Social Security Technical Panel Report to the 1991 Advisory Council on Social Security*

In December 1989, the quadrennial Advisory Council on Social Security appointed a Panel of Technical Experts to review the assumptions and methodology used to project the future financial status of the Social Security system. The group of nine economists and actuaries spent 6 months reviewing the projection work of the Social Security Administration's Office of the Actuary and Office of Research and Statistics and generally found it to be "professional and highly competent." The Panel did, however, recommend the use of new or revised tests of the system's financial soundness, the maintenance of a contingency reserve throughout the long-range projection period, and changes in three of the major economic assumptions used in projecting the system's future. The Panel did not recommend changes in the demographic assumptions that underlie the projections. Panel members recommended a more thorough external review and validation of the projection methodology than time permitted and cited numerous areas where its members thought further research would be useful. The Panel's recommendations and the rationale for them are reprinted from their report to the Advisory Council. This month, we are reprinting the Panel's report; next month we will reprint the individual appendices that were included with the full report.

*Reprint of report submitted to 1991 Advisory Council on Social Security on August 17, 1990.

Executive Summary

In December 1989, the quadrennial Advisory Council on Social Security convened a Panel of Technical Experts to review the assumptions and methodology used to project the future financial status of the Old-Age, Survivors, and Disability Insurance (OASDI) programs. The Panel also was asked to review measures of the financial soundness of the OASDI system.

The Panel met monthly for 6 months, drawing on its own expertise and that of other economists and actuaries, as well as demographers. The staffs of the Offices of the Actuary and of Research and Statistics at the Social Security Administration provided support for the Panel.

Generally, the Panel found the Agency's projection work to be professional and highly competent. The Panel made numerous recommendations relating to measures and tests of trust fund soundness, actuarial assumptions, and projection methodology. Its most important conclusions include the following:

- That a contingency reserve equal to at least 100 percent of annual expenditures be built and maintained throughout the 75-year projection period.
- That the Board of Trustees of the OASI and DI Trust Funds adopt tests of the soundness of the funds, both for the short and long range. Failure of the system to meet these tests would alert policymakers and the public to the need for action to improve the financial status of the system.
- That three of the most critical economic assumptions used in making financial forecasts be changed; namely, that the assumed ultimate real interest rate be increased, the assumed ultimate real wage differential be decreased, and the assumed ultimate rate of inflation be increased.
- That the projection methodology appears reasonable; it has no discernible pattern of bias.
- That the projection methodology be externally reviewed and validated.

With regard to the most important demographic assumptions—the best-estimate projections of mortality and fertility—the Panel made no suggestions for change.

The net effect of the Panel's recommendations relating to the contingency reserve and the economic assumptions is to change the long-range (75-year) summarized actuarial balance of the OASDI system from −.91 percent of taxable payroll to −.70 percent of taxable payroll under best-estimate (II-B) assumptions.

In addition, the Panel made numerous other recommendations, including an agenda for further analysis and study. These research recommendations are summarized in appendix A of the Panel's report to the Advisory Council. Its specific recommendations directly related to the Panel's mandate follow.

Summary of Recommendations

Evaluation of trust fund soundness and presentation of results: Seventy-five years is an appropriate period over which to evaluate the soundness of the system.

A contingency reserve equal to at least 100 percent of annual expenditure should be built and maintained throughout the 75-year projection period.

A summary measure of actuarial balance should continue to be used and should:

- Continue to be based on the present-value method of summarizing income and cost rates; and
- Be modified to include the cost of building and maintaining a contingency reserve equal to 100 percent of annual expenditures throughout the projection period.

The Panel recommends that the Trustees Report highlight four additional measures of the system's financial well-being:

- The year in which the trust funds are projected to exhaust their reserves, as well as the first year in which the reserves fall below a fund ratio of 50 percent.
- The amount of any tax or benefit changes needed to bring the system back into long-range actuarial balance.
- The amount of transfers to and from Federal general revenues needed as special Treasury obligations are purchased and redeemed.
- The size of any difference between the cost rate and the income rate in the 75th year of the projection period, which is a measure of ultimate balance in the system.

A short-range test of the soundness of the OASDI system is necessary. The Panel recommends a test that applies to the first 10 years of the projection period and indicates whether the system:

- Has a contingency reserve or fund ratio at the beginning of each year of more than 50 percent, or
- Is projected to achieve a fund ratio of more than 50 percent within 5 years and remain at or above that level, and
- Has revenues sufficient to pay benefits in each month at the beginning of that month.

A long-range test of trust fund solvency is also needed. It should cover the 75-year projection period and should:

- Summarize actuarial balances for all valuation periods up to 75 years including both the beginning trust fund balance and the cost of building and maintaining a contingency reserve equal to 100 percent of annual expenditures throughout the 75-year period.
- Apply a tolerance level for an actuarial deficit of 5 percent of the summarized cost rate over the full 75-year period and grading uniformly to zero at the beginning of the first projection period.
- Use a present-value calculation.

The projection set now labeled "alternative II-A" that is based on Federal budget assumptions should be eliminated and the remaining three sets should be labeled "low cost," "best estimate," and "high cost."

Assumptions

The Panel recommends that the ultimate best-estimate (II-B) real wage growth assumption be decreased from 1.3 to 1.0 percent and that the low- and high-cost projection assumptions be set at 0.4 and 1.6 percent, respectively.

The Panel recommends an increase in the ultimate best-estimate (II-B) inflation rate from 4.0 to 5.0 percent and increases in the low- and high-cost assumptions to 3.0 and 7.0 percent, respectively.

The Panel recommends an increase in the ultimate best-estimate (II-B) real interest rate assumption from 2.0 to 2.8 percent and an increase in the low-cost rate from 3.0 to 3.3 percent. The Panel recommends no change in the high-cost assumption of 1.5 percent.

The Panel makes no suggestions for changing the level of the mortality assumptions. It does, however, suggest an assumption of continued increase for several years beyond 1990 in deaths from the Acquired Immune Deficiency Syndrome (AIDS) in the low-cost projections.

The Panel recognizes the uncertainty of future fertility trends. A majority of the Panel considers the ultimate total fertility rate of 1.9 as appropriate for the best-estimate assumption, but would also consider 1.8 reasonable. The Panel recommends that the ultimate fertility rate for the high-cost projection be reduced from 1.6 to 1.4, in light of current experience of certain developed countries.

The Panel recommends a net increase of 150,000 in the number of immigrants assumed in the low-cost projections.

The Panel suggests that consideration be given to using separate first marriage and remarriage rates.

The Panel makes no recommendation for changing the present retirement rate assumptions.

The Panel makes no recommendation for changing the present disability assumptions.

Projection Methodology

The Panel recommends that additional resources be allocated to an indepth analysis of the projection methodology.

Other Policy Issues

Because of the complexity inherent in the OASDI system of taxes and benefits, changes in that system generally should be considered primarily on their own merit, rather than in the context of short-range budget debates.

The current investment policy for the OASI and DI Trust Funds seems reasonable.

The current statutory basis for an actuarial opinion should be continued and the statement of opinion should remain in the Trustees Report.

The automatic stabilizer in current law is of limited effectiveness. Further analysis of the role of stabilizers should be done.

A group with appropriate expertise should be convened to review technical and communications issues related to SSA's Personal Earnings and Benefit Estimate Statements.

SSA should explore ways to communicate financial information about the system to the general public in a more understandable way.

A new technical panel should be convened within the next 4 to 8 years.

Panel of Technical Experts

Chairman, Stephen G. Kellison

Actuaries

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Georgia State University

Donald S. Grubbs, Jr.
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Chapter 1: Introduction

Overview

The Social Security cash benefit programs—Old-Age, Survivors, and Disability Insurance (OASDI)—comprise the Nation's primary public income-maintenance system and will account for 20.8 percent of Federal expenditures in 1990. Social Security touches the lives of most Americans in some way: virtually all jobs (128 million workers) are covered under Social Security, and the program each month pays benefits to about 39 million retired and disabled workers, their families, and surviving families of decreased workers.

The OASDI system is funded mainly from earmarked payroll taxes (currently 5.6 percent for OASI and 0.6 percent for DI for employers and employees each) and credited to the OASI and DI Trust Funds. Revenues resulting from the taxation of Social Security benefits are also credited to the trust funds. Any trust fund revenues not immediately needed to finance current Social Security benefits are invested in interest-bearing U.S. Treasury securities. Interest earnings on these securities accrue to the trust funds.

Although the OASI and DI programs have separate trust funds, the Panel considered OASDI as one system for purposes of this report. In this regard, the Panel noted that the Trustees treat the two funds as one for actuarial evaluation purposes (although information is also provided for each fund separately). The Congress has in the past provided for tax rate reallocations and, in the Omnibus Budget Reconciliation Act of 1981 and the Social Security Amendments of 1983, temporary interfund borrowing authority between the two funds. The Panel recognized that the Congress could enact similar measures linking the two funds should future circumstances so require.

Considerations Involving the Economy and Federal Budget

Since its inception in 1935, the program has operated at times on a current-cost basis (pay-as-you-go) and at times on a partial-reserve basis. The Social Security Amendments of 1972 legislated a tax rate schedule that would result in current-cost financing.[1] However, the Social Security amendments of both 1977 and 1983 (which resolved serious short-range and long-range financial problems) resulted in future accumulation of large reserves.

The 1983 amendments also called for showing the operations of the OASI and DI Trust Funds (and the Medicare Trust Funds) as separate functions within the unified Federal Budget for fiscal years 1985 through 1992. Beginning with fiscal year 1993, the operations of the funds were to be removed from the unified Federal Budget as a means of helping to insulate the programs from short-range budgetary pressures. The Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm-Rudman-Hollings, or GRH) accelerated the date for removing OASDI from the Federal Budget to 1986, but provided that the trust funds would be counted in meeting the GRH deficit targets through 1993.

The relationship of the trust funds to the Federal Budget and GRH deficit targets has received considerable attention as trust fund assets have begun to accumulate. In calendar year 1989, OASI and DI Trust Fund revenues were $289.4

[1] U.S. Congress, House, Committee on Ways and Means, **Actuarial Cost Estimates for the Old-Age, Survivors, Disability, Hospital, and Supplementary Medical Insurance Systems as Modified by Public Law 92-603** (Prepared by the Office of the Actuary, Social Security Administration), Committee Print, 93rd Cong., 1st sess. Washington, DC: U.S. Government Printing Office, 1973, page 2.

billion and expenditures were $236.2 billion. This $53.2 billion excess, coupled with the reserves already on hand and the advance tax transfers in January 1990, gave the trust funds a balance of $188.9 billion (about 74 percent of this year's outgo) at the beginning of 1990. These assets are projected to grow until they reach more than 450 percent of annual outgo early in the next century and to decline thereafter.

Whether or not the OASI and DI Trust Funds are in or out of the budget or GRH targets, the accumulation of substantial trust fund reserves has important public policy and economic implications that go well beyond the operation of the OASDI system itself. While OASDI annual income from payroll taxes and taxation of benefits exceeds OASDI expenditures, the excess will be used to purchase Treasury securities. This investment will reduce the Federal Government's need to borrow from other sources regardless of whether the non-Social Security portion of the budget is in deficit. Subsequently, OASDI tax income will be insufficient to cover expenditures and it will be necessary to use interest income and to redeem the securities to meet OASDI costs (unless a tax rate increase or benefit change is enacted before then). These redemptions will represent a substantial demand on Federal general revenues at that time.

Given the broad ramifications of a substantial trust fund buildup and subsequent drawdown for the Federal Budget, for investment markets, and for the economy as a whole, the Panel believes that it is critical for the OASDI Trustees Report to discuss this issue and to highlight clearly the year-by-year transfers of funds back-and-forth between the trust funds and the general funds. As part of this display, the amount of interest income to the trust fund should continue to be identified separately from all other sources of income. (See chapter 2.)

Alternative Funding Scenarios

It is true, of course, that the large trust fund buildup projected under present law may not occur if the Congress acts to modify the current tax rate schedule and/or benefit provisions. With respect to these possible changes, the Panel notes that the OASDI system can operate successfully under a variety of funding scenarios, including several that have emerged as legislative proposals in the current Congress. The scenarios discussed most frequently can be classified in three broad categories:

- Operate the system on a pay-as-you-go basis and avoid the accumulation of a trust fund balance in excess of a reasonable contingency reserve.
- Allow a sizable, but temporary, trust fund buildup and subsequent decline, as will occur under current law.
- Permit the trust fund buildup and then maintain it at a substantial level on a permanent basis.

