The Growth in Social Security Benefits Among the Retirement-Age Population from Increases in the Cap on Covered Earnings

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Analysts have proposed raising the maximum level of earnings subject to the Social Security payroll tax (the "tax max") to improve long-term Social Security Trust Fund solvency. This article investigates how raising the tax max leads to the "leakage" of portions of the additional revenue into higher benefit payments. Using Health and Retirement Study data matched to Social Security earnings records, we compare historical payroll tax payments and benefit amounts for Early Boomers (born 1948–1953) with tax and benefit simulations had they been subject to the tax max (adjusted for wage growth) faced by cohorts 12 and 24 years older. We find that 43.2 percent of the additional payroll tax revenue attributable to tax max increases affecting Early Boomers relative to taxes paid by the cohort 12 years older leaked into higher benefits. For Early Boomers relative to those 24 years older, we find 53.5 percent leakage.

Introduction

Raising the maximum earnings level subject to the payroll tax is one of the policies often suggested as a means of narrowing the financial gap facing the Social Security system (for example, Senate Special Committee on Aging 2010). Increasing the cap on taxable earnings would generate greater payroll tax revenues to reduce future Social Security Trust Fund shortfalls in the face of increasing benefit obligations. The Social Security Administration's (SSA's) Office of the Actuary, the Congressional Budget Office (CBO), and the Congressional Research Service (CRS), among others, have estimated the effects of increasing the taxable maximum (or "tax max").[1] Typically, they simulate the effects of changing the tax max under two polar assumptions about such a law—that either the increased taxes on earnings will result in higher benefit payments, or they will not.[2] The difference between these estimates indicates "leakage"—the additional payroll tax receipts that are used to pay higher benefits, rather than to shore up the Social Security trust funds—as those who pay additional taxes because of the higher tax max are in turn credited with additional benefits. The size of this potential leakage obviously concerns those who are contemplating changes in the Social Security tax and benefit structure.

The tax max has increased in the past, first on an ad hoc basis, and since 1982 as an annual automatic

Selected Abbreviations

AIME	average indexed monthly earnings
CBO	Congressional Budget Office
CRS	Congressional Research Service
EB	Early Boomer
HRS	Health and Retirement Study

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Selected Abbreviations—*Continued*

PIA	primary insurance amount
SSA	Social Security Administration

adjustment determined by wage indexing.[3, 4] In this article we use data from the University of Michigan's Health and Retirement Study (HRS) matched with data from Social Security administrative files to improve our understanding of how tax max changes have affected Social Security tax receipts and benefit payments. Using HRS data enables us to learn about changes in own benefits from increases in own earnings, as well as increases in spouse and survivor benefits due to increases in the taxable earnings of primary beneficiaries in couple households.[5]

To separate the effects of changes in the tax max from changes in earnings over time for members of a given cohort, we adjust the cap, reducing it to levels that applied to older cohorts, while holding earnings constant at the levels observed for the youngest cohort available. Because the calculation involves lowering the caps relative to actual values, we do not confront the absence of data on earnings above the taxable maximum. Thus, we avoid a problem faced by studies that project the effects of changing the tax max into the future. Moreover, if we chose to use the actual earnings of an older cohort as our base, and then to project earnings forward, we would face the further limitation of having the administrative data on earnings prior to 1978 censored by the earnings cap.

Using historical data provides another advantage. Projecting future earnings for each individual with earnings near the tax max is harder than it might first appear. Forecasting the effects of tax max increases on benefits and taxes paid is sensitive to the model underlying the projections. Analysts must project not only major trends, such as those in the wage structure and earnings of women in married and single-person households. Forecasts of benefits paid also depend on the projected share of earnings that will exceed the tax max over the course of each individual's lifetime. For any individual, the relation between actual earnings and the tax max may vary from year to year. Projecting the distribution of earnings around the tax max for any individual may require calculating not only the wage when fully employed, but also periods of layoff and turnover and their effect on covered earnings in years when jobs are changed. Long-term job attachment is becoming less common and the trend toward greater job turnover is expected to continue. Forecasting the relation between the tax max and actual earnings requires projecting many complex variables, such as the likelihood of job turnover among individuals, how turnover incidence and duration differ by wage, how the new wage compares with the previous wage for quits and layoffs, the earner's demographic characteristics (including educational attainment and differences by sex), and business cycles. Projecting these outcomes strains current analytical and forecasting capabilities. We avoid these issues by analyzing the effects of historical changes and using as a baseline the earnings observed for a single younger cohort. As mentioned earlier, our simulations effectively reduce the tax max. As a result, we observe the exact course of yearly earnings, uncensored by the lower cap that applied to older cohorts.

By using historical data, we can finesse the difficulties involved in making projections, especially those that have not yet been closely examined in the literature, such as the frequency with which each individual's earnings cross the tax max from year to year. Consequently, we can directly measure leakage to higher benefits without risking myriad other forecasting errors. We ask, what would be the total amount of benefits and taxes based on own earnings for individuals born from 1948 through 1953 (the Early Boomer cohort) if they had faced the tax maxes that applied to individuals who were 12 and 24 years older? Answering this question provides a new perspective on an important policy. Of course, it is also of interest to determine how past increases in the tax max have affected both payroll tax receipts and the leakage to benefit increases for those in the highest earnings brackets.

