STUDY BY THE STAFF OF THE U.S.

General Accounting Office

Social Security Actuarial Projections

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PREFACE

This U.S. General Accounting Office Staff Study explores some of the reasons cited as to why the Social Security Administration's (SSA's) actuarial projections over the past decade did not forecast the financial status of the Old-Age, Survivors, and Disability Insurance (OASDI) trust funds more accurately. The study focuses on the integrity of three key factors that can significantly affect the actuarial projections: (1) the demographic and economic assumptions; (2) the actuarial methods; and (3) the actuaries' professional independence.

We conducted an extensive literature search and obtained testimonial evidence from persons in the fields of actuarial science, economics, and social insurance policy. We also obtained information from 389 randomly selected Fellows of the Society of Actuaries residing in the United States who felt they were qualified to respond to our questionnaire, which encompassed the key factors noted above.

Much of the information that we gathered was highly subjective and represented the personal views of those we questioned. As might be expected, the experts did not always agree on some issues regarding the accuracy of the projections.

The accuracy of long-range (75-year) actuarial projections can best be measured either after 75 years have elapsed or a substantial portion of it. In the interim, one can only compare the current estimates to previous estimates and analyze the sources of change from one period to the other. This we have done for SSA estimates made from 1972 to 1981.

The study highlights some of the key factors affecting actuarial projections and presents the views of a cross-section of the actuarial profession.

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C o n t e n t s

ABBREVIATIONS

CPI   Consumer Price Index
FICA   Federal Insurance Contribution Act
FSA   Fellow of the Society of Actuaries
GAO   General Accounting Office
OASDI   Old-Age, Survivors, and Disability Insurance
SSA   Social Security Administration

GLOSSARY

Actuarial Balance   - The difference between the
                average rate of FICA
                taxes, and the average rate
                of program costs.

Trust Fund Balances - The amount of assets currently
                available to the trust fund for
                operations.

Taxable Payroll   - The taxable payroll consists of
                total yearly earnings which are
                subject to Social Security taxes,
                including deemed wages based on
                military service.

SUMMARY

This study examines past SSA actuarial projections of the future long-range (75 years) financial status of the OASDI trust funds and presents the views of a cross-section of actuaries on the methods and assumptions used in measuring the status of the funds. The study focuses on three factors which can significantly affect the integrity of the projections: (1) the assumptions that the actuaries make regarding the future behavior of key demographic and economic factors; (2) the actuarial methods that the actuaries choose to make the projections; and (3) the degree of professional independence that the actuaries are able to exercise in making demographic and economic assumptions, and selecting the actuarial methodology.

The empirical evidence we gathered could neither prove nor disprove that (1) the demographic and economic assumptions SSA made were always reasonable; and (2) the lack of actuarial independence significantly affected the projections. However, the majority opinion among the Chief Actuaries, economists, and Fellows of the Society of Actuaries (FSAs) covered in the study was that SSA's demographic and economic assumptions were generally too optimistic from 1973 through 1982 and that more actuarial independence was needed. Most of them said they believed that SSA's actuarial methodology was appropriate for evaluating a public insurance program.

The law requires that the Board of Trustees, (Secretaries of Treasury, Labor, and Health and Human Services) prepare an annual report to the Congress on the current financial operations of social security programs and their projected status into the future. It is expected that this report gives as accurate a picture as possible of the Trust Fund's status over the next 75 years.

There are, however, no criteria for what constitutes an acceptable variance when making projections. Consequently, when actual experience differs from projections previously made, there is no clear guide for measuring whether the differences are "acceptable."

Because no such guide exists, an assessment of the quality of past projections must be limited to determining whether differences between actual experience and what was forecast resulted from factors that could not reasonably have been perceived, or whether they resulted from shortcomings in the preparation of the estimates.

Our analysis shows that SSA adjusted its projections each year from 1973 to 1982, with each successive projection generally showing an increased actuarial deficit.[1] In other words, the previous year's long-range projection had, based on the new assumptions, underestimated the program's cost or overestimated the income. The 1973 long-range projection forecast an actuarial surplus of 1.04 percent of taxable payroll. By 1978 the long-range projection forecast an actuarial deficit of -8.2 percent of taxable payroll. This is a change in the projected actuarial balance by 9.24 percent of taxable payroll, which amounts to trillions of dollars over a 75-year projection.

Most of the volatility in the actuarial projections appear to have been caused by the interaction between the automatic benefit increases, tied to cost-of-living increases, and the economy's unfavorable performance. The automatic benefit increase, enacted in 1972, tied the cost of paying benefits directly to cost-of-living increases. Thus, when the cost of living increased as indicated by the consumer price index (CPI), an increase in benefits, and in turn, program cost followed automatically. These program costs increased faster than revenues from taxes on earnings and therefore increased the trust fund deficits. As the economy became more erratic, the deficits become more difficult to forecast.

Legislation which should make future projections less sensitive to changing economic factors was passed in the 1977 and 1983 amendments to the Social Security Act. The 1977 Amendments minimized the effects of inflationary wages during the workers' recent years of employment by decoupling the computation of initial benefits from the effects of cost of living increases and computing them on the basis of average monthly indexed earnings, rather than on average monthly earnings. The 1983 Amendments provided that the automatic benefit increases be based on either wages or prices, whichever is lower, when the trust funds' balances fall below specified levels, thus keeping the average rate of increase in program costs equal to or less than the average rate of increase in wages subject to Social Security taxes.