While the effects of each of these alternatives on the national economy are substantial and varied, each would allow for the continued payment of OASDI benefits. Thus, the choice between these basic tracks should be based on careful analysis of public policy and economic considerations, as well as how to assure public confidence in the system. It should not be based on considerations related solely to the actuarial status of the OASDI system itself.

On the other hand, for purposes of this technical review, the Panel focused on the financial condition of the OASDI program as a separate system in isolation from its effects on the overall economy.[2] The Panel report addresses the evaluation and presentation of the status of the trust funds strictly on the basis of their adequacy for meeting the commitments of the OASDI program.

[2] Viewing OASDI as a separate system does not imply, however, that the actuarial status of the trust funds can be validly measured using the funding standards applied to other closed systems, such as private pension plans. (Appendix B gives a full discussion of the Panel's views on the inappropriateness of such a comparsion.)

Chapter 2: Evaluation of Financial Condition of OASDI System and Presentation of Trust Fund Projections

Introduction

One of the central elements of the charge to the Panel from the Advisory Council was that it recommend "measures that should be used to judge the program's short-range and long-range financial soundness."

In including this request in its charge, the Council reflected a similar request by the Board of Trustees of the OASDI system in their 1988 and 1989 Trustee's Reports.[3] The Trustees said, "The Board particularly requests that a Panel of Financing Experts ... be appointed by the Advisory Council, and that the Panel should be instructed to provide advice regarding the measures that should be used to judge the system's short-range and long-range financial soundness."[4]

Further, the Council invited the Panel to consider recommendations related to tests of trust fund soundness made by a workgroup convened by the two public members of the Board of Trustees.

Evaluation of Financial Condition

The Panel considered a number of issues related to the financial condition of the trust funds: the appropriate length of the projection period; whether a contingency reserve is needed and, if so, how large should it be; and measures and tests of trust fund long- and short-range soundness. The Panel's conclusions and rationale follow.

The Evaluation Period

Seventy-five years is an appropriate period over which to evaluate the soundness of the system.

Since OASDI involves commitments over the remaining lifetimes of the current population of the United States, as well as generations yet unborn, it is important to have a long-range perspective. Seventy-five years seems an appropriate period over which to consider the program's long-range financial soundness. It is the period traditionally used by the OASDI Trustees. The Panel saw no compelling reason to change it. Moreover, 75 years roughly coincides with the maximum remaining lifespan of participants entering the workforce today. Thus, if the system meets the long-range test of financial soundness, a participant can reasonably expect that the system will be able to meet all of its obligations over his or her expected lifetime.

Contingency Reserve

A contingency reserve equal to at least 100 percent of annual expenditures should be built and maintained throughout the 75-year projection period.

The Panel agreed that it is important to maintain a minimum contingency reserve throughout the 75-year projection period and to include the cost of this reserve in the cost rates for the entire 75-year period as well as for shorter periods. Further, it agreed that whether the system is being financed on a pay-as-you-go or on a partial reserve

[3] The Board of Trustees consists of the secretaries of the Treasury, of Labor, and of Health and Human Services plus two persons representing the public.

[4] U.S. Congress, House, **Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds: Communication from the Board of Trustees Transmitting the 1989 Annual Report of the Board of Trustees,** H.Doc. 100-192, 100th Cong., 2nd sess., 1988, page 31 and H.Doc. 101-56, 101st Cong., 1st sess., 1989, page 32.

funding basis, 100 percent is a reasonable minimum fund ratio. Whether a ratio in excess of 100 should be maintained depends on whether or not the system is intended to be financed on a partial reserve basis.

The Panel examined the issue of an appropriate trust fund ratio or contingency reserve in some depth. It reviewed a number of historical studies as well as one conducted at the Panel's request in 1990 by OACT.[5] This study (see appendix C) indicated that:

> OASDI assets of from 55 to 110 percent of annual expenditures would generally be sufficient to cover the effects of a period of adverse economic conditions for about 5 to 10 years. Adding another 10 to 25 percent, for the possibility of simultaneous, non-economic adverse experience, suggests that a fund ratio of from 65 to 135 percent would guard against short-range adverse contingencies.

This finding is compatible with those of earlier studies.

Under best-estimate assumptions (used in the intermediate II-B projection in the Trustees Report), the cost of building and maintaining a 100-percent contingency reserve over the entire 75-year period would be 0.17 percent of payroll subject to Social Security taxes (taxable payroll). That is, this recommendation would change the best-estimate (II-B) long-range actuarial deficit from 0.91 to 1.08 percent. Under the assumption changes recommended later by this Panel, the cost of maintaining an adequate contingency reserve would decline from 0.17 to 0.12 percent of taxable payroll. The system is now projected to have a contingency reserve of at least 100 percent until the year 2039.

[5] See also Alicia H. Munnell and Lynn E. Blais, "Do We Want Large Social Security Surpluses?," **New England Economic Review,** September/October 1984, pages 5-21 and Lawrence H. Thompson and Paul N. Van de Water, "The Short-Run Behavior of the Social Security Trust Funds," **Public Finance Quarterly,** July 1977, pages 351-372.

The Measure of Actuarial Balance

The Panel considered both measures and tests that could be used to evaluate the well-being of the OASI and DI Trust Funds. Measures tend to be like scales—they indicate the degree of the system's financial health. Tests are binary—the system does or does not meet a given test. Failure of a test provides an alert that trouble may be pending.

The Panel recommends that the Trustees' Report highlight five measures and that it add two tests—one short- and one long-range.

The Trustees Reports traditionally include information about patterns of cost rates, income rates, fund ratios, annual balances, and actuarial balance over the 75-year projection period. The Panel believes all of these are useful.

The estimated **cost rate** is the cost of benefit payments and program administration expressed as a percent of taxable payroll. The estimated **income rate** is the sum of (1) the scheduled OASDI tax rate for the year and (2) the estimated income from taxation of Social Security benefits expressed as a percent of taxable payroll. Income earned from interest on trust fund reserves is not included in the annual income rate. Comparison of income rates and cost rates over the full 75-year projection period portrays the flow of income and outgo of the OASDI system. Graph 2.1 illustrates these measures, using the 1990 Trustees Report best estimate (II-B) of the future.

In any year the **annual balance** is the income rate minus the cost rate. As shown, annual balances over the next several decades are positive, as the income rate exceeds the cost rate of the program. The excess of trust fund income over outgo will be invested in interest bearing U.S. securities. Later in the projection period, the income rate falls short of the cost rate and annual balances are negative. By the end of the projection period, the annual balance is a negative 4.16 percent of payroll. At that time, the annual income rate is only about three-fourths of the annual cost rate of the system.

Measures of annual **fund ratios** are used to show the size of the combined OASI and DI Trust Fund assets (including prior interest earnings) relative to the cost of the system. Specifically, the fund ratio is calculated as the balance of OASDI assets at the beginning of the year (including advance tax transfers of revenues projected for the month of January) divided by that year's projected outgo. The pattern of fund ratios over the 75-year projection period also is shown in graph 2.1.

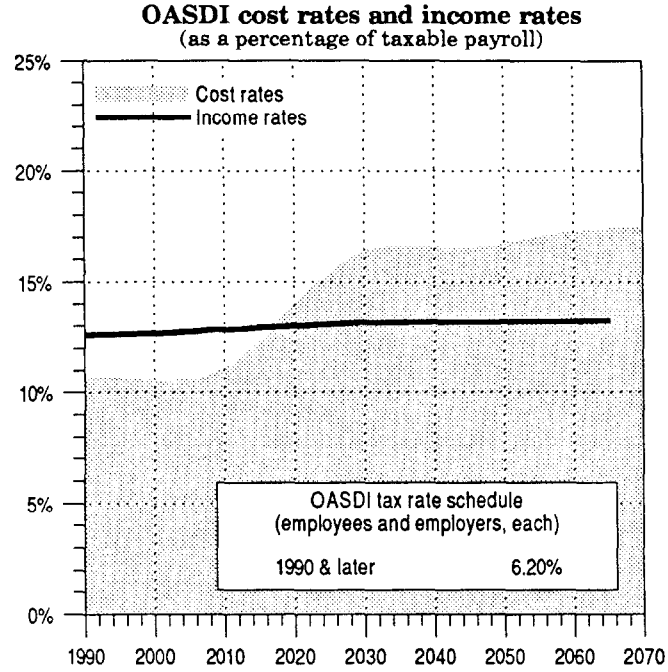
The **actuarial balance** is a single summary measure of the status of the trust funds over the full 75-year projection period. It is calculated as the difference between the summarized income rates and summarized cost rates over the period.

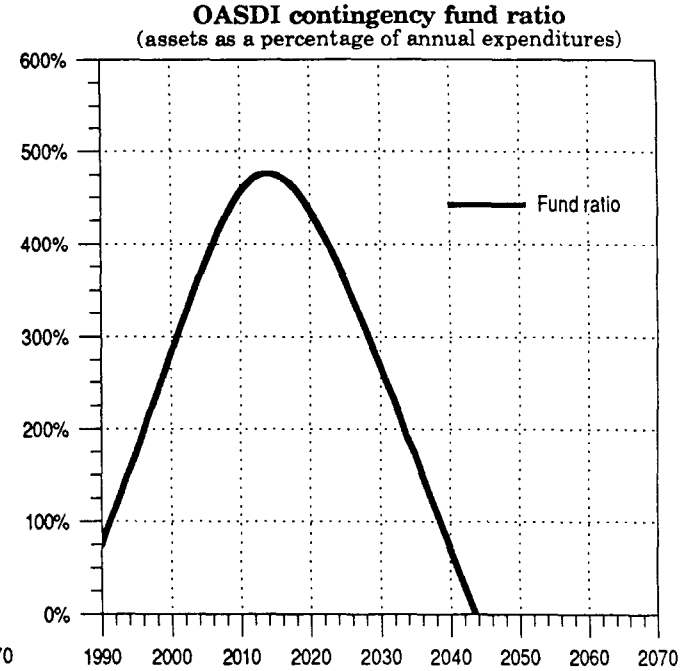
Beginning in 1988 the method of calculating the actuarial balance was changed to a "present-value" method from an "average cost" method that had been used from 1972 to 1987. (Before 1972 the present-value method had been used.)

In the current present-value measure:

- The summarized cost rate is the present value of program costs over the 75-year period divided

Graph 2.1—Projected OASDI financial operations under present law, based on the alternative II-B economic and demographic assumptions





Calendar year	Income rate	Cost rate	Balance	Contingency fund ratio
1990	12.61%	10.60%	2.01%	74%
1991	12.60	10.64	1.96	94
1992	12.61	10.67	1.94	113
1993	12.61	10.69	1.92	132
1994	12.62	10.69	1.93	153
1995	12.62	10.67	1.95	173
1996	12.62	10.63	2.00	194
1997	12.62	10.59	2.03	216
1998	12.63	10.56	2.06	237
1999	12.63	10.54	2.09	258
2000	12.65	10.56	2.09	280
2005	12.74	10.59	2.14	379
2010	12.82	11.08	1.74	455
2015	12.89	12.25	.64	475
2020	12.98	13.86	-.88	436
2025	13.06	15.33	-2.27	362
2030	13.12	16.28	-3.16	270
2035	13.14	16.62	-3.47	172
2040	13.15	16.55	-3.40	72
2045	13.15	16.52	-3.37	-29
2050	13.16	16.70	-3.54	-134
2055	13.18	17.00	-3.82	-246
2060	13.19	17.23	-4.04	-367
2065	13.20	17.36	-4.16	-497

Period	Summarized income rate	Summarized cost rate	Summarized balance	Alternative balance
1990-2014	12.67%	10.83%	1.84%	---
2015-2039	13.02	15.20	-2.18	---
2040-2064	13.14	16.89	-3.75	---
1990-2064*	13.04	13.95	-.91	-1.08%

* Summarized income rate, balance, and alternative balance for 1990-2064 include beginning trust fund assets. Alternative balance also reflects requirement for ending fund assets equal to 100 percent of annual expenditures.

Note: Estimates are based on the alternative II-B assumptions from the 1990 OASDI Trustees Report.

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by the present value of taxable payroll over the period.

- The summarized income rate is the sum of the fund balance at the beginning of the period plus the present value of OASDI revenue over the 75-year period, divided by the present value of taxable payroll over the period.
- The present-value calculations use the rate of interest that is assumed to be earned by the trust funds over the period.
- The actuarial balance is the summarized income rate minus the summarized cost rate.

The summary measure of actuarial balance should continue to be used and should:

- Continue to be based on the present-value method of summarizing income and cost rates; and
- Be modified to include in the cost of building and maintaining a contingency reserve throughout the projection period equal to 100 percent of annual expenditures.