In this analysis, 2004 is the most recent year for which HRS data and matched Social Security earnings records are available for members of one of the HRS' youngest cohorts—the Early Boomers, who were aged 51–56 that year. Although the Early Boomer (EB) cohort includes 6 birth years, other HRS cohorts span different numbers of birth years. For consistency, we restrict our comparison cohorts (12 years and 24 years older than the Early Boomers) to those who were aged 51–56 in 1992 and in 1980, respectively. Thus, the cohort that is 12 years older than the Early Boomers, designated EB+12 in this

article, comprises only the youngest members (born 1936–1941) of the cohort identified in HRS simply as "the (original) HRS cohort." Likewise, the cohort born 1924–1929, herein called EB+24, is a subgroup of the HRS' Children of the Depression Age cohort (see Table 1).

A few words about the induced increase in spouse and survivor benefits are useful here. Many low earners, including those with a work history so sporadic they do not qualify for additional benefits based on their own earnings, may nevertheless have a spouse whose earnings exceed a previously specified cap. These low-earning spouses will enjoy higher benefits because of the increase in the earnings cap. To determine how spouse and survivor benefits change when the tax max changes, a data set such as the HRS conveniently permits the analysis of total benefits in each household.

Tax max policy affects Social Security's distributional properties.[6] In keeping with the program's redistributive motivation, each dollar increase in average indexed monthly earnings (AIME) for those very near the tax max is matched by an increase in benefits of only 15 cents. To enhance the system's redistributive effects, policymakers could increase the cap on covered earnings without raising Social Security benefits. However, some are loath to do that because it violates the insurance principle underlying Social Security and may undermine support for the system.

This article's next section discusses government forecasts of how changes in maximum covered earnings would affect benefits and taxes. Subsequent sections present the history of tax max changes, analyze how changes in the earnings cap have affected the Social Security benefits for individuals and households, and consider the effects of potential future tax max changes on household benefits and taxes. The final two sections discuss possible extensions of the analysis and conclude.

Available Estimates of the Effects of Increasing the Tax Max

Forward-looking estimates of the effect of raising the tax max are available from a number of sources. The typical approach takes a population base, ages it, and makes assumptions about the values of certain economic variables (often using the Social Security Trustees' intermediate assumptions for wage growth, interest rates, inflation, and other measures). Analysts using this approach then project or make assumptions about retirement age and the age at which benefits are claimed, condition their calculations on whether spouse and survivor benefits are included, perhaps also estimate behavioral responses, and then project the likely effects of changing the tax max. Estimated effects also depend on whether the analyst measures benefits and taxes using annual or present values, as changes in the share of payroll tax receipts induced by tax max changes, as amounts paid in a specified year, or with other measures. Outcomes also depend on the population subgroup analyzed—for example, a birth cohort, a demographic subgroup, or a group defined by its place in the income distribution.

Consider three different sets of results. First, in calculations for the Senate Committee on Aging (2010), SSA's Office of the Actuary estimated that eliminating the tax max without increasing benefits would decrease the 75-year actuarial deficit by 2.32 percent. On the other hand, if tax max increases were accompanied by a benefit increase that follows the current formula, the deficit would be reduced by 1.89 percent of taxable payroll. Thus, increasing benefits along with the tax max would raise total benefit payments by about 0.43 percent of the taxable payroll base.

CBO (2010, Table 2) analyzes the effects of increasing the tax max on the present values of revenues and outlays over a 75-year period. As a share of GDP, outlays would increase by 0.3 percentage points, while revenues would increase by 0.9 percentage points, so

Table 1.
Cohorts referenced in this study

Name	Birth years	Aged 51–56	Source in HRS
Early Boomers	1948–1953	2004	The *Early Boomers* comprise one of the HRS' full cohorts
EB+12	1936–1941	1992	Subsample (last 6 birth years) of the *Original HRS* cohort
EB+24	1924–1929	1980	Subsample of the *Children of the Depression Age* cohort

SOURCE: Author's derivation based on HRS.

that increased benefit payments would account for about one-third of the increased tax collections.

CRS estimates that removing the tax max in 2013 would mean that by 2035, 21 percent of beneficiaries would have paid some additional payroll taxes over the course of their lifetimes (Mulvey 2010). However, the average change in taxes and benefits would be small. Looking *only* at own taxes and benefits for individuals who would pay any additional taxes over the course of their work lives, median total lifetime tax payments would rise by 3 percent and benefits would increase by 2 percent relative to current law. (Note the CRS estimate does not consider spouse and survivor benefits, as the other estimates do.) Here, the estimated gain in benefits relative to taxes is even larger than that of the other studies. Although the exact ratio depends on rounding, the midrange estimate suggests a gain in benefits roughly equal to two-thirds the gain in taxes.

These estimates clearly vary according to the time period analyzed, the definition of the dependent variable measuring the leakage in tax receipts toward higher benefits, the many assumptions underlying the projections, the data used to make the estimates, the target population, and other factors. Each agency relies on its own simulation model or models. The Office of the Actuary and CBO rely on in-house models, while CRS uses the Urban Institute's Dynasim Model.[7] These models differ in many respects and can generate a very wide spread in estimated leakage of payroll tax revenues into higher benefits resulting from raising the tax max. Given this very wide variation in federal agencies' estimates of projected leakage from taxes to benefits, it is of interest to consider historical experience.

Historical Tax Max Changes

From 1937 through 1950, the maximum annual earnings subject to the payroll tax was $3,000. With a fixed taxable earnings cap, sustained growth in worker earnings over time meant that the share of total earnings covered by Social Security began to decline. Despite periodic ad hoc tax max increases beginning in 1951, that share continued to fall for decades. Annual tax max increases began in 1972, and in the years that followed, increasing the share of earnings covered by Social Security became a more prominent policy motivation. Since 1982, all annual tax max increases have been indexed to earnings.

