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# ISSUE BRIEF

AMERICAN ACADEMY of ACTUARIES

## An Actuarial Perspective on the 2003 Social Security Trustees Report

Each year, the Board of Trustees of the Old-Age, Survivors and Disability Insurance (“Social Security”) Trust Funds reports on the program’s financial condition. The Trustees Report is generally about 200 pages of text and tables that present in great detail the trustees’ assessment of the financial condition of Social Security over the next 75 years. This year for the first time, the trustees presented additional measures of the financial status of Social Security beyond the traditional 75-year projection period, as well as a broader discussion of the uncertainty surrounding all such projections.

This issue brief provides an actuarial perspective on the most recent report, together with sufficient background material for readers to obtain a good understanding of (1) what the trustees are saying about the future financial condition of Social Security and (2) the limitations of the trustees’ assessment. The debate over Social Security’s financial condition has raised many important questions. The American Academy of Actuaries, a nonpartisan professional association of actuaries from all practice areas in the United States, offers this issue brief to address some of the issues that have been raised.

### Key Findings from the 2003 Trustees Report

The Trustees Report shows financial projections based on three sets of assumptions. The projections based on the intermediate assumptions are the trustees’ best estimate. Those projections show the following:

● **Key Dates:**

- In 2018, benefits and administrative expenses begin to exceed tax income; to fill the gap, the U.S. Treasury must pay some interest income in cash, and the amount grows each year.
- In 2028, benefits and administrative expenses begin to exceed tax income and interest on trust fund assets; to fill the gap, the Treasury must pay all interest in cash and begin drawing down the assets held by the trust funds.

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- In 2042, the Social Security trust funds become exhausted—that is, use up all accumulated assets—and income is insufficient to pay benefits in full.
- These key dates are each one year later than the corresponding dates in the previous year’s Trustees Report.
- **Actuarial Balance:** An actuarial deficit (negative actuarial balance) of 1.92 percent of taxable payroll is projected for the long-range 75-year period, 2003–77. Social Security is not in close actuarial balance because, over that period, revenues would be sufficient to pay only 87 percent of costs. In 2042, when the trust funds become exhausted, tax revenues cover only 73 percent of costs.
- **Magnitude of Changes Required:** Social Security has a long-range actuarial deficit of 1.92 percent of taxable payroll. In other words, if action were taken this year, the combined employee-employer payroll-tax rate, currently 12.40 percent, could be increased by 1.92 percentage points to 14.32 percent, bringing Social Security’s trust funds into balance for the next 75 years. Long-range actuarial balance could also be achieved with an across-the-board benefit cut of about 13 percent for all current and future recipients. These numbers increase if action does not occur until later.
- **Sustainability:** Moreover, neither of these two illustrative methods for putting Social Security in actuarial balance would keep it in balance. The projection periods for future trustees reports will include years beyond 2077, which are years of deficits. Any proposed change in Social Security intended to be a permanent fix would certainly need to address those ongoing deficits.
- **Cost vs. GDP:** The cost of Social Security (total benefits plus expenses) rises from 4.4 percent of the gross domestic product (GDP) today to about 7.0 percent by the end of the 75-year projection period. Even though the projected insolvency date for Social Security’s trust funds has moved one year later, Social Security still faces long-term financial problems. This conclusion is consistent with those reached on reports from the past decade. While insolvency is not imminent, the program will have long-range financial shortfalls under the trustees’ best estimate assumptions. The improvements in projected financial status are due largely to changes in assumptions that reflect recent experience. However, the fundamental demographic forces that are expected to cause long-term financial problems for Social Security have not changed.

## **Measures of Unfunded Obligations**

Social Security’s long-term unfunded obligations may be expressed in several ways. One way is to place a dollar value on the excess, on a present value basis, of future cost, primarily scheduled benefit payments, over the current trust fund balance plus future income, primarily payroll taxes. Because of the size of the Social Security system and the long-term nature of its obligations, these unfunded obligation figures are very large, in the trillions of dollars. When reported by the media, these figures often shock the public into believing Social Security’s long-term financial problems can never be solved. A better way is to express the unfunded obligations as a percentage of the present value of future taxable payroll. This percentage represents how much the employer-employee tax rate, currently 12.4 percent of taxable payroll, would need to be raised to eliminate Social Security’s long-term deficit. While putting the unfunded obligations in this context does not make Social Security’s long-term problems any less serious, it gives the public a better idea of the steps that could be taken to solve them.

### **Open-group basis over 75 years**

Social Security is funded on a modified pay-as-you-go basis. This means the benefits of a given generation of workers are paid primarily by taxes levied on succeeding generations of workers. This makes it appropriate to measure Social Security’s unfunded obligations on an “open-group” basis, which includes the taxes and benefits of workers expected to enter the system in the future. Since workers receive benefits after they pay taxes, excluding future new entrants would ultimately lead to a situation where the valuation includes workers receiving benefits, but not the active workers paying for those benefits. The result would not be an appropriate measure of Social Security’s unfunded obligations.