Under the best-estimate (II-B) assumptions, the actuarial balance is a −0.91 percent of taxable payroll (a deficit): that is the difference between the summarized 75-year cost rate of 13.95 percent and the summarized 75-year income rate of 13.04 percent.

Other Measures

In addition, the Panel recommends that Trustees Reports highlight four other measures of the system's financial well-being:

(1) The year in which the trust funds are projected to exhaust their reserves, as well as the first year in which the reserves fall below a fund ratio of 50 percent.

(2) The amount of any tax or benefit changes needed to bring the system back into long-range actuarial balance.

(3) The amount of transfers to and from Federal general revenues that may be needed as special Treasury obligations are purchased and redeemed.

(4) The size of any difference between the cost rate and the income rate in the 75th year of the projection period, which is a measure of ultimate balance in the system.

Generally, this information has been included in Trustees Reports. The Panel believes these particular measures are critical and that they should be highlighted.

(1) The trust funds are now projected to be exhausted before the end of the 75-year period. Specifically, the 1990 Trustees Report projects that the trust funds will be exhausted in 2043 based on best-estimate (II-B) assumptions. The year in which the trust funds will be exhausted is an important indicator because it provides a theoretical outside limit (based on the best-estimate projection) as to how long the system could continue meeting its obligations without corrective action being taken. The Panel recommends that the Trustees' Report flag the year in which the trust fund ratio falls below 50 percent and, according to the short-range test, requires attention because it does not adequately provide for contingencies. Typically, this would be a few years earlier than the year of total exhaustion and would suggest the immediacy of concern.

(2) The amount of any revenue and/or benefit changes needed to restore long-range solvency is important because it provides insight into the magnitude of correction that may be needed. The magnitude of needed change typically depends on when the change would be implemented—the longer policymakers postpone corrective action, the larger the adjustment will need to be. The Panel suggests that the Trustees Report indicate the size of the change that would be needed currently and at selected later points, up to the point that the trust funds would otherwise be depleted.

(3) As noted in chapter 1, the need for year-by-year transfer of funds back and forth between the OASI and DI Trust Funds and the general fund should be highlighted. Increased attention should be devoted to the implications of these transfers for the Federal Budget, for investment markets, and for the economy as a whole. The amount of interest income projected to be transferred to the trust funds from the general fund should be separately identified.

(4) Acknowledgment of any difference between the cost and income rates in the last year of the projection period is important because it represents the currently estimated amount by which taxes must ultimately be increased or benefits ultimately cut. Moreover, when the cost and income rates at the end of 75 years differ significantly, as has been the case, an increasing and persistent imbalance is incorporated in the 75-year actuarial balance

in each successive annual Trustees Report.[6] To display this important indicator in the most useful fashion, the Panel suggests that the cost and income rates be shown with and without interest and that interest income be shown separately.

Tests of Financial Soundness

Traditionally, the determination of whether or not the system is adequately financed has focused on a single test: the test of close actuarial balance. If the actuarial balance is more or less than 5 percent of the summarized cost rate, the OASDI system has been considered to be "out of close actuarial balance." Such a condition has been considered to be a warning that future changes are needed in the program's benefit or financing provisions. The 1990 Trustees Report best-estimate (II-B) projection indicated that the income rate summarized over the 75-year period is only 93.5 percent of the summarized cost rate. Thus, it fails the test of close actuarial balance because it is not within 95 to 105 percent of the long-range cost rate.

In 1989, the Board of Trustees of the system discontinued explicit use of the test of close actuarial balance:

> The Board is of the opinion that decisions about the long-range future of the OASDI program should not be based solely on the estimated long-range actuarial balance. This particular concept, although useful in the decision-making process, does not fully capture all of the information that may be necessary for arriving at appropriate decisions. It is particularly inadequate now since it does not reveal what actually occurs when a substantial reserve accumulates during the early part of the projection period and decumulates during the latter part of the period.[7]

The Chief Actuary for the Social Security Administration (SSA) dissented from this view:

> "Close actuarial balance" is a valid concept, that ... is generally accepted by the actuarial profession in evaluating the actuarial status of the OASDI program, and that ... should be included in the report, continuing the practice in effect since the late 1950's.[8]

The Committees on Social Insurance of the American Academy of Actuaries (AAA) and of the Society of Actuaries (SOA), as well as a workgroup convened by the public trustees, have made recommendations regarding tests of trust fund soundness.

A joint statement issued by the actuarial committees recommends retention of close actuarial balance as a single long-range test and the addition of a short-range test.[9] Under this added test, the system would be considered to have adequate short-range funding if, over the first 5 years of the projection period:

- the funds are greater than 50 percent of annual expenditures, and are projected to remain greater than 50 percent, or
- the funds are less than 50 percent of annual expenditures, and the funds are projected to become greater than 50 percent of annual expenditures, then remain greater than 50 percent, and,
- in addition, the trust funds are able to meet all of their obligations when due.

The public trustees workgroup recommended the same short-range test as did the actuarial committees, but indicated that the relevant period for achieving the 50-percent contingency reserve should be the first 10 years of the projection period, rather than the first 5.

The workgroup also recommended that a "portfolio" of measures be used to describe the long-range soundness of the system, rather than relying on a single test. They suggested that the Trustees Report include an array of graphs that would illustrate for the full 75 years, both in dollars adjusted for inflation and in dollars not adjusted, the income and outgo of the system, annual balances, trust fund assets, ratios of income at the beginning of the year to outgo in that year, and actuarial balance.

Having reviewed the studies and recommendations of other groups, the Panel recommends that short- and long-range measures be adopted. The Panel's recommendations are generally consistent with those of the AAA, the SOA, and the public trustees' workgroup. The Panel's findings follow.

A short-range test of the soundness of the OASDI system is necessary. The Panel recommends a test that applies to the first 10 years of the projection period and indicates whether the system:

- Has a contingency reserve or fund ratio at the beginning of each year of more than 50 percent, or
- Is projected to achieve a fund ratio of more than 50 percent

[6] Under the 1989 best-estimate (II-B) assumptions, the difference between the income rate and the cost rate in the 75th year of the 75-year projection period was 4.09 percent; by 1990, the imbalance had grown to 4.16 percent.

[7] Trustees Report, 1989, pages 31-32.

[8] Trustees Report, 1989, page 32.

[9] The Committees on Social Insurance of the AAA and SOA, Joint Statement, November 1989, page 2.

within 5 years and remain at or above that level, and
- Has revenues sufficient to pay benefits in each month in the 10-year period at the beginning of that month.

Failure of this test would indicate a serious problem requiring the immediate attention of policymakers. A fund ratio of 50 percent is a minimal amount to ensure continued payment of benefits while corrective measures are developed and enacted into law in response to unexpectedly bad experience.

The system meets this short-range test.

A long-range test of trust fund solvency is also needed. It should cover the 75-year projection period and should:

- Summarize actuarial balances for all valuation periods up to 75 years including both the beginning trust fund balance and the cost of building and maintaining a contingency reserve equal to 100 percent of annual expenditures throughout the 75-year period.
- Apply a tolerance level for an actuarial deficit of 5 percent of the summarized cost rate over the full 75-year period and grading uniformly to zero at the beginning of the first projection period.
- Use a present-value calculation.

In essence, the Panel recommendation calls for a "generalized" version of the traditional test of close actuarial balance that would automatically incorporate subintervals of the projection period as well as the entire 75-year period. The Panel's proposal provides for presentation of all the information included in the traditional test. However, the Panel believes its test is superior to the traditional test, which is based only on a comparison of cost and income rates averaged over 75 years. This traditional test is incomplete because it does not provide sufficient information about the status of the trust funds over shorter periods. Thus, the OASDI system theoretically could be in close actuarial balance even though the trust funds would be exhausted at an early point in the 75-year period.

To address the questions raised by possible trust fund behavior between years 11 and 75, the Panel proposes that the present discounted value of costs and income also be calculated for each period ending with the 75th year. The Panel's proposal improves the traditional test by providing more information about the intermediate periods, while retaining the results over the full 75 years. However, the Panel believes use of the traditional test of close actuarial balance is preferable to use of no test at all, and recommends reinstatement of that test if its own test is not adopted.

The test recommended by the Panel includes a range in the tolerance level from 0 to 5 percent. This widening of the tolerance band is designed to reflect the increasing uncertainty over time about the reliability of the forecasts. It is consistent with the current test of close actuarial balance in that it uses 5 percent as its tolerance measure over the full 75-year period, but imposes a series of tests for shorter periods that the Panel believes are appropriately more stringent. The test would apply only on the low side; that is, it would be a tolerance limit on any actuarial deficit (or negative balance), but would not apply to positive balances unless the Congress explicitly adopted a policy to maintain a pay-as-you-go system.

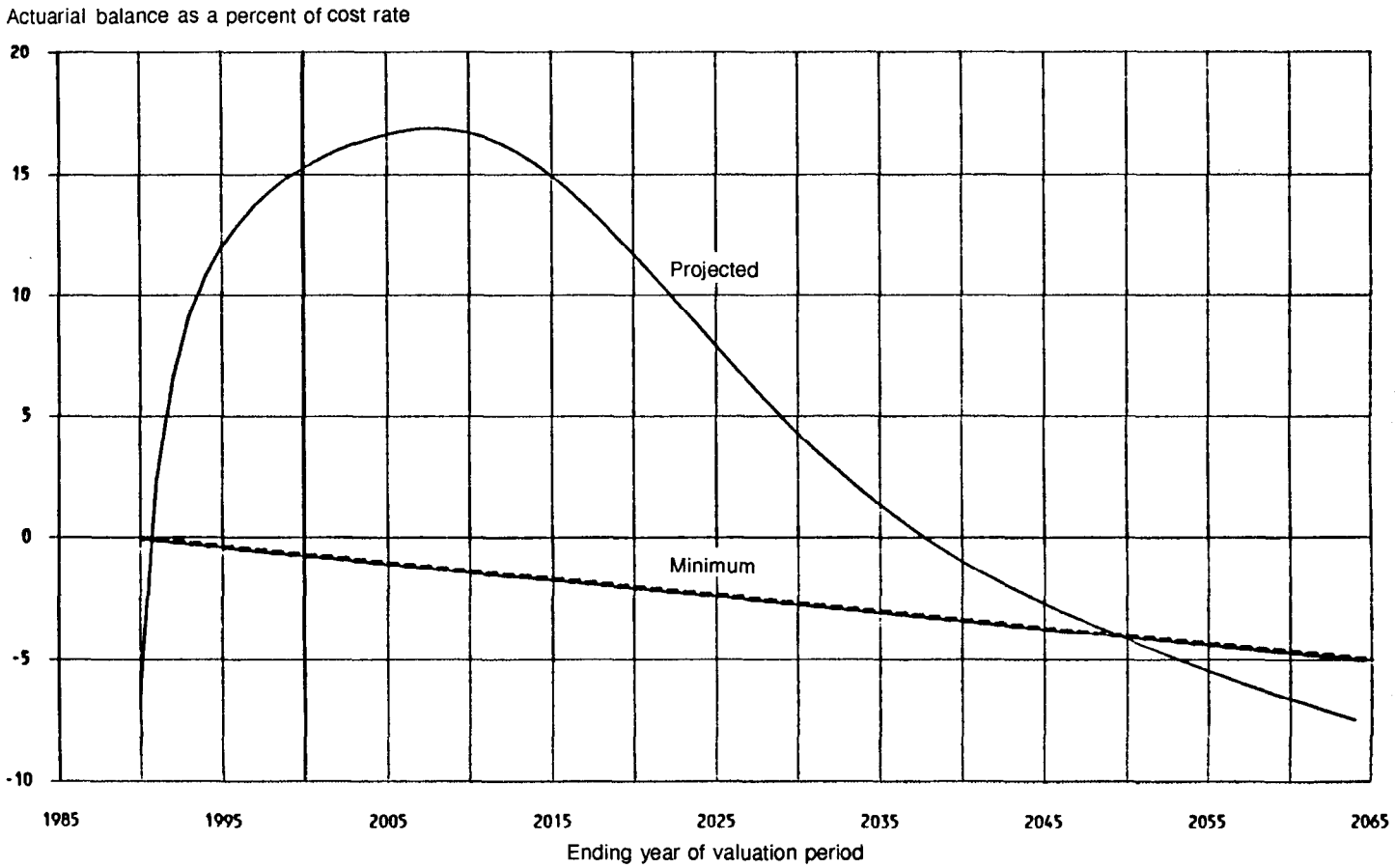
Further, the Panel recognizes that its recommended short-range test requiring a 50-percent fund ratio is not smoothly integrated with a long-range requirement for a 100-percent fund ratio beginning in the 11th year of the projection period. However, this is not of overriding concern because the two tests serve somewhat different purposes. The short-range test is intended to signal the need for immediate legislative **action**; the long-range test is intended to signal the need for **attention** to possible distant difficulties. The timing of any action that may be needed to address a long-range problem depends on the degree and timing of the projected financial imbalance.