From 1951 through 2004, maximum taxable earnings increased from $3,600 to $87,900, a multiple of 24.4. Over the same period, average annual earnings increased from $2,799 to $35,649, a multiple of 12.7 (SSA 2008, Table 2.A8). Thus, the rate of increase in maximum taxable earnings has been nearly twice that of average earnings.

To illustrate the effects of earnings cap changes, consider a member of the EB+12 cohort who worked in a single job from age 25 to age 60, which he reached in 1996. For simplicity, assume this individual's yearly earnings always increased over his lifetime, and his 1961 earnings are the lowest of those counted in computing his AIME. In 1961, the tax max was $4,800, which was about 17 percent greater than average annual wages. Earnings above the cap were not subject to the payroll tax and did not generate future benefits. Now consider a person from the Early Boomer cohort leaving a long-term job in 2008 at age 60. Assume that earnings in 1973 would be the lowest counted toward this person's AIME. In 1973, the tax max was $10,800. Because annual wages averaged about $7,580 that year, earnings as much as 42 percent above average were taxed (and generated benefits). Of course, many of those with relatively low earnings were not affected by the increase in maximum covered earnings; but the higher ceiling on covered earnings increased the AIME for many moderate or high earners.

For this analysis, we adjust any change in the tax max over time for changes in average earnings over that time. We base that adjustment on the calculated wage growth used to index covered earnings in the AIME calculation. Members of the Early Boomer cohort reached age 25 between 1973 and 1978, and members of the EB+12 cohort reached age 25 between 1961 and 1966. After indexing, the earnings cap for those aged 25 in 1961, $4,800, is equivalent to $8,880 in 1973. Thus, over the 12-year period, the real cap on earnings (as indexed by earnings growth and not by growth in consumer prices) increased by 21.6 percent, from $8,880 to $10,800. Similarly, adjusting the $6,600 cap on earnings in 1966 by the index applicable over the ensuing 12 years increases the real cap to $14,124. The actual ceiling for 1978 ($17,700) is 25.3 percent higher than the wage index-adjusted ceiling for 1966. Thus, the real earnings cap is higher for members of younger cohorts.

Now consider in more detail how the tax max has changed over time relative to the average annual Social Security–covered wage. Table 2 reports those data for 1951 through 2004. Policymakers have raised

maximum covered earnings more rapidly than average earnings have increased. In the 1950s and 1960s, the tax max was a bit higher than the average wage.[8] For those years, the ratios of maximum taxable earnings to average annual wages ranged between 1.03 and 1.40. In the early and mid-1970s, the tax max began to rise much more rapidly than the average wage. Beginning in 1983, after the introduction of indexing to set the annual cap, the ratio of maximum earnings to average earnings roughly stabilized.

Early Boomers whose 35 years of highest earnings occurred between ages 25 and 60 would have their AIMEs calculated based on covered earnings roughly between 1975 and 2010.[9] Thus, the AIME and primary insurance amount (PIA) calculations for this cohort would exclude the period before 1975, when the ratio of the cap to average earnings was 1.64 or lower.

For the EB+12 cohort, AIMEs would be determined by earnings from roughly 1963 to 1998. In contrast with the Early Boomers, this group's AIME calculation basis would exclude the 1999–2010 period, when the ratio of earnings cap to average wages was high (ranging from 2.37 to approximately 2.55), and replace it with the 1963–1974 period, when the cap-to-average earnings ratio ranges from 1.03 to 1.64.

The difference in the earnings caps experienced by the Early Boomers and the EB+24 cohort is even wider. Earnings in 1951 would be the earliest included in EB+24 members' AIME calculation, and from 1951 through 1963, the ratio of maximum covered earnings to average annual wage ranges from 1.09 to 1.29. Compared with the EB+12 cohort, the EB+24 cohort's 1951–1963 period replaces 1986–1998, eliminating a

Table 2.
Tax max and average annual wage, 1951–2004

Year	Tax max ($)	Average annual wage ($)	Tax max / average wage	Year	Tax max ($)	Average annual wage ($)	Tax max / average wage
1951	3,600	2,799	1.29	1978	17,700	10,556	1.68
1952	3,600	2,973	1.21	1979	22,900	11,479	1.99
1953	3,600	3,139	1.15	1980	25,900	12,513	2.07
1954	3,600	3,156	1.14	1981	29,700	13,773	2.16
1955	4,200	3,301	1.27	1982	32,400	14,531	2.23
1956	4,200	3,532	1.19	1983	35,700	15,239	2.34
1957	4,200	3,642	1.15	1984	37,800	16,135	2.34
1958	4,200	3,674	1.14	1985	39,600	16,823	2.35
1959	4,800	3,856	1.24	1986	42,000	17,322	2.42
1960	4,800	4,007	1.20	1987	43,800	18,427	2.38
1961	4,800	4,087	1.17	1988	45,000	19,334	2.33
1962	4,800	4,291	1.12	1989	48,000	20,100	2.39
1963	4,800	4,397	1.09	1990	51,300	21,028	2.44
1964	4,800	4,576	1.05	1991	53,400	21,812	2.45
1965	4,800	4,659	1.03	1992	55,500	22,935	2.42
1966	6,600	4,938	1.34	1993	57,600	23,133	2.49
1967	6,600	5,213	1.27	1994	60,600	23,754	2.55
1968	7,800	5,572	1.40	1995	61,200	24,706	2.48
1969	7,800	5,894	1.32	1996	62,700	25,914	2.42
1970	7,800	6,186	1.26	1997	65,400	27,426	2.38
1971	7,800	6,497	1.20	1998	68,400	28,861	2.37
1972	9,000	7,134	1.26	1999	72,600	30,470	2.38
1973	10,800	7,580	1.42	2000	76,200	32,155	2.37
1974	13,200	8,031	1.64	2001	80,400	32,922	2.44
1975	14,100	8,631	1.63	2002	84,900	33,252	2.55
1976	15,300	9,226	1.66	2003	87,000	34,065	2.55
1977	16,500	9,779	1.69	2004	87,900	35,649	2.47