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[1]From 1973 to 1980, three sets of projections were shown in the Trustees' report. One set was designated "optimistic", another "pessimistic", and third "intermediate". Beginning with the 1981 report, two alternative sets of intermediate projections were prepared sharing the same demographic assumptions but with one reflecting a more robust economic expansion than the other. For the comparisons made in this study, we used the intermediate projections based on less robust economic expansion.

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A STUDY OF SSA'S ACTUARIAL PROJECTIONS

The law requires the Board of Trustees[1] to make annual reports to the Congress on the financial operations and actuarial status of the Old-Age, Survivors, and Disability Insurance (OASDI) trust funds. These funds operate on pay-as-you-go financing. Their reserves are generally small (about $25 billion) when compared to current liabilities (about $160 billion in 1982).

The OASDI programs' viability, therefore, depends on maintaining a sound balance between income from FICA taxes and outgo for benefits. Accordingly, both income and outgo require continuous monitoring and, when necessary to ensure trust fund viability, adjusting the levels of benefits or taxes. The Congress has traditionally used actuarial estimates from the Trustees' reports as one basis for adjusting the levels of benefits or taxes.

SSA'S ACTUARIAL COST PROJECTIONS

The Office of the Actuary is a component of SSA and its principal functions include providing the Board of Trustees with statements of operations and actuarial projections on the financial status of the OASDI programs. This office is staffed with a Chief Actuary, staff actuaries, and management and support personnel.

The Chief Actuary is responsible to the Commissioner, SSA, but the actuarial assumptions and methods used and projections prepared for the Trustees' Annual Reports are subject to the Board of Trustees' approval. In the Trustees' reports for fiscal years 1981 through 1983, however, the Chief Actuary voluntarily included a Statement of Actuarial Opinion:

> "It is my opinion (1) that the techniques and methodology used herein in evaluating the actuarial status of the Old-Age and Survivors Insurance and the Disability Insurance Trust Funds are generally accepted within the actuarial profession; and (2) the assumptions used and the resulting cost estimates are, in the aggregate, reasonable for the purposes for which they are intended, as described in the body of this

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[1]The Board of Trustees consists of the Secretaries of the Treasury, Labor, and Health and Human Services; the Commissioner, SSA serves as Secretary of the Board of Trustees.

report, taking into consideration the experience and
expectations of the program."[2]

SSA's actuarial projections contain 75-year estimates[3] of
the financial operations and status of the OASDI trust funds.
These are not precise predictions, but estimates which indicate
the trend and general range of future costs under certain condi-
tions. The true income and outgo depend on mortality, fertil-
ity, unemployment, inflation, and other demographic and economic
factors.[4] Demographic factors affect the number of people pay-
ing Social Security taxes and receiving benefits, while economic
factors affect the levels of these people's wages and Social
Security benefits.

Our study focused on three areas that affect the long-range
projections--actuarial assumptions, actuarial independence, and
actuarial methods, concentrating on the annual projections made
during the period 1973 to 1982.

Actuarial Assumptions

SSA's long-range actuarial cost projections, contained in
the Trustees' annual reports, changed significantly over the
years 1973 to 1982. The 1973 projections forecast that the
average rate of income would exceed the average rate of outgo
by 1.04 percent of taxable payroll for the next 75 years
(1973-2047). However, the 1974 projections forecast that the
outgo of funds would exceed the income by 0.51 percent of tax-
able payroll. The actuarial deficit increased with each new
projection from 1973 to 1978, when it peaked at -8.2 percent of
payroll.

Table 1 shows the actuarial balances of the OASDI trust
funds at the beginning and the end of fiscal years 1973 through
1982 and what caused the balance to change each year. The
balances are shown as average percentages of taxable income for
the next 75 years. While the table lists only the first year of
each 75-year projection, it shows the average balance for the

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[2]Such a statement is now required by law--the Social Security
Amendments of 1983.

[3]The Trustees' reports also contain 5- and 25-year projections,
but this study focused on the long-range (75-year) projections.

[4]Subsequent changes in legislation also affect the projections,
and they are revised when new laws are enacted.

entire 75 years. The balances show a downward (or an increasing
deficit) trend from 1973 to 1978. The major reason for the
changes during the period was the actuaries' changes to prior
assumptions about the behavior of demographic and economic
factors.

We compared the actual rates of increase for four key
economic factors--(1) the consumer price index, (2) average
wages, (3) average real wages (average wages less consumer price
increases), and (4) unemployment--to the rates SSA actuaries had
used to develop the actuarial projections (1973 through 1981).
The results of these comparisons are in appendix II. Our
analysis shows that the actual CPI and unemployment rates were
higher than SSA's estimates and the average wage increases were
lower, thereby causing the actuarial projections to understate
benefit costs and overstate trust fund revenues.

The increase in CPI increased program cost and, when the
average wage increase did not keep up with price increases, it
caused a negative real wage growth indicated by the difference
between price-increase and wage increases, thus causing an
unfavorable impact on the the projections. Finally, the higher
than projected unemployment had a direct impact on the income
side of the projections because fewer people were working than
expected and, therefore, less tax revenues were received.

A major factor which affected the projections was the
automatic benefit-increase provision. This provision, enacted
in 1972, coupled benefit increases to annual increases in the
CPI. This coupling not only allowed current benefits to in-
crease but future benefits as well. The OASDI program cost, for
the first time, was tied to cost of living increases, but tax-
able wages to pay them were not. Consequently, when the CPI
began increasing rapidly in the 1970s, outpacing the increases
in taxable wages, this resulted in an erosion of trust fund
balances and an increase in actuarial deficits.