As indicated above, the Panel recommends that interest income to the trust fund continue to be considered in calculating whether the system meets its long-range test; that is, the calculation should be made on a present-value basis, using the rate of interest assumed to be earned by the trust fund reserves as the discount rate.

The present-value method, which was adopted in 1988, is appropriate in light of the projected buildup of the trust funds. The present-value method, unlike the "average-cost" method used in 1972–87, includes the initial trust fund balance in the summarized measure of income. In addition, the present-value method appropriately discounts the future value of projected trust fund income and outgo by the interest rate that is assumed to be earned by the trust funds in the future.

The system does not now meet all aspects of the long-range test recommended by the Panel. Specifically, the system does not pass the test when the curve showing the actuarial balance as a percentage of the cost rate (including the 100-percent contingency reserve) goes below the line indicating the tolerance level. As shown in graph 2.2, according to the best-estimate (II-B) assumptions, for projection periods ending in 2050 or later, the

Graph 2.2—Comparison of projected OASDI actuarial balance as a percent of cost rate for varying valuation periods to minimum for close actuarial balance: 1990 alternative II-B



system is outside the bounds of the tolerance band. Further, as noted earlier, after the year 2039, it will no longer have a contingency reserve of at least 100 percent. (See appendix D.)

Presentation of Trust Fund Projections

- The projection set now labeled "alternative II-A" that is based on Federal Budget assumptions should be eliminated and the remaining three sets should be labeled "low cost," "best estimate," and "high cost."
- Further study should be made of the conceptual basis for the low- and high-cost sets.
- How rates of inflation are incorporated into the low- and high-cost projections should be further considered.
- OACT should explore ways to best reflect interaction among assumptions in the three alternative projections.

The best-estimate projection (currently designated as alternative II-B) fulfills a central role and should be retained in essentially its present form.

The Panel recommends eliminating alternative II-A, which is based on Federal Budget economic assumptions in the short range. Its purpose is not obvious and its preparation detracts from the resources needed to prepare the other three projections. The Panel recognizes that the best-estimate assumptions may differ from the Federal Budget assumptions in the short range.

To provide insight into the amount of potential variability involved in future experience of the OASDI system, projections on either side of the best estimate (II-B) are critical. Traditionally, these have been labeled "optimistic" and "pessimistic." However, this nomenclature can be confusing. For example, improvements in mortality are included in the "pessimistic" projections. The Panel believes that calling the alternatives "high cost"

and "low cost" would improve public understanding of their meaning.

Generally, the economic and demographic assumptions underlying alternatives I (optimistic or low cost) and III (pessimistic or high cost) are chosen individually so as to result in a reasonably wide range of program costs. Thus, for example, real wage gains assumed for the low-cost projection are higher than those assumed for the best-estimate (II-B) projection, while the real wage gains assumed for the high-cost projection are lower, because lower real wage gains, by themselves, result in higher program costs. Similarly, the fertility rates assumed for the low-cost alternative are higher than those assumed for the best-estimate (II-B) projection, while the fertility rates assumed for the high-cost alternative are lower.

Further work is necessary to define the conceptual framework for the current low- and high-cost projections. Although theoretically they represent a collection of extreme values for each of the variables, how they should be interpreted is not obvious. For example, possible interpretations include: absolute bounds on what could possibly happen, confidence intervals, illustrative alternative projections, and sensitivity analyses. The Panel suspects that the low- and high-cost projections are often used by the public and by policymakers as confidence bounds. However, this is not appropriate at least as far as the economic assumptions are concerned: actual economic experience has sometimes fallen outside the bounds of the low- and high-cost projections. (See appendix E for an analysis of forecast accuracy.)

Attention should also be given to the way in which rates of inflation are factored into the low- and high-cost projections. The assumptions for the future rate of increase in the Consumer Price Index (CPI) are not chosen on the basis of their cost effects, as are most other assumptions. The low-cost alternative incorporates lower inflation assumptions, while the high-cost projection incorporates higher inflation assumptions. However, high inflation results in lower costs, because inflation affects income to the system (from wages) before it does outgo (benefits).

Internal consistency of the assumptions should increase the credibility and accuracy of the forecasts. This is particularly true of the demographic assumptions, which have a number of well-established relationships among the variables. Consider, for example, the interactions among fertility, marital status, labor-force participation and birth expectations. The forecasting model has separate forecasts for marital status and fertility, yet it does not explicitly reflect any relationship between them. The Panel believes that OACT staff should study how best to incorporate some of these interactions (between marital status and fertility, for example).

Chapter 3: Actuarial Assumptions

Introduction

In reviewing both the economic and the demographic assumptions on which SSA builds its projections, the Panel considered the reasonableness of the values assumed in the 1990 Trustees Report, as well as the reasonableness of the process used to develop these values. Because a variety of approaches would yield plausible values, the Panel recommends change only in those instances where a strong case could be made for an alternative process or value.

In the case of both the economic and demographic assumptions, anyone who wishes to estimate their values 75 years into the future must do so with humility. Many of the significant changes that have taken place in the years since Social Security was enacted, or even in the last 25 years, were not anticipated by those initially making forecasts for the Social Security program. This is not to criticize the prognosticators, but rather to acknowledge the unpredictability of the future. While the art of forecasting has improved over the past decades, it is far from becoming an exact science.

In an effort to allow for uncertainty about the most likely values for the demographic and economic assumptions, SSA projects the range of values that seems most likely under circumstances more and less favorable to the Social Security program. The Panel thus looked not only at the central assumptions, but also at the high- and low-cost assumptions.

Assumptions about the course of demographic and economic events are made, typically, for the next 10 to 20 years and then are assumed to achieve an ultimate rate that will prevail over the remainder of the 75-year projection period. For the most part, the Panel focused on these ultimate rates.

Sensitivity of Assumptions

In general, the Panel reviewed most thoroughly the assumptions that make the most difference in determining the financial status of the system. Deciding which assumptions are the most important is somewhat subjective. Traditionally OACT has calculated the effects on the actuarial balance under the best-estimate projection of substituting the low- or high-cost projection for each chosen element.

Such an analysis shows, for example, that, over the 75-year period, a change in the ultimate real wage differential from 1.3 percent (the best-estimate assumption) to 0.8 percent (the high-cost assumption), in itself, would increase the actuarial deficit by 0.52 percent of taxable payroll.

Similarly, an increase in the long-range cumulative improvement in the death rate from 35 to 50 percent would increase the actuarial deficit by 0.79 percent of taxable payroll. (This would increase system costs, since benefits would need to be paid longer.) In contrast, realization of the high-cost assumption for immigration (a net increase of 450,000 instead of 600,000) would cost the system only 0.10 percent of payroll. These effects are summarized in table 3.1.

Economic Assumptions

The Panel concluded that three economic variables—the real wage differential, the real interest rate, and the rate of price inflation, as measured by the CPI—had the greatest potential impact on the actuarial balance of the OASDI program and therefore deserved the most attention.

A theme that ran throughout the Panel's discussion of the economic assumptions was the question of how much weight should be attached

to relatively distant history as opposed to recent experience and, where possible, future expectations of others. In general, the Panel thought that, while the process used to develop the Trustees' assumptions has been thorough and comprehensive, it may place too much weight on periods in the distant past. As discussed below, an analysis of the historical success of alternative forecasting approaches is a subject that deserves further study.

Real Wage Differential

The Panel recommends that the best-estimate (II-B) ultimate real wage growth assumption be decreased from 1.3 to 1.0 percent and that the low- and high-cost projection assumptions be set at 0.4 and 1.6 percent, respectively.

The real wage differential is the difference between the percentage increases in the average annual wage in covered employment and the average annual CPI. In the 1990 Trustees Report, the assumed ultimate real wage differentials for the low-cost, best-estimate, and high-cost projections are 2.2 percent, 1.3 percent, and 0.8 percent, respectively. These values can be derived either by looking directly at growth in average real covered earnings or by beginning with productivity (output per hour) growth and then excluding the "linkages"—namely, the projected change in the number of hours worked and the ratio of wages to total compensation resulting from the continued expansion in fringe benefits.

Taking the productivity approach, the 1990 Trustees Report best-estimate (II-B) real-wage assumption of 1.3 percent is derived from a productivity growth assumption of 1.7 percent minus a 0.2-percent annual decline in average hours worked and a 0.2-percent annual decline in earnings as a percent of compensation. The assumed annual productivity growth is consistent with average experience over the period 1951–89 (table 3.2).

Table 3.1.—Sensitivity of actuarial balance to key economic and demographic assumptions, 1990 Trustees Report

75-year actuarial balance with II-B assumptions: −.91

Impact of change in assumptions on II-B actuarial balances (in percents of payroll)

Assumption	75 years	
	Low cost	High cost
Economic		
Real wage differential	0.94	−0.52
Real interest rate	.51	−.27
Consumer Price Index	−.42	.20
Demographic		
Fertility rate	.48	−.51
Cumulative reduction in death rate	.66	−.79
Net immigration	.09	−.10

Assumed ultimate rates (in percents)

	Low cost	Best estimate (II-B)	High cost
Economic			
Real wage differential	2.2	1.3	0.8
Real interest rate	3.0	2.0	1.5
Consumer Price Index	2.0	4.0	5.0
Demographic			
Fertility rate	2.2	1.9	1.6
Cumulative reduction in death rate	18.0	35.0	50.0
Net immigration	750,000	600,000	450,000

Source: **1990 Trustees Report**, appendix B.

The Panel agreed that a forecast of all of the economic variables—except possibly for inflation—must be based on a careful analysis of past performance combined with a thoughtful assessment of how future experience might differ from the past. The bulk of the discussion, however, was devoted to discussing which historical period provides the appropriate basis for forecasting the next 75 years.

One could argue that the appropriate basis for projecting a variable such as productivity growth over the next 75 years is the performance of this variable over the past 75 years. Data prepared by the U.S. Bureau of Labor Statistics[10] show that for the period 1908–89, annual increases in output per hour worked in the U.S. private nonfarm economy averaged 1.8 percent. A recent study by Baumol et al.,[11] which surveyed numerous studies of long-range productivity trends, concluded that labor productivity growth for the economy as a whole, including the farm and nonfarm sectors, has averaged more than 1.5 percent per year since the middle of

[10]Department of Labor, Bureau of Labor Statistics, **Productivity and the Economy: A Chartbook** (Bulletin 2298), Washington, DC: U.S. Government Printing Office, 1988.

[11]William J. Baumol, Sue Ann Batey Blackman, and Edward N. Wolff, **Productivity and American Leadership: The Long View**, Cambridge, MA: The MIT Press, 1989.

Table 3.2.—Averages (1951–89) for key economic variables with various weights for preceding years

Variable	Weight applied to each preceding year				
	1.00	0.98	0.95	0.92	0.90
Productivity growth	1.7	1.6	1.4	1.3	1.2
Real covered earnings growth	1.3	1.2	1.0	1.0	1.0
Real interest rate	2.0	2.3	2.8	3.4	3.7
Consumer Price Index	4.2	4.5	4.9	5.1	5.1

Source: Social Security Administration, Office of the Actuary, unpublished data.

the 19th century. The study also concluded that productivity growth showed no evidence of a secular decline, but exhibited enormous cyclical variability.

The experience of the post-World War II period provides an example of the cyclicality of productivity growth. The 1950's and 1960's were periods of rapid productivity growth with an average annual rate of 2.3 percent, while productivity growth in the 1970's and 1980's averaged roughly 1.2 percent. Much attention has been focused on this productivity slowdown, including the shift in employment from manufacturing to services, and the decline in the position of the United States relative to other nations.

The question is, to the extent that history matters, whether the relevant number for long-term productivity growth is the 1.5- to 1.8-percent figure for the last century, the 1.7 percent for the postwar period, or the 1.2 percent for the last 20 years. After extensive discussion among the Panel members, a consensus emerged that changes in saving behavior, patterns of employment, and the nature of technological progress are likely to produce somewhat less productivity growth in the future than was enjoyed in the past. In other words, the experience of the recent past may be more relevant than that of more distant periods.