Traditionally, Social Security's unfunded obligations have been measured over a 75-year valuation period. This period was chosen because it includes the entire future lifetimes of nearly all current participants. The trustees report that the system's unfunded obligation over the next 75 years is \$3.5 trillion. This represents 1.92 percent of taxable payroll over the valuation period. In other words, an immediate increase in the payroll tax rate from 12.4 percent to 14.32 percent would eliminate Social Security's deficit for the next 75 years. Alternatively, actuarial balance could be achieved by reducing benefits by 13 percent across-the-board starting immediately.

### **Closed-group basis**

For the first time, the trustees also report the system's unfunded obligation on a "closed-group" basis, which includes only the taxes and benefits of individuals age 15 or older on the valuation date. The amount is \$10.5 trillion. This method does not appropriately measure Social Security's unfunded obligation, because, under the modified pay-as-you-go funding scheme, current workers are not intended to pay for their own benefits.

### **Open-group basis with infinite time horizon**

Finally, the trustees report the system's unfunded obligation on an open-group basis with an infinite time horizon. Many observers question the reliability or usefulness of calculations of Social Security's unfunded obligation over 75 years, given the uncertainty of economic and demographic trends over such a long period. Calculations over an infinite period are certainly less reliable. Nevertheless, calculating Social Security's obligation over an infinite future eliminates the sustainability problem mentioned above; i.e., once the system has been put into actuarial balance on an infinite-future basis, mere passage of time cannot put the system out of balance. This does not mean the unfunded obligation on an infinite-future basis will not increase on a dollar basis; in fact, it is expected to increase each year with interest. However, the present value of taxable payroll also increases with interest each year, so the unfunded obligation as a percentage of taxable payroll is expected to remain stable.

The system's unfunded obligation on an infinite-future basis is \$10.5 trillion. (It is only a coincidence that this amount is the same as on a closed-group basis.) This represents 3.8 percent of taxable payroll on the same infinite-future basis. In other words, an immediate increase in the payroll tax rate from 12.4 percent to 16.2 percent would eliminate Social Security's deficit for all time under the intermediate assumptions. Alternatively, this could be achieved by reducing benefits by 23 percent across-the-board starting immediately. The unfunded obligation on an infinite-future basis is about three times the 75-year deficit on a dollar basis, but only about twice as high as a percentage of payroll.

## **Changes Since the Previous Report**

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### **Changes in Benefit and Tax Provisions of the Law**

The trustees report that no legislative changes that would have a significant effect on Social Security's finances over the long term were enacted into law since last year's report.

### **Changes in the Projection Period**

As each year passes, the long-range 75-year projection period moves forward one year; that is, the first year from the previous year's projection period becomes part of the past, and a new 75th year is added at the end of the previous projection period. Thus, for the 2003 Report, the year 2077 has been added to the projection period. Benefit payments and administrative expenses in that year are expected to exceed income by 6.50 percent of taxable payroll. Spread over the entire 75-year projection period (and combined with other, less significant "valuation period" effects), this increases the overall actuarial deficit by 0.07 percent of taxable payroll.

### **Changes in Assumptions and Methods**

Because the trustees cannot know what the future will bring, they must make assumptions about economic and demographic factors that affect Social Security's financial condition. The nature of these assumptions and how they affect the results of the projection are discussed in detail in the Academy's issue brief, *Assumptions Used to Project Social Security's Financial Condition*.

Over the years, several independent panels of experts have evaluated the reasonableness of the trustees' assumptions. The last such panel to report was convened in 1999 under the auspices of the Social Security Advisory Board, a governmental body that advises the Commissioner of Social Security. The 1999 panel recommended changes to specific assumptions in the intermediate set but concluded that the trustees' projection methodology is "reasonable as a whole." The technical panel recommended three major changes to the intermediate assumptions that would significantly affect either program income or outgo. The changes related to (1) a more rapid reduction in mortality (with a corresponding increase in life expectancy), (2) an increase in the assumed ultimate annual real wage differential (expected increases in the national average wage, adjusted for inflation) from 0.9 percentage point to 1.1 percentage points, and (3) a decrease in the ultimate annual real interest rate expected on the special-issue Treasury securities held by the trust funds from 3.0 percent to 2.7 percent.

Increases in life expectancy would raise program costs because people receive benefits longer. Increases in the ultimate real wage differential would strengthen program financing because the resulting increases in payroll taxes occur sooner than the increases in benefit costs. Lower interest rates would reduce the income to the trust funds and, thus, weaken the program's financial status.