Most of the economists, former SSA Chief Actuaries, and
private sector actuaries that we interviewed said that the
assumptions SSA used in 1973 were reasonable at the time, and
that they would not have projected the extent of the unfavorable
economic conditions that occurred later in the 1970s and early
1980s. Some of the experts we talked to held that it was rea-
sonable for SSA to assume that the economic conditions would
soon improve and, in retrospect, the degree of pessimism that
would have been required in 1973 to produce an estimate that
matched what the trust funds would need over the next 75 years
would not have been believable or acceptable by most experts.

Table 1
Sources of Changes in the OASDI
Long-Range Actuarial Balance
(% of taxable income for next 75 years)

Year of Trustees' Report	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Total
Actuarial Balance-Start of year	+1.04	-0.51	-2.98	-5.32	-7.96	-8.20	-1.40	-1.20	-1.52	-1.82	-0.51
Causes of changes:	(1)										
Changes in Assumptions											
Economic		-0.19	-1.95	-1.24	+0.12	+0.14	-0.06	-0.17	-0.29	-0.06	-3.70
Demographic		-2.22	-0.49	-1.02	-0.24	-0.02	+0.04	-0.33	+0.13	+0.13	-4.02
Total		-2.41	-2.44	-2.26	-0.12	+0.12	-0.02	-0.50	-0.16	+0.07	-7.72
Changes in Legislation											
Expenditure reductions						+5.56		+0.20	+0.01	+0.19	+5.96
Scheduled tax increases		+0.25				+1.18					+1.43
Mandatory retirement						+0.08					+0.08
Average wage indexing series							-0.02				-0.02
Total		+0.25				+6.82	-0.02	+0.20	+0.01	+0.19	+7.45
Actuarial Methods											
Moving valuation date ahead one year (see p. 6)		-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.35
Change in methods						+0.01	+0.17	+0.15			+0.33
Total		-0.02	-0.03	-0.03	-0.04	-0.03	+0.13	+0.11	-0.05	-0.05	-0.02
Miscellaneous Sources											
Trust fund cost item					+0.13						+0.13
Court ruling changing male dependency requirements					-0.12						-0.12
Other factors		-0.28	+0.13	-0.48	+0.04	-0.11	+0.11	-0.13	-0.10	-0.21	-1.03
Total		-0.28	+0.13	-0.35	-0.08	-0.11	+0.11	-0.13	-0.10	-0.21	-1.02
Actuarial Balance-End of year		-0.51	-2.98	-5.32	-7.96	-8.20	-1.40	-1.20	-1.52	-1.82	-1.82

Note: (1) The 1973 Trustees' Report did not provide details of the sources of the change in actuarial balance. However, the narrative stated that the disability rate assumptions were the principal source of the change.

However, most of them expressed the opinion that SSA actuaries should have recognized the trend of eroding economic conditions that were occurring after 1973 and responded with less optimistic assumptions.

Actuarial Independence

Although the Office of the Actuary is a part of SSA, the actuarial methods and assumptions it uses are subject to the Board of Trustees' approval. We explored the questions of whether any lack of independence had affected the actuaries' projections of the future status of the trust funds and whether the Chief Actuary should be independent of the Board of Trustees. We discussed these questions with the present and three past Chief Actuaries of SSA, and on the latter issue questioned 389 FSAs. We did not find any documented or corroborative evidence that past projections had been affected by a lack of actuarial independence although we were told that in at least one instance it did happen. We were told that although some pressures might exist at times, they can be constructive, resulting in closer analysis of the issues in question. We found that most FSAs preferred more independence for the Chief Actuary.

Two of the four SSA Chief Actuaries we questioned said that they had sufficient independence to exercise professional judgment in selecting the methods and assumptions used in the projections, while the other two preferred more independence. One former Chief Actuary who preferred more independence said that he had adjusted the fertility rate from 2.1 (births per female) to 1.9 before developing the projections for the 1976 Trustees' Reports. He felt that continuing high inflation, increasing educational levels, improved birth control methods and use, and increased career opportunities for women had begun a trend toward fewer births per female. In 1977, however, the Trustees required him to use a 2.1 fertility rate when developing the projections for the 1977 Trustees' Reports. This, in turn, reduced the projected actuarial deficit by .84 percent of payroll over 75 years. From 1977 to 1982, the fertility rate used in the Trustees' Reports remained unchanged. However, in 1983 it was adjusted to its current rate of 2.0.

Sixty-two percent of the FSAs we surveyed said that the chief actuary should report independently to the Congress on the future status of the Social Security trust funds. Sixty-eight percent said that if the Board of Trustees retained ultimate responsibility for establishing methods and assumptions, the Chief Actuary should certify or issue disclaimers to the methods

and assumptions used. As stated on page 5, the Chief Actuary
has certified the actuarial methods, techniques, and assumptions
used in each report since 1981.

Actuarial Methods

     Actuarial methods are those procedures by which future eco-
nomic and demographic assumptions, wages, taxes, and benefits
are correlated and calculated to project the financial status of
the trust funds. Accordingly, the projections are affected by
the methods and techniques that the actuary uses, different
methods and techniques can change the actuarial results. How-
ever, SSA's actuarial methods and techniques were generally ap-
propriate for a public insurance system, based on our assessment
and the opinions of the FSAs we surveyed.