To develop appropriate empirical evidence, the Panel used weighted, rather than simple, averages of postwar data (1951–89). Although several approaches to weighting could be used, the Panel chose geometric weight factors declining at an annual rate of 0.95. This factor roughly halves the weight applied to earlier data every 14 years. This procedure produces a productivity growth assumption of 1.4 percent. Adjusting for the assumed change in the ratio of earnings to total compensation of 0.2 percent per year and the assumed decline in hours worked of 0.2 percent per year yields a real wage growth best-estimate (II-B) assumption of 1.0 percent, as opposed to the current assumption of 1.3 percent.

Approaching the estimation of the real wage differential directly from the growth in real covered earnings produces a result of a similar magnitude. For example, applying a declining geometric weight factor of 0.95 to each preceding year of real earnings growth produces an annual average over the period 1951–89 of 1.0 percent.

While real wage growth may average 1.0 percent over the next 75 years, shifts in the composition of the workforce would be expected to introduce deviations from that value in the short run. Work by Welch and Murphy[12] suggests that the changing age, sex, and education mix of the labor force may have added 0.1 percent to real earnings growth over the postwar period; subtracting this from the average brings the base rate of gains in real earnings to 0.9 percent. In the future, other compositional changes are likely to occur that will affect productivity growth. For the next decade, wage growth may be as much as 0.3 percent higher than this long-range trend, as relatively fewer numbers of new workers enter the labor force and the baby boomers mature. The Panel estimates that this demographic factor will decline to 0.2 percent for the first decade of the 20th century and to 0.1 percent for the remainder of the period. In short, the pattern of real wage growth for the next 75 years, adjusting for compositional changes, is projected to be 1.2 percent for the period 1990–2000, 1.1 percent for 2000–10, and 1.0 percent thereafter.

Two issues remain. The first is to determine an approach for deriving the values of real wage growth for the low- and high-cost alternatives. One possible assumption for the high-cost projection would be to assume a continuation of productivity growth of the last 20 years. This would yield a value of 1.1 percent for total growth. Taking account of the linkages described above would yield a high-cost assumption of 0.7 percent for real wage growth. On the other hand, the weighted average of growth in covered earnings over the last 20 years has been 0.6 percent. Moreover, favorable demographic and educational developments over the past 20 years may have added 0.2 percent to average annual growth that may not continue in the future. Using the slightly lower value and adjusting for compositional factors produces a high-cost assumption of 0.4. Making the low-cost assumption symmetrical in a linear sense around the best-estimate (II-B) assumption would yield a range of 0.4 to 1.6. This compares with the current ultimate assumptions of 0.8 to 2.2.

[12]Finis R. Welch and Kevin Murphy, **Recent Trends in Real Wages: Evidence from Household Data** (Working Paper), Los Angeles: Unicon Research Corporation, 1989.

The remaining issue is whether the assumed rate of growth of fringe benefits and the decline in hours worked are reasonable. The Panel did not investigate this issue in detail and believes more research relating to fringe benefits and hours worked would be useful.

Real Interest Rate

The Panel recommends an increase in the ultimate best-estimate (II-B) real interest rate assumption from 2.0 to 2.8 percent and an increase in the low-cost rate from 3.0 to 3.3 percent. The Panel recommends no change in the high-cost assumption of 1.5 percent.

The interest rate assumption plays little role in a pay-as-you-go system, but has a relatively significant impact on the actuarial balance whenever the projected trust fund accumulation is large. Under the current financing schedule, a higher real interest rate has a positive effect on the balances because the large accumulation precedes a period of decumulation. The current ultimate assumed real rates for the low-cost, best-estimate, and high-cost projections are 3.0 percent, 2.0 percent, and 1.5 percent, respectively.

The relevant interest rate for the OASDI system is the return that can be earned on trust fund assets. Under current law, these assets are invested solely in U.S. Government obligations. The portfolio is almost exclusively special issues, which bear an interest rate at issue equal to the average market yield of all outstanding Government securities with at least 4 years until maturity. Although the special issues have no specific period until maturity, their maturity schedule has generally been spread equally over a period of 15 years; they are always redeemable at par. Over the last 40 years, the trust funds have earned a real return of roughly 2 percent, which is largely the basis for the current best-estimate (II-B) projection.

The Panel generally agreed that all sources of relevant information should be used in constructing a 75-year forecast. In the absence of major structural changes, averages of historical values are a legitimate starting point to project future performance. Again the issue arose about the appropriate past period on which to base future projections. Some members viewed the high rates of the 1980's as an anomaly, while others considered them the beginning of a new period of permanently higher returns. Those who argued that a structural shift had occurred cited the decreased saving rate, which makes capital relatively scarcer, and more efficient intermediation between savers and investors, which allows returns on financial instruments to move closer to the economy's return on capital. Those who view the 1980's as an anomaly attribute the high real rates to Government effort to wring inflation out of the economy in the late 1970's and to large Government deficits, which probably will not persist indefinitely.

The historical pattern of real interest rates is even more uneven than real earnings growth. The four postwar decades consist of three decades with an average real interest rate of less than 1 percent and one with an average of more than 5 percent. The combination produces the unweighted average of 2 percent for the entire 1951–89 period.

In addition to historical experience, the Panel agreed that current market interest rates should be considered in making projections. Comparing current nominal yields on 5- and 10-year Government securities with projected inflation produces expected real returns in the range of 3 to 4 percent. (See graph 3.1.) This evidence suggests that some people anticipate that high real rates may persist for some time into the future. The Panel urges that, as an ongoing practice, the sum of the inflation assumption and the real interest rate assumption be compared to current long-term nominal interest rates. When that sum differs appreciably from the long-term nominal rate, as it does for the 1990 Trustees Report, then substantial explanation about the reasons for this deviation should be included in the text of the Trustees Report.

Because of the current high real rates of interest and the possibility that structural changes have occurred, the Panel once again concluded that the weight should decrease for years in the more distant past. Using a 0.95-percent weight for each preceding year over the period 1951–89 would suggest 2.8 percent as the long-term real rate assumption for the best-estimate (II-B) projection. This lies roughly midway between the 1990 Trustees Report assumption and an expected rate that one would infer from current market rates and inflation expectations, using the expectations hypothesis.

Regardless of their views on why real interest rates are currently so high, all Panel members believed that the adjustment from present rates of 3 or 4 percent to the long-range value would probably not occur as rapidly as assumed in the 1990 Trustees Report. The consensus was that the period over which the phase-in occurs should be extended from 10 to 15 years.

Following the procedure for establishing the low- and high-cost assumptions for the real wage differential, the less-costly scenario in this case can be based on the weighted average for the last 20 years, which yields a figure of 3.3 percent. There seems no particular reason to change the high-cost assumption; it should remain 1.5.

Inflation

The Panel recommends an increase in the ultimate best-estimate (II-B) inflation rate from 4.0 to 5.0 percent and increases in the low- and high-cost assumptions to 3.0 and 7.0 percent, respectively.

The rate of inflation has an important effect on the actuarial balance, beyond its influence on real wage growth and the real rate of interest. The reason is that, if inflation is increasing, rising wages and prices will increase program revenues before costs because cost-of-living adjustments lag increases in revenues by about 6 months on average. In the 1990 Trustees Report, the assumed ultimate annual rates of increase in the CPI for the low-cost, best-estimate (II-B), and high-cost alternatives are presently 2.0 percent, 4.0 percent, and 5.0 percent, respectively.

Unlike the real interest rate and wage differential, the rate of inflation is less the product of fundamental economic forces and more the result of deliberate Government policy, as well as fundamental economic forces. This has both economic and political implications. On the political side, the Panel recognized that the Trustees may often be in the difficult position of having to forecast a variable that the Federal Reserve can strongly influence. The Secretary of the Treasury, who serves as managing trustee of the trust funds, is unlikely to want to contradict Federal Reserve intentions. This potential conflict of interest makes it particularly important to develop assumptions on the basis of a relatively objective process.

The nature of that process will inevitably be quite different from that used for other economic variables. Historical data are significantly less important and should be used only to determine whether the assumptions made are reasonable. Emphasis in the projection process should be placed on the forecasts made by the private sector as a way of ensuring objectivity. For example, Data Resources, Inc. (DRI) projects changes in the CPI until 2014 and the WEFA Group makes a comparable forecast for the same period.[13] Currently, DRI projects an average rate of increase of 5.1 percent and WEFA projects 4.6 percent over the 25-year period. Taking the average of the two yields a long-term inflation assumption of roughly 5.0 percent.

Given the increase in the best-estimate (II-B) assumption to 5.0 percent, it seems reasonable to increase the low-cost assumption to 3.0 percent and the high-cost assumption to 7.0 percent. (As noted earlier, the Panel also questions whether lower inflation is more appropriately incorporated in the high-cost projection, rather than in the low-cost projection.)

Conclusion

Table 3.3 summarizes the economic assumptions that follow from the Panel's recommended process. They involve offsetting increases and decreases in projected overall costs. (See chapter 4.)

The major conclusion that emerges from this review is that empirical research could assist in resolving the major issue debated by the Panel. Specifically, current Social Security long-range forecasting procedures rely heavily on historical averages of relevant variables taken over different horizons. Disagreements center on which averaging period or which averaging weights are appropriate for each series. These questions can be addressed by using the statistical techniques of time series analysis. Resources should be devoted to the development of alternative statistical approaches for extrapolating past time series of relevant variables. Initially, the focus should be on univariate approaches, though the Panel suspects that multivariate approaches might ultimately be worthwhile.

One final note—the long-range deficit reported in the 1990 Trustees Report increased by 0.16 percent because of a recent decline in the ratio of taxable to total payroll. The decline is attributable to recent increased wage dispersion, in particular to growth in wages above the level subject to Social Security taxes. Careful monitoring of this ratio will be essential to determine whether the large decline was a one-time phenomenon or the beginning of a significant downward trend.

[13] The Panel used these two forecasts because they are typical of the 250 or so private short-range projections available and are among the only available longer run projections.

Table 3.3.—Panel economic assumptions compared to Trustees assumptions

Variable	Low cost	Best estimate	High cost
Panel suggested economic assumptions (in percents)			
Real wage differential	1.6	1.0	0.4
Real interest rate	3.3	2.8	1.5
Consumer Price Index	3.0	5.0	7.0
1990 Trustees Report economic assumptions (in percents)			
Real wage differential	2.2	1.3	0.8
Real interest rate	3.0	2.0	1.5
Consumer Price Index	2.0	4.0	5.0

Demographic Assumptions

The Panel considered the following demographic assumptions used in the actuarial projections of the OASDI program: mortality, fertility, immigration, marriage and divorce, retirement, and disability.[14]

Table 3.4.—Variations in mortality rates by period

Period	Annual percentage reduction	
	Male	Female
1900–1936	0.81	0.95
1936–1954	1.60	2.54
1954–1968	–.19	.79
1968–1988	1.56	1.58
1900–1988	.99	1.39

Mortality

The Panel makes no suggestions for changing the level of the mortality assumptions. It does, however, suggest an assumption of continued increase for several years beyond 1990 in deaths from the Acquired Immune Deficiency Syndrome (AIDS) in the low-cost projections.

The mortality assumptions upon which Social Security population projections are based vary by age, sex, and cause of death.

Mortality rates have decreased during most past periods, but have been highly variable. The average annual percentage reduction in age-adjusted central death rates during various historical periods are shown in table 3.4.

The rates of improvement varied not only by sex and by period, but also by age and cause of death. During most of these periods, the percentage reduction was greater at younger ages than at older ages. Thus, similar to the problem of economic assumptions, the question is the rates from which historical periods are most relevant.

A helpful approach to this problem is to analyze rates of change in mortality by various causes, as has been done by OACT. Rates of improvement by cause have varied significantly, with even greater variation by period than the variation in the overall rates of mortality. For example, rates of death from lung cancer increased more than tenfold between 1930 and 1986. However, this trend may reverse itself in the years ahead, because the rate of smoking has recently declined. This reversal may be sooner and more significant for males than females.

AIDS was unknown a few years ago, but has become a major cause of death among young adult males in recent years and is still increasing in importance. This raises questions concerning how long the increase will continue, how high the death rates will be, and to what extent they will decline in the future. The experience with AIDS suggests that other causes of death presently unknown or cures for currently significant causes of death could arise in the future, perhaps with an even more significant effect. Because it is anticipated that AIDS will affect relatively few older workers and retirees, it has a fairly modest effect upon costs of the OASDI system. (An increase in AIDS deaths has an unfavorable effect on the trust funds because the deaths tend to occur among relatively young workers who, if they survived and remained healthy, would continue to pay taxes into the system for many years.) AIDS mortality is assumed to increase until 2000 under the best-estimate (II-B) and high-cost projections and until 1990 under the low-cost projection and then to decrease to approximately half of the peak level. The Panel believes that, even in the low-cost scenario, the assumption should be modified to reflect expected continued increases in deaths for several years beyond 1990.