SOURCE: SSA (2008), Table 2.A8.

NOTE: For 1937–1950, tax max was $3,000.

period in which the cap-to-average wage ratio ranged from 2.33 to 2.55.

Next, we examine how the fraction of workers with total earnings above or below the tax max has changed over time. Table 3 reports the share of the population with earnings below the taxable earnings cap, with detail by sex. In 1937, 96.9 percent of workers had earnings below the cap, so only 3.1 percent of workers had earnings at or above the cap. The fraction of workers with earnings at or above the cap rose until the 1960s, when it reached more than one-third, and then began to fall. By 1979, only 10.0 percent of workers had earnings at or above the cap. In the years that followed, the cap rose sharply enough that the earnings of only about 5–6 percent of workers met or exceeded it. We also see that male workers were more likely than female workers to have earnings at or above the cap. In 1950, about 40 percent of male workers and about 5 percent of female workers had earnings at or above the tax max. By 2004, 8.8 percent of men and 2.8 percent of women had earnings at or above the cap.

How Changes in the Social Security Earnings Cap Affect Monthly Benefits

Now we consider the relation of maximum taxable earnings to AIME and the PIA for a representative sample of the population. As a baseline sample, we use the Early Boomer cohort.

Individuals' Own Benefits

We begin with the calculation of monthly benefits from own earnings. We use HRS data matched with Early Boomers' earnings histories from Social Security administrative records together with projections

Table 3.
Percentages of all, male, and female workers with earnings below the tax max: Selected years 1937–2004

Year	All workers	Men	Women	Year	All workers	Men	Women
1937	96.9	95.8	99.7	1976	85.1	76.3	97.5
1940	96.6	95.4	99.7	1977	85.2	76.3	97.5
1945	86.3	78.6	98.9	1978	84.6	75.4	97.1
1950	71.1	59.9	94.6	1979	90.0	83.6	98.6
1951	75.5	64.6	96.7	1980	91.2	85.5	98.8
1952	72.1	60.0	95.4	1981	92.4	87.4	99.0
1953	68.8	55.5	93.8	1982	92.9	88.3	98.9
1954	68.4	55.4	93.0	1983	93.7	89.6	99.0
1955	74.4	63.4	95.9	1984	93.6	89.4	98.9
1956	71.6	59.7	94.5	1985	93.5	89.3	98.8
1957	70.1	58.7	93.1	1986	93.8	89.7	98.7
1958	69.4	58.4	91.8	1987	93.9	89.9	98.6
1959	73.3	62.7	94.3	1988	93.5	89.4	98.3
1960	72.0	60.9	93.5	1989	93.8	90.1	98.3
1961	70.8	59.6	92.4	1990	94.3	90.9	98.4
1962	68.8	57.1	91.1	1991	94.4	91.1	98.3
1963	67.5	55.5	90.0	1992	94.3	91.0	98.1
1964	65.5	53.1	88.5	1993	94.4	91.3	98.1
1965	63.9	51.0	87.3	1994	94.6	91.4	98.1
1966	75.8	64.4	95.6	1995	94.2	91.0	97.9
1967	73.6	61.5	94.2	1996	93.9	90.6	97.7
1968	78.6	68.0	96.3	1997	93.8	90.5	97.6
1969	75.5	62.8	96.0	1998	93.7	90.3	97.5
1970	74.0	61.8	93.5	1999	93.9	90.7	97.5
1971	71.7	59.1	91.7	2000	93.8	90.6	97.4
1972	75.0	62.9	93.9	2001	94.1	91.0	97.5
1973	79.7	68.9	96.2	2002	94.6	91.8	97.7
1974	84.9	76.2	97.8	2003	94.5	91.8	97.5
1975	84.9	76.4	97.5	2004	94.1	91.2	97.2

SOURCE: SSA (2008), Table 4.B4.

of their earnings, and compute their benefits using SSA's AnyPIA program. Please note that these results, and all results for individuals shown in the tables, apply only to insured individuals in the Early Boomer age range. Results for households, discussed later, will include benefits for individuals beyond this age range, as well as spouse and survivor benefits for those who are not insured based on their own earnings. All calculations assume benefits are claimed at normal retirement age and exclude public employees.

To simulate the effects of the lower tax max that applied to members of older cohorts, we simply truncate the earnings stream submitted to the AnyPIA program. For example, for covered earnings in 2004, a first calculation would use covered earnings up to the actual tax max in 2004, which is $87,900. Even if an HRS respondent had earnings higher than $87,900, the amount submitted to the benefit calculation is limited to the amount of the cap. When simulating the effects of the lower (nominal) cap faced by those born 12 years earlier, we would take the actual 2004 earnings for the members of the Early Boomer cohort, but subject them to the covered earnings cap that applied in 1992. The cap that applied to members of the older cohort was $55,500. Similarly, the cap that an Early Boomer would have faced 24 years before, in 1980, was $25,900.