     We did, however, note that SSA's 75-year open-group moving
valuation method has caused the actuarial deficits to increase
0.4 percent of taxable payroll from 1974 to 1982 for the next 75
years, as a result of the moving valuation date. Each year the
valuation date is moved forward one year by adding a new 75th
year at the end and deleting the first year of the previous
period. When the projected deficit for the new year is larger
than that of the deleted year, the actuarial deficit will in-
crease. Such was the case in the OASDI actuarial projections
from 1974 to 1982 (see table 1 Actuarial Methods). Only about
25 percent of the FSAs who responded to our questionnaire
thought this valuation methodology significantly affected SSA's
definition of actuarial balance. Nonetheless, this problem
could easily be corrected by evaluating the program to perpetu-
ity on a present-value basis, as SSA has done in the past,
rather than using the 75-year moving valuation method.

COMPARISON OF SSA'S ECONOMIC FORECAST TO ACTUAL RESULTS

FOR FORECAST YEARS 1973 TO 1981

ANNUAL PERCENTAGE RATE OF

INCREASE IN CONSUMER.PRICE INDEX

First year of forecast					Second year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	6.2	4.5	1.7		1973	11.0	3.0	8.0
1974	11.0	9.1	1.9		1974	9.1	5.7	3.4
1975	9.1	9.0	0.1		1975	5.8	6.6	-0.8
1976	5.8	6.3	-0.5		1976	6.5	6.0	0.5
1977	6.5	6.0	0.5		1977	7.6	5.4	2.2
1978	7.6	6.1	1.5		1978	11.3	6.1	5.2
1979	11.3	9.4	1.9		1979	13.5	7.4	6.1
1980	13.5	14.2	-0.7		1980	10.3	9.7	0.6
1981	10.3	11.1	-0.8					
Total			5.6		Total			25.2
No. of years			9		No. of years			8
Average difference			0.6		Average difference			3.1

Third year of forecast					Fourth year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	9.1	2.8	6.3		1973	5.8	2.8	3.0
1974	5.8	4.5	1.3		1974	6.5	3.2	3.3
1975	6.5	6.5	0.0		1975	7.6	5.7	1.9
1976	7.6	6.0	1.6		1976	11.3	5.5	5.8
1977	11.3	5.3	6.0		1977	13.5	4.7	8.8
1978	13.5	5.7	7.8		1978	10.3	5.2	5.1
1979	10.3	6.6	3.7					
Total			26.7		Total			27.9
No. of years			7		No. of years			6
Average difference			3.8		Average difference			4.6

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	Fifth year of forecast		
Report year	Actual	Forecast	Difference
1973	6.5	2.8	3.7
1974	7.6	3.0	4.6
1975	11.3	4.6	6.7
1976	13.5	5.0	8.5
1977	10.3	4.1	6.2
Total			29.7
No. of years			5
Average difference			5.9

	Sixth year of forecast		
Report year	Actual	Forecast	Difference
1973	7.6	2.75	4.85
1974	11.3	3.0	8.3
1975	13.5	4.0	9.5
1976	10.3	4.5	5.8
Total			28.45
No. of years			4
Average difference			7.1

	Seventh year of forecast		
Report year	Actual	Forecast	Difference
1973	11.3	2.75	8.55
1974	13.5	3.0	10.5
1975	10.3	4.0	6.3
Total			25.35
No. of years			3
Average difference			8.4

	Eighth year of forecast		
Report year	Actual	Forecast	Difference
1973	13.5	2.75	10.75
1974	10.3	3.0	7.3
Total			18.05
No. of years			2
Average difference			9.0

	Ninth year of forecast		
Report year	Actual	Forecast	Difference
1973	10.3	2.75	7.55

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ANNUAL PERCENTAGE RATE OF INCREASE-AVERAGE WAGES

First year of forecast					Second year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	6.9	7.1	-0.2		1973	7.4	6.9	0.5
1974	7.4	7.9	-0.5		1974	6.6	8.5	-1.9
1975	6.6	7.2	-0.6		1975	7.9	9.0	-1.1
1976	7.9	7.7	0.2		1976	7.3	8.5	-1.2
1977	7.3	8.4	-1.1		1977	8.0	8.1	-0.1
1978	8.0	7.2	0.8		1978	9.3	7.9	1.4
1979	9.3	8.3	1.0		1979	8.5	8.0	0.5
1980	8.5	9.6	-1.1		1980	8.6	9.5	-0.9
1981	8.6	10.2	-1.6					
					Total			-2.8
Total			-3.1		No. of years			8
No. of years			9		Average difference			-0.4
Average difference			-0.3					

Third year of forecast					Fourth year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	6.6	6.3	0.3		1973	7.9	5.2	2.7
1974	7.9	8.0	-0.1		1974	7.3	7.6	-0.3
1975	7.3	11.0	-3.7		1975	8.0	8.8	-0.8
1976	8.0	9.4	-1.4		1976	9.3	8.5	0.8
1977	9.3	7.8	1.5		1977	8.5	7.1	1.4
1978	8.5	7.9	0.6		1978	8.6	7.4	1.2
1979	8.6	9.1	-0.5					
					Total			5.0
Total			-3.3		No. of years			6
No. of years			7		Average difference			0.8
Average difference			-0.5					