After studying past rates of change by cause of death and considering future expectations, OACT develops assumptions regarding ultimate rates of improvement in mortality by principal cause of death and age-sex groupings. The assumed rates of improvement differ by projection scenario. Annual rates of improvement are then projected to change gradually from recent average levels, measured as average annual mortality improvement between 1968[15] and the present, reaching the assumed ultimate rates of improvement within 25 years (by 2014). The Panel believes that the differential ultimate rates of change in mortality by cause should be reviewed to ensure that they reflect such factors as the variation in changes in smoking habits by sex. In addition, the method of moving from the current level to the ultimate level should be further reviewed. Under the best-estimate projection, the ultimate future percentage decreases in mortality rates in years 2014 and later are generally about half those experienced during 1900–88 and less than one-third those for 1968–88. Smaller decreases are projected under the low-cost projection and greater decreases are projected under the high-cost projection.

[14]The Panel did not include a professional demographer, but it benefited from reviewing a number of studies and articles by demographers, as well as specific submissions to the Panel.

[15]The year for which cause-specific data were first available.

A better understanding is needed of the causes of the trend in lung cancer in order to determine whether, when, and to what extent the current high level of mortality from this cause may be reduced. More analysis is needed of the rate and magnitude of future decreases in mortality from lung cancer, cardiovascular diseases, and other causes that may be expected from continued declines in smoking, as well as from other factors such as continued advances in medical practice.

The Panel recognizes that dramatic improvement or deterioration is possible from unpredictable sources, such as significant breakthroughs in scientific research or living practices, deterioration of the environment, or nuclear disasters. However, the use of such assumptions does not appear to the Panel to be warranted for OASDI projections at this time.

Fertility

The Panel recognizes the uncertainty of future fertility trends. A majority of the Panel considers the ultimate total fertility rate of 1.9 as appropriate for the best-estimate (II-B) assumption, but would also consider 1.8 reasonable.[16] The Panel recommends that the ultimate fertility rate for the high-cost projection be reduced from 1.6 to 1.4, in light of current experience of certain developed countries.

"Total fertility rates" are expressed as the number of children a woman would bear during her lifetime if she experienced a given year's age-specific fertility rates. Total fertility rates rose from 2.2 in 1940 to 3.6 in 1960. After 1960, fertility rates began to fall, reaching a low of 1.7 in 1976. Since 1976 fertility rates have risen slightly, reaching approximately 1.9 in 1988 (the most recent data available).

The best-estimate (II-B) projection uses future fertility rates of 1.9 births per woman. Under the low- and high-cost projections, the fertility rate reaches 2.2 and 1.6, respectively, for years 2014 and later.

In the United States, black and Hispanic women have historically experienced higher fertility rates than other women in the population. The proportion of young American women who are black and Hispanic is growing. This change in the mix of the underlying population may result in slightly higher overall fertility rates in the future. The Panel recommends further investigation into the overall future impact of this change in mix in population.

The decline in fertility rates in the United States since 1960 has also been experienced in most high-income economies and many developing countries in the world.[17] Fertility rates in some countries have reached levels substantially below those existing currently in the United States, including 1.3 in Italy, 1.4 in West Germany, 1.5 in Austria and Denmark, and 1.6 in Spain, Belgium, Netherlands, Finland, and Switzerland. Fertility rates in less-developed countries are substantially higher than those in the United States, but these too have decline sharply.

The median age at first birth increased from 21.8 years in 1960 to 23.6 years in 1986 (the most recent year for which these data are available). It is not clear to what extent this may result in fewer children per woman or merely in a later average maternal age at birth. Even if the only effect were to defer the average maternal age at birth, the result would be some increase in the average years between generations and a decrease in the total birth rate.

Demographers view surveys of women concerning their future expected births as indicative of future fertility rates. While individuals may have more or fewer children than the surveys indicate, trends in birth expectations may indicate future trends in overall fertility. Lifetime birth expectations for women age 18 to 34 have averaged between 2.0 to 2.1 births per woman annually since 1979, indicating that a continued decrease in fertility may not occur.[18]

The recent upward trend in U.S. fertility rates has created differences of opinion concerning ultimate rates of fertility. Some think that fertility rates have stabilized, while others expect resumption of the prior downward trend that occurred between about 1960 and 1976. The Bureau of the Census assumed an ultimate rate of 1.8 in 1989, compared to 1.9 under Social Security's best-estimate (II-B) projection.

Fertility rates may be related to other assumptions used in OASDI projections. A higher level of immigration may increase average fertility rates because new immigrants tend to have more children. Lower fertility might lead to legislation permitting higher immigration to meet labor supply needs. Fertility rate assumptions may also be related to other factors, including assumptions concerning unemployment; real wage growth; demographic, economic, political

[16] See dissenting view in appendix F.

[17] **World Development Report 1989**, International Bank for Reconstruction and Development, 1989, pages 216–17.

[18] U.S., Department of Commerce, Bureau of the Census, "Fertility in American Women: June 1988," **Current Population Reports, Population Characteristics** (Series P-20, No. 436). Washington, DC: Government Printing Office, 1989, U.S. Bureau of the Census.

conditions in foreign countries; and other factors such as delays in the age of childbearing.

Further research may assist in selecting fertility assumptions in the future. Better understanding of the causes of past trends may help in predicting the future. Questions to be studied include the relationship between age at first birth and the total fertility rate, the birth rates of immigrants and of their children, the trends in fertility rates for various sectors of the population, and the extent to which recent increases in fertility rates are attributable to the increase in the proportion of blacks and Hispanics among women of childbearing age.

Table 3.5.—1990 Trustees Report immigration assumptions

Immigration	Low cost	Best estimate	High cost
Legal	600,000	525,000	450,000
Emigration of legal residents	150,000	125,000	100,000
Net legal	450,000	400,000	350,000
Net other-than-legal	300,000	200,000	100,000
Total net	750,000	600,000	450,000

Immigration

The Panel recommends a net increase of 150,000 in the number of immigrants assumed in the low-cost projections.

The number of legal immigrants is largely determined by legislation. The Immigration Act of 1965 increased the level from around 300,000 to about 400,000. The admission of refugees and political asylees further increased the level to about 550,000 during the last decade. However, there are no reliable data on the number of emigrants since 1957, and there have never been reliable data on the number of other-than-legal immigrants.

The 1990 Trustees Report assumes the number of net immigrants in 1989 and in each future year under the three projections as shown in table 3.5.

Beginning in the 1990 Trustees Report the projections assume a different rate of work in reported covered employment for other-than-legal resident aliens than for other members of the population.

The Panel suggests further study of immigration, including the relationship between labor-force participation rates and rates of total net immigration, and the length of coverage and average earnings of immigrants who remain in the country, as well as those immigrants and natives who emigrate. Further study is also warranted as to the effect of immigration on the OASDI system, including the extent to which legal and other-than-legal immigrants receive benefits based upon their coverage under the system.

Because of lack of data on emigration and other-than-legal immigration, even present levels of net immigration are only educated guesses that may be far from accurate. And while the level of legal immigration is established by law, Congress may change the law. The Panel believes the uncertainty concerning future levels of immigration should be reflected in a wider range around the best-estimate (II-B) and, thus, recommends an increase in the assumed level of immigration under the low-cost projection. Specifically, the Panel believes legal immigration should be increased to 700,000, emigration increased to 200,000, and net other-than-legal immigration increased to 400,000, for total net immigration of 900,000.

Marriage and Divorce

The Panel suggests that consideration be given to using separate first marriage and remarriage rates.

Marriage and divorce rates are used in the projection of the number of individuals entitled to benefits as a spouse, widow, or widower of a covered worker.

Age-adjusted central marriage rates remained fairly stable from 1957 through 1969, after which they experienced a significant decline. By 1985 the rates reached about half the prior level. A continued slight decrease in 1986 and 1987 appears to have stabilized in the last several years.

The divorce rate more than doubled between 1960 and 1979, but has remained relatively stable since then. Marriage and divorce rates have not received much study, perhaps because over the long run these assumptions have relatively little impact on costs under the OASDI system.

Under the best-estimate (II-B) projection, marriage and divorce rates are assumed to remain at approximately the levels of recent years. Under the low-cost scenario, marriage rates are anticipated to fall and divorce rates are anticipated to rise, while the opposite is anticipated under the high-cost projection.

Retirement

The Panel has no recommendation for changing the present retirement rate assumptions.

The numbers of retired-worker beneficiaries are projected by age and sex in relation to the number of fully insured persons who are eligible. The percentages of eligible workers aged 62 through 69 who are

retired-worker beneficiaries increased during the 1970's, as in earlier periods. During the 1980's, the percentages remained reasonably stable, decreasing slightly.

Beginning in 1990, the retirement earnings test was modified to reduce OASI benefits by $1 for each $3 of earnings in excess of the "annual exempt amount" for workers aged 65 through 69, compared to the prior reduction of $1 for each $2 of excess earnings. This makes it possible for more individuals aged 65 through 69 to receive OASI benefits while still working part-time. To reflect this change, beginning in 1990 the percentage of persons aged 65 through 69 who are retired-worker beneficiaries is assumed to increase.

Scheduled increases in the delayed retirement credit, which provides increased monthly benefit levels for deferring application for benefits, are assumed to decrease the percentages of those aged 62 through 69 who are retired-worker beneficiaries. Future decreases in OASI benefits at all ages related to the scheduled change in the normal retirement age between 2000 and 2022 are also assumed to decrease the percentages beginning in the year 2000. That age is scheduled to increase to 66 for those turning 62 in 2005 and to age 67 for those turning 62 in 2022 and thereafter.

The net effect of these factors is to increase the percentages of persons at ages 62 through 69 who are retired-worker beneficiaries in the 1990's and to decrease the percentages thereafter.

Disability

The Panel makes no recommendation for changing the present disability assumptions.

Rates of disability incidence under the DI program have fluctuated substantially in the past. The age-sex adjusted disability incidence rate per 100,000 of disability-insured workers rose from 295 in 1965 to 681 in 1974 and then fell to 320 by 1982. This incidence rate again rose in 1983–85, reaching 396 by 1985, remaining relatively stable since 1985. Historically, administrative guidelines for what constitutes the onset of disability and recovery from disability have varied significantly. Most of those familiar with these changes believe that the fluctuation of disability incidence rates is principally due to changes in program administration, rather than resulting from changes in rates of sickness or accident or of changes in economic conditions.

Under the best-estimate (II-B) projection, long-range future disability incidence rates are assumed to increase for three reasons. First, the age-sex adjusted incidence rate (for ages up to 65) is projected to rise from 389 per 100,000 in 1988 to about 460 per 100,000 by 2010, absent the effects of increased normal retirement age. Second, scheduled increases in the normal retirement age, beginning with those attaining age 62 in the year 2000, and the associated reduction in the available retirement benefit at ages 62 through 64 will further increase disability incidence at these ages, causing the age-sex adjusted ratio for all ages up to 65 to rise to almost 490 per 100,000, or about 125 percent of the 1988 rate. Third, as the normal retirement age is increased, persons at ages 65 and 66 will also become eligible for DI benefits.

Under the low-cost projection, incidence rates are assumed to remain at approximately the level experienced during the last 5 years until 2010, after which they are expected to increase but not to the level assumed under the best-estimate projection. Under the high-cost projection, higher levels of disability incidence are assumed than under the best estimate (II-B) for both stages of the increase.