Beginning with the 2000 Trustees Report, the trustees moved in the direction of the panel's first two major recommendations, regarding life expectancy and real wage growth. This action is consistent with the trustees' history of tending to agree with most - but not all - of the recommendations of technical panels over a period of time. For the 2002 Trustees Report, the assumed ultimate real wage differential under the trustees' intermediate assumptions was increased from its 2001 value of 1.0 to 1.1, or equal to the technical panel's recommended assumption. Mortality projections in the 2002 Report also report reflected somewhat more rapid reductions in death rates. A 2003 Technical Panel has been convened and is expected to report later this year, although the assumptions for the 2003 Report were set before the 2003 Panel was convened.

For the 2003 Trustees Report, the ultimate assumptions concerning the rates of change in key economic and demographic parameters are essentially unchanged from last year's report. However, revisions to certain historical data affected the starting levels of various demographic and economic factors, and their transition to their assumed ultimate rates of change. On the demographic side this was largely the effect of incorporating the results of the 2000 Census which only recently became available. This had the effect of raising assumed net immigration and lowering assumed fertility rates over the first part of the projection period. On the economic side, there were several changes, with largely offsetting effects, in part reflecting revisions to historical estimates of aggregate wages, and assumed increases in labor force participation as life expectancy increases in the future. The trustees also alluded to several methodological improvements, along with updates to program specific data which had the net effect of lowering somewhat the actuarial deficit. All these assumption changes together, combined with incremental improvements in the projection methodology, decreased the actuarial deficit by about 0.03 percent of taxable payroll.

The net result of these changes in assumptions and methods and the change in the long-range valuation period, discussed above, is a small increase in the 75-year actuarial deficit, from 1.87 percent of taxable payroll in 2002 to 1.92 percent of taxable payroll in 2003.

## **Beyond Solvency**

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While 2042 is certainly important as the year when the combined Social Security trust funds are expected to exhaust their assets, another important milestone is expected in 2018. Until that year, tax revenue is expected to exceed benefit payments and administrative expenses. This excess currently is invested in special-issue government securities that are held by the trust funds. But Social Security's outgo is rising more rapidly than its tax income. Beginning in 2018, benefit payments and administrative expenses are expected to exceed tax revenue, largely due to the rapid increase in the number of baby boomers leaving the workforce and receiving benefits.

Unless Congress acts to reduce Social Security's anticipated long-range deficit, all the government securities held by the trust funds must gradually be redeemed and converted to cash by 2042. The federal government could raise the large amounts of cash needed by selling comparable government securities to the public, by raising other taxes or by reducing other expenditures. Over the years following 2018, the accumulated Social Security cash requirements could place a severe strain on the federal government's finances. How the government raises the funds to redeem the government securities held in Social Security's trust funds depends on many factors, such as the surplus/deficit situation for the rest of the federal government, the size and growth rate of the economy and the attractiveness of U.S. government securities in the international financial market.

## Beyond the Best Estimate

Because of the inherent uncertainty of events occurring as long as 75 years into the future, for purposes of the annual report, the trustees make three projections based on three sets of assumptions: intermediate (best estimate), low-cost and high-cost. The intermediate projection underlies the findings described above. The following table summarizes the ultimate, long-range value of some of the key economic and demographic assumptions under the intermediate, low-cost and high-cost assumptions:

<u>Ultimate Value</u>	<u>Intermediate</u>	<u>Low-Cost</u>	<u>High-Cost</u>
Total fertility rate (children per woman)	1.95	2.2	1.7
Average annual reduction in age-sex-adjusted death rates from 2027 to 2077	0.73	0.34%	1.27%
Annual net immigration	900,000	1,300,000	672,500
Life expectancy at birth in 2077 (in years)	83.3	80.0	87.7
Annual percentage change in:			
Average wage in covered employment	4.1%	3.6%	4.6%
Consumer Price Index	3.0%	2.0%	4.0%
Real wage differential	1.1%	1.6%	0.6%
Productivity (total U.S. economy)	1.6%	1.9%	1.3%
Annual labor force growth	0.2%	0.6%	-0.3%
Unemployment rate	5.5%	4.5%	6.5%
Annual interest rate on new treasury securities	6.0	5.7%	6.2%

Under the low-cost assumptions, the trust funds remain solvent over the entire 75-year projection period. This result reflects a number of factors, including: an ultimate annual real wage differential of 1.6 percentage points, versus 1.1 percentage points for the intermediate assumptions, and an average annual labor-force increase trending toward 0.6 percent, versus 0.2 percent for the intermediate assumptions. Other important differences between the intermediate and low-cost assumptions are the fertility rate (average number of children born to a woman in her lifetime), which rises to 2.2 in the low-cost set but declines to 1.95 in the intermediate set, and life expectancy at birth, which is 80.1 years in 2077 in the low-cost set but 83.4 years in the intermediate set.

