 2070 Avg Ret Income    65.3       62.0 [ -3.33] ( -5.1%) < 25.7%>
 2070 Avg DC Benefit    24.4       21.1 [ -3.33] (-13.6%) < 25.7%>
 ------------------
 LTFE QUINTILE 5:
 2070 Avg Ret Income    94.9       86.8 [ -8.15] ( -8.6%) < 62.9%>
 2070 Avg DC Benefit    41.0       32.9 [ -8.15] (-19.9%) < 62.9%>
--------------------------------------------------------------------
```

See page 17 for explanation of table entries.

Appendix Details of Reform:
Replace Current Contribution Caps with 20/20 Caps

```
--------------------------------------------------------------------
 PARAMETER         CURRENT-LAW   REFORM
  basecap              17000     20000  |  PLUS ee+er cap at 20000
  catchup               5500         0  |   and at 20% of earnings
--------------------------------------------------------------------
 2012 Agg EE DC Cont     267       236 [ -31.3] (-11.7%)
 2012 Pct EEC Capped    12.2      15.7 [   3.5] ( 28.7%)
 2012 Agg ER DC Cont     147       124 [ -23.0] (-15.7%)
 2012 Agg IncTax Rev    1026      1034 [   8.6] (  0.8%)
--------------------------------------------------------------------
 ALL INDIVIDUALS:
 2070 Avg Ret Income    50.1      46.5 [ -3.62] ( -7.2%) <100.0%>
 2070 Avg DC Benefit    18.0      14.3 [ -3.62] (-20.2%) <100.0%>
 ------------------
 LTFE QUINTILE 1:
 2070 Avg Ret Income    16.9      16.7 [ -0.20] ( -1.2%) <  1.1%>
 2070 Avg DC Benefit     3.0       2.8 [ -0.20] ( -6.8%) <  1.1%>
 ------------------
 LTFE QUINTILE 2:
 2070 Avg Ret Income    29.0      28.4 [ -0.62] ( -2.1%) <  3.4%>
 2070 Avg DC Benefit     7.4       6.8 [ -0.62] ( -8.3%) <  3.4%>
 ------------------
 LTFE QUINTILE 3:
 2070 Avg Ret Income    44.3      42.6 [ -1.64] ( -3.7%) <  9.0%>
 2070 Avg DC Benefit    14.0      12.4 [ -1.64] (-11.7%) <  9.0%>
 ------------------
 LTFE QUINTILE 4:
 2070 Avg Ret Income    65.3      60.8 [ -4.50] ( -6.9%) < 24.8%>
 2070 Avg DC Benefit    24.4      19.9 [ -4.50] (-18.4%) < 24.8%>
 ------------------
 LTFE QUINTILE 5:
 2070 Avg Ret Income    94.9      83.8 [-11.16] (-11.7%) < 61.6%>
 2070 Avg DC Benefit    41.0      29.9 [-11.16] (-27.2%) < 61.6%>
--------------------------------------------------------------------
```

See page 17 for explanation of table entries.