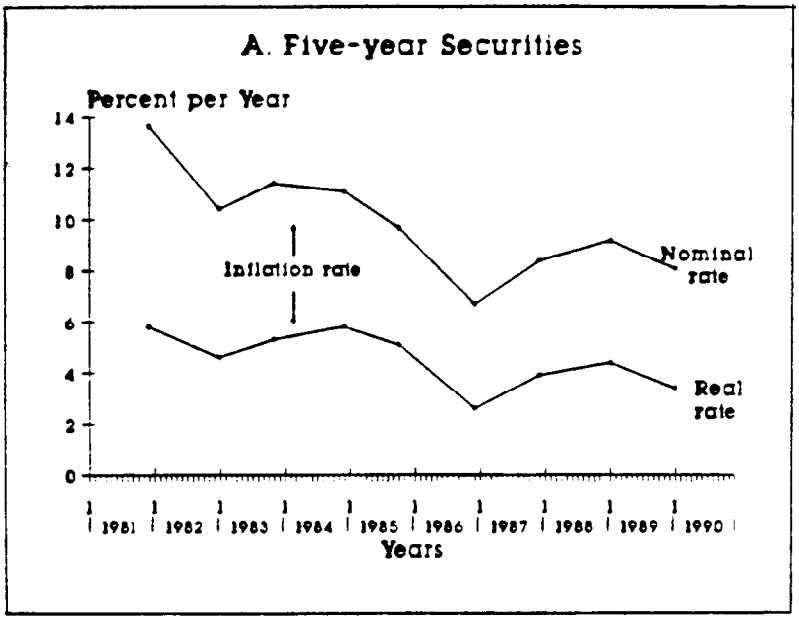
A worker's disability status terminates by recovery, death, or attainment of the normal retirement age under OASI. Under the best-estimate (II-B) projection for the short range, total termination rates are expected to increase from the relatively low levels of 1984–89 to levels comparable to those of the 1970's. Thereafter termination rates due to mortality are assumed to decrease while recovery rates are assumed to increase. The low- and high-cost projections include higher and lower termination rates, respectively, than the best-estimate (II-B).

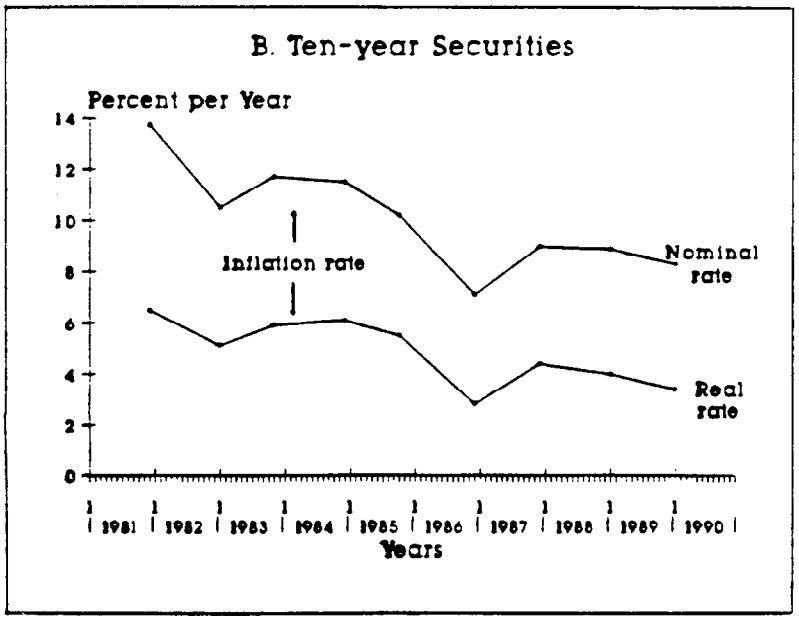
The Panel suggests further research on disability incidence rates, mortality rates, recovery rates, and early retirement as they relate to cause of disability and to the impact of changing occupation mix of the population. The apparently overwhelming effect of varying administrative practices, however, may make such studies difficult to perform and of relatively limited value.

Conclusion

The Social Security Administration has taken a careful and professionally responsible approach in selecting demographic assumptions to recommend for use in the projections of the OASDI system. The Panel believes that the demographic assumptions used by the OASDI Board of Trustees are reasonable in the aggregate and appropriate for their purposes. It recommends certain minor changes in those assumptions and certain areas for which further research may lead to more refined assumptions.

Graph 3.1—Nominal and real interest rates on U.S. securities using WEFA forecasts of inflation, 1981-90





Source: Nominal rates for 5-year securities, OECD Financial Statistics Monthly; for 10-year securities, DRI U.S. Databank. Inflation rates from WEFA U.S. Long-Term Economic Outlook.

Note: Inflation rate, measured by CPI, is forecast as of the month preceding the month of interest rate measurement.

Chapter 4: Financial Implications

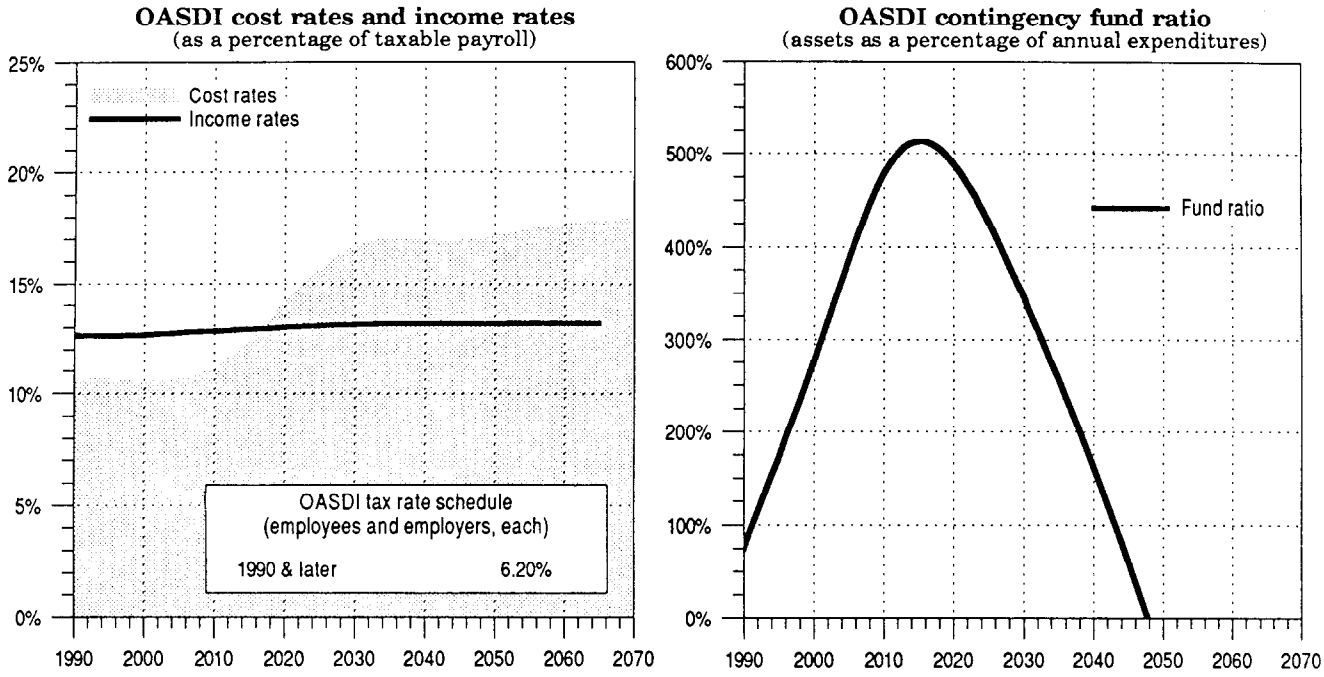
The Panel has made offsetting recommendations, the implementation of which would both improve and worsen the forecast of the future health of the OASDI system. The recommended increase in the interest rate assumption has a significant positive effect on the long-range actuarial balance because that measure takes account of interest the trust funds are earning during this period of reserve accumulation. Two other recommendations—the decrease in assumed productivity and the maintenance of a 100-percent contingency reserve—would place increased financial demands on the system and would worsen its apparent financial well-being according to measures that do not take account of interest. (See graph 4.1.)

Specifically, using the Panel's recommended changes in the best-estimate (II-B) economic assumptions and implementing its recommendation to include the cost of maintaining a 100-percent contingency reserve throughout the 75-year projection period would result in a summarized long-range (75-year) actuarial balance of −0.70 percent of payroll (a deficit), compared to −0.91 percent under the Trustees' 1990 best-estimate (II-B) assumptions. The effects of the Panel's recommendations are shown in table 4.1.

It should be noted that the change in the summarized actuarial long-range balance attributable to the change in the real interest assumption is of a different character from the other changes. The above results are based on a perspective limited to the Social Security system. When viewed from the standpoint of the entire Federal Budget, the higher level of interest income to the trust funds implies a correspondingly higher level of interest expense to the U.S. general fund. In other words, it represents a shift from a need for an increase in OASDI payroll taxes (or benefit reduction) to a need for other sources of revenue. One further cautionary comment is that the real interest assumption would have less effect on actuarial balance if the system were financed more nearly on a pay-as-you-go basis.

While the long-range actuarial balance is improved by the Panel's recommendations, the annual balances are actually worse; i.e., more negative under the Panel's assumptions for all but the first few years of the long-range projection period. For the last year of the projection period (2064) the annual balance of revenue over outgo changes from −4.14 percent of payroll under the Trustees best-estimate (II-B) assumptions to −4.58 under the Panel's best-estimate (II-B) assumptions. Annual balances are generally worse under the Panel's assumptions because (1) the higher assumed interest rate does not affect annual balances and (2) the magnitude of the change due to the real wage assumption (which increases the size of the deficit) exceeds the magnitude of the change due to the inflation assumption (which reduces the size of the deficit).

Graph 4.1—Projected OASDI financial operations under the intermediate assumptions recommended by the Advisory Council's Technical Panel on Social Security



Calendar year	Income rate	Cost rate	Balance	Contingency fund ratio
1990	12.63%	10.53%	2.10%	74%
1991	12.60	10.62	1.97	94
1992	12.61	10.65	1.95	113
1993	12.61	10.69	1.92	132
1994	12.62	10.69	1.93	152
1995	12.62	10.66	1.96	171
1996	12.62	10.62	2.00	192
1997	12.62	10.59	2.03	212
1998	12.63	10.56	2.06	233
1999	12.63	10.55	2.08	254
2000	12.65	10.55	2.10	275
2005	12.74	10.65	2.09	385
2010	12.83	11.18	1.65	477
2015	12.91	12.42	.49	513
2020	13.00	14.08	-1.08	489
2025	13.08	15.61	-2.53	428
2030	13.14	16.63	-3.49	347
2035	13.17	17.02	-3.85	257
2040	13.17	16.98	-3.80	163
2045	13.17	16.95	-3.78	62
2050	13.19	17.14	-3.95	-50
2055	13.20	17.44	-4.24	-176
2060	13.22	17.68	-4.46	-318
2065	13.22	17.82	-4.60	-477

Period	Summarized income rate	Summarized cost rate	Summarized balance	Alternative balance
1990-2014	12.67%	10.85%	1.82%	- - -
2015-2039	13.04	15.40	-2.36	- - -
2040-2064	13.16	17.32	-4.16	- - -
1990-2064*	13.05	13.62	-.58	-0.70%

* Summarized income rate, balance, and alternative balance for 1990-2064 include beginning trust fund assets. Alternative balance also reflects requirement for ending fund assets equal to 100 percent of annual expenditures.

Office of the Actuary
July 26, 1990

Table 4.1.—Effects of Panel recommendations

Recommendation	Effect on long-range actuarial balance (percent of payroll)
Decrease the ultimate real wage differential best-estimate (II-B) assumption from 1.3 to 1.0 percent	−0.30
Increase the ultimate inflation rate from 4.0 to 5.0 percent	+0.20
Increase the ultimate real interest rate from 2.0 to 2.8 percent and phase in the ultimate rate over the first 15 years of the projection period, rather than the first 10 years as assumed by the Trustees	+0.43
Effect of assumption changes (subtotal)	+0.33
Include the cost of building and maintaining a contingency reserve equal to 100 percent of annual expenditures over the 75-year projection period	−0.12
Total effect of recommendations	+0.21

Chapter 5: Projection Methods

As indicated in previous sections of this report, analyses of actuarial projections of the OASDI program typically focus on a relatively short list of key demographic and economic assumptions that could have a significant effect on those projections. Development of both short-range and long-range cost and revenue projections involves a complex methodology that incorporates a significant number of assumptions and formulas, many of which are heavily dependent on judgment. The Panel also reviewed this projection methodology.

The Panel reviewed various previously published actuarial studies and other documents produced by OACT and ORS staff and reviewed additional documents prepared in response to requests from the Panel. The Panel also listened to staff presentations describing the various models used for the short-range and long-range cost and revenue projections and discussed with staff various aspects of the methodology. Further, the Panel itself investigated, to the extent possible, the accuracy of some of SSA's assumptions. (See appendix E.)

The Panel concludes that:

- Overall, the projection methodology used appears to be reasonable and has no discernible pattern of bias;
- Methodology continually evolves as projections are prepared for various Trustees Reports and in response to requests for analysis of various proposed legislative changes; and
- The ability of staff to document the continually changing projection process and to engage in basic research that could enhance the process is severely constrained by lack of staff and by limited computer resources.