Fifth year of forecast

Report year	Actual	Forecast	Difference
1973	7.3	5.2	2.1
1974	8.0	5.5	2.5
1975	9.3	7.7	1.6
1976	8.5	7.7	0.8
1977	8.6	6.4	2.2
Total			9.2
No. of years			5
Average difference			1.8

Sixth year of forecast

Report year	Actual	Forecast	Difference
1973	8.0	5.0	3.0
1974	9.3	5.5	3.8
1975	8.5	7.0	1.5
1976	8.6	6.7	1.9
Total			10.2
No. of years			4
Average difference			2.5

Seventh year of forecast

Report year	Actual	Forecast	Difference
1973	9.3	5.0	4.3
1974	8.5	5.5	3.0
1975	8.6	6.0	2.6
Total			9.9
No. of years			3
Average difference			3.3

Eighth year of forecast

Report year	Actual	Forecast	Difference
1973	8.5	5.0	3.5
1974	8.6	5.0	3.6
Total			7.1
No. of years			2
Average difference			3.5

Ninth year of forecast

Report year	Actual	Forecast	Difference
1973	8.6	5.0	3.6

ANNUAL PERCENTAGE RATE OF INCREASE IN REAL WAGES

(Increase in Average Wages Minus Increases in CPI)

First year of forecast				Second year of forecast			
Report year	Actual	Forecast	Difference	Report year	Actual	Forecast	Difference
1973	0.7	2.6	-1.9	1973	-3.6	3.9	-7.5
1974	-3.6	-1.2	-2.4	1974	-2.5	2.8	-5.3
1975	-2.5	-1.8	-0.7	1975	2.1	2.4	-0.3
1976	2.1	1.4	0.7	1976	0.8	2.5	-1.7
1977	0.8	2.4	-1.6	1977	0.4	2.7	-2.3
1978	0.4	1.1	-0.7	1978	-2.0	1.8	-3.8
1979	-2.0	-1.1	-0.9	1979	-5.0	0.6	-5.6
1980	-5.0	-4.6	-0.4	1980	-1.7	-0.2	-1.5
1981	-1.7	-0.9	-0.8				
Total			-8.7	Total			-28.0
No. of years			9	No. of years			8
Average difference			-1.0	Average difference			-3.5

Third year of forecast				Fourth year of forecast			
Report year	Actual	Forecast	Difference	Report year	Actual	Forecast	Difference
1973	-2.5	3.5	-6.0	1973	2.1	2.4	-0.3
1974	2.1	3.5	-1.4	1974	0.8	4.4	-3.6
1975	0.8	4.5	-3.7	1975	0.4	3.1	-2.7
1976	0.4	3.4	-3.0	1976	-2.0	3.0	-5.0
1977	-2.0	2.5	-4.5	1977	-5.0	2.4	-7.4
1978	-5.0	2.2	-7.2	1978	-1.7	2.2	-3.9
1979	-1.7	2.5	-4.2				
Total			-30.0	Total			-22.9
No. of years			7	No. of years			6
Average difference			-4.3	Average difference			-3.8

Fifth year of forecast

Report year	Actual	Forecast	Difference
1973	0.8	2.4	-1.6
1974	0.4	2.5	-2.1
1975	-2.0	3.1	-5.1
1976	-5.0	2.7	-7.7
1977	-1.7	2.3	-4.0
Total			-20.5
No. of years			5
Average difference			-4.1

Sixth year of forecast

Report year	Actual	Forecast	Difference
1973	0.4	2.25	-1.85
1974	-2.0	2.5	-4.5
1975	-5.0	3.0	-8.0
1976	-1.7	2.2	-3.9
Total			-18.25
No. of years			4
Average difference			-4.6

Seventh year of forecast

Report year	Actual	Forecast	Difference
1973	-2.0	2.25	-4.25
1974	-5.0	2.5	-7.5
1975	-1.7	2.0	-3.7
Total			-15.45
No. of years			3
Average difference			-5.1

Eighth year of forecast

Report year	Actual	Forecast	Difference
1973	-5.0	2.25	-7.25
1974	-1.7	2.0	-3.7
Total			-10.95
No. of years			2
Average difference			-5.5

Ninth year of forecast

Report year	Actual	Forecast	Difference
1973	-1.7	2.25	-3.95

ANNUAL PERCENTAGE RATE OF AVERAGE UNEMPLOYMENT

First year of forecast					Second year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	4.9	4.7	0.2		1973	5.6	4.5	1.1
1974	5.6	5.8	-0.2		1974	8.5	5.8	2.7
1975	8.5	8.8	-0.3		1975	7.7	8.0	-0.3
1976	7.7	7.7	0.0		1976	7.0	6.9	0.1
1977	7.0	7.1	-0.1		1977	6.0	6.3	-0.3
1978	6.0	6.3	-0.3		1978	5.8	5.9	-0.1
1979	5.8	6.0	-0.2		1979	7.2	6.2	1.0
1980	7.2	7.2	0.0		1980	7.6	7.9	-0.3
1981	7.6	7.8	-0.2					
					Total			3.9
Total			-1.1		No. of years			8
No. of years			9		Average difference			0.5
Average difference			-0.1					

Third year of forecast					Fourth year of forecast			
Report year	Actual	Forecast	Difference		Report year	Actual	Forecast	Difference
1973	8.5	4.5	4.0		1973	7.7	4.5	3.2
1974	7.7	4.8	2.9		1974	7.0	4.5	2.5
1975	7.0	7.0	0.0		1975	6.0	6.2	-0.2
1976	6.0	6.6	-0.6		1976	5.8	6.2	-0.4
1977	5.8	5.7	0.1		1977	7.2	5.2	2.0
1978	7.2	5.4	1.8		1978	7.6	5.0	2.6
1979	7.6	6.0	1.6					
					Total			9.7
Total			9.8		No. of years			6
No. of years			7		Average difference			1.6
Average difference			1.4					