The next step is to adjust the nominal cap from 12 years earlier for wage growth between 1992 and 2004. We use the data from Table 1 to calculate the growth in average wages, multiplying the nominal cap in place 12 years earlier by the growth in the average annual wage over the ensuing 12-year period. In the 1980s, caps and average wages grew at similar rates, so that a cap for any given year, adjusted for the change in average annual wages, does not differ much from the cap that applied 12 years later. Because of the lower caps in the 1970s, however, even after the wage-growth adjustment there is a substantial effect of the tax max changes on benefits in those years.

Earnings histories are imputed for the 37 percent of the Early Boomer cohort who do not have a matched Social Security earnings record. We use a nearest-neighbor approach to impute benefits for those individuals. A regression is run for those who have a matched earnings record, where the PIA computed from the earnings record is the dependent variable. Independent variables are taken from the respondent reports to the HRS.[10] The nearest neighbor is then selected on the basis of the predicted PIA, drawn from a sample that includes both those with and those without matched earnings records. We then replace the missing record with the entire Social Security record of the donor.

Table 4 shows a 5.2 percent increase in AIME (from $3,277 to $3,448) when we substitute the payroll tax cap that applied to the Early Boomer cohort for the adjusted cap that applied to the EB+12 cohort. Given

Table 4.
AIME and average PIA for all, male, and female individuals: Comparing effects of lifetime earnings cap for Early Boomers with real earnings caps experienced by the EB+12 and EB+24 cohorts (weighted estimates in dollars)

	Early Boomers		EB+12		EB+24	
Individuals	AIME	PIA	AIME	PIA	AIME	PIA
All	3,448	1,636	3,277	1,600	3,057	1,553
	(2,430)	(746)	(2,216)	(711)	(1,904)	(660)
Men	4,301	1,886	4,007	1,825	3,674	1,757
	(2,591)	(759)	(2,321)	(718)	(1,953)	(659)
Women	2,661	1,405	2,603	1,391	2,487	1,365
	(1,966)	(653)	(1,876)	(638)	(1,665)	(602)

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Sample comprises 2,405 earnings records for Social Security–insured individuals aged 51–56 in 2004 (1,056 men and 1,349 women); values for 881 earning records (37 percent) are imputed.

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Estimates are weighted using the 2004 respondent-level weight. Nominal caps for 1980 and 1992 are respectively adjusted for 1980–2004 and 1992–2004 growth in wages.

Standard deviations shown in parentheses.

the progressivity of the benefit formula, the PIA is only 2.2 percent greater ($1,636 versus $1,600) when the Early Boomer cap is substituted for the adjusted EB+12 cap. For men, the difference in AIME under the Early Boomer and the adjusted EB+12 caps is 7.3 percent ($4,301 versus $4,007), wider than the 2.2 percent difference for women ($2,661 over $2,603). The corresponding effects of raising the earnings cap on benefits between the EB+12 and Early Boomer cohorts are 3.3 percent ($1,886 versus $1,825) for men and 1.0 percent ($1,405 versus $1,391) for women. As expected, women are much less likely to have earnings near the cap, thus their own benefits are much less likely to be affected by an increase in the cap. But, as we discuss later, their spouse and survivor benefits are affected by the relation between their husband's earnings and the cap.

Table 4 also makes the analogous calculations regarding the increase in the real earnings cap over 24 years, allowing us to compare the effects of the real caps in place for the Early Boomer cohort with those for the EB+24 cohort. For the entire population, the difference in benefits generated by raising the tax max is 5.3 percent (from $1,553 to $1,636). For men, raising the tax max between the EB+24 and Early Boomer cohorts causes benefits to increase 7.3 percent (from $1,757 to $1,886). For women, the difference is 2.9 percent (from $1,365 to $1,405).

Next, we examine benefits for Early Boomers according to AIME quartile. Table 5 presents results of the same analysis used for Table 4, restricted to individuals in the fourth (highest) AIME quartile. Those individuals experience most of the PIA growth attributable to earnings cap changes.

For both sexes combined, members of the Early Boomer cohort enjoy a PIA from own work 3.7 percent higher than the PIA they would receive if they were subject to the real caps imposed on the EB+12 cohort, and 9.9 percent higher than that of the EB+24 cohort.

The effects of raising the caps are much larger for men in the top AIME quartile of male earners than for women in the top AIME quartile of female earners. For example, raising the cap from the real level that applied to the EB+12 cohort to that of the Early Boomers effectively increased benefits for men by 4.4 percent, while women's benefits increased by only 2.0 percent. The corresponding change between the EB+24 cohort and the Early Boomers increased benefits for men in the top quartile by 10.9 percent and for women by 7.4 percent.