Based on the above conclusions, the Panel recommends that additional resources be allocated to an indepth analysis of the projection methodology.

The following sections provide additional detail on the review and the rationale for the Panel's conclusions and recommendations.

General Description and Evaluation of the Projection Methodology

OACT produces the short-range and long-range cost projections, and the long-range revenue projection. ORS produces the short-range revenue projection. The short-range and long-range cost projections are produced by different staff groups within OACT. Thus, development of the short-range and long-range cost and revenue projections requires the cooperation of several different groups, inherently including a system of checks and balances.

For both the short range and long range, the total taxable payroll is based on population projections, labor-force participation rates, and numerous other factors. Total tax revenue is developed by applying tax rate factors to the taxable payroll.

Benefit projections are based on the population projection, the percentage insured and eligible to receive benefits by benefit type, the percentage receiving by benefit type, and average benefit calculations by benefit type and beneficiary gender. Both the average benefit calculation for the short range and the average benefit calculation for the long range involve the construction of computer-simulated earnings histories and the calculation of average benefits for newly retired workers, although the simulation processes are not the same. Average benefits for other classes of beneficiaries are calculated as a function of the average benefits for retired or

disabled male and female workers. The average benefit for a given class of beneficiaries is multiplied by the number of beneficiaries to obtain the benefit cost projection for the class.

For both the short range and long range, low-cost and high-cost projections are developed by varying key assumptions.

In general, the use of different methodologies for the short range, as compared to the long range, in certain portions of the projections has resulted from both the different staffs involved and the different goals of the projections. The short-range projections attempt to extrapolate from recent data while long-range projections attempt to be more representative of ultimate assumed demographic and economic factors and thus are relatively less sensitive to variations in recent data. The staffs that develop the different portions of the projections work together to produce projections that are reasonably consistent and that have smooth transitions between the short range and long range. The short-range and long-range staffs continue to work to eliminate inappropriate differences in methodology.

It is difficult to compare the results of the projections with subsequent actual experience, even in the short range. Although it is possible to compare actual to expected values for individual assumptions, it is very difficult to quantify the impact of the methodology. This results from the extreme difficulty of quantifying separately the impact of legislated program changes that alter benefits or revenues from what was projected.

A further complication arises from subsequent revision of data used in preparing the projections; for example, the Commerce Department in one quarter often revises estimates of the gross national product (GNP) for a prior quarter and occasionally for many prior years. In addition, the complexity and evolutionary development of the projection methodology make it difficult simply to input the realized values of the variables to produce a projection that would have been made if the realized values had been assumed.

If the resources were available to allow the staff to complete projections and to incorporate changes in methods and legislation more quickly and on a more fully documented and routine basis, then more use of approximate comparisons of the results of a projection with subsequent actual experience would be possible. Such comparisons would provide an indication of the impact of the methodology on the accuracy of the results of the projection and enhance the ongoing process of improvement in the OASDI projections.

In considering the projection methodology, it is important to note that OACT is asked to project the costs of proposed legislative changes as well as to project the cost of the current law. This dual need suggests a two-part process: relatively simple approximations are used for repeated cost projections, while more complex methods are used as a starting point for analyzing the impact of proposed legislative changes. This dual use, as well as repeated use of the same methodology in successive projections, justifies continuing evaluation and improvement of methodology—even though the largest projection errors are likely to come from incorrect key assumptions, rather than methodological shortcuts.

The Panel did not find any bias that resulted in the projections' being consistently either too high or too low, and believes the overall methodology is reasonable. However, given the objectives of the review and the limited time available, the Panel did not complete the type of indepth review that is necessary to assess the impact of the methodology on the accuracy of the resulting projections.

Illustration of the Complexity of the Projection Methodology

The simulation process used to calculate the average benefit for newly retired workers in the long-range projection illustrates the complexity of the methodology. A simulation of earnings histories is required for the calculation of average indexed monthly earnings (AIME), which is necessary for the estimation of the average benefit. The AIME estimation process starts with a set of annual earnings figures. The figures are indexed to the year the worker reaches age 60 by the growth in average annual wages for the country. Earnings are not indexed for years after age 60. The length of the averaging period varies by year of birth until the system reaches maturity in 1991. For persons reaching 62 in 1991 or later (those born in 1929 or later) the averaging period is 35 years; that is, earnings from the 35 years of highest earning are used to compute benefits.

The simulation begins with a sample of actual earnings histories. This sample is modified to reflect ways in which future earnings histories are likely to differ from current actual earnings histories. For the 1989 Trustees Report, these modifications adjusted for:

- Differences in the legislated determination of the future maximum taxable earnings base compared with the erratic growth

of the base prior to the legislation;

- The decline in the fraction of low- and zero-earnings levels that have resulted from the increase in the percentage of the population covered by the OASDI system and increased employment by women as well as increases in the number of zero-earnings years at ages where the percent working is projected to decline; and
- The lengthening computation period.

An additional modification was included in the 1990 Trustees Report to reflect the trend toward an increased dispersion in earnings that has been experienced over the last 15 years. Other modifications resulting from this change in earnings dispersion may also be warranted for effects not explicitly incorporated in the simulation. For example, an adjustment may be appropriate for different earnings history and earnings dispersion patterns for males and females, and for a changing male/female mix.

Other factors also complicate the projection process. For example, a change in the level of immigration affects the average benefit by adding a set of workers who are unlikely to have the same earnings histories as the rest of the population (as has been recognized for other-than-legal immigrants in the 1990 Trustees Report projections). Note that the same net immigration numbers can occur with different levels of gross immigration and emigration. (Currently, emigration is projected at about one-fourth the level of gross immigration.) The same net immigration coming from different gross levels could imply different average benefit levels, since lifetime earnings histories (particularly the number of zero-earnings years) would differ. This could become especially important because future immigration levels may be very different from those of the recent past as international conditions or the desirability of immigration change.

Other examples of the possible need for different modifications for different assumption levels include:

- Different earnings histories due to the impact of different nominal wage growth rates on the unindexed portion of the earnings histories; and
- Different earnings dispersion due to different wage growth rates.

While the Panel has not completed an indepth analysis of any of these examples, it seems appropriate that resources be allocated to investigate the importance of such potential modifications to the simulation process.

The simulation of earnings histories was selected to illustrate the complexity of the projection methodology because it shows clearly some of the difficulties inherent in the projection process. However, it would be wrong to infer that the step of simulating earnings histories is the only, or necessarily the most significant, difficulty in the projection process, because there are considerable complexities elsewhere in the process.

Many of these complexities could benefit from a thorough evaluation, rather than the incremental process of gradual refinement necessitated by current resource limitations. In addition to investigating methods to validate the projection methodology and to evaluate alternative methodologies, research could also focus on development of possible simplifications in the methodology. Such simplifications would allow OACT and ORS to respond more quickly to requests from Congress and elsewhere for cost and revenue estimates. The Simplifications could be reviewed on a periodic basis to determine if they continue to be reasonable.

Recommended Analyses

The recommended specific analyses of the projection methodology include, but are not limited to, the following issues:

- Sensitivity of the results to alternative methodologies. Specific issues to be addressed include:
  - —determination of appropriate differences between the short-range and long-range methodologies, with special emphasis on the merging of the short-range and long-range projections (regular rotation of some of the OACT staff members between the short-range and long-range offices could be beneficial in this regard);
  - —determination of appropriate modifications to the process for simulating earnings histories;
  - —use of stochastic simulations to test the sensitivity of the projections to the projection methodology and to allow factors which could differ for the separate low- and high-cost projections;
  - —use of various approaches for integrating assumptions in the projection methodology (e.g., time series, cycles, trends); and
  - —determination of the appropriate balance between complexity and simplicity.
- Development of a systematic approach to allow comparison of projection results with subsequent actual experience; and

- Routinization and documentation sufficient to allow relatively easy determination of the reasonableness of the methodology and the results, and relatively easy identification of the areas that would most benefit from continued research.

Many of these issues have been addressed in the past, some more recently than others. As the methodology continues to evolve, such issues should continue to be reviewed. Ideally, an ongoing program of basic research should regularly address all such issues on a formalized basis. OACT's in-house capacity for making revenue and cost projections is severely limited. These recommendations are most likely best carried out primarily by external reviewers; supporting these evaluations and implementing any recommendations for change coming from this research will place additional demands on OACT and ORS. The Panel recommends that additional in-house resources be made available to OACT and ORS to support external reviews.

The need to train and brief new personnel or external reviewers implies that provision of additional in-house resources should precede additional evaluations. The Panel believes that the potential benefits are significant enough to justify the additional cost.

Chapter 6: Other Policy Issues

The Panel also considered a number of current policy issues for which the expertise of its members seemed relevant. The Panel's recommendations on these issues follow.

- Because of the complexity inherent in the OASDI system of taxes and benefits, changes in that system generally should be considered primarily on their own merit, rather than in the context of short-range budget debates.

The OASDI program is a complicated structure designed to serve as a stable income-maintenance system across generations. The relationship under the program between earnings over the worklife and benefits in retirement is complex and delicate. Apparently simple changes can have subtle and unintended effects. For example, proposals are sometimes made to make a simple, uniform delay in the cost-of-living adjustment (COLA). Surprisingly, such an apparently simple change can have quite different effects on successive cohorts as they become eligible for benefits. (See appendix G for an analysis of this problem.) This example, among others that could be cited, strongly indicates that proposed changes in the Social Security program should be carefully considered on their own merits and generally not in the context of the annual budget process. Stability is essential to maintain public confidence and to fulfill the social purposes of the system.

- The current investment policy for the OASI and DI Trust Funds seems reasonable.

Since their inception, the OASI and DI Trust Funds have been invested in Treasury securities. The Panel has considered proposals for alternative investments—such as State and local bonds or infrastructure—and finds no compelling reason at this time to change the current investment policy.

- The current statutory basis for an actuarial opinion should be continued and the statement of opinion should remain in the Trustees Report.

The Panel believes that it is in the public interest for the financial projections to be of high quality and objectivity. The current requirement for actuarial opinion is quite useful in assuring the public that the assumptions and methodologies meet appropriate actuarial professional standards.

- The automatic stabilizer in current law is of limited effectiveness. Further analysis of the role of stabilizers should be done.

Historically, whenever the OASDI system has been projected to go out of financial balance, legislative action has been necessary. The Social Security Amendments of 1983 included an automatic stabilizer to become effective if the trust fund ratio fell to 20 percent. The Trustees are mandated to recommend benefit or financing changes if the trust funds are projected to drop below a 20-percent ratio. If the stabilizer were activated, future cost-of-living increases would be based on the lower of the increase in prices or the increase in wages. The Panel has reviewed this provision and believes it would serve an important function if prices were rising faster than wages. Under those circumstances, beneficiaries would share the burden of sluggish economic growth. However, the Panel believes that:

—The 20-percent trigger is too low. The system would already be in crisis by the time the fund ratio dropped to such a low level.
—The current stabilizer would, as

noted, be effective if prices rose more rapidly than wages, but not in times of other kinds of economic distress.

- A group with appropriate expertise should be convened to review technical and communications issues related to SSA's Personal Earnings and Benefit Estimate Statements.

These statements, introduced in 1988, have been useful in providing the public with reasonable estimates of the Social Security benefits they can expect to receive. Congress has now mandated that these statements be distributed to all participants in the system by the year 2000. The Panel was unable to review fully the methodology used to estimate future benefits and suggests that an appropriate group, consisting of public information experts, as well as actuaries and economists, do so in the future.

- SSA should explore ways to communicate financial information about the system to the general public in a more understandable way.

The Trustees Report contains a wealth of information about the OASDI system and its financial condition. However, it has been written for a sophisticated audience that wants detailed information; it is an imposing document for those with a less comprehensive interest. Further, fairly brief assurances of the systems financial soundness are incorporated in the annual cost-of-living notices to beneficiaries. Some compromise between the complexity of the Trustees Report and the brevity of the sentence or so in the COLA notice is needed. Public understanding of this complex program is important for its continued public support. SSA should consider new and innovative means to promote understanding of the financing of the program.

- A new technical panel should be convened within the next 4 to 8 years.

The Social Security Act requires the appointment of an Advisory Council on Social Security every 4 years. The last such Council to request a review of actuarial assumptions and methods did so in 1978. A new panel should be convened before another 12 years pass. The accuracy of SSA's projections will be critical during this coming decade with its projected trust fund buildup and the related issues about the appropriate means of funding the system (on a pay-as-you-go or partial reserve funding method). Questions of how to report and reflect the changing circumstances of the system are inevitable. The advice of another panel of actuaries and economists could be most helpful during this period.