Fifth year of forecast ||||	Sixth year of forecast			
Report year	Actual	Forecast	Difference
1973	7.0	4.5	2.5
1974	6.0	4.5	1.5
1975	5.8	5.4	0.4
1976	7.2	5.7	1.5
1977	7.6	5.0	2.6
Total			8.5
No. of years			5
Average difference			1.7

Sixth year of forecast			
Report year	Actual	Forecast	Difference
1973	6.0	4.5	1.5
1974	5.8	4.5	1.3
1975	7.2	4.8	2.4
1976	7.6	5.2	2.4
Total			7.6
No. of years			4
Average difference			1.9

Seventh year of forecast			
Report year	Actual	Forecast	Difference
1973	5.8	4.5	1.3
1974	7.2	4.5	2.7
1975	7.6	5.0	2.6
Total			6.6
No. of years			3
Average difference			2.2

Eighth year of forecast			
Report year	Actual	Forecast	Difference
1973	7.2	4.5	2.7
1974	7.6	5.0	2.6
Total			5.3
No. of years			2
Average difference			2.6

Ninth year of forecast			
Report year	Actual	Forecast	Difference
1973	7.6	4.5	3.1

FSA ACTUARIAL OPINIONS

Our survey of FSAs conducted in mid-1982 disclosed the following opinions on the methods and assumptions used in measuring the status of the Social Security Trust Funds:

(1)   The 1981 (and 1982) ultimate assumed rates of fertility and increase in real covered earnings were too high (i.e., too optimistic).

(2)   It is preferable to have a moderate degree of conservatism (i.e., pessimism) in the assumptions, particularly in the short range.

(3)   The OASI and DI Trust Funds should have a balance of more than six months of expenditures. The level preferred by more respondents than any other is twelve months.

(4)   The actuaries are somewhat concerned about a quirk in the method of calculating actuarial balance which causes the long-range deficit to increase slightly each year as the valuation date is moved forward. However, only one-fourth of the actuaries thought ·this problem severe enough to invalidate the definition of actuarial balance to a great extent.

(5)   The actuaries believe the use of scheduled future tax increases in the calculation of actuarial balance is acceptable if the ultimate tax rates are not unreasonably high.

(6)   Just over half of the respondents would measure the actuarial balance of the HI Trust Fund over the same period of time as the OASI and DI Trust Funds. About one-third would prefer to continue to measure the OASI and DI Trust Funds for seventy-five years. Another one-third would continue to measure the HI Trust Fund for twenty-five years. However, those in favor of change would tend to decrease the period for OASI and DI, and to increase the period for HI.

(7)   The actuaries are in favor of greater independence for the Chief Actuaries of SSA and HCFA. They favored requiring the Chief Actuaries to either verify the Trustee Reports (as was done voluntarily in 1981, 1982, and 1983) or report independently on the actuarial status of the funds. The actuaries were split as to

the desirability of having a Government Actuary who
would be responsible for reporting the status of all
Federal pension and social insurance funds.

Survey Methodology

We selected a random sample of 500 of 3,380 FSAs with U.S.
mailing addresses in the 1981 Society of Actuaries Year Book.
Five of the selected actuaries were reported to be either dead
or too ill to respond. Of our adjusted sample of 495, 51 actu-
aries failed to respond and 55 others reported that they were
not qualified to answer the questions. Our analysis is based
upon the answers of the 389 remaining respondents who rated
themselves at least somewhat qualified to answer.

We analyzed the responses of the following subgroups and
found that their answers did not differ significantly from those
of the larger group of 389 actuaries.

--135 actuaries who either now specialize or during most of
   their careers have specialized in pension or social
   insurance work;

--109 actuaries who rated themselves well qualified or very
   well qualified to respond;

--61 actuaries who were in both of the above groups.

Personal Characteristics of 389 Respondents

Years worked as an actuary	Number	Percent	Adjusted percent
1 - 5	15	3.9	3.9
6 - 10	100	25.7	25.8
11 - 15	88	22.6	22.7
16 - 20	57	14.7	14.7
21 - 30	78	20.1	20.2
31 +	49	12.6	12.7
No response	2	0.5	-
	389	100.0[1]	100.0

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[1]Percentages in all tables may not add due to rounding.

Current work status	Number	Percent	Adjusted percent
Full-time actuary	315	81.0	81.2
Part-time actuary	24	6.2	6.2
Retired	26	6.7	6.7
Non-actuary	23	5.9	5.9
No response	1	0.3	-
	389	100.0	100.0

Type of work now	Number	Percent	Adjusted percent
Individual life	84	21.6	23.1
Group life	3	0.8	0.8
Individual health	11	2.8	3.0
Group health	30	7.7	8.2
Individual annuity	6	1.5	1.6
Pension	123	31.6	33.8
Education	2	0.5	0.5
Generalist	55	14.1	15.1
Other	50	12.9	13.7
No response	25	6.4	-
	389	100.0	100.0