Total Benefits at the Household Level

Household benefits include own benefits for each spouse and any auxiliary benefits for the couple's lower earner (spouse benefits if the higher earner is

Table 5.
PIA in the highest AIME quartile for all, male, and female individuals: Comparing effects of lifetime earnings cap for Early Boomers with real earnings caps experienced by the EB+12 and EB+24 cohorts (weighted estimates)

Individuals	PIA for Early Boomers ($)	PIA for EB+12 cohort ($)	PIA for EB+24 cohort ($)	Percent difference in PIA between EB+12 and Early Boomer cohorts	Percent difference in PIA between EB+24 and Early Boomer cohorts
All	2,633	2,539	2,395	3.7	9.9
	(275)	(268)	(249)		
Men	2,658	2,546	2,396	4.4	10.9
	(277)	(276)	(258)		
Women	2,569	2,519	2,391	2.0	7.4
	(258)	(244)	(226)		

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Sample comprises 537 earnings records for Social Security–insured individuals aged 51–56 in 2004 (365 men and 172 women).

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Estimates are weighted using the 2004 respondent-level weight. Nominal caps for 1980 and 1992 are respectively adjusted for 1980–2004 and 1992–2004 growth in wages.

Standard deviations shown in parentheses.

alive, survivor benefits if the higher earner has died). Own Social Security benefits are calculated with the AnyPIA program, and spouse and survivor benefits are derived from the own-benefits calculations. Earnings are imputed for divorced or deceased spouses with missing records. All benefits are determined using a life table adjusted for the relation between income and survival probability.[11]

Table 6 reports the effects of changing the cap over time on the benefits paid to households by AIME quartile. For two-earner households, the quartile is determined by summing AIME for both spouses. Values reflect the sum of all Old-Age and Survivors Insurance benefits received by the household, including spouse and survivor benefits. The PIA for households in the highest AIME quartile in 2004 is 3.5 percent higher than it would be if they were subject to the real caps imposed on households 12 years older, and their benefits are 9.2 percent higher than they would be if they were subject to the real caps imposed on households 24 years older. Members of other earnings quartiles are also affected by the change in the cap, but much less so.

Table 7 analyzes the effect of the difference in caps on benefits for two-earner and one-earner households. Given the lower covered earnings of members of one-earner households, fewer of them have earnings near the cap. Consequently, the effect of the increase in the cap is greater for members of two-earner households. Changes in the tax max occurring between the EB+12 and Early Boomer cohorts effectively increased benefits by 3.0 percent for Early Boomers in two-earner households and by 2.3 percent for those in one-earner households. The comparable figures are 6.9 percent and 5.2 percent for tax max increases that took place between the EB+24 and Early Boomer cohorts.

How Tax Max Changes Affect Lifetime Benefits and Taxes

The next analysis compares the effects of tax max changes on the present values of lifetime benefits and taxes. This allows us to determine the size of the leakage to benefits; that is, the increase in benefits received compared with the present value of taxes paid when the tax max increases. For simplicity, we report results of this analysis only at the household level.

We stress two important details about the tax rates used in this analysis. First, we focus on Old-Age and Survivors Insurance and omit disability benefits or taxes. Second, payroll tax rates have changed over time (see SSA 2008, Table 2.A3). To isolate the effects of tax max changes, we hold earnings and other

Table 6.
Present value of lifetime Social Security benefits by AIME quartile: Comparing effects of lifetime earnings cap for Early Boomer households with the real earnings caps experienced by EB+12 and EB+24 cohort households (weighted estimates)

AIME quartile	Early Boomers ($)	EB+12 ($)	EB+24 ($)	Percent difference in lifetime benefit between EB+12 and Early Boomer cohorts	Percent difference in lifetime benefit between EB+24 and Early Boomer cohorts
First (lowest)	117,354 (65,910)	115,707 (64,002)	114,385 (62,225)	1.4	2.6
Second	225,323 (60,695)	220,849 (58,313)	218,184 (57,409)	2.0	3.3
Third	349,174 (63,079)	338,663 (59,324)	327,636 (57,797)	3.1	6.6
Fourth (highest)	471,997 (65,999)	456,154 (65,090)	432,425 (63,314)	3.5	9.2

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Sample comprises 2,286 households with at least one member aged 51–56 in 2004.

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Estimates are weighted using the 2004 respondent-level weight. Nominal caps for 1980 and 1992 are respectively adjusted for 1980–2004 and 1992–2004 growth in wages.

Standard deviations shown in parentheses.

aspects of the tax and benefit rules, such as the payroll tax rate, constant between cohorts.

Table 8 shows that the present value of lifetime benefits (including spouse and survivor benefits) for households with at least one Early Boomer ($290,849) exceeds the present value of taxes paid ($256,300) by 13.5 percent. Table 6 showed how, after adjusting the cap in real terms, the present value of benefits grows because of the tax max increase. Comparing the effect of the taxable maximum that applied for members of the EB+12 cohort with the tax max in place for the Early Boomers, Table 8 shows that benefits effectively increase from $282,735 to $290,849, or by 2.9 percent. The present value of payroll taxes paid increases much more with the increase in the tax max between the EB+12 and Early Boomer cohorts, from $237,527 to $256,300, or by 7.9 percent. Comparing the tax maxes experienced by the EB+24 and Early Boomer cohorts, the present value of benefits increases from $273,057 to $290,849, or by 6.5 percent. The increase in the present value of payroll taxes is much larger, from $223,039 to $256,300, or 14.9 percent.

Our results allow us to estimate the leakage to benefits created by the increase in the payroll tax cap. After adjusting tax maxes to account for growth in average wages, the change between the EB+12 and the Early Boomer cohorts in the present value of benefits divided by the change in the present value of taxes equals 43.2 percent. Between the EB+24 and Early Boomer cohorts, that measure is 53.5 percent. Thus, between 43 and 54 percent of the additional taxes collected because of tax max increases pay for increased benefits, reducing the incremental funds available for addressing the Social Security revenue shortfall by almost one-half.