Under the high-cost assumptions, the trust funds are exhausted in 2031, eleven years earlier than under the intermediate assumptions. Under this scenario, the annual real wage differential settles at 0.6 percent, and the labor force actually begins contracting by 0.3 percent annually late in the projection period. The fertility rate falls to 1.7, and the life expectancy in 2077 rises to 87.8 years.

While the trustees consider the projections based on the intermediate assumptions to be their best estimate, they believe that the other assumption sets are within the range of reasonable expectation. And, of course, any combination of assumptions from the three sets also falls within this range. To facilitate analysis of other combinations of assumptions, the trustees also include in their report a “sensitivity analysis,” which examines the effects of changes in each of the major assumptions by considering the impact of changing each assumption in isolation from the intermediate level to the low-cost and high-cost level.

The trustees provide such analyses for eight different demographic, economic, and program-specific assumptions in a detailed appendix to the report. The following table summarizes the results for three particular key assumptions:

<u>Ultimate Value</u>	<u>Intermediate</u>	<u>Low-Cost</u>	<u>High-Cost</u>
<b>Total fertility rate:</b>			
Ultimate assumption (Children per woman)	1.95	2.2	1.7
75-year actuarial balance	-1.92%	-1.65%	-2.19%
Year of combined trust fund exhaustion	2042	2042	2042
<b>Reduction in death rates:</b>			
Ultimate assumption (Average annual reduction in total age-sex adjusted death rates from 2027 to 2077)	0.76%	0.35%	1.33%
75-year actuarial balance	-1.92%	-1.26%	-2.69%
Year of combined trust fund exhaustion	2042	2047	2039
<b>Real wage differential:</b>			
Ultimate assumption (Average wage increase minus 3% CPI increase)	1.1%	1.6%	0.6%
75-year actuarial balance	-1.92%	-1.40%	-2.42%
Year of combined trust fund exhaustion	2042	2049	2038

If all the elements of the sensitivity analysis were changed simultaneously, the resulting low-cost and high-cost projections would result in changing the negative actuarial balance from 1.92 percent to a positive balance of 0.42 percent and a negative balance of 5.07 percent respectively.

Not surprisingly, experts have differing opinions about the best assumptions to use for projecting the future financial condition of Social Security. Some observers argue that the trustees' intermediate assumptions are too pessimistic and thus overstate the program's financial problems. These observers usually argue that the trustees' assumptions about the performance of the economy are too pessimistic, because the trustees fail to take into account adjustments in productivity and labor-force participation rates that they believe are likely to occur as the population ages. Others argue that the intermediate assumptions understate the severity of Social Security's financial problems. In particular, these observers often claim that the trustees are understating how long people will live in the future.

Because reasonable disagreement can exist as to the validity of the various assumption sets, prior technical panels have recommended that the trustees consider performing a stochastic analysis of the trust funds' future financial condition as an adjunct to the traditional deterministic valuation. Such stochastic techniques enable modelers to attach probability measures to a range of possible outcomes, thus hopefully suggesting the likelihood of such outcomes. In the 2003 Report, the trustees present the results of their first effort to develop such stochastic models of trust fund operations. The results are labeled as preliminary, in part because the period used in the analysis of the historical variability of key variables is relatively homogeneous and may not reflect the full range of potential variability. Also, due to timing considerations, they are centered on the intermediate results from the 2002 Report. As such, they are not particularly comparable to the other results in the 2003 Report. However, they do represent a possibly interesting advance in the way experts will be able to evaluate the future of Social Security. The analysis indicates that the range of likely outcomes is much narrower than the range indicated by the low-cost and high-cost assumption sets. The trustees qualify their results as follows: "As a result, the variation indicated in this appendix should be viewed as the minimum plausible potential variation for the future. Substantial shifts, as predicted by many experts and as seen in prior centuries, are not fully reflected in the current model."

## Conclusion

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The projected financial condition of the Social Security program under the intermediate assumptions of the 2003 Trustees Report is quite similar to that shown in the 2002 Report. The projected date of trust fund exhaustion has moved from 2041 to 2042, and the size of the actuarial deficit over the 75-year projection period has increased slightly. The 2003 Report also projects that trust fund expenditures will exceed tax income beginning in 2018. If this occurs, Social Security will start putting demands on the Treasury for additional funds. Thereafter, the projected shortfall of tax income will rise, exceeding 6 percent of payroll by 2077. All this assumes that future demographic and economic experience will follow the intermediate assumptions (and that the Social Security Act is not changed). Given the uncertainty of the future over the next 75 years, many other reasonable scenarios are possible. Under some, Social Security's financial problems disappear, while under others they become much worse.



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