Type of work most of career	Number	Percent	Adjusted percent
Individual life	133	34.2	34.4
Group life	5	1.3	1.3
Individual health	15	3.9	3.9
Group health	31	8.0	8.0
Individual annuity	4	1.0	1.0
Pension	113	29.0	29.2
Education	2	0.5	0.5
Generalist	42	10.8	10.9
Other	42	10.8	10.9
No response	2	0.5	-
	389	100.0	100.0

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Type of employer now	Number	Percent	Adjusted percent
Life Ins. Co.	213	54.8	58.7
Health Ins. Co.	10	2.6	2.8
Casualty Ins. Co.	7	1.8	1.9
Consulting firm	110	28.3	30.3
Other company	3	0.8	0.8
State or local government	4	1.0	1.1
Federal Government	3	0.8	0.8
Other	13	3.3	3.6
No answer	26	6.7	-
	389	100.0	100.0

Type of employer most of career	Number	Percent	Adjusted percent
Life Ins. Co.	275	70.7	72.0
Health Ins. Co.	8	2.1	2.1
Casualty Ins. Co.	2	0.5	0.5
Consulting firm	78	20.1	20.4
Other company	1	0.3	0.3
State or local government	2	0.5	0.5
Federal Government	3	0.8	0.8
Other	13	3.3	3.4
No answer	7	1.8	-
	389	100.0	100.0

Assumptions Used in 1981 Trustees Reports

We asked our sample of actuaries their opinions of the ultimate rates of three key assumptions in the 1981 Trustees' Reports, the period of time required to reach these ultimate rates and the extent of conservatism which should be used in setting assumptions.

Best ultimate inflation rate	Number	Percent	Adjusted percent
2% or less	3	0.8	0.8
2% < rate < 4%	19	4.9	4.9
4% (rate used in Trustees' report	88	22.6	22.9
4% < rate < 7%	227	58.4	59.1
7% or more	47	12.1	12.2
No answer	5	1.3	-
	389	100.0	100.0

Period to reach ultimate inflation rate	Number	Percent	Adjusted percent
5 years or less	23	5.9	6.0
6 - 10 years (10 used in Trustees' report	252	64.8	65.8
11 - 15 years	81	20.8	21.1
16 - 20 years	22	5.7	5.7
More than 20 years	5	1.3	1.3
No answer	6	1.5	-
	389	100.0	100.0

Best ultimate rate of increase in real covered earnings	Number	Percent	Adjusted percent
2.5% or more	4	1.0	1.0
1.5% < rate < 2.5%	40	10.3	10.4
1.5% (rate used in Trustees' report)	112	28.8	29.2
0.5% < rate < 1.5%	172	44.2	44.9
0.5% or less	55	14.1	14.4
No answer	6	1.5	-
	389	100.0	100.0

Period used to reach ultimate rate	Number	Percent	Adjusted percent
5 years or less	28	7.2	7.3
6 - 10 years	186	47.8	48.6
11 - 15 years (15 years used in Trustees' report)	147	37.8	38.4
16 - 20 years	18	4.6	4.7
More than 20 years	4	1.0	1.0
No answer	6	1.5	-
	389	100.0	100.0

Best ultimate fertility rate (lifetime births per woman)	Number	Percent	Adjusted percent
2.4 or more	5	1.3	1.3
2.1 < rate < 2.4	11	2.8	2.9
2.1 (rate used in Trustees' reports)	128	32.9	33.5
1.7 < rate < 2.1	214	55.0	56.0
1.7 or less	24	6.2	6.3
No answer	7	1.8	-
	389	100.0	100.0

Period used to reach ultimate rate	Number	Percent	Adjusted percent
5 years or less	23	5.9	6.1
6 - 10 years	64	16.5	17.1
11 - 15 years	70	18.0	18.7
16 - 20 years	80	20.6	21.3
21 - 25 years (25 years used in Trustees' reports)	134	34.4	35.7
More than 25 years	4	1.0	1.1
No answer	14	3.6	-
	389	100.0	100.0

To what extent should the projections in the Trustees' reports include conservative assumptions in the short range?	Number	Percent	Adjusted percent
Very great extent	52	13.4	13.6
Great extent	107	27.5	28.0
Moderate extent	132	33.9	34.6
Some extent	67	17.2	17.5
Little or no extent	24	6.2	6.3
No answer	7	1.8	-
	389	100.0	100.0

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In the long range?	Number	Percent	Adjusted percent
Very great extent	27	6.9	7.0
Great extent	93	23.9	24.3
Moderate extent	158	40.6	41.3
Some extent	80	20.6	20.9
Little or no extent	25	6.4	6.5
No answer	6	1.5	-
	389	100.0	100.0

Methods Used to Measure Actuarial Balance

We asked several questions related to the methods of defining and calculating the status of the trust funds.

What should be the optimum size of the Old Age and Survivors Insurance Trust Funds in months of expenditures?

Optimum size	Number	Percent	Adjusted percent
3 or less	4	1.0	1.1
4 - 6	43	11.1	11.3
7 - 9	80	20.6	21.1
10 - 12	213	54.8	56.1
13 - 18	11	2.8	2.9
19 - 24	13	3.3	3.4
25 or more	16	4.1	4.2
No answer	9	2.3	-
	389	100.0	100.0

What should be the optimum size of the Disability Insurance Trust Fund in months of expenditures?