Table 9 restricts the sample to households in the highest AIME quartile. For the Early Boomer cohort, benefits ($471,997) amount to about 97 percent of taxes paid ($484,775). Under the taxable maxima that applied to older cohorts, the present value of their benefits would slightly exceed the present value of their taxes. For those in the top AIME quartile, tax max increases are associated with a smaller leakage from taxes to benefits. The difference in tax payments resulting from changes in the tax max between the EB+12 and Early Boomer cohorts is associated with a leakage to benefits equal to 33.4 percent of taxes paid. Tax max changes between the EB+24 and Early Boomer cohorts are associated with 44.7 percent of the additional taxes paid leaking into higher benefits.

Table 7.
Present value of lifetime Social Security benefits for all, one-earner, and two-earner households: Comparing effects of lifetime earnings cap for Early Boomer households with real earnings caps experienced by EB+12 and EB+24 cohort households (weighted estimates)

Households	Early Boomers ($)	EB+12 ($)	EB+24 ($)	Percent difference in lifetime benefit between EB+12 and Early Boomer cohorts	Percent difference in lifetime benefit between EB+24 and Early Boomer cohorts
All	290,849 (147,429)	282,735 (141,556)	273,057 (133,285)	2.9	6.5
Two earners	373,146 (117,554)	362,132 (112,039)	349,025 (103,119)	3.0	6.9
One earner	168,080 (91,484)	164,291 (88,160)	159,731 (83,373)	2.3	5.2

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Sample comprises 2,286 households with at least one member aged 51–56 in 2004 (1,348 two-member households and 938 one-member households).

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Estimates are weighted using the 2004 respondent-level weight. Nominal caps for 1980 and 1992 are respectively adjusted for 1980–2004 and 1992–2004 growth in wages.

Standard deviations shown in parentheses.

Table 8.

Present value of lifetime Social Security benefits and taxes: Comparing effects of lifetime earnings cap for Early Boomer households with real earnings caps for EB+12 and EB+24 cohort households (weighted estimates)

Lifetime value of Social Security	Early Boomers ($)	EB+12 ($)	EB+24 ($)	Ratio of change in benefits to change in taxes— Between EB+12 and Early Boomer cohorts	Between EB+24 and Early Boomer cohorts
Benefits[a]	290,849	282,735	273,057	0.432	0.535
	(147,429)	(141,556)	(133,285)		
Taxes[b]	256,300	237,527	223,039		
	(177,917)	(157,002)	(140,978)		

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Sample comprises 2,286 households with at least one member aged 51–56 in 2004; earnings records for some households are imputed.

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Calculations use real interest rate when computing discounted present value of benefits as of normal retirement age; nominal interest rate when discounting that benefit from normal retirement age to 2004, when calculating present value of taxes paid before 2004, and when discounting taxes paid after 2004; and double the Social Security payroll tax rate for individuals, when calculating lifetime taxes paid.

Standard deviations shown in parentheses.

a. Present value of benefits at normal retirement age discounted to 2004 dollars.

b. Present value of taxes paid until the year prior to enrollment year, in 2004 dollars. Omits taxes paid by spouses who died before 2004.

Table 9.

Present value of lifetime Social Security benefits and taxes: Comparing effects of lifetime earnings cap for Early Boomer households in the highest AIME quartile with earnings caps for EB+12 and EB+24 cohort households (weighted estimates)

Lifetime value of Social Security	Early Boomers ($)	EB+12 ($)	EB+24 ($)	Ratio of change in benefits to change in taxes— Between EB+12 and Early Boomer cohorts	Between EB+24 and Early Boomer cohorts
Benefits[a]	471,997	456,154	432,425	0.334	0.447
	(65,999)	(65,090)	(63,314)		
Taxes[b]	484,775	437,367	396,327		
	(114,331)	(95,725)	(85,117)		

SOURCE: Authors' calculations based on HRS data using SSA's AnyPIA program.

NOTES: Reflects 509 households with at least one member aged 51–56 in 2004 and with matched Social Security records; missing records are imputed.

Values for Early Boomers reflect the effects of lifetime earnings cap as of 2004, when cohort members were aged 51–56. Correspondingly, values for the EB+12 and EB+24 cohorts reflect lifetime earnings caps as of 1992 and 1980, respectively.

Calculations use real interest rate when computing discounted present value of benefits as of normal retirement age; nominal interest rate when discounting that benefit from normal retirement age to 2004, when calculating present value of taxes paid before 2004, and when discounting taxes paid after 2004; and double the Social Security payroll tax rate for individuals, when calculating lifetime taxes paid.

Standard deviations shown in parentheses.

a. Present value of benefits at normal retirement age discounted to 2004 dollars.

b. Present value of taxes paid until the year prior to enrollment year, in 2004 dollars. Omits taxes paid by spouses who died before 2004.

Possible Extensions

In light of our findings, two avenues for further analysis present themselves.

Analyses Based on Historical Data Versus Projections

Using historical data, we have examined the effects of increasing the tax max on benefits and taxes. Others have projected the aging of selected population bases to estimate the effect of increasing the tax max, forecasting earnings with different degrees of sophistication. Our findings differ from those estimates for three reasons: The two sets of estimates refer to different periods; they employ different changes in the tax max; and the process of projecting earnings, including earnings above the tax max, can further affect the differences in earnings used in the two types of calculations.