Optimum size	Number	Percent	Adjusted percent
3 or less	4	1.0	1.1
4 - 6	48	12.3	12.6
7 - 9	67	17.2	17.6
10 - 12	220	56.6	57.9
13 - 18	14	3.6	3.7
19 - 24	16	4.1	4.2
25 or more	11	2.8	2.9
No answer	9	2.3	-
	389	100.0	100.0

Each succeeding Trustees' report shows a small increase in the long-term deficit because of the change in valuation date. The long-term balance is calculated over a 75-year period. Each succeeding valuation has a new year added at the end of the previous valuation's first year deleted. Expenditures are expected to be much higher than scheduled taxes 75 years from now. Thus each succeeding valuation replaces a relatively favorable year with an unfavorable one--thereby increasing the deficit.

To what extent does this condition make the definition of actuarial balance inappropriate	Number	Percent	Adjusted percent
Very great extent	42	10.8	11.1
Great extent	51	13.1	13.5
Moderate extent	54	13.9	14.3
Some extent	90	23.1	23.8
Little or no extent	141	36.2	37.3
No answer	11	2.8	-
	389	100.0	100.0

The OASI and DI trust funds are considered to be in actuarial balance if the 75-year average of projected expenditures as a percent of payroll equals the average of the payroll tax rates, including scheduled increases provided by existing law.

Is the use of scheduled tax increases acceptable in the calculation of actuarial balance?	Number	Percent	Adjusted percent
Yes	71	18.3	18.4
Yes--if the ultimate rates do not exceed a reasonable level	223	57.3	57.8
No	64	16.5	16.6
Other answer	28	7.2	7.3
No answer	3	0.8	-
	389	100.0	100.0

What is the best method for measuring the status of the OASI and DI trust funds?	Number	Percent	Adjusted percent
Closed group	11	2.8	2.9
Open group - perpetuity	64	16.5	16.8
Open group - 75 years	128	32.9	33.5
Open group - 26 to 74 years	102	26.2	26.7
Open group - 25 years	48	12.3	12.6
Open group - less than 25 years	14	3.6	3.7
Other	15	3.9	3.9
No answer	7	1.8	-
	389	100.0	100.0

Of the HI trust fund?			
Closed group	7	1.8	1.8
Open group - perpetuity	43	11.1	11.3
Open group - 75 years	51	13.1	13.4
Open group - 26 to 74 years	79	20.3	20.7
Open group - 25 years	134	34.4	35.1
Open group - less than 25 years	56	14.4	14.7
Other	12	3.1	3.1
No answer	7	1.8	-
	389	100.0	100.0

Responsibilities of the Chief Actuary

At the time we prepared our questionnaire, the 1980
Trustees' Reports were the last that had been published. The
Trustees (three Cabinet officials) had the ultimate responsibil-
ity for approving the methods and assumptions used by the Chief
Actuaries in measuring the status of the trust funds. The 1981
and 1982 reports differed from the 1980 reports in that a second

intermediate set of economic assumptions more pessimistic than official Administration assumptions was added. The Chief Actuaries have certified the last two sets of Trustees' Reports. These changes have been done on a voluntary basis. They are not required by law and could thus be changed back to the more restrictive pre-1981 approach at a later date.

To what extent do you agree with the following statements on the responsibilities of the Chief Actuary?

The current (1980 reports) situation is acceptable. The Board of Trustees are responsible for the plans and therefore have the right to decide what to report.

Extent of agreement	Number	Percent	Adjusted percent
Strongly agree	11	2.8	2.9
Moderately agree	87	22.4	23.2
Undecided	33	8.5	8.8
Moderately disagree	143	36.8	38.1
Strongly disagree	101	26.0	26.9
No answer	14	3.6	-
	389	100.0	100.0

The Board of Trustees should have the ultimate responsibility for establishing methods and assumptions, but the Chief Actuaries should be given the responsibility to certify each report and to issue disclaimers in the report if they do not agree with the methods and assumptions.

Extent of agreement	Number	Percent	Adjusted percent
Strongly agree	133	34.2	35.6
Moderately agree	122	31.4	32.6
Undecided	20	5.1	5.3
Moderately disagree	66	17.0	17.6
Strongly disagree	33	8.5	8.8
No answer	15	3.9	-
	389	100.0	100.0

The Chief Actuaries should report independently to the Congress on the future status of the trust funds. The Board of Trustees could continue to report on the current operations and history of the funds.

Extent of agreement	Number	Percent	Adjusted percent
Strongly agree	118	30.3	31.1
Moderately agree	119	30.6	31.4
Undecided	47	12.1	12.4
Moderately disagree	70	18.0	18.5
Strongly disagree	25	6.4	6.6
No answer	10	2.6	-
	389	100.0	100.0

A Government Actuary should be appointed for an extended period of time. The actuary would be responsible for establishing methods and assumptions for reporting on all Federal social insurance and pension plans.

Extent of agreement	Number	Percent	Adjusted percent
Strongly agree	63	16.2	16.8
Moderately agree	87	22.4	23.2
Undecided	77	19.8	20.5
Moderately disagree	84	21.6	22.4
Strongly disagree	62	15.9	16.5
Other answer	2	0.5	0.6
No answer	14	3.6	-
	389	100.0	100.0

Self-rating of Qualification

At the end of our questionnaire we asked:

How well qualified do you feel you were to answer the questions?

Qualification rating	Number	Percent
Very well qualified	21	4.7
Well qualified	89	20.0
Moderately qualified	158	35.6
Somewhat qualified	121	27.3
Not qualified (excluded from analysis)	48	10.8
No answer (excluded from analysis)	7	1.6
	444	100.0

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