With considerable additional work, it would be possible to modify our approach so as to project the effects of future changes in the tax max. Earlier, we discussed how important it would be for that particular exercise to project more than the average effect of the ongoing changes in the distribution of earnings. Forecasts depend on accurate modeling of the changing patterns of labor force participation by women over their life cycles, as well as fundamental changes in occupations, industries, skill mixes, and job attachment. In addition, projections are dependent on accurate forecasts of the variation in earnings in proximity to current and anticipated tax max levels.

Behavioral Responses to Tax Max Changes

Further analysis might also consider behavioral responses to changes in the taxable maximum. It is not clear how important behavioral responses would be. For example, Liebman and Saez (2006) found little evidence that either the labor supply or the earnings of high earners (or their spouses) respond to changes in the tax rate.

Conclusions

This article analyzes how changes in the tax max have affected Social Security benefits and taxes. For the Early Boomer cohort—those aged 51–56 in 2004—lifetime household benefits increased by 2.9 percent because of the increase in the real payroll tax ceiling compared with the cohort 12 years older, and by 6.5 percent compared with the cohort 24 years older. Tax receipts increased by 7.9 percent and 14.9 percent over those that would have been collected under the tax ceilings that applied to the cohorts 12 and 24 years older, respectively. Thus, about 43.2 percent of the additional tax revenues generated by increasing the tax max between the EB+12 and Early Boomer cohorts will ultimately be used to increase total benefits. Similarly, about 53.5 percent of the additional tax revenues created by the increase in the payroll tax cap between the EB+24 and Early Boomer cohorts will be used to increase total benefits.

The estimates closest to ours are those made by CBO (2010), who find that about one-third of additional revenues gained from abolishing the tax max would be paid out in the form of higher benefits. Our look at historical data for the three cohorts suggests that the changes in maximum covered earnings would result in higher leakage to increased benefits, between 43 percent and 54 percent.

The figures generated by CRS (Mulvey 2010) are further out of line with ours. Although CRS confined their analysis to individuals' own benefits and taxes and did not consider spouse and survivor benefits, they nevertheless estimated that around two-thirds of the additional taxes would be lost to higher benefits. That estimate far exceeds our calculations of historical experience.

To be sure, our estimates of the size of leakage of additional taxes into benefits are bracketed by the estimates of the CBO and CRS. However, the differences are substantial, with the CBO estimate of leakage at about one-third, the CRS estimate at about two-thirds, and ours falling between, at roughly one-half.

Notes

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[1] To avoid excessive repetition, this article uses the terms "tax max," "cap," "maximum," and "ceiling" interchangeably.

[2] The extent to which these proposals would raise the tax max varies. For example, some proposals would abolish the cap entirely. Others would raise the tax max, but would not tax all earnings. See CBO (2010) for analysis of policies that would set a higher threshold without extending taxation to all earnings.

[3] Using wage indexing to set the annual tax max actually originated in 1975. However, the legislation authorizing

wage indexing also introduced a flaw in the benefit formula that required adding ad hoc increases to the wage indexed tax max increases during 1979–1981 (Whitman and Shoffner 2011).

[4] As reported by CRS, "Since 1982, the Social Security taxable earnings base has risen at the same rate as average wages in the economy. However, because of increasing earnings inequality, the percentage of covered earnings that are taxable has decreased from 90% in 1982 to 85% in 2005. The percentage of covered earnings that is taxable is projected to decline to about 83% for 2014 and later. Because the cap was indexed to the average growth in wages, the share of the population below the cap has remained relatively stable at roughly 94%. Of the 9.5 million Americans with earnings above the base, roughly 80% are men and only 9% had any earnings from self-employment income" (Mulvey 2010).

[5] Our analysis treats the household—a respondent and spouse (if present) who occupy a housing unit as their usual place of residence—as the unit of observation. Within a household, we restrict attention to retired-worker and auxiliary (dependent and survivor) benefits that are being paid or will be paid to age-eligible respondents and their spouses. We omit from consideration benefits paid to disabled workers and their dependents, child benefits, and all other benefits paid by the Social Security programs.

[6] For evidence on Social Security's redistributional effects at the individual and household levels, see Gustman and Steinmeier (2001) and Gustman, Steinmeier, and Tabatabai (2011). Coe and others (2011) conclude that the income tax on Social Security benefits has little effect on the distribution of benefits among households classified by earnings decile.

[7] Other SSA estimates rely on the Modeling Income in the Near Term (MINT) model, produced for SSA by the Urban Institute expressly for making short-run projections in which behavioral responses are limited.

[8] In the early years of Social Security, maximum taxable earnings exceeded the earnings of almost all workers. Ninety-seven percent of workers in 1937 and 1940 had earnings below the tax max. By 1945, 86 percent of workers had earnings below the cap (SSA 2008, Table 4.B4).

[9] Although Table 2 omits data for 2005–2010, the use of wage indexing to set the annual cap since 1982 has kept the cap-to-average wage ratio relatively stable.

[10] Covariates include annual earnings from current job, household income from last calendar year, demographic characteristics, marital status and history, age, work history (including reported work in each HRS wave, tenure on longest and current job, total number of years worked, number of jobs, number of jobs held for 5 or more years, industry and occupation of current job, and union membership), whether US-born, homeownership, number of children, labor force and disability status, self-employment status in 2004, and veteran status.

[11] See Gustman, Steinmeier, and Tabatabai (2011) for further details on the construction of measures of Social Security benefits at the household level and the distribution of benefits among households.

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